U.S. Fish & Wildlife Service

Water Resource Inventory and Assessment Appendices

Kanuti National Wildlife Refuge

March 2017

Glossary of Terms and Acronyms

AAC	Alaska Administrative Code
ACEC	Areas of Critical Environmental Concern
ACIA	Arctic Climate Impact Assessment
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
AHPS	Advanced Hydrologic Prediction Service
ANHP	Alaska National Heritage Program
ANILCA	Alaska National Interests Land Conservation Act
ANOVA	Analysis of Variance
APRFC	Alaska-Pacific River Forecast Center
AS	Alaska Statute
AWC	Anadromous Waters Catalogue
BLM	United States Bureau of Land Management
CCP	Comprehensive Conservation Plan
CFS	Cubic feet per second
COOP	Cooperative Observer Program
CWA	Clean Water Act
CYPA	Central Yukon Planning Area
CYRMP	Central Yukon Resource Management Plan
DEM	Digital Elevation Model
DIN	Dissolved Inorganic Nitrogen
DO	Dissolved Oxygen
DOC	Dissolved Organic Carbon

DOI	United States Department of the Interior
DON	Dissolved Organic Nitrogen
DOT	Department of Transportation
EPA	United States Environmental Protection Agency
ERDAS	Earth Resources Data Analysis System
FGDC	Federal Geographic Data Committee
GHCN	Global Historic Climate Network
GIS	Geospatial Information System
HADS	Hydrometeorological Automated Data System
HUC	Hydrologic Unit Code
IFSAR	Interferometric Synthetic Aperture Radar
I&M	Inventory and Monitoring
IPCC	Intergovernmental Panel on Climate Change
IOC	Issues of Concern
LAS	Land Administrative System for Alaska
LCC	Landscape Conservation Cooperatives
LOESS	Locally Estimated Scatterplot Smoothing
MWAT	Maximum Weekly Average Temperatures
MWMT	Maximum Weekly Maximum Temperature
NCDC	National Climate Data Center
NEPA	National Environmental Policy Act
NHD	National Hydrologic Dataset
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPS	United States Park Service
NRCS	National Resources Conservation Service

NSIDC	National Snow and Ice Data Center
NWI	National Wetlands Inventory
NWIS	National Water Information System
NWRS	National Wildlife Refuge System
NWQL	National Water Quality Laboratory
NWR	National Wildlife Refuge
NWS	National Weather Service
PDO	Pacific Decadal Oscillation
PNA	Pacific/North American teleconnection pattern
PPT	Parts per thousand
RAWS	Remote Automated Weather Stations
RCAT	Refuge Climate Analysis Tool
RHI	Region of Hydrologic Influence
RLGIS	Refuge Lands Geographic Information System
RMP	Resource Management Plan
ROS	Regression on Order Statistics
SC	Specific Conductance
SCAN	Soil Climate Analysis Network
SNOTEL	Snow Telemetry
SOI	Southern Oscillation Index
STATSGO2	State Soil Geographic Digital General Soil Map
TCC	Tanana Chiefs Traditional Tribal Consortium
TDS	Total Dissolved Solids
T&E	Threatened and Endangered
The Refuge	Kanuti National Wildlife Refuge
TKQ	Kanuti River Tributary

TMDL	Total Maximum Daily Load
TON	Total Organic Nitrogen
TR	Total Recoverable
TWUP	Temporary Water Use Permit
USFWS	United States Fish and Wildlife Service (The Service)
USHCN	US Historical Climatology Network
USGS	United States Geologic Survey
WERC	Water and Environmental Research Center University of Alaska Fairbanks
WRB	Water Resources Branch
WRCC	Western Region Climate Center
WRI	Water Resources Inventory
WRIA	Water Resources Inventory and Assessment

http://water.usgs.gov/wsc/glossary.html

http://water.epa.gov/scitech/swguidance/standards/criteria/nutrien

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Appendix A-Water Resource Inventory

Kanuti National Wildlife Refuge
Alaska

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1. Introduction

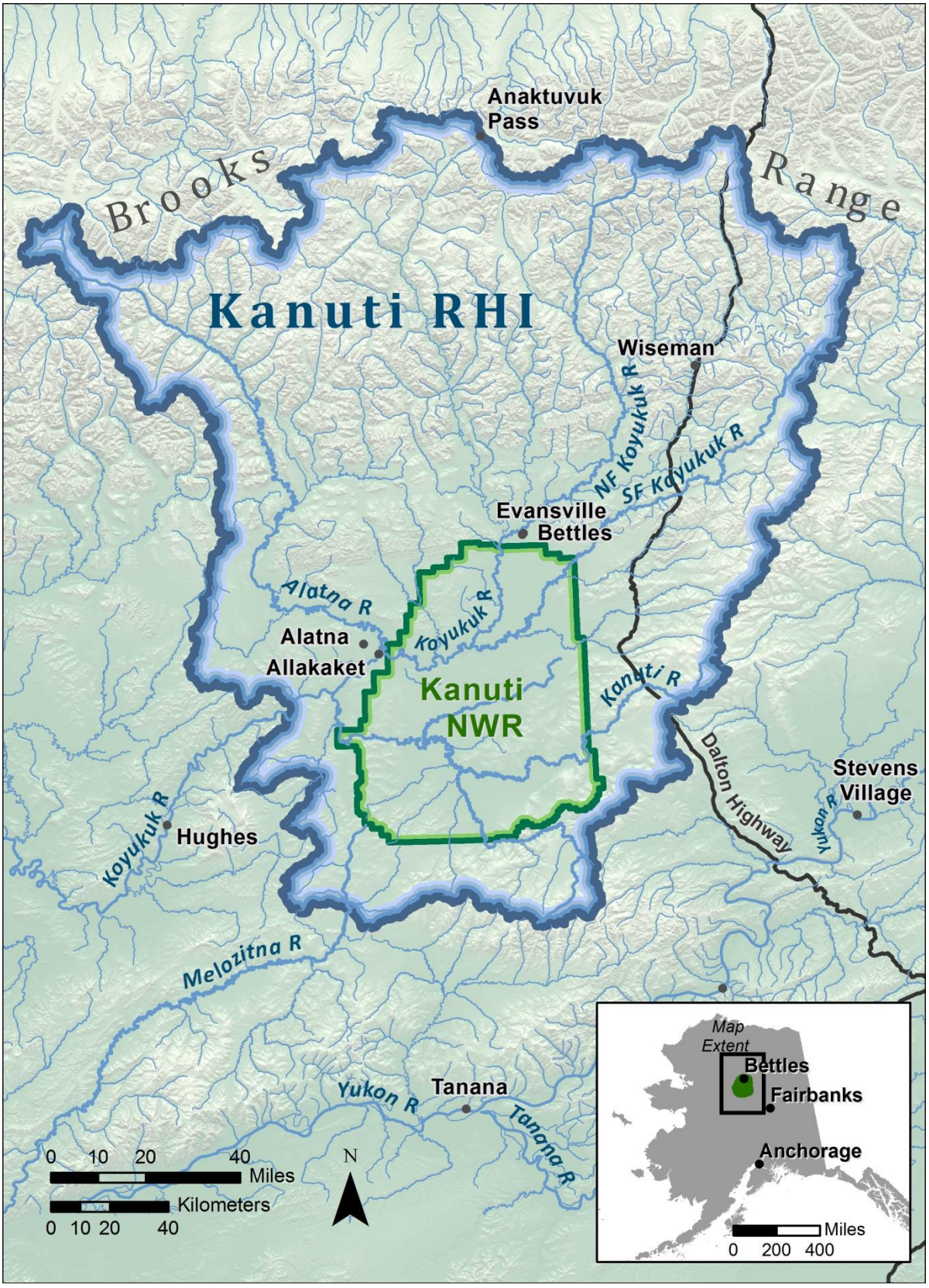
The WRI provides current and accurate accounting of water resources to support the acquisition, management, and protection of clean and fresh water for NWRs. An accurate water resources inventory enables the prioritization of resource management decisions consistent with a refuge's established purposes.

This is a living, digital document. Digital links provide access to websites and digital sources where possible. The data associated with this document includes information gathered from sources prior to December 2015. Appendix B-Methods provides a more detailed discussion of the methods used in the inventory and the assessment of the inventory data.

The maps presented in this document provide a first glance at the water resources of the Kanuti Refuge, and the geospatial information used to compile this document. A large-scale interactive map poster provides additional detail (See Appendix C for access, instructions on use, and map legend). The PDF (geoPDF) format used to construct the map poster allows the user to manipulate data layers, zoom in and out, and view information associated with the geospatial features.

The geospatial data processing for the inventory and assessment utilizes two boundaries: the Kanuti Refuge boundary and the RHI (Map 1). The RHI is defined as "the area(s) upstream/up gradient or downstream/down gradient, from refuge lands and relevant to water and resource management of the Refuge (Esralew 2012)."

The inventory results provide a source of data and a reference for ongoing water resource studies. The document summarizes information on climate, surface water and groundwater, water management infrastructure, water quality, water rights, and issues of concern. The inventory presents information gathered from the Refuge staff interviews, local, national, and regional databases, and geospatial datasets. The accounting and quantification of water resources on and off the Kanuti Refuge lands is based on the NHD and meets the USGS mapping standards. Calculated values for surface areas, lengths, and elevation extracted from the NHD are estimates. A single mapping resolution cannot be assigned to the NHD.



Map 1: Kanuti Refuge and the Region of Hydrologic Influence (RHI). (Anadromous waters appear in bold)

2. Inventory Methods

The WRI report (Flanagan and Cunanan 2013) released in May 2013 identified hydro-climate, water resources, infrastructure, water quality, water monitoring, and threat data available from national and regional databases. The WRI presented this information through a series of detailed tables and maps. The document is available on ServeCat (ServCat reference code 47662).

This document provides updates to the inventory tables and maps found in the May 2013 WRI document. It provides the final inventory portion of the WRIA.

This inventory gathered available information on water resources through:

- studies and reports on relevant water resources investigations and research publicly available through the internet or from hard-copy refuge files;
- publicly available surface water, water quality, and groundwater data from local, state, and national agencies; and
- interviews with refuge and regional office staff.

Within the document, data source lists, tables summarizing the inventoried water resource related features/records, maps depicting the resource spatially, and discussions comprise the inventory results. These products, described here for clarity, provide useful information throughout the document.

- Data Source Tables list the databases discovered and accessed to obtain the inventory data for this report. Each table lists the database source with a website link or a point of contact to access the data. The tables identify whether the data from the source is included in the inventory (inventory status) to inform the reader of the databases queried for the inventory and assessment.
- Inventory Tables list the results of the data retrieved from the accessed sources. Each inventory table provides records that will aid in the management of water resources on Kanuti Refuge. The table captions explain the content of each table. Features labeled "within the Refuge" fall within the Refuge boundary. Features "within the RHI" fall within the RHI boundary but outside the Refuge boundary. The total quantification in the RHI is the RHI feature count/value plus the Refuge feature count/value.
- Maps graphically display the resources discussed in each data table. The maps provide a geographically relevant view of the information collected via the data inventory. The maps provide a first glance at the geospatial information. The large format, interactive geoPDF map poster that accompanies this document provides a more detailed view of the data.

3. Inventory

The goal of every WRIA is to provide a basic understanding of the water resources important to a refuge, and assess the potential threats to those resources. The inventory attempts to quantify the extent, number, or quantity of these resources by compiling information on hydrology, water rights, water availability, water monitoring, and water quality. It also identifies and locates threats occurring on the landscape that have the potential to harm the water resources on the Refuge.

3.1. Inventory of Surface Water

A catalogue of the extent and characteristics of the water resources within the Kanuti Refuge is the first step to understanding where and how water features support fish and wildlife populations and habitats in their natural diversity. The inventory of surface water quantifies the extents and types of flowing (lotic) and still (lentic) water features, which provide essential habitat to both fish and wildlife species in and around the Refuge.

In general, the accounting and quantification of water bodies (rivers, lakes, glaciers, etc.) on and off Kanuti Refuge is based on the NHD and meets the USGS mapping standards. Calculated values for surface areas, lengths, and elevation information extracted from the NHD are estimates. A single mapping resolution cannot be assigned to the NHD. For more information on the specific mapping technique used to developed NHD contact the USGS.

Rivers and Lacustrine Systems

The rivers, lakes, and wetlands of the Kanuti Refuge provide water to habitat in river channels, lakes, and ponds for fish waterfowl, migratory birds, moose, caribou, and the vegetative species. The inventory of these features across the Refuge landscape provides a snap shot of their current extent, and a baseline for current and future management.

A literature review of studies of rivers and lakes on and around the Kanuti Refuge was conducted. Information associated with lakes and ponds (lacustrine systems) found in research papers and literature sources are included in the surface water data sources listed in Table 1 and the bibliography.

Table 1: Surface Water Data Sources - Listing inventory data utilized in the surface water inventory

Data Source	*Agency*	*Inventory Date*	*Link*
Stream Auefice Zones in Alaska	ADNR		http://www.dggs.dnr.state.ak.us/pubs/id/2375
World Glacier Inventory	NSIDC	3/12/2013	http://nsidc.org/data/docs/noaa/g01130_glacier_inventory/
Anadromous Waters Catalog	ADFG	7/10/2013	http://www.adfg.alaska.gov/sf/SARR/AWC/
National Hydrography Dataset	USGS	4/23/2012	http://nhd.usgs.gov/
National Wetlands Inventory	USFWS	4/23/2012	http://www.fws.gov/wetlands/
UAF Water and Environmental Research Center	UAF		http://ine.uaf.edu/werc/projects/
USFWS Wetlands Landcover Crosswalk	USFWS/AKNHP (UAA)	1/31/2016	Appendix D

Queries of geospatial data sources provided the length of rivers, the surface areas of lakes, and an accounting of the number of lakes in different size classes. Tables 2, 3, 4, and 5 list the extent, and/or count of river and lake features in the Refuge and the RHI.

Table 2: Length of named rivers and streams within Kanuti Refuge and the RHI buffer

Name	*Within External Boundary of Kanuti Refuge (miles)*	*Within RHI Buffer (miles)*
Acme Creek		***2.1***
Agiak Creek		30.3
Agnes Creek		4.3
Alatna River		222.6
Alder Creek		14.7
Alinement Creek		9.5
Allard Creek		3.1
Allen River		62.2
Amawk Creek		6.7
Archibald Creek		0.9
Arrigetch Creek		13.0
Awlinyak Creek		19.9
Bar Creek		7.5
Barrenland Creek		6.3
Bear Creek		2.7
Bedrock Creek		22.4
Bergman Creek		14.8
Bettles River		19.4
Big Jim Creek		13.4
Big Spruce Creek		17.3
Billy Glen Creek		1.9
Birch Creek		4.7
Blarney Creek		6.4
Bluecloud Creek		5.2
Bombardment Creek		4.5
Bonanza Creek		36.5
Bore Creek		6.0
Boulder Creek		13.1
Bridge Creek	16.3	0.0
Bullrun Creek		8.1
California Creek		6.5
Canyon Creek		10.7
Chapman Creek		11.1
Chebanika Creek		21.2
Chebanika Creek		21.2
Chicken Creek		14.7
Chimney Fork		4.8
Cladonia Creek		11.9
Clara Creek		5.8
		0.0

Name	*Within External Boundary of Kanuti Refuge(miles)*	*Within RHI Buffer (miles)*
Clear River		32.6
Coalit Creek		10.9
Colorado Creek		3.5
Conglomerate Creek		17.7
Contact Creek		11.6
Cow Creek		1.7
Crag Creek		2.5
Crevice Creek		11.2
Cummings Creek		11.4
Dalimaloak Creek		6.4
Davis Creek		2.9
Dawn Creek		13.0
Deadman Creek		3.7
Death Valley Creek		8.9
Dietrich River		38.8
Discovery Creek		26.1
Douglas Creek		9.4
Dryas Creek		3.4
Eagle Creek		13.5
East Creek		6.5
East Fork Henshaw Creek	2.7	48.1
Eekayruk Creek		3.0
Eider Creek		1.6
Eightmile Creek		4.6
Ekokpuk Creek		25.0
Eldorado Creek		6.1
Emery Creek		5.3
Emma Creek		6.7
Ernie Creek		16.3
Fall Creek		8.3
Fay Creek		1.2
Fickett Creek	17.4	0.0
Fish Creek	36.5	50.2
Fishless Creek		6.6
Flat Creek		20.7
Florence Creek		22.8
Frisky Creek		3.3
Garnet Creek		4.7
Gilroy Creek		4.3
Githgidunka Creek		16.2
Glacier Creek		19.4
Glacier River		42.6

Name	*Within External Boundary of Kanuti Refuge(miles)*	*Within RHI Buffer (miles)*
Gold Creek		10.3
Granite Creek		5.8
Grayling Creek		5.1
Grizzly Creek		14.4
Grotto Creek		6.0
Gull Creek		6.9
Gunsight Creek		2.2
Hackett Creek		8.6
Hammond River		48.2
Harriet Creek		8.8
Hawzerah Creek	12.2	0.0
Helpmejack Creek		31.1
Henry Creek		31.9
Henshaw Creek	21.7	0.0
Hidden Creek		5.3
Holmes Creek		4.6
Holonada Creek	22.1	19.3
Holy Moses Creek		1.2
Horse Creek		6.5
Howard Creek		3.8
Hoyadazzithethno Creek		19.2
Hudson Bay Creek		3.0
Hungarian Creek		13.1
Hungry Creek		4.4
Hunt Fork John River		13.5
Iniakuk River		47.6
Inukpasugruk Creek		14.0
Ipnek Creek		9.0
Irish Creek		2.2
Ishtalitna Creek		25.0
Jack White Creek		6.3
Jane Creek	1.1	14.4
Jay Creek		2.4
Jennie Creek		2.9
Jesse Creek		4.2
Jim Pup		2.8
Jim River	2.9	67.3
John R Creek		8.5
John River		140.2
Jones Creek		12.6
July Creek		8.0
Jumbo Creek		4.8

Name	*Within External Boundary of Kanuti Refuge(miles)*	*Within RHI Buffer (miles)*
Kachwona Creek		10.6
Kadakina Creek	20.6	0.0
Kalhabuk Creek		5.7
Kanuti Charlatan Creek	84.4	0.0
Kanuti Kilolitna River	35.0	70.5
Kanuti River	152.9	68.8
Kapoon Creek		4.1
Karillyukpuk Creek		5.6
Keating Creek		10.1
Kenunga Creek		7.9
Kevuk Creek		35.4
King Creek		14.0
Kinnorutin Creek		3.5
Kodosin Nolitna Creek	29.6	1.4
Kollutarak Creek		23.5
Kollutuk Creek		6.8
Koyukuk River	65.2	62.4
Kupuk Creek		5.2
Kutuk River		37.2
Kuyuktuvuk Creek		16.4
Ladanan Creek		11.9
Lake Creek		11.6
Larson Creek		2.5
LaSalle Creek		10.1
Last Chance Creek		2.9
Limestone Creek		2.9
Linda Creek		6.3
Little Spruce Creek		4.4
Little Swede Creek		1.9
Long Creek		4.1
Loon Creek		13.1
Lower Fork Twelvemile Creek		4.4
Madison Creek		9.9
Magnet Creek		2.6
Mailbox Creek		3.7
Malamute Fork		48.8
Malamute Fork Alatna River		29.5
Marion Creek		18.0
Mascot Creek		8.9
Mashooshalluk Creek		21.4
Masu Creek		11.5
Mathews River		24.7

Name	*Within External Boundary of Kanuti Refuge(miles)*	*Within RHI Buffer (miles)*
McCamant Creek		11.2
McKinley Creek		12.5
Mellow Creek		3.4
Melozitna River		39.3
Mentanontli River		36.8
Mettenpherg Creek		32.5
Michigan Creek		22.6
Midas Creek		9.5
Middle Fork Koyukuk River		74.7
Millichetah Creek		10.7
Minnesota Creek		7.1
Minnie Creek		16.8
Missouri Creek		9.5
Moore Creek		13.9
Moose Creek		5.1
Mosquito Fork		27.0
Mud Creek		14.4
Mule Creek		3.2
Myrtle Creek		9.3
Nahtuk River		24.4
Nethkahati Creek		19.6
Ninemile Creek		12.4
Nolan Creek		4.6
Nolitna Creek	44.1	0.0
North Fork Bonanza Creek		40.5
North Fork Koyukuk River		115.3
Notoniono Creek		0.0
Nugget Creek		5.3
Nutirwik Creek		12.5
Organ Creek		7.1
Over Creek		2.4
Pasco Creek		1.4
Pass Creek		13.6
Passless Creek		4.5
Peavey Creek	16.2	0.0
Pegeeluk Creek		14.8
Phoebe Creek		14.3
Pingaluk River		27.4
Pinnyanaktuk Creek		4.1
Pope Creek		6.8
Porcupine Creek		6.3
Portland Creek		6.3

Name	*Within External Boundary of Kanuti Refuge(miles)*	*Within RHI Buffer (miles)*
Prospect Creek		27.6
Publituk Creek		20.1
Pyramid Creek		7.0
Quartz Creek		3.3
Ram Creek		8.1
Ready Bullion Creek		3.2
Redstar Creek		7.6
Richmond Creek		4.2
Right Fork Vermont Creek		1.2
Robert Creek		20.9
Rock Creek		16.2
Rockybottom Creek		23.8
Roosevelt Creek		9.9
Rosie Creek		8.9
Roy Creek		12.5
Ruby Creek		5.2
Rye Creek		6.0
Saint Louis Creek		7.6
Saint Patricks Creek		5.7
Savioyok Creek		8.2
Sawlog Creek		3.0
Sawyer Creek		3.3
Scofield Creek		5.3
Seward Creek		5.8
Shady Creek		4.2
Shamrock Creek		1.8
Sheep Creek		19.8
Short Creek		0.4
Shukok Creek		12.6
Shukokluk Creek		18.7
Shushalluk Creek		6.5
Sinyalak Creek		23.0
Sirr Creek		4.4
Siruk Creek		68.4
Sithdondit Creek		24.1
Siwash Creek		15.5
Sixtymile Creek		28.3
Slate Creek		17.0
Slathtouka Creek		32.4
Sleepy Creek		9.3
Slokhenjikh Creek		32.9
Smally Creek		1.7

Name	*Within External Boundary of Kanuti Refuge(miles)*	*Within RHI Buffer (miles)*
Smith Creek		2.3
Snowden Creek		7.4
Snowshoe Creek		2.4
South Fork Bonanza Creek		30.4
South Fork Koyukuk River	58.0	122.5
Spring Creek		3.0
Squaw Creek		7.3
Suckik Creek		9.0
Surprise Creek		2.7
Survey Creek		9.4
Swamp Creek		10.1
Swede Creek		10.3
Swift Creek		2.0
Takahula River		15.7
Tangleblue Creek		9.5
Thompson Pup		0.7
Till Creek		11.7
Timber Creek		32.2
Tinayguk River		52.2
Tobatokh Creek		15.8
Tobin Creek		9.2
Tobuk Creek		33.1
Torment Creek		25.0
Trembley Creek		7.5
Tributary Creek		8.1
Twelvemile Creek		6.8
Unakserak River		28.8
Upper Fork Twelvemile Creek		6.1
Vermont Creek		3.3
Vi Creek		9.9
Wakeup Creek		1.3
Walkaround Creek		11.1
Washington Creek		7.3
West Fork Henshaw Creek	1.2	39.9
Weyahok River		10.7
Wild River		69.2
Willow Creek		15.8
Wilson Creek		4.3
Winnie Creek		8.9
Wiseman Creek		18.3
Wolf Creek		20.4
Wolf Pup		2.9

Name	*Within External Boundary of Kanuti Refuge(miles)*	*Within RHI Buffer (miles)*
Wolverine Creek		26.4
Yankee Creek		3.4
Yenituk Creek		8.8
Total length	640.1	4509.0

Table 3: Length of unnamed rivers and streams within Kanuti Refuge or the RHI buffer

Name	*Within the External Boundary of Kanuti Refuge (miles)*	*Within RHI Buffer (miles)*
Unnamed	3082	15729

Table 4: Distribution of lake/pond surface area within Kanuri Refuge.

Area Class (acres)	*Count*	*Sum of Area (acres)*
0–250	6,403	45,443
490– <740	1	692
740-990	3	2,965
1,240–1,480	1	1,507
1,730–1,980	0	0
3,210–10,8700	0	0
Total	**6,408**	**50,607**

Table 5: Distribution of lake/pond surface area the RHI Boudary beyond the Refuge.

Area Class (acres)	*Count*	*Sum of Area (acres)*
0–250	6,596	34,842
490– <740	1	618
740-990	0	0
1,240–1,480	1	1,557
1,730–1,980	2	4,398
3,210–10,8700	2	6,499
Total	**6,602**	**47,914**

Wetland Classification

The Kanuti Refuge's establishing language includes providing essential feeding and nesting habitat to resident and migrating waterfowl and migratory birds. Wetlands provide a large portion of that habitat across the Refuge landscape. The accounting of the type and extent of the Refuge's wetland features utilizes the NWI and a wetland classification derived from existing landcover maps (since the NWI only covers 14% of RHI and none of the Refuge). This inventory estimates wetlands and wetland types. Where the NWI was not available, component landcover classes provide a proxy for wetland and deep-water habitats (Flagstad 2016). Table 6 provides a list of the source landcover maps used to construct the wetland distribution and classification derived from landcover data. This classification underestimates the extent and habitat characteristics of wetlands in the Kanuti Refuge and presents the need for completing the NWI, NHD plus, and representative soils/permafrost datasets, information previously unavailable for use in management decisions.

Table 6: Source landcover maps used to infer wetland type and distribution in Kanuti RHI listed in decreasing order of percent map area

Map Name	*Citation*	*Map Source Name*	*Date(s) of Imagery*	*Percent Accuracy*	*Mapped Area (%)*
ak_earthcov_mosaic _feb2007.img	Ducks Unlimited, Inc. 2007	DU Interior Mosaic	1992, 1999	33-85	49.186
An ecological land survey and landcover map of the Arctic Network	Jorgenson et al. 2009	NPS Arctic Network	2002	65-80	46.372
Predictive Ecosystems Model for the Alaska - Yukon Arctic Ecoregion	Jorgenson 2003	TNC Arctic Ecosystem	1976-1981, 1985, 1986, 1995	not assessed	3.268
Alaska Statewide Landcover classification – part 1-4	Fleming 2012	blkr_evt_f2	2000	not assessed	0.683
ak_earthcov_mosaic _feb2007.img	Ducks Unlimited, Inc. 2007	DU Interior	1992, 1999	33-85	0.255
Alaska Statewide Landcover classification – part 1-4	Fleming 2012	flats_evt_f2	2000	not assessed	0.220
The existing vegetation type (EVT) spatial data layer	Landfire 2004	Landfire	2000	not assessed	0.013
Alaska Statewide Landcover classification – part 1-4	Fleming 2012	koyu_evt_v2	2000	not assessed	0.002

Wetland classification codes follow the Wetland Classification scheme proposed by Cowardin et al. (1979) and standardized by the USFWS (2013). Where available, NWI coverage takes precedence. Where the NWI is not available, the methodology derives wetland classes from landcover maps. To retain the greatest level of accuracy, the methodology assigns wetland codes to landcover classes at the finest hierarchical level possible without making assumptions regarding plant species composition, soil condition, or hydrological regime of the landcover class. The methodology assigns primary and secondary wetland codes where a landcover class could be interpreted as more than one wetland type. The process uses a combination of wetland codes where the landcover class represents a mosaic of wetland types. The methodology preserves landcover class information for upland habitats.

Table 7 lists the resulting wetland classes. The extent of the classes derived from existing landcover maps do not meet the minimum Federal Geographic Data Committee (FGDC) national standards established for the NWI data layer and therefore are not distributed through the National Wetland mapper. Tables 8 and 9 list the wetland landcover crosswalk results for the Refuge and RHI.

Table 7: Description of the wetlands of Kanuti Refuge according to the Cowardin classification scheme

Wetland Code Refuge	*System*	*Vegetation Class/Subclass/Modifier*	*Class2/Subclass2/Modifier2*
L1UBH	Lacuatrine	Limnetic/Unconsolididated Bottom/Permanently Flooded	NA
L2UBH	Lacuatrine	Litoral/Unconsolididated Bottom/Permanently Flooded	NA
L2AB3H	Lacuatrine	Littoral/Aquatic Bed/Rooted Vascular/Permanently Flooded	NA
PAB3h	Palustrine	Aquatic Bed/Broad-leaved Deciduous/Diked/Impounded	NA
PEM1B	Palustrine	Emergent/Persistent/Saturated	NA
PEM1F	Palustrine	Emergent/Persistent/Semipermanently Flooded/Saturated	NA
PFO4B	Palustrine	Forested/Needle-Leaved Evergreen/Saturated	NA
PSS1/EM1B	Palustrine	Scrub Shruband/ Broad-Leaved Deciduous	Emergent/Persistent
PSS1B	Palustrine	Scrub Shrub/Broad-Leaved Deciduous/Saturated	NA
PUBH	Palustrine	Unconsolididated Bottom/Permanently Flooded	NA
R2AB3H	Riverine	Lower Perennial/Aquatic Bed/Rooted Vascular/Permanently Flooded	NA
R2UB3H	Riverine	Lower Perennial/Unconsolididated Bottom/Mud/Permanently Flooded	NA
R2UBH	Riverine	Lower Perennial/Unconsolididated Bottom/Permanently Flooded	NA
Wetland Code RHI	***System***	***Vegetation Class/Subclass/Modifier***	***Class2/Subclass2/Modifier2***
L1UBH	Lacuatrine	Limnetic/Unconsolididated Bottom/Permanently Flooded	NA
L2AB3H	Lacuatrine	Littoral/Aquatic Bed/Rooted Vascular/Permanently Flooded	NA
L2ABH	Lacuatrine	Littoral/Aquatic Bed/Permanently Flooded	NA
L2UBH	Lacuatrine	Littoral/Unconsolidated Bottom/Permanently Flooded	NA
PAB	Palustrine	Aquatic Bed	NA
PAB3H	Palustrine	Aquatic Bed/Rooted Vascular/Permanently Flooded	NA
PEM1A	Palustrine	Emergent/Persistent/Temporarily Flooded	NA
PEM1B	Palustrine	Emergent/Persistent/Saturated	NA
PEM1E	Palustrine	Emergent/Persistent/Seasonally Flooded/Saturated	NA
PEM1F	Palustrine	Emergent/Persistent/Semipermanently Flooded	NA
PFO1C	Palustrine	Forested/Broad Leaved Deciduous/Seasonally Flooded	NA
PFO4/1A	Palustrine	Forested/Needle Leaved Evergreen	Forested/Broad Leaved Deciduous/Temporarily Flooeded
PFO4/1C	Palustrine	Forested/Needle Leaved Evergreen	Forested/Broad Leaved Deciduous/Seasonally Flooeded
PFO4/EM1B	Palustrine	Forested/Needle Leaved Evergreen	Emergent/Persistent/Saturated
PFO4/SS1B	Palustrine	Forested/Needle-Leaved Evergreen	Scrub Shrub/Needle Leaved Deciduous/Saturated
PFO4/SS1C	Palustrine	Forested/Needle Leaved Evergreen	Scrub Shrub/Broad Leaved Deciduous/Seasonally Flooded
PFO4A	Palustrine	Forested/Needle Leaved Evergreen/Temporarily Flooded	NA
PFO4B	Palustrine	Forested/Needle-Leaved Evergreen/Saturated	NA
PSS1/3B	Palustrine	Scrub Shrub/Broad-Leaved Deciduous	Broad Leaved Evergreen/Saturated
PSS1/3B	Palustrine	Scrub Shruband/ Broad-Leaved Deciduous	Scrub Shrub/Broad Leaved Evergreen/Saturated
PSS1/EM1B	Palustrine	Scrub Shruband/ Broad-Leaved Deciduous	Emergent/Persistent
PSS1/EM1E	Palustrine	Scrub Shrub/Broad Leaved Deciduous	Emergent/Persistent/Seasonally Flooded/Saturated
PSS1A	Palustrine	Scrub Shrub/Broad Leaved Deciduous/Temporarily Flooded	NA
PSS1B	Palustrine	Scrub Shrub/Broad Leaved Deciduous/Saturated	NA
PSS1C	Palustrine	Scrub Shruband/ Broad-Leaved Deciduous/Seasonally Flooded	NA
PSS1E	Palustrine	Scrub Shrub/Broad Leaved Deciduous/Seasonally Flooded/Saturated	NA
PSS3A	Palustrine	Scrub Shrub/Broad Leaved Evergreen/Temporarily Saturated	NA
PSS3B	Palustrine	Scrub Shrub/Broad Leaved Evergreen/Saturated	NA
PSS4B	Palustrine	Scrub Shrub/Needle Leaved Evergreen/Saturated	NA
PUBC	Palustrine	Unconsolidated Bottom/Seasonally Flooded	NA
PUBH	Palustrine	Unconsolidated Bottom/Permanently Flooded	NA
R2AB3H	Riverine	Lower Perennial/Aquatic Bed/Rooted Vascular/Permantently Flooded	NA
R2ABH	Riverine	Lower Perennial/Aquatic Bed/Permanently Flooded	NA
R2UB3H	Riverine	Lower Perennial/Unconsolidated Bottom/Mud/Permanently Flooded	NA
R2UBH	Riverine	Lower Perennial/Unconsolididated Bottom/Permanently Flooded	NA
R2US3C	Riverine	Lower Perennial/Unconsolidated Shore/Mud/Seasonally Flooded	NA
R2USC	Riverine	Lower Perennial/Unconsolididated Shore/Seasonally Flooded	NA

Table 8: Generalized categories and classes of wetland and deep-water habitats listed in decreasing order of mapped area within the RHI only

Generalized Category	*Mapped Area (Acres)*	*Mapped Area (%)*
Upland	9,870,705	86.1
Freshwater Forested Shrub	1,337,888	11.7
Lake	99,090	0.9
Freshwater Emergent	69,527	0.6
Riverine	57,830	0.5
Pond	22,788	0.2
Grand Total	11,457,828	100

Wetland Class	*Mapped Area (Acres)*	*Mapped Area (%)*
UPL	9,870,705	86
PSS1/EM1B	709,994	6
PFO4/SS1B	234,551	2
PSS1B	183,613	2
L1UBH	88,959	1
PSS1/3B	68,260	1
PSS1C	55,872	0.5
PFO4B	45,209	0.4
PEM1B	34,084	0.3
PEM1F	31,396	0.3
R2UBH	23,597	0.2
PFO4/SS1C	22,070	0.2
R2USC	20,796	0.2
PUBH	16,404	0.1
R2UB3H	13,230	0.1
L2AB3H	9,951	0.1
PFO4/1C	6,504	0.1
PAB3H	5,892	0.1
PFO1C	5,744	0.1
PSS3A	4,268	0.04
PEM1E	3,513	0.03
PFO4A	1,712	0.01
PEM1A	534	<0.01
PAB	476	<0.01
L2UBH	180	<0.01
R2US3C	168	<0.01
PSS1A	40	<0.01
PSS4B	32	<0.01
R2ABH	21	<0.01
R2AB3H	18	<0.01
PUBC	16	<0.01
PSS1/EM1E	10	<0.01
PFO4/EM1B	8	<0.01
L2ABH	1	<0.01
PSS3B	0.4	<0.01
PFO4/1A	0.2	<0.01
PSS1E	0.2	<0.01
Grand Total	11,457,828	100

Table 9: Generalized categories and classes of wetland and deep-water habitats listed in decreasing order of mapped area within the Kanuti Refuge only

Generalized Category	*Mapped Area (Acres)*	*Mapped Area (%)*
Upland	1,326,887	81.1
Freshwater Forested Shrub	212,788	13.0
Lake	48,696	3.0
Freshwater Emergent	28,977	1.8
Riverine	13,151	0.8
Pond	6,336	0.4
Grand Total	1,636,834	100

Wetland Class	*Mapped Area (Acres)*	*Mapped Area (%)*
UPL	1,326,887	81.06
PSS1B	129,387	7.90
PSS1/EM1B	82,106	5.02
L1UBH	40,109	2.45
PEM1F	16,499	1.01
PEM1B	12,477	0.76
L2AB3H	8,497	0.52
PUBH	8,210	0.50
R2UB3H	6,094	0.37
PAB3H	4,941	0.30
PFO4B	1,295	0.08
R2UBH	232	0.01
L2UBH	90	0.01
R2AB3H	10	<0.01
Grand Total	1,636,834	100.00

3.2. Inventory of Groundwater Information

Maintenance of natural patterns, volume of flow, and water levels in Kanuti Refuge's water resources is a founding purpose of the Refuge under ANILCA. Many factors contribute to the timing of flow and the volume of water in the Refuge's lakes and rivers, including the contribution of groundwater to the hydrologic process. Unfortunately, very little information about the characteristics of groundwater flow and quality throughout the Kanuti Refuge exists. The permafrost that covers much of the Refuge limits groundwater movement and affects its transmission to rivers, lakes, ponds, and wetlands. Kanuti Refuge is in a zone of continuous and discontinuous permafrost, although frozen areas outnumber unfrozen areas (Ferrians 1994; Walvoord et al. 2012).

In the absence of any specific geospatial or research related information on Kanuti Refuge's groundwater and permafrost resources, the inventory does not present tables to quantifying the resources.

3.3. Inventory of Water Quality Data

ANILCA established Kanuti Refuge to ensure water quality for the protection of wildlife populations and habitats. Realizing that purpose requires an understanding of the natural range of water quality characteristics within the waters of the Refuge. Determining the availability of water quality data is the first step in determining the data requirements needed to establish such a baseline. The inventory gathered water quality information in two ways. First, the most recent EPA approved water quality assessment for the ADEC (ADEC, 2012) provided the status of "impaired waters" on and around the Refuge. Then, the inventory gathered a list of water quality data collection sites from available databases. Table 10 provides a listing of the water quality data sources obtained via the data mining effort.

Table 10: Water Quality Data Sources - Listing inventory data sources used in the water quality inventory

Data Source	*Agency*	*Inventory Date*	*Link*
Alaska DEC impaired waters	ADEC	2/20/2014	http://www.dec.state.ak.us/das/GIS/apps.htm
NAWQA Data Warehouse	USGS		http://infotrek.er.usgs.gov/apex/f?p=NAWQA:HOME:0
Water Quality Portal	USGS/EPA		http://www.waterqualitydata.us/index.jsp
EPA STORET	EPA		http://www.epa.gov/storet/
Anadromous Waters Catalog	ADFG	7/10/2013	http://www.adfg.alaska.gov/sf/SARR/AWC/
Watershed Assessment, Tracking & Environmental Results	EPA		http://epamap32.epa.gov/radims/
NWRS Water Quality Information System	USGS		http://www.cerc.usgs.gov/Projects.aspx?ProjectId=65
Lake Habitat and Fish Surveys on Interior Alaska National Wildlife Refuges, 1984–1986	USFWS		http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
R7 - Water Resource Branch Water Quality Dataset	USFWS	12/10/2012	

The inventory first looked at the EPA approved water quality assessment for the ADEC(Alaska Department of Environmental Conservation 2012) to determine if any of the Refuge waters are considered "impaired waters." Impaired waters are waters whose beneficial uses are impaired by pollutants and fail to meet the EPA approved water quality standards administered by the ADEC. The EPA places these waters in the polluted water category on the State of Alaska Clean Water Act (CWA) Assessment as part of the 303(d) list. Impaired waters include waters with relevant National Pollutant Discharge Elimination Systems (NPDES) permits, systems exceeding EPA standards for Total Maximum Daily Loads (TMDLs) listed on the EPA Catalogue of Impaired Waters, and other areas of know pollution. No 303(d) listed waters occur in Kanuti Refuge or RHI. But that does not exclude these waters from water quality concerns or contaminant issues.

The 303(d) list of impaired waters identifies waters tested for water quality issues that failed to meet EPA standards, but many waters are not monitored or are only monitored for a small suite of water quality parameters. The inventory of water quality databases and reports revealed monitoring sites for water chemistry, the physical characteristics of water quality, water temperature, and the chemical/physical suitability of water for fish. Table 11 provides a summary of the water quality sites by parameter. Table 12 provides a detailed list of water quality parameters collected at each of the monitoring station along with a link to the data when the data is available via the internet.

Table 11: Water quality monitoring sites within the Kanuti Refuge or the RHI buffer outside the Refuge boundary summarized by parameter group

Parameter Group	*Site Count*	*In Refuge*	*In RHI*
water quality chemical	6	6	0
water quality physical	80	19	61
water temperature	10	4	6
fish	11	11	0

Table 12: Water quality monitoring sites within the Kanuti Refuge or the RHI buffer summarized by parameter group and station

Parameter Group	Station Name	Site Number	Source	Status	Begin Date	End Date	Agency	Position	URL
habitat	Tokusatatquaten	660714151114100	USFWS Lake Surveys	historic	1984	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
habitat	Sithylemenkat	660730151233500	USFWS Lake Surveys	historic	1984	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
habitat	Old Dummy	660818151511400	USFWS Lake Surveys	historic	1984	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
habitat	Unnamed	660826151551200	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
habitat	Unnamed	660857151482200	USFWS Lake Surveys	historic	1984	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
habitat	Unnamed	660936151470600	USFWS Lake Surveys	historic	1984	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
habitat	Unnamed	662150151582300	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
habitat	Kodosin	662211152000000	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
habitat	Konedsin	662224151570800	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
habitat	Mingkoket	662959152070200	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
habitat	Minnkokut	663337151411800	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
water quality chemical	South Fork Koyukuk River 7.5 miles above Jim River near Bettles, AK	665105151054300	WRB Gage Stations	active	2011	NA	USFWS	Refuge	NA
water quality chemical	Kanuti Kilolitna River 23 miles above Holonada Creek near Allakaket, AK	655930151520700	WRB Gage Stations	active	2011	NA	USFWS	Refuge	NA
water quality chemical	Kanuti River 30 miles below Dalton Highway near Bettles, AK	661747151065800	WRB Gage Stations	active	2011	NA	USFWS	Refuge	NA
water quality chemical	Fish Creek at Hulgothen Bluffs near Bettles, AK	663405151122800	WRB Gage Stations	active	2003	2007	USFWS	Refuge	NA
water quality chemical	South Fork Koyukuk River at Dalton Highway near Bettles, AK	670106150172600	WRB Gage Stations	active	2011	NA	BLM	Refuge	NA
water quality chemical	Kanuti River Tributary 1 mile above Kanuti River near Bettles, AK	661223151051100	WRB Gage Stations	active	2010	NA	USFWS	Refuge	NA
water quality physical	Tokusatatquaten	660714151114100	USFWS Lake Surveys	historic	1984	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
water quality physical	Sithylemenkat	660730151233500	USFWS Lake Surveys	historic	1984	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
water quality physical	Old Dummy	660818151511400	USFWS Lake Surveys	historic	1984	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
water quality physical	Unnamed	660826151551200	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
water quality physical	Unnamed	660857151482200	USFWS Lake Surveys	historic	1984	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
water quality physical	Unnamed	660936151470600	USFWS Lake Surveys	historic	1984	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
water quality physical	Unnamed	662150151582300	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
water quality physical	Kodosin	662211152000000	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
water quality physical	Konedsin	662224151570800	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
water quality physical	Mingkoket	662959152070200	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
water quality physical	Minnkokut	663337151411800	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
water quality physical	South Fork Koyukuk River 7.5 miles above Jim River near	665105151054300	WRB Gage Stations	active	2008	NA	USFWS	Refuge	NA

Parameter Group	Station Name	Site Number	Source	Status	Begin Date	End Date	Agency	Position	URL
	Bettles, AK								
water quality physical	Koyukuk River 0.8 miles below John River near Bettles, Alaska	665429151405100	WRB Gage Stations	active	2010	NA	USFWS	Refuge	NA
water quality physical	Kanuti Kilolitna River 23 miles above Holonada Creek near Allakaket, AK	655930151520700	WRB Gage Stations	active	2008	NA	USFWS	Refuge	NA
water quality physical	Kanuti River 30 miles below Dalton Highway near Bettles, AK	661747151065800	WRB Gage Stations	active	2010	NA	USFWS	Refuge	NA
water quality physical	Fish Creek at Hulgothen Bluffs near Bettles, AK	663405151122800	WRB Gage Stations	active	2002	2007	USFWS	Refuge	NA
water quality physical	Kanuti River Tributary 1 mile above Kanuti River near Bettles, AK	661223151051100	WRB Gage Stations	active	2008	NA	USFWS	Refuge	NA
water quality physical	Holonada Creek 17 miles above Kanuti Kilolitna River near Allakaket, AK	660145152074900	WRB Gage Stations	active	2010	NA	USFWS	Refuge	NA
water temperature	Kanuti Kilolitna River	6559301515206	AKOATS	underdevelopment	2005	2013	USFWS	Refuge	http://aknhp.uaa.alaska.edu/aquatic-ecology/akoats/
water temperature	Kanuti River tributary	6612221510511	AKOATS	underdevelopment	2008	2014	USFWS	Refuge	http://aknhp.uaa.alaska.edu/aquatic-ecology/akoats/
water temperature	Kanuti River	6617471510658	AKOATS	underdevelopment	2008	2013	USFWS	Refuge	http://aknhp.uaa.alaska.edu/aquatic-ecology/akoats/
water temperature	Henshaw Creek	6633241521234	AKOATS	on going	2013	2013	USFWS	Refuge	http://aknhp.uaa.alaska.edu/aquatic-ecology/akoats/
water temperature	South Fork Koyukuk River	6651051510542	AKOATS	underdevelopment	2008	2013	USFWS	Refuge	http://aknhp.uaa.alaska.edu/aquatic-ecology/akoats/
water temperature	Slate Creek	6715151501033	AKOATS	on going	1998	2014	USGS	Refuge	http://aknhp.uaa.alaska.edu/aquatic-ecology/akoats/
water temperature	Marion Creek	6719301500205	AKOATS	completed	2013	2013	BLM	Refuge	http://aknhp.uaa.alaska.edu/aquatic-ecology/akoats/
water temperature	Nugget Creek	6728401495040	AKOATS	completed	2011	2011	BLM	Refuge	http://aknhp.uaa.alaska.edu/aquatic-ecology/akoats/
water temperature	Upper Gold Creek	6728551494039	AKOATS	completed	2012	2012	BLM	Refuge	http://aknhp.uaa.alaska.edu/aquatic-ecology/akoats/
water temperature	Lower Gold Creek	6730461495122	AKOATS	completed	2012	2012	BLM	Refuge	http://aknhp.uaa.alaska.edu/aquatic-ecology/akoats/
water quality physical	BONANZA C TRIB NR PROSPECT CAMP AK	663650150413300	NWIS	historic	1971	1975	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	PROSPECT C NR PROSPECT CAMP AK	664654150411500	NWIS	historic	1975	1975	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	JIM R NR BETTLES AK	664708150523200	NWIS	historic	1970	1976	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	SLATE C AT COLDFOOT AK	671515150103300	NWIS	historic	1998	2014	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	WISEMAN C AT WISEMAN AK	672436150063000	NWIS	historic	1970	1976	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	KANUTI R NR BETTLES AK	662601150381600	NWIS	historic	1971	1977	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	FB01901419BCCD1 001	662730150384700	NWIS	historic	1974	1974	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	KOYUKUK R AT ALLAKAKET AK	663358152383900	NWIS	historic	1972	1972	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	PROSPECT C AT PIPELINE NR BETTLES AK	664648150403900	NWIS	historic	1977	1977	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	JIM R BL PROSPECT CAMP SITE 4 NR BETTLES AK	664707150495800	NWIS	historic	1976	1976	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	JIM R BL PROSPECT CAMP SITE 3 NR BETTLES AK	664733150440900	NWIS	historic	1976	1976	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	PROSPECT C AT MOUTH NR PROSPECT CAMP AK	664735150424500	NWIS	historic	1970	1972	USGS	RHI	http://waterdata.usgs.gov/nwis

Parameter Group	Station Name	Site Number	Source	Status	Begin Date	End Date	Agency	Position	URL
water quality physical	JIM R BL PROSPECT CAMP SITE2 NR BETTLES AK	664740150435700	NWIS	historic	1975	1976	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	JIM R BL PROSPECT CAMP SITE2 NR BETTLES AK	664740150435700	NWIS	historic	1975	1977	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	JIM R BL PROSPECT CAMP NR BETTLES AK	664740150435700	NWIS	historic	1975	1976	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	JIM R BL PROSPECT CAMP NR BETTLES AK	664740150435700	NWIS	historic	1975	1977	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	JIM R AB PROSPECT CAMP NR BETTLES AK	664750150431500	NWIS	historic	1975	1977	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	SF KOYUKUK R NR WISEMAN AK	670108150164900	NWIS	historic	1977	1977	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	SLATE C NR WISEMAN AK	671527150111400	NWIS	historic	1971	1972	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	MF KOYUKUK R AB SLATE C NR WISEMAN AK	671544150122500	NWIS	historic	1972	1972	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	MINNIE C NR WISEMAN AK	672458150023100	NWIS	historic	1971	1971	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	MINNIE C AT WISEMAN AK	672518150053700	NWIS	historic	1971	1971	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	MF KOYUKUK R NR WISEMAN AK	672616150043900	NWIS	historic	1970	1978	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	NOLAN CREEK LK NR WISEMAN AK	672754150155100	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	HAMMOND R NR WISEMAN AK	672743150020900	NWIS	historic	1977	1977	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	UNNAMED LK NR MOUTH OF DIETRICH R NR WISEMAN AK	673850149432000	NWIS	historic	1970	1972	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	UNNAMED P NR MOUTH OF DIETRICH R NR WISEMAN AK	673907149432700	NWIS	historic	1970	1972	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	SNOWDEN C NR DIETRICH CAMP NR WISEMAN AK	674418149451900	NWIS	historic	1977	1977	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	DIETRICH R BL KUYUKTUVUK C NR WISEMAN AK	675408149492400	NWIS	historic	1971	1972	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	KUYUKTUVUK C 1MI AB DIETRICH R NR WISEMAN AK	675536149512100	NWIS	historic	1971	1972	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	NUTIRWIK C NR WISEMAN AK	675603149491000	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	KUYUKTUVUK C 5MI AB DIETRICH R NR WISEMAN AK	675958149544700	NWIS	historic	1971	1971	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	KUYUKTUVUK C 10MI AB DIETRICH R NR WISEMAN AK	680306149505400	NWIS	historic	1971	1971	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	JOHN R 1 MI BL INUKPASUGRUK C AT ANAKTUVUK PASS AK	680656151470600	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	JOHN R BL INUKPASUGRUK C AT ANAKTUVUK PASS AK	680712151464000	NWIS	historic	2002	2003	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	14UKPASUGRUK C AT ANAKTUVUK PASS AK	680733151445300	NWIS	historic	2002	2003	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	UD01500219CACA1 005 OBSERVATION WELL 7	680735151453900	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	UD01500219CABC1 004 OBSERVATION WELL 6	680737151454700	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	UD01500219ACBD1 003 OBSERVATION WELL 5	680750151450500	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	JOHN R TRIB AT ANAKTUVUK PASS AK	680751151451100	NWIS	historic	2002	2003	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	CONTACT C AB INUKPASUGRUK C AT ANAKTUVUK PASS AK	680753151443200	NWIS	historic	2002	2002	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	CONTACT C 0.7 MI AB MOUTH AT ANAKTUVUK PASS AK	680800151440300	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	UD01500219AABC1 002 OBSERVATION WELL 4	680804151444000	NWIS	historic	2003	2003	USGS	RHI	http://waterdata.usgs.gov/nwis

Parameter Group	Station Name	Site Number	Source	Status	Begin Date	End Date	Agency	Position	URL
water quality physical	JOHN R TRIB AB LAGOONS AT ANAKTUVUK PASS AK	680807151444300	NWIS	historic	2003	2003	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	UD01500219AABA1 001 OBSERVATION WELL 3	680808151443100	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	UD01500218DDCD1S	680809151442200	NWIS	historic	1972	1972	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	CONTACT C 1.1 MI AB MOUTH AT ANAKTUVUK PASS AK	680818151434400	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	CONTACT C .4 MI BL MAIN ST AT ANAKTUVUK PASS AK	680820151433600	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	UD01500218DADC1 002	680824151441800	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	UNNAMED LK AT ANAKTUVUK PASS AK	680826151443600	NWIS	historic	1971	1971	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	CONTACT C .2 MI BL MAIN ST AT ANAKTUVUK PASS AK	680827151434300	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	CONTACT C AT AIRSTRIP AT ANAKTUVUK PASS AK	680829151434900	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	UD01500217CBBD1 003 OBSERVATION WELL 2	680830151435300	NWIS	historic	2003	2003	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	UD01500218DAAA1 003	680834151441500	NWIS	historic	1974	1989	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	CONTACT C AT MAIN ST AT ANAKTUVUK PASS AK	680835151440000	NWIS	historic	2002	2003	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	UD01500217BCCC1 001	680836151440400	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	UD01500217BCCD1 002 OBSERVATION WELL 1	680836151435900	NWIS	historic	2003	2003	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	CONTACT C AT ANAKTUVUK PASS AK	680844151440700	NWIS	historic	1989	1989	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	CONTACT C BL L CONTACT C AT ANAKTUVUK PASS AK	680855151443200	NWIS	historic	2002	2002	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	L CONTACT C AT MOUTH AT ANAKTUVUK PASS AK	680856151443500	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	CONTACT C AB L CONTACT C AT ANAKTUVUK PASS AK	680857151445500	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis

3.4. Inventory of Water Rights Data

In addition to the protection of the Refuge's water quality, ANILCA established the Kanuti Refuge to ensure the necessary water quantity within the Refuge for the conservation of fish and wildlife habitats and populations. The Service began surveying the timing and volume of flow on a subset of the Refuge rivers—identified for resource value in 2008—and completed the survey in 2015. The results of that survey provide an account of water availability on these rivers, and paint a limited picture of the availability of water on the Refuge. To ensure a volume of water that maintains the biologic and ecologic function of Refuge's rivers, water rights around the Refuge need to be quantified to prevent upstream water extraction that may affect the Refuge in the future.

An inventory of the number, type, and location of water rights managed by ADNR provides the current state of water availability in Kanuti Refuge and RHI. The inventory results include an accounting of surface water and groundwater water rights, including temporary water use authorizations. The location and type of water right provide an understanding of water use. The inventory results also establish the state filing number, status, and owner of the water right for evaluation purposes.

Table 13 provides the list of the data sources used to construct the inventory the water rights within Kanuti Refuge and the RHI boundary.

Table 13: Water Rights Data Sources

Data Source	Agency	Inventory Date	Link
Alaska Department of Natural Resources Temporary Water Use Permits	ADNR	2/21/2014	http://dnr.alaska.gov/mlw/mapguide/water/twup_start_tok.cfm
Land Administration System	ADNR	2/21/2014	http://dnr.alaska.gov/projects/las/
Alaska State Geo-Spatial Data Clearinghouse	Alaska		http://www.asgdc.state.ak.us/
Water Rights and Temporary Use Authorizations	ADNR	12/15/2012	http://dnr.alaska.gov/mlw/mapguide/wr_intro.cfm

According to the State of Alaska, a water right is a legal right to use surface or groundwater under the Alaska Water Use Act (AS 46.15). A water right allows a specific amount of water from a specific water source to be diverted, impounded, or withdrawn for a specific use. Groundwater water rights are water rights associated with groundwater wells. Surface water rights include consumptive surface water rights and instream flow water rights.

ADNR LAS website (ADEC, 2017) provided the information associated with active and pending water rights within Kanuti Refuge and the RHI. Geospatial processing joined these records with the spatial data layers to determine the claims with the greatest likelihood of affecting the water supplies of the Kanuti Refuge. Attribute information from the ADNRs records include: the water right type, file status, priority date, owner, and upstream extent of the water right. The Alaska Region WRIA geodatabase, water rights feature dataset maintains the geospatial dataset and the associated attribute information for each water right.

Table 14 presents the results of the inventory of active water rights and claims and temporary use water permits. The list includes water right applications with certified, ready for action, ready for action (protested), permitted application, reserved right, and vested right status.

Table 14: Water rights within the Kanuti Refuge or the RHI buffer organized by water rights type, priority date, and application status

Water Feature Name	*Water right type*	*LAS Number State of AK reference number*	*Status*	*Owner*	*Position*
Jim River	Instream Reservation	LAS13700	Application Received	DFG SPORT FISH DIV INSTREAM FL, OW COORDINATOR	Refuge
Jim River	Instream Reservation	LAS13700	Application Received	DFG SPORT FISH DIV INSTREAM FL, OW COORDINATOR	RHI-upstream
Jim River	Instream Reservation	LAS26581	Application Received	USDI BUREAU LAND MANAGEMENT AL, ASKA STATE OFFI CE	RHI-upstream
Well on Jim Creek Drainage	Subsurface	ADL401822	Certificate Issued	ALYESKA PIPELINE SERVICE COMPA, NY	RHI-upstream
Well on Jim Creek Drainage	Subsurface	ADL64151	Cert. Pend. Action	ALYESKA PIPELINE SERVICE COMPA, NY	RHI-upstream
Well near main stem Koyukuk	Subsurface	ADL75890	Certificate Issued	ALLAKAKET CITY OF,	RHI-downstream
Well on Birch Creek a tributary to Wild River	Subsurface	LAS1489	Certificate Issued	MANNS, ALBERT OR CECILIA	RHI-upstream
Well near main stem Koyukuk	Subsurface	LAS19758	Permit Issued	ALATNA TRIBAL COUNCIL,	RHI-downstream
Well near main stem Koyukuk	Subsurface	LAS19981	Permit Issued	ALLAKAKET CITY OF,	RHI-downstream
Well on Contact Creek tributary to John River	Subsurface	LAS20235	Permit Issued	NORTH SLOPE PUBLIC WORKS,	RHI-upstream
Takahula Lake on Takahula River a tributary to Alatna River	Surface	ADL400050	Cert. Pend. Action	HELMERICKS, HARMON R	RHI-upstream
Prospect Creek/Bob's Pup tributary to Jim Creek	Surface	ADL400065	Permit Issued	FRYAR GOLD MINING GROUP VENTUR, E	RHI-upstream
Unnamed tributary to Alatna River	Surface	ADL400071	Cert. Pend. Action	KEIM, CHARLES J	RHI-upstream
Linda Creek tributary to the Middle Fork Koyukuk River	Surface	ADL400169	Permit Pend. Action	COMPASS MINING INC,	RHI-upstream
Lake Creek tributary to Wild Lake on Wild River	Surface	ADL400628	Permit Pend. Action	BROOKS RANGE EXPL. II, LLC,	RHI-upstream
Hammond River, Vermont Creek tributary to Middle Fork Koyukuk River	Surface	ADL402336	Certificate Issued	ALMINCO AK MINING CO., INC.,	RHI-upstream
Dam on Emma Creek tributary to Middle Fork Koyukuk River	Surface	ADL403549	Permit Pend. Action	NORDEEN, WILLIAM H	RHI-upstream
Hammond River tributary to Middle Fork Koyukuk River	Surface	ADL407935	Permit Issued	WEISZ, LARRY	RHI-upstream
Nolan Creek tributary to Wiseman Creek and Middle Fork Koyukuk River	Surface	ADL46238	Certificate Issued	SILVERADO GOLD MINES INC.,	RHI-upstream
Slate Creek tributary to Middle Fork Koyukuk River	Surface	ADL46334	Certificate Issued	SWENSON, LLOYD D	RHI-upstream
Archibald Creek tributary to Wiseman Creek and Middle Fork Koyukuk River	Surface	ADL47928	Certificate Issued	SILVERADO GOLD MINES INC,	RHI-upstream
Seward Creek tributary to Wild River	Surface	LAS11734	Certificate Issued	HIGHTOWER, EVERETT R	RHI-upstream
Seward Creek tributary to Wild Lake on Wild River	Surface	LAS13319	Certificate Issued	HIGHTOWER, EVERETT R	RHI-upstream
Well at Pump Station 5	TWUP-Subsurface	P2012-3	Permit Issued	Alyeska Pipeline	RHI-upstream
Well at Pump Station 5	TWUP-Subsurface	P2012-3	Permit Issued	Alyeska Pipeline	RHI- upstream
Well at Pump Station 5	TWUP-Subsurface	P2012-3	Permit Issued	Alyeska Pipeline	RHI- upstream
Seasonal Pond at Pump Station 5	TWUP-Surface	P2010-7	Permit Issued	Alyeska Pipeline	RHI- upstream
Seasonal Pond at Pump Station 5	TWUP-Surface	P2010-7	Permit Issued	Alyeska Pipeline	RHI- upstream

3.5. Inventory of Climate and Surface Water Monitoring

The purposes of Kanuti Refuge cannot be met without considering how climate may affect the availability and quality of water. An understanding of how changes in climate may affect water quality, water quantity, and water related habitats can be established through monitoring. An inventory of both climate and water related monitoring projects uncovers the data available for current and future management of Kanuti Refuge's water in a time of climate change.

The inventory catalogued climate and water monitoring stations from publically available Web sources and servers, data from the Service's hydrologic data storage system, and refuge archival records. The inventory presents data readily available in digital format at the time of this report.

Table 15 presents sources for the climate monitoring stations to provided data that represented climate conditions for Kanuti Refuge and RHI. The climate station information sources inventoried include: the National Center for Environmental Information (2013), National Water Information System (NWIS) (2013), SNOTEL station network (2014), the MesoWest Climate Data Portal (2013), and the Artic Landscape Conservation Cooperative Imiq hydro-climate data portal (2014). The inventory located thirty-six climate stations within Kanuti Refuge and RHI, listed in Table 16. Table 16 organizes the inventoried stations by the managing agency and climate network listed in the bulleted list below.

- NOAA GHNC is the Global Historical Climatology Network (GHCN) operated by the National Oceanic and Atmospheric Agency(NOAA)
- NOAA ISD is the Integrated Surface Database (ISD) operated by NOAA
- NRCS SNOTEL is a Snow Telemetry (SNOTEL) operated by the National Water and Climate Center (NRCS)
- NRCS Snow Course is a non-automated survey operated by the National Water and Climate Center (NRCS)
- UAF WERC is the University of Alaska Fairbanks (UAF) Water and Environmental Research Center (WERC). They operate Automated Surface Observing Systems (ASOS).
- RAWS is a Remote Automated Weather Station operated by US Fish and Wildlife Service (USFWS) or National Park Service (USPS).
- Cooperative Observer Program (COOP) sites are NOAA sites operated by cooperating agencies.

The inventory selected surface water monitoring stations (including water quality, temperature, fisheries, and water quantity monitoring stations) within the Kanuti Refuge RHI. The surface water quantity data sources inventoried include NWIS, the Service's water resources inventory gage stations, and refuge reports/files with available location information. Table 17 lists the data sources. Table 18 provides a summary list of water related monitoring stations. Table 19 provides a detailed list of the individual sites organized by parameter. Table 19 also provides links to the web accessible datasets.

Table 15: Climate Data Sources - Listing inventory data sources used in the climate stations inventory

Data Source	*Agency*	*Retrieval Method*	*Inventory Date*	*Link*
Long Term Ecological Research Network Data Portal	NSF			https://metacat.lternet.edu/das/lter/
Scenarios Network for Alaska & Arctic Planning	UAF			http://www.snap.uaf.edu/
US Climate Reference Network	NOAA			http://www.ncdc.noaa.gov/crn/observations.htm
Imiq Hydro-climate Database	University of Alaska Fairbanks	scheduled download	10/1/2014	http://arcticlcc.org/projects/imiq
United States Historical Climatology Network	USDOE			http://cdiac.ornl.gov/epubs/ndp/ushcn/ushcn.html
Alaska Climate Research Center	UAF			http://climate.gi.alaska.edu/
National Centers for Environmental Information	NOAA		5/1/2013	http://www.ncdc.noaa.gov/cdo-web/
MesoWest	University of Utah	web tool	1/7/2013	http://mesowest.utah.edu/
NOAA Breakup and Ice Information Data	NOAA			http://aprfc.arh.noaa.gov/data/breakup.php
UAF International Arctic Research Center Data Archive	UAF			http://climate.iarc.uaf.edu/geonetwork/srv/en/main.home
Advanced Cooperative Arctic Data and Information Service	NSF			http://www.aoncadis.org/
National Snow and Ice Data Center	NSIDC			http://nsidc.org/data/collections.html
Parameter-elevation Regressions on Independent Slopes Model	OSU			http://www.prism.oregonstate.edu/
RAWS USA Climate Archive	WRCC	aggregated - Mesowest		http://www.raws.dri.edu/
SNOwpack Telemetry	NRCS	aggregated - Mesowest	10/1/2014	http://www.wcc.nrcs.usda.gov/snow/
Real-time Observation Monitor and Analysis Network	NOAA			http://raws.wrh.noaa.gov/roman/

Table 16: Weather and Climate Station Table - listing hydro-climate stations within the Kanuti Refuge or the RHI buffer

Data Source/Agency	*Station Name*	*Station Number*	*Data Network*	*Station Type*	*Begin Date*	*End Date*	*Position*	*Link*
NOAA GHCN	ALLAKAKET	USC00500230	NCDC GHCN	ASOS	7/1/1907	5/31/1998	RHI	NOAA GHCN link
NOAA GHCN	ANAKTUVUK AUTO	USC00500270	NCDC GHCN	COOP	7/1/1953	9/30/1973	RHI	NOAA GHCN link
NOAA GHCN	BETTLES AP_70174	USW00026533	NCDC GHCN	ASOS	5/1/1951	4/30/2013	RHI	NOAA GHCN link
NOAA GHCN	BETTLES CAA	USW00026517	NCDC GHCN	ASOS	5/1/1944	4/30/1951	RHI	NOAA GHCN link
NOAA GHCN	COLDFOOT	USC00502104	NCDC GHCN	COOP	9/1/1993	4/30/2000	RHI	NOAA GHCN link
NOAA GHCN	COLDFOOT CAMP	USC00502103	NCDC GHCN	COOP	10/1/1970	5/31/1977	RHI	NOAA GHCN link
NOAA GHCN	DIETRICH CAMP	USC00502425	NCDC GHCN	COOP	10/1/1970	4/30/1972	RHI	NOAA GHCN link
NOAA GHCN	OLD MAN	USC00506800	NCDC GHCN	COOP	2/1/1975	10/31/1976	RHI	NOAA GHCN link
NOAA GHCN	PROSPECT CREEK	USC00507778	NCDC GHCN	COOP	10/1/1970	4/30/2001	RHI	NOAA GHCN link
NOAA GHCN	WILD LAKE	USC00509858	NCDC GHCN	COOP	1/1/1955	9/30/1960	RHI	NOAA GHCN link
NOAA GHCN	WILD LAKE 2	USC00509859	NCDC GHCN	COOP	12/1/1963	2/29/1976	RHI	NOAA GHCN link
NOAA GHCN	WISEMAN	USC00509869	NCDC GHCN	COOP	11/1/1918	4/30/2013	RHI	NOAA GHCN link
NOAA ISD	ANAKTUVUK PASS	701625	NCDC ISD	COOP	9/11/1980	12/31/2012	RHI	NOA ISD Link
NOAA ISD	BETTLES	701740	NCDC ISD	COOP	1/1/1945	12/31/2012	Refuge	NOA ISD Link
NOAA ISD	BETTLES CAA	999999-26517	NCDC ISD	COOP	7/1/1948	5/1/1951	RHI	NOA ISD Link
NOAA ISD	DIETRICK (SAWRS)	701746	NCDC ISD	COOP	8/25/1973	7/29/1975	RHI	NOA ISD Link
NOAA ISD	OLD MAN	702616	NCDC ISD	COOP	1/8/1975	11/23/1976	RHI	NOA ISD Link
NOAA ISD	OLD MAN	999999-26540	NCDC ISD	COOP	11/1/1974	11/1/1975	RHI	NOA ISD Link
NOAA ISD	PROSPECT CREEK ARPT	701748	NCDC ISD	ASOS	8/25/1973	12/18/2012	RHI	NOA ISD Link
NOAA ISD	PROSPECT CREEK ARPT	722163	NCDC ISD	ASOS	6/1/2004	6/7/2011	RHI	NOA ISD Link
NOAA ISD	WISEMAN ALASKA WB	749222	NCDC ISD	COOP	1/1/1945	7/1/1948	RHI	NOA ISD Link
NOAA ISD	WISEMAN ARPT	701749	NCDC ISD	COOP	8/19/1994	8/3/2002	RHI	NOA ISD Link
NRCS SNOTEL	BETTLES FIELD	1182	SNOTEL	SNOTEL	10/1/1980	3/19/2014	RHI	NRCS SNOWTEL Link
NRCS SNOTEL	COLDFOOT	958	SNOTEL	SNOTEL	7/26/1995	3/19/2014	RHI	NRCS SNOWTEL Link
NRCS SNOTEL	GOBBLERS KNOB	962	SNOTEL	SNOTEL	7/16/1997	3/19/2014	RHI	NRCS SNOWTEL Link
NRCS SCAN	KANUTI LAKE	2212	SCAN	SCAN	10/01/2014	Present	Refuge	NRCS SNOWTEL Link
NRCS Snow Course	BETTLES FIELD	51R01	Snow Course	Snow Course	10/1/1989	Present	RHI	NRCS SNOWTEL Link
NRCS Snow Course	KALDOYEIT	51R02	Snow Course	Snow Course	10/1/1989	Present	RHI	NRCS SNOWTEL Link
NRCS Snow Course	KANUTI CHALATNA	52R02	Snow Course	Snow Course	10/1/1989	Present	Refuge	NRCS SNOWTEL Link
NRCS Snow Course	KANUTI KILOLITNA	52R04	Snow Course	Snow Course	10/1/1989	Present	Refuge	NRCS SNOWTEL Link
NRCS Snow Course	MINNKOKUT	51R03	Snow Course	Snow Course	10/1/1989	Present	RHI	NRCS SNOWTEL Link
NRCS Snow Course	NOLITNA	52R03	Snow Course	Snow Course	10/1/1989	Present	RHI	NRCS SNOWTEL Link
NRCS Snow Course	TAIHOLMAN	51R04	Snow Course	Snow Course	10/1/1980	Present	RHI	NRCS SNOWTEL Link
NRCS Snow Course	BONANZA FORKS	50r03	Snow Course	Snow Course	1/29/1981	Present	RHI	NRCS Snow Course Link
NRCS Snow Course	COLDFOOT	50s01	Snow Course	Snow Course	2/17/1970	11/30/2005	RHI	NRCS Snow Course Link
NRCS Snow Course	LAKE TODATONTEN	52r01	Snow Course	Snow Course	3/6/1968	4/4/2012	RHI	NRCS Snow Course Link
NRCS Snow Course	PROSPECT AIRSTRIP (DISC)	50r01	Snow Course	Snow Course	2/1/1971	4/23/1993	RHI	NRCS Snow Course Link

Data Source/Agency	Station Name	Station Number	Data Network	Station Type	Begin Date	End Date	Position	Link
UAF WERC Ambler Corridor Project	Upper Iniakuk	DAM6	ASOS	ASOS	NA	NA	RHI	UAF WERC Link
UAF-WERC Umiat Corridor	White Lake	DUM6	ASOS	ASOS	NA	NA	RHI	UAF WERC Link
UAF WERC Ambler Corridor Project	WLD	DAM5	ASOS	ASOS	NA	NA	RHI	UAF WERC Link
NRCC USFWS RAWS	Kanuti Refuge	AKAN	RAWS	RAWS	8/1/1990	4/30/2013	Refuge	RAWS Link
NRCC NPS RAWS	Chimney Lake	ACHM	RAWS	RAWS	9/1/2012	4/30/2013	RHI	RAWS Link
NRCC NPS RAWS	Pamichtuk Lake	APAM	RAWS	RAWS	9/1/2012	9/30/2012	RHI	RAWS Link
NRCC NPS RAWS	Ram Creek	ARMC	RAWS	RAWS	9/1/2012	4/30/2013	RHI	RAWS Link

Table 17: Monitoring Data Sources - listing inventory data sources used in the monitoring stations inventory

Data Source	Agency	Retrieval Method	Inventory Date	Link
Streams Database	ADNR			http://dnr.alaska.gov/mlw/water/hydro/streams/streams.cfm
R7 - Water Resource Branch Database	USFWS			
Contaminants Assessment Process	USFWS			https://ecos.fws.gov/cap
Boise Lab Stream Temperature Modeling and Monitoring	USFS	data call	2/27/2013	http://www.fs.fed.us/rm/boise/AWAE/projects/stream_temperature.shtml
Imiq Hydro-climate Database	University of Alaska Fairbanks	scheduled download	10/1/2014	http://arcticlcc.org/projects/imiq
R7 - NWRS Lake Temperature Monitoring	USFWS			
National Water Information System	USGS	web tool	1/23/2013	http://nwis.waterdata.usgs.gov/
North Slope Science Initiative	UAF			http://catalog.northslope.org/
Water Quality Portal	USGS/EPA			http://www.waterqualitydata.us/index.jsp
NAWQA Data Warehouse	USGS			http://infotrek.er.usgs.gov/apex/f?p=NAWQA:HOME:0
SNOwpack Telemetry	NRCS	aggregated - Mesowest		http://www.wcc.nrcs.usda.gov/snow/
R7 - Discharge Gages	USFWS	data call	1/7/2013	
Lake Habitat and Fish Surveys on Interior Alaska National Wildlife Refuges, 1984–1986	USFWS			http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf

Table 18: Water resources monitoring sites within the Kanuti Refuge or the RHI buffer outside the Refuge boundary summarized by parameter group

Parameter Group	Site Count	In Refuge	In RHI
discharge	18	9	9
stage	9	9	9
water quality chemical	6	6	0
water quality physical	80	19	61
water temperature	10	4	6
fish	11	11	0

Table 19: Water resources monitoring sites within the Kanuti Refuge or the RHI buffer summarized by parameter group and station

Parameter Group	Station Name	Site Number	Source	Status	Begin Date	End Date	Agency	Position	URL
discharge	South Fork Koyukuk River 7.5 miles above Jim River near Bettles, AK	665105151054300	WRB Gage Stations	active	2008	NA	USFWS	Refuge	NA
discharge	Koyukuk River 0.8 miles below John River near Bettles, Alaska	665429151405100	WRB Gage Stations	active	2010	NA	USFWS	Refuge	NA
discharge	Kanuti Kilolitna River 23 miles above Holonada Creek near Allakaket, AK	655930151520700	WRB Gage Stations	active	2008	NA	USFWS	Refuge	NA
discharge	Kanuti River 30 miles below Dalton Highway near Bettles, AK	661747151065800	WRB Gage Stations	active	2008	NA	USFWS	Refuge	NA
discharge	Henshaw Creek at Double Point Mountain near Allakaket, AK	664129152165400	WRB Gage Stations	active	2008	NA	USFWS	Refuge	NA
discharge	Fish Creek at Hulgothen Bluffs near Bettles, AK	663405151122800	WRB Gage Stations	active	2008	NA	USFWS	Refuge	NA
discharge	South Fork Koyukuk River at Dalton Highway near Bettles, AK	670106150172600	WRB Gage Stations	active	2008	NA	BLM	Refuge	NA
discharge	Kanuti River Tributary 1 mile above Kanuti River near Bettles, AK	661223151051100	WRB Gage Stations	active	2008	NA	USFWS	Refuge	NA
discharge	Holonada Creek 17 miles above Kanuti Kilolitna River near Allakaket, AK	660145152074900	WRB Gage Stations	active	2008	NA	USFWS	Refuge	NA
fish	Tokusatatquaten	660714151114100	USFWS Lake Surveys	historic	1984	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
fish	Sithylemenkat	660730151233500	USFWS Lake Surveys	historic	1984	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
fish	Old Dummy	660818151511400	USFWS Lake Surveys	historic	1984	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
fish	Unnamed	660826151551200	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
fish	Unnamed	660857151482200	USFWS Lake Surveys	historic	1984	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
fish	Unnamed	660936151470600	USFWS Lake Surveys	historic	1984	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
fish	Unnamed	662150151582300	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
fish	Kodosin	662211152000000	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
fish	Konedsin	662224151570800	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
fish	Mingkoket	662959152070200	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
fish	Minnkokut	663337151411800	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
habitat	Tokusatatquaten	660714151114100	USFWS Lake Surveys	historic	1984	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
habitat	Sithylemenkat	660730151233500	USFWS Lake Surveys	historic	1984	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
habitat	Old Dummy	660818151511400	USFWS Lake Surveys	historic	1984	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
habitat	Unnamed	660826151551200	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf

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habitat	Unnamed	660857151482200	USFWS Lake Surveys	historic	1984	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
habitat	Unnamed	660936151470600	USFWS Lake Surveys	historic	1984	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
habitat	Unnamed	662150151582300	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
habitat	Kodosin	662211152000000	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
habitat	Konedsin	662224151570800	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
habitat	Mingkoket	662959152070200	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
habitat	Minnkokut	663337151411800	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
stage	South Fork Koyukuk River 7.5 miles above Jim River near Bettles, AK	665105151054300	WRB Gage Stations	active	2008	NA	USFWS	Refuge	NA
stage	Koyukuk River 0.8 miles below John River near Bettles, Alaska	665429151405100	WRB Gage Stations	active	2010	NA	USFWS	Refuge	NA
stage	Kanuti Kilolitna River 23 miles above Holonada Creek near Allakaket, AK	655930151520700	WRB Gage Stations	active	2008	NA	USFWS	Refuge	NA
stage	Kanuti River 30 miles below Dalton Highway near Bettles, AK	661747151065800	WRB Gage Stations	active	2008	NA	USFWS	Refuge	NA
stage	Henshaw Creek at Double Point Mountain near Allakaket, AK	664129152165400	WRB Gage Stations	active	2008	NA	USFWS	Refuge	NA
stage	Fish Creek at Hulgothen Bluffs near Bettles, AK	663405151122800	WRB Gage Stations	active	2008	NA	USFWS	Refuge	NA
stage	South Fork Koyukuk River at Dalton Highway near Bettles, AK	670106150172600	WRB Gage Stations	active	2008	NA	BLM	Refuge	NA
stage	Kanuti River Tributary 1 mile above Kanuti River near Bettles, AK	661223151051100	WRB Gage Stations	active	2008	NA	USFWS	Refuge	NA
stage	Holonada Creek 17 miles above Kanuti Kilolitna River near Allakaket, AK	660145152074900	WRB Gage Stations	active	2008	NA	USFWS	Refuge	NA
water quality chemical	South Fork Koyukuk River 7.5 miles above Jim River near Bettles, AK	665105151054300	WRB Gage Stations	active	2011	NA	USFWS	Refuge	NA
water quality chemical	Kanuti Kilolitna River 23 miles above Holonada Creek near Allakaket, AK	655930151520700	WRB Gage Stations	active	2011	NA	USFWS	Refuge	NA
water quality chemical	Kanuti River 30 miles below Dalton Highway near Bettles, AK	661747151065800	WRB Gage Stations	active	2011	NA	USFWS	Refuge	NA
water quality chemical	Fish Creek at Hulgothen Bluffs near Bettles, AK	663405151122800	WRB Gage Stations	active	2003	2007	USFWS	Refuge	NA
water quality chemical	South Fork Koyukuk River at Dalton Highway near Bettles, AK	670106150172600	WRB Gage Stations	active	2011	NA	BLM	Refuge	NA
water quality chemical	Kanuti River Tributary 1 mile above Kanuti River near Bettles, AK	661223151051100	WRB Gage Stations	active	2010	NA	USFWS	Refuge	NA
water quality physical	Tokusatatquaten	660714151114100	USFWS Lake Surveys	historic	1984	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
water quality physical	Sithylemenkat	660730151233500	USFWS Lake Surveys	historic	1984	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
water quality physical	Old Dummy	660818151511400	USFWS Lake Surveys	historic	1984	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
water quality physical	Unnamed	660826151551200	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
water quality physical	Unnamed	660857151482200	USFWS Lake Surveys	historic	1984	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
water quality physical	Unnamed	660936151470600	USFWS Lake Surveys	historic	1984	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf

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water quality physical	Unnamed	662150151582300	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
water quality physical	Kodosin	662211152000000	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
water quality physical	Konedsin	662224151570800	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
water quality physical	Mingkoket	662959152070200	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
water quality physical	Minnkokut	663337151411800	USFWS Lake Surveys	historic	1985	NA	USFWS	Refuge	http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
water quality physical	South Fork Koyukuk River 7.5 miles above Jim River near Bettles, AK	665105151054300	WRB Gage Stations	active	2008	NA	USFWS	Refuge	NA
water quality physical	Koyukuk River 0.8 miles below John River near Bettles, Alaska	665429151405100	WRB Gage Stations	active	2010	NA	USFWS	Refuge	NA
water quality physical	Kanuti Kilolitna River 23 miles above Holonada Creek near Allakaket, AK	655930151520700	WRB Gage Stations	active	2008	NA	USFWS	Refuge	NA
water quality physical	Kanuti River 30 miles below Dalton Highway near Bettles, AK	661747151065800	WRB Gage Stations	active	2010	NA	USFWS	Refuge	NA
water quality physical	Fish Creek at Hulgothen Bluffs near Bettles, AK	663405151122800	WRB Gage Stations	active	2002	2007	USFWS	Refuge	NA
water quality physical	Kanuti River Tributary 1 mile above Kanuti River near Bettles, AK	661223151051100	WRB Gage Stations	active	2008	NA	USFWS	Refuge	NA
water quality physical	Holonada Creek 17 miles above Kanuti Kilolitna River near Allakaket, AK	660145152074900	WRB Gage Stations	active	2010	NA	USFWS	Refuge	NA
water temperature	Kanuti Kilolitna River	6559301515206	AKOATS	underdevelopment	2005	2013	USFWS	Refuge	http://aknhp.uaa.alaska.edu/aquatic-ecology/akoats/
water temperature	Kanuti River tributary	6612221510511	AKOATS	underdevelopment	2008	2014	USFWS	Refuge	http://aknhp.uaa.alaska.edu/aquatic-ecology/akoats/
water temperature	Kanuti River	6617471510658	AKOATS	underdevelopment	2008	2013	USFWS	Refuge	http://aknhp.uaa.alaska.edu/aquatic-ecology/akoats/
water temperature	Henshaw Creek	6633241521234	AKOATS	on going	2013	2013	USFWS	Refuge	http://aknhp.uaa.alaska.edu/aquatic-ecology/akoats/
water temperature	South Fork Koyukuk River	6651051510542	AKOATS	underdevelopment	2008	2013	USFWS	Refuge	http://aknhp.uaa.alaska.edu/aquatic-ecology/akoats/
water temperature	Slate Creek	6715151501033	AKOATS	on going	1998	2014	USGS	Refuge	http://aknhp.uaa.alaska.edu/aquatic-ecology/akoats/
water temperature	Marion Creek	6719301500205	AKOATS	completed	2013	2013	BLM	Refuge	http://aknhp.uaa.alaska.edu/aquatic-ecology/akoats/
water temperature	Nugget Creek	6728401495040	AKOATS	completed	2011	2011	BLM	Refuge	http://aknhp.uaa.alaska.edu/aquatic-ecology/akoats/
water temperature	Upper Gold Creek	6728551494039	AKOATS	completed	2012	2012	BLM	Refuge	http://aknhp.uaa.alaska.edu/aquatic-ecology/akoats/
water temperature	Lower Gold Creek	6730461495122	AKOATS	completed	2012	2012	BLM	Refuge	http://aknhp.uaa.alaska.edu/aquatic-ecology/akoats/
discharge	KOYUKUK R NR ALLAKAKET AK	662636153060900	NWIS	historic	1994	1994	USGS	RHI	http://waterdata.usgs.gov/nwis
discharge	BONANZA C TRIB NR PROSPECT CAMP AK	663650150413300	NWIS	historic	1975	2013	USGS	RHI	http://waterdata.usgs.gov/nwis
discharge	PROSPECT C NR PROSPECT CAMP AK	664654150411500	NWIS	historic	1905	2012	USGS	RHI	http://waterdata.usgs.gov/nwis
discharge	JIM R NR BETTLES AK	664708150523200	NWIS	historic	1905	1977	USGS	RHI	http://waterdata.usgs.gov/nwis
discharge	SLATE C AT COLDFOOT AK	671515150103300	NWIS	historic	1905	2013	USGS	RHI	http://waterdata.usgs.gov/nwis
discharge	WISEMAN C AT WISEMAN AK	672436150063000	NWIS	historic	1971	1994	USGS	RHI	http://waterdata.usgs.gov/nwis
discharge	NUGGET C NR WISEMAN AK	672923149522900	NWIS	historic	1975	2013	USGS	RHI	http://waterdata.usgs.gov/nwis

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discharge	SNOWDEN C NR WISEMAN AK	674418149443300	NWIS	historic	1905	2004	USGS	RHI	http://waterdata.usgs.gov/nwis
discharge	DIETRICH R TRIB NR WISEMAN AK	675746149461200	NWIS	historic	2004	2011	USGS	RHI	http://waterdata.usgs.gov/nwis
stage	KOYUKUK R NR ALLAKAKET AK	662636153060900	NWIS	historic	1994	1994	USGS	RHI	http://waterdata.usgs.gov/nwis
stage	BONANZA C TRIB NR PROSPECT CAMP AK	663650150413300	NWIS	historic	1975	2013	USGS	RHI	http://waterdata.usgs.gov/nwis
stage	PROSPECT C NR PROSPECT CAMP AK	664654150411500	NWIS	historic	1905	2012	USGS	RHI	http://waterdata.usgs.gov/nwis
stage	JIM R NR BETTLES AK	664708150523200	NWIS	historic	1905	1977	USGS	RHI	http://waterdata.usgs.gov/nwis
stage	SLATE C AT COLDFOOT AK	671515150103300	NWIS	historic	1905	2013	USGS	RHI	http://waterdata.usgs.gov/nwis
stage	WISEMAN C AT WISEMAN AK	672436150063000	NWIS	historic	1971	1994	USGS	RHI	http://waterdata.usgs.gov/nwis
stage	NUGGET C NR WISEMAN AK	672923149522900	NWIS	historic	1975	2013	USGS	RHI	http://waterdata.usgs.gov/nwis
stage	SNOWDEN C NR WISEMAN AK	674418149443300	NWIS	historic	1905	2004	USGS	RHI	http://waterdata.usgs.gov/nwis
stage	DIETRICH R TRIB NR WISEMAN AK	675746149461200	NWIS	historic	2004	2011	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	BONANZA C TRIB NR PROSPECT CAMP AK	663650150413300	NWIS	historic	1971	1975	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	PROSPECT C NR PROSPECT CAMP AK	664654150411500	NWIS	historic	1975	1975	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	JIM R NR BETTLES AK	664708150523200	NWIS	historic	1970	1976	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	SLATE C AT COLDFOOT AK	671515150103300	NWIS	historic	1998	2014	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	WISEMAN C AT WISEMAN AK	672436150063000	NWIS	historic	1970	1976	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	KANUTI R NR BETTLES AK	662601150381600	NWIS	historic	1971	1977	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	FB01901419BCCD1 001	662730150384700	NWIS	historic	1974	1974	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	KOYUKUK R AT ALLAKAKET AK	663358152383900	NWIS	historic	1972	1972	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	PROSPECT C AT PIPELINE NR BETTLES AK	664648150403900	NWIS	historic	1977	1977	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	JIM R BL PROSPECT CAMP SITE 4 NR BETTLES AK	664707150495800	NWIS	historic	1976	1976	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	JIM R BL PROSPECT CAMP SITE 3 NR BETTLES AK	664733150440900	NWIS	historic	1976	1976	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	PROSPECT C AT MOUTH NR PROSPECT CAMP AK	664735150424500	NWIS	historic	1970	1972	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	JIM R BL PROSPECT CAMP SITE2 NR BETTLES AK	664740150435700	NWIS	historic	1975	1976	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	JIM R BL PROSPECT CAMP SITE2 NR BETTLES AK	664740150435700	NWIS	historic	1975	1977	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	JIM R BL PROSPECT CAMP NR BETTLES AK	664740150435700	NWIS	historic	1975	1976	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	JIM R BL PROSPECT CAMP NR BETTLES AK	664740150435700	NWIS	historic	1975	1977	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	JIM R AB PROSPECT CAMP NR BETTLES AK	664750150431500	NWIS	historic	1975	1977	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	SF KOYUKUK R NR WISEMAN AK	670108150164900	NWIS	historic	1977	1977	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	SLATE C NR WISEMAN AK	671527150111400	NWIS	historic	1971	1972	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	MF KOYUKUK R AB SLATE C NR WISEMAN AK	671544150122500	NWIS	historic	1972	1972	USGS	RHI	http://waterdata.usgs.gov/nwis

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water quality physical	MINNIE C NR WISEMAN AK	672458150023100	NWIS	historic	1971	1971	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	MINNIE C AT WISEMAN AK	672518150053700	NWIS	historic	1971	1971	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	MF KOYUKUK R NR WISEMAN AK	672616150043900	NWIS	historic	1970	1978	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	NOLAN CREEK LK NR WISEMAN AK	672754150155100	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	HAMMOND R NR WISEMAN AK	672743150020900	NWIS	historic	1977	1977	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	UNNAMED LK NR MOUTH OF DIETRICH R NR WISEMAN AK	673850149432000	NWIS	historic	1970	1972	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	UNNAMED P NR MOUTH OF DIETRICH R NR WISEMAN AK	673907149432700	NWIS	historic	1970	1972	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	SNOWDEN C NR DIETRICH CAMP NR WISEMAN AK	674418149451900	NWIS	historic	1977	1977	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	DIETRICH R BL KUYUKTUVUK C NR WISEMAN AK	675408149492400	NWIS	historic	1971	1972	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	KUYUKTUVUK C 1MI AB DIETRICH R NR WISEMAN AK	675536149512100	NWIS	historic	1971	1972	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	NUTIRWIK C NR WISEMAN AK	675603149491000	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	KUYUKTUVUK C 5MI AB DIETRICH R NR WISEMAN AK	675958149544700	NWIS	historic	1971	1971	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	KUYUKTUVUK C 10MI AB DIETRICH R NR WISEMAN AK	680306149505400	NWIS	historic	1971	1971	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	JOHN R 1 MI BL INUKPASUGRUK C AT ANAKTUVUK PASS AK	680656151470600	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	JOHN R BL INUKPASUGRUK C AT ANAKTUVUK PASS AK	680712151464000	NWIS	historic	2002	2003	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	14UKPASUGRUK C AT ANAKTUVUK PASS AK	680733151445300	NWIS	historic	2002	2003	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	UD01500219CACA1 005 OBSERVATION WELL 7	680735151453900	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	UD01500219CABC1 004 OBSERVATION WELL 6	680737151454700	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	UD01500219ACBD1 003 OBSERVATION WELL 5	680750151450500	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	JOHN R TRIB AT ANAKTUVUK PASS AK	680751151451100	NWIS	historic	2002	2003	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	CONTACT C AB INUKPASUGRUK C AT ANAKTUVUK PASS AK	680753151443200	NWIS	historic	2002	2002	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	CONTACT C 0.7 MI AB MOUTH AT ANAKTUVUK PASS AK	680800151440300	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	UD01500219AABC1 002 OBSERVATION WELL 4	680804151444000	NWIS	historic	2003	2003	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	JOHN R TRIB AB LAGOONS AT ANAKTUVUK PASS AK	680807151444300	NWIS	historic	2003	2003	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	UD01500219AABA1 001 OBSERVATION WELL 3	680808151443100	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	UD01500218DDCD1S	680809151442200	NWIS	historic	1972	1972	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	CONTACT C 1.1 MI AB MOUTH AT ANAKTUVUK PASS AK	680818151434400	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	CONTACT C .4 MI BL MAIN ST AT ANAKTUVUK PASS AK	680820151433600	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	UD01500218DADC1 002	680824151441800	NWIS	historic		USGS	RHI	http://waterdata.usgs.gov/nwis	
water quality physical	UNNAMED LK AT ANAKTUVUK PASS AK	680826151443600	NWIS	historic	1971	1971	USGS	RHI	http://waterdata.usgs.gov/nwis

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water quality physical	CONTACT C .2 MI BL MAIN ST AT ANAKTUVUK PASS AK	680827151434300	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	CONTACT C AT AIRSTRIP AT ANAKTUVUK PASS AK	680829151434900	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	UD01500217CBBD1 003 OBSERVATION WELL 2	680830151435300	NWIS	historic	2003	2003	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	UD01500218DAAA1 003	680834151441500	NWIS	historic	1974	1989	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	CONTACT C AT MAIN ST AT ANAKTUVUK PASS AK	680835151440000	NWIS	historic	2002	2003	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	UD01500217BCCC1 001	680836151440400	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	UD01500217BCCD1 002 OBSERVATION WELL 1	680836151435900	NWIS	historic	2003	2003	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	CONTACT C AT ANAKTUVUK PASS AK	680844151440700	NWIS	historic	1989	1989	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	CONTACT C BL L CONTACT C AT ANAKTUVUK PASS AK	680855151443200	NWIS	historic	2002	2002	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	L CONTACT C AT MOUTH AT ANAKTUVUK PASS AK	680856151443500	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis
water quality physical	CONTACT C AB L CONTACT C AT ANAKTUVUK PASS AK	680857151445500	NWIS	historic	NA	NA	USGS	RHI	http://waterdata.usgs.gov/nwis

3.7. Inventory of Threats

Managing water to meet the Refuge purposes is a complex task that requires an understanding of the water features, their habitat value, their current condition, and the threats to their current condition. Thus far, the inventory presents the available information for establishing the current extent and condition of the Refuge's water resources. The inventory of threats provides a view of things threatening the future condition of water quality, quantity, and aquatic habitat.

The inventory identifies the threats in and around Kanuti Refuge from existing data sources. The inventory applies a threat and cause hierarchy lexicon established by the national WRIA team to each threat feature (Tables 20 and 21).

These threats were gathered via a geospatial inventory of existing state, federal, and local database. Table 22 lists the data sources used to construct the threats geospatial data layers. These geospatial data layers delineate threats and classify them via the threat and cause hierarchy. Map 2, Map 3, and Table 23 present the results of the threats inventory. The Assessment provides a discussion of these and other threats, and how they will influence the inventoried water resources.

Table 20: National WRIA Classification of Threats

Type of Threat	Threat Subclass
Water Quality Related Threats	Nutrient Pollution
	Pathogens
	Pesticides
	Mercury
	Metals (other than Mercury)
	PCBs
	Altered Thermal Regime
	Salinity/TDS/Chlorides/Sulfates
	Altered Ph
	Low Dissolved Oxygen
	Endocrine Disruptors/Emerging Contaminants
	Other Contaminants/ Altered Water Chemistry
	Hydrocarbons
	Nutrient Pollution
Water Quantity Related Threats	Insufficient Surface Water
	Insufficient Groundwater
	Excess Surface Water/Flooding
	Excess Groundwater/High Water Table
	Altered Flow Regime
	Compromised Water Management Capability
	Legal challenges or fines for non-compliance with water policy, law, or regulation
Aquatic Habitat Threat	Impaired Stream Connectivity
	Bank Erosion/Channel Incision
	Sedimentation
	Habitat Shifting/Alteration
	Loss/Alteration of Stream Channel Habitat
	Loss/Alteration of Floodplain Habitat
	Loss/Alteration of Wetland Habitat
	Loss/Alteration of Lake or Pond Habitat
	Loss/Alteration of Estuarine Habitat
	Tundra/Permafrost Thawing

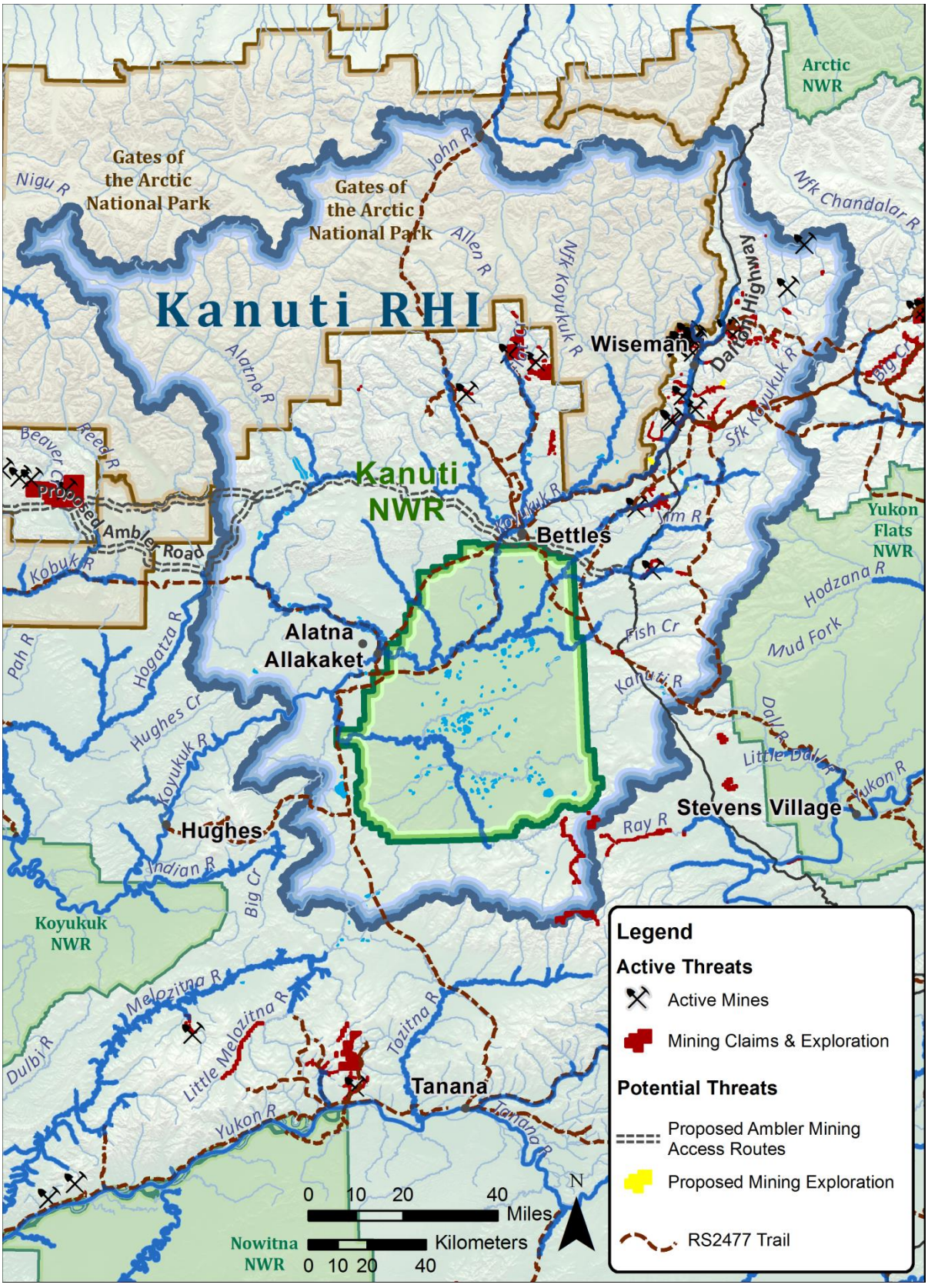
Table 21: National WRIA Classification of the causes to associate with known threats

Cause of Threat	Cause of Threat Sub-Category
Water Quality Causes	Agricultural Runoff
	Cropland drainage/Tiling
	Urban Runoff
	Urban Sewage
	Wastewater Treatment Facilities
	Failing Septic
	Livestock
	Concentrated Animal Feeding Operations
	Wildlife Sources
	Industrial Effluent
	Oil and Gas Development
	Oil and Gas Exploration
	Hydraulic Fracturing
	Garbage/Solid Waste
	Airborne Pollutants
	Irrigation
	Fire and Fire Suppression
	Naturally-Occurring Contaminants
	Invasive Species
	Agricultural Run-off
Water Supply Causes	Surface Water Diversion: Agriculture
	Surface Water Diversion: Municipal
	Surface Water Diversion: Industrial
	Groundwater Pumping: Agriculture
	Groundwater Pumping: Municipal
	Groundwater Pumping: Industrial
	Dams
	Locks
	Canals
	Levees/Dikes
	Drainage Ditches
	Channelization
	Impervious surfaces
	Pumping Stations
	Irrigation Return Flows
	Inter-Basin Transfers
	Invasive species
Water Management Capability Causes	Non-USFWS Management of Water Infrastructure
	Lack of Water Management Infrastructure
	Inefficient, Inadequate, or Damaged Water Management Infrastructure
	Other Legal/Political Constraints
	No Active Monitoring
Water Rights / Legal Causes	USFWS Does Not Have Permit / Right for Refuge Water Use
	Existing Permit / Right for Non-Wildlife Beneficial Use
	Existing Rights Junior Priority
	Existing Rights Insufficient Quantity/Timing to Meet Refuge Purposes
	State Regulations Not Enforced
	Refuge Water Rights Challenged by others
	USFWS Not Participating in Basin Adjudication
	USFWS Not Quantifying Water Use
	Loss Due to Non-Use
	No Proof of Beneficial Use
	ESA Compliance /Threats to Listed Species
	Interstate Compact Agreements
	International Treaties
	Augmentation/Replacement Requirements
	Restrictions in Establishing Legislation
	Other Legal Disputes/Issues
Landscape Alteration Causes	Altered Riparian Vegetation
	Agriculture
	Urban Development
	Roads/Culverts
	Road Construction/Maintenance
	Pipelines and Utility Corridors
	Grazing/Ranching
	Logging/Forestry
	Mining/Quarrying
	Wetland Filling
Climate Causes	Climate Warming
	Extreme Precipitation Events
	Change in Frequency/Severity of Extreme Precipitation Events
	Change in Precipitation Patterns (Non-Extreme)

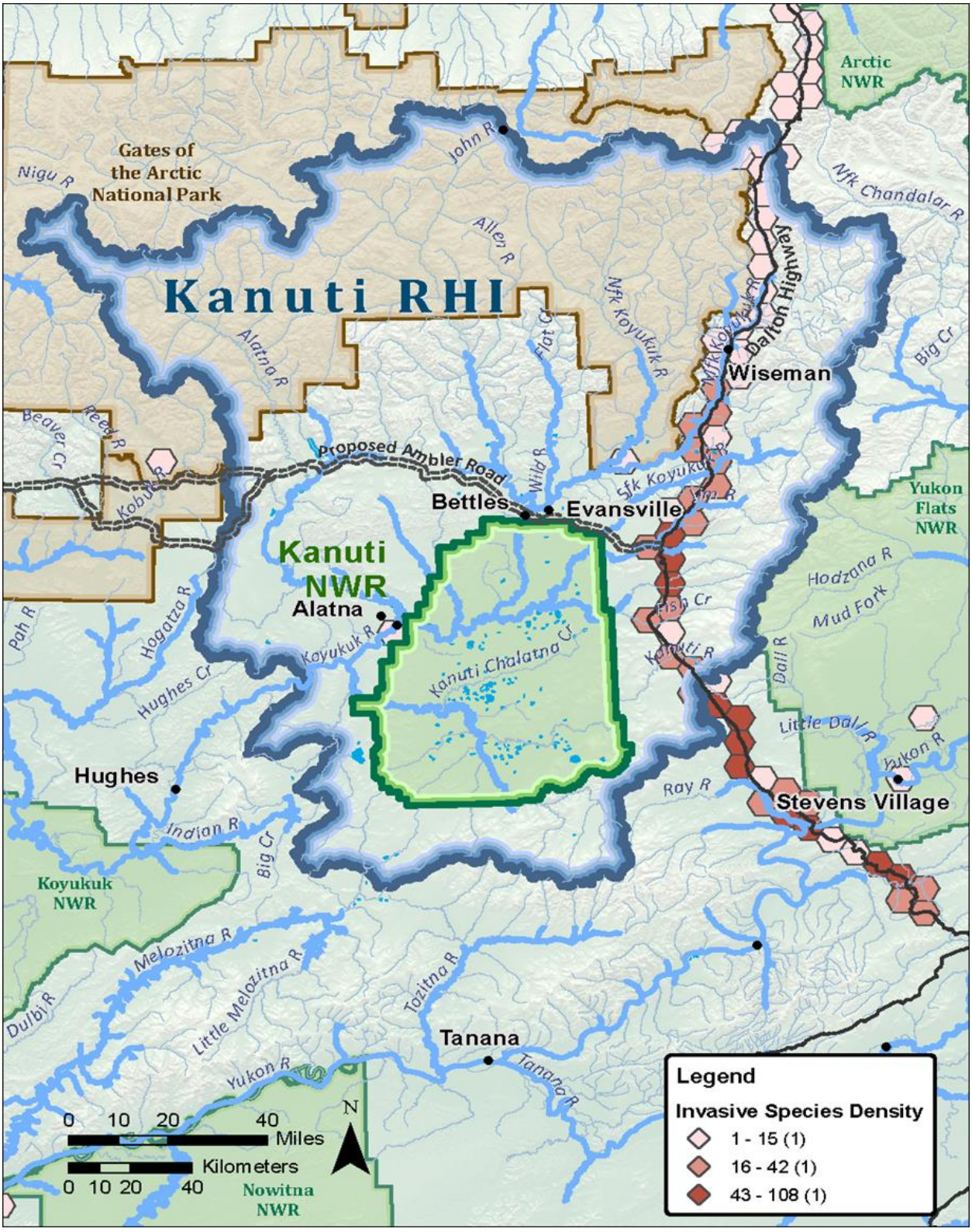
	Changes in Rain-Snow Regimes
	Droughts
	Increase in Drought Frequency/Severity
	Desertification
	Temperature Extremes
	Change in Wildfire Frequency/Severity
	Sea Level Rise
	Storm-Induced Coastal Erosion
	Increased Rate of Storm-Induced Coastal Erosion
	Tropical Storms/Hurricanes
	Increased Frequency/Intensity of Tropical Storms and Hurricanes
	Glacier Retreat
Public Use/Recreation	

Table 22: Threat Data Sources and Supporting Information

Data Source	Agency	Inventory Date	Link
Alaska Oil and Gas Conservation Commission	ADA	2/21/2014	http://doa.alaska.gov/ogc/publicdb.html
Alaska State Geo-Spatial Data Clearinghouse	Alaska		http://www.asgdc.state.ak.us/
Alaska Department of Environmental Conservation Contaminated Sites	ADEC	2/20/2014	http://dec.alaska.gov/arcgis/rest/services
Division of Oil and Gas Lease Database	ADNR	1/7/2013	http://dog.dnr.alaska.gov/Publications/OGExtract.htm
Mining Claims Online	ADNR		http://dnr.alaska.gov/MapAK/browser?id=3143&set=map&gsid=E3DD0097D0C0FEA80B209BD7F8464605.tomcat-90
NAWQA Data Warehouse	USGS		http://infotrek.er.usgs.gov/apex/f?p=NAWQA:HOME:0
Contaminants Assessment Process	USFWS		https://ecos.fws.gov/cap
Anadromous Waters Catalog	ADFG	7/10/2013	http://www.adfg.alaska.gov/sf/SARR/AWC/
Watershed Assessment, Tracking & Environmental Results	EPA		http://epamap32.epa.gov/radims/
Alaska Department of Natural Resources Trans-Alaska Pipeline System	ADNR	2/25/2014	http://dnr.alaska.gov/mdfiles/trans_alaska_pipeline.html
Marine Exchange of Alaska's Vessel Tracking System	MXAK		http://www.mxak.org/vtrack/vtrack_intro.html
National Atmospheric Deposition Network	University of IL		http://nadp.sws.uiuc.edu/mdn/
NOAA Environmental Sensitivity Index Maps	NOAA		http://response.restoration.noaa.gov/maps-and-spatial-data/download-esi-maps-and-gis-data.html
NOAA Alaska Shore Zone	NOAA		http://mapping.fakr.noaa.gov/szflex/
Alaska Fire History Database	FRAMES		http://www.frames.gov/rcs/10000/10436.html
USGS Alaska Resource Data File	USGS	2/25/2014	http://mrdata.usgs.gov/ardf/
Potential Abandoned Mine Sites in Alaska	ADNR		http://dnr.alaska.gov/mlw/mining/ardf50/index.htm
Land Administration System	ADNR		http://dnr.alaska.gov/projects/las/
Alaska Exotic Plants Information Clearinghouse	AKNHP	2/21/2014	http://aknhp.uaa.alaska.edu/botany/akepic/
Formerly Used Defense Sites Program	ACOE	3/14/2013	http://www.usace.army.mil/Missions/Environmental/FormerlyUsedDefenseSites/FUDSGIS.aspx
Alaska Department of Environmental Conservation Solid Waste Sites	ADEC	2/25/2014	http://www.dec.state.ak.us/das/GIS/apps.htm
Bureau of Land Management Federal Mining Claims	BLM	2/25/2014	http://sdms.ak.blm.gov/isdms/imf.jsp?site=sdms
Alaska Department of Natural Resources Temporary Water Use Permits	ADNR	2/21/2014	http://dnr.alaska.gov/mlw/mapguide/water/twup_start_tok.cfm
Alaska Department of Natural Resources State Mining Claims	ADNR	2/18/2014	http://dnr.alaska.gov/mdfiles/st_mining.html
Alaska Department of Natural Resources Alaska Statewide Active Lease Boundaries	ADNR	2/18/2014	http://dog.dnr.alaska.gov/GIS/GISDataFiles.htm
USGS Environmental Mercury Mapping, Modeling, and Analysis (EMMA) Fish Tissue Data	USGS	2/20/2014	http://emmma.usgs.gov/datasets.aspx
EPA Facility Registry System	EPA	2/20/2014	http://www.epa.gov/enviro/geo_data.html
Alaska Energy Authority Sites Evaluated for Potential Hydropower or Existing Hydroelectric Sites	AEA	2/20/2014	http://www.akenergyinventory.org/data/hyddata
Pesticide Use Proposals	USFWS		https://systems.fws.gov/pups/
Superfund Information Systems	EPA		http://www.epa.gov/superfund/sites/cursites/
National Inventory of Dams	USACE	1/8/2013	http://nid.usace.army.mil
Environmental Contaminants Data Management System	USFWS		http://www.fws.gov/chemistry/acf_ecdms.html
R7 - Environmental Contaminants Reports	USFWS		http://alaska.fws.gov/fisheries/contaminants/reports.htm
Waste Erosion Assessment and Review	ADEC	2/20/2014	http://dec.alaska.gov/arcgis/rest/services
Early Detection and Distribution Mapping System	USFS		http://www.eddmaps.org/alaska/distribution/
Arctic Environmental Response Management Application	NOAA		https://www.erma.unh.edu/arctic/erma.html
R7 - Environmental Contaminants Contaminant Assessment Process	USFWS		http://alaska.fws.gov/fisheries/contaminants/process.htm
Alaska DEC impaired waters	ADEC	2/20/2014	http://www.dec.state.ak.us/das/GIS/apps.htm
DOI Office of Surface Mining Abandoned Mine Lands Inventory System	OSM	2/20/2014	http://amlis.osmre.gov/Default.aspx
Enforcement and Compliance History Online	EPA		http://www.epa-echo.gov/echo/
USAF 611th Air Force Admin Record site	DOD		http://www.adminrec.com/PACAF.asp?Location=Alaska
Alaska Monitoring and Assessment Program	ADEC		http://dec.alaska.gov/water/wqsar/monitoring/AKMAP.htm
USGS Environmental Mercury Mapping, Modeling, and Analysis database	USGS		http://emmma.usgs.gov/
Air Quality Branch Database	USFWS		http://www.fws.gov/refuges/AirQuality/monitoring.html
EPA Envirofacts	EPA		http://www.epa.gov/enviro/
Greenhouse Gas Reporting Program	EPA		http://www.epa.gov/ghgreporting/
Toxic Release Inventory Program	EPA		http://www.epa.gov/tri/



Map 2: Mining threats within Kanuti Refuge and RHI (no oil and gas leases occur in the area).



Map 3: Invasive species and road threats within Kanuti Refuge and RHI. Polygons represent the density of invasive species occurrences from Alaska exotic plants information clearing house database

Table 23: Threats to Water Resources Inventory table- listing threats site name, threat type, status of threat with date, and a link to the threat site record within the Kanuti Refuge or the RHI buffer (continued in Appendix G)

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Aquatic habitat threats	Impaired Stream Connectivity	NA	1079 Slough	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Aba-Dabba Creek	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Alder Mountain Creek	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Alignment Slough	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Beaver Dam Brook	Active	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Beaver Dam Brook tributary	Active	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Beaver Spring	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Brockman Creek	Active	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Brockman Creek side channel	Active	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Calf Creek	Active	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Caribou Mountain Creek	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Chapman Creek	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Chapman Creek tributary	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Clara Creek	Active	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Clara Creek Overflow	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Confederate Gulch Creek	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Confusion Creek	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Crossroads Creek	Active	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Cushing Creek	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Dee Creek	Active	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Dietrich River tributary	Active	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Dietrich River tributary	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Disaster Creek	Active	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Douglas Creek tributary	Active	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI

Appendix B-Water Resource Inventory and Assessment (WRIA) Analysis Methods

Prepared by Cathleen Flanagan, USFWS

Climate Analysis Methods

Recent Weather Conditions

Climate data from the NCDC for Bettles, Alaska from 1952-2013 was used to describe the weather of Kanuti Refuge. Summary data from this station was used to define the annual, monthly, and extreme climate statistics. The WRIA also gathered calculated climate statistics from weather stations in Allakaket, Anaktuvuk, Coldfoot, and Wiseman from the WRCC to describe the variation in weather across the RHI.

Snow depth data from six snow course sites monitored by the Kanuti Refuge and distributed by the NRCS describes the variability of winter precipitation across the Kanuti Refuge. This section summarizes average monthly snow depth data from the six stations.

Estimation of Trends in Response to Changing Climate and Anthropogenic Stressors

To address climate change on and around the Refuge, the WRIA reviewed data from specific weather stations surrounding the Refuge. The evaluation of weather stations included a review of the periods of record and the availability of useful climatological parameters. Recent studies emphasize the challenges of evaluating climate trends in Alaska, which are subject to significant decadal scale climate variability (Lapez-de-Lacalle 2012). McAfee et al (2013) evaluated climate stations in Alaska for the statistical homogeneity of monthly precipitation records. McAfee et al (2013) regarded the 1952-2010 climate data for Bettles Airport Station (Coop ID 500761) as useful for analyzing trends in precipitation and climate related studies(McAfee et al. 2013). This station has a complete station record for temperature and precipitation and was used to evaluate Kanuti Refuge's climatological parameters. The site-specific climate analysis for Kanuti Refuge used the 1952-2010 climate data for Bettles Airport Station (Coop ID 500761), which is discussed in the following section.

The WRIA used the Refuge Climate Assessment Tool (RCAT) to evaluate existing climate characteristics relevant for the Kanuti Refuge and RHI. The USFWS, in cooperation with the University of California Davis Center for Watershed Sciences, developed this tool (Holmes and Esralew 2014). The tool utilizes climate information from GHCN stations to estimate precipitation and temperature trends and conditions that affect an area. USFWS developed the tool to gain an understanding of the expected inter-annual variability of climate or climate predictability needed for the proper management of Refuge water resources. With the knowledge gained in the RCAT analysis, managers may better anticipate water needs and protect Refuge infrastructure ahead of major events such as flooding or prolonged droughts.

Comparison of climate to teleconnection indices

An understanding of global climate factors and large-scale circulation patterns that influence the variability of temperature and precipitation is useful for understanding climate predictability. Numerous studies have examined the use of teleconnection indices that indicate the effect of these large-scale circulation patterns on local climate (temperature and precipitation).

RCAT aggregates precipitation and temperature data from USHCN sites to annual or annual water year resolution and compares that data with SOI, PDO, and PNA to assist with determination of whether these teleconnections are strongly linked to temperature and precipitation affecting the area of interest, and whether these teleconnections can be used to predict or characterize climate characteristics at and near this area.

Non-parametric multiple comparisons test

The Kruskal-Wallis non-parametric multiple comparisons test is used to compare the distribution of October through March precipitation (average seasonal in inches per year) and minimum, maximum, and mean annual temperature (average seasonal in degrees Fahrenheit) for a selected USHCN station, to all of the following parameters: 1) The distribution of July through November SOI, 2) the distribution of October through March PDO, and 3) the distribution of October through March PNA. The period of record used for the comparison is 1950-current. The Kruskall-Wallis multiple comparisons test is a non-parametric analogue of the one-way analysis of variance (ANOVA) test (Helsel and Hirsch 2002). The non-parametric test was selected due to the relaxed assumptions of normality and outliers than its parametric counterpart. RCAT uses the Kruskal-Wallis test to compare multiple datasets at one time to determine if the distributions among all groups were statistically different at a p-value of 0.05.

RCAT automatically splits teleconnection index values into phase groups for the multi-distribution comparisons. A water year is considered to be an El Niño year if the SOI was less than or equal to -0.05, a neutral year if the SOI was between -0.05 and 0.05, and a La Niña year if the SOI is greater than or equal to 0.05. A water year was considered to be in the cool phase if the PDO was less than or equal to -0.05, a neutral phase if the PDO was between -0.05 and 0.05, and a warm phase if the PDO was greater than or equal to 0.05. A water year was considered to be in the negative phase if the PNA was less than or equal to -0.05, a neutral phase if the PNA was between -0.05 and 0.05, and a positive phase if the PNA was greater than or equal to 0.05. RCAT produces a boxplot to show differences in the distributions of temperature and precipitation between teleconnection phase groups.

Non-parametric Time-series trend analysis

To evaluate existing precipitation and temperature trends associated with climate change, the analysis computed time-series trends in precipitation and temperature for the USHCN station. We also generated time series from monthly precipitation (total inches) and monthly temperature (maximum, minimum, and range of difference between maximum and minimum) for the following aggregated time-periods: seasonal (4 seasons), cool-season (October through March), and annual (water year). We also generated time-series for precipitation and temperature (range of difference between maximum and minimum only) for 12 separate months.

The report presents the results of Kendall's tau statistical time-series trend test to test for statistically significant (at a p-value of 0.05) of the time-series trends (Kendall and Gibbons 1990; Sen 1968). The Kendall's tau test is a non-parametric statistical test that can be used to indicate the likelihood of upward or downward trends in data with time. Tau coefficients range from -1.0 to 1.0; a tau of -1.0 indicates that every data observation decreased with time, and a tau of 1.0 indicates that every data observation increased with time. This analysis selected the Kendall's tau non-parametric statistic for trend detection

because it is less sensitive to outliers and does not assume a normal distribution, parametric analogues. Since hydrological data in the Western United States often violates the assumption of a normal distribution with skewedness, bimodality, and/or heterskedasticity, a non-parametric approach is preferred due to relaxed assumptions required on the source data.

The sen-slope, defined as the median slope, is a non-parametric analogue of a standard linear regression slope. It is computed as the median slope between all point pairs. We selected this slope over a linear regression slope due to relaxed assumptions of normality and outliers in the source data.

Time-series plots and LOESS trend lines

The climate analysis produced time-series plots for annual, seasonal, and monthly time steps. All time-series graphics include a LOESS trend line to assist with visualization of potential trends. LOESS is a non-parametric regression procedure that reduces the influence of outliers and displays a smooth or trend line for the entire range of data (Cleveland and Devlin 1988). A LOESS regression defines a LOESS trend line (Helsel and Hirsch 2002). The span of the LOESS line controls the degree of smoothing, and defines the localized subset of data to which a series of regressions are fit to construct a smooth curve. Our analysis used a default span of 0.75. The LOESS lines provides a useful tool for trend visualization, they do not determine statistical significance of trends.

The data and graphical results from the climate analysis create a baseline understanding of the current variability in climate conditions that affect the Refuge. The climate discussion presents the interpretation of the RCAT results of significant trends in temperature and precipitation at the analyzed weather station. This discussion helps evaluate the potential changes in climate conditions at the Kantui Refuge by looking at changes in the long-term records.

Surface Water Analysis Methods

Characterization of Recent Conditions
Lotic Ecosystems - Flowing Water
The WRIA summarizes the data records for gage stations located on the Refuge and operated by the Service to evaluate the characteristics of the Refuge's surface water flow. The data summary for each station includes the analysis of flow characteristics on a gaged river. The WRIA presents the information in two ways:

- The annual hydrograph which displays the magnitude and timing of flow of the river's by plotting average daily flow over the course of the water year; and
- Hydrologic statistics that describe the maximum, minimum, and average flows at a station.

Lentic Ecosystem-Lakes and Wetland
A literature review was conducted to summarize the known condition of lakes and ponds in the Kanuti Refuge and RHI. Very few specific studies of lakes within the Kanuti Refuge exist. Kafka (1988) conducted a limited study of chemical and biological variation of average size/depth lakes in the Kanuti

drainage. The Service conducted a large-scale lake and fisheries survey in Interior Alaska Refuges from 1984 to 1986 (USFWS 2011).

The NWI maps and describes wetlands across Alaska. The NWI only mapped fourteen percent of the RHI and none of Kanuti Refuge. The incomplete status of the NWI leaves a gap in the knowledge of wetland coverage on Kanuti Refuge. For this reason, the WRIA constructed an alternate wetland map derived from existing landcover maps geographically coincident with Kanuti RHI. The wetland landcover crosswalk uses the component landcover classes as a proxy for wetland and deep-water habitats (Flagstad 2016).

The wetland landcover crosswalk resulted in a wetland geospatial data layer from available landcover datasets. The component landcover classes in the original data sources serve as a proxy for wetland and deep-water habitats. Wetland codes follow the Wetland Classification scheme proposed by Cowardin et al. (1979) and standardized by the USFWS (2013). To retain the greatest level of accuracy, the process assigns wetland codes to landcover classes at the finest hierarchical level possible without making assumptions regarding plant species composition, soil condition, or hydrological regime of the landcover class. The process assigns primary and secondary wetland codes where a landcover class could be interpreted as more than one wetland type. It uses a combination of wetland codes where the landcover class represents a mosaic of wetland types. The process preserves landcover class information for upland habitats. Where available, NWI coverage takes precedence. The WRIA discusses the results of the classification. Details on the process, the data limitations, and caveats associated with the construction of the data. Appendix E provides the full report on associate with the construction of the data (Flagstad 2016).

No long-term gage stations, condition of permafrost, or extent of lake/wetland perimeter exist on the Kanuti Refuge or within the RHI. The period of record of the gage inventory run by the Service is 6 years. Six years of data is not sufficient to analyze the long-term trends in timing or magnitude of spring flows in response to climate change or anthropogenic stressors. The discussion of trends in lotic and lentic ecosystems relies on the results of literature searches.

Groundwater Analysis Method

Characterization of Recent Conditions
Little is known about the flow and quality of groundwater throughout Kanuti Refuge. The results of a literature search describe the recent conditions of groundwater on the Refuge in absence of any specific data associated with the Refuge groundwater and permafrost conditions.

Infrastructure Analysis Methods

Infrastructure facilities for the management of water do not exist on the Kanuti Refuge. The inventory did not require an analysis of facilities, since they do not exist.

Water Quality Analysis Methods

Section 305(b) of the Federal CWA requires each state to report on the status of the waters of the state through a 305(b) report. Section 303(d) of the Federal CWA requires that each state identify waters not meeting water quality standards and for which adequate water pollution controls have not been required. The list of Alaska's 303(d) waters is included in Alaska's 305(b) report. None of the waters on Kanuti Refuge or in the RHI boundary are EPA's 303(d) listed in the ADEC's 2012 status report on the condition of Alaska's surface waters (ADEC, 2012).

The results of the baseline water quality assessment of the Refuge (in Appendix F and summarized in the WRIA) summarize water quality reports and data available for areas in and near the Refuge. The procedures assess the chemical and physical state of measured waters and compare selected water quality data with established EPA aquatic life criteria. In addition, the assessment process includes a review of published reports and the analysis of available water quality data.

The results of the baseline water quality assessment of Kanuti Refuge included in the assessment analyzes the results of physical, chemical, and biologic variables collected by the Service at different levels of flow on five of Kanuti Refuges' river systems: Hollanda Creek, Kanuti-Kilolitna River, Kanuti River, South Fork Kanuti River, and a TKQ. The assessment also includes a summary of the aquatic macro invertebrate communities on the South Fork Koyukuk, Kanuti Kilolitna, and Kanuti Rivers. An unpublished report written by Dan Bogan (Bogan 2014) for the Service summarized the biologic data. An unpublished report by Rebecca Shaftel at the Alaska Center for Conservation Science (ACCS) (Shaftel 2015) summarizes the results of the chemical and physical water quality samples collected by the Service.

Water Chemistry Analysis Methods
Four types of field quality control samples were collected during baseline data collection: field blanks, source blanks, concurrent samples, and split samples. Field blanks test for contamination from collection and processing procedures while source blanks test for contaminants in the source water. Concurrent

samples are two samples collected from the same site and closely together in time while split samples are two identical samples collected from the same volume of sample water. Concurrent and split samples determine precision in sample collection procedures. The Service reviewed all the data from field quality control samples and did not detect issues with the sampling procedures, equipment, or the lab.

Nitrogen constituents are determined by subtraction from laboratory results. Laboratory results provide values for ammonia, ammonia plus total organic nitrogen (TON), and ammonia plus dissolved organic nitrogen (DON); DON and TON are calculated by subtraction from laboratory results. The lab provides results for nitrate plus nitrite and nitrite; but nitrate is calculated by subtraction.

The baseline water quality assessment of Kanuti Refuge (in Appendix F and summarized in the WRIA) uses boxplots to summarize field parameters, dissolved solids, major ions, and nutrients. The analysis also compares the medians and maximums of the same parameters results to several USGS reports to determine if stream water quality is within normal ranges for natural waters (Brabets and Ourso 2013; Glass 1999; Hem 1985). For trace metals, many of the results are below method detection limits; the analysis uses robust regression on order statistics (ROS) to generate the trace metal summary statistics. Robust ROS may be applied to parameters and sites with more than 3 observations and less than 80% censoring of data. The method develops a regression between the uncensored data and their normal scores and uses the regression model to impute the censored values (Bolks et al. 2014; Helsel 2012). The method requires a distributional assumption and the lognormal distribution is used for all trace elements; a step in the analysis requires visual evaluation of normal probability plots to assess fit. Confidence intervals for the mean of each site and each trace element are estimated by generating 1,000 bootstrapped samples of the data and calculating the mean using robust ROS (Bolks et al. 2014). Robust ROS is not used to estimate statistics for Holonada Creek because it was only sampled three times for trace metals. The discussion compares the results for trace metals to ADEC water quality standards (18 AAC 70). This analysis compares all trace elements to the chronic aquatic life criteria (the most stringent criteria). Note that we compare the results of discrete sampling events to the chronic life criteria, which EPA derives from average concentrations during a four-day period (for all trace metals other than iron).

The baseline water quality assessment of the Refuge uses a piper diagram to evaluate the composition of major cations and anions at each site; some conversions were necessary prior to plotting. The laboratory provides alkalinity results as calcium carbonate, which we converted to bicarbonate. We also converted the laboratory results of major cations (Ca2+, Mg2+, Na+, and K+) and anions (HCO3-, Cl-, NO3-, and SO42-) from milligrams per liter to milliequivalents per liter in order to express the results as the percent of total cations and total anions in the piper diagram plots.

Stream Temperature Analysis Methods

The baseline water quality assessment of the Refuge provides 15-minute time series of stream temperatures collected with tidbit data loggers for three sites. To identify erroneous data and incomplete daily records, we conducted a quality assurance review of the data. The review included screening for several types of data errors: values of -777, days with less than 96 measurements, winter values below -0.2˚ C indicating a frozen logger, and air temperature measurements on days when the logger was removed from the stream for downloading. In addition, the field deployment notes indicated time-periods when the logger stopped recording because the storage capacity had been reached. For each of these

errors, we removed all measurements associated with the day of the error so the final quality-controlled dataset only includes days with a complete record of 96 valid 15-minute measurements.

The analysis aggregates quality-controlled 15-minute measurements to daily means, daily maximums, daily minimums, and daily ranges for calculation of stream temperature metrics. The analysis calculates monthly averages for a month when the sensor measured 90% of the days in that month. The results present the MWAT and MWMT for each year. We calculate both metrics as the annual maximum of a 7-day rolling average by calculating MWAT from mean daily stream temperatures and MWMT from maximum daily stream temperatures. We calculate several other metrics for the month of July to determine differences in thermal regimes among the three sites: maximum daily range, median daily range, and cumulative degree-days.

Habitat Assessment Analysis Methods

The baseline water quality assessment of the Kanuti Refuge followed EPA methods for aquatic habitat assessments of three sites within Kanuti Refuge between 2008 and 2014 (Kaufman and Robinson 1998). The water quality discussion presents physical habitat and channel characteristics, along with the species richness and total taxa richness results of the macro invertebrate and diatom sampling. An unpublished report completed by the ACCS (Bogan 2014) presents a complete account of the sampling and analysis methods.

Water Rights Analysis Methods

The inventory includes a summary of the number, type, and location of water right managed by ADNR in the RHI and on Kanuti Refuge. The inventory results include an accounting of surface water rights, groundwater water rights, and temporary water use authorizations. The location and type of water right provide an understanding of where and how water is used. The inventory results also list the state filing number, status, and owner of the water right for evaluation purposes.

The water rights analysis assesses the water rights within the RHI/Refuge by location. The assessment presents the location, purpose, and quantity of water requested or granted for upstream water rights. The analysis used ADNR's Land Administration System (LAS) system to review existing water right applications, permits, and/or certificates. The assessment appraised each upstream water right for the potential to harm the availability of water in the Refuge.

Threats Assessment Analysis Methods

The inventory and assessment of threats included several steps. We constructed a geodatabase of known threats using available geospatial data. Staff interviews in March of 2013 captured threats and IOCs facing the Refuge's waters in using a threat assessment matrix. The interview employed a questionnaire and a threats classification to capture this information.

Common issues considered in the threats discussion include (not mutually exclusive) the effects of anthropogenic, natural events, and climate change on water quality, water supply/water rights, and water resources and their relationship to habitat, natural diversity, and refuge management. The assessment-categorized threats according to a threats classification standard adopted by the national WRIA team and discussed in the WRIA.

For the purpose of the interview with the Refuge staff a "threat" is defined as a known occurrences of an activity that is harmful to water resource in the Refuge or the RHI. An IOC is a perceived threat/need identified through the research and staff interviews.

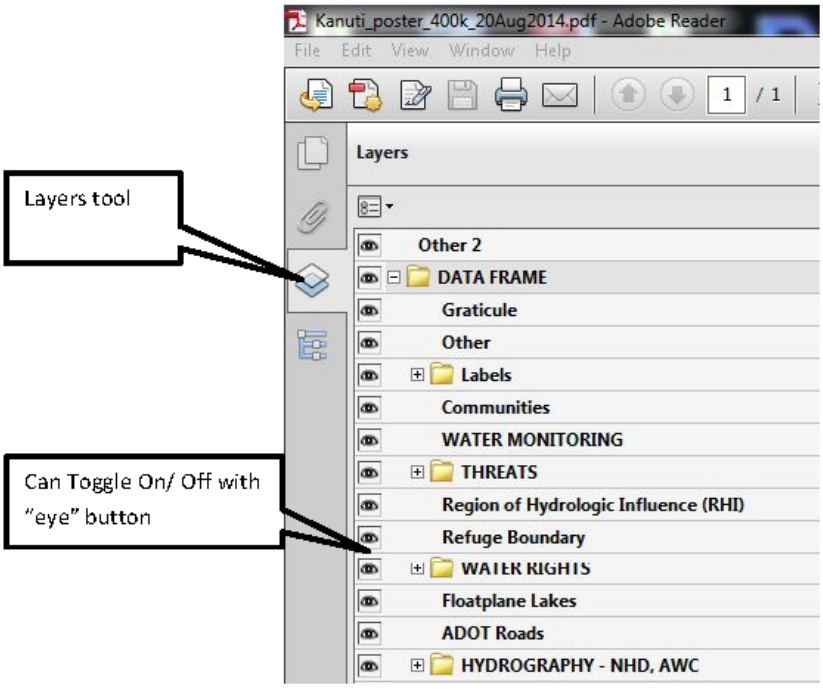
The assessment applies the national WRIA threats classification to the IOC list developed from staff interviews. The frequency of geospatial threats across the Refuge and the RHI inform the list IOCs facing the Refuge. Recommendations address the IOCs.

Appendix C-Instructions for Utilizing Interactive Map Poster and Map Legend

Instructions for using a layered PDF map in Adobe Reader.

1) When you initially open the Poster map in Adobe Reader, all of the "layers" will be turned "on" and drawn on the map. This is very visually messy although it allows the map viewer to customize their view by choosing which datasets and labels they would like to see.
2) Layers can be:
    a. Datasets or a grouping of datasets
        i. A single dataset such as "Refuge Boundary"
        ii. Or a group of datasets such as "Monitoring" which contains
            1. Hydroclimate Sites
            2. Water Monitoring
            3. Hydro Gages
    b. Dataset Labels

    c. Map elements – often listed as "Other" or "Other2"
        i. Scale Bar
        ii. Legend
        iii. Title
        iv. Graticule (latitude and longitude grid)
        v.
3) You can toggle layers on or off by using the layers tool



Legend

Lakes
- Class 1 (<10 sq kms)
- Class 2 (>10 sq kms)
- Streams

Anadromous Waters
- Arctic
- Interior
- Southcentral
- Southeast
- Southwest
- Western

- Fish Studies

Climate Sites - MesoWest
- AFGWFO
- AIRNOW
- AJKWFO
- AKDOT
- APRSWXNET/CWOP
- CRN
- GPSMET
- HADS
- MADIS MISC
- MARITIME
- NCAWOS
- NERRS
- NOS-NWLON
- NWS/FAA
- RAWS
- SCAN
- SNOTEL
- USARRAY

Sampled Lake Type
- Closed Basin
- Open Basin

Water Monitoring - Temperature
- ADFG, Water Quality
- BLM, Water Quality
- CIK, Water Quality
- KRAA, Water Quality
- NPS, Water Quality
- TribSunq, Water Quality
- UAA, Water Quality
- USFS, Water Quality
- USFWS, Water Quality
- USGS, Water Quality
- UW, Water Quality
- YRITWC, Water Quality
- USGS, Water Quality
- USFWS, Water Quality

Water Quantity
- Hydro Gage, active
- Hydro Gage inactive

Water Rights - Withdrawals
- Instream Flow Reservation
- Subsurface - Groundwater
- Surface Water

Instream Flow Reservation
- Certificate Issued
- Permit Pending Action
- Application Received
- Water Rights - Area

Active Threats
- Active, Dams
- Active, Garbage/Solid Waste
- Active, Industrial Effluent
- Active, Mining
- Active, Temp. Water Use Permit
- Active, Oil and Gas Development
- Active, Urban Sewage
- Active, Invasive species

Closed Threats
- Closed, Garbage/Solid Waste
- Closed, Industrial Effluent
- Closed, Mining
- Closed, Oil and Gas Development
- Closed, Urban Sewage

Proposed / Unknown - Threats
- Proposed/Potential, Dams
- Proposed/Potential, Garbage/Solid Waste
- Proposed/Potential, Industrial Effluent
- Proposed/Potential, Mining
- Proposed/Potential, Temp Wtr. Use
- Proposed/Potential, Urban Sewage
- Unknown, Mining
- Unknown, NA
- Unknown, Oil and Gas Development

- Proposed Ambler Mining Access Routes

Threats - polygons
- Active, Mining Exploration
- Active, Oil and Gas Exploration
- Active, Industrial Effluent
- Proposed, Mining

- ADOT Roads

Invasive Species Density - #/25 sq. miles
- 1 - 15
- 16 - 42
- 43 - 108
- 109 - 354

- Communities
- Historically Active Volcanoes
- Refuge Boundary
- Other Refuge Boundaries
- National Park and Preserve
- State Legislatively Designated Areas

- Watersheds - HUC10
- Region of Hydrologic Influence (RHI)

Surface Owner - outline
- USFWS
- Native Allotment
- Village Native Corp.
- Regional Native Corp.
- State of Alaska
- Other Federal
- Other Private
- Undefined

Surface Owner
- USFWS
- Native Allotment
- Village Native Corp.
- Regional Native Corp.
- State of Alaska
- Other Federal
- Other Private
- Undefined

Subsurface Owner
- USFWS
- Regional Native Corp.
- Native Allotment
- State of Alaska
- Other Federal
- Other Private
- Village Native Corp.

Appendix D-Geospatial and Tabular Source Database Tables

Table 24: Geospatial and tabular database sources used in the inventory of features on the Kanuti Refuge.

Subject	Source name	Agency	Statue	Date	Web Link
Facility	Refuge Purposes Database	USFWS	scheduled download		http://www.fws.gov/refuges/policiesandbudget/purposes/Purposes_Search.cfm
Facility	Refuge Profiles	USFWS	scheduled download		http://www.fws.gov/refuges/
Facility	R7 - Water Jurisdiction Land Order Status	USFWS	scheduled download	2/25/2013	
Facility	R7 - NWRS Surrounding Watersheds HUC 10	USFWS	data call	1/15/2013	
Facility	National Cadastral Data	USFWS			http://www.fws.gov/GIS/data/CadastralDB/
Facility	Alaska Landcover Maps	AK National Heritage Program			http://aknhp.uaa.alaska.edu/ecology/landcover-maps/
Facility	UAA VEP Landcover Maps	UAA_VEP	scheduled download	3/14/2013	http://aknhp.uaa.alaska.edu/ecology/landcover-maps/
Facility	R7 - Refuge Boundaries	USFWS	data call		
Facility	Protracted Land Grid	BLM	scheduled download	12/6/2012	http://sdms.ak.blm.gov/sdms/data_protracted_grid_gis.html
Topography and Landforms	STRM Digital Elevation Model	NASA			http://gdex.cr.usgs.gov/gdex/
Topography and Landforms	National Elevation Dataset	USGS			http://ned.usgs.gov/
Topography and Landforms	ASTER Global Digital Elevation Map	NASA			http://gdex.cr.usgs.gov/gdex/
Topography and Landforms	National Elevation Dataset				http://wms.alaskamapped.org/wcs
Topography and Landforms	ASTER Global Digital Elevation Map	NASA			http://asterweb.jpl.nasa.gov/gdem.asp
Topography and Landforms	Shuttle Radar Topography Mission				http://www2.jpl.nasa.gov/srtm/
Soils	Imiq Hydro-climate Database	University of Alaska Fairbanks	scheduled download	10/1/2014	http://arcticlcc.org/projects/imiq
Hydro-Climate	Long Term Ecological Research Network Data Portal	NSF			https://metacat.lternet.edu/das/lter/
Hydro-Climate	Scenarios Network for Alaska & Arctic Planning	UAF			http://www.snap.uaf.edu/
Hydro-Climate	US Climate Reference Network	NOAA			http://www.ncdc.noaa.gov/crn/observations.htm
Hydro-Climate	Imiq Hydro-climate Database	University of Alaska Fairbanks	scheduled download	10/1/2014	http://arcticlcc.org/projects/imiq
Hydro-Climate	United States Historical Climatology Network	USDOE			http://cdiac.ornl.gov/epubs/ndp/ushcn/ushcn.html
Hydro-Climate	Alaska Climate Research Center	UAF			http://climate.gi.alaska.edu/
Hydro-Climate	National Climatic Data Center	NOAA			http://www.ncdc.noaa.gov/other-data-access
Hydro-Climate	MesoWest	University of Utah	web tool	1/7/2013	http://mesowest.utah.edu/
Hydro-Climate	NOAA Breakup and Ice Information Data	NOAA			http://aprfc.arh.noaa.gov/data/breakup.php
Hydro-Climate	UAF International Arctic Research	UAF			http://climate.iarc.uaf.edu/geonetwork/srv/en/main.home

Subject	Source name	Agency	Statue	Date	Web Link
	Center Data Archive				
Subject	**Source name**	**Agency**	**Statue**	**date**	**Web Link**
Hydro-Climate	Advanced Cooperative Arctic Data and Information Service	NSF			http://www.aoncadis.org/
Hydro-Climate	National Snow and Ice Data Center	NSIDC			http://nsidc.org/data/collections.html
Hydro-Climate	Parameter-elevation Regressions on Independent Slopes Model	OSU			http://www.prism.oregonstate.edu/
Hydro-Climate	RAWS USA Climate Archive	WRCC	aggregated - Mesowest		http://www.raws.dri.edu/
Hydro-Climate	SNOwpack Telemetry	NRCS	aggregated - Mesowest		http://www.wcc.nrcs.usda.gov/snow/
Hydro-Climate	Real-time Observation Monitor and Analysis Network	NOAA			http://raws.wrh.noaa.gov/roman/
Inventory	Lake Habitat and Fish Surveys on Interior Alaska National Wildlife Refuges, 1984–1986	USFWS			http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
Water Resources	Stream Auefice Zones in Alaska	ADNR			http://www.dggs.dnr.state.ak.us/pubs/id/2375
Water Resources	World Glacier Inventory	NSIDC	scheduled download	3/12/2013	http://nsidc.org/data/docs/noaa/g01130_glacier_inventory/
Water Resources	Anadromous Waters Catalog	ADFG	scheduled download	7/10/2013	http://www.adfg.alaska.gov/sf/SARR/AWC/
Water Resources	National Hydrography Dataset	USGS	scheduled download	4/23/2012	http://nhd.usgs.gov/
Water Resources	National Wetlands Inventory	USFWS	scheduled download	4/23/2012	http://www.fws.gov/wetlands/
Water Resources	UAF Water and Environmental Research Center	UAF			http://ine.uaf.edu/werc/projects/
Infrastructure	Well Log Tracking System	ADNR	scheduled download		http://dnratwmlwims02.dnr.state.ak.us/welts/
Infrastructure	ADOT harbors	ADOT		3/14/2013	
Infrastructure	Alaska Department of Natural Resources Dam Inventory	ADNR		12/19/2012	
Infrastructure	Alaska Department of Fish and Game Fish Passage Inventory	ADFG		2/25/2014	http://www.adfg.alaska.gov/index.cfm?adfg=fishpassage.database
Infrastructure	Alaska Dam Inventory	ADNR	data call	12/26/2012	
Infrastructure	Geographic Names Information System	USGS	scheduled download	1/14/2013	http://geonames.usgs.gov/domestic/download_data.htm
Infrastructure	Geospatial Fisheries Information Network	USFWS		3/2/2014	https://ecos.fws.gov/geofin/
Infrastructure	Alaska Department of Transportation infrastructure database	ADOT	scheduled download		http://www.dot.state.ak.us/stwdplng/mapping/transdata.shtml
Infrastructure	National Inventory of Dams	USACE	scheduled download	1/8/2013	http://nid.usace.army.mil
Infrastructure	Alaska Department of Transportation Bridges	ADOT		2/24/2014	http://www.dot.state.ak.us/stwdplng/mapping/shapefiles.shtml
Water Quality	Alaska DEC impaired waters	ADEC		2/20/2014	http://www.dec.state.ak.us/das/GIS/apps.htm
Water Quality	NAWQA Data Warehouse	USGS			http://infotrek.er.usgs.gov/apex/f?p=NAWQA:HOME:0
Water Quality	Water Quality Portal	USGS/EPA			http://www.waterqualitydata.us/index.jsp

Subject	Source name	Agency	Statue	Date	Web Link
Water Quality	EPA STORET	EPA			http://www.epa.gov/storet/
Water Quality	Anadromous Waters Catalog	ADFG	scheduled download	7/10/2013	http://www.adfg.alaska.gov/sf/SARR/AWC/
Water Quality	Watershed Assessment, Tracking & Environmental Results	EPA			http://epamap32.epa.gov/radims/
Subject	**Source name**	**Agency**	**Statue**	**date**	**Web Link**
Water Quality	NWRS Water Quality Information System	USGS			http://www.cerc.usgs.gov/Projects.aspx?ProjectId=65
Water Quality	Lake Habitat and Fish Surveys on Interior Alaska National Wildlife Refuges, 1984–1986	USFWS			http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
Water Quality	R7 - Water Resource Branch Water Quality Dataset	USFWS	data call	12/10/2012	
Water Monitoring	Streams Database	ADNR			http://dnr.alaska.gov/mlw/water/hydro/streams/streams.cfm
Water Monitoring	R7 - Water Resource Branch Database	USFWS			
Water Monitoring	Contaminants Assessment Process	USFWS			https://ecos.fws.gov/cap
Water Monitoring	Boise Lab Stream Temperature Modeling and Monitoring	USFS	data call	2/27/2013	http://www.fs.fed.us/rm/boise/AWAE/projects/stream_temperature.shtml
Water Monitoring	Imiq Hydro-climate Database	University of Alaska Fairbanks	scheduled download	10/1/2014	http://arcticlcc.org/projects/imiq
Water Monitoring	R7 - NWRS Lake Temperature Monitoring	USFWS			
Water Monitoring	National Water Information System	USGS	web tool	1/23/2013	http://nwis.waterdata.usgs.gov/
Water Monitoring	North Slope Science Initiative	UAF			http://catalog.northslope.org/
Water Monitoring	Water Quality Portal	USGS/EPA			http://www.waterqualitydata.us/index.jsp
Water Monitoring	NAWQA Data Warehouse	USGS			http://infotrek.er.usgs.gov/apex/f?p=NAWQA:HOME:0
Water Monitoring	SNOwpack Telemetry	NRCS	aggregated - Mesowest		http://www.wcc.nrcs.usda.gov/snow/
Water Monitoring	R7 - Discharge Gages	USFWS	data call	1/7/2013	
Water Monitoring	Lake Habitat and Fish Surveys on Interior Alaska National Wildlife Refuges, 1984–1986	USFWS			http://www.fws.gov/alaska/fisheries/fish/Data_Series/d_2011_12.pdf
Water Rights	Alaska Department of Natural Resources Temporary Water Use Permits	ADNR		2/21/2014	http://dnr.alaska.gov/mlw/mapguide/water/twup_start_tok.cfm
Water Rights	Land Administration System	ADNR	web tool		http://dnr.alaska.gov/projects/las/
Water Rights	Alaska State Geo-Spatial Data Clearinghouse	Alaska			http://www.asgdc.state.ak.us/
Water Rights	Water Rights and Temporary Use Authorizations	ADNR	scheduled download	12/15/2012	http://dnr.alaska.gov/mlw/mapguide/wr_intro.cfm
Threats	Alaska Oil and Gas Conservation Commission	ADA	scheduled download	2/21/2014	http://doa.alaska.gov/ogc/publicdb.html
Threats	Alaska State Geo-Spatial Data	Alaska			http://www.asgdc.state.ak.us/

Subject	Source name	Agency	Statue	Date	Web Link
	Clearinghouse				
Threats	Alaska Department of Environmental Conservation Contaminated Sites	ADEC	scheduled download	2/20/2014	http://dec.alaska.gov/arcgis/rest/services
Threats	Division of Oil and Gas Lease Database	ADNR	scheduled download	1/7/2013	http://dog.dnr.alaska.gov/Publications/OGExtract.htm
Subject	**Source name**	**Agency**	**Statue**	**date**	**Web Link**
Threats	Mining Claims Online	ADNR			http://dnr.alaska.gov/MapAK/browser?id=3143&set=map&gsid=E3DD0097D0C0FEA80B209BD7F8464605.tomcat-90
Threats	NAWQA Data Warehouse	USGS			http://infotrek.er.usgs.gov/apex/f?p=NAWQA:HOME:0
Threats	Contaminants Assessment Process	USFWS			https://ecos.fws.gov/cap
Threats	Anadromous Waters Catalog	ADFG	scheduled download	7/10/2013	http://www.adfg.alaska.gov/sf/SARR/AWC/
Threats	Watershed Assessment, Tracking & Environmental Results	EPA			http://epamap32.epa.gov/radims/
Threats	Alaska Department of Natural Resources Trans-Alaska Pipeline System	ADNR		2/25/2014	http://dnr.alaska.gov/mdfiles/trans_alaska_pipeline.html
Threats	Marine Exchange of Alaska's Vessel Tracking System	MXAK			http://www.mxak.org/vtrack/vtrack_intro.html
Threats	National Atmospheric Deposition Network	University of IL			http://nadp.sws.uiuc.edu/mdn/
Threats	NOAA Environmental Sensitivity Index Maps	NOAA			http://response.restoration.noaa.gov/maps-and-spatial-data/download-esi-maps-and-gis-data.html
Threats	NOAA Alaska Shore Zone	NOAA			http://mapping.fakr.noaa.gov/szflex/
Threats	Alaska Fire History Database	FRAMES			http://www.frames.gov/rcs/10000/10436.html
Threats	USGS Alaska Resource Data File	USGS	scheduled download	2/25/2014	http://mrdata.usgs.gov/ardf/
Threats	Potential Abandoned Mine Sites in Alaska	ADNR			http://dnr.alaska.gov/mlw/mining/ardf50/index.htm
Threats	Land Administration System	ADNR	web tool		http://dnr.alaska.gov/projects/las/
Threats	Alaska Exotic Plants Information Clearinghouse	AKNHP	scheduled download	2/21/2014	http://aknhp.uaa.alaska.edu/botany/akepic/
Threats	Formerly Used Defense Sites Program	ACOE		3/14/2013	http://www.usace.army.mil/Missions/Environmental/FormerlyUsedDefenseSites/FUDSGIS.aspx
Threats	Alaska Department of Environmental Conservation Solid Waste Sites	ADEC		2/25/2014	http://www.dec.state.ak.us/das/GIS/apps.htm
Threats	Bureau of Land Management Federal Mining Claims	BLM		2/25/2014	http://sdms.ak.blm.gov/isdms/imf.jsp?site=sdms
Threats	Alaska Department of Natural Resources Temporary Water Use Permits	ADNR		2/21/2014	http://dnr.alaska.gov/mlw/mapguide/water/twup_start_tok.cfm
Threats	Alaska Department of Natural Resources State Mining Claims	ADNR		2/18/2014	http://dnr.alaska.gov/mdfiles/st_mining.html
Threats	Alaska Department of Natural Resources Alaska Statewide Active Lease Boundaries	ADNR		2/18/2014	http://dog.dnr.alaska.gov/GIS/GISDataFiles.htm
Threats	USGS Environmental Mercury Mapping, Modeling, and Analysis (EMMA) Fish Tissue Data	USGS		2/20/2014	http://emmma.usgs.gov/datasets.aspx

Subject	Source name	Agency	Statue	Date	Web Link
Threats	EPA Facility Registry System	EPA		2/20/2014	http://www.epa.gov/enviro/geo_data.html
Threats	Alaska Energy Authority Sites Evaluated for Potential Hydropower or Existing Hydroelectric Sites	AEA	scheduled download	2/20/2014	http://www.akenergyinventory.org/data/hyddata
Threats	Pesticide Use Proposals	USFWS			https://systems.fws.gov/pups/
Threats	Superfund Information Systems	EPA			http://www.epa.gov/superfund/sites/cursites/
Threats	National Inventory of Dams	USACE	scheduled download	1/8/2013	http://nid.usace.army.mil
Subject	**Source name**	**Agency**	**Statue**	**date**	**Web Link**
Threats	Environmental Contaminants Data Management System	USFWS			http://www.fws.gov/chemistry/acf_ecdms.html
Threats	R7 - Environmental Contaminants Reports	USFWS			http://alaska.fws.gov/fisheries/contaminants/reports.htm
Threats	Waste Erosion Assessment and Review	ADEC		2/20/2014	http://dec.alaska.gov/arcgis/rest/services
Threats	Early Detection and Distribution Mapping System	USFS			http://www.eddmaps.org/alaska/distribution/
Threats	Arctic Environmental Response Management Application	NOAA			https://www.erma.unh.edu/arctic/erma.html
Threats	R7 - Environmental Contaminants Contaminant Assessment Process	USFWS			http://alaska.fws.gov/fisheries/contaminants/process.htm
Threats	Alaska DEC impaired waters	ADEC		2/20/2014	http://www.dec.state.ak.us/das/GIS/apps.htm
Threats	DOI Office of Surface Mining Abandoned Mine Lands Inventory System	OSM		2/20/2014	http://amlis.osmre.gov/Default.aspx
Threats	Enforcement and Compliance History Online	EPA			http://www.epa-echo.gov/echo/
Threats	USAF 611th Air Force Admin Record site	DOD			http://www.adminrec.com/PACAF.asp?Location=Alaska
Threats	Alaska Monitoring and Assessment Program	ADEC			http://dec.alaska.gov/water/wqsar/monitoring/AKMAP.htm
Threats	USGS Environmental Mercury Mapping, Modeling, and Analysis database	USGS			http://emmma.usgs.gov/
Threats	Air Quality Branch Database	USFWS			http://www.fws.gov/refuges/AirQuality/monitoring.html
Threats	EPA Envirofacts	EPA			http://www.epa.gov/enviro/
Threats	Greenhouse Gas Reporting Program	EPA			http://www.epa.gov/ghgreporting/
Threats	Toxic Release Inventory Program	EPA			http://www.epa.gov/tri/

Appendix E-Wetland Mapping of Kanuti National Wildlife Refuge, Alaska

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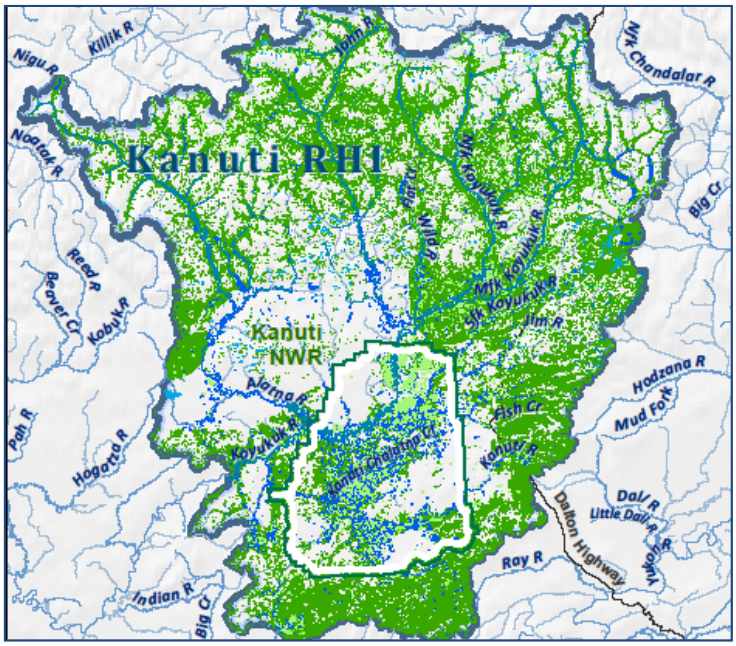

February 18, 2016

Background

The AKNHP in collaboration with USFWS developed the wetland map for Kanuti Refuge and greater RHI to better inform land managers on the type and extent of key natural resources at the regional and refuge level. Because no part of the Kanuti Refuge and only 14% of the Kanuti RHI has been mapped following NWI protocols, development of an alternate and interim wetland map was deemed necessary. AKNHP derived the interim map from existing landcover maps that were geographically coincident with the Kanuti RHI and uses the component landcover classes as a proxy for upland, wetland, and deepwater habitats.

Data Use and Limitations

As discussed, the mapping presented here uses the best available landcover data as a proxy for upland, wetland, and deepwater habitat. A GIS environment provided the geodatabase platform for the analysis. The habitat types and their distributions have not been field checked, formally assessed for accuracy, or post-processed in any way. As such, the data layers provided herein are best used for the coarse-level analysis of habitat and identification of data gaps opposed to the fine-scale indication of ground condition. Because these data do not meet the minimum FGDC national standards established for the National Wetlands data layer it will not distributed through the National Wetland mapper. Where available, NWI coverage should take precedence.

Known problems with the map stem largely from landcover classes that include both wetland and upland habitat or more than one wetland or deepwater system. Landcover classes that could be variably interpreted as wetland or upland were coded as upland to avoid making assumptions with respect to plant species composition, hydrological regime, or soil condition. The protocol results in a wetland distribution derived from landcover classes that are more conservative than the NWI coverage. In particular, landcover classes characterized by open to woodland black spruce, willow species, and/or recent burns yet coded as upland should be interpreted as areas where the presence of wetlands could not be concluded from the available data rather than confirmed upland habitat.

Additionally, landcover classes that include more than one wetland or deepwater system should be treated as tentative classifications. The Cowardin classification separates Riverine, Lacustrine, and Palustrine systems, however generic water landcover classes such as Clear Water, Turbid Water, Water, and Open Water often include all three or a subset of these systems. In such a situation, the landcover class was coded in accordance to the dominant wetland or deepwater system that it represented. As a result, habitat that is obviously riverine in plain view (linear spatial pattern) or palustrine (<8 ha) may be coded as lacustrine (>8 ha) or vice versa. These misattributions were addressed as a pilot project in the final phase of this mapping effort by incorporating information from the National Hydrographic Dataset (NHD). While the results are not perfect, the attribution of the problematic waterbodies was greatly improved.

Methods

To derive a wetland map from landcover data, the most accurate landcover maps coinciding with the Kanuti RHI were selected and mosaicked using the ERDAS Imagine remote sensing application (Table 1). The eight raster landcover images selected were mosaicked in an order that preserved the most accurate information in areas of overlap. Where necessary, the raster images were resized to provide a uniform resolution of 30 m pixels. Following mosaicking, all work was performed in the geographic information system ArcGIS 10.3. The raster mosaic was converted to a multi-part feature class to allow attribution that is more specific (see the processing steps provided at the end of this report for detail). The final feature class is displayed in the Alaska Albers Equal Area Conic projection and references the North America Datum of 1983.

Table 1: Source landcover maps used to infer wetland type and distribution in Kanuti RHI listed in decreasing order of percent map area

Map Name	*Citation*	*Map Source Name*	*Date(s) of Imagery*	*Percent Accuracy*	*Mapped Area (%)*
ak_earthcov_mosaic _feb2007.img	Ducks Unlimited, Inc. 2007	DU Interior Mosaic	1992, 1999	33-85	49.186
An ecological land survey and landcover map of the Arctic Network	Jorgenson et al. 2009	NPS Arctic Network	2002	65-80	46.372
Predictive Ecosystems Model for the Alaska - Yukon Arctic Ecoregion	Jorgenson 2003	TNC Arctic Ecosystem	1976-1981, 1985, 1986, 1995	not assessed	3.268
Alaska Statewide Landcover classification – part 1-4	Fleming 2012	blkr_evt_f2	2000	not assessed	0.683
ak_earthcov_mosaic _feb2007.img	Ducks Unlimited, Inc. 2007	DU Interior	1992, 1999	33-85	0.255
Alaska Statewide Landcover classification – part 1-4	Fleming 2012	flats_evt_f2	2000	not assessed	0.220
The existing vegetation type (EVT) spatial data layer	Landfire 2004	Landfire	2000	not assessed	0.013
Alaska Statewide Landcover classification – part 1-4	Fleming 2012	koyu_evt_v2	2000	not assessed	0.002

Wetland codes follow the Wetland Classification scheme proposed by Cowardin et al.(1979) and standardized by the USFWS (Dahl 1990). To retain the greatest measure of accuracy, wetland codes were assigned to landcover classes at the finest hierarchical level possible without making assumptions regarding site condition and plant community composition. Landcover classes that could be interpreted as either wetland or upland or represented a mosaic of wetland and upland types were primarily coded as upland and secondarily as wetland. Similarly, landcover classes that could be interpreted as more than one wetland type were assigned primary and secondary wetland codes. A combination of wetland codes was used as the primary habitat type where the landcover class represented a mosaic of wetland types. Landcover class information was preserved for all upland habitats.

When the appropriate wetland code could not be interpreted from the landcover class name, a variety of resources were consulted. Typically, the distribution of the landcover class was reviewed in the GIS

environment to see where it occurred on the landscape; this step often involved comparing the occurrence of the landcover type to the underlying imagery or digital elevation model (DEM). When available, the original description of the landcover class was reviewed to glean information regarding dominant plant species, hydrological regime, and soil condition. Where dominant species were listed, their wetland indicator status in the Alaska region was checked in the National Wetland Plant List (Lichvar et al. 2014).

Feedback received from Kanuti NWR staff during review of the draft products prompted the revision of four landcover class designations, two of which originated from the Ducks Unlimited map that comprises approximately 50% of the RHI (DU, 2007), a third originating from the Black River EVT map that comprises less than 1% of the RHI (Fleming 2012), and a fourth landcover class originating from the Landfire map that also comprises less than 1% of the RHI (Landfire 2004). The landcover classes changed from upland to wetland are: Fire Scar – Tussock Tundra (Ducks Unlimited, Permanent Identifier 101), Fire Scar – Low Shrub Tussock Tundra (Ducks Unlimited, Permanent Identifier 103), Black Spruce/Tussock Forest (Black River EVT, Permanent Identifier 2479), and Western North American Boreal Shrub and Herbaceous Floodplain Wetland (Landfire, Permanent Identifier 2407). The revision of these classes from upland to wetland increased the area of wetlands within the RHI and NWR.

Also in the final stages of mapping, information from the NHD was incorporated to give more accurate resolution of lacustrine, palustrine, and riverine systems. For the NHD Waterbody feature dataset, lakes and ponds, and stream and river feature types were selected and exported to two new feature classes. The lake and pond features were separated again on the basis of area with lakes greater than or equal to 8 ha and ponds less than 8 ha; a division in accordance with NWI guidelines (Cowardin et al. 1979). The NHD-derived feature classes were then rasterized to three separate files delineating lakes, ponds and streams/rivers, which were ultimately mosaicked with the original Kanuti Wetlands raster ('Kanuti_Wetlands_Raster_RHI'). In this way, pixels previously misattributed as lake, pond, or riverine were revised to the correct system.

Results

Habitat distribution as interpreted from landcover class shows that within the RHI, 86% of the mapped area is upland, 12% is wetland, and 2% is deepwater habitat. Similarly, within the NWR, 81% of the mapped area is interpreted to be upland, 15% is interpreted as wetland, and 4% is interpreted as deepwater habitat. At the RHI level, 178 unique landcover classes representing 23 coarse landcover classes were collapsed into one upland and 36 wetland classes. At the refuge level, 56 unique landcover classes representing 19 coarse landcover classes were collapsed into one upland and 13 wetland classes. At both the RHI and NWR levels, the wetland classes were further collapsed into five generalized wetland and deepwater categories. Map classes are listed in decreasing order of area by generalized upland, wetland, and deepwater category as well as coarse-scale landcover class for the RHI and NWR in Tables 2-5.

Table 2: Generalized upland, wetland, and deepwater categories listed in decreasing order of mapped area within the Kanuti RHI

Generalized Category	*Mapped Area (Acres)*	*Mapped Area (%)*
Upland	9,870,705	86.1
Freshwater Forested Shrub	1,337,888	11.7
Lake	99,090	0.9
Freshwater Emergent	69,527	0.6
Riverine	57,830	0.5
Pond	22,788	0.2
Grand Total	11,457,828	100

Table 3: Coarse-scale landcover classes listed in decreasing order of mapped area within the Kanuti RHI

Landcover Class	*Mapped Area (Acres)*	*Mapped Area (%)*
White Spruce or Black Spruce (Open-Closed)	2,297,489	20.1
Low Shrub	1,679,320	14.7
Dwarf shrub-Lichen	1,261,708	11.0
Tall Shrub (Open-Closed)	856,265	7.5
White Spruce or Black Spruce (Woodland)	794,590	6.9
Tussock Tundra (Low shrub or Herbaceous)	740,601	6.5
Dwarf Shrub	707,070	6.2
Fire Scar	612,923	5.3
Lichen	587,049	5.1
White Spruce or Black Spruce-Deciduous (Open-Closed)	578,640	5.1
Deciduous Forest (Open-Closed)	472,965	4.1
White Spruce or Black Spruce/Lichen (Woodland-Open)	248,279	2.2
Sparse Vegetation (Interior Alaska; Cook Inlet Basin)	224,513	2.0
Freshwater or Saltwater	142,356	1.2
Bareground	72,213	0.6
Low Shrub/Lichen	50,765	0.4
Herbaceous (Wet) (Interior Alaska; Cook Inlet Basin)	46,133	0.4
Herbaceous (Mesic) (Interior Alaska; Cook Inlet Basin)	44,512	0.4
Herbaceous (Aquatic)	16,359	0.1
Ice-Snow	14,136	0.1
White Spruce or Black Spruce (Woodland-Closed)	9,001	0.1
Herbaceous (Wet) (Northern and Western Alaska)	747	0.0
Urban; Agriculture; Road	194	0.0
Grand Total	11,457,828	100

Table 4: Generalized upland, wetland, and deepwater categories listed in decreasing order of mapped area within the Kanuti NWR

Generalized Category	*Mapped Area (Acres)*	*Mapped Area (%)*
Upland	1,326,887	81.1
Freshwater Forested Shrub	212,788	13.0
Lake	48,696	3.0
Freshwater Emergent	28,977	1.8
Pond	13,151	0.8
Riverine	6,336	0.4
Grand Total	1,636,834	100

Table 5: Coarse-scale landcover classes listed in decreasing order of mapped area within the Kanuti NWR

Landcover Class	*Mapped Area (Acres)*	*Mapped Area (%)*
Fire Scar	438,940	26.8
White Spruce or Black Spruce (Open-Closed)	349,687	21.4
White Spruce or Black Spruce-Deciduous (Open-Closed)	177,838	10.9
White Spruce or Black Spruce (Woodland)	136,543	8.3
Deciduous Forest (Open-Closed)	124,597	7.6
White Spruce or Black Spruce/Lichen (Woodland-Open)	86,707	5.3
Tussock Tundra (Low shrub or Herbaceous)	82,106	5.0
Low Shrub	67,894	4.1
Tall Shrub (Open-Closed)	60,245	3.7
Freshwater or Saltwater	54,735	3.3
Herbaceous (Wet) (Interior Alaska; Cook Inlet Basin)	18,992	1.2
Herbaceous (Aquatic)	13,448	0.8
Bareground	8,851	0.5

Dwarf Shrub	7,831	0.5
Herbaceous (Mesic) (Interior Alaska; Cook Inlet Basin)	6,354	0.4
Lichen	1,963	0.1
White Spruce or Black Spruce (Woodland-Closed)	93	0.0
Ice-Snow	7	0.0
Dwarf shrub-Lichen	3	0.0
Grand Total	1,636,834	100

Landcover types comprising approximately 75% of wetland habitat within the RHI are: Low shrub - Tussock Tundra, Upland Organic-rich Moist Acidic Dwarf Birch-Tussock Shrub, Lowland Organic-rich Wet Acidic Black Spruce Forest, fire scar - low shrub tussock tundra, Clear Water, and Lowland Moist Dwarf Birch-Ericaceous-Willow Low Shrub (Table 6). Dominant upland landcover types within the RHI are: Alpine Rocky Dry Dryas Dwarf Shrub, Open Needleleaf, Upland Rocky-loamy Moist White Spruce Forest, Woodland Needleleaf, Upland Moist Dwarf Birch-Ericaceous-Willow Low Shrub, Low Shrub, Alpine Rocky Dry Acidic Barrens, Upland Rocky-loamy Moist Circumacidic Alder-Willow Tall Shrub, Tall Shrub, Closed Deciduous, Open Mixed Needleleaf/Deciduous, and Dwarf Shrub, which together represent over 75% of the habitat mapped as upland (Table 7).

Table 6: Landcover classes coded as wetland or deepwater habitats listed in decreasing order of mapped area within the Kanuti RHI. Note: landcover class names are preserved from their original source map, classes comprising less than 1% are not included.

Landcover Class	*Mapped Area (Acres)*	*Mapped Area (%)*
Low shrub - Tussock Tundra	345,286	21.8
Upland Organic-rich Moist Acidic Dwarf Birch-Tussock Shrub	266,060	16.8
Lowland Organic-rich Wet Acidic Black Spruce Forest	234,551	14.8
fire scar - low shrub tussock tundra	180,411	11.4
Clear Water	78,102	4.9
Lowland Moist Dwarf Birch-Ericaceous-Willow Low Shrub	68,260	4.3
Tussock Tundra	42,418	2.7
Lowland Organic-rich Wet Circumacidic Alder Tall Shrub	33,447	2.1
Lowland Spruce Forest	33,116	2.1
Tussock Tundra - Lichen	32,262	2.0
fire scar - tussock tundra	25,971	1.6
Riverine Water	24,583	1.5
Mixed Shrub-Sedge Tussock Tundra-Bog	23,119	1.5
Riverine Gravelly-loamy Moist Circumalkaline White Spruce-Willow Forest	22,070	1.4
Riverine Gravelly Moist Circumalkaline Barrens	20,623	1.3
Wet Graminoid	19,951	1.3
Lowland Lake	16,108	1.0
Aquatic Bed	15,858	1.0
Total	1,482,196	93.4

Table 7: Landcover classes coded as upland habitat listed in decreasing order of mapped area within the Kanuti RHI. Note: landcover class names are preserved from their original source map, classes comprising less than 1% are not included.

Landcover Class	*Mapped Area (Acres)*	*Mapped Area (%)*

Alpine Rocky Dry Dryas Dwarf Shrub	1,115,773	11.3
Open Needleleaf	991,439	10.0
Upland Rocky-loamy Moist White Spruce Forest	949,673	9.6
Woodland Needleleaf	758,993	7.7
Upland Moist Dwarf Birch-Ericaceous-Willow Low Shrub	746,642	7.6
Low Shrub	695,635	7.0
Alpine Rocky Dry Acidic Barrens	535,393	5.4
Upland Rocky-loamy Moist Circumacidic Alder-Willow Tall Shrub	431,254	4.4
Tall Shrub	379,806	3.8
Closed Deciduous	304,392	3.1
Open Mixed Needleleaf/Deciduous	291,462	3.0
Dwarf Shrub	249,163	2.5
Closed Mixed Needleleaf/Deciduous	207,534	2.1
Sparse Vegetation	200,315	2.0
Upland Rocky-loamy Moist Alkaline Sedge-Dryas Meadow	183,703	1.9
Fire Scar	155,014	1.6
Open Needleleaf - Lichen	133,427	1.4
Alpine Rocky Moist Ericaceous Dwarf Shrub	131,277	1.3
Upland Shrub Birch-Willow Tundra (Upland Low Scrub)	130,612	1.3
fire scar - tall shrub	115,268	1.2
Woodland Needleleaf - Lichen	114,813	1.2
Alpine Rocky Dry Alkaline Barrens	96,512	1.0
Total	8,918,099	90.3

Dominant wetland landcover types within Kanuti Refuge are: fire scar - low shrub tussock tundra, Low shrub - Tussock Tundra, and Clear Water, which together represent over 80% of the habitat mapped as wetland or deepwater (Table 8). Dominant upland landcover types within the refuge are: Open Needleleaf, Woodland Needleleaf, Fire Scar, Open Mixed Needleleaf/Deciduous, Closed Deciduous, fire scar - tall shrub, Low Shrub, and Closed Mixed Needleleaf/Deciduous, which together represent over 75% of the habitat mapped as upland (Table 9).

Table 8: Landcover classes coded as wetland or deepwater habitats listed in decreasing order of mapped area within the Kanuti NWR. Note: landcover class names are preserved from their original source map, classes comprising less than 1% are not included.

Landcover Class	*Mapped Area (Acres)*	*Mapped Area (%)*
fire scar - low shrub tussock tundra	129,387	41.7
Low shrub - Tussock Tundra	76,036	24.5
Clear Water	48,523	15.7
Wet Graminoid	14,510	4.7
Aquatic Bed	13,448	4.3
fire scar - tussock tundra	12,477	4.0
Turbid Water	6,200	2.0
Tussock Tundra	4,262	1.4
Total	304,843	98.4

Table 9: Landcover classes coded as upland habitat listed in decreasing order of mapped area within the Kanuti NWR. Note: landcover class names are preserved from their original source map, classes comprising less than 1% are not included.

Landcover Class	*Mapped Area (Acres)*	*Mapped Area (%)*
Open Needleleaf	347,890	26.2
Woodland Needleleaf	135,247	10.2
Fire Scar	116,464	8.8
Open Mixed Needleleaf/Deciduous	110,134	8.3
Closed Deciduous	109,770	8.3
fire scar - tall shrub	80,168	6.0
Low Shrub	67,889	5.1
Closed Mixed Needleleaf/Deciduous	67,695	5.1
Tall Shrub	60,245	4.5
Woodland Needleleaf - Lichen	58,109	4.4
fire scar - low shrub	54,265	4.1
fire scar - open needleleaf	37,841	2.9
Open Needleleaf - Lichen	28,591	2.2
Open Deciduous	14,827	1.1
Total	1,289,135	97.2

Discussion

The separate geospatial treatment of wetlands derived from NWI mapping versus those interpreted from landcover is recommended due to the drastically different mapping protocols and resulting spatial incongruities between the two datasets. Due to the more specific protocols of NWI mapping, the total area of wetland habitat is greater when delineated in accordance with NWI standards than it is when inferred from landcover and for this reason, areas mapped in accordance with the NWI standard appear to support more extensive and diverse wetlands compared to similar landscapes where wetland area was inferred from landcover. To quantify this point, the areas for the generalized categories of upland, wetland, and

deepwater habitats were compared between NWI and landcover for the area of the RHI where NWI maps are available (Table 10). Mapped areas are comparable for all wetland and deepwater types except for the Freshwater Forested Shrub category where NWI returns an area almost double that estimated from landcover. As discussed in the data limitations section, this discrepancy is largely due to landcover classes like woodland black spruce, which include both upland and wetland types, yet are classified as upland. It is important to understand that these apparent spatial differences stem from the methodoly rather than ecological differences. Due to the danger of misinterpretation, coverages incorporating both the NWI and landcover-derived wetlands has not been provided as a final deliverable.

Table 10: A comparison of areas for the generalized upland, wetland, and deepwater categories derived from NWI and landcover listed in decreasing order of mapped area within the NWI-mapped area of Kanuti RHI.

	National Wetland Inventory		*Landcover-derived*	
Generalized Category	**Mapped Area (Acres)**	**Mapped Area (%)**	**Mapped Area (Acres)**	**Mapped Area (%)**
Upland	961,546	60.2	1,336,603	83.7
Freshwater Forested Shrub	596,906	37.4	226,330	14.2
Freshwater Emergent	19,436	1.2	15,922	1.0
Riverine	14,331	0.9	10,352	0.6
Pond	2,229	0.1	1,428	0.1
Lake	1,822	0.1	5,358	0.3
Grand Total	1,596,270	100	1,595,992	100

However, NWI mapping was incorporated to estimate a maximum wetland area for the RHI by giving preference to the NWI coverages where available. Specifically, upland, wetland, and deepwater areas derived from landcover were subtracted from the RHI and replaced by NWI where digital data was available (approximately 11 topographic quadrangles). The wetland area estimated by this method is approximately 3% greater than that estimated from landcover alone, with the greatest increase shown in Freshwater Forested Shrub (Table 11; see Table 2 for comparison).

Table 11: Maximum areas of generalized upland, wetland, and deepwater categories derived from NWI and landcover listed in decreasing order of mapped area within the Kanuti RHI.

Generalized Category	*Mapped Area (Acres)*	*Mapped Area (%)*
Upland	9,495,421	82.9
Freshwater Forested Shrub	1,708,407	14.9
Lake	95,552	0.8
Freshwater Emergent	73,030	0.6
Riverine	61,810	0.5
Pond	23,589	0.2
Grand Total	11,457,808	100

As NWI maps are not available for any part of the NWR, the upland, wetland and deepwater areas interpreted from landcover provide the best available estimates of wetland area within the refuge.

Processing steps:

To create a wetland habitat feature class for the Region of Hydrologic Interest:

1. Export Data - select the 'Kanuti_NWR_RHI' feature from the 'AK_RHIs_regional' feature class and export as feature class 'Kanuti_RHI_boundary'
2. Extract by Mask where Input Raster is 'ak_lc_nw_interior_27oct20131' and feature mask is 'Kanuti_RHI_boundary' output raster is 'Kanuti_Wetlands_Final_RHI_raster'
3. Add Attribute Index to the 'PrimaryKey' field in 'Kanuti_Wetlands_Final_RHI_raster', where index name is 'Index'
4. Convert raster to a polygon where the input raster is 'Kanuti_Wetlands_Final_RHI_raster', the field is 'PrimaryKey' and the output polygon feature is 'Kanuti_Wetlands_Final_RHI_poly_undiss', polygons were not simplified
5. Dissolve features where the input is 'Kanuti_Wetlands_Final_RHI_poly_undiss', the dissolve field is 'PrimaryKey' and multipart features are allowed, output is 'Kanuti_Wetlands_Final_RHI_ploy_dissolve'. Note the primary keys 67, 79, 114, 305, 320, and 339 were not fully dissolved (i.e. two multipart features exist for each value) due to memory constraints.
6. Add Attribute Index to all fields in 'Kanuti_Wetlands_Final_RHI_poly_dissolve', index name is 'Index'
7. Add Join where 'Kanuti_Wetlands_Final_RHI_poly_dissolve' is the input feature class, 'gridcode' (i.e. PrimaryKey) is the input join field, 'Kanuti_Wetlands_Revised_JoinTable' is the join table and 'Primary Key' is the output join field, all target features are kept.
8. Export all features from 'Kanuti_Wetlands_Final_RHI_poly_dissolve', to 'Kanuti_Wetlands_Final_RHI_poly' to preserve the join (note: this must be done in ArcMap, not ArcCatalog)
9. Delete unnecessary or redundant fields (e.g. gridcode, which is now replicated by the PrimaryKey field and OBJECTID_ field, which is relict from the join table).

To create a wetland habitat feature class for the Refuge:

1. Extract by Mask where Input Raster is 'Kanuti_Wetlands_Final_RHI_raster' and feature mask is 'Kanuti_NWR_boundary' output raster is 'Kanuti_Wetlands_Final_NWR_raster'
2. Add Attribute Index to the 'PrimaryKey' field in 'Kanuti_Wetlands_Final_NWR_raster', index name is 'Index'
3. Convert raster to a polygon where the input raster is 'Kanuti_Wetlands_Final_NWR_raster'' the field is 'PrimaryKey' and the output polygon feature is 'Kanuti_Wetlands_Final_NWR_poly_undiss', polygons were not simplified
4. Dissolve features where the input is 'Kanuti_Wetlands_Final_NWR_poly_undiss', the dissolve field is 'grid_code' (i.e. PrimaryKey) and multipart features are allowed, output is 'Kanuti_Wetlands_Final_NWR_poly_dissolve'
5. Add Attribute Index to 'gridcode' (i.e. PrimaryKey) in 'Kanuti_Wetlands_Final_NWR_poly_dissolve', index name is 'Index'
6. Add Join where 'Kanuti_Wetlands_Final_NWR_poly_dissolve' is the input feature class, 'gridcode' (i.e. PrimaryKey) is the input join field, 'Kanuti_Wetlands_Revised_JoinTable' is the join table and 'Primary Key' is the output join field, all target features are kept.
7. Export all features from 'Kanuti_Wetlands_Final_NWR_ploy_dissolve' to 'Kanuti_Wetlands_Final_NWR_poly' to preserve the join (note: this must be done in ArcMap, not ArcCatalog)
8. Delete unnecessary or redundant fields (e.g. gridcode, which is now replicated by the PrimaryKey field and OBJECTID_ field, which is relict from the join table).

To incorporate NWI polygons to the Wetland Habitat feature class at the RHI level:

1. Clip 'AK_wet_poly' to 'Kanuti_RHI' output feature class is 'Kanuti_NWI_poly'
2. Convert features to points where 'Kanuti_NWI_poly' is the input layer, 'Kanuti_NWI_point' is the output layer and centroids are constrained to the inside of their parent feature.
3. Spatial Join 'Kanuti_Wetlands_RHI_Draft' with 'Kanuti_NWI_point' where the output is "Kanuti_Wetlands_NWI_RHI_Draft' the join operation is one to one, all target features are kept and match option is 'Intersect'.

Note: An attempt was made to union the 'Kanuti_Wetlands_draft' with the 'Kanuti_NWI_poly' but it proved to be too computationally intensive for the processing computer, therefore the centroid approach was used. The disadvantage of attributing a NWI wetland code to a landcover feature following the centroid method is that the entire multipart feature is attributed based on its intersection with the centroid of a single NWI polygon. For example, if the landcover class 'Black Spruce Forest' which would have been conservatively classified as upland, intersects a polygon that NWI has classified as PFO4B in the very limited area for which NWI data is available, then all parts of the multipart feature will be attributed PFO4B within the Kanuti RHI.

The separate treatment of the NWI coverage and the Wetland Habitat feature classes (i.e. not incorporating the NWI identities to the Wetland Habitat feature classes) is recommended due to the drastically different mapping protocols and resulting spatial incongruities. A feature class incorporating both the landcover-inferred and NWI wetlands has not been provided as a final deliverable.

To incorporate information from the National Hydrolography Dataset at the RHI level

1. For the NHDWaterbody feature dataset, the lakes and ponds polygon feature type (FType = LakePond) was selected and exported to a new feature class containing 1,060,120 features.
2. Next, the lake and pond features were split into two separate feature classes on the basis of area with lakes greater than or equal to 8 ha and ponds less than 8 ha; a division in accordance with NWI guidelines (Cowardin et al. 1979). This resulted in a lakes feature class containing 72,820 features and a ponds feature class containing 987,300 features.
3. The lake, pond, and stream/river feature classes were clipped to the Kanuti RHI boundary which reduced the number of polygons to 12,218 ponds and 790 lakes.
4. For the NHDStreamRiver feature dataset the StreamRiver line feature type (FType = StreamRiver) was selected and exported to a new feature class.
5. The three NHD-derived feature classes were rasterized to files named 'Kanuti_NHD_Lake', 'Kanuti_NHD_Pond' and 'Kanuti_NHD_StreamRiver'.
6. Within the greater wetland raster ('Kanuti_Wetlands_Raster_RHI') pixels classified as 'Lake', 'Pond' or 'Riverine' were extracted by their attributes to form a new raster named 'Kanuti_Wetland_Raster_LPR_RHI'.
7. Following these attribute-based extractions, successive extractions were performed on the 'Kanuti_Wetland_Raster_LPR_RHI' using the 'Kanuti_NHD_Lake', 'Kanuti_NHD_Pond' and 'Kanuti_NHD_StreamRiver' rasters as masks. The three new files were named Kanuti_Wetland_raster_LPR_maskbyLake_RHI, Kanuti_Wetland_raster_LPR_maskbyPond_RHI, and Kanuti_Wetland_raster_LPR_maskbyStreamRiver_RHI. This operation allowed identification of pixels where the wetland map and NHD classifications differed (e.g the wetland map classified a waterbody as a lake, whereas the improved NHD product classified it as a pond).
8. These misclassified pixels were then extracted from the three 'maskedby' rasters. Specifically, pixels misattributed as pond or riverine were extracted from the 'Kanuti_Wetland_raster_LPR_maskbyLake_RHI' raster, pixels misattributed as lake or riverine were extracted from the 'Kanuti_Wetland_raster_LPR_maskbyPond_RHI', and pixels misattributed as pond or lake were extracted from the

'Kanuti_Wetland_raster_LPR_maskbyStreamRiver_RHI' raster. The three new files were named Kanuti_revise_to_Lacustrine, Kanuti_revise_to_Palustrine, and Kanuti_revise_to_Riverine.

9. Within these three files the misclassified pixels were reattributed to the correct system and assigned new primary keys. The revised attribute tables were exported to a table for use in later joining.
10. The rasters containing pixels to be revised were reclassified to assign new, unique values. These reclassified rasters were named Lake_ReClass, Pond_Reclass, and River_ReClass. New values were assigned in ascending order from 1 beginning with the lowest primary key in the Lake raster, then the lowest primary key in the Pond raster and finally the lowest Primary Key in the River raster. These values ranged from 1-21 and were translated to the join table.
11. The Lake_ReClass, Pond_Reclass, and River_ReClass and Kanuti_Wetland_Raster_RHI raster files were then mosaicked to a new, 16-bit unsigned single banded raster using 'MINIMUM' as the raster operator. In this way the lower values assigned to the revised rasters were given priority where they overlapped the original thematic raster.
12. Values in the new mosaic named 'Kanuti_Wetlands_RHI_mosaic' were joined back to the attribute table using an indexed join table saved in CSV format that included both attributes for the old and revised pixels.
13. The 'Kanuti_Wetlands_RHI_mosaic' raster was then copied to a new raster 'Kanuti_Wetlands_Revised_RHI' to make the join permanent.

Metadata summary for 'Wetland_Habitat_Kanuti_RHI' and 'Wetland_Habitat_Kanuti_NWR' Feature Classes[1]

Topology Type: Polygon

Attributes Included:

Field Name: PRIMRY_KEY

Alias: Permanent Identifier

Type: String

Length: 40

Definition: A number that uniquely identifies the occurrence of each feature (original landcover class name) in the Alaska Natural Heritage Program landcover classification.

Field Name: VALUE

Alias: Raster Value

Type: String

Length: 40

Definition: A number that uniquely identifies the occurrence of each cell type (original landcover type) in the Alaska Natural Heritage Program landcover raster mosaic.

Field Name: LC_SOURCE

Alias: Landcover Source Name

Type: text

Length: 255

Definition: The name of the original landcover mapping source information for this dataset.

Field Name: LC_CLASS

Alias: Landcover Class Name

Type: text

Length: 255

Definition: The landcover class name associated with the original mapping source information for this dataset.

Field Name: LC_COARSE

Alias: Landcover Coarse Class Name

Type: text

[1] FGDC metadata is embedded in the 'Wetland_Habitat_Kanuti_RHI' and 'Wetland_Habitat_Kanuti_NWR' feature classes.

Length: 255

Definition: The coarse-scale landcover class name assigned to provide a unified legend for variably-named yet compositionally similar landcover types across Alaska. See Boggs et al. 2015 for a description of the class.

Field Name: LC_DETAIL

Alias: Landcover Detailed Class Name

Type: text

Length: 255

Definition: The fine-scale or detailed landcover class name assigned to provide a unified legend for variably-named yet compositionally similar landcover types across Alaska. See Boggs et al. 2015 for a description of the class.

Field Name: NWI_GEN

Alias: Generalized NWI Code

Type: text

Length: 50

Definition: Provides a general description of wetland type that approximates the NWI code at the system, subsystem or class level. Categories are defined by the following methodology:

Freshwater Emergent: includes all wetland types described as dominantly palustrine (system) emergent (class).

Freshwater Forested Shrub: includes all wetland types described as dominantly palustrine (system) and forested and/or shrub-scrub (class).

Freshwater Pond: includes all wetland types occupying less than 20 acres that are described as palustrine (system) with unconsolidated bottom and/or aquatic bed (class).

Lake: includes all wetland types occupying more than 20 acres that are described as lacustrine (system) and limnetic and/or littoral (subsystem).

Riverine: includes all wetland types described as riverine (system).

Upland: includes all types that are not otherwise generalized as wetland or deepwater

Field Name: HAB_CODE_1

Alias: Habitat Code Primary

Type: text

Length: 50

Definition: Identifies the primary NWI code associated with the Cowardin classification of wetland and deepwater habitats. Mixed codes are allowed to accommodate mosaicked landcover types.

Field Name: HAB_CODE_2

Alias: Habitat Code Secondary

Type: text

Length: 50

Definition: Identifies secondary NWI code associated with the Cowardin classification of wetland and deepwater habitats. Mixed codes are allowed to accommodate mosaicked landcover types.

Field Name: SYSTEM

Alias: NWI System

Type: text

Length: 10

Definition: Highest level of Cowardin classification hierarchy defined as a complex of wetlands that share similar hydrologic, geomorphologic, chemical, or biological factors.

Field Name: SUBSYSTEM

Alias: NWI Subsytem

Type: text

Length: 10

Definition: Identifies breakdown within wetlands system to more specific categories related primarily to substrate to tidal influence for wetlands or the source of water for riparian areas.

Field Name: CLASS

Alias: NWI Class

Type: text

Length: 10

Definition: The highest taxonomic unit below wetland subsystem describing the general appearance of the habitat based on dominant life form of vegetation or the physiography and composition of the substrate – features that can be recognized without the aid of detailed environmental measurements.

Field Name: SUBCLASS

Alias: NWI Subclass

Type: text

Length: 10

Definition: Distinction of finer difference in vegetation life forms or substrate.

Field Name: DOM_TYPE

Alias: Dominance Type

Type: text

Length: 255

Definition: Determined on the basis of dominant plant species; nomenclature is in accordance with the USDA PLANTS database. Dominance type is not a complete domain and as a result is a free text field.

Field Name: WATER_MOD

Alias: Water Regime Modifier

Type: text

Length: 10

Definition: Descriptors of wetland behavior based on duration and timing of inundation.

Field Name: COMMENTS

Alias: Comments

Type: text

Length: 255

Definition: Field used to describe any information specific to data collected in the field that cannot be described in existing fields. This information should be specific to conditions, which may affect the use of the data in the classification or accuracy assessment process.

Field Name: COM_[REFUGE NAME] e.g. 'COM_KANUTI'

Alias: [Refuge Name] Comments e.g. 'Kanuti Comments'

Type: text

Length: 255

Definition: Field used to describe any information specific to the habitat type as it is treated within a given refuge that cannot be described in existing fields. This information should be specific to conditions within the refuge, which may affect the use of the data in the classification or accuracy assessment process.

Field Name: AREA_AC

Alias: Area (acres)

Type: double

Precision: 0

Scale: 0

Definition: Area of habitat polygon in acr

Appendix F-Results of the Kanuti Refuge Baseline Water Quality Assessment

Prepared by:
Rebecca Shaftel, Alaska Center for Conservation Science
Cathleen Flanagan, U.S. Fish and Wildlife Service

The baseline water quality assessment of water on the Kanuti Refuge looks at the range of physical, chemical, and biologic variables at different levels of flow on five of Kanuti Refuge river systems: Hollanda Creek, Kanuti-Kilolitna River, Kanuti River, South Fork Kanuti River, and a TKQ. The study also assesses the aquatic macro invertebrate communities on the South Fork Koyukuk, Kanuti Kilolitna, and Kanuti Rivers. Aquatic macro invertebrates constitute a substantial portion of the freshwater biodiversity in Alaska and are effective indicators of environmental condition in freshwater systems (Barbour et al. 1999b; Karr and Chu 1999; Loeb and Spacie 1994; Rosenberg and Resh 1993). Additionally, the study describes the patterns of water quality across watersheds of the Kanuti Refuge and attempts to characterize watersheds not significantly influenced by human disturbance.

The ACCS collected the biologic data and summarized it in an unpublished report written by Dan Bogan (2014) for the Service.

The Service collected the chemical and physical water quality samples. The USGS National Water Quality Laboratory (NWQL) performed the laboratory sample analysis. The data results are summarized in an unpublished report by Rebecca Shaftel at the ACCS (2015) for the Service. This summary of natural waters for the Kanuti Refuge utilizes the results of that report.

Physical Water Quality Results

Physical water quality parameters dissolved oxygen (DO), pH, specific conductance, and water temperature provide the most basic, yet informative, characterization of a waterbody. The natural range of these parameters represents the physical conditions that support the aquatic species using these systems. This report describes each parameter to expand the readers understanding of the role each parameter plays in establishing the characteristic of a healthy aquatic ecosystem. Table 1 and Figure 1 present the range of physical water quality parameters across Kanuti Refuge in table and graph

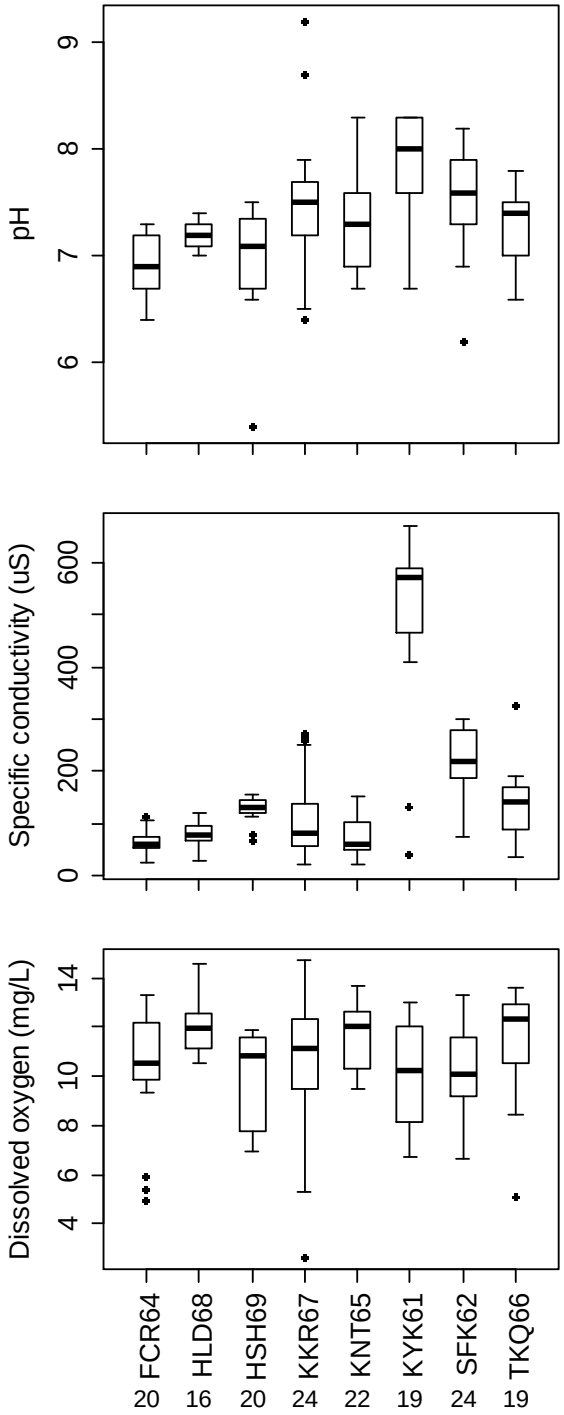

Figure 1: Box Plots of physical field parameters for eight monitoring site. The number below site code on the x axis is the number of samples anlayzed.

form to provide a view of the different physical regimes of these systems.

DO is the gaseous oxygen present in water. DO is mainly regulated by temperature, but fluctuations can be caused by other factors such as organic matter loading, decomposition, and water aeration.

The pH of water is a unitless measure of hydrogen ion concentration that reflects relative acidity or alkalinity, and affects aquatic organism respiration, salt exchange, and many biogeochemical processes.

Specific conductance measures the ability of water to conduct an electrical current, with higher values generally representing groundwater influence or pollution, and lower values representing contributions from rain and snowmelt.

Salinity is measure in parts per thousand (PPT) units.

Median dissolved oxygen values at all of the sites ranges from 10-12.3 mg/L, which is slightly lower than the dissolved oxygen equilibrium value at 5˚ C , 12.75 mg/L (Hem 1985). Diel fluctuations in dissolved oxygen can be as large as 10 mg/L (Huggins and Anderson, 2005), which can make comparison of snapshot measurements between streams or seasons difficult. Examination of dissolved oxygen percentages and concentrations by month indicate relatively stable values for the monthly measurements collected over several years. For all sites, dissolved oxygen percentages were at or near 100% from spring through fall (May to September), while wintertime values were depressed between 40-80%. The maximum dissolved oxygen concentrations occurred in May, likely due to high biological productivity and cold stream temperatures.

Median pH values of the eight monitoring sites are circumneutral (between 6.5-7.5), with the exception of the Koyukuk River, which has a median pH of 8.0.

The results of the physical water quality analysis show that the main stem of the Koyukuk River has much higher specific conductivity values than the other monitoring sites. Its median value of 571 µS/cm, which is much higher than the next highest median value of 217 µS for the South Fork Koyukuk River. Henshaw Creek and the Kanuti River Tributary have median specific conductivity values between 130-140 µS/cm, while median values of Fish Creek, Holonada Creek, the Kanuti Kilolitna River, and the Kanuti River are less than 81 µS/cm. Interestingly, the highest median specific conductivity value for 31 streams in Cook Inlet was 313 µS/cm, which occured on another large river systems, the Matanuska River. Two other sites in Cook Inlet had median values above 200 µS/cm, while the remaining 28 sites studies had median values below 200 µS/cm (Glass, 1999)

In general, high specific conductivity values typical occur during baseflow periods when groundwater contributions are highest, but can also be elevated during storm flows in watersheds with land disturbance (Brabets and Ourso 2013). Daily monitoring of specific conductivity in streams with historic mining activities shows increases after rain events that range from 300 to 700 µS/cm (Brabets and Ourso 2013).

Table 1: Physical Water Quality Parameter Ranges of Kanuti Refuge Rivers (USFWS 2014)

Site	*Statistic*	*pH*	*Cond (uS/cm)*	*SpecCond (uS)*	*Temp (C)*	*Salinity*	*BarrPres (mmHg)*	*DO (mg/L)*	*DO (%)*	*Discharge (cfs)*
Fish Creek	Mean	6.9	40.7	64.1	6.5	0.0	742	10.1	85.6	
	Median	6.9	42.3	61.1	6.2	0.0	741	10.5	97.5	
	Stnd Dev	0.34	12.6	22.2	6.0	0.0	8.6	2.4	24.4	
	Min	6.4	17.0	26.5	0.0	0.0	728	4.9	33.1	9.93
	Max	7.3	59.2	113	15.6	0.0	765	13.3	111.8	1890
	Range	0.97	42.2	86.3	15.6	0.0	37	8.4	78.7	
Holland Creek	Mean	7.2	47.8	79.1	4.1	0.0	742	12.0	93.4	
	Median	7.2	51.1	77.4	4.2	0.0	741	11.9	94.5	
	Stnd Dev	0.14	17.8	25.7	3.6	0.0	12.6	1.2	6.2	
	Min	7.0	14.5	27.5	0.0	0.0	732	10.5	82.9	0
	Max	7.4	82.1	119	9.7	0.1	783	14.6	105.2	565
	Range	0.46	67.6	91.6	9.7	0.1	51	4.1	22.3	
Henshaw Creek	Mean	7.0	74.9	128	3.7	0.1	735	10.0	78.8	
	Median	7.1	76.0	132	0.3	0.1	742	10.9	85.8	
	Stnd Dev	0.50	13.0	23.1	4.3	0.0	36	1.8	20.6	
	Min	5.4	39.1	66.3	0.0	0.0	596	6.9	47.0	41.6
	Max	7.5	91.8	154	11.4	0.1	763	11.9	106.3	3380
	Range	2.10	52.7	87.3	11.4	0.1	167	5.1	59.3	
Kanuti Kilolitna River	Mean	7.5	71.5	122	5.1	0.0	741	10.0	81.3	
	Median	7.5	58.8	84.2	1.4	0.0	740	10.4	96.9	
	Stnd Dev	0.64	46.3	90.4	6.2	0.0	9.6	3.0	26.3	
	Min	6.4	11.7	20.2	0.0	0.0	727	2.6	19.5	0
	Max	9.2	144	271	17.0	0.1	765	13.9	101.6	3530
	Range	2.81	132	250	17.0	0.1	38	11.3	82.1	
Kanuti River	Mean	7.2	47.1	79.5	5.1	0.0	739	11.6	93.9	
	Median	7.1	42.5	63.1	1.0	0.0	739	12.0	95.6	
	Stnd Dev	0.45	20.9	42.4	6.4	0.0	8.4	1.4	14.0	
	Min	6.7	13.3	22.5	0.0	0.0	725	9.5	68.4	
	Max	8.3	79.4	152	17.2	0.1	762	13.7	114.3	
	Range	1.57	66.1	130	17.2	0.1	37	4.2	45.9	
Koyukuk River	Mean	7.8	307	501	4.6	0.2	740	9.9	78.7	
	Median	8.0	313	572	0.1	0.3	738	10.2	86.0	
	Stnd Dev	0.44	104	167	5.9	0.1	13.7	2.1	22.9	
	Min	6.7	19.8	37.8	0.0	0.0	701	6.7	47.4	1.57
	Max	8.3	408	669	15.2	0.3	762	13.0	107.8	2200
	Range	1.57	388	631	15.2	0.3	61	6.3	60.4	
South Fork Koyukuk River	Mean	7.5	134	216	5.7	0.1	739	10.2	84.3	
	Median	7.6	149	216	1.7	0.1	739	9.8	95.6	
	Stnd Dev	0.51	42.9	73.6	6.9	0.0	7.1	1.9	20.6	
	Min	6.2	44.5	73.9	0.0	0.0	730	6.6	45.5	109
	Max	8.1	176	301	17.7	0.1	757	13.0	109.4	35080
	Range	1.94	131	227	17.7	0.1	27	6.3	63.9	
Kanuti River Tributary (TKQ)	Mean	7.3	85.0	141	4.7	0.1	739	11.5	91.8	
	Median	7.4	84.1	141	3.8	0.1	737	12.3	97.0	
	Stnd Dev	0.35	44.7	80.0	4.5	0.0	9.8	2.1	16.8	
	Min	6.6	21.8	36.7	0.0	0.0	722	5.1	37.0	4.07
	Max	7.8	170	324	11.8	0.1	764	13.6	107.5	915
	Range	1.18	148	288	11.8	0.1	42	8.5	70.5	

The Service collected discrete and continuous water temperature data and made discrete cross sectional measurements de at all sites during sampling events. Continuous temperature data are available for three streams: Kanuti River, South Fork Koyukuk River, and the TKQ. The continuous data presents a more representative view of water temperature and is used in the characterization of water temperature discussion below.

Table 2 presents MWAT and MWMT values and flags them if the annual time series did not include all three summer months (June, July, and August). The thermal maxima for the TKQ is approximately 3˚ C lower than maxima calculated for the other two sites. One or more years of MWMT values on the South Fork Koyukuk and Kanuti rivers are above EPA's recommended maximum summer temperature criteria for salmon and trout migration of 18˚ C. This is common in undisturbed Alaskan streams. Mauger noted that 29 of 48 salmon streams exceeded the criteria in one or more years over several summers in the Cook Inlet basin (Mauger 2013).

Table 25. Maximum weekly average temperatures (MWAT) and maximum weekly maximum temperatures (MWMT) for three water quality sites.

	MWAT				MWMT			
Monitoring Site	2010	2011	2012	2013	2010	2011	2012	2013
Kanuti R. Trib.	13.4[a]	12.4	NA	13.1	14.9[a]	13.9	NA	15.1
S.F. Koyukuk R.	NA	15.0	16.0	16.2[a]	NA	16.9	18.6	18.3[a]
Kanuti R.	17.5[a]	16.3	15.6[a]	16.6[a]	20.3[a]	18.3	17.8[a]	19.2[a]

[a] Values may be low because one or more summer months (June, July, and August) are missing temperature data or have incomplete records (>10% of days are missing).

The monthly water temperature averages also indicate differences in temperature regimes between the three continuously sampled field sites; the tributary to the Kanuti River is colder than the other two sites, especially in June and July (Table 3). The Kanuti River has the largest maximum daily temperature ranges in July (Table 4), although the median daily ranges for July are similar across the three sites. Both the Kanuti and South Fork Koyukuk rivers accumulated approximately 100 degree-days more than the tributary to the Kanuti River in July.

Table 3. Mean monthly temperatures for three water quality sites.

Month	*Kanuti River*				*South Fork Koyukuk River*			*Tributary to Kanuti River*			
	2010	**2011**	**2012**	**2013**	**2011**	**2012**	**2013**	**2010**	**2011**	**2012**	**2013**
Jan	NA	0.0	NA	0.0	NA	0.0	NA	NA	0.0	NA	NA
Feb	NA	0.0	NA	0.0	NA	0.0	NA	NA	NC	NA	NA
Mar	NA	0.0	NA	-0.1	NA	0.0	NA	NA	NC	NA	NA
Apr	NA	0.0	NA	NA	NA	0.0	NA	NA	0.0	NA	NA
May	NA	2.5	NA	NA	NC	2.5	NC	NA	1.5	NA	NC
Jun	NC	11.9	NA	NA	12.3	12.8	NC	NC	8.6	NA	8.3
Jul	NC	14.7	14.4	NC	14.1	13.9	NC	NC	11.2	NA	11.0
Aug	13.4	9.7	11.3	13.0	10.1	11.0	12.2	10.6	7.5	NA	10.2
Sep	6.0	NC	4.7	NC	6.2	4.4	NC	4.8	NC	NC	3.5
Oct	0.0	NA	0.5	NA	0.6	0.6	NA	0.2	NA	0.5	0.7
Nov	0.0	NA	0.0	NA	0.0	NC	NA	0.0	NA	NC	-0.1
Dec	0.0	NA	0.0	NA	0.0	NA	NA	0.0	NA	NA	-0.1

NA = Not applicable. No recorded temperature data for the month.

NC = Not complete. Greater than 10% of days were missing temperature data.

Table 4. July temperature metrics for three water quality sites.

Monitoring Site	*July maximum daily range*	*July median daily range*[a]	*July cumulative degree days*[a]
Kanuti R. Trib.	5.6	3.0	334
S.F. Koyukuk R.	5.2	2.9	427
Kanuti R.	6.9	3.5	437

[a] based on years with a complete daily record for July.

Water Chemistry Results

Total Dissolved Solids: Median TDS concentrations for the five water quality sites range from 55 to 132 mg/L (Figure 2). TDS concentrations are highest on the South Fork Koyukuk River. The median values are over two times higher than the Kanuti River and the Kanuti Kilolitna Rivers. For all sites, the highest TDS values occur in March and are above 200 mg/L for the Kanuti River Tributary. These values are similar to those on unmined streams in the Kantishna Hills (Brabets and Ourso, 2013) and most streams of the Cook Inlet basin, excluding Chester Creek, which is an urban stream and Caribou Creek, which has coal deposits in its watershed (Glass, 1999).

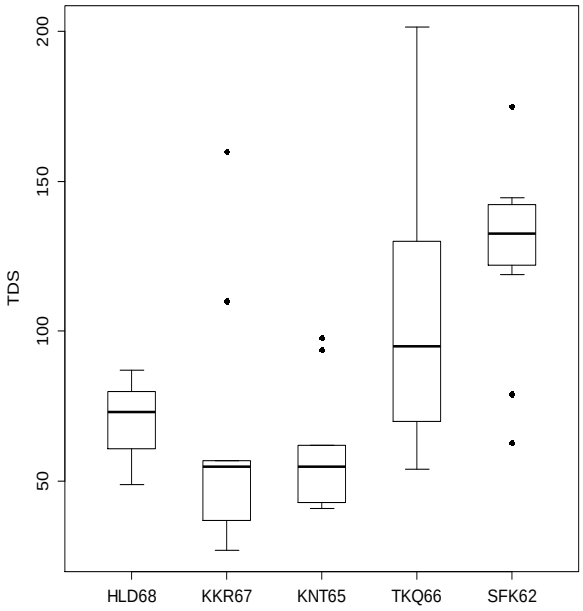

Figure 2: Box Plots of total dissolved solids concentrations for five water quality sites

Major Ions: The piper diagram shows the composition of major cations and anions in the water samples (Figure 3). The dominant anions for all five sites are carbonate and bicarbonate, with very little chloride and up to 40% sulfate in the Kanuti Kilolitna River, Kanuti River Tributary, and the South Fork Koyukuk River. Calcium is the dominant cation in the Kanuti River Tributary and South Fork Koyukuk River while the Kanuti River and Holonada Creek have almost equal percentages of calcium and magnesium. The Kanuti Kilolitna River is dominated by calcium (50-60%), but has the highest contributions of sodium and potassium amongst the five sites (20-25%). All five sites are characterized as calcium-magnesium bicarbonate streams.

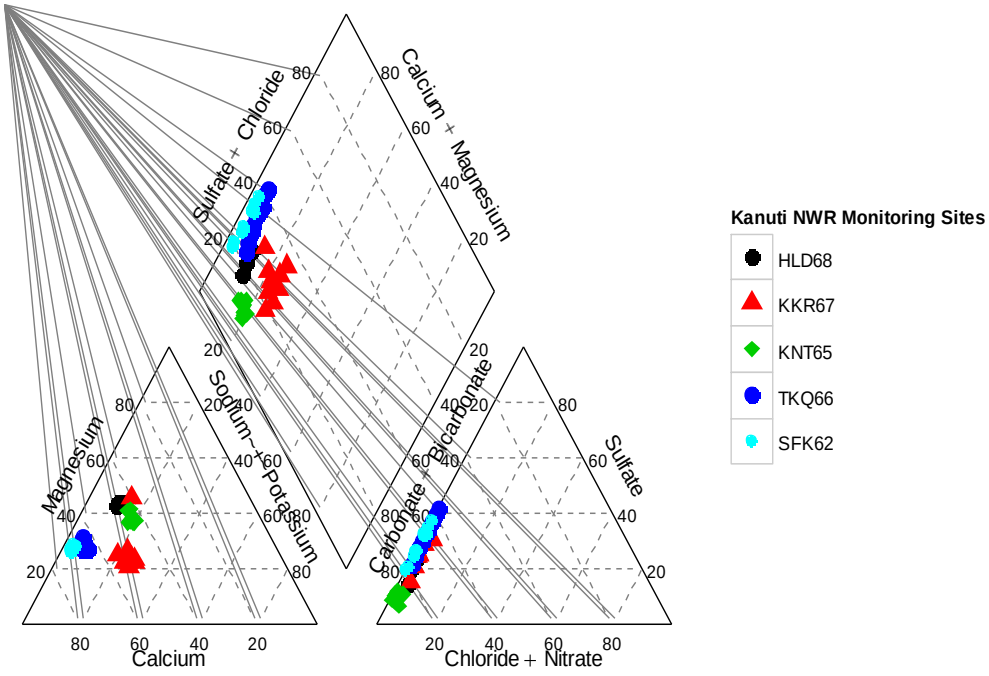

Figure 3: Piper diagram representing major cations and anions at five water quality sites

Dissolved Organic Carbon (DOC): Median dissolved organic carbon for the five streams range from 4.5 to 7.1 mg/L (Figure 4). Maximum DOC concentrations occur in May for all sites and range from 12.6 to 19.8 mg/L. Notably, these maximum concentrations are higher than the maximums reported for either the Kantishna Hills (6.7 mg/L) or streams of Cook Inlet (13 mg/L). Although, DOC concentrations in rivers of the Kanuti Refuge are high, they are well within the range of Arctic rivers.

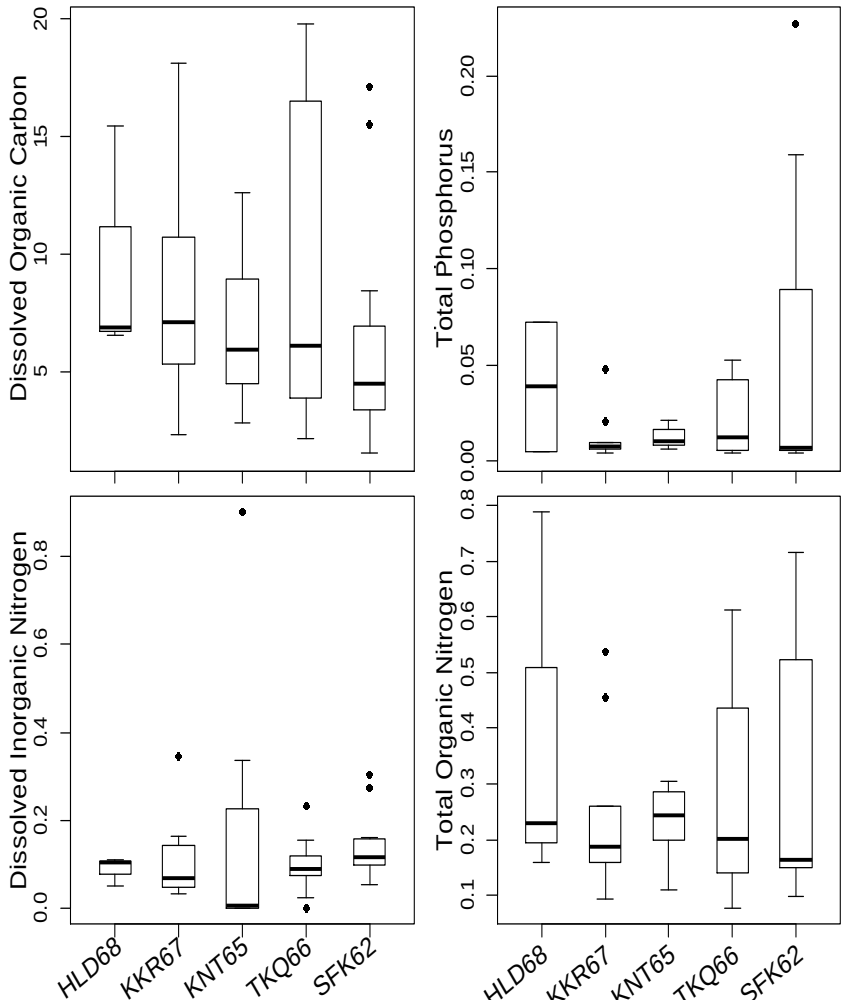

Figure 4: Boxplots of nutrient parameters for five water quality sites

Phosphorous: Three phosphorus parameters were measured at the water quality sites: total phosphorus, dissolved phosphorus, and ortho-phosphate. Many of the sample results for ortho-phosphate are below method detection limits (64%). The total phosphorus results are consistently higher than dissolved phosphorus although the two parameters do not strongly correlate (r^2=0.17; r^2=0.54 after removal of two outliers). Median concentrations of total phosphorus range from 0.007 to 0.039 mg/L. The highest concentrations occur in May and two samples collected from the South Fork Koyukuk River are over 0.15 mg/L; twice as high as samples collected at other sites or dates. Median concentrations of Cook Inlet streams are similar for total phosphorus, except for the Susitna River, whose median and maximum total phosphorus concentrations are 0.1 mg/L and 1.1 mg/L, respectively (Glass, 1999). Two to five samples at each water quality site have measureable levels of orthophosphate and median values ranging from 0.0052 to 0.0077 mg/L. Median values of orthophosphate for several streams in the Cook Inlet basin are an order of magnitude higher (Glass, 1999). Phosphorus species are both low, but well within the range of natural waters and below concentrations for streams in Cook Inlet, which may have anthropogenic inputs.

Dissolved Organic Nitrogen: Nitrate plus nitrite and ammonia are summed to evaluate the concentration of dissolved inorganic nitrogen (DIN). Approximately 70% of the samples for both nitrite and ammonia are below method detection limits indicating that nitrate is the major form of inorganic nitrogen at all

sites. Median concentrations for DIN range from 0.005 to 0.116 mg/L. Maximum concentrations occur in either March or September and range from 0.11 to 0.34 mg/L except for an anomalously high value of 0.90 mg/L found at the Kanuti River in September. Median concentrations for DIN are low compared to Cook Inlet streams, although some of those streams may have anthropogenic sources of nutrients (Glass, 1999).

Total Organic Nitrogen (TON): The total and dissolved organic nitrogen concentrations are similar (r^2=0.83; r^2=0.93 after removal of one outlier) so only totals are discussed here. Median concentrations for TON range from 0.17 to 0.24 mg/L for the five monitoring sites. The highest values are reported in May (0.55 to 0.79 mg/L). Median and maximum TON concentrations for streams in the Kanuti Refuge are lower than streams in Cook Inlet, where medians range from 0.13 to 0.87 mg/L and six sites have maximum values well above 1 mg/L (Glass, 1999). The difference in timing of maximum concentrations for DIN and TON may be due to the higher bioavailability of DIN, which may limit its transport during the snow-free season. Nitrogen species are both low, but well within the range of natural waters and below concentrations for streams in Cook Inlet, which may have anthropogenic inputs.

Trace Elements: For this analysis, all trace elements are compared to the chronic aquatic life criteria since they are the most stringent. It is also important to note that the majority of sample results for cadmium, silver, and zinc are below method detections limits. Of these results, 73% of cadmium, 91% of silver, and 73% of zinc fall below the limits. The presence of non-detects elicited the use of bootstrapping methods developed for analyzing non-detects in data sets. The bootstrapping method estimates the means using ROS with 80% confidence intervals. Bootstrap estimates are calculated for the remaining 11 trace elements (Figure 5).

Means for chromium, copper, and lead are very close to the method detection limits. The 80% confidence intervals for aluminum at the Kanuti Kilolitna River and the Tributary to the Kanuti River both exceeded the aquatic life chronic criteria (Table 5). The 80% confidence intervals for copper exceeds the aquatic life chronic criteria at three sites: the Kanuti Kilolitna River, the Tributary to the Kanuti River, and the South Fork Koyukuk River. The criteria for copper are hardness based, meaning they are calculated based on the hardness values found at the site. Two of these sites, the Tributary to the Kanuti River, and the South Fork Koyukuk River have median hardness values of 26 and 37, respectively, which alter the copper chronic criteria considerably, making it well above the 80% confidence intervals for their mean concentrations. No other trace elements had confidence intervals around their means that exceeded aquatic life chronic criteria. The number of censored results for silver is too high at each site to use robust ROS.

Many of the ADEC water quality criteria for trace elements are calculated based on hardness. This analysis uses a hardness value of 8 hg/L to calculate the hardness dependent criteria, since 8 mg/L is the lowest median value reported for the five sites (Table 5). When a result exceeds the criteria, we recalculate the criteria based on the hardness for that site to determine if the exceedance is a true exceedance. Eleven samples (one or more from each of the monitoring sites) exceed the chronic criteria for aluminum. In one of these exceedances, the hardness and pH values are high enough to exceed the acute criteria. The results for aluminum are conservative. The analysis compares dissolved aluminum to the criteria for total recoverable (TR) aluminum, which is less than or equal to TR aluminum according to Donna Damrau at the NWQL (Personal communication Donna Damrau February 25, 2015).

Twelve samples (one or more from each of the monitoring sites) exceeded the chronic criteria for copper, which are calculated separately for each site and date based on the median hardness at the site.

The results of quality control samples verify the findings for both copper and aluminum.

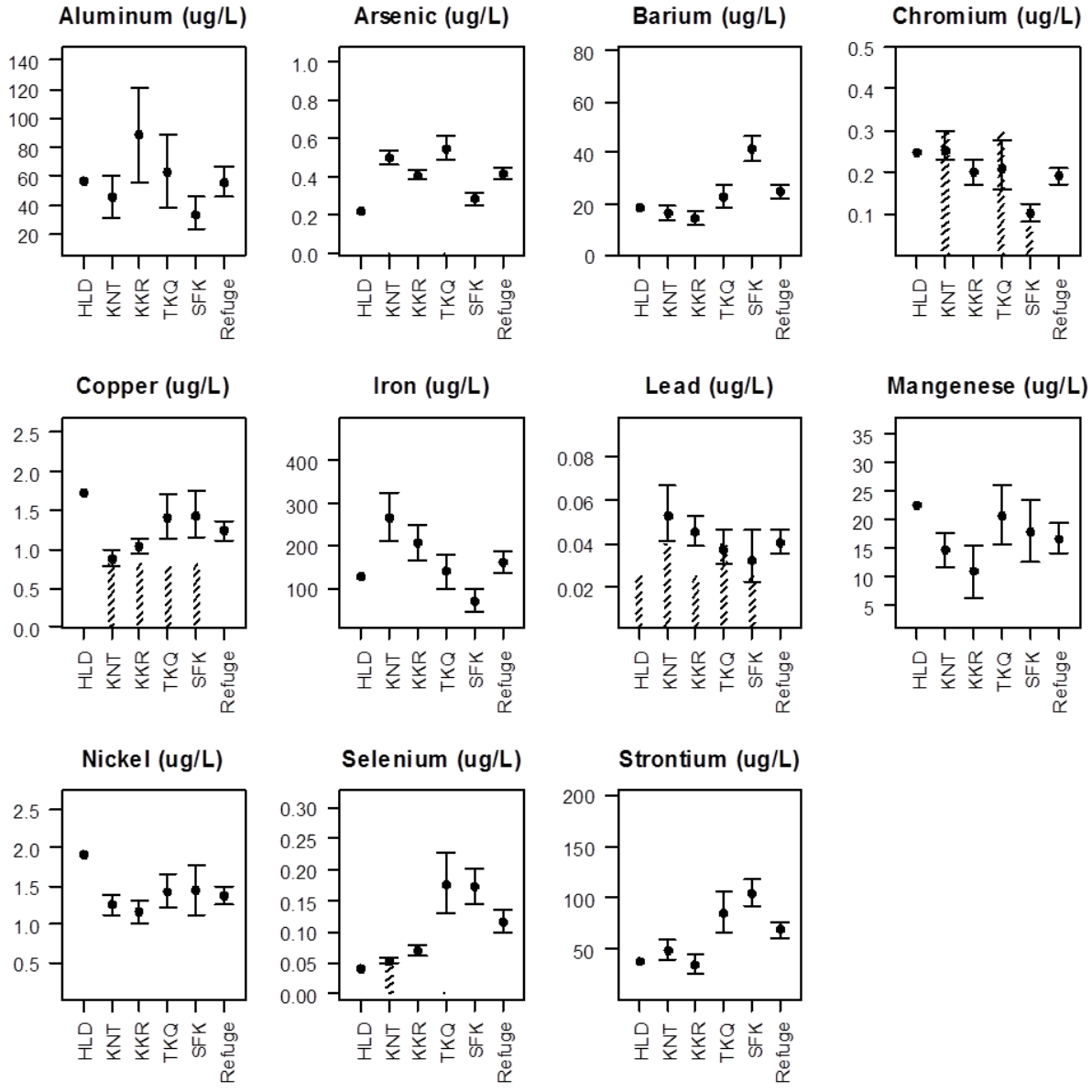

Figure 5: Mean concentrations for eleven trace elements at five water quality sites and data grouped across the Refuge. Bars indicate 80% confidence intervals. Shaded bars are highest method detection limit at each site.

Table 5: Alaska Water Quality Standards for trace elements (USFWS 2014)

Aquatic life criteria1 (ug/L)

Trace element	Acute	Chronic	
Aluminum	750	87	TR
Arsenic	340	150	D
Barium	NA	NA	
Cadmium	0.17	0.04	D
Chromium	72.00	9.37	D
Copper	1.24	1.03	D
Iron	NA	1000	
Lead	3.80	0.15	D
Manganese	NA	NA	
Nickel	55.27	6.14	D
Selenium	NA	4.6	D
Silver	0.04	NA	D
Strontium	NA	NA	
Zinc	13.79	13.90	D

1Using hardness of 8, approximate minimum median value for all sites.
TR - total recoverable; D – dissolved

Invertebrates, Diatoms and Habitat Results

This study collected quantitative samples for benthic habitat, macro invertebrates, and diatoms in three gaged streams on the Kanuti Refuge: Kanuti River, South Fork Koyukuk River, and Kanuti-Kilolitna River. The study also collected semi-quantitative multi-habitat samples of macro invertebrates and diatoms for a more comprehensive characterization of the biota. This characterization of natural waters briefly discusses results of this work; An unpublished report written by Dan Bogan of the ACCS (Bogan 2014) provides a more detailed account of the results.

Taxonomically, the macro invertebrate communities are comparable to communities previously reported for similar interior Alaskan streams (Brabets and Ourso 2013; Oswood 1989). One difference between the studies stands out, Oswood (1989) found Ephemeropterans and Plecopterans generally outnumbered Trichopterans, which is not the case for the Kanuti and Kilolitna-Kanuti Rivers. For both of these rivers, Trichopterans are consistently found in greater abundance than Plecopterans and Ephemeropterans in the multi-habitat and quantitative samples (Bogan 2014).

To calculate total taxa richness, the analysis adds all organisms found in the multi-habitat sample with those not found in the multi-habitat sample, but in at least one of the quantitative samples. The total taxa richness findings are consistent over the three sampling years at each site. An exception is found on Kilolitna-Kanuti River in 2013, where total taxa richness is considerably lower (35) than the previous two years (47 and 48).

The results of the quantitative macroinvertebrate samples reveal greater overall benthic invertebrate densities in the Kanuti and Kilolitna-Kanuti Rivers than in the S.F. Koyukuk River. There are high variations at each location from year to year, suggesting patchy distributions of organisms in each system. The Kanuti and Kanuti-Kilolitna Rivers have more stable beds than the S.F. Koyukuk River. Bed stability contributes to higher invertebrate densities. It is also interesting to note that inter-annual variation of invertebrate densities is higher in the Kanuti and Kanuti-Kilolitna Rivers than in the S.F. Koyukuk River.

The results of the diatom analysis revealed 209 taxa of benthic diatoms, with 12 taxa documented from each of the three sites each year. These findings corroborate the long held notion that the majority of species in benthic river diatom assemblages are represented by a relatively small number of individuals (Patrick et al. 1954). Benthic diatom taxa richness generally declines with ecological degradation (Barbour et al. 1999a; Stevenson and Bahls 1999) making it a useful metric for system health over time. But, one caveat exists when applying diatom taxa richness to ecosystem health—slight nutrient enrichment in otherwise nutrient-poor streams (typical of interior Alaska) leads to increased taxa richness (Patrick 1973; Stevenson 1984).

Sixty-five of the 209 identified diatom taxa are motile. Motile diatoms can have an advantage in a vertically developing benthic communities found in streams undergoing siltation since they are sediment tolerant. Motile taxa represent over 30% of the identified taxa, but more than 5% of the diatoms present in one multi-habitat sample (Kilolitna-Kanuti River, 2011, 8%) suggested that the benthic algal communities are not being adversely impacted by sediment deposition in the three rivers. Over time, the sediment and flow regime of each river drives the physical habitat and stream channel morphology. Although the current sediment loads are not affecting benthic communities, changes in stream discharge

or sediment load associated with natural or anthropogenic causes may alter channel morphology and physical habitat for biological organisms. An understanding of the natural fluctuation of sedimentation and flow provides another metric for monitoring ecosystem health.

The results of the physical habitat data for the three rivers found similarities that Table 6 summarizes. These findings show that the Kanuti-Kilolitna and Kanuti Rivers are more alike than the South Fork Koyukuk River. The South Fork Koyukuk River is characterized by an open canopy (10.5% closed), and a relatively wide channel (87m bankfull width) that is interrupted by the presence of many bars. The Kilolitna-Kanuti and Kanuti rivers are also relatively open (14.6 and 15.0% closed canopy respectively), but they are not as wide (50.0 and 46.6m bankfull widths respectively) and have fewer bars. The South Fork Koyukuk and Kilolitna-Kanuti Rivers are very similar at bankfull stage (0.7 and 0.8m respectively) and incised (both 1.5m) heights, while the Kanuti River reach has lower bankfull (0.4m) and incised (1.1m) heights.

Table 6: Channel characteristics =/- standard deviations for rivers on Kanuti Refuge (Bogan et al 2012)

	Canopy cover (% closed)	*Channel slope (%)*	*Bar Width (m)*	*Wetted width (m)*	*Bankfull width (m)*	*Bankfull height (m)*	*Incised height (m)*
S.F. Koyukuk	10.5 ± 26.0	1.2 ± 0.3	6.4 ± 9.8	63.5 ± 13.6	87.0 ± 8.9	0.7 ± 0.2	1.5 ± 0.3
Kanuti- Kilolitna	14.6 ± 29.2	0.8 ± 0.3	0.8 ± 1.5	38.0 ± 7.0	50.0 ± 7.5	0.8 ± 0.1	1.5 ± 0.4
Kanuti	15.0 + 27.8	0.9 + 0.3	2.3 + 3.7	37.7 + 11.0	46.6 + 8.0	0.4 + 0.1	1.1 + 0.2

Appendix G-Weather and Climate Trend Analysis

Prepared by: Cathleen Flanagan, U.S. Fish and Wildlife Service

According to the Intergovernmental Panel on Climate Change (IPCC), "water resource issues have not been adequately addressed in climate change analyses and climate policy formulation." Although, Alaska is the focus of many climate change discussions, changes in the hydrologic response to climate change are lacking in available analyses.

Alaska's average annual statewide temperatures have increased by nearly 4ºF from 1949 to 2005, with significant spatial variability due to the large latitudinal and longitudinal expanse of the state. The rate of winter warming have exceeded the rate of summer warming, and increases in mean annual temperature have been greatest in the interior region (USGS, 2012). This warming trend results from both natural climate variability and climate forcing caused by increases in greenhouse gas concentrations produced by human activities in temperate and tropical latitudes (Karl et al. 2009).

Annual precipitation has increased across Alaska over the past century. A number of studies show that middle- and high-latitude regions of Alaska have experienced increases in precipitation of between 7% and 12%, which is much higher than the global average increase of 2% (Hulme et al. 1998; IPCC, 2007; Jones and Hulme 1996). More importantly, the increases in precipitation mostly occurred in autumn and winter (IPCC, 2007) , resulting in significant changes in seasonal distribution of precipitation and hydrologic response.

Local and regional climate change discussions often consider changes in air temperature, which is exactly where our discussion begins. But temperature change over time is elusive since air temperature change varies annually and for different seasons. Table 1 lists the change in average annual and seasonal temperatures over the last six decades at the Bettles Airport.

Table 26: Total change in mean seasonal and annual temperature (°F) for two period (1949-2013 and 1977-2013) at Bettles Airport, Alaska (Alaska Climate Research Center (2015))

Location	*Winter*	*Spring*	*Summer*	*Autumn*	*Annual*
Bettles Airport (1949-2013)	*7.7*	*4.2*	*1.5*	*2.0*	*3.7*
Bettles Airport (1977-2013)	*-0.7*	*-0.5*	*-0.6*	*1.9*	*0.0*

Figure 1 presents a plot of annual mean, maximum, and minimum temperature over times. The solid black lines through each curve represent the Locally Estimated Scatterplot Smoothing (LOESS) trend line to assist with the visualization of potential trends. LOESS is a non-parametric regression procedure that reduces the influence of outliers and displays a smooth or trend line for the entire range of data (Cleveland and Devlin 1988). A LOESS regression defines

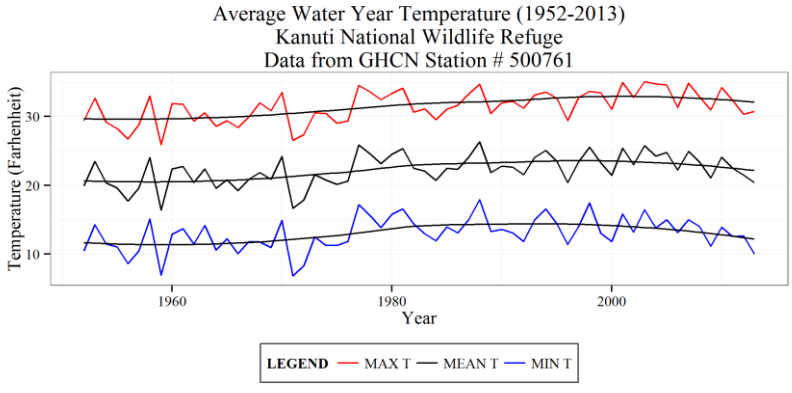

Figure 6: Trend in average, minimum, and maximum annual temperature over time. The solid lines represent the average LOESS line with a 75% span.

the LOESS trend line (Helsel and Hirsch 2002). This analysis uses a span of 0.75; the span controls the degree of smoothing, and defines the localized subset of data that a series of regressions are fit in order to construct a smooth curve. Here the LOESS trend through the mean annual temperatures indicates a slight upward shift in annual temperatures over time.

We see a similar upward trend in temperature in the historic record by season. A look at changes in seasonal temperature over time captures a discrete view of what is occurring throughout the year. Figure 2 provides a graphic of seasonal trends rather than relative temperature between seasons. The red line through each curve represents a LOESS line (which is essentially a local regression applied over a specified span of the data). The shaded area represents the 95% confidence interval around the LOESS line. The LOESS line indicates rising trends in temperature during each season, over time. The most apparent changes in seasonal temperature appear to occur in winter and spring.

Although LOESS lines are useful for trend visualization purposes, they do not determine the statistical significance of trends. We used the Kendall's tau statistical time-series trend test to verify the rising trend in annual and seasonal air temperature. Table 2 lists the results of the test. The Kendall's tau test tests whether all time-series trends are statistically significant at a p-value of 0.05 (Kendall and Gibbons 1990; Sen 1968). The Kendall's tau test is a non-parametric statistical test that can be used to indicate the likelihood of upward or downward trends in data with time. Increasing trends of winter and spring seasonal average and maximum temperature are significant according to the test results. The significant p value, coupled with a high positive slope, supports this argument. The trend is most notable for winter tmax with a positive slope of 0.11 (and a 0.01 p value), which indicates a positive trend/rise in the winter maximum temperatures over time. This increasing temperature trend is also significant for the cool season from October through February over the period of record.

Table 27: Results of the Kendal's Tau Statistical Time Series Test Showing the Significance Levels of Total Change in Mean Seasonal and Annual Temperature (°F) at the Bettles Weather Station, 1952-2013

Time Period	*pvalue*	*Slope*	*Median*
annual tavg	*0.00*	*0.06*	*22.51*
winter tmax	*0.01*	*0.11*	*-0.46*
winter tavg	*0.02*	*0.10*	*-8.95*
spring tmax	*0.01*	*0.07*	*34.34*
April tmax	*0.03*	*0.09*	*21.79*
may tmax	*0.05*	*0.06*	*43.88*

The LOESS line and Kendal Tau test are linear trend analysis techniques. Linear trend tests can mask important variability characteristics in the time series and do not account for multivariable interactions or

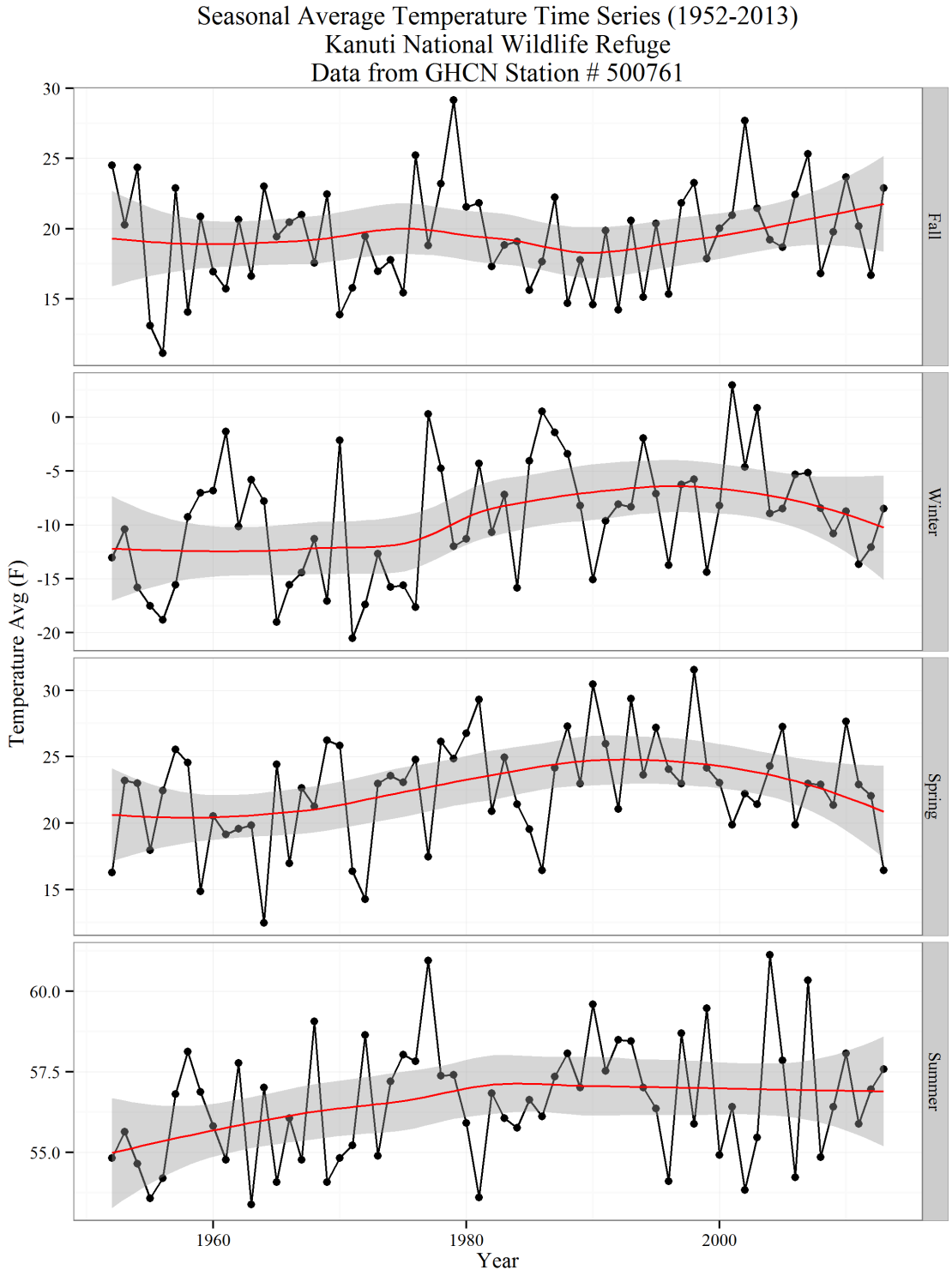

Figure 7: Seasonal average temperature trends over time. The Y-axis limits are fitted to the range of seasonal data to visualize the dataset trends rather than the relative temperature between seasons. The red line represents the LOESS line and the shaded area represents the 95% confidence interval around the LOESS line.

the effects of decadal to multi-decadal climate variability known to influence climate in Alaska. The Arctic Oscillation (AO), the PDO, and the North Atlantic Oscillation (NAO) are effects known to influence the Arctic. We consider the effect of the multi-decadal climate variability independently and discuss their possible influences on changes in temperature and precipitation.

The Arctic Oscillation (AO) refers to an opposing pattern of pressure between the Arctic and the northern middle latitudes. The positive phase of the Arctic Oscillation brings ocean storms farther north, making the weather wetter in Alaska. The negative phase brings warm weather to high latitudes. Over most of the past century, the Arctic Oscillation alternated between its positive and negative phase. For a period during the 1970s to mid-1990s, the Arctic Oscillation tended to stay in its positive phase (NSIDC, 2015). The NAO consists of two pressure centers in the North Atlantic. It is important to note that the AO and NAO are two separate indices that are ultimately describing the same phenomenon of varying pressure gradients in the northern latitudes in the positive and negative phases (NCSU, 2015).

The PDO is a pattern of Pacific climate variability that persists on a multi-decadal level (20-30 years) (http://jisao.washington.edu/pdo/). The PDO oscillates between warm and cold phases that alter upper level atmospheric winds. Two full cycles of the PDO have occurred in the past century. A cool PDO regime prevailed from 1890-1924 and again from 1947-1976 and warm PDO regimes dominated from 1925-1946 and from 1977 through the mid-1990s (Figure 3). During positive PDO phases, winter temperatures are higher than usual in the Pacific Northwest and Alaska and winter precipitation is higher than usual in Alaska.

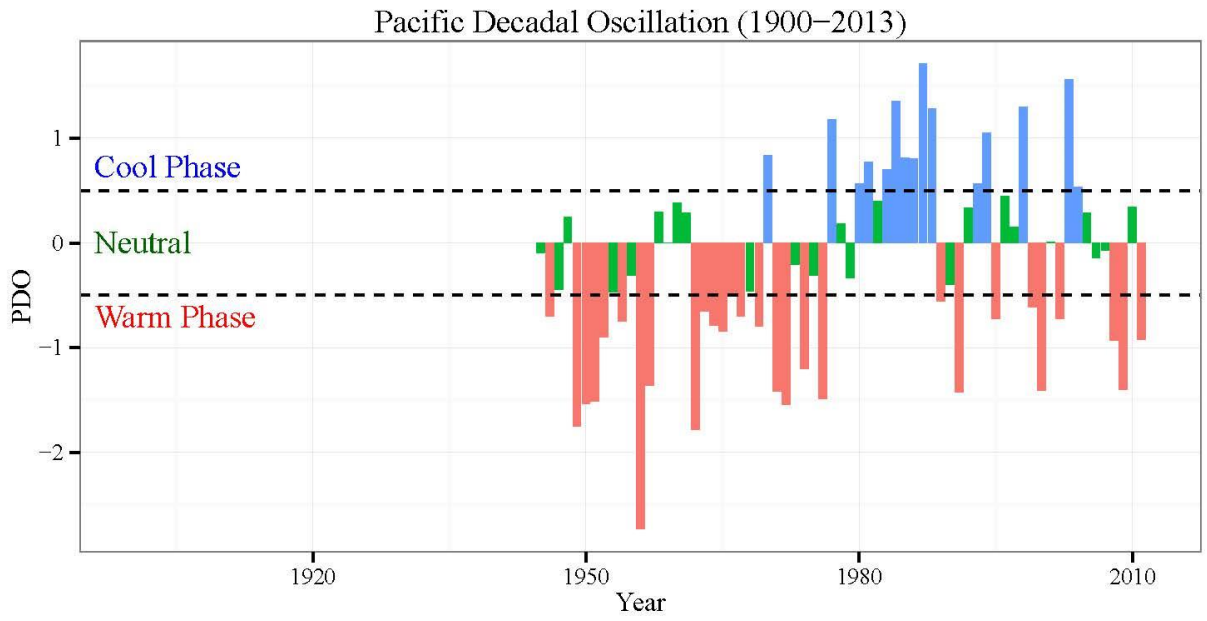

Figure 8: The PDO teleconnection bar chart presents a visual aid for the PDO. The Y-axis represents the annual teleconnection value; the X-axis represents the year. The dotted lines represent the cutoffs for the different classification of cool, warm, and neutral phases of the PDO

Referring back to Figure 1 and 2, we see an upward trend in annual and seasonal temperatures that begins around 1980. Variability from the trend line exists from year to year. The period prior to 1980 was colder than the period from 1980 to present. The temperature shift since 1980 is magnified by a phase

shift of the PDO from a negative phase to a positive phase (Figure 3). The PDO affects the trends in temperature. There may also be a climate change component affecting the trend that cannot be separated here. In the future, the climate of Alaska may be affected and magnified by a combination of PDO phase conditions and global warming. Air temperature and precipitation increases associated with increased concentrations of greenhouse gases are projected for Alaska (Christensen et al. 2007).

Trends in precipitation are similar to those in temperature, but are more variable than those in temperature (Figures 4 and Figure 5). Alaska saw a 10 percent increase in precipitation from 1949 to 2005, with the greatest increase during winter (USGS, 2012). Annual precipitation has increased in Bettles over the past century (Figure 4). This slight annual increase is the net result of a gradual decline in late summer rainfall (August) but a gradual increase in fall precipitation and wintertime snowfall (February) (USGS, 2012) (Figure 5).

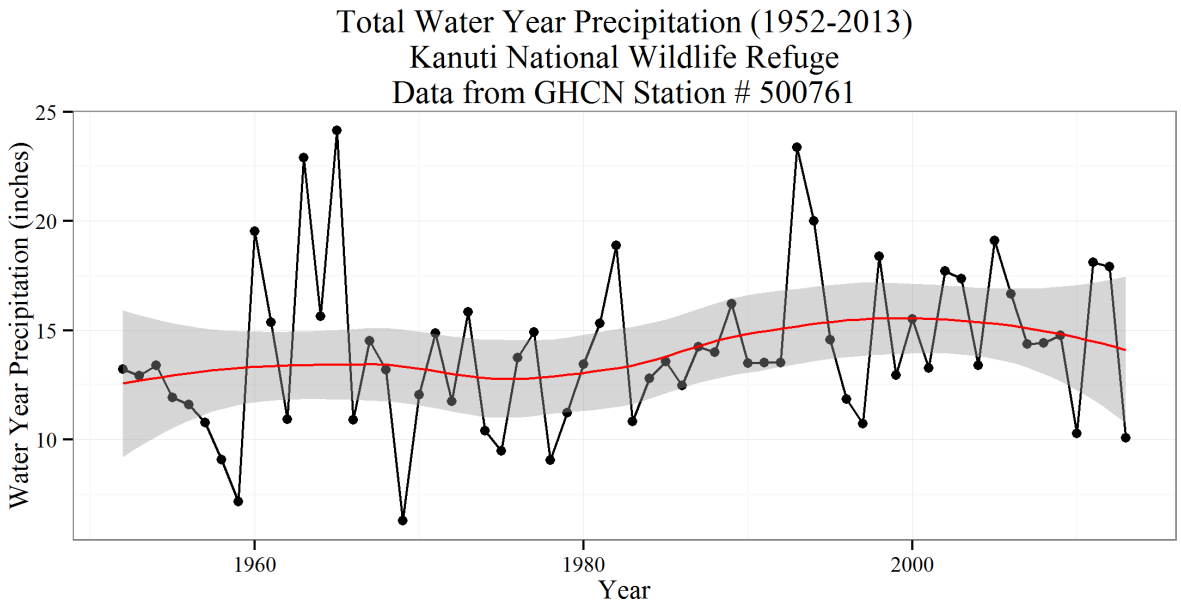

Figure 9: Total water year precipitation (1952-2013). The red line represents a LOESS line, which is essentially a local regression, applied over a specified span of the data. The shaded area represents the 95% confidence interval around the LOESS line.

In general, the changes in precipitation in Bettles mimic the trends seen in the State and in the Arctic. Observed warming in Alaska has been accompanied by a 30 percent increase in precipitation between 1968 and 1991 (USGS, 2012). That increase may have been influenced by the positive phase of the AO/NAO during the 70s-90s. Overall, the total precipitation in the Arctic has increased at a rate of about one percent per decade over the past century (USGS, 2012).

According to the Arctic Climate Impact Assessment (ACIAC, 2005), rising temperature and increased precipitation in the Arctic will result in alteration of the hydrologic regime. The most significant changes projected include rising spring peak river flows and a shift in the peak timing; declining snow cover, especially in spring due to increased warming; thawing permafrost affecting groundwater, lakes and

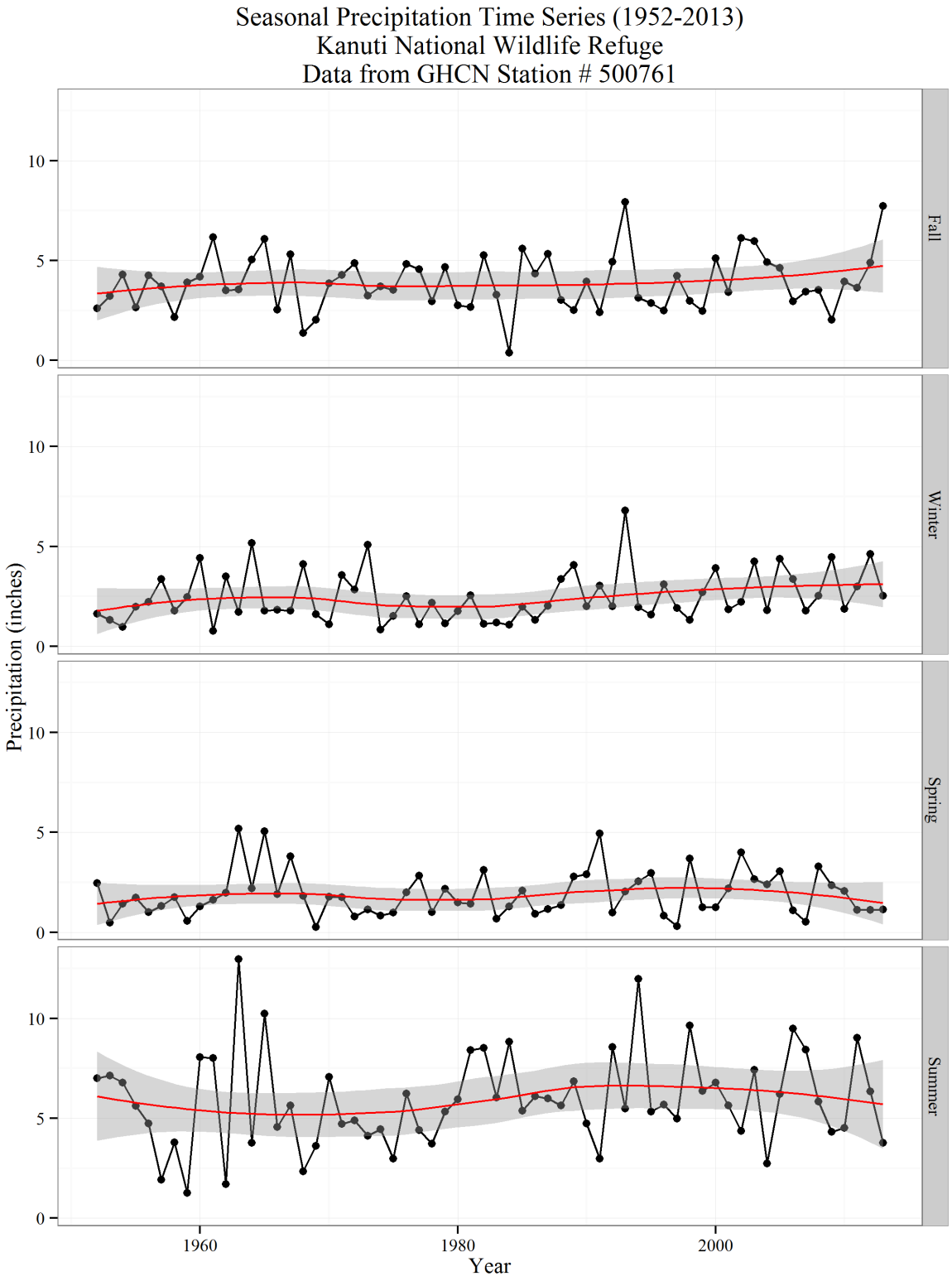

Figure 10: Seasonal Precipitation (1952-2013).The Y-axis limits are static between the seasons to display the relative amount of precipitation that falls within a given season. The red line represents a LOESS line. The shaded area represents the 95 % confidence interval around the LOESS line.

wetlands size and extent and diminishing lake and river ice with later freeze up and earlier breakup. Understanding that change is occurring and observing how these changes affect Kanuti Refuge's landscape is the key to dealing with the effects that may not be avoided but may be managed over time.

Appendix H-Continuation of Inventory Tables in WRIA

Table 23 (continued): Threats to Water Resources Inventory Table- listing threats site name, threat type, status of threat with date, and a link to the threat site record within the Kanuti Refuge or the RHI buffer

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Aquatic habitat threats	Impaired Stream Connectivity	NA	Equisetum Creek	Active	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Equisetum Creek	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Fish Creek Middle Fork	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Horseshoe Slough	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Jackson Slough	Active	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Jackson Slough	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Jackson Slough	Unknown	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Koyukuk River Middle Fork tributary	Active	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Koyukuk River South Fork tributary	Active	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Koyukuk River South Fork tributary	Unknown	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Koyukuk River tributary	Active	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Linda Creek	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Little Nasty Creek	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Little Nasty Creek South Fork	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Little Piddler Creek	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Marsh Creek	Active	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Mary Angel Creek	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Mary Angel Creek South Fork	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Mud Creek	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Mud Creek tributary	Unknown	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Ninety Six Creek	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Ninety Six Creek Pond	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Aquatic habitat threats	Impaired Stream Connectivity	NA	Ninety Six Creek Pond Outlet	Active	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Nugget Creek	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Olson's Lake Creek	Active	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	One-Seven-Six Mile Creek	Active	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Over Creek Complex	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Oxbow Lake System	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Pence's Pond	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Pung's Crossing Creek	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Rosie Creek	Active	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Rosie Creek	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Sahr's Slough	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Sharon Creek	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Sheep Creek	Active	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Snowden Creek	Active	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Spoiled Creek	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Spring Slough	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Spring Slough	Unknown	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Spring Slough South Fork	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Sukakpak Creek West Fork	Active	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Trent's Trickle	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Union Gulch	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Valve Site Creek	Active	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Windy Arm Creek North Fork	Active	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	Windy Arm Creek South Fork	Active	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Aquatic habitat threats	Impaired Stream Connectivity	NA	Windy Arm Creek South Fork	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI
Aquatic habitat threats	Imparied Stream Connectivity	NA	TAPS MP 200.26 CULVERT	Unknown	20-Mar-14	Alaska Department of Transportation Bridges	RHI
Aquatic habitat threats	Imparied Stream Connectivity	NA	BIG CONTACT CREEK	Unknown	20-Mar-14	Alaska Department of Transportation Bridges	RHI
Aquatic habitat threats	Imparied Stream Connectivity	NA	BROCKMAN CREEK	Unknown	20-Mar-14	Alaska Department of Transportation Bridges	RHI
Aquatic habitat threats	Imparied Stream Connectivity	NA	DIETRICH RIVER	Unknown	20-Mar-14	Alaska Department of Transportation Bridges	RHI
Aquatic habitat threats	Imparied Stream Connectivity	NA	DOUGLAS CREEK	Unknown	20-Mar-14	Alaska Department of Transportation Bridges	RHI
Aquatic habitat threats	Imparied Stream Connectivity	NA	FISH CREEK	Unknown	20-Mar-14	Alaska Department of Transportation Bridges	RHI
Aquatic habitat threats	Imparied Stream Connectivity	NA	GOLD CREEK	Unknown	20-Mar-14	Alaska Department of Transportation Bridges	RHI
Aquatic habitat threats	Imparied Stream Connectivity	NA	HAMMOND RIVER	Unknown	20-Mar-14	Alaska Department of Transportation Bridges	RHI
Aquatic habitat threats	Imparied Stream Connectivity	NA	JIM RIVER NO 1	Unknown	20-Mar-14	Alaska Department of Transportation Bridges	RHI
Aquatic habitat threats	Imparied Stream Connectivity	NA	JIM RIVER NO 2	Unknown	20-Mar-14	Alaska Department of Transportation Bridges	RHI
Aquatic habitat threats	Imparied Stream Connectivity	NA	JIM RIVER NO 3	Unknown	20-Mar-14	Alaska Department of Transportation Bridges	RHI
Aquatic habitat threats	Imparied Stream Connectivity	NA	KANUTI RIVER	Unknown	20-Mar-14	Alaska Department of Transportation Bridges	RHI
Aquatic habitat threats	Imparied Stream Connectivity	NA	MARION CREEK	Unknown	20-Mar-14	Alaska Department of Transportation Bridges	RHI
Aquatic habitat threats	Imparied Stream Connectivity	NA	MIDDLE FORK KOYUKUK RIVER 1	Unknown	20-Mar-14	Alaska Department of Transportation Bridges	RHI
Aquatic habitat threats	Imparied Stream Connectivity	NA	MIDDLE FORK KOYUKUK RIVER 2	Unknown	20-Mar-14	Alaska Department of Transportation Bridges	RHI
Aquatic habitat threats	Imparied Stream Connectivity	NA	MIDDLE FORK KOYUKUK RIVER 3	Unknown	20-Mar-14	Alaska Department of Transportation Bridges	RHI
Aquatic habitat threats	Imparied Stream Connectivity	NA	MIDDLE FORK KOYUKUK RIVER 4	Unknown	20-Mar-14	Alaska Department of Transportation Bridges	RHI
Aquatic habitat threats	Imparied Stream Connectivity	NA	MINNIE CREEK	Unknown	20-Mar-14	Alaska Department of Transportation Bridges	RHI
Aquatic habitat threats	Imparied Stream Connectivity	NA	NORTH FORK BONANZA CREEK	Unknown	20-Mar-14	Alaska Department of Transportation Bridges	RHI
Aquatic habitat threats	Imparied Stream Connectivity	NA	NUTIRWIK CREEK	Unknown	20-Mar-14	Alaska Department of Transportation Bridges	RHI
Aquatic habitat threats	Imparied Stream Connectivity	NA	OWEN CREEK	Unknown	20-Mar-14	Alaska Department of Transportation Bridges	RHI
Aquatic habitat threats	Imparied Stream Connectivity	NA	PROSPECT CREEK	Unknown	20-Mar-14	Alaska Department of Transportation Bridges	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Aquatic habitat threats	Imparied Stream Connectivity	NA	PUNG CREEK	Unknown	20-Mar-14	Alaska Department of Transportation Bridges	RHI
Aquatic habitat threats	Imparied Stream Connectivity	NA	SLATE CREEK	Unknown	20-Mar-14	Alaska Department of Transportation Bridges	RHI
Aquatic habitat threats	Imparied Stream Connectivity	NA	SOUTH FORK BONANZA CREEK	Unknown	20-Mar-14	Alaska Department of Transportation Bridges	RHI
Aquatic habitat threats	Imparied Stream Connectivity	NA	SOUTH FORK KOYUKUK RIVER	Unknown	20-Mar-14	Alaska Department of Transportation Bridges	RHI
Aquatic habitat threats	Imparied Stream Connectivity	NA	WISEMAN BRIDGE	Unknown	20-Mar-14	Alaska Department of Transportation Bridges	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species		Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	145MP	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-001	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-002	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-003	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-004	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-005	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-006	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-007	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-008	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-017	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-018	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-019	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-020	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-021	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-022	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-023	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-024	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-025	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-026	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-027	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-028	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-029	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-030	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-031	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-032	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-033	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-034	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-035	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-036	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-037	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-038	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-039	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-040	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-041	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-042	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-043	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-044	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-045	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-046	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-048	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2008-RMG-049	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-002	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-003	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-004	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-005	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-006	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-007	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-008	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-009	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-010	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-011	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-012	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-013	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-014	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-015	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-016	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-017	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-018	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-019	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-020	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-021	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-022	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-023	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-024	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-025	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-026	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-027	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-028	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-029	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-030	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-031	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-032	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-033	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-034	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-035	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-036	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-037	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-038	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-039	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-040	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-041	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-042	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-043	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-044	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-045	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-046	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-047	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-048	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-049	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-050	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-051	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-052	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-053	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-054	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-055	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-056	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-057	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-058	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-059	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-060	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-061	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-062	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-063	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-064	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-065	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-066	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-067	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-068	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-069	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-070	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-071	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-072	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-073	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-074	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-077	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-078	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-079	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-080	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-081	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-082	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-083	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-084	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-085	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-086	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-087	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-088	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-089	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-124	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-125	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-126	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-127	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-128	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-129	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-130	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-131	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-132	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-133	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	2010-RMG-134	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	234	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	235	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	236	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	237	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	238	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	239	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	240	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	241	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	242	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	243.1	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	243.2	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	245	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	246	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	247.1	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	247.2	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	248	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	250	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	251	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	252	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	253	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	254	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	255	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	256	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	257	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	258	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	259	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	260	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	261	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	262	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	263	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	264	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	265	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	266	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	267	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	268	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	269	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	270	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	271.1	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	271.2	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	272	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	273	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	274	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	275	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	276	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	278	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	279	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	280	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	281	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	282	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	283	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	284	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	285	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	286.1	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	286.2	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	286.3	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	287	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	288	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	289	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	290	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	291	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	292	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	293	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	294	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	295.1	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	295.2	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	296	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	297	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	298	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	299	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	300	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	301	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	302	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	303	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	304	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	305	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	306	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	308	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	309	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	310	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	313.1	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	313.2	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	314.1	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	314.2	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	319	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	320	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	321	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	322	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	323	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	324	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	325	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	326	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	327	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	328	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	329	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	330	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	331	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	332	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	333	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	334	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	335	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	336	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	337	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	338	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	339	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	340	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	341	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	342	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	343.1	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	343.2	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	ARCTIC	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	BLM06-0006	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	BLM06-0007	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	BLM06-0008	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	BLM06-0009	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	BLM06-0010	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	BLM06-0011	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	BLM06-0012	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	BLM06-0013	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	BLM06-0014	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	BLM06-0015	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	BLM06-0016	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	BLM06-0017	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	BLM06-0018	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	BLM06-0019	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	BLM06-0020	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-10	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-11	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-12	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-13	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-14	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-15	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-16	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-17	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-18	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-19	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-2	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-3	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-32	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-33	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-34	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-35	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-36	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-37	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-38	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-39	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-4	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-40	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-41	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-42	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-43	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-44	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-45	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-46	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-47	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-48	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-49	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-5	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-50	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-51	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-52	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-53	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-54	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-55	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-56	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-57	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-58	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-59	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-6	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-60	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-61	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-62	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-63	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-64	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-65	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-66	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-67	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-7	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-76	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-77	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-78	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-79	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-8	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04P-9	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04R-1	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04R-3	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04R-4	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04R-5	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04T-1	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04T-10	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04T-11	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04T-12	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04T-13	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04T-14	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04T-15	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04T-16	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04T-17	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04T-18	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04T-19	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04T-2	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04T-20	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04T-21	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04T-22	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04T-23	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04T-24	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04T-3	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04T-33	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04T-34	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04T-35	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04T-36	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04T-4	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04T-5	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04T-6	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04T-7	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04T-8	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D04T-9	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D129E	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D136.75W	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	D137.25W	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	dampc 1073	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	dapmc 1068	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	dapmc 1069	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	dapmc 1070	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	dapmc 1071	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	dapmc 1072	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	dapmc 1074	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	dapmc 1075	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	dapmc 1076	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	dapmc 1077	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	dapmc 1078	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	dapmc 1079	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	dapmc 1080	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	dapmc 1081	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	dapmc 1082	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	dapmc 1083	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	dapmc 1084	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	dapmc 1085	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	dapmc 1086	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	dapmc 1087	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	dapmc 1088	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	dapmc 1089	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	DC05P-05	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	DC05P-07	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	DC05T-17	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	DC05T-18	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	DC05T-19	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	DC05T-20	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	DC05T-21	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	DC05T-22	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	HD_6	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	Loss/Alteration of floodplain habitat	Invasive species	LD_6	Active	15-Mar-13	Alaska Exotic Plants Information Clearinghouse	RHI
Aquatic habitat threats	No habitat threats	NA		Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Aquatic habitat threats	No habitat threats	NA	Alatna River	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Aquatic habitat threats	No habitat threats	NA	Bear Creek	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Aquatic habitat threats	No habitat threats	NA	Bettles River	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Aquatic habitat threats	No habitat threats	NA	Bonanza Creek	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Aquatic habitat threats	No habitat threats	NA	Chapman Creek	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI

Threat Type	Threat Subclass	Threat Cause	Site Name	Status	Start Date	Data Source Name	Position
Aquatic habitat threats	No habitat threats	NA	Chicken Creek	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Aquatic habitat threats	No habitat threats	NA	Douglas Creek	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Aquatic habitat threats	No habitat threats	NA	Eagle Creek	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Aquatic habitat threats	No habitat threats	NA	East Fork Henshaw (Sozhekla) Creek	Unknown	13-Apr-12	Anadromous Waters Catalog	Refuge
Aquatic habitat threats	No habitat threats	NA	Fish Creek	Unknown	13-Apr-12	Anadromous Waters Catalog	Refuge
Aquatic habitat threats	No habitat threats	NA	Hammond River	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Aquatic habitat threats	No habitat threats	NA	Henshaw (Sozhekla) Creek	Unknown	13-Apr-12	Anadromous Waters Catalog	Refuge
Aquatic habitat threats	No habitat threats	NA	Iniakuk River	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Aquatic habitat threats	No habitat threats	NA	Jim River	Unknown	13-Apr-12	Anadromous Waters Catalog	Refuge
Aquatic habitat threats	No habitat threats	NA	Jim River	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Aquatic habitat threats	No habitat threats	NA	John River	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Aquatic habitat threats	No habitat threats	NA	Kanuti Kilolitna River	Unknown	13-Apr-12	Anadromous Waters Catalog	Refuge
Aquatic habitat threats	No habitat threats	NA	Kanuti River	Unknown	13-Apr-12	Anadromous Waters Catalog	Refuge
Aquatic habitat threats	No habitat threats	NA	Kanuti River	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Aquatic habitat threats	No habitat threats	NA	Koyukuk River	Unknown	13-Apr-12	Anadromous Waters Catalog	Refuge
Aquatic habitat threats	No habitat threats	NA	Koyukuk River	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Aquatic habitat threats	No habitat threats	NA	Mailbox Creek	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Aquatic habitat threats	No habitat threats	NA	Malamute Fork Alatna River	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Aquatic habitat threats	No habitat threats	NA	Malamute Fork John River	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Aquatic habitat threats	No habitat threats	NA	Marion Creek	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Aquatic habitat threats	No habitat threats	NA	Mettenpherg Creek	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Aquatic habitat threats	No habitat threats	NA	Middle Fork Koyukuk River	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Aquatic habitat threats	No habitat threats	NA	Minnie Creek	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Aquatic habitat threats	No habitat threats	NA	Mosquito Fork	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Aquatic habitat threats	No habitat threats	NA	North Fork Koyukuk River	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Aquatic habitat threats	No habitat threats	NA	Prospect Creek	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Aquatic habitat threats	No habitat threats	NA	Rosie Creek	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Aquatic habitat threats	No habitat threats	NA	Sinyalak Creek	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Aquatic habitat threats	No habitat threats	NA	Slate Creek	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Aquatic habitat threats	No habitat threats	NA	South Fork Koyukuk River	Unknown	13-Apr-12	Anadromous Waters Catalog	Refuge
Aquatic habitat threats	No habitat threats	NA	South Fork Koyukuk River	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Aquatic habitat threats	No habitat threats	NA	Twelve Mile Creek	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Aquatic habitat threats	No habitat threats	NA	West Fork Henshaw (Sozhekla) Creek	Unknown	13-Apr-12	Anadromous Waters Catalog	Refuge
Aquatic habitat threats	No habitat threats	NA	Wild River	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Aquatic habitat threats	No habitat threats	NA	Wiseman Creek	Unknown	13-Apr-12	Anadromous Waters Catalog	RHI
Water quality threats	Contaminant Pollution	Mining	# 3 UNION	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	# 4 UNION	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	# 5 UNION	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	# 6 UNION	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#1 A ON SMITH CREEK	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#1 ABOVE DISC. THOMPSON PUP	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#1 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#1 BELOW DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#1 BELOW DISCOVERY NOLAN CREEK	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#1 BENCH LEFT LIMIT	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#1 FAY CREEK	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#1 FRC SMITH CREEK	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#10 ABOVE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#10 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	#11 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#12 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#13 1/2 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#13 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#14 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#14 BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#15 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#15 LEFT LIMIT BENCH ABOVE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#16 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#16 LEFT LIMIT BENCH ABOVE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#17 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#17 LEFT LIMIT BENCH ABOVE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#18 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#18 LEFT LIMIT BENCH ABOVE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#19 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#19 LEFT LIMIT BENCH ABOVE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#2 ABOVE DISC. THOMPSON PUP	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#2 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#2 BELOW DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#2 BELOW DISCOVERY NOLAN CREEK	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#2 BENCH LEFT LIMIT	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#2 FAY CREEK	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#2 FRC SMITH CREEK	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#20 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#20 LEFT LIMIT BENCH ABOVE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	#21 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#21 LEFT LIMIT BENCH ABOVE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#22 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#22 LEFT LIMIT BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#23 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#24 ABOVE DISCOVERY(RE-LOCATE)	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#25 ABOVE DISCOVERY(RE-LOCATE)	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#26 ABOVE DISCOVERY(RE-LOCATE)	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#27 ABOVE DISCOVERY(RE-LOCATE)	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#28 ABOVE DISCOVERY(RE-LOCATE)	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#3 ABOVE DISC. THOMPSON PUP	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#3 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#3 BELOW DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#3 FAY CREEK	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#4 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#4 BELOW DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#4 BELOW DISCOVERY NOLAN CREEK	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#5 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#5 BELOW DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#6 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#7 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#8 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#8 LEFT LIMIT BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	#9 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	#9 LEFT LIMIT BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	/ALARIN #2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	1 ABOVE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	1 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	1 BELOW	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	1 BELOW DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	1 BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	10 ABOVE DISCOVERY CLAIM ASSOC.	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	10 BELOW	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	10 BELOW DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	11 ABOVE DISCOVERY CLAIM ASSOC.	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	11 BELOW	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	11 BELOW DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	12 BELOW DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	13 BELOW DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	14 BELOW DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	15 ABOVE DISCOVERY CLAIM ASSOC.	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	15 BELOW DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	16 ABOVE DISCOVERY CLAIM ASSOC.	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	16 BELOW DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	17 ABOVE DISCOVERY CLAIM ASSOC.	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	18 ABOVE DISCOVERY CLAIM ASSOC.	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	19 ABOVE DISCOVERY CLAIM ASSOC.	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	2 ABOVE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	2 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	2 BELOW	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	2 BELOW DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	2 BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	2 RH JM ASS #1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	2 RH JM ASS #2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	2 RH JM ASS #3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	2&3 BELOW	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	23 BELOW DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	24 BELOW DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	25 BELOW DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	2-X BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	3 ABOVE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	3 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	3 BELOW	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	3 BELOW DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	3 BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	4 ABOVE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	4 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	4 BELOW	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	4 BELOW DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	4 BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	4&5 BELOW	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	5 ABOVE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	5 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	5 BELOW	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	6 ABOVE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	6 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	7 ABOVE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	7 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	7 BELOW	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	7 BELOW DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	7&8 BELOW	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	8 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	8 BALLS CLAIM #1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	8 BALLS CLAIM #2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	8 BALLS CLAIM #3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	8 BALLS CLAIM #4	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	8 BALLS CLAIM #5	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	8 BELOW	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	8 BELOW DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	8 OF 9 MINE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	9 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	9 BELOW	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	9 BELOW DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	A & O FRACTION	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ACME #1 ABOVE	Proposed/Potential	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ACME #2 ABOVE	Proposed/Potential	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	ACME 1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ACME 2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ACME 3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	AG LOCATION	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	AG LOCATION #2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	AG LOCATION 2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	AG LOCATION 3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	AG LOCATION 4	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	AG LOCATION 5	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	AG LOCATION 6	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ALAMO ASSOC	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ANNA MAE I	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ANNA MAE II	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ARCHIBALD NO. 4	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ASPEN PLACER #1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ASPEN PLACER #2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ASPEN PLACER #3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ASPEN PLACER #4	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ASPEN PLACER #5	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	AU ASSOCIATION #1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	AU ASSOCIATION #10	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	AU ASSOCIATION #11	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	AU ASSOCIATION #12	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	AU ASSOCIATION #13	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	AU ASSOCIATION #14	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	AU ASSOCIATION #2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	AU ASSOCIATION #3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	AU ASSOCIATION #4	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	AU ASSOCIATION #5	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	AU ASSOCIATION #6	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	AU ASSOCIATION #8	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	AU ASSOCIATION #9	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	AUBURN	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	B 26 FRACTION	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BC 1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BC 2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH # 2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 10	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 11	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 12	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 13	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 14	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 15	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 16	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 17	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 18	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 19	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 20	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 21	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	BENCH 22	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 23	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 24	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 25	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 26	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 27	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 28	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 29	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 30	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 31	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 32	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 33	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 34	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 35	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 36	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 37	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 38	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 39	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 40	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 41	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 42	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 43	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 44	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 45	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 46	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	BENCH 47	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 48	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 49	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 50	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 51	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 52	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 53	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 54	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 55	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 56	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 57	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 58	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 59	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 60	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 61	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 62	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 63	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 64	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 65	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 66	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 67	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 68	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 69	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 70	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 71	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	BENCH 72	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 73	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 74	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 75	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 76	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 77	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH 9	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH CLAIM #1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH CLAIM #2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH CLAIM #3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH CLAIM #4	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH CLAIM #5	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH CLAIM #6	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH CLAIM #7	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH CLAIM #8	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BENCH LIMIT LEFT #3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BETTY III	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BETTY IIII	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BETTY VII	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BETTY VIII	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BETTY VIIII	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BETTY X	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BIG ROCK #1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BIG ROCK #2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BIG ROCK #3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	BILL 1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BILL 2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BILL 3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BILL 4	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BILL 5	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BILL 6	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BILL 7	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BLITZ II	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	BRANDON RELOCATION	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	CALLION FRACTION	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	CANARY BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	CANARY BENCH CLAIM NO 1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	CANARY BENCH NO 2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	CANARY CREEK	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	CANYON	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	CECIL	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	CLARA CREEK 1 BELOW DISC ASSOC	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	CLARA CREEK DISCOVERY ASSOC.	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	COCOMO	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	COOP 8	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	COOP-1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	COOP-10	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	COOP-11	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	COOP-2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	COOP-3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	COOP-4	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	COOP-5	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	COOP-6	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	COOP-7	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	COOP-9	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	CORNUCOPIA ASSOC	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	COWBOYS CORNER ASSOC	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	D AND C FRACTION	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	DAISY BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	DAVIS CREEK NO 1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	DAVIS CREEK NO 1 BELOW MOUTH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	DAVIS CREEK NO 2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	DAVIS CREEK NO 3A	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	DAVIS CREEK NO 3B	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	DISC ON THOMPSON CR.	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	DISCOVERY SMALLEY CREEK	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	DISCOVERY #1 ASSOC MYRTLE CK	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	DISCOVERY #2 ASSOCIATION	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	DISCOVERY BENCH RIGHT LIMIT	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	DISCOVERY CLAIM	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	DISCOVERY CLAIM MOUTH SLATE CR	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	DISCOVERY LODE NO. 1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	DISCOVERY LODE NO. 2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	DISCOVERY NOLAN CREEK	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	DM 1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	DM 4	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	DMD 002	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	DMD 004	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	DMD 005	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	DMD001	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	DOL-1-FRACTION	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	DOL-2-FRACTION	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	DONALD	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	DOUBLE LL BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	EAGLE CREEK-1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	EAGLE CREEK-10	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	EAGLE CREEK-2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	EAGLE CREEK-3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	EAGLE CREEK-4	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	EAGLE CREEK-5	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	EAGLE CREEK-6	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	EAGLE CREEK-7	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	EAGLE CREEK-8	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	EAGLE CREEK-9	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	EL DORADO BENCH ASSN. #17	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	EL DORADO BENCH ASSN. #18	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	EL DORADO BENCH ASSN. #19	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ELDORADO	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ELDORADO BENCH ASSOC #1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ELDORADO BENCH ASSOC #10	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ELDORADO BENCH ASSOC #11	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ELDORADO BENCH ASSOC #12	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ELDORADO BENCH ASSOC #13	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ELDORADO BENCH ASSOC #14	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ELDORADO BENCH ASSOC #16	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ELDORADO BENCH ASSOC #2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ELDORADO BENCH ASSOC #3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ELDORADO BENCH ASSOC #4	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ELDORADO BENCH ASSOC #5	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ELDORADO BENCH ASSOC #6	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ELDORADO BENCH ASSOC #7	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ELDORADO BENCH ASSOC #8	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ELDORADO BENCH ASSOC #9	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ELMER'S TUNE #4	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ELMER'S TUNE #5	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ENGINE MOUNTAIN FRACTION	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	ETERNITY 1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ETERNITY 2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	EUREKA BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	EXPRESS	Proposed/Potential	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	FAT LADY 1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	FAT LADY 2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	FAT LADY 3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	FAT LADY 4	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	FAT LADY 5	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	FIELD GOAL II	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	FLAG II	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	FOURTEEN ABOVE DISCOVERY CLAIM ASSOC.	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	FOX I	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	FOX II	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	FOX III	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	FRAC ADJ TO #1A ON SMITH CK	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	FRACTION CLAIM	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	FRYAR #1 ASSOC	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GLACIER #1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GLACIER #10	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GLACIER #2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GLACIER #3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GLACIER #4	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GLACIER #5	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	GLACIER #6	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GLACIER #7	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GLACIER #8	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GLACIER #9	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GM 10	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GM 11	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GM 14	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GM 15	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GM 16	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GM 17	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GM 18	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GM 21	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GM 23	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GM 9	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLD BENCH #001	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLD BENCH #002	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLD BENCH #003	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLD BENCH #004	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLD BENCH 001	Proposed/Potential	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLD BENCH 002	Proposed/Potential	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLD BENCH 003	Proposed/Potential	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLD BENCH 004	Proposed/Potential	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLD BENCH 005	Proposed/Potential	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLD BENCH 006	Proposed/Potential	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLD BENCH 007	Proposed/Potential	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	GOLD BENCH 008	Proposed/Potential	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLD BENCH 009	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLD BENCH 010	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLD CO #7	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLD FORK #10 ASSOC	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLD FORK #11 ASSOC	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLD FORK #12 ASSOC	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLD FORK #17 ASSOC	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLD FORK #19 ASSOC	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLD FORK #21 ASSOC	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLD FORK #22 ASSOC	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLD FORK #6 ASSOC	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLD FORK #7 ASSOC	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLD FORK #8 ASSOC	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLD FORK #9 ASSOC	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLD I	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLD II	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLD III	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLD IV	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLDCO #5	Proposed/Potential	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLDCO2	Proposed/Potential	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLDNDREAMS-1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLDNDREAMS-10	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLDNDREAMS-11	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLDNDREAMS-12	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	GOLDNDREAMS-2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLDNDREAMS-3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLDNDREAMS-4	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLDNDREAMS-5	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLDNDREAMS-6	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLDNDREAMS-7	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLDNDREAMS-8	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOLDNDREAMS-9	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GOVERNOR'S GROUND, THE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	GRIFFITH, THE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	HAMM CREEK #1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	HIGH & DRY BENCH CLAIM	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	HIGH BENCH #1 ASSOC	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	HIGHLAND BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	HILL OF BEANS	Proposed/Potential	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	HILLSIDE BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	HOOSIER NUMBER 2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	HOT SPOT I	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	HOT SPOT II	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	HOT SPOT III	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	HOT SPOT IV	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	HOT SPOT V	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	INDEPENDENCE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	INDEPENDENCE DAY DISCOVERY #1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	IRONSIDE BENCH NO 1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	IRONSIDE BENCH NO 2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	IRONSIDE BENCH NO 3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	IRONSIDE BENCH NO 4	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	IRONSIDE BENCH NO 6	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	IVY #1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	IVY #2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	J#1A	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	J. VOSS TRANS MINING #25	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	J. VOSS TRANS MINING #26	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	JAKE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	JAKE I	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	JAKE II	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	JAY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	JIMMIE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	JJ1B	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	JJ1E	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	JJ1F	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	JUNE #1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	KANDAL (EUREKA) BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	KATHERINE #1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	KELLY'S GULCH 1 ABOVE DISC.	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	KELLY'S GULCH DISCOVERY CLAIM	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	KINGS GULCH 1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	KINGS GULCH 2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	LA PAZ	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	LADY DARLENE #II	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	LB1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	LB2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	LITTLE ROCK	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	LITTLE TOM #II	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	LUCKY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	LUCKY 13	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	LUCKY 14	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	LUCKY LOU #1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	M 19	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	M 20	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	M 5	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	M 6	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	M 7	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	M 8	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MAGNET I	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MAGNET II	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MAGNET III	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MALARIN #1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MARIA #1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MARIA DANIELLE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MARIA'S MINNI #1 ABOVE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MARIONS BERRIES	Proposed/Potential	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MARJORIE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	MARK A	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MARY ANN PUP	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MARY'S BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MATTHEW #1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MATTHEW #II	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MATTHEW I	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MATTHEWS MINNI DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MC1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MC2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MC3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MC4	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MC5	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MC6	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MC7	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MC8	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MIDNIGHT HIGH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MIDNITE 3B ASSN # 1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MIDNITE MINING ASSOC #1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MIDNITE MINING ASSOC #11	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MIDNITE MINING ASSOC #12	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MIDNITE MINING ASSOC #1A	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MIDNITE MINING ASSOC #2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MIDNITE MINING ASSOC #3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	MIDNITE MINING ASSOC #4	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MIDNITE MINING ASSOC #5	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MIDNITE MINING ASSOC #6	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MIDNITE MINING ASSOC #8	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MIDNITE MINING ASSOC #9	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MISS PETITE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MISSY BELOW PAARTIAL	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MONOGRAM	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MT-1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MT-2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	MUCHO ORO	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NELSON'S #1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NESBIT CREEK #1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NEVER SWEAT BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NEW HOPE ASSOCIATION	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NO 1 ABOVE CANARY CREEK	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NO 1 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NO 1 BELOW DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NO 2 ABOVE DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NO 2 ABOVE DISCOVERY SMALLEY C	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NO 2 ABOVE LEFT LIMIT BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NO 2 BELOW DISCOVERY SMALLEY C	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NO 3 ABOVE LEFT LIMIT BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	NO 4 ABOVE LEFT LIMIT BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NO 5 ABOVE LEFT LIMIT BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NO 6 ABOVE LEFT LIMIT BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NO 7 ABOVE LEFT LIMIT BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NO 7 ABOVE LEFT LIMIT BENCH FRACTION	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NO. 1 ABOVE WOMBAT	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NO. 1 ARCHIBALD ASSOCIATION	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NO. 1 BELOW DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NO. 1 LEFT LIMIT OF SOUTH FORK	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NO. 2 ABOVE WOMBAT	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NO. 2 BELOW DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NO. 3 ARCHIBALD ASSOCIATION	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 1&2 ABOVE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 10	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 100	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 105	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 106	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 107	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 108	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 109	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 11	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	NOLAN 110	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 111	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 116	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 117	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 118	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 119	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 12	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 120	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 121	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 124	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 125	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 126	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 15	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 151	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 152	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 155	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 156	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 157	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 159	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 16	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 160	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 168	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 169	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 17	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 170	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	NOLAN 171	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 172	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 176	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 179	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 18	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 184	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 185	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 186	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 196	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 197	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 198	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 199	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 209	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 210	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 211	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 221	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 222	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 223	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 23	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 24	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 25	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 26	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 3 ABOVE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	NOLAN 328	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 329	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 330	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 331	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 334	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 335	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 336	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 337	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 338	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 339	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 341	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 36	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 37	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 38	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 39	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 4	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 4 ABOVE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 40	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 41	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 42	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 43	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 44	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 5	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 6	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 7	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	NOLAN 70	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 71	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 72	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 73	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 76	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 77	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 78	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 79	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 8	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 80	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 81	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 82	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 85	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 86	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 87	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 88	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 89	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 9	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 90	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 91	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 92	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 93	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 94	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 95	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN 96	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	NOLAN 97	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN CREEK #6 BELOW DISC	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NOLAN CREEK #7 BELOW DISC	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NUGGET #1 ABOVE ASSOCIATION	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NUGGET #2 ABOVE ASSOCIATION	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NUGGET BOWL RELOCATION	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	NUGGET DISCOVERY ASSOCIATION	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	OGDEN BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	OLD MYRTLE CREEK	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ONE ABOVE DISCOVERY SMALLEY CK	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ONE BELOW BENCH CLAIM	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ONE BELOW DISCOVERY SMALLEY CK	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	OPTION II	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ORIGINAL H	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ORIGINAL H BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ORO GRANDE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	OVERNIGHT	Proposed/Potential	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	P&G 10 FRATION	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	P&G 11	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	P&G 12 FRACTION	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	P&G 9	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	P&G MINING CLAIM II 3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	P&G MINING CLAIM II 4	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	P.M. ABOVE ASSOC. CLAIM	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	PAN HANDLER	Proposed/Potential	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	PORCUPINE CREEK DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	POST II	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	POTATOE PATCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	POTATOE PATCH NUMBER 2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	POTATOE PATCH NUMBER 3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	POTATOE PATCH RT LIMIT BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	PRIORITY	Proposed/Potential	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	PUNT II	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	QUICK KICK II	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	RACHEL A	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	RAINBOW	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	RAINBOW CHASER ASSOCIATION	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	RAINBOW CHASER II MAYBE	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	RANGERS RULE ASSOC	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	RM-47	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	RONALD HODGES MEMORIAL #1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	RONALD HODGES MEMORIAL #2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	RONALD HODGES MEMORIAL #3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ROUGH GOLD BENCH CLAIM	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	ROUGHNECK RIDGE ASSOC	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SADIE #11	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SADIE #13	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	SAFETY II	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SCREEN II	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SIDELINE II	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SLATE CK 303	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SLATE CK 304	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SLATE CK 305	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SLATE CK 306	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SLATE CREEK 301	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SLATE CREEK 302	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SLATE GOLD	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SMALL CHANGE 1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SMALL CHANGE II	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SMALL CHANGE III	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SMITH 10	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SMITH 9	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SMITH CREEK FRC #3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SMITH CREEK FRC #4	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SMITH CREEK NO 1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SOUTH FORK #2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SOUTH FORK EMMA CREEK ASSOC.	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SPAM NO 1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SPAM NO 2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SPAM NO 3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SPAM NO 4	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SPAM NO 5	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	SS H1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H10	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H11	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H12	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H13	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H14	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H15	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H16	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H17	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H18	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H19	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H20	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H21	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H22	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H23	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H24	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H25	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H26	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H27	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H28	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H29	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H30	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H31	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	SS H32	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H33	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H34	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H35	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H36	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H4	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H5	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H6	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H7	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H8	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SS H9	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SSH 37	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SSH 38	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SSH 39	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	STARLIGHT #1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	STARLIGHT #2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	STARLIGHT #3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNBURNT GOLD	Proposed/Potential	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNDOWN FRACTION	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSEST A7	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET #16	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET #17	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET #18	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET #19	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET #20	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	SUNSET #21	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET #22	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET #23	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET #24	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET #25	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET #26	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET #27	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET #28	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET #29	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET #30	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET #31	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET #32	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET #33	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET #34	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET #35	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET #36	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET #37	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET #44	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET #45	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET A 8	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET A1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET A-10	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET A2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET A3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET A4	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	SUNSET A5	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET A-9	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SUNSET ASSOCIATION #6	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SURETHING BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SWEEP II	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SWIFT # 1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SWIFT # 2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SWIFT # 3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SWIFT # 4	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SWIFT #1-A	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SWIFT #2-A	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SWIFT #3-A	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SWIFT #4-A	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SWIFT LODE #1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SWIFT LODE #2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	SWIFT LODE #3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	THEODORE ALLEN PUP	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	THIRTEEN ABOVE DISCOVERY CLAIM ASSOC.	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	THORS HAMMER	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	TIM 1 ASSOCIATION	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	TIM 2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	TOPNOTCH BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	TORDENSKJOLD NO. 1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	TORDENSKJOLD NO. 2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	TORDENSKJOLD NO. 3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	TORDENSKJOLD NO. 4	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	TORDENSKJOLD NO. 5	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	TORDENSKJOLD NO. 6	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	TORDENSKJOLD NO. 7	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	TORDENSKJOLD NO. 8	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	TOUCHDOWN II	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	TWELVE ABOVE DISCOVERY CLAIM ASSOC.	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	TWELVE MILE CREEK DISCOVERY	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	UNNAMED I	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	UNNAMED II	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V & S NO. 10	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V & S NO. 11	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V & S NO. 12	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V & S NO. 13	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V & S NO. 14	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V & S NO. 15	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V & S NO. 16	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V & S NO. 17	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V & S NO. 18	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V & S NO. 20	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V & S NO. 8	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V & S NO. 9	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V. L. # 10	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	V. L. # 11	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V. L. # 13	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V. L. # 14	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V. L. # 15	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V. L. # 16	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V. L. # 17	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V. L. # 18	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V. L. # 19	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V. L. # 23	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V. L. # 24	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V. L. # 25	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V. L. # 26	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V. L. # 27	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V. L. # 28	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V. L. # 29	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V. L. # 3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V. L. # 30	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V. L. # 4	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V. L. # 5	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V. L. # 6	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V. L. # 7	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V. L. # 8	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	V. L. # 9	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	VERMONT 1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	VERMONT 2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	VICTOR DISCOVERY ASSOCIAION	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	VICTORIA #1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	VMC 1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	VMC 2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	VMC 3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	VMC 4	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	WEBSTER I	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	WHITE RAVEN # 13	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	WHITE RAVEN # 14	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	WILLY GLENN ASSOC #30	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	WILLY GLENN ASSOC #32	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	WISE 1	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	WISE 10	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	WISE 2	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	WISE 3	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	WISE 4	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	WISE 5	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	WISE 6	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	WISE 7	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	WISE 8	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	WISE 9	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	WOMBAT	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	WORKMAN BENCH	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	WORKMAN BENCH EXTENSION	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	WRIGHT CREEK I	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	WRIGHT CREEK II	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	YUKON I	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	YUKON II	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	YUKON III	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	YUKON IV	Active	20-Mar-14	Bureau of Land Management Federal Mining Claims	RHI
Water quality threats	Contaminant Pollution	Contaminant Pollution	Trans-Alaska Pipeline System	Unknown	20-Mar-14	Alaska Department of Natural Resources Trans-Alaska Pipeline System	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	ADOT&PF Allakaket Airport Fueling Facility (New Airport)	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	ADOT&PF Bettles Airport Block 1, Lot 4	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	ADOT&PF Dalton Highway Mile 145	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	ADOT&PF Dalton Highway Mile 152.7	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	ADOT&PF Jim River Maintenance Camp	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	ADOTPF - Coldfoot Maintenance and Operations Station	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	ADOTPF - Jim River Maintenance and Operations Station	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	Alaska West Transport	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	Allakaket Abandoned Diesel Pipelines	Active	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	Allakaket Airport Apron	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	Allakaket Former AP&T Power House	Active	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	Allakaket Former City Gasoline Tank Farm	Active	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Industrial Effluent	Allakaket Former City Power House	Active	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	Allakaket Old Generator Shack	Active	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	Allakaket School	Active	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	ALYESKA PIPELINE SERVICE COMPANY - PUMP STATION 5 - DRA INJECTION FACILITY	Proposed/Potential	20-Mar-14	EPA Facility Registry System	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	Alyeska Prospect Creek Camp	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	Alyeska PS 05 20RB0 Valve Release	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	Alyeska PS 05 Fuel Island Spill 1	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	Alyeska PS 05 Fuel Island Spill 2	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	Alyeska PS 05 Tank Farm	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	Alyeska PS 05 Turbine Fuel Spill	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	Alyeska PS 05 Well House Spill	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	Anaktuvuk Pass Power Plant	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	AT&T Alascom TAPS Repeater Coldfoot	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	AT&T Alascom TAPS Repeater Eagle	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	AT&T Alascom TAPS Repeater Kaaruk	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	AT&T Alascom TAPS Repeater Margaret Hill	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	Bettles Lodge Block 4, Lots 3A, 4A, 5A, and 7	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	BLM 60 Mile Campground	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	BLM Alaska Fire Service Bettles Station	Active	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Industrial Effluent	Brooks Range Aviation	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	Chevron Tigkukpuk #1	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	City of Allakaket Diesel Tank Farm	Active	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	Coldfoot Camp Generator Release	Active	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	Coldfoot Services	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	FAA - Bettles Airport UST# 46-C-1 Pumphouse	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	FAA Bethel Flight Service Station	Active	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	FAA Bettles Living Quarters AST Tank Farm	Active	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	FAA Bettles Site Wide	Active	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	FAA Bettles Station Building 101	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	FAA Bettles Station Building 106	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	FAA Bettles Station Building 107	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	FAA Bettles Station Building 108	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	FAA Bettles Station Building 109	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	FAA Bettles Station Building 110	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	FAA Bettles Station Building 200	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	FAA Bettles Station NDB	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	FAA Bettles Station Pump House	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	FAA Bettles Station RCAG	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	FAA Bettles Station VORTAC	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	FAA Bettles UST 46-C-011 Bldg 111	Active	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI

Threat Type	Threat Subclass	Threat Cause	Site Name	Status	Start Date	Data Source Name	Position
Water quality threats	Contaminant Pollution	Industrial Effluent	FAA Bettles UST 46-C-2 Bldg 603 Powerhouse	Active	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	FAA Bettles UST# 46-A-1	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	FAA Bettles UST# 46-C-03 Building 400	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	FAA Bettles UST# 46-C-102A	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	FORMER CITY GASOLINE TANK FARM	Active	20-Mar-14	EPA Facility Registry System	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	FORMER CITY POWER HOUSE	Active	20-Mar-14	EPA Facility Registry System	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	FORMER DIESEL TANK FARM	Active	20-Mar-14	EPA Facility Registry System	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	New Bettles Airstrip	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	NPS Bettles Employee Housing HOT - Bldg 104	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	NPS Bettles Employee Housing HOT - Bldg 109	Active	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	NSB Anaktuvuk Pass Former Drum Storage and Stockpile	Active	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	NSB Anaktuvuk Pass Pumphouse	Active	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	OLD ALATNA VILLAGE SITE	Active	20-Mar-14	EPA Facility Registry System	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	OLD AP&T GENERATOR BUILDING	Active	20-Mar-14	EPA Facility Registry System	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	Old Town Bettles Drums	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	Prospect Airport Lease Lot 1	Active	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	Sourdough Outfitters, Block 5, Lots 1A & 1B	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	TACAN Radar Site	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Industrial Effluent	Wiseman Teacher Housing Facility	Closed	17-Dec-12	Alaska Department of Environmental Conservation Contaminated Sites	RHI
Water quality threats	Contaminant Pollution	Mining	Smalley Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Abo	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	Acme Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Addis Heather	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Agnes Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Alaska Mining Co., Inc	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Ammi Ltd Partnership (Mickmann S)	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Ann	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Archibald Creek; Archibald Gulch	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Armstrong Edward J.	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Armstrong Jay R	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Bauer Megan	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Bear Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Bell Chester L	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Bell Rocky Joe	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Bettles Bar; Bettles Riffle	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Bettles River	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Big Four Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Big Jim Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Big Jim Creek; Suklak Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Big Spruce Creek; Spruce Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Birch Creek	Active	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Bonanza, Beef	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Bore Creek; Boer Gulch; Boer Creek; Boar Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Bourbon Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Brewer Danny E	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	Brooks Range Expl. Ii, Llc	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Broste Wayne	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Buckeye Gulch; Buckeye Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Buzz; Buzzard	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	California Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Canyon Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Carolan Matthew	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Chapman Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Christenson Benjamin W	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Cindy	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Clara Creek	Active	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Cogdill L John	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Colorado Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Confederate Gulch	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Conglomerate Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Cow Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Crevice Creek	Active	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Cross Robert D.	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Davis Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Deimos	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Devault Kris	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Dionne Paul	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Dionne Paul H	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Discovery Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Dolphin Kim	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	Dome Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Eagle Cliff; Eagle Bluff	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	East Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Eightmile Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Emery Creek; Emory Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Emma Creek	Active	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Emma Dome	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Eva	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Evelyn Lee	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Fall Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Fay Creek; Fay Gulch; Faye Creek	Active	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Fejes William (Bill) Charles	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Ferguson	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Finlay David L	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Forchak Cheryle	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Fortress	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Freel Tracy	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Frisbe Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Frog	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Fryingpan Bar	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Garnet Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Ginger	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Glaser Donald E	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Gold Bench	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Gold Bottom Gulch; Gold	Active	27-Feb-13	USGS Alaska Resource Data File	RHI

Threat Type	Threat Subclass	Threat Cause	Site Name	Status	Start Date	Data Source Name	Position
			Bottom Creek				
Water quality threats	Contaminant Pollution	Mining	Gold Creek; Little Gold Creek	Active	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Gold N Stones Inc	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Gordon Peter	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Granite Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Grubstake Bar	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Guthrie H. Paul	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Hall John B	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Hamm Ralph D	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant pollution	Mining	HAMMOND RIVER - BLM FAIRBANKS	Active	24-Jan-13	DOI Office of Surface Mining Abandoned Mine Lands Inventory System	RHI
Water quality threats	Contaminant Pollution	Mining	Hammond River; Hammond Creek	Active	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Hanshaw Bar	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Helpmejack Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	HET	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Hidden Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Higgins Pete	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Hoffman Michael N	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Hooper Gerald W	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Humphrey Hank M	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Hunter James A	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Hurricane-Diane	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Ironside Bench; Ironside Bar	Active	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Jap Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Jay Creek; Eagle Gulch	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	Jenkins Edward	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Jennie Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Jennings Jennifer L	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Jim Prospect Confluence; Jim River; Jim River Confluence	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Jim Pup; Jim Pup Creek; Jim Gulch; Jim Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	John River	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Jones Cecil Ray	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Jones Creek (placer); Bog	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Juneau Mining Company	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Kay Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Kelly Gulch; Kelly's Gulch; Kelly's Mistake	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	King Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Kothlow Eugene L.	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Krause Floyd E	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Krkovich Duane	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Krkovick Reginald D	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Lake Creek	Active	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Lake Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Lance Frank	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Landmark Alaska Limited Partne Rship	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Last Chance Creek; Crab Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Limestone Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Linda Creek	Active	27-Feb-13	USGS Alaska Resource Data File	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	Lofty Gulch	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Lost Pipe; Alatna River	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Lozo Suzi	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Lucky Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Luke Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Luna	Active	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Lynx Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Magby Jed	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Magnet Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Mailbox Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Manns Cecilia	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Manns Mick	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Marion Creek; Marian Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Marshall Roger K	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Mary's Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Mascot Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	McCamant Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	McKinley Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Mckinney Randy	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Midas Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Mike	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Miller Vernon F	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Minnie Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Missy Moose Mining	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Moore Jaime	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	Moose Creek; Moose Gulch	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Moose Trail	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Mule Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Myrtle Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Neck Creek; Coon Gulch	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Nelson Paul W	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Nesbit Joe	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Nolan Creek	Active	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Northern Lights Mining Inc	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Nugget Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Nutirwik Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Oker Rick A	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Oregon Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	O'Rourke Tim	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Palisades	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Pasco Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Perkins John	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Peterson Rick	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Phoebe Creek; Feebee Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Pike John K.	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Pilgrim	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Pope; Eldorado Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Porcupine Creek	Active	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Pringle Bench; Jones & Boyle	Active	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Prospect Creek	Active	27-Feb-13	USGS Alaska Resource Data File	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	Pyne Eric C	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Quartz Creek	Active	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Rahberger Ed	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Rainbow Gulch; Rainbow Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Red	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Regan Dale	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Robert Creek; Sheep Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Robinson Robert M	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Roches Moutonnees	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Rock Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Rocky Point	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Rockybottom Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Rogers Tom	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Roosevelt Creek; RO; Skroo	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Rosie Creek; Rose Creek; Lake Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Rye Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Sawlog Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Sawyer Creek; Sawyer Gulch	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Schachle Michael J	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Seaman Max	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Seward Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Shady Creek, Gus Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Shamrock Creek; Butte Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Sheep Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	Sheep Creek; Sheep Gulch	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Shupe Michael C	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Silver King	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Sirr Creek; North Fork Seward Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Sixtymile Creek; Fool Creek; Sixtymile	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Slate Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Slisco Bench	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Smith Creek; Smith Gulch	Active	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Smith Kathleen M	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Snoeshoe Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Snowden Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Spring Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Stacey John Dennis	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Suckik Creek; Sickik Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Surprise Creek; Summit Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Swift Creek; Swift Gulch	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Tainter Gary H	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Tana	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Teck American Incorporated	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Thomas Martha W	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Thompson Pup; Thompson Gulch	Active	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Timber Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Tobin Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Tramway Bar	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	Trembley Creek; Kuyuktuvuk Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Twelvemile Creek; Upper Fork; Lower Fork; Potato Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Twocent Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Union Gulch; Union Creek	Active	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (on Sukakpak Mountain)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (ridge between Madison and Crevice Creeks)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (above Gold Bottom Gulch)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (along and at head of Thompson Pup)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (along Right Fork)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (along Willow Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (at head of Kanuti Kilolitna River)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (at head of Limestone Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (benches upper Hammond River)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (between Crevice and McCamant Creeks)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (between Sirr Creek and Wild Lake)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (east of Ernie Lake)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (east of Gunsight Mountain)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (east of head of Bonanza Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	Unnamed (east of the north end of Wild Lake)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (east of upper Midas Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (east of upper Wild Lake)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (east of VABM Allen)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (east of Wild Lake, opposite Seward Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (east side of lower Wild Lake)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (head of Bedrock Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (head of Jones Creek tributary)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (head of Sheep Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (headwaters of Malamute Fork John River)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (Holonada Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (in Glacier Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (in headwater fork of Crevice Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (in Smith Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (in the Helpmejack Hills)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (lower Crevice Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (near Allen River)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (near Bluecloud Mountain)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (near Caribou Mountain)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (near head St. Patricks Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	Unnamed (near Horace Mountain)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (near Howard Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (near Jones Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (near Kanuti Hot Springs)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (near Kilo Hot Spring)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (near Kutuk River)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (near lower Kanuti River)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (near Mathews Dome)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (near Mettenpherg Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (near Prospect Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (near Siwash Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (near southwest end of Midnight Dome)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (near summit of Smith Creek Dome)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (near the head of Colorado Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (near the junction of Fall and Michigan Creeks)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (near VABM Pink)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (near Walkaround Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (near Weyahok River)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (near Wiehl Mountain)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (near Willow Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (north of Arrigetch Peaks)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	Unnamed (north of Kanuti Kilolitna River)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	Refuge
Water quality threats	Contaminant Pollution	Mining	Unnamed (north of Kanuti Kilolitna River)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (north of Mathews Dome)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (northeast of Ernie Lake)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (northeast of Heart Mountain)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (northwest of Colorado Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (northwest of Gilroy Mountain)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (northwest of head of Jay Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (northwest of junction of Pass and Mettenpherg Creeks)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (northwest of Takahula River)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (on lower Walkaround Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (on lower Wiseman Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (on McKinley Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (on Smith Creek Dome)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (on upper Kanuti River)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (ridge east of Scofield Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (south of Arrigetch Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (south of Eagle Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	Unnamed (south of Ernie Lake)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (south of lower Michigan Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (south of Mathews Dome)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (south of Mt. Hecht)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (south of Organ and Sixtymile Creeks)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (south of Pet Lake)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (south of the Hammond River)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (south of upper Seward Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (south of VABM Allen)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (south of Winers Lake)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (southeast of Sithylemenkat Lake)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (southeast of upper Sheep Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (southwest of Sillyasheen Mountain)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (tributary to the Kanuti River)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	Refuge
Water quality threats	Contaminant Pollution	Mining	Unnamed (upper Crevice Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (upper Slokhenjikh Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (west of Awlinyak Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (west of Deadman Mountain)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	Unnamed (west of Kanuti Kilolitna River)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (west of lower Wild Lake)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (west of Mettenpherg Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (west of Nahtuk Mountain)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (west of Sithylemenkat Lake)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	Refuge
Water quality threats	Contaminant Pollution	Mining	Unnamed (west of Twoday Mountain)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (west of upper Flat Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (west of upper Jones Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (west of upper Malamute Fork John River)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Unnamed (west of upper Millichetah Creek)	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Venus	Active	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Vermont Creek; Right Fork	Active	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Vermont Dome	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Viavant Tim	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Victor	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Wakeup Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Washington Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Webster Gulch	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Wiehl Mountain	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Willow Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Wilson Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quality threats	Contaminant Pollution	Mining	Wiseman Creek	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Workman's Bench; Wannemaker and Wortman	Active	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Wright Richard L	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Wright Wesley	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Yoder George	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Zarrilli Tom	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Contaminant Pollution	Mining	Zinc	Proposed/Potential	27-Feb-13	USGS Alaska Resource Data File	RHI
Water quality threats	Contaminant Pollution	Mining	Zwolinski Chris J	Active	20-Mar-14	Alaska Department of Natural Resources State Mining Claims	RHI
Water quality threats	Nutrient Pollution	Garbage/Solid Waste	Allakaket 1.6 mile South Landfill	Active	20-Mar-14	Alaska Department of Environmental Conservation Solid Waste Sites	RHI
Water quality threats	Nutrient Pollution	Garbage/Solid Waste	Allakaket Landfill	Closed	20-Mar-14	Alaska Department of Environmental Conservation Solid Waste Sites	RHI
Water quality threats	Nutrient Pollution	Garbage/Solid Waste	Alyeska Old Man Camp 87-1	Closed	20-Mar-14	Alaska Department of Environmental Conservation Solid Waste Sites	RHI
Water quality threats	Nutrient Pollution	Garbage/Solid Waste	Alyeska Pipeline Site 100-1 Camp	Active	20-Mar-14	Alaska Department of Environmental Conservation Solid Waste Sites	RHI
Water quality threats	Nutrient Pollution	Garbage/Solid Waste	Alyeska Pump Station #5 (DS 92-3.1)	Closed	20-Mar-14	Alaska Department of Environmental Conservation Solid Waste Sites	RHI
Water quality threats	Nutrient Pollution	Garbage/Solid Waste	Anaktuvuk Pass Landfill	Closed	20-Mar-14	Alaska Department of Environmental Conservation Solid Waste Sites	RHI
Water quality threats	Nutrient Pollution	Garbage/Solid Waste	Anderson Landfill	Closed	20-Mar-14	Alaska Department of Environmental Conservation Solid Waste Sites	RHI
Water quality threats	Nutrient Pollution	Garbage/Solid Waste	Bettles DOT Airport Landfill	Closed	20-Mar-14	Alaska Department of Environmental Conservation Solid Waste Sites	RHI
Water quality threats	Nutrient Pollution	Garbage/Solid Waste	Evansville Landfill	Active	20-Mar-14	Alaska Department of Environmental Conservation Solid Waste Sites	RHI
Water quality threats	Nutrient Pollution	Garbage/Solid Waste	Fairbanks Biosolids: Dornath, Worthen, Koponen	Closed	20-Mar-14	Alaska Department of Environmental Conservation Solid Waste Sites	RHI
Water quality threats	Nutrient Pollution	Garbage/Solid Waste	Jim River Landfill ADOT/PF	Closed	20-Mar-14	Alaska Department of Environmental Conservation Solid Waste Sites	RHI
Water quantity threats	Altered Ecological Flows	Dams	Alatna	Proposed/Potential	15-Mar-13	Alaska Energy Authority Sites Evaluated for Potential Hydropower or Existing Hydroelectric Sites	RHI
Water quantity threats	Altered Ecological Flows	Dams	Alatna River	Proposed/Potential	15-Mar-13	Alaska Energy Authority Sites Evaluated for Potential Hydropower or Existing Hydroelectric Sites	RHI
Water quantity threats	Altered Ecological Flows	Dams	Alatna River, Upper	Proposed/Potential	15-Mar-13	Alaska Energy Authority Sites Evaluated for Potential Hydropower or Existing Hydroelectric Sites	RHI
Water quantity threats	Altered Ecological Flows	Dams	Alatna/ Allakaket	Proposed/Potential	15-Mar-13	Alaska Energy Authority Sites Evaluated for Potential Hydropower or Existing Hydroelectric Sites	RHI

Threat Type	Threat Subclass	Threat Cause	Site Name	Status	Start Date	Data Source Name	Position
			(unnamed creek 2.5 mi S of)				
Water quantity threats	Altered Ecological Flows	Dams	Allakaket (unnamed stream NW)	Proposed/Potential	15-Mar-13	Alaska Energy Authority Sites Evaluated for Potential Hydropower or Existing Hydroelectric Sites	RHI
Water quantity threats	Altered Ecological Flows	Dams	Allakaket (unnamed stream South)	Proposed/Potential	15-Mar-13	Alaska Energy Authority Sites Evaluated for Potential Hydropower or Existing Hydroelectric Sites	RHI
Water quantity threats	Altered Ecological Flows	Dams	Anaktuvuk Pass (Inukpasugruk Creek)	Proposed/Potential	15-Mar-13	Alaska Energy Authority Sites Evaluated for Potential Hydropower or Existing Hydroelectric Sites	RHI
Water quantity threats	Altered Ecological Flows	Dams	Bettles (Jane Creek)	Proposed/Potential	15-Mar-13	Alaska Energy Authority Sites Evaluated for Potential Hydropower or Existing Hydroelectric Sites	RHI
Water quantity threats	Altered Ecological Flows	Dams	Jack White (Koyukuk River)	Proposed/Potential	15-Mar-13	Alaska Energy Authority Sites Evaluated for Potential Hydropower or Existing Hydroelectric Sites	RHI
Water quantity threats	Altered Ecological Flows	Dams	Jim River	Proposed/Potential	15-Mar-13	Alaska Energy Authority Sites Evaluated for Potential Hydropower or Existing Hydroelectric Sites	Refuge
Water quantity threats	Altered Ecological Flows	Dams	John River	Proposed/Potential	15-Mar-13	Alaska Energy Authority Sites Evaluated for Potential Hydropower or Existing Hydroelectric Sites	RHI
Water quantity threats	Altered Ecological Flows	Dams	Kanuti (Koyukuk River)	Proposed/Potential	15-Mar-13	Alaska Energy Authority Sites Evaluated for Potential Hydropower or Existing Hydroelectric Sites	RHI
Water quantity threats	Altered Ecological Flows	Dams	Wiseman (Hammond River)	Proposed/Potential	15-Mar-13	Alaska Energy Authority Sites Evaluated for Potential Hydropower or Existing Hydroelectric Sites	RHI
Water quantity threats	Altered Ecological Flows	Dams	Wiseman (Jap Creek)	Proposed/Potential	15-Mar-13	Alaska Energy Authority Sites Evaluated for Potential Hydropower or Existing Hydroelectric Sites	RHI
Water quantity threats	Altered Ecological Flows	Dams	Wiseman (Larson Creek)	Proposed/Potential	15-Mar-13	Alaska Energy Authority Sites Evaluated for Potential Hydropower or Existing Hydroelectric Sites	RHI
Water quantity threats	Altered Ecological Flows	Dams	Wiseman (Marion Creek)	Proposed/Potential	15-Mar-13	Alaska Energy Authority Sites Evaluated for Potential Hydropower or Existing Hydroelectric Sites	RHI
Water quantity threats	Altered Ecological Flows	Dams	Wiseman (Minnie Creek)	Proposed/Potential	15-Mar-13	Alaska Energy Authority Sites Evaluated for Potential Hydropower or Existing Hydroelectric Sites	RHI
Water quantity threats	Altered Ecological Flows	Dams	Wiseman (Moose Creek)	Proposed/Potential	15-Mar-13	Alaska Energy Authority Sites Evaluated for Potential Hydropower or Existing Hydroelectric Sites	RHI
Water quantity threats	Water rights/Legal	No Proof of beneficial	ADOT&PF - NRO, á	Active	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI
Water quantity threats	Water rights/Legal	No Proof of beneficial	ALMINCO AK MINING CO., INC., á	Proposed/Potential	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI
Water quantity threats	Water rights/Legal	No Proof of beneficial	ALYESKA PIPELINE SERVICE CO -, TRANS-ALASKA PI PELINE SYSTEMá	Active	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI
Water quantity threats	Water rights/Legal	No Proof of beneficial	AMMI LTD PARTNERSHIP, á	Proposed/Potential	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI
Water quantity threats	Water rights/Legal	No Proof of beneficial	ARMSTRONG, JAY Rá	Proposed/Potential	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI
Water quantity threats	Water rights/Legal	No Proof of beneficial	BOREAL RESOURCES INC, á	Proposed/Potential	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI
Water quantity threats	Water rights/Legal	No Proof of beneficial	BRANDON, STEWART á	Proposed/Potential	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI

Threat Type	*Threat Subclass*	*Threat Cause*	*Site Name*	*Status*	*Start Date*	*Data Source Name*	*Position*
Water quantity threats	Water rights/Legal	No Proof of beneficial	COLBY, GRADEN Já	Proposed/Potential	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI
Water quantity threats	Water rights/Legal	No Proof of beneficial	EVEN, DANIEL Lá	Active	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI
Water quantity threats	Water rights/Legal	No Proof of beneficial	EVEN, DANIEL Lá	Proposed/Potential	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI
Water quantity threats	Water rights/Legal	No Proof of beneficial	FEJES, WILLIAM (BILL) CHARLESá	Proposed/Potential	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI
Water quantity threats	Water rights/Legal	No Proof of beneficial	FREEL, TRACY á	Proposed/Potential	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI
Water quantity threats	Water rights/Legal	No Proof of beneficial	GOLD DIGGERS EXPLORATION LLC, á	Proposed/Potential	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI
Water quantity threats	Water rights/Legal	No Proof of beneficial	GREENE, STEPHEN (STEVE) Aá	Proposed/Potential	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI
Water quantity threats	Water rights/Legal	No Proof of beneficial	H C CONTRACTORS, INC., á	Active	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI
Water quantity threats	Water rights/Legal	No Proof of beneficial	HAGAN, THOMAS Oá	Proposed/Potential	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI
Water quantity threats	Water rights/Legal	No Proof of beneficial	HAMM, RALPH Dá	Proposed/Potential	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI
Water quantity threats	Water rights/Legal	No Proof of beneficial	HIGGINS, PETE á	Active	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI
Water quantity threats	Water rights/Legal	No Proof of beneficial	JOHN A. BONACOR, á	Active	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI
Water quantity threats	Water rights/Legal	No Proof of beneficial	JONES, DOUGLAS WARRENá	Active	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI
Water quantity threats	Water rights/Legal	No Proof of beneficial	LNT MINING LLC, á	Active	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI
Water quantity threats	Water rights/Legal	No Proof of beneficial	MACLAREN, RONALD á	Proposed/Potential	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI
Water quantity threats	Water rights/Legal	No Proof of beneficial	NILES, BRANDON Wá	Proposed/Potential	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI
Water quantity threats	Water rights/Legal	No Proof of beneficial	PERKINS, JOHN á	Proposed/Potential	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI
Water quantity threats	Water rights/Legal	No Proof of beneficial	POST, ALLEN á	Proposed/Potential	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI
Water quantity threats	Water rights/Legal	No Proof of beneficial	SHOREY, TIMOTHY A.á	Proposed/Potential	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI
Water quantity threats	Water rights/Legal	No Proof of beneficial	SMITH, DAVID á	Proposed/Potential	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI
Water quantity threats	Water rights/Legal	No Proof of beneficial	SWAN, JAMES Wá	Proposed/Potential	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI
Water quantity threats	Water rights/Legal	No Proof of beneficial	WICKEN, JAMES Tá	Proposed/Potential	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI
Water quantity threats	Water rights/Legal	No Proof of beneficial	WRIGHT, RICHARD L.á	Proposed/Potential	20-Mar-14	Alaska Department of Natural Resources Temporary Water Use Permits	RHI
Aquatic habitat threats	Impaired Stream Connectivity	NA	1079 Slough	Proposed/Potential	18-Dec-12	Alaska Department of Fish and Game Fish Passage Inventory	RHI

Appendix I-National Water Resource Inventory and Assessment Threats and Needs Classification

TYPE of Threat

1. **Water Quality Related Threats**
   - 1.1. Nutrient Pollution
   - 1.2. Pathogens
   - 1.3. Pesticides
   - 1.4. Mercury
   - 1.5. Metals (other than Mercury)
   - 1.6. PCBs
   - 1.7. Altered Thermal Regime
   - 1.8. Salinity/TDS/Chlorides/Sulfates
   - 1.9. Altered Ph
   - 1.10. Low Dissolved Oxygen
   - 1.11. Endocrine Disruptors/Emerging Contaminants
   - 1.12. Other Contaminants/ Altered Water Chemistry
   - 1.13. Hydrocarbons

2. **Water Quantity Related Threats**
   - 2.1. Insufficient Surface Water
   - 2.2. Insufficient Groundwater
   - 2.3. Excess Surface Water/Flooding
   - 2.4. Excess Groundwater/High Water Table
   - 2.5. Altered Flow Regime
   - 2.6. Compromised Water Management Capability
   - 2.7. Legal challenges or fines for non-compliance with water policy, law, or regulation

3. **Aquatic Habitat Threats**
   - 3.1. Impaired Stream Connectivity
   - 3.2. Bank Erosion/Channel Incision
   - 3.3. Sedimentation
   - 3.4. Habitat Shifting/Alteration
   - 3.5. Loss/Alteration of Stream Channel Habitat
   - 3.6. Loss/Alteration of Floodplain Habitat
   - 3.7. Loss/Alteration of Wetland Habitat
   - 3.8. Loss/Alteration of Lake or Pond Habitat
   - 3.9. Loss/Alteration of Estuarine Habitat
   - 3.10. Tundra/Permafrost Thawing

CAUSE of Threat

1. **Water Quality Causes**
   - 1.1. Agricultural Runoff
   - 1.2. Cropland drainage/Tiling
   - 1.3. Urban Runoff
   - 1.4. Urban Sewage
   - 1.5. Wastewater Treatment Facilities
   - 1.6. Failing Septic
   - 1.7. Livestock
   - 1.8. Concentrated Animal Feeding Operations
   - 1.9. Wildlife Sources
   - 1.10. Industrial Effluent
   - 1.11. Oil and Gas Development
   - 1.12. Oil and Gas Exploration
   - 1.13. Hydraulic Fracturing
   - 1.14. Garbage/Solid Waste
   - 1.15. Airborne Pollutants
   - 1.16. Irrigation
   - 1.17. Fire and Fire Suppression
   - 1.18. Naturally-Occurring Contaminants
   - 1.19. Invasive Species

2. **Water Supply/Quantity Causes**
   - 2.1. Surface Water Diversion: Agriculture
   - 2.2. Surface Water Diversion: Municipal
   - 2.3. Surface Water Diversion: Industrial
   - 2.4. Groundwater Pumping: Agriculture
   - 2.5. Groundwater Pumping: Municipal
   - 2.6. Groundwater Pumping: Industrial
   - 2.7. Dams
   - 2.8. Locks
   - 2.9. Canals
   - 2.10. Levees/Dikes
   - 2.11. Drainage Ditches
   - 2.12. Channelization
   - 2.13. Impervious Surfaces
   - 2.14. Pumping Stations
   - 2.15. Irrigation Return Flows
   - 2.16. Inter-Basin Transfers

3. **Water Management Capability Causes**
   - 3.1. Non-FWS Management of Water Infrastructure
   - 3.2. Lack of Water Management Infrastructure
   - 3.3. Inefficient, Inadequate, or Damaged Water Management Infrastructure
   - 3.4. Other Legal/Political Constraints
   - 3.5. No Active Monitoring

4. **Water Rights / Legal Causes**
   - 4.1. FWS Does Not Have Permit / Right for Refuge Water Use
   - 4.2. Existing Permit / Right for Non-Wildlife Beneficial Use
   - 4.3. Existing Rights Junior Priority
   - 4.4. Existing Rights Insufficient Quantity/Timing to Meet Refuge Purposes
   - 4.5. State Regulations Not Enforced
   - 4.6. Refuge Water Rights Challenged by others
   - 4.7. FWS Not Participating in Basin Adjudication
   - 4.8. FWS Not Quantifying Water Use
   - 4.9. Loss Due to Non-Use
   - 4.10. No Proof of Beneficial Use
   - 4.11. ESA Compliance /Threats to Listed Species
   - 4.12. Interstate Compact Agreements
   - 4.13. International Treaties
   - 4.14. Augmentation/Replacement Requirements
   - 4.15. Restrictions in Establishing Legislation
   - 4.16. Other Legal Disputes/Issues

5. **Landscape Alteration Causes**
   - 5.1. Altered Riparian Vegetation
   - 5.2. Agriculture
   - 5.3. Urban Development
   - 5.4. Roads/Culverts
   - 5.5. Road Construction/Maintenance
   - 5.6. Pipelines and Utility Corridors
   - 5.7. Grazing/Ranching
   - 5.8. Logging/Forestry

5.9. Mining/Quarrying
5.10. Wetland Filling

6. Climate-Related Causes

6.1. Climate Warming
6.2. Extreme Precipitation Events
6.3. Change in Frequency/Severity of Extreme Precipitation Events
6.4. Change in Precipitation Patterns (Non-Extreme)
6.5. Changes in Rain-Snow Regimes
6.6. Droughts
6.7. Increase in Drought Frequency/Severity
6.8. Desertification
6.9. Temperature Extremes
6.10. Change in Wildfire Frequency/Severity
6.11. Sea Level Rise
6.12. Storm-Induced Coastal Erosion
6.13. Increased Rate of Storm-Induced Coastal Erosion
6.14. Tropical Storms/Hurricanes
6.15. Increased Frequency/Intensity of Tropical Storms and Hurricanes
6.16. Glacier Retreat

7. Public Use/Recreation

Additional Threat Attributes

Threat Severity

1. High: Prevents fulfillment of refuge/hatchery purpose(s) or NWRS mission; threatens public safety; threatens T&E species; threatens adverse legal consequences; threatens infrastructure
2. Moderate: Hinders completion of one or more management objectives (e.g. degrades habitat for non-T&E species, inadequate infrastructure for habitat management)
3. Low: directly or indirectly affects refuge operations, but does not hinder refuge purposes or management objectives. Potentially of concern.
4. Unknown: insufficient information to determine severity

Threat Time Frame (immediacy)

A. Existing: currently a threat
B. Medium-term: anticipated threat within next 10 years (e.g., potential encroaching development or a groundwater contamination plume moving toward the refuge)
C. Long-term: anticipated threat that is more than 10 years out (e.g., climate change)

Threat Feasibility-Can FWS address this alone?

- Yes: mitigation measures are entirely within FWS control and do not require outside assistance
- No: mitigation measures are partially or entirely outside of FWS control; requires collaboration/partnerships

Source (multiple sources can be selected)

1. Peer-reviewed report or journal article
2. Personal communication with refuge staff
3. Threats and needs assessment
4. On-site observation
5. Unpublished report
6. Published geospatial data
7. Unpublished geospatial data
8. Internet published data
9. Unpublished data
10. WRIA recommendation
11. CCP
12. CAP or onsite investigation
13. Management plan

Source Quality/Reliability (considering all sources selected)

- High: information is complete; information from peer-reviewed report; or documented with measured data, photos, or personally observed by recorder. Examples: information from peer-reviewed journal articles or reports; on-site observation; report from refuge with documentation.
- Medium: some information may be missing; or information from reliable source, but little documentation; not documented with measured data, photos or personally observed; or information reviewed internally, but not peer-reviewed. Examples: personal communication with Refuge Manager; information from unpublished report
- Low/Unknown: information is known to be incomplete; source of information is of unknown reliability; little to no documentation; information has not been internally reviewed. Examples: third-party communications; information from unpublished reports of unknown quality

NEEDS CLASSIFICATION

1. **Water-Related Infrastructure**
   - 1.1. Repair or Replace Water Supply Infrastructure
   - 1.2. Repair or Replace Water Management Infrastructure
   - 1.3. Repair or Replace Recreational Infrastructure
   - 1.4. New Water Supply Infrastructure
   - 1.5. New Water Management Infrastructure
   - 1.6. New Recreational Infrastructure
   - 1.7. Remove Infrastructure

2. **Monitoring/Measurement**
   - 2.1. Create/Update Water Monitoring Plan
   - 2.2. Water Quality Baseline Monitoring
   - 2.3. Targeted Water Quality Monitoring
   - 2.4. Water Supply/Quantity Monitoring
   - 2.5. Suspended sediment monitoring/measurement
   - 2.6. Bedload monitoring/measurement
   - 2.7. Water Level Monitoring
   - 2.8. Pump test/Aquifer Yield
   - 2.9. Habitat Monitoring
   - 2.10. Species Monitoring
   - 2.11. New Monitoring Infrastructure

3. **Water Supply/Management**
   - 3.1. Acquire New Water
   - 3.2. Relinquish/Transfer Excess Water
   - 3.3. Reduce Flooding Impacts
   - 3.4. Create/Update Water Management Plan
   - 3.5. Determine Water Use Requirements

4. **Modeling/Research/Assessment**
   - 4.1. Water Resources Inventory and Assessment
   - 4.2. Hydrologic Modeling
   - 4.3. Instream Flows Assessment (IFIM/ELOHA)
   - 4.4. Hydraulic and Sediment Transport Modeling
   - 4.5. Groundwater Modeling
   - 4.6. Geomorphic Modeling
   - 4.7. Fluvial Geomorphic Assessment (form and function)
   - 4.8. Sediment transport validation
   - 4.9. Bank erosion modeling and validation
   - 4.10. Water Quality Concentration/Loading Assessment
   - 4.11. Climate Change Vulnerability Assessment
   - 4.12. Functional Assessment
   - 4.13. Data Gap Analysis/Water Monitoring Network Design

5. **Mapping and Geospatial Data/Analysis**
   - 5.1. Geographic Survey Points/Area
   - 5.2. Water System Mapping
   - 5.3. Water Rights Mapping
   - 5.4. LiDAR Survey
   - 5.5. Aquatic Habitat Mapping
   - 5.6. Wetland/Vegetation Mapping
   - 5.7. Bathymetry/Storage

6. Water Rights/Water Entitlements
   - 6.1. Water Rights/Entitlements Litigation
   - 6.2. Water Rights Perfection
   - 6.3. Water Rights/Entitlements Resolution of Disputes (non-litigious)
   - 6.4. Water Rights/Entitlements Interpretation
   - 6.5. Water Rights/Entitlements Enhancement of Reporting
   - 6.6. Exercise Water Rights
   - 6.7. Acquire New/Additional Water Rights/Entitlements
   - 6.8. Assert/Quantify Federal Reserve Water Right

7. Coordination/Support

7.1. Build/Strengthen/Expand Watershed Partnerships
7.2. Improve Communication/Education/Outreach with Stakeholders
7.3. Seek Legislative Relief/Assistance

8. **Water Quality Mitigation/Habitat** Improvement
8.1. Reduce Non-Point Source Pollution
8.2. Reduce Point-Source Pollution
8.3. Develop or Promote Adoption of Best Mgt. Practices
8.4. Restore Habitat
8.5. Restore/Protect Beneficial Environmental Flows
8.6. Spill Clean-up
8.7. Protect Habitat from Invasive Species
8.8. Land Acquisition
8.9. Restore floodplain function
8.10. Restore native aquatic species

Additional Needs Attributes:

Priority

- High: Necessary to fulfill refuge/hatchery purpose(s) or NWRS mission; necessary to protect public safety, infrastructure or avoid serious legal consequences; necessary for survival of T&E species
- Moderate: Necessary to complete one or more management objectives, or protect/restore habitat for non-T&E species
- Low / Unknown: Would be helpful for refuge operations, but not critical to refuge functions, or is unknown

Effort Required

1. Major: Requires more staff and/or funding than can be provided by refuge/hatchery and Regional Office (requires outside support)
2. Minor: Can be accomplished with existing staff and budget (refuge/hatchery and RO), although it may require re-prioritization of personnel or funding

Timeline (when it should be addressed)

A. Short-term: less than 2 years
B. Medium: 2-5 years
C. Long-term: greater than 5 years

Can FWS address this alone?

- Yes: obtainment entirely within FWS control and do not require outside assistance
- No: obtainment measures are partially or entirely outside of FWS control; requires collaboration/partnerships

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