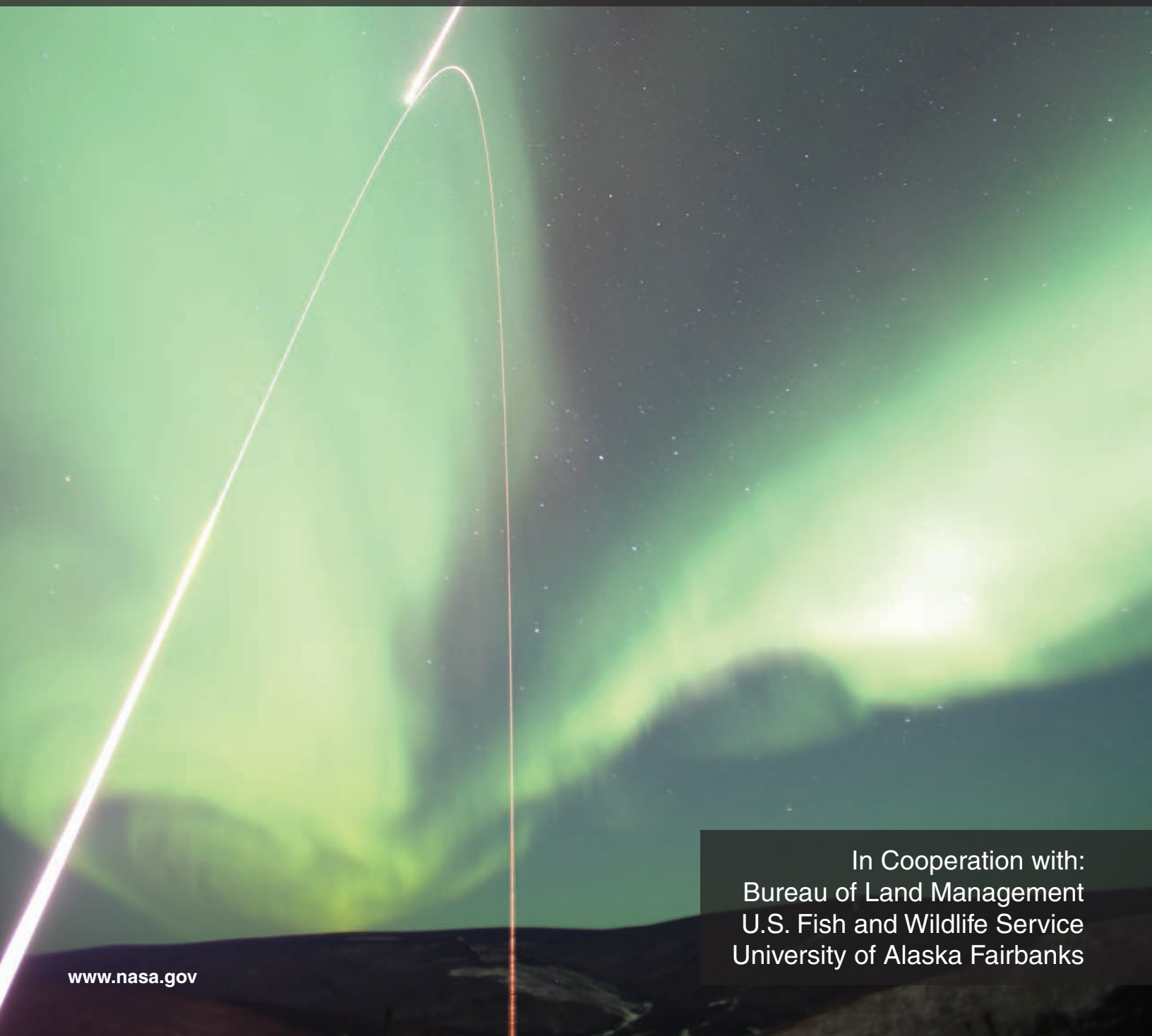
National Aeronautics and Space Administration

Final Environmental Impact Statement

Sounding Rockets Program at Poker Flat Research Range

Volume II
Appendices A-K

July 2013



In Cooperation with:
Bureau of Land Management
U.S. Fish and Wildlife Service
University of Alaska Fairbanks

www.nasa.gov

Photo Credit: *Craig Heinselman, SRI*

Cover image: *The February 18, 2012 launch of the Magnetosphere-Ionosphere Coupling in the Alfvén Resonator (MICA) sounding rocket mission from Poker Flat Research Range, Alaska.*

FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE SOUNDING ROCKETS PROGRAM AT POKER FLAT RESEARCH RANGE

VOLUME II

APPENDICES A THROUGH K

Sounding Rockets Program Office
National Aeronautics and Space Administration
Wallops Island, VA 23337

July 2013

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LIST OF ABBREVIATIONS AND ACRONYMS

°C	degrees Celsius
°F	degrees Fahrenheit
Σ	sigma, absolute dispersion
ACHP	Advisory Council on Historic Preservation
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
AGL	above ground level
AK	Alaska
Al	aluminum
ANCSA	Alaska Native Claims Settlement Act
ANILCA	Alaska National Interest Lands Conservation Act
AP/AL	ammonium perchlorate/aluminum
APE	area of potential effect
ASRC	Arctic Slope Regional Corporation
ATV	all-terrain vehicle
BA	Biological Assessment
BB	Black Brant
BEA	U.S. Bureau of Economic Analysis
BLM	U.S. Bureau of Land Management
C	carbon
Ca	calcium
CAA	Clean Air Act
CAAA	Clean Air Act and its Amendments
CAH	Central Arctic Herd
CBS	Chukchi/Bering Seas
Cd	cadmium
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
Cl	chlorine

LIST OF ABBREVIATIONS AND ACRONYMS (*Continued*)

Cm	curium
Co	cobalt
CO_2	carbon dioxide
CPCRW	Caribou-Poker Creeks Research Watershed
Cu	copper
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
D	distance(s)
dB	decibels
dBA	decibels A-weighted
DEW-Line	Distant Early Warning-Line
DOD	U.S. Department of Defense
Draft Revised Arctic CCP	*Arctic Refuge Draft Revised Comprehensive Conservation Plan*
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EJIP	Environmental Justice Implementation Plan
EM	electromagnetic
EPA	U.S. Environmental Protection Agency
ERD	Environmental Resources Document
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FB	Fairbanks, Alaska
Fe	iron
FEIS	Final Environmental Impact Statement
FLPMA	Federal Land Policy and Management Act
FMP	Fishery Resource Management Plan
FR	*Federal Register*
FY	fiscal year
GDP	gross domestic product

LIST OF ABBREVIATIONS AND ACRONYMS (*Continued*)

GMU	Game Management Unit
GPS	global positioning system
GRN	Sondre Stromfjord, Greenland
GSFC	Goddard Space Flight Center
H	hydrogen
HANLC	high altitude noctilucent clouds
HFEF	high frequency electron flux
HMTA	Hazardous Material Transportation Act
HSWA	Hazardous and Solid Waste Act
Hz	hertz
IR	infrared
kg	kilogram(s)
km	kilometer(s)
kNm	kilo-Newton-meters
kPa	kilopascal(s)
KWAJ	Kwajalein, Marshall Islands
LC	launch complex(es)
Li	lithium
LVI	launch vehicle impact
Mg	magnesium
MISTI	mesospheric ionization structure and turbulence investigation
mm	millimeter(s)
MMPA	Marine Mammals Protection Act
MOA	Memorandum of Agreement
MOTR	Multi-Object Tracking Radar
MS	mass spectrometer
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSDS	Material Safety Data Sheet
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
msl	mean sea level

LIST OF ABBREVIATIONS AND ACRONYMS (*Continued*)

N	nitrogen
NAAQS	National Ambient Air Quality Standards
NACA	National Advisory Committee for Aeronautics
NASA	National Aeronautics and Space Administration
NC/NG	nitrocellulose/nitroglycerin
NCA	National Conservation Area
NEPA	National Environmental Policy Act
NFSAM	Nuclear Flight Safety Assurance Manager
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NO_x	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRA	National Recreation Area
NRHP	National Register of Historic Places
NSROC	NASA Sounding Rocket Operations Contract
NWR	National Wildlife Refuge
NWRSAA	National Wildlife Refuge System Administration Act
OCS Oil and Gas Draft PEIS	*Outer Continental Shelf Oil and Gas Leasing Program:2012–2017 Draft Programmatic Environmental Impact Statement*
OHV	off-highway vehicle
OSHA	Occupational Safety and Health Administration
OSSA	Office of Space Science and Applications
Pb	lead
PCH	Porcupine Caribou Herd
PFRR	Poker Flat Research Range
PFRR EIS	*Environmental Impact Statement for the Sounding Rockets Program at Poker Flat Research Range*

LIST OF ABBREVIATIONS AND ACRONYMS (*Continued*)

pH	the negative logarithm of the effective hydrogen ion concentration in gram equivalents per liter, used in expressing both acidity and alkalinity
PM_n	particulate matter with an aerodynamic diameter less than or equal to *n* micrometers
psi	pounds per square inch
QE	quadrant elevation or launch angle
RCRA	Resource Conservation and Recovery Act
RIMS II	Regional Input-Output Modeling System
RMP	Resource Management Plan
RMR	Radioactive Materials Report
RNA	Research Natural Area
ROD	Record of Decision
ROI	region of influence
RS	Radioactive source
RSO	Range Safety Officer
S	sulfur
SBS	Southern Beaufort Sea
SEC, sec	second(s)
SEIS	Supplemental Environmental Impact Statement
SHPO	State Historic Preservation Office
SIC	sea ice concentration
SO	stratospheric ozone
Sr	strontium
SRP	Sounding Rockets Program
SRP EIS	*Final Environmental Input Statement for Sounding Rocket Program*
SRP SEIS	*Final Supplemental Environmental Impact Statement for Sounding Rocket Program*
S-T	stratosphere - troposphere
STS	Space Transportation System (Space Shuttle)
T	threatened

LIST OF ABBREVIATIONS AND ACRONYMS (*Continued*)

T-IO	Terrier-Improved Orion
TLV	threshold limit values
TMA	trimethylaluminium
TMDL	Total Maximum Daily Load
TSCA	Toxic Substances Control Act
U.S.	United States
U.S.C.	*United States Code*
UAF	University of Alaska Fairbanks
USDOI	U.S. Department of the Interior
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
UV	ultraviolet
VA	Virginia
VRM	Visual Resource Management
WFF	Wallops Flight Facility
WI	Wallops Island, Virginia
WMH	White Mountains Herd
WSA	Wilderness Study Area
WSMR	White Sands Missile Range

COMMON METRIC/BRITISH SYSTEM EQUIVALENTS

Length

1 centimeter (cm) = 0.3937 inch	1 inch = 2.54 cm
1 centimeter = 0.0328 foot (ft)	1 foot = 30.48 cm
1 meter (m) = 3.2808 feet	1 ft = 0.3048 m
1 meter = 0.0006 mile (mi)	1 mi = 1609.3440 m
1 kilometer (km) = 0.6214 mile	1 mi = 1.6093 km
1 kilometer = 0.53996 nautical mile (nmi)	1 nmi = 1.8520 km
	1 mi = 0.87 nmi
	1 nmi = 1.15 mi

Area

1 square centimeter (cm^2) = 0.1550 square inch (in^2)	1 in^2 = 6.4516 cm^2
1 square meter (m^2) = 10.7639 square feet (ft^2)	1 ft^2 = 0.09290 m^2
1 square kilometer (km^2) = 0.3861 square mile (mi^2)	1 mi^2 = 2.5900 km^2
1 hectare (ha) = 2.4710 acres (ac)	1 ac = 0.4047 ha
1 hectare (ha) = 10,000 square meters (m^2)	1 ft^2 = 0.000022957 ac

Volume

1 cubic centimeter (cm^3) = 0.0610 cubic inch (in^3)	1 in^3 = 16.3871 cm^3
1 cubic meter (m^3) = 35.3147 cubic feet (ft^3)	1 ft^3 = 0.0283 m^3
1 cubic meter (m^3) = 1.308 cubic yards (yd^3)	1 yd^3 = 0.76455 m^3
1 cubic meter (m^3) = 0.000811 acre-ft	1233 m^3 = 1 acre-ft
1 liter (l) = 1.0567 quarts (qt)	1 qt = 0.9463264 l
1 liter = 0.2642 gallon (gal)	1 gal = 3.7845 l
1 kiloliter (kl) = 264.2 gal	1 gal = 0.0038 kl

Mass/Weight

1 gram (g) = 0.0353 ounce (oz)	1 oz = 28.3495 g
1 kilogram (kg) = 2.2046 pounds (lb)	1 lb = 0.4536 kg
1 metric ton (mt) = 1.1023 tons	1 ton = 0.9072 metric ton

Energy

1 joule = 0.0009 British thermal unit (BTU)	1 BTU = 1054.18 joule
1 joule = 0.2392 gram-calorie (g-cal)	1 g-cal = 4.1819 joule

Pressure

1 newton/square meter (N/m^2) = 0.0208 pound/square foot (psf)	1 psf = 48 N/m^2

Force

1 newton (N) = 0.2248 pound-force (lbf)	1 lbf = 4.4478 N

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APPENDIX A

COORDINATION AND CONSULTATION

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APPENDIX A.
COORDINATION AND CONSULTATION

A.1 GENERAL CORRESPONDENCE

DATE	FROM	TO
April 14, 2011	NASA, Example Scoping Letter and Attachments	Potentially Interested Party
September 21, 2012	NASA, Example Draft EIS Distribution Letter	Potentially Interested Party

National Aeronautics and
Space Administration

Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, VA 23337

Reply to Attn of: 250.W

April 14, 2011

Alaska Center for the Environment
807 G Street #100
Anchorage AK 99501

Dear Sir or Madam:

I am writing to you regarding the continued operations of the National Aeronautics and Space Administration's (NASA) Sounding Rockets Program at the University of Alaska Fairbanks' (UAF) Poker Flat Research Range (PFRR) near Fairbanks, Alaska. In September 2010, we requested input for an Environmental Assessment (EA) that we were preparing. After considering the comments provided by members of the public during the scoping process, we have now decided to prepare an Environmental Impact Statement (EIS). The EIS will evaluate the effects of NASA's continued operations at PFRR and will support the decision-making process for the U.S. Fish and Wildlife Service's (USFWS's) and the Bureau of Land Management's (BLM's) proposed issuance of permits for rocket impact and recovery at Arctic and Yukon Flats National Wildlife Refuges and the Steese National Conservation Area and the White Mountains National Recreation Area, respectively.

Owned and operated by UAF since 1968, the PFRR is a launch facility for sounding rockets, which carry scientific instruments into regions of the upper atmosphere and space that are inaccessible by other commonly used observation methods (e.g., satellites and balloons). The PFRR is located northeast of the unincorporated village of Chatanika, Alaska and consists of approximately 5,200 acres of land that house rocket and support facilities, launch pads, and tracking infrastructure. The primary types of missions conducted by NASA at PFRR are in partnership with university scientists who study the earth's atmosphere and its interaction with the space environment.

Pursuant to the National Environmental Policy Act (NEPA), the EIS will consider a range of alternatives that meet NASA's needs for obtaining the requisite earth and space science data afforded by high-latitude sounding rocket launches in support of its science and educational missions. Alternatives currently being considered for evaluation in the EIS include:

- Continuing the SRP in its present form and at the current level of effort;
- Continuing SRP launches from PFRR within the existing flight zones with differing requirements for identification and recovery of spent stages and payloads;
- Modifying the trajectories of the existing flight zones; and
- Conducting a subset of launches at other high-latitude launch sites, thereby avoiding the federally-managed lands.

2

The No Action Alternative is to discontinue sounding rocket launches from PFRR.

The EIS will analyze the effects of the alternatives on all applicable environmental media, including airspace, noise, safety, biological resources, socioeconomics, transportation, cultural resources, water resources, wetlands, air quality, land use, hazardous materials, recreation and visual resources, environmental justice, subsistence, and cumulative impacts. NASA anticipates that the areas of most interest to the public will be: the effects of rocket and payload landing and recovery on special interest lands (including Wilderness Areas and Wild Rivers), considerations to ensure public safety during rocket flight, and potential effects on subsistence uses on lands within the flight zones. Public and agency scoping may identify other environmental resources for consideration in the EIS.

The enclosed documents provide more detailed information regarding the PFRR and the history behind the EIS. Additionally, I encourage you to visit the project's website on a regular basis for the most up-to-date information about the project.

The website's address is http://sites.wff.nasa.gov/code250/pfrr_eis.html.

In scoping the EIS, we would like to request input from you regarding potential environmental concerns or project alternatives such that it can be considered in preparing the Draft document. As a part of this effort, we will be holding public meetings to provide further information and gather input from the public. The scoping meeting locations and dates identified at this time are shown below and onthe enclosed flyer.

- Thursday, April 28, 1:00 to 3:00 p.m., at the Fort Yukon Tribal Hall, 3rd and Alder Street, in Fort Yukon, Alaska*
- Monday, May 2, 2:00 to 4:00 p.m., at the University of Alaska Fairbanks, William R. Wood Campus Center, 505 S. Chandalar Drive in Fairbanks, Alaska.
- Monday, May 2, 6:00 to 8:00 p.m. at Pioneer Park, Blue Room, 3rd Floor, 2300 Airport Way, in Fairbanks, Alaska.
- Tuesday, May 3, 2:00 to 4:00 p.m. and 6:00 to 8:00 p.m. at the U.S. Fish and Wildlife Service Alaska Regional Office, Gordon Watson Conference Room, 1011 East Tudor Road, in Anchorage, Alaska.

**Please note that the Fort Yukon meeting, originally scheduled for Friday, April 29, 2011, as indicated on the enclosed Federal Register notice, has been rescheduled for the date shown above due to conflicts that were not anticipated at the time the notice was published.*

Each scoping meeting will begin with an open house where the public will have the opportunity to interact with members of the project team through one-on-one discussions. Approximately 30 minutes into the open house, NASA will provide an overview of the NEPA process and current PFRR operations. Following the presentations, public comments may be provided. During this time, all oral comments and questions will be recorded for consideration in preparing the Draft EIS. If you require special assistance to attend the meetings, please contact Joshua Bundick at the address below at least two (2) business days prior to the meeting. As an additional effort to inform the public of these meetings, we request your assistance in posting the enclosed flyer in a visible place within your community.

Comments may also be submitted by email, mail, phone, or fax, and will be accepted throughout the entire Draft EIS analysis process. However, for full early consideration and to best help shape and refine the proposal, please submit comments by June 1, 2011 to:

Joshua Bundick
Manager, Poker Flat Research Range EIS
NASA Goddard Space Flight Center's Wallops Flight Facility
Wallops Island, VA 23337
Phone: (757) 824-2319
Fax: (757) 824-1819
Email: Joshua.A.Bundick@nasa.gov

If you do not have input at this time, other means for involvement, including reviews of the Draft and Final EIS, will be offered in the future. You will be provided mailed notices regarding the availability of these documents unless you request to be removed from our distribution list. On behalf of the entire EIS team, I would like to thank you for your interest in this project. We look forward to working with you.

Sincerely,

Carolyn Turner

Carolyn Turner
Associate Chief, Medical and Environmental Management Division

3 Enclosures:
1. *Federal Register* Notice
2. PFRR Flight Zone Map
3. Scoping Meeting Notification Flyer

Federal Register / Vol. 76, No. 71 / Wednesday, April 13, 2011 / Notices 20715

qualitative feedback we mean information that provides useful insights on perceptions and opinions, but are not statistical surveys that yield quantitative results that can be generalized to the population of study. This feedback will provide insights into customer or stakeholder perceptions, experiences and expectations, provide an early warning of issues with service, or focus attention on areas where communication, training or changes in operations might improve delivery of products or services. These collections will allow for ongoing, collaborative and actionable communications between the Agency and its customers and stakeholders. It will also allow feedback to contribute directly to the improvement of program management.

Feedback collected under this generic clearance will provide useful information, but it will not yield data that can be generalized to the overall population. This type of generic clearance for qualitative information will not be used for quantitative information collections that are designed to yield reliably actionable results, such as monitoring trends over time or documenting program performance. Such data uses require more rigorous designs that address: The target population to which generalizations will be made, the sampling frame, the sample design (including stratification and clustering), the precision requirements or power calculations that justify the proposed sample size, the expected response rate, methods for assessing potential non-response bias, the protocols for data collection, and any testing procedures that were or will be undertaken prior to fielding the study. Depending on the degree of influence the results are likely to have, such collections may still be eligible for submission for other generic mechanisms that are designed to yield quantitative results.

The Agency received no comments in response to the 60-day notice published in the **Federal Register** of December 22, 2010 (75 FR 80542).

Below we provide NASA Headquarters projected average estimates for the next three years: [1]

Current Actions: New collection of information.

Type of Review: New Collection.

Affected Public: Individuals and Households, Businesses and Organizations, State, Local or Tribal Government.

Average Expected Annual Number of Activities: 1,000.

Respondents: 200,000 annually.

Annual Responses: 200,000.

Frequency of Response: Once per request.

Average Minutes per Response: 15 minutes.

Burden Hours: 50,000 hours (over three years).

An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid Office of Management and Budget control number.

Fran Teel,

Acting NASA Clearance Officer.

[FR Doc. 2011–8761 Filed 4–12–11; 8:45 am]

BILLING CODE 7510–13–P

[1] The 60-day notice included the following estimate of the aggregate burden hours for this generic clearance federal-wide:

Average Expected Annual Number of Activities: 25,000.

Average Number of Respondents per Activity: 200.

Annual Responses: 5,000,000.

Frequency of Response: Once per request.

Average Minutes per Response: 30.

Burden Hours: 2,500,000.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

[Notice (11–034)]

National Environmental Policy Act; Sounding Rockets Program; Poker Flat Research Range

AGENCY: National Aeronautics and Space Administration.

ACTION: Notice of intent to prepare an Environmental Impact Statement (EIS) and to conduct scoping for continuing sounding rocket operations at Poker Flat Research Range (PFRR), Alaska.

SUMMARY: Pursuant to the National Environmental Policy Act, as amended, (NEPA) (42 U.S.C. 4321 *et seq.*), the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 CFR parts 1500–1508), and NASA's NEPA policy and procedures (14 CFR part 1216, subpart 1216.3), NASA intends to prepare an EIS for its continued use of the University of Alaska-Fairbanks (UAF) owned and managed PFRR, outside of Fairbanks, Alaska. The U.S. Fish and Wildlife Service (USFWS), Bureau of Land Management (BLM), and UAF will serve as Cooperating Agencies as they possess both regulatory authority and specialized expertise regarding the Proposed Action that will be the subject of the EIS.

The purpose of this notice is to apprise interested agencies, organizations, tribal governments, and individuals of NASA's intent to prepare the EIS and to request input regarding the definition of reasonable alternatives and significant environmental issues to be evaluated in the EIS.

In cooperation with BLM, UAF, and USFWS, NASA will hold public scoping meetings as part of the NEPA process associated with the development of the EIS. The scoping meeting locations and dates identified at this time are provided under **SUPPLEMENTARY INFORMATION** below.

DATES: Interested parties are invited to submit comments on environmental issues and concerns, preferably in writing, on or before June 1, 2011, to assure full consideration during the scoping process.

ADDRESSES: Comments submitted by mail should be addressed to Joshua Bundick, Manager, Poker Flat Research Range EIS, NASA Goddard Space Flight Center's Wallops Flight Facility, Wallops Island, Virginia 23337. Comments may be submitted via e-mail to *Joshua.A.Bundick@nasa.gov.*

FOR FURTHER INFORMATION CONTACT: Joshua Bundick, Manager, Poker Flat Research Range EIS, NASA Wallops Flight Facility, Wallops Island, Virginia 23337; telephone (757) 824–2319; e-mail: *Joshua.A.Bundick@nasa.gov.* Additional information about NASA's Sounding Rocket Program (SRP) and the University of Alaska-Fairbanks' PFRR may be found on the internet at *http://sites.wff.nasa.gov/code810* and *http://www.pfrr.alaska.edu,* respectively. Information regarding the NEPA process for this proposal and supporting documents (as available) are located at *http://sites.wff.nasa.gov/code250/pfrr_eis.html.*

SUPPLEMENTARY INFORMATION:

Programmatic Background

NASA's SRP, based at the Goddard Space Flight Center's Wallops Flight Facility (WFF), supports the NASA Science Mission Directorate's strategic vision and goals for understanding the phenomena affecting the past, present, and future of Earth and the solar system and supports the Agency's educational mission. The suborbital missions enabled by the SRP provide researchers with opportunities to build, test, and fly new instrument concepts while simultaneously conducting world class scientific research. With its hands-on approach to mission formulation and execution, the SRP also helps ensure that the next generation of space scientists receives the training and experience necessary to move on to NASA's larger, more complex missions

Launch Sites

Sounding rockets can be launched from permanently established ranges or from temporary launch sites using NASA's mobile range assets. Permanent ranges include WFF in Wallops Island, Virginia; PFRR near Fairbanks, Alaska; White Sands Missile Range (WSMR) in White Sands, New Mexico; Kwajalein Island, Marshall Islands Republic; Esrange, Kiruna, Sweden; and the Norwegian Rocket Range, Andøya, Norway. In the past, temporary launch sites have included Australia, Brazil, Greenland, and Puerto Rico. The majority of sounding rocket launches occur at WSMR, WFF, and PFRR.

Where the SRP conducts its work is highly dependent on the scientific goals of each mission. For example, if equatorial phenomena must be observed, a site such as Brazil is used. For middle latitudes, Wallops Island, Virginia, or White Sands, New Mexico, are selected. If the aurora borealis must be observed, a northern latitude is required, such as at PFRR.

PFRR Background

The PFRR, located northeast of the unincorporated village of Chatanika, Alaska, consists of approximately 2,100 hectares (5,200 acres) of land that house rocket and payload support facilities, launch pads, and tracking infrastructure. Since the late 1960s, NASA, other government agencies, and educational institutions have supported suborbital rocket launches from the PFRR. While the PFRR is owned and managed by the Geophysical Institute of UAF, the NASA SRP has exclusively funded and managed the support contract with PFRR for more than 25 years.

The northern location of the PFRR is strategic for launching sounding rockets for scientific research in auroral space physics and earth science. The PFRR is the only high-latitude, auroral-zone rocket launching facility in the United States where a sounding rocket can readily study the aurora borealis and the sun–Earth connection. Recent Earth science-based missions have furthered the understanding of ozone depleting substances in the upper atmosphere. Such studies are critical for the continual refinement of theories and research on the topics of ozone depletion, global warming, and climate change. Recent space physics-focused missions have measured the upper atmospheric winds and auroras in the ionosphere. The information collected further assists the nation's scientists in understanding the interactions between the sun and Earth as well as the origin and evolution of the solar system. Technology development and validation enabled by the SRP at the PFRR is critical in furthering the development of Earth and space science instruments at a fraction of the size and cost that would result from using other launch methods. The PFRR facility also supports educational outreach programs where students and scientists from various universities are able to conduct aeronautics and space research.

Additionally, from an operational perspective, PFRR is an ideal location for sounding rocket missions. Directly north (downrange) from the launch site are vast areas of open, very sparsely populated lands of interior Alaska and the Arctic Ocean to the extreme north. Having the ability to launch rockets over such a vast area with very low population density is critical to ensuring public safety.

Existing SRP NEPA Documents and Context

In 2000, NASA published a Final Supplemental EIS (FSEIS) for the SRP. The 2000 FSEIS considered SRP operations at a programmatic level and expanded upon the original SRP EIS prepared in 1973, to include multiple launch sites, new launch vehicles, and updated environmental conditions. In its Record of Decision for the 2000 FSEIS, NASA decided to continue SRP operations at its current level of effort at all launch sites, including PFRR. Since then, NASA has launched approximately four (4) sounding rockets annually from PFRR primarily during the winter months. It is expected that this launch rate at PFRR would continue to satisfy NASA's needs into the reasonably foreseeable future.

NASA recently reviewed its 2000 SRP FSEIS and determined that the overall environmental analysis in the 2000 SRP FSEIS remains sufficient to support the Agency's broad programmatic decision to continue the SRP, however potential changes in both PFRR operations and the environmental context of the launch corridor north of PFRR warrant preparation of additional PFRR-specific environmental analysis to better inform Agency decisions regarding PFRR. For example, PFRR is now considering a more rigorous rocket and payload recovery process. Additionally, a large portion of downrange lands are undergoing wilderness review, which could ultimately affect how rocket and payload recoveries are handled.

Accordingly, NASA began the preparation of an Environmental Assessment to determine if those changes presented potentially a significant impact necessitating an EIS. During the scoping process for the EA in the fall of 2010, NASA solicited input from over 75 potentially interested agencies and organizations. A number of conservation organizations expressed concern regarding NASA's continued operations at PFRR and requested that a more detailed assessment be performed. As such, NASA decided that an EIS would be the most appropriate level of NEPA documentation for the proposal. The subject EIS will tier from the programmatic 2000 FSEIS and provide a focused analysis of SRP operations at PFRR.

Cooperating Agency Actions

The PFRR EIS will serve as a decision-making tool not only for NASA but also for its two Federal Cooperating Agencies, BLM and USFWS. Directly north of the PFRR facility are its downrange flight zones, over which rockets are launched and within which spent stages and payloads impact the ground. Within these flight zones are landmasses owned or managed by several Federal, State and Native Alaskan organizations, including the USFWS, BLM, Alaska Department of Natural Resources, Doyon Regional Corporation, and the Native Village of Venetie Tribal Government. More specifically, the subject Federal lands within the PFRR flight corridor are BLM's North Steese Conservation Area and White Mountain National Recreational Area, and the UFWS-managed Arctic and Yukon Flats National Wildlife Refuges (NWRs). Historically, the managing entities have issued UAF annual or multi-year special-use authorizations and agreements for impact of rockets and recovery operations on these lands. BLM and USFWS are currently considering if and how future authorizations for rocket landing and recovery would be issued for the properties under their management. Additionally, both agencies are currently preparing long-term management plans for their respective landholdings. BLM is currently drafting its Eastern Interior Resource Management Plan; Arctic NWR is currently updating its Comprehensive Conservation Plan (CCP); and the revision of the Yukon Flats NWR CCP is expected to begin within the next two years. The results of these planning processes will play a significant role in how future launches from PFRR would occur. As such, the PFRR EIS will consider the effects of each agency's respective permitting actions within the context of their long-term management objectives.

Federal Register / Vol. 76, No. 71 / Wednesday, April 13, 2011 / Notices 20717

Alternatives

The EIS will consider a range of alternatives that meet NASA's needs for obtaining the requisite earth and space science data afforded by high-latitude sounding rocket launches in support of both NASA's science and educational missions.

Alternatives currently being considered for evaluation in the EIS include:

- Continuing the SRP in its present form and at the current level of effort;
- Continuing SRP launches from PFRR within the existing flight zones with differing requirements for identification and recovery of spent stages and payloads;
- Modifying the trajectories of the existing flight zones; and
- Conducting a subset of launches at other high-latitude launch sites, thereby avoiding the federally-managed lands.

The No Action Alternative is to discontinue sounding rocket launches from PFRR. NASA anticipates that the areas of potential environmental impact from each alternative of most interest to the public will be: The effects of rocket and payload landing and recovery on special interest lands (including Wilderness Areas and Wild Rivers), considerations to ensure public safety during rocket flight, and potential effects on subsistence uses on lands within the flight zones.

Scoping Meetings

NASA and its Cooperating Agencies plan to hold three public scoping meetings to provide information on the PFRR EIS and to solicit public comments regarding environmental concerns and alternatives to be considered in the EIS. The public scoping meetings are scheduled as follows:

—Friday, April 29, 2011, at the Tribal Hall, Third and Alder Streets, Fort Yukon, Alaska, 1 p.m.–4 p.m.

—Monday, May 2, 2011, at the University of Alaska-Fairbanks, William R. Wood Student Center, 505 South Chandalar Drive, Fairbanks, Alaska, 2 p.m.–4 p.m.

—Monday, May 2, 2011, at the Pioneer Park, Blue Room, 2300 Airport Way, Fairbanks, Alaska, 6 p.m.–8 p.m.

—Tuesday, May 3, 2011, at the United States Fish and Wildlife Service Alaska Regional Office, Gordon Watson Conference Room, 1011 East Tudor Road, Anchorage, Alaska, 2 p.m.–4 p.m. and 6 p.m.–8 p.m.

As the EIS is prepared, the public will be provided several opportunities for involvement, the first of which is during scoping. Even if an interested party does not have input at this time, other avenues, including reviews of the Draft and Final EIS, will be offered in the future. The availability of these documents will be published in the **Federal Register** and through local news media to ensure that all members of the public have the ability to actively participate in the NEPA process.

In conclusion, written public input on alternatives and environmental issues and concerns associated with NASA's SRP launches at PFRR that should be addressed in the EIS are hereby requested.

Olga M. Dominguez,

Assistant Administrator, Office of Strategic Infrastructure.

[FR Doc. 2011–8844 Filed 4–12–11; 8:45 am]

BILLING CODE 7510–13–P

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

[Notice: (11–035)]

NASA Advisory Council; Space Operations Committee; Meeting.

AGENCY: National Aeronautics and Space Administration.

ACTION: Notice of meeting.

SUMMARY: In accordance with the Federal Advisory Committee Act, Public Law 92–463, as amended, the National Aeronautics and Space Administration announces a meeting of the NASA Advisory Council (NAC) Space Operations Committee.

DATES: Tuesday, May 3, 2011, 8 a.m.–2 p.m. local time.

ADDRESSES: Doubletree Hotel, 2080 North Atlantic Ave, Cocoa Beach, FL 32931.

FOR FURTHER INFORMATION CONTACT: Mr. Jacob Keaton, NAC Space Operations Committee Executive Secretary, National Aeronautics and Space Administration Headquarters, Washington, DC 20546, 202/358–1507, *jacob.keaton@nasa.gov.*

SUPPLEMENTARY INFORMATION: The agenda for the meeting includes the following topics:

—Space Operations Mission Directorate FY2012 Budget.

—Commercial Crew Development Program status.

—Commercial Orbital Transportation System status.

—21st Century Launch Complex status.

—Recommendation preparation and discussion.

The meeting will be open to the public up to the seating capacity of the room. It is imperative that the meeting be held on this date to accommodate the scheduling priorities of the key participants.

P. Diane Rausch,

Advisory Committee Management Officer, National Aeronautics and Space Administration.

[FR Doc. 2011–8845 Filed 4–12–11; 8:45 am]

BILLING CODE 7510–13–P

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

[Notice: (11–036)]

NASA Advisory Council; Audit, Finance and Analysis Committee; Meeting

AGENCY: National Aeronautics and Space Administration.

ACTION: Notice of meeting.

SUMMARY: In accordance with the Federal Advisory Committee Act, Public Law 92–463, as amended, the National Aeronautics and Space Administration announces a meeting of the Audit, Finance and Analysis Committee of the NASA Advisory Council.

DATES: Tuesday, May 3, 2011, 9 a.m.–11:45 a.m., Local Time.

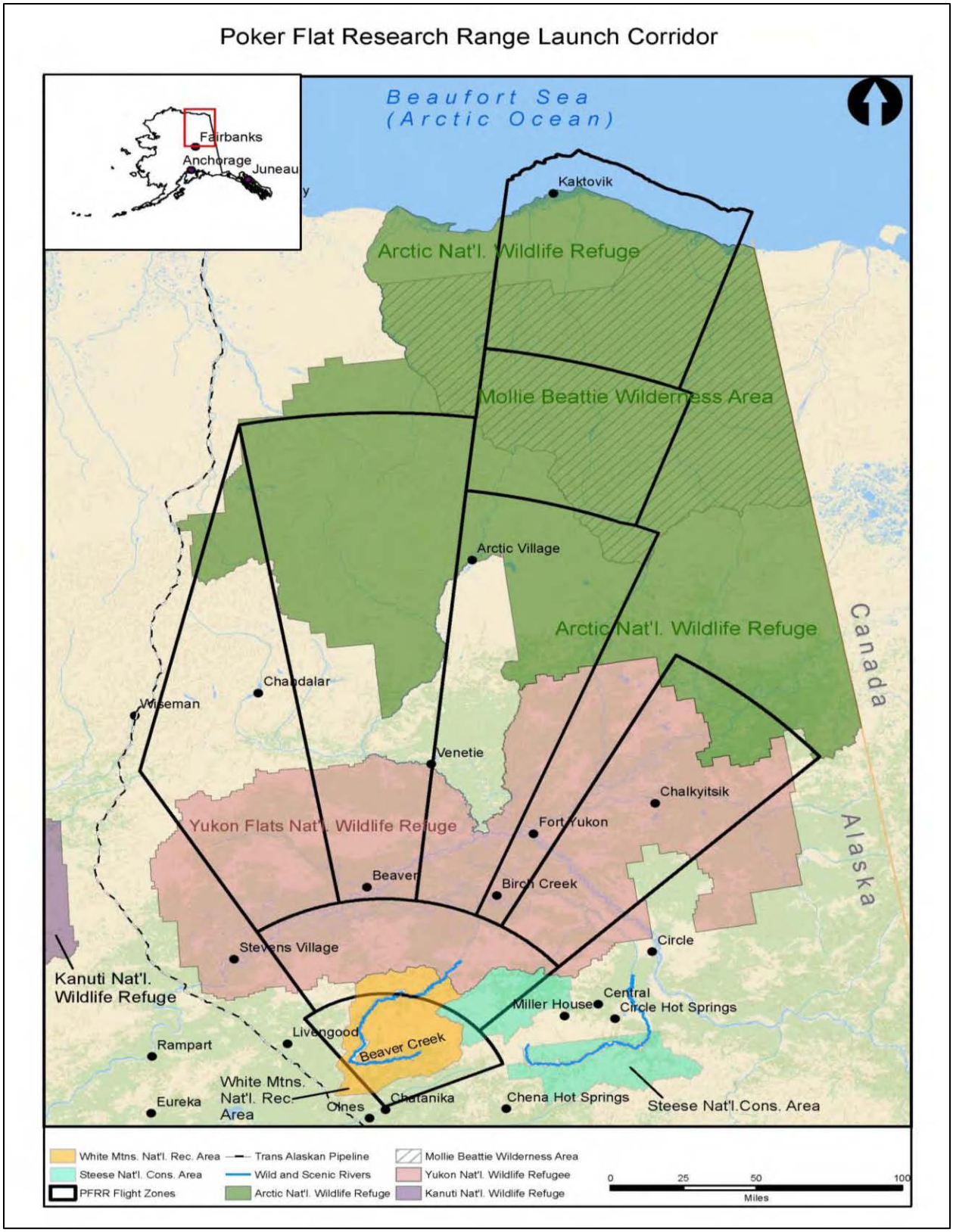
ADDRESSES: NASA Headquarters, Conference Room 8D48, 300 E Street, SW., Washington, DC 20546.

FOR FURTHER INFORMATION CONTACT: Ms. Charlene Williams, Office of the Chief Financial Officer, National Aeronautics and Space Administration Headquarters, Washington, DC 20546, Phone: 202–358–2183, fax: 202–358–4336.

SUPPLEMENTARY INFORMATION: The agenda for the meeting includes the following topics:

- Overview of the GAO Quick Look Book.
- Overview of the NASA Strategic Plan.
- Committee Discussion.

The meeting will be open to the public up to the seating capacity of the room. It is imperative that the meeting be held on this date to accommodate the scheduling priorities of the key participants. Visitors will need to show a valid picture identification such as a driver's license to enter the NASA Headquarters building (West Lobby—Visitor Control Center), and must state that they are attending the Audit, Finance, and Analysis Committee meeting in room 8D48 before receiving an access badge. All non-U.S. citizens


Poker Flat Research Range Launch Corridor
Beaufort Sea
(Arctic Ocean)
Fairbanks
Anchorage
Juneau
Kaktovik
Arctic Nat'l. Wildlife Refuge
Mollie Beattie Wilderness Area
Arctic Village
Arctic Nat'l. Wildlife Refuge
Canada
Chandalar
Wiseman
Venetie
Chalkyitsik
Yukon Flats Nat'l. Wildlife Refuge
Fort Yukon
Alaska
Beaver
Birch Creek
Stevens Village
Circle
Kanuti Nat'l.
Wildlife Refuge
Central
Miller House
Circle Hot Springs
Livengood
Rampart
Beaver Creek
White Mtns.
Nat'l. Rec.
Area
Eureka
Olnes
Chatanika
Chena Hot Springs
Steese Nat'l.Cons. Area
White Mtns. Nat'l. Rec. Area
Steese Nat'l. Cons. Area
PFRR Flight Zones
Trans Alaskan Pipeline
Wild and Scenic Rivers
Arctic Nat'l. Wildlife Refuge
Mollie Beattie Wilderness Area
Yukon Nat'l. Wildlife Refugee
Kanuti Nat'l. Wildlife Refuge
0
25
50
100
Miles

NASA Sounding Rockets Program
Poker Flat Research Range

Environmental Impact Statement

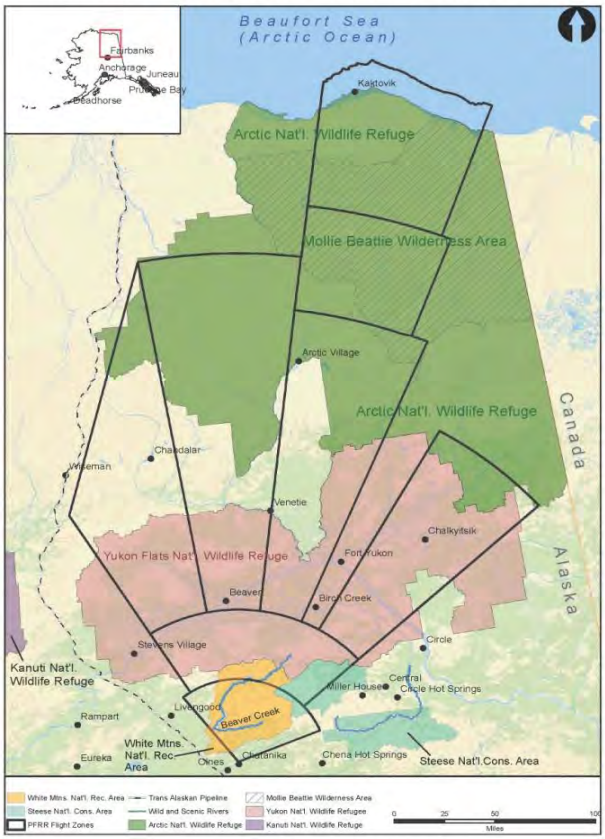
Public Scoping Meetings - Please Attend

The National Aeronautics and Space Administration (NASA) is preparing an Environmental Impact Statement (EIS) for its Sounding Rockets Program (SRP) at the University of Alaska Fairbank's (UAF's) Poker Flat Research Range (PFRR) 30 miles northeast of Fairbanks, Alaska.

Owned and operated by UAF since 1968, the PFRR is a launch facility for sounding rockets, which carry scientific instruments into regions of the upper atmosphere and space that are inaccessible by other commonly used observation methods (e.g., satellites and balloons). The primary types of missions conducted by NASA at PFRR are in partnership with university scientists who study the Earth's atmosphere and its interaction with the space environment.

Pursuant to the National Environmental Policy Act (NEPA), the EIS will evaluate the effects of NASA's continued operations at PFRR. The EIS will address a range of action alternatives as well as a No Action alternative.

NASA is hosting public scoping meetings prior to preparing the Draft EIS to provide further information regarding NASA's Sounding Rocket Program and to request input from the public and government representatives regarding potential environmental concerns or project alternatives. All interested parties are invited.



Poker Flat Research Range Launch Corridor

Scoping Meetings

Thursday, April 28, 2011
1 - 3 p.m.
Fort Yukon Tribal Hall
3rd and Alder Street
Fort Yukon, Alaska 99740

Monday, May 2, 2011
2 - 4 p.m.
University of Alaska Fairbanks
William R. Wood
Campus Center
Multi-level Lounge
505 S. Chandalar Drive
Fairbanks, AK 99775

Monday, May 2, 2011
6 - 8 p.m.
Pioneer Park, Blue Room
3rd Floor
2300 Airport Way
Fairbanks, AK 99701

Tuesday, May 3, 2011
2 - 4 p.m. and 6 - 8 p.m.
U.S. Fish and Wildlife
Service Regional Office
Gordon Watson
Conference Room
1011 East Tudor Rd.
Anchorage, AK 99503

Comments will be accepted throughout the entire Draft EIS analysis process. However, for full early consideration and to best help shape and refine the proposal, please submit comments by **June 1, 2011** to:

Joshua Bundick, Manager
Poker Flat Research Range EIS
NASA Goddard Space Flight Center's Wallops Flight Facility
Wallops Island, VA 23337
Phone: (757) 824-2319
Fax: (757) 824-1819
Email: Joshua.A.Bundick@nasa.gov

If you require special assistance to attend the meetings, please contact Joshua Bundick at least two (2) business days prior to the meeting.

Additional information may be found on the internet at http://sites.wff.nasa.gov/code250/pfrr_eis.html

National Aeronautics and
Space Administration

Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, VA 23337

Reply to Attn of: 250.W

September 21, 2012

Yukon River Drainage Fisheries Association
725 Christensen Drive, Suite 3-B
Anchorage, AK 99501

Dear Sir or Madam:

Please find enclosed a copy of the Draft Environmental Impact Statement (DEIS) for NASA's Sounding Rockets Program at the Poker Flat Research Range (PFRR), Alaska. Prepared in accordance with the National Environmental Policy Act (NEPA), the DEIS evaluates the environmental consequences of five alternative means for continuing sounding rocket launches at PFRR.

The DEIS has been sent to you because public involvement is a very important part of the NEPA process. NASA respectfully requests that you review and provide written comments on the DEIS within 60 days of the publication of the U.S. Environmental Protection Agency's Notice of Availability in the *Federal Register*. Once known, this date will be posted on the project website at: **http://sites.wff.nasa.gov/code250/pfrr_eis.html**.

Details regarding methods for submitting comments on the DEIS are provided on both the project website and on the first page of the document.

Additionally, our project team will be hosting several public meetings in Alaska to discuss the DEIS with interested parties. We encourage you to attend a meeting to speak with members of our team and to learn more about PFRR. As meeting times and locations are scheduled, notices will be published in the *Federal Register* or local news media.

Please contact Mr. Joshua Bundick at (757) 824-2319 or Joshua.A.Bundick@nasa.gov should you have questions or require additional information. You may also call toll-free at (800) 521-3415. When using the toll-free number, please follow the menu options and enter the "pound sign (#)" followed by extension numbers "2319."

Thank you for your interest in this project; we look forward to hearing from you.

Sincerely,

Carolyn Turner

Carolyn Turner
Associate Chief, Medical and Environmental Management Division

Enclosure

A.2 TRIBAL AND NATIONAL HISTORIC PRESERVATION ACT CORRESPONDENCE

DATE	FROM	TO
April 14, 2011	NASA, Example Consultation Letter	Federally Recognized Tribes
April 14, 2011	NASA	Alaska State Historic Preservation Office
April 19, 2011	Naqsragmuit Tribal Council	NASA
May 3, 2011	Gwichyaa Zhee Gwich'in Tribal Government	NASA
September 20, 2011	Beaver Traditional Council	NASA
November 9, 2011	NASA	Advisory Council on Historic Preservation
November 29, 2011	Advisory Council on Historic Preservation	NASA
December 9, 2011	NASA, Example Section 106 Consulting Party Letter	Potential Stakeholder
January 5, 2012	Beaver Traditional Council	NASA
January 9, 2012	Native Village of Venetie Tribal Council	NASA
January 30, 2012	City of North Pole	NASA
May 15, 2012	Doyon, Limited	NASA
August 1, 2012	NASA, Letter Advising of Effects Determination Submittal	Alaska State Historic Preservation Office
August 1, 2012	NASA, Letter Advising of Effects Determination Submittal	Doyon, Limited
August 10, 2012	Alaska State Historic Preservation Office	NASA

National Aeronautics and
Space Administration

Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, VA 23337

Reply to Attn of: 250.W

April 14, 2011

Patrick Hanson
Tribal Chief
Native Village of Venetie Tribal Government
PO Box 81080
Venetie, AK 99781

Dear Tribal Chief Hanson:

I am writing to you regarding the continued operations of the National Aeronautics and Space Administration's (NASA) Sounding Rockets Program at the University of Alaska Fairbanks' (UAF) Poker Flat Research Range (PFRR) near Fairbanks, Alaska. In September 2010, we requested input for an Environmental Assessment (EA) that we were preparing. After considering the comments provided by members of the public during the scoping process, we have now decided to prepare an Environmental Impact Statement (EIS).

The EIS will evaluate the effects of NASA's continued operations at PFRR and will support the decision-making process for the U.S. Fish and Wildlife Service and the Bureau of Land Management's proposed issuance of permits for rocket impact and recovery at Arctic and Yukon Flats National Wildlife Refuges and the Steese National Conservation Area and White Mountains National Recreation Area, respectively.

In scoping the EIS, we would like to request input from you regarding potential environmental concerns or project alternatives such that it can be considered in preparing the draft document. We are particularly interested in your thoughts about how the launch and subsequent recovery of NASA's scientific rockets and payloads may affect Tribal interests, including areas of spiritual importance and subsistence use. Additionally we would invite any input as to whether you believe there are any historic properties as defined by the National Historic Preservation Act that may be affected by our undertaking.

Additionally, should you so desire, we would like to engage in government-to-government consultation to establish a productive, collaborative partnership for current and future proposals at PFRR. If you would like to pursue such consultation, we suggest that the U.S. Fish and Wildlife Service and the Bureau of Land Management be included as consulting parties. Enclosed for your convenience is a consultation questionnaire. Please fill out the form indicating your level of interest and return it in the pre-addressed, postage-paid envelope.

2

We will be hosting scoping meetings in Anchorage, Fairbanks, and Fort Yukon, Alaska in late April/early May 2011. The enclosed materials provide additional information regarding the upcoming scoping process. If you are unable to attend the scoping meetings and would like to meet with us at a later date, we will gladly schedule another meeting when it is convenient for you.

If you do not find it necessary to provide input at this time, we will still keep you apprised of the project's progress by providing a copy of the Draft EIS once it is available. Any comments that you may have at that time will be fully considered in developing the Final EIS.

Thank you for your time and consideration of our request. If you would like to meet with our project team or have any comments regarding future consultations, please contact Ms. Jennifer Groman at (202) 358-0455 or by e-mail at Jennifer.A.Groman@nasa.gov. Alternately, you may contact Mr. Joshua Bundick, the project manager for the EIS, at (757) 824-2319 or email at Joshua.A.Bundick@nasa.gov. On behalf of the entire EIS project team, we look forward to working with you.

Sincerely,

Carolyn Turner
Associate Chief, Medical and Environmental Management Division

4 Enclosures

1. Federal Register Notice
2. PFRR Flight Zone Map
3. Scoping Flyer
4. Consultation Questionnaire

National Aeronautics and
Space Administration

Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, VA 23337

Reply to Attn of: 250.W

April 14, 2011

Judith E. Bittner
Chief, Office of History and Archaeology, and State Historic Preservation Officer
550 West 7th Ave., Suite 1310
Anchorage, Alaska 99501-3565

Dear Ms. Bittner:

I am writing to you regarding the continued operations of the National Aeronautics and Space Administration's (NASA) Sounding Rockets Program (SRP) at the University of Alaska Fairbanks' (UAF) Poker Flat Research Range (PFRR) near Fairbanks, Alaska. In September 2010, we requested input for an Environmental Assessment (EA) that we were preparing. After considering the comments provided by members of the public during the scoping process, we have now decided to prepare an Environmental Impact Statement (EIS). The EIS will evaluate the effects of NASA's continued operations at PFRR and will support the decision-making process for the U.S. Fish and Wildlife Service (USFWS) and the Bureau of Land Management (BLM)'s proposed issuance of permits for rocket impact and recovery at Arctic and Yukon Flats National Wildlife Refuges and the Steese National Conservation Area and White Mountain National Recreation Area, respectively.

Owned and operated by UAF since 1968, the PFRR is a launch facility for sounding rockets, which carry scientific instruments into regions of the upper atmosphere and space that are inaccessible by other commonly used observation methods (e.g., satellites and balloons). The PFRR is located northeast of the unincorporated village of Chatanika, Alaska and consists of approximately 5,200 acres of land that house rocket and support facilities, launch pads, and tracking infrastructure. The primary types of missions conducted by NASA at PFRR are in partnership with university scientists who study the earth's atmosphere and its interaction with the space environment.

Pursuant to the National Environmental Policy Act (NEPA), the EIS will consider a range of alternatives that meet NASA's needs for obtaining the requisite earth and space science data afforded by high-latitude sounding rocket launches in support of its science and educational missions. Alternatives currently being considered for evaluation in the EIS include:

- Continuing the SRP in its present form and at the current level of effort;
- Continuing SRP launches from PFRR within the existing flight zones with differing requirements for identification and recovery of spent stages and payloads;
- Modifying the trajectories of the existing flight zones; and
- Conducting a subset of launches at other high-latitude launch sites, thereby avoiding the federally-managed lands.

The No Action Alternative is to discontinue sounding rocket launches from PFRR.

The EIS will analyze the effects of the alternatives on all applicable environmental media, including airspace, noise, safety, biological resources, socioeconomics, transportation, cultural resources, water resources, wetlands, air quality, land use, hazardous materials, recreation and visual resources, environmental justice, subsistence, and cumulative impacts. NASA anticipates that the areas of most interest to the public will be: the effects of rocket and payload landing and recovery on special interest lands (including Wilderness Areas and Wild Rivers), considerations to ensure public safety during rocket flight, and potential effects on subsistence uses on lands within the flight zones. Public and agency scoping may identify other environmental resources for consideration in the EIS.

With this correspondence, NASA would like to initiate the Section 106 process of the National Historic Preservation Act (NHPA) of 1966 (as amended, and as described in implementing regulations at 36 CFR 800) requiring consultation between NASA and the State Historic Preservation Office (SHPO) for federal undertakings. We are in the early stages of gathering information concerning the Area of Potential Effects and determining the level of data collection required. Any assistance you could provide in identifying concerns you may have about the potential effects of the proposed action on significant cultural resources would be appreciated. NASA intends to coordinate public involvement for the purpose of Section 106 review under NHPA with public involvement in the EIS.

As the project proponent, NASA is serving as the lead agency for NEPA and NHPA consultation with the Alaska SHPO. The U.S. Department of the Interior's BLM and USFWS would undertake actions connected to the proposed undertaking and are participating in NASA's NEPA process and Section 106 consultation. The effects of their actions will be considered in all project-related environmental documentation, including the EIS and any historic resources analysis. As such, please include all three agencies in future NHPA-related correspondence regarding NASA's SRP at PFRR.

The enclosed documents provide more detailed information regarding the PFRR and the history behind the EIS. Additionally, I encourage you to visit the project's website on a regular basis for the most up-to-date information about the project. The website's address is http://sites.wff.nasa.gov/code250/pfrr_eis.html.

In scoping the EIS, we are also requesting input from other agencies and the public regarding potential environmental concerns or project alternatives such that it can be considered in preparing the Draft document. As a part of this effort, we will be holding public meetings to provide further information and gather input from the public. The scoping meeting locations and dates identified at this time are shown below and on the enclosed flyer.

- Thursday, April 28, 1:00 to 3:00 p.m., at the Fort Yukon Tribal Hall, 3rd and Alder Street, in Fort Yukon, Alaska*
- Monday, May 2, 2:00 to 4:00 p.m., at the University of Alaska Fairbanks, William R. Wood Campus Center, 505 S. Chandalar Drive in Fairbanks, Alaska.
- Monday, May 2, 6:00 to 8:00 p.m. at Pioneer Park, Blue Room, 3rd Floor, 2300 Airport Way, in Fairbanks, Alaska.

- Tuesday, May 3, 2:00 to 4:00 p.m. and 6:00 to 8:00 p.m. at the U.S. Fish and Wildlife Service Alaska Regional Office, Gordon Watson Conference Room, 1011 East Tudor Road, in Anchorage, Alaska.

**Please note that the Fort Yukon meeting, originally scheduled for Friday, April 29, 2011, as indicated on the enclosed Federal Register notice, has been rescheduled for the date shown above due to conflicts that were not anticipated at the time the notice was published.*

Each scoping meeting will begin with an open house where the public will have the opportunity to interact with members of the project team through one-on-one discussions. Approximately 30 minutes into the open house, NASA will provide an overview of the NEPA process and current PFRR operations. Following the presentations, public comments may be provided. During this time, all oral comments and questions will be recorded for consideration in preparing the Draft EIS. If you require special assistance to attend the meetings, please contact Joshua Bundick at the address below at least two (2) business days prior to the meeting. As an additional effort to inform the public of these meetings, we request your assistance in posting the enclosed flyer in a visible place within your community.

Comments may also be submitted by email, mail, phone, or fax, and will be accepted throughout the entire Draft EIS analysis process. However, for full early consideration and to best help shape and refine the proposal, please submit comments by June 1, 2011 to:

Joshua Bundick
Manager, Poker Flat Research Range EIS
NASA Goddard Space Flight Center's Wallops Flight Facility
Wallops Island, VA 23337
Phone: (757) 824-2319
Fax: (757) 824-1819
Email: Joshua.A.Bundick@nasa.gov

If you have any specific questions regarding the Section 106 process, please contact Mr. Randy Stanley, our Facility Historic Preservation Officer, at (757) 824-1309 or at Randall.M.Stanley@nasa.gov. Inquiries regarding the EIS should be directed to Mr. Bundick at the above address. On behalf of the entire EIS team, I would like to thank you for your interest in this project. We look forward to working with you.

Sincerely,

Carolyn Turner

Carolyn Turner
Associate Chief, Medical and Environmental Management Division

3 Enclosures:
1. *Federal Register* Notice
2. Map
3. Scoping Meeting Notification Flyer

CONSULTATION QUESTIONNAIRE

Naqsragmuit Tribal Council

Project Name: NASA Sounding Rockets Program at Poker Flat Research Range Environmental Impact Statement

Please check the appropriate response(s) from the list below and use the back of this form or additional sheets if you wish to make comments:

____ We have no traditional religious, cultural properties, or other interests that may be affected by the proposed project and further consultation is not required.

✓ There are or may be issues of concern associated with this proposed project and we request further consultation. We prefer:

✓ Meeting with NASA and its cooperating agencies at a tribal facility.

_____ Communicating with NASA and its cooperating agencies by scheduled teleconference.

✓ We want to continue to receive project information by mail and participate in the public involvement process.

Name of ***Naqsragmiut Tribal Council*** designated contact for this proposed project:

FREIDA RULLAND Phone: 907.661-8419

Please print email: akp.epa@hughes.net

Signed: [illegible] Date: 04/19/2011

Additional Comments:

Please mail response in provided postpaid envelope to:
Joshua Bundick
Poker Flat Research Range EIS
Mailcode 250.W
NASA Wallops Flight Facility
Wallops Island, VA 23337

CONSULTATION QUESTIONNAIRE

Gwichyaa Zhee Gwich'in Tribal Government

Project Name: NASA Sounding Rockets Program at Poker Flat Research Range Environmental Impact Statement

Please check the appropriate response(s) from the list below and use the back of this form or additional sheets if you wish to make comments:

____ We have no traditional religious, cultural properties, or other interests that may be affected by the proposed project and further consultation is not required.

_X_ There are or may be issues of concern associated with this proposed project and we request further consultation. We prefer:

_X_ Meeting with NASA and its cooperating agencies at a tribal facility.

_____ Communicating with NASA and its cooperating agencies by scheduled teleconference.

_X_ We want to continue to receive project information by mail and participate in the public involvement process.

Name of ***Gwichyaa Zhee Gwich'in Tribal Government*** designated contact for this proposed project:

GRETE CHYTHLOOK Phone: 907-662-2581

Please print email: grete.chythlook@fortyukon.org

Signed: Grete Chythlook Date: 4/25/11

Additional Comments:

this meeting is already scheduled for April 28, 2011 @ 1:00 pm in Fort Yukon.

Thank you!

Please mail response in provided postpaid envelope to: Joshua Bundick
Poker Flat Research Range EIS
Mailcode 250.W
NASA Wallops Flight Facility
Wallops Island, VA 23337

7678241819 Environmental Office 02:36:27 p.m. 04-25-2011 9 /9

CONSULTATION QUESTIONNAIRE

Beaver Traditional Council

Project Name: NASA Sounding Rockets Program at Poker Flat Research Range Environmental Impact Statement

Please check the appropriate response(s) from the list below and use the back of this form or additional sheets if you wish to make comments:

X We have no traditional religious, cultural properties, or other interests that may be affected by the proposed project and further consultation is not required.

____ There are or may be issues of concern associated with this proposed project and we request further consultation. We prefer:

_____ Meeting with NASA and its cooperating agencies at a tribal facility.

_____ Communicating with NASA and its cooperating agencies by scheduled teleconference.

____ We want to continue to receive project information by mail and participate in the public involvement process.

Name of ***Beaver Village*** designated contact for this proposed project:

_____ Phone: _____

Please print email: _____

Signed: _____ Date: 09/20/11

Additional Comments:

_____

_____

_____

_____

_____

Please mail response in provided postpaid envelope to:
Joshua Bundick
Poker Flat Research Range EIS
Mailcode 250.W
NASA Wallops Flight Facility
Wallops Island, VA 23337

National Aeronautics and
Space Administration

Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, VA 23337

Reply to Attn of: 250.W

November 9, 2011

Mr. Tom McCulloch
Advisory Council on Historic Preservation
1100 Pennsylvania Avenue, NW, Suite 803
Old Post Office Building
Washington, DC 20004

Dear Mr. McCulloch:

I am writing to you regarding the continued operations of the National Aeronautics and Space Administration's (NASA) Sounding Rockets Program at the University of Alaska Fairbanks' Poker Flat Research Range (PFRR) near Fairbanks, Alaska. In 2010, we began preparing an Environmental Assessment (EA) for this action in accordance with the National Environmental Policy Act (NEPA). After considering the comments provided by members of the public during the scoping process, we are now preparing an Environmental Impact Statement (EIS). The EIS will evaluate the effects of NASA's continued operations at PFRR and will support the decision-making process for the U.S. Fish and Wildlife Service (USFWS) and the Bureau of Land Management (BLM)'s proposed issuance of permits for rocket impact and recovery at Arctic and Yukon Flats National Wildlife Refuges and the Steese National Conservation Area and White Mountains National Recreation Area, respectively.

Concurrent with the NEPA process, NASA will also fulfill its obligations under Section 106 of the National Historic Preservation Act (NHPA). As the project proponent, NASA is serving as the lead Federal agency for NEPA and NHPA consultation with the Alaska State Historic Preservation Office (SHPO), Tribes, and other interested parties. The U.S. Department of the Interior's BLM and USFWS would undertake actions connected to the proposed undertaking and are participating in NASA's NEPA process and Section 106 consultation. The effects of their actions will be considered in all project-related environmental documentation, including the EIS and any historic resources reports. NASA has initiated Section 106 consultation with the Alaska SHPO and has requested input from potentially affected Tribes. We are currently collecting information concerning the Area of Potential Effects and determining the level of data collection required.

With this correspondence, we would like to invite the Advisory Council on Historic Preservation's (ACHP) participation in the PFRR Section 106 process. Given the unique nature of our undertaking, and the diverse interests in the lands that may be affected, we feel that ACHP would be a valuable member of our working group, especially in the event that Memoranda of Agreement or Programmatic Agreements are developed as part of this effort.

2

The enclosed documents provide more detailed information regarding the PFRR and the history behind the EIS. Additionally, I encourage you to visit the project's website on a regular basis for the most up-to-date information about the project. The website's address is http://sites.wff.nasa.gov/code250/pfrr_eis.html.

If you have any specific questions regarding the Section 106 process, please contact me at (757) 824-1309 or at Randall.M.Stanley@nasa.gov. Inquiries regarding the EIS should be directed to the Document Manager, Mr. Josh Bundick, at (757) 824-2319 or Joshua.A.Bundick@nasa.gov. On behalf of the entire project team, I would like to thank you for your consideration of our request. We look forward to working with you.

Sincerely,

Randall M. Stanley

Randall Stanley
Facility Historic Preservation Officer

2 Enclosures:
1. *Federal Register* Notice
2. Map

cc:
HQ/EMD/Ms. J. Groman
BLM/Mr. R. Mills
USFWS/Ms. D. Corbett

Milford Wayne Donaldson, FAIA
Chairman

Clement A. Price Ph.D.
Vice Chairman

John M. Fowler
Executive Director

Preserving America's Heritage

November 29, 2011

Mr. Charles F. Bolden Jr.
Administrator
National Aeronautics and Space Administration
NASA Headquarters
Washington DC 20546-0001

REF: Continuing Sounding Rocket Operations, Poker Flat Research Range, Alaska

Dear Mr. Bolden:

In response to a notification and request by the National Aeronautics and Space Administration (NASA), the Advisory Council on Historic Preservation will participate in consultation to assist NASA in meeting its Section 106 responsibilities for the referenced program. NASA has invited our participation due to the "unique nature of our undertaking and the diverse interests in the lands that may be affected." Our decision to participate in this consultation is based on the Criteria for Council Involvement in Reviewing Individual Section 106 Cases, contained within our regulations (36 CFR Part 800). The criteria are met because the continued operation of this program has the potential to affect important historic properties in Alaska and could present procedural problems due to the need to coordinate with the U.S. Fish and Wildlife Service and the Bureau of Land Management, which are Cooperating Agencies with NASA.

Section 800.6(a)(1)(iii) of our regulations requires that we notify you, as the head of the agency, of our decision to participate in consultation. By copy of this letter, we are also notifying Mr. Randall Stanley, Wallops Flight Facility's Federal Preservation Officer, and Ms. Jennifer Groman, NASA's Historic Preservation Officer of our decision to participate.

Our participation in this consultation will be handled by Dr. Tom McCulloch, who can be reached at 202-606-8554 or at tmcculloch@achp.gov. We look forward to working with NASA on this program.

Sincerely,

John M. Fowler
Executive Director

ADVISORY COUNCIL ON HISTORIC PRESERVATION
1100 Pennsylvania Avenue NW, Suite 803 • Washington, DC 20004
Phone: 202-606-8503 • Fax: 202-606-8647 • achp@achp.gov • www.achp.gov

National Aeronautics and
Space Administration

Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, VA 23337

Reply to Attn of: 250.W

December 9, 2011

Patrick Hanson
Tribal Chief
Native Village of Venetie Tribal Government
P.O. Box 81080
Venetie, AK 99781

Dear Tribal Chief Hanson:

I am writing to you regarding the continued operations of the National Aeronautics and Space Administration's (NASA) Sounding Rockets Program at the University of Alaska Fairbanks' (UAF) Poker Flat Research Range (PFRR) near Fairbanks, Alaska. In April 2011, we requested your input for the Environmental Impact Statement (EIS) that we are currently preparing. At the present time, we are working with the Alaska State Historic Preservation Office (SHPO), Advisory Council on Historic Preservation (ACHP), U.S. Fish and Wildlife Service, and Bureau of Land Management to identify and assess the potential effects of launch and recovery operations on cultural and historic resources.

Section 106 of the National Historic Preservation Act (NHPA) of 1966 requires Federal agencies to consider the effects of their actions on historic properties. The Section 106 process seeks to incorporate historic values into project planning through consultation among the Federal and state agencies, and other parties with an interest in the effects of the undertaking on historic properties.

Tribes, individuals, or organizations with a demonstrated interest in the effects of the undertaking on historic properties may be consulting parties. The various consulting parties work together to discuss options, provide multiple viewpoints, and strive to seek common agreement on the incorporation of historic preservation values into the project.

NASA is beginning the NHPA Section 106 consultation process and is seeking input from project stakeholders who may have an interest in becoming consulting parties. You have been identified as potentially having traditional religious or cultural properties that may be affected and accordingly you may want to be involved in this process.

With the Alaska SHPO and the ACHP, NASA will determine and make contact with all Section 106 consulting parties in the coming weeks. Keeping interested parties and community members fully informed and involved is one of NASA's goals as we evaluate the environmental impacts of our proposed actions. Accordingly, members of our project team will be traveling to interior

2

Alaska in January 2012 to meet with interested groups. If you would like to meet with members of our project team to discuss the EIS, the Section 106 process, or the enhanced recovery and rewards program, please indicate your interest and someone will contact you to coordinate the details of the meeting. We will do our best to accommodate all requests for meetings, as practicable.

Enclosed for your convenience is a consultation questionnaire. Please fill out the form indicating your level of interest and return it in the pre-addressed, postage-paid envelope. Alternately, you are welcome to send an e-mail indicating your level of interest to one of the persons listed below.

If you do not find it necessary to provide input at this time, we will still keep you apprised of the project's progress by providing a copy of the Draft EIS once it is available. Any comments that you may have at that time will be fully considered in developing the Final EIS.

Additionally, we encourage you to follow the project's progress on our website at: http://sites.wff.nasa.gov/code250/pfrr_eis.html.

Thank you for your time and consideration of our request. If you would like to meet with our project team or have any comments regarding future consultations, please contact me at (757) 824-1309 or by e-mail at Randall.M.Stanley@nasa.gov. Or, you may contact Mr. Joshua Bundick, the EIS Document Manager, at (757) 824-2319 or email at Joshua.A.Bundick@nasa.gov. On behalf of the entire project team, we look forward to working with you.

Sincerely,

Randall M. Stanley

Randall Stanley
Facility Historic Preservation Officer

2 Enclosures
1. PFRR Flight Zone Map
2. Consultation Questionnaire

Beaver Council
Box 24029
Beaver, AK
99724

SECTION 106 CONSULTATION QUESTIONNAIRE

Project Name: NASA Sounding Rockets Program at Poker Flat Research Range Environmental Impact Statement

Please check the appropriate response(s) from the list below and use the back of this form or additional sheets if you wish to make comments:

X We have no traditional religious, cultural properties, or other interests that may be affected by the proposed project and further consultation is not required.

____ There are or may be issues of concern associated with this proposed project and we wish to be included as a Section 106 Consulting Party. We prefer:

____ Meeting with NASA and its cooperating agencies at a tribal facility.

____ Communicating with NASA and its cooperating agencies by scheduled teleconference.

X We want to continue to receive project information by mail and participate in the public involvement process.

Name of designated contact for this proposed project:

Rhonda O Pitka Phone: 628-6126

Please print email: fsrdpl@hotmail.com

Signed: X Date: _____

Please explain your reason for interest in the PFRR EIS's Potential Effects on Cultural Resources:

Please mail response in provided postpaid envelope to:
Joshua Bundick
Poker Flat Research Range EIS
Mailcode 250.W
NASA Wallops Flight Facility
Wallops Island, VA 23337

~~Native~~ Village of Venetie
~~BOX 81080~~
~~Venetie, Alaska~~ 99781

N 106 CONSULTATION QUESTIONNAIRE

Project Name: NASA Sounding Rockets Program at Poker Flat Research Range Environmental Impact Statement

Please check the appropriate response(s) from the list below and use the back of this form or additional sheets if you wish to make comments:

____ We have no traditional religious, cultural properties, or other interests that may be affected by the proposed project and further consultation is not required.

✓ There are or may be issues of concern associated with this proposed project and we wish to be included as a Section 106 Consulting Party. We prefer:

✓ Meeting with NASA and its cooperating agencies at a tribal facility.

_____ Communicating with NASA and its cooperating agencies by scheduled teleconference.

✓ We want to continue to receive project information by mail and participate in the public involvement process.

Name of designated contact for this proposed project:

Lance Whitwell Phone: 907-849-8105

Please print email: venetietribal@yahoo.com

Signed: [signature] Date: 1-3-12

Please explain your reason for interest in the PFRR EIS's Potential Effects on Cultural Resources:

A large portion of tribal land is within the corridor

Please mail response in provided postpaid envelope to:
Joshua Bundick
Poker Flat Research Range EIS
Mailcode 250.W
NASA Wallops Flight Facility
Wallops Island, VA 23337

RECEIVED
JAN 9 2012

Mayor Isaacson
~~C Y OF NORTH POLE~~
~~T Snowman Lane~~
~~N th Pole, Alaska 99705~~

SECTION 106 CONSULTATION QUESTIONNAIRE

Project Name: NASA Sounding Rockets Program at Poker Flat Research Range Environmental Impact Statement

Please check the appropriate response(s) from the list below and use the back of this form or additional sheets if you wish to make comments:

✓ We have no traditional religious, cultural properties, or other interests that may be affected by the proposed project and further consultation is not required.

____ There are or may be issues of concern associated with this proposed project and we wish to be included as a Section 106 Consulting Party. We prefer:

_____ Meeting with NASA and its cooperating agencies at a tribal facility.

_____ Communicating with NASA and its cooperating agencies by scheduled teleconference.

✓ We want to continue to receive project information by mail and participate in the public involvement process.

Name of designated contact for this proposed project:

Mayor Doug Isaacson Phone: 907-488-8584

Please print email: mayor@northpolealaska.com

Signed: [signature] Date: 1/30/12

Please explain your reason for interest in the PFRR EIS's Potential Effects on Cultural Resources:

Poker Flats is local + statewide economic driver but we want to ensure valid concerns are addressed. North Pole (area) residents work at Poker Flats and related agencies.
(I apologize for the delayed response due to an admin glitch)

Please mail response in provided postpaid envelope to:
Joshua Bundick
Poker Flat Research Range EIS
Mailcode 250.W
NASA Wallops Flight Facility
Wallops Island, VA 23337

RECEIVED
FEB 7 2012
HAB

Doyon Limited
Lands and Natural Resources Dept.
1 Doyon Place, Suite 300
Fairbanks, Alaska 99701-2941

FAIRBANKS, AK 99701 PM 10 MAY 2012

SECTION 106 CONSULTATION QUESTIONNAIRE

Project Name: NASA Sounding Rockets Program at Poker Flat Research Range Environmental Impact Statement

Please check the appropriate response(s) from the list below and use the back of this form or additional sheets if you wish to make comments:

____ We have no traditional religious, cultural properties, or other interests that may be affected by the proposed project and further consultation is not required.

X There are or may be issues of concern associated with this proposed project and we wish to be included as a Section 106 Consulting Party. We prefer:

____ Meeting with NASA and its cooperating agencies at a tribal facility.

X Communicating with NASA and its cooperating agencies by scheduled teleconference.

X We want to continue to receive project information by mail and participate in the public involvement process.

Name of designated contact for this proposed project:

JEFF FILUT / JIM MERY Phone: 459-2000

Please print email: FILUTJ@DOYON.COM / MERYJ@DOYON.COM

Signed: [signature] Date: 5/15/2012

Please explain your reason for interest in the PFRR EIS's Potential Effects on Cultural Resources:

DOYON OWNED LAND DOWNRANGE

Please mail response in provided postpaid envelope to:
Joshua Bundick
Poker Flat Research Range EIS
Mailcode 250.W
NASA Wallops Flight Facility
Wallops Island, VA 23337

RECEIVED MAY 21 2012 JAB

National Aeronautics and
Space Administration
Headquarters
Washington, DC 20546-0001

Reply to Attn of J. Groman

August 1st, 2012

Ms. Judith E. Bittner
Chief, Office of History and Archaeology, and State Historic Preservation Officer
550 West 7th Ave., Suite 1310
Anchorage, Alaska 99501-3565

Dear ~~Ms. Bittner~~: Judy,

Since we initiated Section 106 consultation with your office via our April 14, 2011 letter, we have continued our assessment of the National Aeronautics and Space Administration's (NASA) Sounding Rockets Program (SRP) at the University of Alaska Fairbanks' (UAF) Poker Flat Research Range (PFRR) near Fairbanks, Alaska. Also, in accordance with the National Environmental Policy Act of 1969 (NEPA), as amended, we have been preparing a Draft Environmental Impact Statement (DEIS). A copy of the DEIS will be made available to all consulting parties near the end of September 2012.

As outlined in our previous letter, UAF is seeking authorizations on behalf of NASA from the U.S. Fish and Wildlife Service (USFWS) and the Bureau of Land Management (BLM) to allow for the continued impact and recovery of sounding rockets launched from PFRR. These authorizations are required because both agencies administer lands downrange from PFRR: USFWS administers the Arctic and Yukon Flats National Wildlife Refuges (NWRs), and BLM administers the White Mountains National Recreation Area (NRA) and Steese National Conservation Area. NASA, as lead agency, is preparing the DEIS to fulfill all three Federal agencies' NEPA obligations. Consistent with the approach taken for NEPA, NASA has assumed the role as lead Federal agency for ensuring that all three action agencies' collective National Historic Preservation Act obligations are also met.

As part of the DEIS preparation and the Section 106 review, NASA identifies the Area of Potential Effect (APE) to be the vast PFRR launch corridor within which the rockets fly and falling items, released at different phases of the launch, impact the ground surface. Furthermore, following a launch, search and recovery efforts would occur within this area. Please see the enclosed map of downrange areas that depicts the APE **(Enclosure 1)**.

In accordance with 36 CFR 800.4, NASA has considered the identification of historic properties within the APE. Recent planning efforts undertaken by USFWS and BLM, particularly the 2012 *Eastern Interior Resource Management Plan*, the 2012 *Revised Arctic Refuge Comprehensive Conservation Plan*, and the 2010 *Yukon Flats NWR Land Exchange EIS*, have provided valuable information regarding the type and extent of known historic properties within the Federally managed lands. Based upon available information, the majority of downrange lands contain

between approximately 20-30 sites per million acres. The Steese National Conservation Area, which is rarely impacted by sounding rockets, contains approximately 50 sites per million acres. The referenced reports acknowledge that there are likely more sites that have not yet been identified or assessed for National Register eligibility due to both the remote nature and sheer size of the subject lands.

To that end, given that the land area encompassed by the APE is approximately 28.2 million acres, it is impractical to survey those areas for resources yet to be identified. Consequently, NASA sought input from its cooperating agencies and a host of consulting parties, including Alaska Native organizations and the Advisory Council on Historic Preservation (ACHP) regarding the best approach for identifying these resources. As a result of its inquiries, NASA assumes that there are unidentified archeological sites and other potentially historic properties within the APE. Rather than attempting to identify the properties themselves, NASA has focused on the potential impacts to any given historic property based on the scope and frequency of the undertaking. Given that the potential for impacts is based on the possibility of a rocket related item landing on or immediately adjacent to a historic property and causing damage, NASA examined the way the items re-enter and are recovered. **Enclosure 3** provides a pictorial summary of the most common landing and recovery scenarios as observed within the past several years. Since the majority of launches occur in winter, the physical impact to the ground surface is very limited.

Based on this assessment and conversations with Alaska Natives, SHPO, and your office about the nature of how items fall back to earth, and the tools and methods employed during recovery, NASA has determined that it is highly unlikely that any historic properties in the APE will be affected by the proposed undertaking. The main concern raised by Alaska Natives was associated with any potential negative effects to subsistence activities. NASA and UAF have been launching suborbital rockets from PFRR since the late 1960s. During that time, subsistence activities continued within the launch corridor without known interruption. Additionally, the low frequency of launches and recoveries, coupled with landowner-imposed Standard Operating Procedures (outlined in **Enclosure 4**), would ensure that NASA's activities would not present a measurable effect above those aircraft-dependent activities also occurring within the APE, including guided hunting, wildlife survey, and mining. Discussions with Alaska Natives also indicated a general support for recovering items in downrange lands, and to the extent practicable, their participation in this effort.

In summary, it is impractical for NASA to identify all historic properties within the APE. However, based on the very small extent of land affected by either an item landing or during its removal, the infrequency and seasonality of launches, and the breadth of downrange lands, it is highly unlikely that any of the items will have an impact on possible historic properties. Consequently, NASA concludes that based on our analysis and input from consulting parties there would be ***no historic properties affected*** by the proposed undertaking; this determination applies to all five alternatives that are proposed in the DEIS. NASA requests your concurrence with this determination, and submits the enclosed Request for State Historic Preservation Office (SHPO) Section 106 Review (36 CFR 800), which describes this undertaking in more detail for your consideration **(Enclosure 4)**. We hope that your office will concur with our finding of *no historic properties affected* and will take the opportunity to provide comments on our DEIS when it becomes available. Complementary to the assessment provided with this correspondence, NASA has included sections on Cultural Resources in the DEIS.

3

If you have any questions regarding the Section 106 process, please contact me at (202) 358-0455 or at Jennifer.A.Groman@nasa.gov, or Randall Stanley, Wallops Flight Facility Historic Preservation Officer, at (757) 824-1309 or Randall.M.Stanley@nasa.gov. Inquiries regarding the DEIS should be directed to Mr. Joshua Bundick at 757-824-2319 or at Joshua.A.Bundick@nasa.gov.

We thank you for your assistance and invite your office to comment on our determination and the forthcoming DEIS.

Respectfully,

Jennifer Groman
NASA Federal Preservation Officer

4 Enclosures:

1. APE Map
2. Background Information
3. Photographs of Sounding Rocket Items
4. Request for SHPO Section 106 Review

cc:
ACHP/Dr. T. McCullouch
BLM/Mr. R. Mills
Doyon, Limited/Mr. J. Mery
Native Village of Venetie Tribal Government/Mr. C. Frank
UAF/Ms. K. Rich
USFWS/Ms. D. Corbett

Enclosure 1: Area of Potential Effect

- The land, water, and airspace within Poker Flat Research Range Flight Zones 1, 2, 3, 4, 4 extended, 4 arctic extension, and 5; and
- The land, water, and airspace within a 400 km (248 mi) circle centered approximately 1,000 km (620 mi) north of the PFRR launch site.

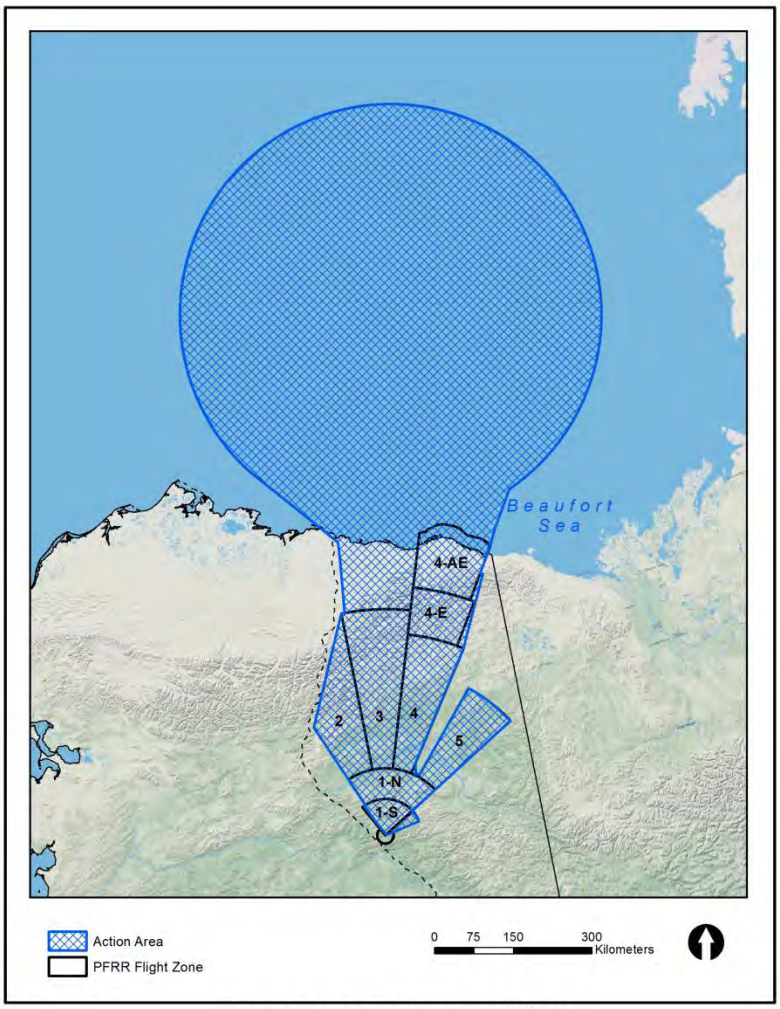


Figure 1. Area of Potential Effect

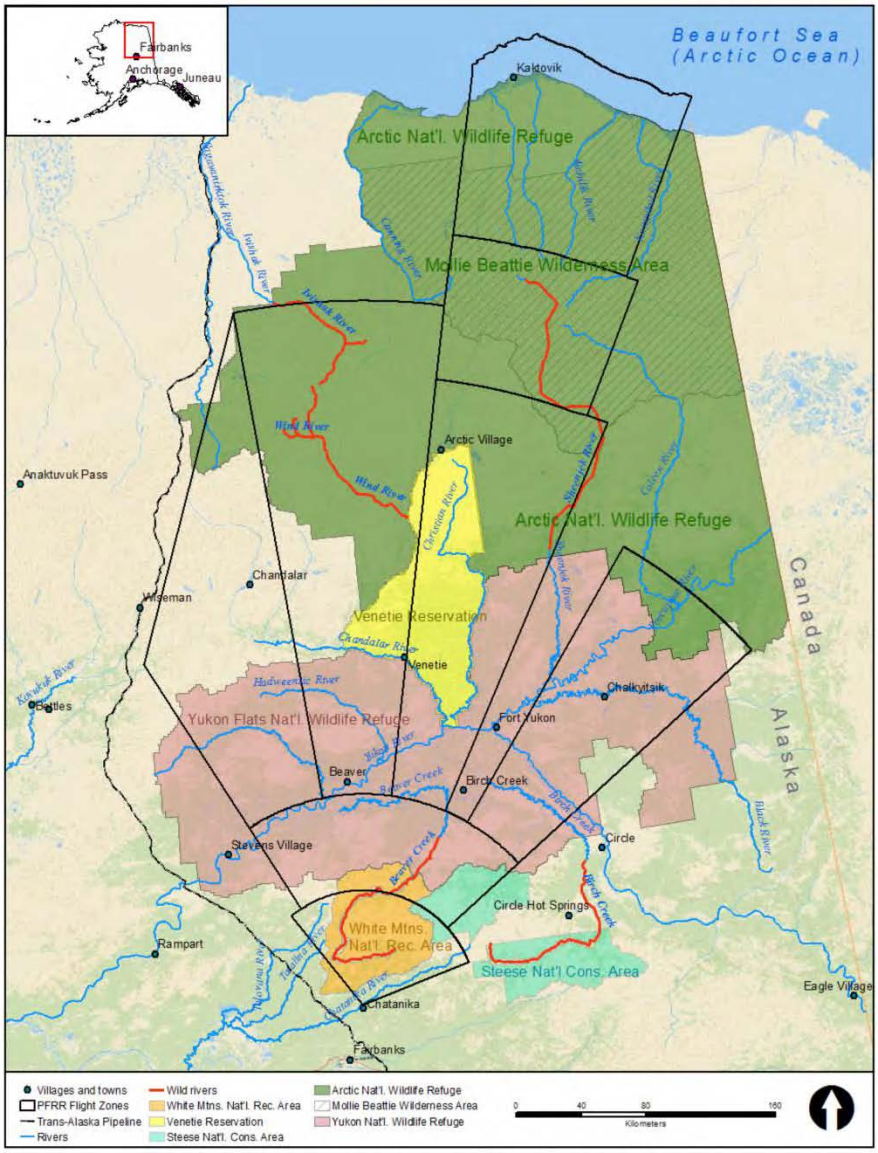


Figure 2. Lands within Area of Potential Effect

Enclosure 2: Background Information

Sounding Rockets

Sounding rockets take their name from the nautical term "to sound," which means to take measurements. Since 1959, NASA-sponsored space and earth science research has used sounding rockets to test instruments used on satellites and spacecraft and to provide information about the Sun, stars, galaxies and Earth's atmosphere and radiation. This type of testing is unique because it cost-effective and time efficient. A large range of phenomena can only be explored with *in situ* probes on sounding rockets, which gather vertical profiles of measured parameters and are essential for the study of the upper atmosphere. Other commonly employed tools to study earth and space science phenomena, including orbiting satellites and ground based observation stations, cannot collect the requisite data that is afforded by a sounding rocket launch. For example, in some cases, Earth-orbiting satellites cannot gather adequate measurements as the satellites are traveling too fast or are too high. In other cases, measurements taken during sounding rocket flights are used to calibrate or verify remote measurements taken from orbiting or land-based instruments.

Each NASA sounding rocket consists of one to four ground-launched; solid-propellant rocket motors, or *stages*, stacked in series, the purpose of which is to propel a scientific experiment, or *payload*, to the upper atmosphere **(Figure 1)**. These rocket motors are configured to meet scientific requirements driven by payload size, flight time, and target altitude desired by the researchers. Individual motors range in size from 14 to 31 inches in diameter and are 76 to 223 inches (6 to 18.5 feet) long. At the time they have consumed all of their fuel, or become *spent*, most rocket stage weights are in the 600- to 1,800-pound range, however several of the final stages are lighter, with weights between 200 and 300 pounds. Payloads generally range in size from 30 to 210 inches (2.5 to 17.5 feet) long, are of similar diameter to the rocket motor on which they are flown, and weigh from less than 100 pounds to over 1,000 pounds. As NASA sounding rockets are suborbital, their upper stages or payloads do not enter an Earth orbit, rather they return to Earth along parabolic trajectories **(Figure 2)**.

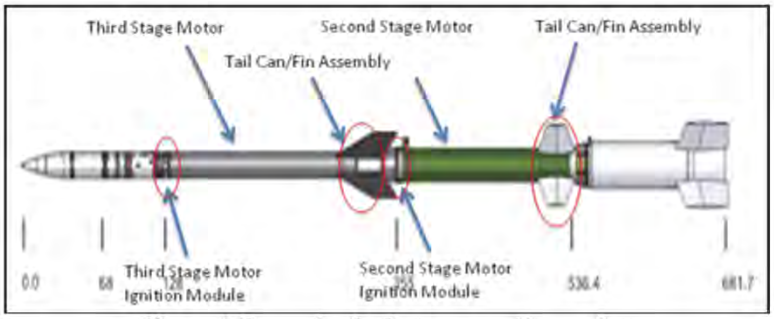


Figure 1. Example of a 3-stage sounding rocket

Following the ignition of the first rocket motor, or stage, which occurs at the launch site, as each rocket motor uses its fuel, it separates from remaining body of the rocket and falls back to Earth. Meanwhile, the scientific experiment, or payload, continues into space and begins collecting data. All metallic and other solid heavier-than-air objects that are propelled into the atmosphere

by sounding rockets land back on Earth in more or less ballistic trajectories. The objects include spent rocket stages, payloads; nose cone doors (released in flight for instruments to "see" their targets); and spin weights, which were released to change rotation of a rocket stage of a launch. Scientific payloads are carried to altitudes from 30 miles to more than 800 miles, with the overall time in space typically ranging from 5 to 20 minutes. The amount and final landing location of rocket hardware is highly mission-dependent, and varies based upon the rocket configuration and the ultimate scientific objectives. Depending on the nature of the experiment, some payloads may include parachute systems such that they can be recovered from their landing locations for analysis or subsequent re-use. Post-flight recovery operations are generally conducted with a combination of fixed and rotary wing aircraft.

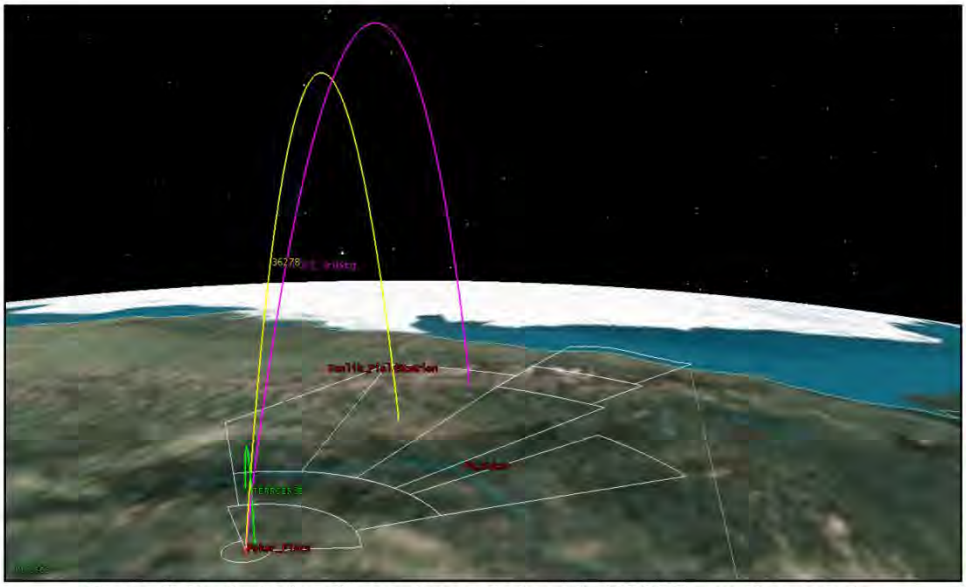


Figure 2. Trajectories of several recently launched PFRR sounding rockets

Sounding rockets can be launched from permanently established ranges or from temporary launch sites using NASA's mobile range assets. Permanent ranges include WFF in Wallops Island, Virginia; PFRR near Fairbanks, Alaska; White Sands Missile Range (WSMR) in White Sands, New Mexico; Kwajalein Island in the Marshall Islands Republic; Esrange Space Center near Kiruna, Sweden; and the Norwegian Sounding Rocket Ranges in Andøya, Norway and Ny-Alesund, Svalbard. In the past, there have been temporary launch sites in Australia, Brazil, Greenland, and Puerto Rico. The majority of sounding rocket launches occur at WFF, PFRR, and WSMR. Where NASA SRP conducts its work is highly dependent on the scientific goals of each mission. For example, if equatorial phenomena must be observed, a site such as Brazil is used. For middle latitudes, WFF or WSMR is selected. If the aurora borealis must be observed, a site at very high latitudes is required, such as at PFRR.

Poker Flat Research Range

Owned and operated by the University of Alaska Fairbanks (UAF) since 1968, the Poker Flat Research Range (PFRR) is located northeast of the unincorporated village of Chatanika, Alaska and consists of approximately 5,200 acres of land that house rocket and support facilities, launch pads, and tracking infrastructure. PFRR is owned and managed by the Geophysical Institute of UAF; however, NASA has exclusively funded and managed the support contract with PFRR for more than 25 years. The primary types of missions conducted by NASA at PFRR are in partnership with university scientists who study the earth's atmosphere and its interaction with the space environment. Since its inception, PFRR has launched approximately 219 NASA sounding rockets and 116 for other entities. The location of PFRR is strategic for launching sounding rockets for scientific research in auroral space physics and earth science. PFRR is the only high-latitude, auroral-zone rocket launching facility in the United States where a sounding rocket can readily study the aurora borealis and the sun–earth connection. The information collected further assists the Nation's scientists in understanding the interactions between the sun and earth as well as the origin and evolution of the solar system. Technology development and validation enabled by NASA SRP at PFRR is critical in furthering the development of earth and space science instruments at a fraction of the size and cost that would result from using other launch methods. PFRR also supports educational outreach programs in which students and scientists from various universities conduct aeronautics and space research.

Consultation with Potentially Interested Parties

Pursuant to American Indian/Alaska Native Policy and Implementation Guidance, beginning in April 2011 with the scoping process for the EIS, NASA mailed letters providing project information and offering government-to-government consultation to the nine Federally recognized Tribes within and adjacent to the PFRR flight corridor. Included with the letters was a postage paid consultation questionnaire, which could be used to provide a project point of contact and express the Tribe's level of interest in the project. NASA also faxed copies of the project information package to the Tribal offices. The below nine Tribes were sent the letter and questionnaire:

- Beaver Traditional Council, Beaver
- Birch Creek Tribal Council, Birch Creek
- Chalkyitsik Village Council, Chalkyitsik
- Circle Native Community, Circle
- Gwitchyaa Zhee Gwich'in Tribal Government, Fort Yukon
- Naqsragmuit Tribal Council, Anaktuvuk Pass
- Native Village of Kaktovik Council, Kaktovik
- Native Village of Stevens Tribal Government, Stevens Village
- Native Village of Venetie Tribal Government, Venetie

Of the nine Tribes, Beaver Traditional Council, Gwitchyaa Zhee Gwich'in Tribal Government, and the Naqsragmuit Tribal Council responded to NASA's request. Beaver Traditional Council indicated that they had no potentially affected interests or concerns regarding the project. The Gwitchyaa Zhee Gwich'in Tribal Government and Naqsragmuit Tribal Council requested to meet with NASA at a tribal facility.

In December 2011, NASA mailed requests for interest in serving as Section 106 consulting parties to the potentially interested Tribal, cultural, and local government organizations listed below:

- Council on Athabascan Tribal Governments
- Tanana Chiefs Conference
- Fairbanks North Star Borough
- North Slope Borough
- Tanana-Yukon Historical Society
- Arctic Slope Regional Corporation
- Chalkyitsik Native Corporation
- Doyon Limited
- Kaktovik Inupiat Corporation
- Nunamiut Corporation
- City of Allakaket
- City of Anaktuvuk Pass
- City of Fairbanks
- City of Fort Yukon
- City of Kaktovik
- City of North Pole
- Beaver Traditional Council
- Birch Creek Tribal Council
- Chalkyitsik Village Council
- Circle Native Community
- Gwichyaa Zhee Gwich'in Tribal Government
- Naqsragmuit Tribal Council
- Native Village of Kaktovik Council
- Native Village of Stevens Tribal Government
- Native Village of Venetie Tribal Government
- Arctic Village Council
- Beaver Kwit'chin
- Canyon Village Traditional Council
- Venetie Tribal Council
- Venetie Village Council

Following this request, NASA received a response from the Beaver Traditional Council, the Native Village of Venetie Tribal Government, and the City of North Pole. Beaver indicated that it did not have concern regarding potential effects on properties of cultural significance; Venetie requested to meet with NASA to discuss the project. The City of North Pole indicated that it did not have any concerns regarding potential effects on cultural resources specifically; however it wished that all valid concerns be addressed though NASA's environmental review process. In May 2012, Doyon, Limited expressed an interest in meeting with NASA regarding the Section 106 process.

Meetings

As a result of the interest expressed in the project, NASA, USFWS, and UAF met with the Tribal Council of the Gwitchyaa Zhee Gwich'in Tribal Government in April 2011 and the Native Village of Venetie Government in February 2012. Notices of the meetings were distributed to local venues within the Villages as well as broadcast on the local Yukon Flats radio station, KZPA 900 AM. In addition, NASA personnel participated in a call-in show on KZPA to give an overview of the project and answer questions.

The primary topics of concern expressed in both meetings were that 1) Villages were not well informed of launches; 2) Students from local Villages should be given a tour of PFRR and have the opportunity to explore scientific and engineering fields; 3) Hazardous materials in rockets should be evaluated as they could affect wildlife, and in turn, affect subsistence users; 4) the

Rewards Program would be beneficial to Village residents; and 5) Village residents should be employed to assist in searches for rocket hardware.

Regarding Venetie specifically, the Council expressed concern that the circa 1989 Memorandum of Agreement-prescribed level of compensation (around $12k yearly) for the use of tribal land is inadequate and needs to be raised. UAF representatives are in the process of accomplishing this through a Memorandum of Agreement (MOA) that is in place.

In addition to the meetings with the Tribal governments, NASA, USFWS, and UAF personnel also gave presentations at the Fort Yukon and Venetie schools.

Following the Naqsragmuit Tribal Council's indication of an interest in the project, both NASA and UAF staff followed up with the specified point of contact through both e-mail and phone calls, however no additional responses were obtained. NASA is currently working to schedule a teleconference with Doyon at a mutually agreeable time.

Future Coordination

To ensure that all potentially affected Tribes are informed of the status of the project, the EIS mailing list includes all nine Federally recognized tribes and those organizations contacted during the identification of consulting parties. All parties will receive copies of any document distributed to the public, including copies of the Draft and Final EIS.

NASA recognizes that the government-to-government consultation process is ongoing and will continue to engage in written and phone communications directed specifically to the Tribes to encourage their engagement at any time. Additional meetings will be scheduled as requested.

Contact with Federal and State Agencies

Since commencing the NEPA process for this undertaking, NASA has held multiple conversations not only with its cooperating agencies, but also the Alaska SHPO and Advisory Council on Historic Preservation (ACHP) to discuss the Section 106 consultation process. Below is a brief summary of those conversations:

- On April 14, 2011, NASA mailed a letter to the SHPO requesting scoping input on the EIS and to request the initiation of the Section 106 consultation process.

- On August 2, 2011, NASA representatives Joshua Bundick (WFF NEPA document manager) and Randall Stanley (WFF Historic Preservation Officer) participated in a teleconference with USFWS Refuge staff and the local BLM field archaeologist. USFWS and BLM staff discussed their respective policies and procedures for managing cultural resources on lands within their jurisdiction. It was mutually agreed upon that NASA would assume the role as lead Federal agency for the Poker Flat Section 106 process.

- On August 11, 2011, NASA's cultural resources consultant, SAIC, held a phone discussion with Ms. Shina DuVall of the Alaska SHPO. Lorraine Gross, SAIC's cultural resources subject matter expert, provided an overview of the project, and Ms. Duvall discussed the general Alaska Section 106 consultation process. It was mutually agreed upon that additional information would be needed to determine the area of potential effect, the level of disturbance associated with each launch or recovery option, and the level of resource identification necessary for this consultation.

- On September 16, 2011, NASA's Joshua Bundick and Randall Stanley, USFWS, BLM, and NASA's cultural resources consultant, Lorraine Gross of SAIC, held a teleconference with Ms. Shina DuVall of the Alaska SHPO. NASA provided an overview of the sounding rockets program at PFRR, and Ms. Duvall discussed the general Alaska Section 106 consultation process. It was mutually agreed upon that additional information would be needed to complete the consultation. The concept of developing a Programmatic Agreement for PFR was informally presented and discussed.

- On November 9, 2011, NASA invited the ACHP to participate in the Section 106 process for this undertaking; in a November 29, 2011 letter, ACHP accepted NASA's offer.

- On February 7, 2012, NASA's Joshua Bundick, Randall Stanley, and Jennifer Groman (Federal Preservation Officer), took part in a conference call with Ms. Shina Duvall from the Alaska SHPO. During this teleconference, Mr. Bundick discussed his recent trip to Alaska to meet with various government entities and Alaska tribes concerning the DEIS. The concerns raised were also discussed among the group.

- After reviewing the internal DEIS, in a March 29, 2012 memorandum, Mr. Robin Mills, BLM Eastern Interior Archaeologist, concurred with NASA's conclusions that there would be the potential for "little to no impacts" to cultural resources on BLM lands from the proposed alternatives. Mr. Mills also recommended no further survey was warranted.

Enclosure 3: Photos demonstrating landing of rocket items in APE

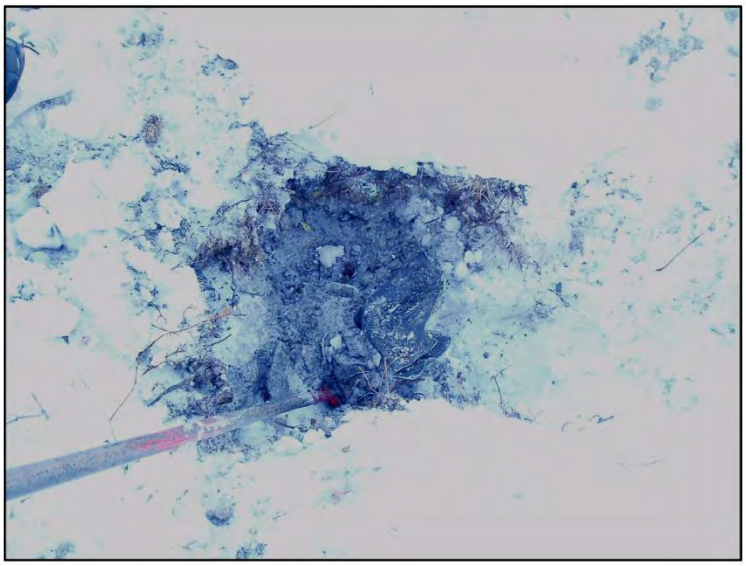
Nearly Complete Burial

1

Ground Penetration without Embedding

2

Hand Digging of impacts that embed



3

Before

After

4

Impact on Rocky Terrain

5

Parachuted Payload Landing

6

Enclosure 4: Request for SHPO Section 106 Review (36 CFR 800)

REQUIRED AGENCY INFORMATION

Federal or State Involvement? Yes, Funding (NASA, Lead Federal Agency); Permit/approval (BLM, USFWS, State of Alaska)

Federal or State Agency contact information: Jennifer Groman, NASA Federal Preservation Officer, 202-358-0455, Jennifer.A.Groman@nasa.gov

Signature of agency official: _____

Secondary Contact Information: Randall M. Stanley, NASA Wallops Flight Facility Historic Preservation Officer, 757-824-1309, Randall.M.Stanley@nasa.gov

I. GENERAL INFORMATION

Project Name: NASA Sounding Rockets Program at the University of Alaska Fairbanks Poker Flat Research Range

Landowners: University of Alaska Fairbanks; Alaska Department of Natural Resources; Bureau of Land Management; U.S. Fish and Wildlife Service; Native Village of Venetie Tribal Government; Doyon, Limited; multiple Village corporations.

Project Address / Location: Northeast of the unincorporated village of Chatanika, Alaska. The APE is extremely large, however its boundaries are shown on **Enclosure 1** and generally described below.

USGS Quad Map Names: Circle, Livengood, Fort Yukon, Beaver, Charley River, Chandalar, Christian, Philip Smith Mountains, Sagavanirktok, Arctic, Mount Michelson, Flaxman Island, Barter Island

Meridians: Fairbanks, Umiat

NAD 83 Latitude/Longitude: Eastern Boundary: 141 degrees W; Western Boundary 150 degrees W; Northern Boundary: 77.5 degrees N; Southern Boundary: 65 degrees N

II. GROUND DISTURBING ACTIVITY

DOES THIS PROJECT INVOLVE GROUND DISTURBANCE? Yes

Description of the length, width, and depth of ground disturbance: Portions of sounding rockets fall to ground anywhere in the area identified in the APE. Upon impacting the ground, each item will likely create a minor divot, however it will be highly dependent upon the actual landing site. Finless payload items rarely penetrate the ground surface. If the item, such as a rocket motor, were to land "nose down" after a normal launch, the width of the disturbance

1

would not be expected to exceed 1 meter in diameter; the depth to which the item would penetrate would vary, but could be as great as 3 meters if the item were to fully embed. If an item were to land on its side, length of the disturbance could be as great as 5 meters long, width on the order of 1 meter, and depth less than 1 meter. See **Enclosure 3** for pictures. Unless items are imbedded in soft soil, there is limited need to dig to remove the items. Digging around the item could result in approximately a 1-meter area of additional disturbance around the item if it were embedded. It is expected that all recovery related ground disturbance would be with hand tools, including shovels and pick axes. Once removed, the item would be transported via fixed or rotary wing aircraft; in rare cases on foot by the recovery crew. Therefore, ground disturbance related to transportation would be negligible.

Previous and current land use, condition, and disturbance: Nearly all lands within the APE are managed specifically for conservation and/or recreational purposes. With the exception of areas immediately surrounding rural villages, some historic placer mining within BLM lands, limited seismic line clearing within Yukon Flats Refuge and along the Coastal Plain of Arctic Refuge, mineral exploration on Doyon lands within the Yukon Flats, and various hunting or trapping cabins, the lands within the APE are relatively undisturbed except by natural processes. The lands directly north of the PFRR launch site, within which most of the first stages of sounding rockets impact, are designated as Special Use "for rocket impact" by the State of Alaska.

Are there archaeological resources on the property? Yes

How was this determined? Consultations with landowners and review of Federal planning documents (i.e., Environmental Impact Statements), which contain summaries of identified resources.

III. DESCRIPTION OF THE PROJECT (UNDERTAKING)

Detailed written description of the project: Enclosure 2 provides a general description of sounding rockets, including their size and composition, as well as an overview of PFRR. Below provides a description of the alternatives NASA is considering for continuing its sounding rockets operations at PFRR:

Alternatives Evaluated in the DEIS

NASA has identified five alternatives as potentially satisfying the objectives identified in the purpose and need for consideration in the DEIS. Under all five alternatives, NASA would continue to fund UAF's PFRR and conduct scientific investigations using sounding rockets. NASA forecasts that an average of about *four launches per year* would be conducted at PFRR, but *could range up to eight launches per year*. This launch rate is typical of past years, but, because of the very nature of scientific research and discovery, it is not possible to predict accurately what future needs might be. New discoveries or scientific needs might require more or fewer launches to accomplish NASA's scientific goals.

Similarly, past scientific research has mandated that *most launches be conducted during the winter months (October through April)*, with most of the launches occurring at night or in darkness. While this is the expected mode of future operations, new scientific needs might raise the desirability of other launch periods. If such needs were to arise, additional analysis of the range safety requirements, as well as potential mitigation factors to reduce environmental impacts, would be required.

Standard Operating Procedures (SOPs)

The following are SOPs have been detailed in the DEIS for the removal of payloads and stages from within downrange lands and would apply to all five alternatives. Collectively, these restrictions and conditions imposed by USFWS and BLM provide the operational restraints on the program and dictate the practices that must be followed and ensure protections to both natural and cultural resources. Those with particular relevance to the protection of cultural resources are shown in bold:

- **The use of off-road vehicles (except snow machines) on USFWS properties is prohibited.**
- When flying over USFWS properties, all aircraft are recommended to maintain a minimum altitude of 2,000 feet above ground level, except during takeoff and landing, and when safety considerations require a lower altitude. Low-level slinging of gear from site to site is prohibited.
- **Large-scale clearing of vegetation for aircraft landing and takeoff is prohibited. Only minor clearing of brush and other minor obstructions is permitted. Any excavation or disturbance during recovery must be filled.**
- Fuel caches are allowed only in designated areas on the USFWS properties, and must be approved by the NWR manager before they are established. Storage must meet the standards of the USFWS, Alaska Region, Fuel Storage Policy.
- PFRR must ensure that its operations do not interfere with or harass NWR visitors or impede access to any site.
- **PFRR operations cannot interfere with subsistence activities of rural users or restrict the access of subsistence users.**
- **The removal or disturbance of historical, recent, ethnological, or archaeological artifacts is prohibited.**
- PFRR must ensure that a transponder or other radio location aid is incorporated with each payload to facilitate tracking and recovery after launch.
- PFRR must clean equipment used to recover rocket debris to prevent the spread of invasive and noxious weeds and plant species at recovery sites.

3

It is expected that post launch searches would be conducted following launch, and prior to new snowfall, whereas most recovery efforts would be conducted during non-winter months due to safety and more favorable weather conditions. *The key difference among the alternatives is the level of search and recovery effort that each would entail*.

- The **No Action Alternative** would not entail any recovery of items unless dictated by scientific need. The maximum recovery expected would be 1 payload per year.

- **Alternative 1** would entail a formal commitment to a "clean range" which would be guided by a formal Recovery Plan. In summary, a post-launch aerial search would occur for all newly launched, land-impacting items. If located, NASA would perform a recovery operation during non-winter months if it were deemed safe and in the best interest of the downrange lands. In essence, some items could be left partially or fully in place if effecting a full recovery would result in greater than negligible vegetative clearing, substantial excavation, or entry into areas where ruts could be formed (e.g., bogs). Employing the same philosophy, items within downrange lands from past launches would also be recovered when reported by users of downrange lands if determined to be environmentally responsible.

- **Alternative 2** would be similar to Alternative 1, however full recovery of items would be required unless it were deemed unsafe for recovery personnel to perform the operation. Given this philosophy, it is expected that the largest amount of material would be removed from downrange lands over time. However, some localized, short- and long-term evidence of the recovery operation could occur depending on the specific situation. If adopted, both landowners and NASA would be willing to accept these impacts in exchange for having fewer sounding rocket items in downrange lands. While the SOPs discussed above would apply to this alternative, it is possible that greater clearing or digging could be required, therefore requiring some modification to the extent of allowable actions.

- **Alternative 3** would be the same as Alternative 1, however it would also include a voluntary restriction on planning future stage or payload impacts within designated Wild or Scenic River corridors. Currently, Beaver Creek and the Sheenjek, Ivishak, and Wind Rivers are located within the PFRR launch corridor.

- **Alternative 4** would be the same as Alternative 2, however it would also include a voluntary restriction on planning future stage or payload impacts within designated Wild or Scenic River corridors.

Please refer to Chapter 2 of the DEIS for a complete description of each of these alternatives.

Attach localized project map: Please see **Enclosure 1**, which is a map of the PFRR launch corridor.

Attach photographs of the project area: Please see **Enclosure 3**, which provides photographs of the undertaking.

4

IV. AREA OF POTENTIAL EFFECTS (APE)

Identify the APE on the USGS map and localized project map: NASA has identified the boundaries of the PFRR launch corridor as the APE. Please refer to **Enclosure 1**. Given the size of the APE, it is not practical to provide the APE on each individual topographic map.

Explain how the APE was developed and how it encompasses potential direct and indirect effects: The APE encompasses all land and water areas over which the rockets fly and falling items, released at different phases of the launch, impact the ground surface. Furthermore, following a launch, search and recovery efforts would occur within this area.

V. IDENTIFICATION OF HISTORIC PROPERTIES

Describe the steps taken (methodology) to identify cultural resources in the APE:

NASA acknowledges that both previously identified and unknown cultural resources occur within the existing launch corridor. However it is impractical for NASA to identify all historic properties. NASA has relied upon data provided by other Federal Agencies and within the Alaska Heritage Resources Survey. In general, as summarized in the U.S. Fish and Wildlife's *Arctic Refuge Revised Comprehensive Conservation Plan/Environmental Impact Statement*, the resources within the APE include:

- Coastal settlements, consisting of semi-subterranean driftwood or whalebone houses, in some cases associated with cemeteries and/or additional structures. Post-contact and pre-contact houses are present along the coast of the Beaufort Sea.
- Inland settlements, consisting of semi-subterranean driftwood or whalebone houses, also in some cases associated with cemeteries and/or additional structures.
- Tent ring complexes, consisting of arrangements of stones used to secure skin tents to the ground, often with associated hearths in and outside of the ring. These features are found along river corridors on elevated terraces and likely relate to seasonal caribou hunting by coastal people. In some cases, these complexes are situated near or adjacent to caribou drive lines or fences.
- Caribou drive lines and fences are found on the north and south sides of the Brooks Range. These linear arrangements of stone cairns (in the north) and spruce (in the south) were used to funnel the movements of caribou herds into corrals where hunters harvested them.
- Lithic scatters, consisting of surface and subsurface collections of artifacts and debris resulting from the procurement, preparation, and manufacture of stone tools.
- Historic cabins built by indigenous peoples, early explorers, and trappers that offer insights into the early contact period.
- Prospecting and mining sites established during the late 19th and early 20th centuries.
- Graves and cemeteries.

NASA has also invited Alaska Natives in the APE to consult and help identify historic properties that they might think may be affected by the undertaking. During discussions with the villages, none have identified historic properties but rather have focused on subsistence practices. NASA has identified procedural protocol to avoid impacts to these practices and species of interest to the villages. Moreover, the infrequent nature of launches would not present a measurable risk of disturbing subsistence activities. While recovery operations would most likely occur during non-winter months when the majority of subsistence hunting occurs, in consideration of the low frequency of launches (and therefore recoveries), the wide dispersion of recovery sites, and landowner-imposed requirements to minimize low altitude flights, effects would be minor.

Information provided by U.S. Fish and Wildlife and Bureau of Land Management are summarized by land parcel below:

Arctic National Wildlife Refuge

Over 530 archeological and historic and paleontological sites have been recorded within the boundaries of Arctic Refuge. Currently, 212 archeological and 188 historical sites have been recorded within the boundaries of Arctic Refuge.

Total Land Area: 19.64 million acres

Site Density: 27 sites/million acres or 0.007 sites/sq km

Yukon Flats National Wildlife Refuge

197 AHRS sites were reported to be located within the Refuge. Of these, 50 are identified as prehistoric (before contact with non-Natives), 106 are identified as historic (after contact with non-Natives), and the remainder have either not been assigned to a period or are modern (last 50 years) in age.

Total Land Area: 10.938 million acres

Site Density: 18 sites/million acres or 0.004 sites/sq km

White Mountains National Recreation Area

Known Sites: 26 historic; 3 prehistoric; 1 both; 30 total

Total Land Area: 1.02 million acres

Site Density: 29.5 sites/million acres or 0.007 sites/sq km

Steese National Conservation Area

Known Sites: 49 historic; 18 prehistoric; 67 total

Total Land Area: 1.28 million acres

Site Density: 52.3 sites/million acres or 0.013 sites/sq km

VI. DETERMINATION OF ELIGIBILITY

There are documented historic properties present within the project area, and it is likely that additional undocumented and potentially eligible properties also exist within the project area. Therefore, it is reasonable to assume that ***historic properties (36 CFR 800.16[d]) are present within the APE.***

VII. FINDING OF EFFECT

Available information indicates that there is approximately a range between 18 to 50 sites recorded in the general area per 1 million acres of land. Due to the low number of projected launches that occur annually and the large area of the projected impact zone shown on the enclosed map, NASA feels that it is highly unlikely any known or unknown historic properties would be affected by this undertaking. Such likelihood is so low that NASA finds that ***no historic properties would be affected [36 CFR 800.4(d)(1)]***. NASA hereby requests that the Alaska SHPO concurs with this finding.

Consulting Parties: See **Enclosure 2** for a complete list of parties that were consulted on this undertaking and the outcomes of those consultations. In addition, those organizations expressing an interest in this undertaking have been provided a copy of this material, including all Enclosures.

National Aeronautics and
Space Administration
Headquarters
Washington, DC 20546-0001

Reply to Attn of: J. Groman

August 1st, 2012

Jim Mery
Senior Vice President Lands and Resources
Doyon Limited
1 Doyon Place, Suite 300
Fairbanks, AK 99701

Dear Mr. Mery:

Please find enclosed a copy of our Section 106 consultation package to Ms. Judith Bittner, Alaska State Historic Preservation Officer (SHPO), regarding the continuation of National Aeronautics and Space Administration's (NASA) Sounding Rockets Program (SRP) at the University of Alaska Fairbanks' (UAF) Poker Flat Research Range (PFRR) near Fairbanks, Alaska. We have provided you a copy of this information as you expressed interest in being a consulting party in the Section 106 Process associated with this undertaking.

Our letter to SHPO identifies the Area of Potential Effect (APE) and our Determination of Effect. The letter also explains NASA's efforts to identify historic properties within the APE. NASA has made a determination of "*no historic properties affected*" based on the unlikely probability of anything from the SRP landing on known or unknown historic property within the APE. We invite you to read our letter and the accompanying information for your review.

In parallel with the Section 106 process, we are preparing a Draft Environmental Impact Statement (DEIS) for this program. We anticipate the DEIS for this program will be available for your review in late September 2012.

If you have any questions regarding the Section 106 process, please contact me at (202) 358-0455 or at Jennifer.A.Groman@nasa.gov, or Randall Stanley, Wallops Flight Facility Historic Preservation Officer, at (757) 824-1309 or Randall.M.Stanley@nasa.gov. Inquiries regarding the DEIS should be directed to Mr. Joshua Bundick at 757-824-2319 or at Joshua.A.Bundick@nasa.gov.

2

We thank you for your assistance and invite you to comment on our determination and the forthcoming DEIS.

Respectfully,

Jennifer Groman
NASA Federal Preservation Officer

5 Enclosures:

1. Copy of letter to SHPO regarding determination of effects
2. APE Map
3. Background Information
4. Photographs of Sounding Rocket Items
5. Request for SHPO Section 106 Review

8-10-2012 3130-1K NASA

National Aeronautics and
Space Administration
Headquarters
Washington, DC 20546-0001

No Historic Properties Affected
Alaska State Historic Preservation Officer
Date. 8-10-2012
File No. 3130-1K NASA SNP

Reply to Attn of: J. Groman

August 1st, 2012

Ms. Judith E. Bittner
Chief, Office of History and Archaeology, and State Historic Preservation Officer
550 West 7th Ave., Suite 1310
Anchorage, Alaska 99501-3565

RECEIVED
AUG 08 2012
OHA

Dear ~~Ms. Bittner~~: Judy,

Since we initiated Section 106 consultation with your office via our April 14, 2011 letter, we have continued our assessment of the National Aeronautics and Space Administration's (NASA) Sounding Rockets Program (SRP) at the University of Alaska Fairbanks' (UAF) Poker Flat Research Range (PFRR) near Fairbanks, Alaska. Also, in accordance with the National Environmental Policy Act of 1969 (NEPA), as amended, we have been preparing a Draft Environmental Impact Statement (DEIS). A copy of the DEIS will be made available to all consulting parties near the end of September 2012.

As outlined in our previous letter, UAF is seeking authorizations on behalf of NASA from the U.S. Fish and Wildlife Service (USFWS) and the Bureau of Land Management (BLM) to allow for the continued impact and recovery of sounding rockets launched from PFRR. These authorizations are required because both agencies administer lands downrange from PFRR: USFWS administers the Arctic and Yukon Flats National Wildlife Refuges (NWRs), and BLM administers the White Mountains National Recreation Area (NRA) and Steese National Conservation Area. NASA, as lead agency, is preparing the DEIS to fulfill all three Federal agencies' NEPA obligations. Consistent with the approach taken for NEPA, NASA has assumed the role as lead Federal agency for ensuring that all three action agencies' collective National Historic Preservation Act obligations are also met.

As part of the DEIS preparation and the Section 106 review, NASA identifies the Area of Potential Effect (APE) to be the vast PFRR launch corridor within which the rockets fly and falling items, released at different phases of the launch, impact the ground surface. Furthermore, following a launch, search and recovery efforts would occur within this area. Please see the enclosed map of downrange areas that depicts the APE **(Enclosure 1)**.

In accordance with 36 CFR 800.4, NASA has considered the identification of historic properties within the APE. Recent planning efforts undertaken by USFWS and BLM, particularly the 2012 *Eastern Interior Resource Management Plan*, the 2012 *Revised Arctic Refuge Comprehensive Conservation Plan*, and the 2010 *Yukon Flats NWR Land Exchange EIS*, have provided valuable information regarding the type and extent of known historic properties within the Federally managed lands. Based upon available information, the majority of downrange lands contain

between approximately 20-30 sites per million acres. The Steese National Conservation Area, which is rarely impacted by sounding rockets, contains approximately 50 sites per million acres. The referenced reports acknowledge that there are likely more sites that have not yet been identified or assessed for National Register eligibility due to both the remote nature and sheer size of the subject lands.

To that end, given that the land area encompassed by the APE is approximately 28.2 million acres, it is impractical to survey those areas for resources yet to be identified. Consequently, NASA sought input from its cooperating agencies and a host of consulting parties, including Alaska Native organizations and the Advisory Council on Historic Preservation (ACHP) regarding the best approach for identifying these resources. As a result of its inquiries, NASA assumes that there are unidentified archeological sites and other potentially historic properties within the APE. Rather than attempting to identify the properties themselves, NASA has focused on the potential impacts to any given historic property based on the scope and frequency of the undertaking. Given that the potential for impacts is based on the possibility of a rocket related item landing on or immediately adjacent to a historic property and causing damage, NASA examined the way the items re-enter and are recovered. **Enclosure 3** provides a pictorial summary of the most common landing and recovery scenarios as observed within the past several years. Since the majority of launches occur in winter, the physical impact to the ground surface is very limited.

Based on this assessment and conversations with Alaska Natives, SHPO, and your office about the nature of how items fall back to earth, and the tools and methods employed during recovery, NASA has determined that it is highly unlikely that any historic properties in the APE will be affected by the proposed undertaking. The main concern raised by Alaska Natives was associated with any potential negative effects to subsistence activities. NASA and UAF have been launching suborbital rockets from PFRR since the late 1960s. During that time, subsistence activities continued within the launch corridor without known interruption. Additionally, the low frequency of launches and recoveries, coupled with landowner-imposed Standard Operating Procedures (outlined in **Enclosure 4**), would ensure that NASA's activities would not present a measurable effect above those aircraft-dependent activities also occurring within the APE, including guided hunting, wildlife survey, and mining. Discussions with Alaska Natives also indicated a general support for recovering items in downrange lands, and to the extent practicable, their participation in this effort.

In summary, it is impractical for NASA to identify all historic properties within the APE. However, based on the very small extent of land affected by either an item landing or during its removal, the infrequency and seasonality of launches, and the breadth of downrange lands, it is highly unlikely that any of the items will have an impact on possible historic properties. Consequently, NASA concludes that based on our analysis and input from consulting parties there would be ***no historic properties affected*** by the proposed undertaking; this determination applies to all five alternatives that are proposed in the DEIS. NASA requests your concurrence with this determination, and submits the enclosed Request for State Historic Preservation Office (SHPO) Section 106 Review (36 CFR 800), which describes this undertaking in more detail for your consideration **(Enclosure 4)**. We hope that your office will concur with our finding of *no historic properties affected* and will take the opportunity to provide comments on our DEIS when it becomes available. Complementary to the assessment provided with this correspondence, NASA has included sections on Cultural Resources in the DEIS.

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If you have any questions regarding the Section 106 process, please contact me at (202) 358-0455 or at Jennifer.A.Groman@nasa.gov, or Randall Stanley, Wallops Flight Facility Historic Preservation Officer, at (757) 824-1309 or Randall.M.Stanley@nasa.gov. Inquiries regarding the DEIS should be directed to Mr. Joshua Bundick at 757-824-2319 or at Joshua.A.Bundick@nasa.gov.

We thank you for your assistance and invite your office to comment on our determination and the forthcoming DEIS.

Respectfully,

Jennifer Groman
NASA Federal Preservation Officer

4 Enclosures:
1. APE Map
2. Background Information
3. Photographs of Sounding Rocket Items
4. Request for SHPO Section 106 Review

cc:
ACHP/Dr. T. McCullouch
BLM/Mr. R. Mills
Doyon, Limited/Mr. J. Mery
Native Village of Venetie Tribal Government/Mr. C. Frank
UAF/Ms. K. Rich
USFWS/Ms. D. Corbett

A.3 ENDANGERED SPECIES ACT CORRESPONDENCE

DATE	FROM	TO
April 14, 2011	NASA	U.S. Fish and Wildlife Service
May 23, 2011	U.S. Fish and Wildlife Service	NASA
September 6, 2011	NASA	National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service
September 6, 2011	NOAA National Marine Fisheries Service	NASA
August 2, 2012	U.S. Fish and Wildlife Service	NASA
November 1, 2012	NOAA National Marine Fisheries Service	NASA
April 30, 2013	NOAA National Marine Fisheries Service	NASA

National Aeronautics and
Space Administration

Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, VA 23337

Reply to Attn of: 250.W

April 14, 2011

Ted Swem
Branch Chief
Fairbanks Fish & Wildlife Field Office
U.S. Fish & Wildlife Service
101 12th Avenue, Room 110
Fairbanks, AK 99701

Dear Sir or Madam:

I am writing to you regarding the continued operations of the National Aeronautics and Space Administration's (NASA) Sounding Rockets Program (SRP) at the University of Alaska Fairbanks' (UAF) Poker Flat Research Range (PFRR) near Fairbanks, Alaska. In September 2010, we requested input for an Environmental Assessment (EA) that we were preparing. After considering the comments provided by members of the public during the scoping process, we have now decided to prepare an Environmental Impact Statement (EIS). The EIS will evaluate the effects of NASA's continued operations at PFRR and will support the decision-making process for the U.S. Fish and Wildlife Service's (USFWS's) and the Bureau of Land Management's (BLM's) proposed issuance of permits for rocket impact and recovery at Arctic and Yukon Flats National Wildlife Refuges and the Steese National Conservation Area and White Mountain National Recreation Area, respectively.

Owned and operated by UAF since 1968, the PFRR is a launch facility for sounding rockets, which carry scientific instruments into regions of the upper atmosphere and space that are inaccessible by other commonly used observation methods (e.g., satellites and balloons). The PFRR is located northeast of the unincorporated village of Chatanika, Alaska and consists of approximately 5,200 acres of land that house rocket and support facilities, launch pads, and tracking infrastructure. The primary types of missions conducted by NASA at PFRR are in partnership with university scientists who study the earth's atmosphere and its interaction with the space environment.

Pursuant to the National Environmental Policy Act (NEPA), the EIS will consider a range of alternatives that meet NASA's needs for obtaining the requisite earth and space science data afforded by high-latitude sounding rocket launches in support of its science and educational missions. Alternatives currently being considered for evaluation in the EIS include:

- Continuing the SRP in its present form and at the current level of effort;
- Continuing SRP launches from PFRR within the existing flight zones with differing requirements for identification and recovery of spent stages and payloads;

- Modifying the trajectories of the existing flight zones; and
- Conducting a subset of launches at other high-latitude launch sites, thereby avoiding the federally-managed lands.

The No Action Alternative is to discontinue sounding rocket launches from PFRR.

The EIS will analyze the effects of the alternatives on all applicable environmental media, including airspace, noise, safety, biological resources, socioeconomics, transportation, cultural resources, water resources, wetlands, air quality, land use, hazardous materials, recreation and visual resources, environmental justice, subsistence, and cumulative impacts. NASA anticipates that the areas of most interest to the public will be: the effects of rocket and payload landing and recovery on special interest lands (including Wilderness Areas and Wild Rivers), considerations to ensure public safety during rocket flight, and potential effects on subsistence uses on lands within the flight zones. Public and agency scoping may identify other environmental resources for consideration in the EIS.

With this correspondence, NASA would like to inquire as to whether USFWS believes there may be any species listed under the Endangered Species Act (ESA) of 1973 potentially within the general action area (see enclosed map of the PFRR flight corridors). Any assistance you could provide in identifying concerns you may have about the potential effects of the proposed action on listed species would be appreciated.

As the project proponent, NASA is serving as the lead agency for NEPA and ESA consultation with the USFWS. The U.S. Department of the Interior's BLM and USFWS would undertake connected actions and are participating in NASA's NEPA process and ESA consultation. The effects of their actions will be considered in all project-related environmental documentation, including the EIS and any biological assessments or evaluations. As such, please include all three agencies in future ESA-related correspondence regarding NASA's SRP at PFRR.

The enclosed documents provide more detailed information regarding the PFRR and the history behind the EIS. Additionally, I encourage you to visit the project's website on a regular basis for the most up-to-date information about the project. The website's address is http://sites.wff.nasa.gov/code250/pfrr_eis.html.

In scoping the EIS, we are also requesting input from other agencies and the public regarding potential environmental concerns or project alternatives such that it can be considered in preparing the Draft document. As a part of this effort, we will be holding public meetings to provide further information and gather input from the public. The scoping meeting locations and dates identified at this time are shown below and on the enclosed flyer.

- Thursday, April 28, 1:00 to 3:00 p.m., at the Fort Yukon Tribal Hall, 3rd and Alder Street, in Fort Yukon, Alaska*

- Monday, May 2, 2:00 to 4:00 p.m., at the University of Alaska Fairbanks, William R. Wood Campus Center, 505 S. Chandalar Drive in Fairbanks, Alaska.

- Monday, May 2, 6:00 to 8:00 p.m. at Pioneer Park, Blue Room, 3rd Floor, 2300 Airport Way, in Fairbanks, Alaska.

- Tuesday, May 3, 2:00 to 4:00 p.m. and 6:00 to 8:00 p.m. at the U.S. Fish and Wildlife Service Alaska Regional Office, Gordon Watson Conference Room, 1011 East Tudor Road, in Anchorage, Alaska.

**Please note that the Fort Yukon meeting, originally scheduled for Friday, April 29, 2011, as indicated on the enclosed Federal Register notice, has been rescheduled for the date shown above due to conflicts that were not anticipated at the time the notice was published.*

Each scoping meeting will begin with an open house where the public will have the opportunity to interact with members of the project team through one-on-one discussions. Approximately 30 minutes into the open house, NASA will provide an overview of the NEPA process and current PFRR operations. Following the presentations, public comments may be provided. During this time, all oral comments and questions will be recorded for consideration in preparing the Draft EIS. If you require special assistance to attend the meetings, please contact Joshua Bundick at the address below at least two (2) business days prior to the meeting. As an additional effort to inform the public of these meetings, we request your assistance in posting the enclosed flyer in a visible place within your community.

Comments may also be submitted by email, mail, phone, or fax, and will be accepted throughout the entire Draft EIS analysis process. However, for full early consideration and to best help shape and refine the proposal, please submit comments by June 1, 2011 to:

Joshua Bundick
Manager, Poker Flat Research Range EIS
NASA Goddard Space Flight Center's Wallops Flight Facility
Wallops Island, VA 23337
Phone: (757) 824-2319
Fax: (757) 824-1819
Email: Joshua.A.Bundick@nasa.gov

If you have any specific questions regarding the ESA process, please contact Mr. Joel Mitchell, our Natural Resources Program Manager, at (757) 824-1127 or at Joel.T.Mitchell@nasa.gov. Inquiries regarding the EIS should be directed to Mr. Bundick at the above address. On behalf of the entire EIS team, I would like to thank you for your interest in this project. We look forward to working with you.

Sincerely,

Carolyn Turner

Carolyn Turner
Associate Chief, Medical and Environmental Management Division

3 Enclosures:
1. *Federal Register* Notice
2. PFRR Flight Zone Map
3. Scoping Meeting Notification Flyer

United States Department of the Interior
U.S. FISH AND WILDLIFE SERVICE
Fairbanks Fish and Wildlife Field Office
101 12th Avenue, Room 110
Fairbanks, Alaska 99701
May 23, 2011

Carolyn Turner
Associate Chief, Medical and Environmental Management Division
National Aeronautics and Space Administration
Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, VA 23337

Re: Species listed under the Endangered Species Act within the Poker Flats Research Range Launch Corridor

Dear Ms. Turner:

Thank you for your letter dated April 14, 2011 requesting information on threatened and endangered species pursuant to section 7 of the Endangered Species Act of 1973, as amended (ESA). Based on your letter, we understand you are preparing an Environmental Impact Statement (EIS) to evaluate the effects of the National Aeronautics and Space Administration (NASA) Sounding Rockets Program's continued operations at the University of Alaska Fairbanks' Poker Flat Research Range (PFRR) near Fairbanks, Alaska. The EIS will also support U.S. Fish and Wildlife Service's (USFWS) and the Bureau of Land Management's (BLM) proposed issuance of permits for rocket impact and recovery at Arctic and Yukon Flats National Wildlife Refuges (NWR) and the Steese National Conservation Area and White Mountains National Recreation Area. The USFWS and BLM will serve as Cooperating Agencies in the preparation of the EIS.

Threatened Species
The U.S. Fish and Wildlife Service (USFWS) has reviewed the PFRR Flight Corridor map enclosed with your letter and has determined three species listed as threatened under the Act may occur in the northernmost portion of the Arctic NWR: spectacled eiders (*Somateria fischeri*), Alaska-breeding Steller's eiders (*Polysticta stelleri*), and polar bears (*Ursus maritimus*). Spectacled eiders nest in very low densities on the Arctic Coastal Plain within Arctic NWR. Although Steller's eiders historically nested in this area as well, they have not been observed in recent decades. Polar bears occupy sea ice and terrestrial habitats within Arctic NWR. For the purposes of Section 7 consultation, we assume polar bears may occur up to 25 miles inland from the Beaufort Sea coast. We also recommend contacting Craig Perham (907-786-3810; craig_perham@fws.gov) with the USFWS Alaska Region Marine Mammal Management Division to address potential effects to polar bears under the Marine Mammal Protection Act.

Designated critical habitat
The portion of the flight corridor that includes the Beaufort Sea and land within 20 miles (32 km) inland from the Beaufort Sea coast overlaps polar bear critical habitat. Please see detailed critical habitat maps or shapefiles provided at the USFWS Alaska Region Marine Mammal Management polar bear critical habitat website[1] for additional information on the extent of polar bear critical habitat within the action area.

Candidate species
Yellow-billed loons (*Gavia adamsii*) breed at low densities within Arctic NWR and may also migrate through the region.

No listed species or designated critical habitats occur in Yukon Flats National Wildlife Refuges, the Steese National Conservation Area, or the White Mountains National Recreation Area.

This letter applies only to endangered and threatened species under USFWS jurisdiction.

Thank you for your cooperation in meeting our joint responsibilities under the Act. If you need further assistance, please contact Denise Walther at (907) 456-0277.

Sincerely,

Ted Swem

Ted Swem
Branch Chief
Endangered Species

cc via e-mail:
Joel Mitchell, NASA
Joshua Bundick, NASA
Winona Brown, Yukon Flats NWR
Ann Marie Larosa, Arctic NWR
Lenore Heppler, BLM

[1] http://alaska.fws.gov/fisheries/mmm/polarbear/esa.htm#critical_habitat

National Aeronautics and
Space Administration

Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, VA 23337

Reply to Attn of: 250.W

September 6, 2011

Mr. Brad Smith
Field Office Supervisor
National Marine Fisheries Service
Protected Resources Division
222 West 7th Avenue, #43
Anchorage, AK 99513-7577

Dear Mr. Smith:

On April 14, 2011, we wrote to you regarding the continued operations of the National Aeronautics and Space Administration's (NASA) Sounding Rockets Program (SRP) at the University of Alaska Fairbanks' (UAF) Poker Flat Research Range (PFRR) near Fairbanks, Alaska.

With this correspondence NASA would like to inquire as to whether the National Marine Fisheries Service (NMFS) believes there may be any species listed under the Endangered Species Act (ESA) of 1973 potentially within the general action area (see enclosed map of the PFRR flight corridors). Any assistance you could provide in identifying concerns you may have about the potential effects of the proposed action on listed species would be appreciated.

As the project proponent, NASA is serving as the lead agency for preparing the National Environmental Policy Act (NEPA) documentation and will also assume this role during any ESA consultation with the NMFS. The U.S. Department of the Interior's Bureau of Land Management (BLM) and U.S. Fish and Wildlife Service (USFWS) would undertake connected actions and accordingly are participating in NASA's NEPA process and ESA consultation. The effects of their actions will be considered in all project-related environmental documentation, including the Environmental Impact Statement (EIS) and any biological assessments or evaluations. As such, please include all three agencies in future ESA-related correspondence regarding NASA's SRP at PFRR.

The enclosed document provides more detailed information regarding the PFRR and the history behind the EIS. Additionally, I encourage you to visit the project's website on a regular basis for the most up-to-date information about the project. The website's address is http://sites.wff.nasa.gov/code250/pfrr_eis.html.

We respectfully request the courtesy of a reply within 30 days of receiving this letter. If you have any specific questions regarding the ESA process, please contact Mr. Joel Mitchell, our Natural Resources Program Manager, at (757) 824-1127 or at Joel.T.Mitchell@nasa.gov.

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Inquiries regarding the EIS should be directed to Mr. Joshua Bundick at (757) 824-2319 or at Joshua.A.Bundick@nasa.gov.

On behalf of the entire EIS team, I would like to thank you for your interest in this project. We look forward to working with you.

Sincerely,

Carolyn Turner

Carolyn Turner
Associate Chief, Medical and Environmental Management Division

2 Enclosures:
1. *Federal Register* Notice
2. PFRR Flight Zone Map

From: Brad Smith
To: Bundick, Joshua A. (WFF-2500);
Subject: Re: PFRR Section 7
Date: Tuesday, September 06, 2011 5:02:32 PM

Hi Joshua, thanks for this background material. It appears that portions of the launch corridor for the Poker Flats facility would extend over the Beaufort Sea. I could not tell whether the action includes azimuths that might involve the Chukchi Sea as well. For purposes of consultation under the ESA, the endangered bowhead whale occurs in both these waters, while the endangered humpback and fin whales are recorded within the Chukchi, but not the Beaufort. No critical habitat for any of these species occurs in or near this region. Additionally, NMFS has proposed to list the ringed and bearded seals as threatened (http://www.fakr.noaa.gov/prules/75fr77496.pdf).

Please contact me regarding any ESA consultation for this project, my desk number is 907-271-3023.

On 9/6/2011 10:56 AM, Bundick, Joshua A. (WFF-2500) wrote:

> Hi Brad, it was nice speaking with you earlier today.
>
> As we discussed, I have attached our April 2011 scoping letter (with incorrect address, but FYI) and September 2011 Section 7 tech info/species list request letter. I apologize for having sent the letter to the wrong address—that should explain why we hadn't heard anything from you..! Where both letters share the same attachments, I have just provided one "package" of attachments for you. I did not send the scoping meeting announcement flyer for obvious reasons....
>
> Please take a look at the information, and let me know if you have any questions. We look forward to working with your office on this project.
>
> Best,
>
> Josh

Joshua Bundick

Lead, Environmental Planning

NASA Wallops Flight Facility

Wallops Island, VA 23337

Office: (757) 824-2319

Fax: (757) 824-1819

Joshua.A.Bundick@nasa.gov

--

Brad K. Smith
Protected Resources Div.
Anchorage
(907)271-3023
Brad.Smith@noaa.gov

United States Department of the Interior
U.S. FISH AND WILDLIFE SERVICE
Fairbanks Fish and Wildlife Field Office
101 12th Avenue, Room 110
Fairbanks, Alaska 99701
August 2, 2012

Joshua Bundick
Lead, Environmental Planning
NASA Wallops Flight Facility
Wallops Island, VA 23337

Re: section 7 consultation under the Endangered Species Act within the Poker Flats Research Range Launch Corridor

Dear Mr. Bundick:

This memorandum is in response to your July 24, 2012 request for concurrence for effects of the National Aeronautics and Space Administration (NASA) Sounding Rockets Program on endangered and threatened species, and critical habitats pursuant to Section 7 of the Endangered Species Act of 1973, as amended (ESA). NASA analyzed effects of the proposed action on three listed species, Steller's eiders (*Polysticta stelleri*), spectacled eiders (*Somateria fischeri*), and the polar bear (*Ursus maritimus*), and one candidate species, the yellow-billed loon (*Gavia adamsii*). The analysis also included an evaluation of the effects of the proposed action on polar bear critical habitat. NASA determined that the proposed action would have no effect on the avian species because of a lack of spatial overlap between these species and project effects, and we concur with this determination. Thus, the proposed action may only affect the polar bear and its critical habitat.

THE PROPOSED ACTION

Based on the biological assessment, we understand NASA's Sounding Rockets Program plans to continue operations at the University of Alaska Fairbanks' Poker Flat Research Range (PFRR) near Fairbanks, Alaska. Federal actions undertaken by the Bureau of Land Management (BLM) and the U.S. Fish and Wildlife Service (USFWS) are also considered in this consultation. These agencies manage lands within the eastern Interior of Alaska and issue authorizations to UAF (on NASA's behalf) for sounding rocket launches; specifically, BLM manages the Steese National Conservation Area and White Mountains National Recreation Area under the Federal Land Policy and Management Act of 1976, as amended; USFWS manages Arctic and Yukon Flats National Wildlife Refuges in accordance with its responsibilities under the National Wildlife Refuge System Administration Act of 1966, as amended.

Program activities
Although the Sounding Rockets program is proposed to continue indefinitely, this consultation considers effects for the next 10 years, the temporal boundary NASA selected for cumulative effects analysis in a forthcoming Environmental Impact Statement for its operations at PFRR.

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NASA plans to continue launching two to four, but no more than eight multi-stage suborbital sounding rockets annually from PFRR near Fairbanks, Alaska. NASA expects no more than 4 Beaufort Sea-impacting rockets would be launched in a given year. If more than four rockets are launched in a given year, NASA expects that the remaining rockets would be of shorter-range configurations and would land well inshore (about 200 km) of the Beaufort Sea; thus, they would not affect listed species. The launches could occur across eight days or concentrated into two or three days. Launches are expected to occur during winter; however, a few non-winter launches could occur. If a non-winter launch were to be proposed, NASA would re-initiate Section 7 consultation at that time.

Description of sounding rockets
The rockets that could affect listed species or critical habitat are the Black Brant-class (or equivalent) vehicles, which employ either three or four rocket motors. NASA sounding rockets consist of one to four solid-propellant rocket motors staged in series. All rocket motors launched by NASA at PFRR would be spin-stabilized, unguided, and solid fueled. Propellants typically include ammonium perchlorate and aluminum or nitrocellulose and nitroglycerine.

Atop the motors are payloads (Figure 1). Payloads could be made of aluminum, steel, magnesium, other lightweight metals, or occasionally composites such as fiberglass or graphite/epoxy. Internal components consist mainly of electronic subsystems, batteries, pressure systems (pressure vessels, tubing, regulators, valves, etc.), and sensors and instruments such as magnetometers, optical devices, and antennas.

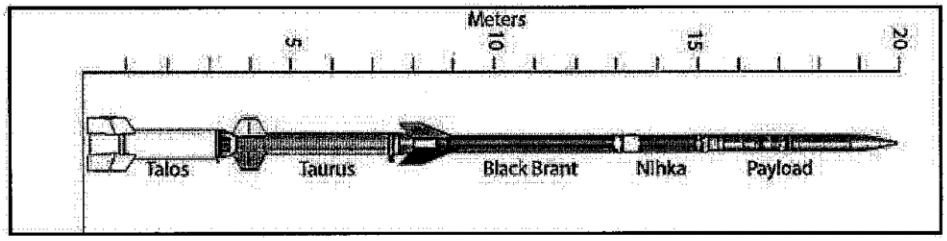

Figure 1. Black Brant XII sounding rocket. Other similar rockets within the Black Brant class of rocket could also be deployed.

Re-entry
Because NASA sounding rockets are suborbital, their upper motors or payloads do not enter an Earth orbit; rather, they return to Earth along parabolic trajectories. All metallic and other solid heavier-than-air objects that are propelled into the atmosphere by sounding rockets would land back on Earth. The objects include spent rocket motors, payloads; nose cone doors (released in flight for instruments to "see" their targets), and spin weights, which were released to change rotation of a rocket stage of a launch. It is expected that extreme re-entry dynamics would result in deployed booms and detectors being separated from their primary structures. However, the primary structures without aluminum skin sections would survive until impact. It is likely that these structures would undergo sufficient deformation such that they, along with any components

housed in these locations, would be dispersed around the impact point. It is possible that batteries could be located in these exposed assemblies, but this is not the typical case. Electronic boards, wiring, connectors and other small components are likely to be numerous in the debris field. Spent motors and enclosed portions of payloads would experience significant damage but are not likely to break apart to the extent that internal elements would be significantly exposed (e.g. residual propellant, telemetry components such as batteries, etc.).

THE ACTION AREA

The action area includes the land, water, and airspace within areas of northern Alaska and the Beaufort Sea as represented in Figure 2.

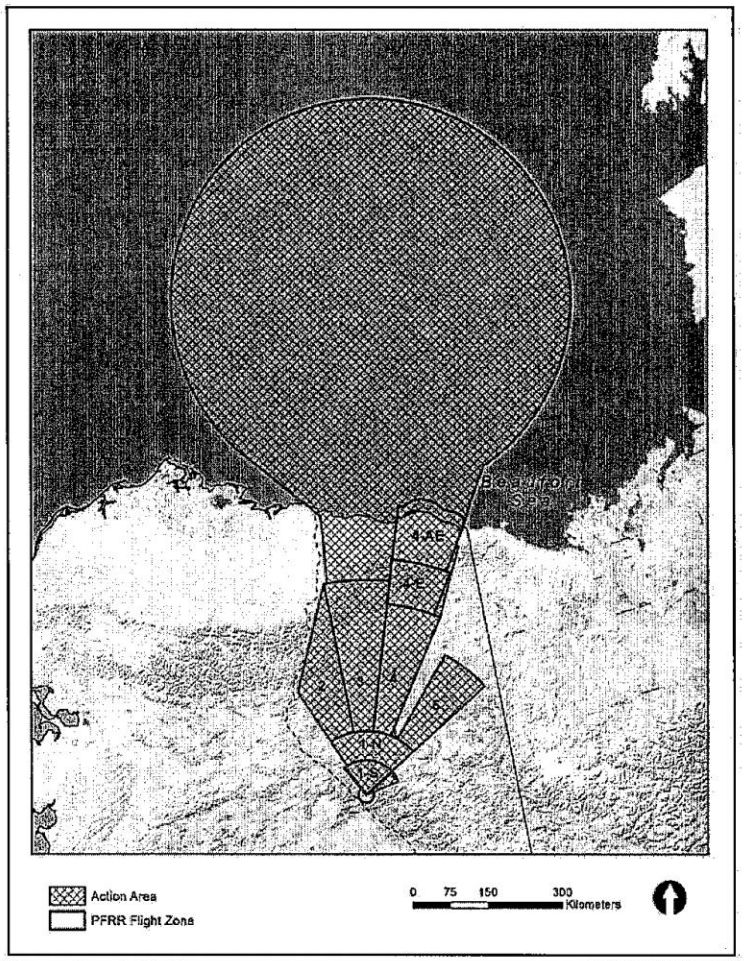

Figure 2. The action area for rockets launched by NASA from PFRR.

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EFFECTS OF THE ACTION

Polar bear

On May 15, 2008, the polar bear was listed as threatened (73 FR 28212). Polar bears would likely be foraging, transiting, and denning in the action area, especially on barrier islands or on sea ice near shore. Polar bears also den in terrestrial areas of the action area. Potential impacts on polar bears from launch operations would be associated with re-entering debris landing within their habitat. Typically, debris would land far offshore in the Beaufort Sea or Arctic Ocean, but there is a small chance that they could land closer to shore in areas frequented by polar bears.

A potential concern for effects to polar bears could be flight debris-related injury, as polar bears are curious animals that typically investigate objects or smells that catch their attention (Stirling 1988). Polar bears have been observed to ingest a wide range of indigestible and hazardous materials and to feed at dumps (Clarkson and Stirling 1994). Instances of polar bear injury related to human made materials (e.g., pieces of a lead battery, ethylene glycol antifreeze) have been documented (Amstrup et al. 1989). However, these have been in unnatural settings (including roadsides treated with antifreeze and dye and the Churchill, Manitoba, municipal landfill) that are much different from the habitat within the PFRR flight corridor. The dump example involved individual bears habituated to finding supplemental food in landfills (Lunn and Stirling 1985).

Debris that lands on sea ice would be unlikely to harm a polar bear in the event one was to encounter it; additionally, polar bears are unlikely to encounter debris given the size of the action area and the relatively small debris field created by a rocket returning to earth. The item is expected to rapidly become covered by ice or drifting snow, essentially making it inaccessible to polar bears. As the ice melts the rocket hardware would subsequently sink into the ocean. If debris landed on multi-year sea ice, the chance that a polar bear would encounter it would be extremely low because polar bears usually use sea ice closer to shore where ice seals, their main prey, are more common. Additionally, the chance that rocket debris would hit a polar bear is very unlikely; thus, we expect effects from falling debris on bears to be discountable.

Assuming four launches per year, the maximum number of items that would enter the Beaufort Sea annually would be four payloads and up to four spent motors (from the final stage). Typical water depths within these areas would be at least 300 m. As discussed earlier, payloads and spent stages that enter the marine environment would sink. Unrecovered payloads contain materials (e.g., batteries) that would result in limited and localized contamination as the materials enter the aquatic environment. Considering the limited number of launches per year, the relatively small size and wide spatial dispersion of debris and its largely inert or non-reactive nature, we anticipate insignificant effects on polar bears.

The probability of a piece of flight hardware landing on a polar bear den was also estimated using information on known polar bear dens in the area. The chance that one of these launches directly impacting a polar bear den is less than one chance in 21 million (4.6×10^{-8}). Thus, we anticipate insignificant effects of polar bears denning in the action area.

Polar bears may hear the sounds generated by debris reentry; however, it is reasonable to conclude that such effects would be temporary, minor, and similar to other natural sounds in

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their marine environment, such as the sounds of ice cracking, popping, and colliding (Greening and Zakarauskas 1994; Milne 1972; Milne and Ganton 1964; Xie and Farmer 1991). Therefore, effects of sound generated from rocket debris re-entry would be insignificant.

Polar bear critical habitat

The Service designated critical habitat for polar bears on November 24, 2010 (75 FR 76086). The Action Area overlaps with the three units of designated polar bear critical habitat: sea ice, terrestrial denning, and barrier islands (Figure 3). Typically, debris would land far offshore in the Beaufort Sea or Arctic Ocean; but, a small chance exists that debris could land in one of the critical habitat units. Critical denning habitat would not typically be affected by these launches as it is outside the normal debris fallout area. The chance that debris would typically impact the sea ice critical habitat unit is less than one chance in 150 (6.6×10^{-3}). While not calculated, the chance of rocket debris impacting barrier island critical habitat is also extremely low. Table 1 shows the probability of a typical spent rocket motor or payload landing within sea ice (feeding) and terrestrial denning polar bear critical habitat. Additionally, assuming an average sea ice thickness of 1 meter (Kwok and Rothrock 2009), it is highly unlikely that re-entry would result in a penetration depth that would exceed the average ice thickness. Payloads and spent motors would likely impact the ice and undergo elastic and plastic deformation while creating an impact crater but would not pierce the ice and immediately sink into the water (Wilcox 2012). Given the extremely low probability of rocket debris landing within and permanently occupying polar bear critical habitat, and the minor effects to sea ice's physical feature if debris did impact sea ice, we anticipate effects on critical habitat to be discountable and insignificant.

Table 1. Probability of impact on polar bear critical habitat and dens

Distance from the PFRR Launch Site (kilometers)	Polar Bear Critical Habitat	Potential Impact Ellipse (square kilometers)	Amount of Polar Bear Critical Habitat Within Ellipse (square kilometers)	Probability of a Spent Stage or Payload Landing in Polar Bear Critical Habitat
1,000	Feeding habitat	503,375	14,964	6.6×10^{-3}
1,000	Denning habitat	503,375	0	0
1,000	Polar bear dens within potential impact area[a]	503,375	0.022	4.6×10^{-8}

a. An estimated 69 known polar bear dens could be within the area potentially impacted by a typical National Aeronautics and Space Administration launch into the Beaufort Sea (Based on information from **Amstrup and Gardner 1994**) based on information collected over the years by the National Oceanic and Atmospheric Administration. Assuming each den covers an area of approximately 3 square meters (30 square feet) **(Stirling 1988)**; this analysis assumes a safety zone within a 10-meter (33-foot) radius of the den. The potential area of disturbance around a polar bear den that could result in either damage to the den or injury or death to the polar bear is estimated to be approximately 315 square meters (380 square yards) per den, or 0.022 square kilometers (0.0085 square miles) for 69 dens.

Note: To convert kilometers to miles, multiply by 0.62137; square kilometers to square miles, by 0.38610.

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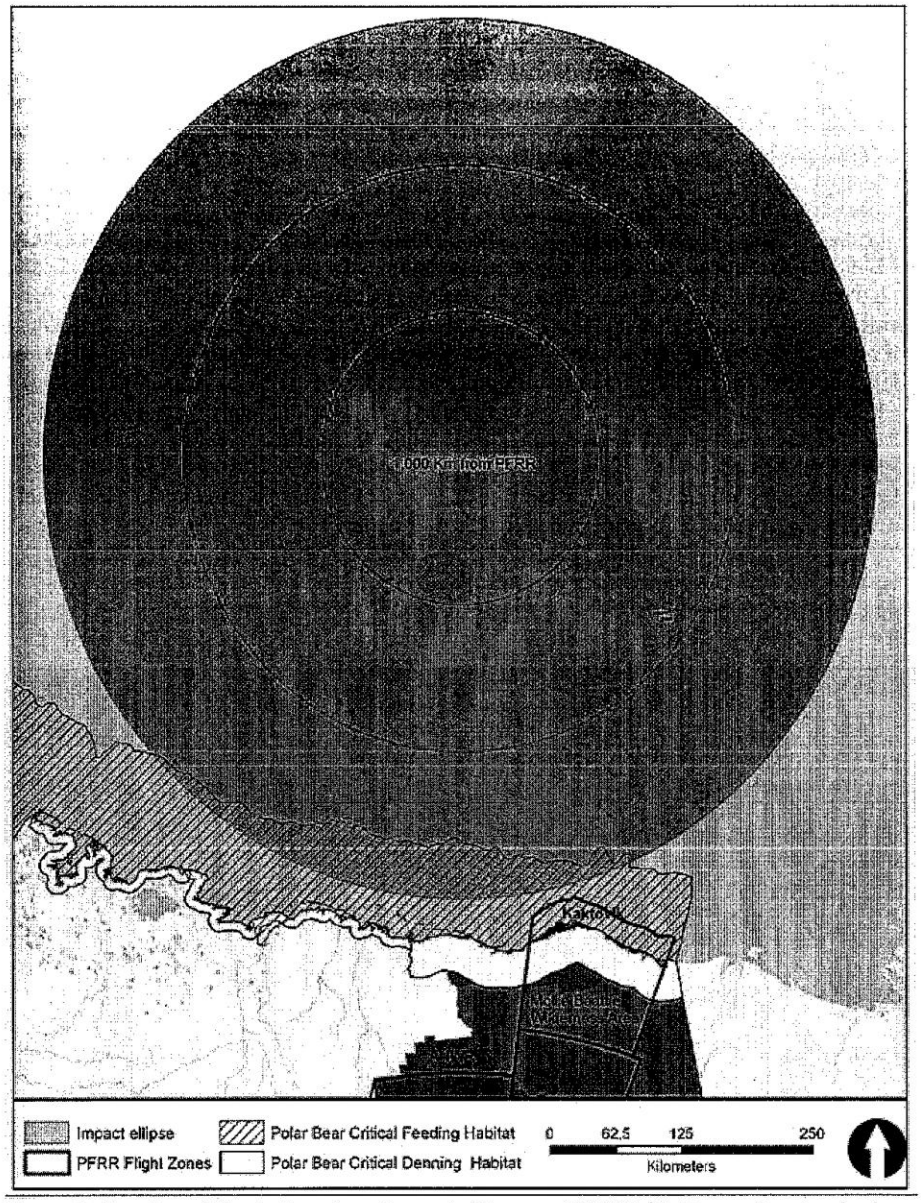

Figure 3. Overlap of the Action Area (impact ellipse and PFRR flight zones) and polar bear critical habitat.

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Summary
While the proposed action may affect polar bears, potential effects would be discountable and insignificant. Likewise, the proposed action would have only insignificant and discountable effects on polar bear critical habitat. The Service therefore concurs that that the proposed action is not likely to adversely affect polar bears and designated critical habitat. We also concur that that the proposed action has no effect on listed eiders and is not likely to jeopardize the continued existence of yellow-billed loons.

Thank you for your cooperation in meeting our joint responsibilities under the ESA. If you need further assistance, please contact Shannon Torrence at (907) 455-1871.

Sincerely,

Ted Swem

Ted Swem
Branch Chief
Endangered Species

Cc:
Mark Bertram, Yukon Flats NWR
Ann Marie Larosa, Arctic NWR
Lenore Heppler, BLM

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

November 1, 2012

Joshua A. Bundick
Environmental Planning Lead
National Aeronautics and Space Administration
Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, Virginia 23337

Dear Mr. Bundick:

On July 25, 2012 the National Marine Fisheries Service (NMFS) received your letter regarding the National Aeronautics and Space Administration's (NASA's) sounding rockets launch program out of Poker Flat, Alaska. You requested concurrence with your determination that the proposed action "may affect, but is not likely to adversely affect" proposed threatened ringed seals pursuant to Section 7 of the Endangered Species Act (ESA).

This consultation letter is based on information provided in the July 2012 Biological Assessment for NASA Sounding Rockets Program at Poker Flat Research Range, and other sources of information. A complete administrative record of this consultation is on file in this office. While the proposed action may affect proposed threatened ringed seals, our assessment (described below) finds any such effects would not adversely affect these species.

This constitutes our informal conference opinion of the effects of this action on the Arctic ringed seal, a species proposed for listing under the ESA. Upon issuance of a final rule to list these seals, NMFS will issue a letter confirming this letter to be the informal consultation for this action.

Action Area

NASA has identified the action area to include all federal and nonfederal lands and waters within the Poker Flat Research Range (PFRR) area and the flight path of the sounding rockets (Fig. 1). This area includes the following:

The land, water, and airspace within PFRR Flight Zones 1, 2, 3, 4, 4 extended, 4 arctic extension, and 5; and the land, water, and airspace within a 400 km (248 mi) circle centered approximately 1,000 km (620 mi) north of the PFRR launch site.

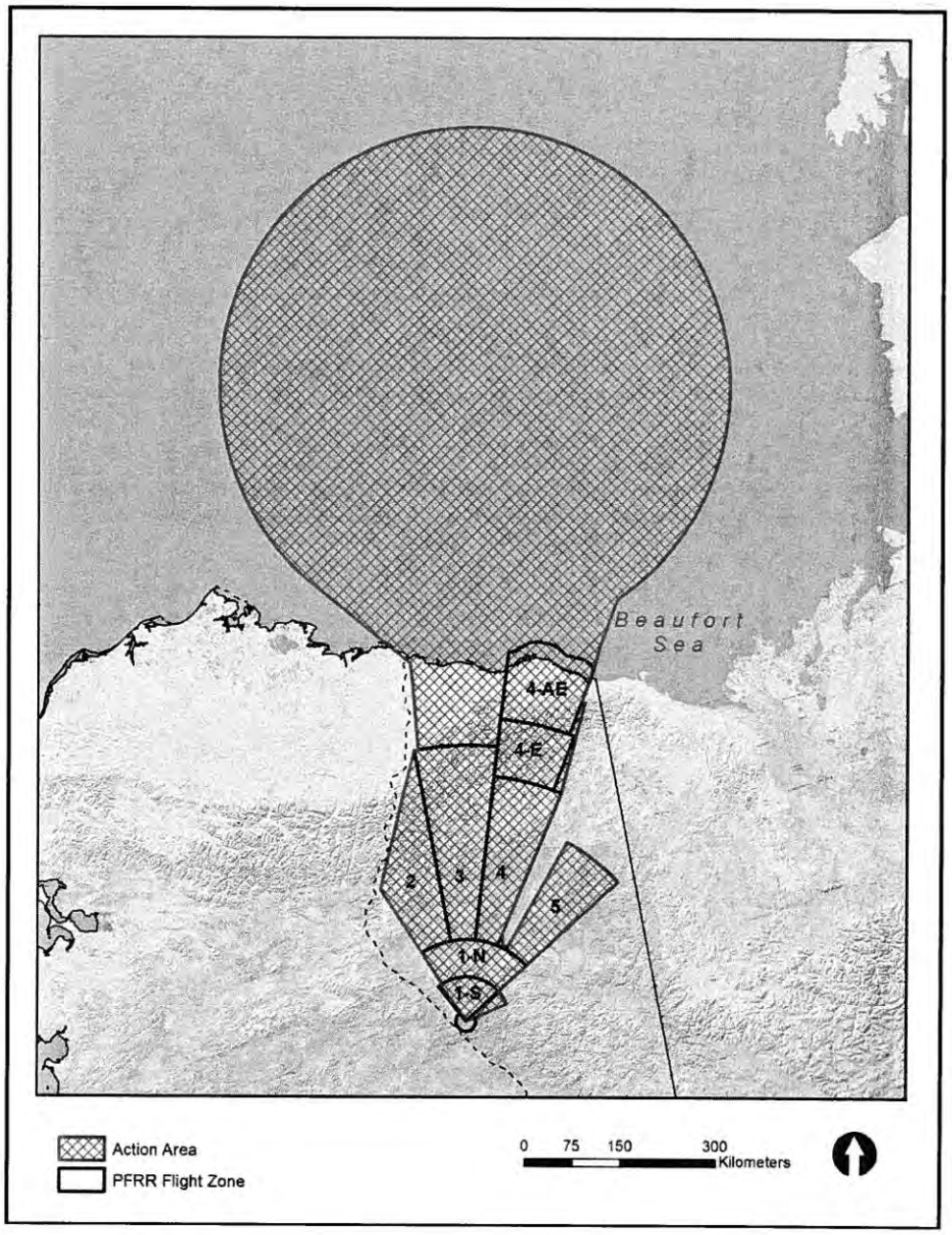

Figure 1. Action Area

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Description of the Action

NASA intends to continue their on-going Sounding Rocket Program (SRP) at the PFRR. NASA sounding rockets consist of one to four ground-launched solid-propellant rocket motors staged in series, the purpose of which is to propel a scientific payload to the upper atmosphere. As NASA sounding rockets are suborbital, their upper stages or payloads do not enter an Earth orbit, rather they return to Earth along parabolic trajectories. All rocket motors launched by NASA at PFRR are spin stabilized, unguided, and solid fueled. Propellants typically include ammonium perchlorate and aluminum or nitrocellulose and nitroglycerine.

A variety of payloads and experiments are flown on SRP missions at PFRR. These payloads/experiments range in size from 0.76 to 5.3 meters (30 to 210 inches) long, are of similar diameter to the rocket motor on which they are flown, and weigh from less than 45 kilograms (100 pounds) to over 140 kilograms (300 pounds). The payloads often contain deployable devices, such as a nose cone used to cover sensitive electronic instruments during ascent, releasable doors, antennas, de-spin weights, cables, and other similar components. In many cases, a payload flown on a single rocket will be separated in flight into multiple pieces, each designed to carry out a specific scientific objective.

All metallic and other solid heavier-than-air objects that are propelled into the atmosphere by sounding rockets land back on Earth in more or less ballistic trajectories. The objects include spent rocket stages, payloads, nose cone doors (released in flight for instruments to "see" their targets), and spin weights, which were released to change rotation of a rocket stage of a launch.

Spent motors and enclosed portions of payloads would experience plastic deformation and significant damage but are not likely to break apart to the extent that internal elements would be significantly exposed (e.g. residual propellant, telemetry components such as batteries, etc.).

A description of materials and equipment that would be relevant in assessing potential effects on listed species or habitat is presented below.

Pyrotechnics - In addition to the rocket propellant, each rocket motor contains a series of small explosive charges. To provide perspective regarding size, the largest charge currently employed is just less than 0.3 grams (0.01 ounce). These charges serve two primary functions: rocket motor ignition and separation of the stage after it has finished burning.

Payloads also contain a number of the above-described pyrotechnic charges for purposes such as removing doors and nosecones to expose the scientific experiment. The size and number of these charges would be mission-specific and would vary; however even in the case that all charges were of the largest variety, the total charge mass would be less than

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28 grams (g) (1 ounce [oz]). Once activated, under normal flight conditions, these pyrotechnic systems would pose no hazard to wildlife on the ground.

Batteries – Small electrical systems are required on each rocket motor such that the ignition and separation functions described above may occur. As only the first stage can be ignited from a ground-based circuit, rechargeable batteries are employed. On the forward end of each motor, approximately 1.8 kg (4 lbs) of nickel-cadmium cells are housed within rigid plastic containers bolted to the head cap of the motor. To assist in providing perspective, this quantity of batteries is comparable to approximately 48 "AA" cells typically used in consumer electronic devices.

In addition to the batteries onboard the rocket motor, the payload would contain batteries for the attitude control system, telemetry, and scientific experiments. The total mass of batteries onboard would vary based upon mission requirements; however, a typical mission would be expected to employ approximately 9 kg (20 lb) of nickel-cadmium batteries. This would equate to approximately three packs of 24 "C" cells and single packs of 24 and 16 "A" cells.

In addition to the cadmium found in the batteries themselves, very small quantities of lead containing solder are used on sounding rocket electrical systems. Although the majority of electrical systems are connected with crimps, some soldered connections are still employed, including those in the battery packs. Approximately 100 g (3.5 oz) of solder would be used on a rocket's entire electrical system, with 40 percent (40 g [1.4 oz]) of this solder consisting of lead. To assist in providing perspective, this quantity of lead is slightly more than what is contained within a single 12-gauge shotgun shell used for small-game hunting.

Balance Weights – To ensure that the spinning rocket components do not "wobble," between 2.3 and 4.5 kg (5-10 lb) of lead balance weights are employed on most sounding rocket payloads. These weights would typically be in the form of 0.6 or 1.3 cm (0.25 or 0.5 in) thick curved plates that are bolted to the inside of the payload skin sections. It would be highly unlikely that these weights would be dislodged such that they would separate from the payload upon impact.

Pressure Systems – Onboard the payload section of the rocket are small cylinders of high pressure (generally 5,000 psi) compressed gas, typically argon or nitrogen. These gases are vented during normal flight to align the payload in optimum position for taking its respective measurement. The typical quantity onboard a sounding rocket is small, estimated to be approximately 0.009 m^3 (0.05 ft^3). Although both gases are non-hazardous, damage to the cylinder could cause the cylinder to rupture or act as a projectile. However, the likelihood of such an incident occurring would be very low as this system is designed to vent its contents during reentry.

Chemical Tracers – Payloads launched from PFRR sometimes carry small quantities of metal vapors (including barium, lithium sodium, strontium, and samarium) or trimethyl aluminum (TMA) that are intentionally dispersed at high altitude to study high-altitude

phenomena. Sodium and lithium releases are produced by burning a mixture of thermite (titanium diboride, the reaction product of boron and titanium) and the metal to produce a vapor. TMA, on the other hand, is a pyrophoric liquid that reacts on contact with oxygen to produce chemiluminescence.

To provide the reader perspective, compounds containing several of these elements are commonly used in non-science-related applications requiring luminescence. In particular, barium creates the green color in fireworks whereas strontium produces the red color. To provide perspective regarding size, for some TMA payloads (the most commonly employed tracer), modules are released during flight with each containing approximately 380 ml (12.9 oz) of the liquid; slightly more than the contents of a typical soda can.

Larger canisters are most commonly used as they release the material along a longer duration of the trajectory and typically hold approximately 6 liters (1.6 gallons). In general, the primary on-the-ground hazard associated with these materials is the potential for fire or burns. During normal flight, these materials are released high in the atmosphere, with only trace amounts (estimated to be less than 100 g [3.5 oz]) present in hardware that returns to earth. The small soda can sized modules would not contain any residual as they rupture during flight; the most likely location of the trace quantities would be within the piping of the canister-type systems.

Future launches are expected to occur within the winter months from October through May, with the majority between January and April, consistent with PFRR launch activity over the past ten years. However, the potential for a researcher to propose an experiment during the non-winter months cannot be discounted. Furthermore, the potential environmental effects from a non-winter launch would be highly mission-specific. In the event that a future non-winter launch were to be proposed, supplemental analysis would be required to determine potential effects on ESA species or habitat, potentially requiring further consultation with the Services.

Future NASA SRP missions at PFRR could average from two to four launches every year. It is expected that no more than eight multi-stage suborbital rockets would be launched in any one year from PFRR under any action alternative. The eight launches could be spread across 8 separate days or concentrated into only 2 or 3 separate days with multiple launches.

Effects from Interdependent and Interrelated Actions

Interdependent actions are defined as actions with no independent use apart from the proposed action. Interrelated actions include those that are part of a larger action and depend on the larger action for justification. No such actions were identified.

Listed Species

No threatened or endangered marine species would be affected by the proposed action. The Arctic sub-species of ringed seal (*Phoca hispida*) has been proposed for listing as threatened and may be affected by these launches. In May of 2008, NMFS received a petition to list ringed seals under the ESA. NMFS completed status review of this species

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in May of 2010 (Kelly ET AL. 2010) and proposed to list the ringed seal as threatened on December 10, 2012 (75 FR 77476).That listing decision is now pending. There are no current reliable population abundance estimates for ringed seals in Alaska (Allen and Angliss 2012).

Ringed Seals

Arctic ringed seals have a circumpolar distribution, occurring in all seas of the Arctic Ocean. Ringed seals have an affinity for ice-covered waters and are able to occupy areas of even continuous ice cover by abrading breathing holes in that ice. Arctic ringed seals do not come ashore and use sea ice as a substrate for resting, pupping, and molting (Kelly *et al.* 2010). Arctic ringed seals use sea ice as a platform for resting throughout the year, and they make and maintain breathing holes in the ice from freeze-up until breakup. They normally give birth in late winter-early spring in subnivean lairs constructed in the snow on the sea ice above breathing holes. Movements during the subnivean period are typically limited, especially when ice cover is extensive. Mating takes place typically in May shortly after parturition. In the spring, as day length and temperature increase, ringed seals haul out in large numbers on the surface of the ice near breathing holes or lairs. This behavior is associated with the annual May-July molt.

Ringed seals feed on a variety of prey; their diet may vary with region. Cod are an important prey species in the Beaufort Sea.

We have little information on the numbers of ringed seals within the action area. Extensive surveys of ringed and bearded seals have been conducted in the Beaufort Sea, but most surveys have been conducted over the landfast ice, and few seal surveys have occurred in open water or in the pack ice.

No critical habitat has been designated for this species.

Effect of the Action on Listed Species

The ESA Section 7 implementing regulations (50 CFR 402.02) define "effects of the action" as:

> "The direct and indirect effects of an action on the species or critical habitat together with the effects of other activities which are interrelated or interdependent with that action, that will be added to the environmental baseline. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur (50 CFR 402.02)."

There are three possible determinations of effects under the ESA. The determinations and their definitions are:

No Effect – The proposed action or interrelated or interdependent actions will not affect (positively or negatively) listed species or their habitat.

May affect, not likely to adversely affect – The proposed action or interrelated or interdependent actions may affect listed species or their habitat, but the effects are expected to be insignificant, discountable, or entirely beneficial. *Insignificant effects* relate to the size of the impact and should never reach the scale where a take will occur. *Discountable effects* are those that are extremely unlikely to occur. Based on best judgment, one would not 1) be able to meaningfully measure, detect, or evaluate insignificant effects; or 2) expect discountable effects to occur. *Beneficial effects* are contemporaneous positive effects with no adverse effects to listed species.

May affect, likely to adversely affect – The proposed action or interrelated or interdependent actions may have measurable or significant adverse effects on listed species or their habitat. Such a determination requires formal ESA Section 7 consultation.

Determinations are also required to assess the effects of a federal action on any designated critical habitat for listed species.

Discussion

According to the BA, the potential impacts on ringed seals from launch operations would be associated with re-entering payloads and/or stages landing near seals or seal habitat, and sonic booms.

The possibility of payloads contacting ringed seals is remote. Assuming a conservative density of 1 individual per square kilometer throughout the Beaufort Sea and allowing for a 10-meter (33-foot) radius buffer zone around each seal, NASA calculates the per-launch chance of an impact near a ringed seal as approximately 1 in 3,200.

Sounding rockets reach supersonic speeds very quickly (i.e., after several seconds); however they generally would not generate a sonic boom noticeable on the ground due to their high angle of ascent. The ballistic re-entry of a representative stage or payload would generate a mild sonic boom at an altitude between 18,000 m (60,000 ft) and 9,000 m (30,000 ft). The peak instantaneous sound pressure received on the ice would be approximately 114 dB and be of very low frequency (less than 100 Hz). The duration of the low frequency sound would be very brief at approximately 30 milliseconds.

In addition to the sonic boom, the stage or payload would eventually land on the snow-covered ice, generating a momentary impulse sound estimated to be 131 dB (at 15 m [50 ft] distance from the impact site) in air; 192 dB in the water below the impact site. This

conservative estimate is based upon the kinetic energy of the impacting piece of flight hardware.

A primary concern of sound exposure on pinnipeds is whether the source would result in either temporary or permanent hearing loss. Based upon the conservatively derived source levels from flight hardware impacting the sea ice, it is possible that individuals directly under the area of impact could be exposed to levels above the 190 dB Level A injury threshold currently recognized as the acoustic threshold for the onset of temporary threshold shift due to in-water acoustic exposure. However, it is highly unlikely that this would occur based upon the probability of impact calculations. Further, with normal propagation conditions in water, a source level of 190 dB would degrade within a few meters to levels not capable of inducing hearing shifts.

Southall *et al.* (2007) considered in-air levels capable of inducing temporary threshold shifts in pinnipeds, and proposed 149 dB re: 20 μPa (flat weighting) as the appropriate criteria. The expected noise levels for sonic booms from re-entry should be well below this level. An area of uncertainty is whether such sonic booms could induce a startle reaction in seals. NMFS concludes this is unlikely due to the relatively low densities of seals, the transient nature of the noise, the expected intensity of the sonic boom on the ground, and the fact that the frequency would be below 100 Hz. Seals hear at relatively high frequencies, and their hearing is poor at frequencies below 500 Hz (Richardson *et al.* 1995).

Launch operations could overlap the general ringed seal birthing and suckling period (i.e., mid-March to April), presenting concern for in-lair pups. However, snow dens have been found to be very effective in muffling sound and vibration. Even with relatively modest attenuation, it may be concluded that in-den received sound levels from an incoming sounding rocket section would be below the criteria proposed by Southall *et al.* (2007) and would have negligible adverse effects. Furthermore, as nearly all of the sound energy of the sonic boom is below 75 Hz (the minimum estimated range of hearing as presented in Southall *et al.* [2007]), it is doubtful that boom-induced sounds received outside of dens would be detected by seals.

In summary, the sound resulting from sonic booms or the impact of payloads on the snow and ice would not be expected to cause adverse effects on individuals in or out of water. Although this analysis cannot discount all possibility that ringed seals would hear the sounds generated by stage and payload reentry, it is reasonable to conclude that such effects would be temporary and similar to other natural sounds in their environment, such as the sounds of ice cracking, popping, and colliding.

Payloads and spent stages that enter the marine environment are expected to reach the ocean floor and lodge in oxygen-poor sediments or remain on the ocean floor and corrode or become encrusted by marine organisms. In nearly all cases, these items would ultimately be interred at water depths greater than 300 m (1,000 ft). Under normal conditions, spent stages are essentially inert steel tubes with an electronic system on the forward end, which contains batteries and wiring. Payloads contain small quantities of

batteries and other materials that would gradually leach into the water column, resulting in limited and localized contamination that would be rapidly dispersed by currents. Any impacts to ringed seals from these items would be insignificant.

Conclusion

NMFS concurs with NASA's determination that the planned action "may affect, but is not likely to adversely affect" Arctic ringed seals. Given the generally low levels of anticipated risk to these animals and the probabilities of occurrence associated with the potential impacts (stressors), NMFS concludes that this action will have an insignificant and/or discountable effect on this species.

Re-initiation of consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) take of a listed species occurs, (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not considered, (3) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered, or (4) a new species is listed or critical habitat designated that may be affected by the action. Should you have further questions or concerns, please contact Brad Smith at (907) 271-3023 or Brad.Smith@NOAA.gov.

Sincerely,

Robert D Mecum

for James W. Balsiger, Ph.D.
Administrator, Alaska Region

9

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

April 30, 2013

Joshua A. Bundick
Environmental Planning Lead
National Aeronautics and Space Administration
Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, Virginia 23337

Dear Mr. Bundick:

On November 1, 2012 the National Marine Fisheries Service (NMFS) issued a Letter of Concurrence (LOC) regarding the National Aeronautics and Space Administration's (NASA's) sounding rockets launch program out of Poker Flat, Alaska. We recently received your request that NMFS confirm our conclusions relative to the Arctic ringed seal and the Beringia bearded seal. These seals were proposed for listing under the Endangered Species Act at the time of our earlier consultation. NMFS published Final Rules to list these animals as threatened species in December 2012.

We have reviewed your request and find that the conclusions of the LOC regarding these seals remain correct, and that there have been no significant changes in the subject action or in the information used in preparing our LOC. Therefore that letter represents our informal consultation on these seals. No further action is necessary on the part of the National Aeronautics and Space Administration. This concludes section 7 consultation. Reinitiation of consultation is required if: (1) take of a listed species occurs, (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered, (3) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not previously considered, or (4) a new species is listed or critical habitat designated that may be affected by the action.

Please contact Mr. Brad Smith in our Anchorage office if you have any questions in this matter, (907-271-3023).

Sincerely,

James W. Balsiger, Ph.D.
Administrator, Alaska Region

ALASKA REGION - www.fakr.noaa.gov

References cited

Allen, B. M., and R. P. Angliss. 2012. Alaska marine mammal stock assessments, 2011. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-234, 288 p.

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A.4 FEDERAL REGISTER NOTICES

DATE	TYPE OF NOTICE	AGENCY
April 13, 2011	Notice of Intent	NASA
September 28, 2012	Notice of Availability of *Draft PFRR EIS*	U.S. Environmental Protection Agency
October 10, 2012	Notice of Availability of *Draft PFRR EIS*	NASA

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qualitative feedback we mean information that provides useful insights on perceptions and opinions, but are not statistical surveys that yield quantitative results that can be generalized to the population of study. This feedback will provide insights into customer or stakeholder perceptions, experiences and expectations, provide an early warning of issues with service, or focus attention on areas where communication, training or changes in operations might improve delivery of products or services. These collections will allow for ongoing, collaborative and actionable communications between the Agency and its customers and stakeholders. It will also allow feedback to contribute directly to the improvement of program management.

Feedback collected under this generic clearance will provide useful information, but it will not yield data that can be generalized to the overall population. This type of generic clearance for qualitative information will not be used for quantitative information collections that are designed to yield reliably actionable results, such as monitoring trends over time or documenting program performance. Such data uses require more rigorous designs that address: The target population to which generalizations will be made, the sampling frame, the sample design (including stratification and clustering), the precision requirements or power calculations that justify the proposed sample size, the expected response rate, methods for assessing potential non-response bias, the protocols for data collection, and any testing procedures that were or will be undertaken prior to fielding the study. Depending on the degree of influence the results are likely to have, such collections may still be eligible for submission for other generic mechanisms that are designed to yield quantitative results.

The Agency received no comments in response to the 60-day notice published in the **Federal Register** of December 22, 2010 (75 FR 80542).

Below we provide NASA Headquarters projected average estimates for the next three years: [1]

Current Actions: New collection of information.

Type of Review: New Collection.

Affected Public: Individuals and Households, Businesses and Organizations, State, Local or Tribal Government.

Average Expected Annual Number of Activities: 1,000.

Respondents: 200,000 annually.

Annual Responses: 200,000.

Frequency of Response: Once per request.

Average Minutes per Response: 15 minutes.

Burden Hours: 50,000 hours (over three years).

An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid Office of Management and Budget control number.

Fran Teel,

Acting NASA Clearance Officer.

[FR Doc. 2011–8761 Filed 4–12–11; 8:45 am]

BILLING CODE 7510–13–P

[1] The 60-day notice included the following estimate of the aggregate burden hours for this generic clearance federal-wide:

Average Expected Annual Number of Activities: 25,000.

Average Number of Respondents per Activity: 200.

Annual Responses: 5,000,000.

Frequency of Response: Once per request.

Average Minutes per Response: 30.

Burden Hours: 2,500,000.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

[Notice (11–034)]

National Environmental Policy Act; Sounding Rockets Program; Poker Flat Research Range

AGENCY: National Aeronautics and Space Administration.

ACTION: Notice of intent to prepare an Environmental Impact Statement (EIS) and to conduct scoping for continuing sounding rocket operations at Poker Flat Research Range (PFRR), Alaska.

SUMMARY: Pursuant to the National Environmental Policy Act, as amended, (NEPA) (42 U.S.C. 4321 *et seq.*), the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 CFR parts 1500–1508), and NASA's NEPA policy and procedures (14 CFR part 1216, subpart 1216.3), NASA intends to prepare an EIS for its continued use of the University of Alaska-Fairbanks (UAF) owned and managed PFRR, outside of Fairbanks, Alaska. The U.S. Fish and Wildlife Service (USFWS), Bureau of Land Management (BLM), and UAF will serve as Cooperating Agencies as they possess both regulatory authority and specialized expertise regarding the Proposed Action that will be the subject of the EIS.

The purpose of this notice is to apprise interested agencies, organizations, tribal governments, and individuals of NASA's intent to prepare the EIS and to request input regarding the definition of reasonable alternatives and significant environmental issues to be evaluated in the EIS.

In cooperation with BLM, UAF, and USFWS, NASA will hold public scoping meetings as part of the NEPA process associated with the development of the EIS. The scoping meeting locations and dates identified at this time are provided under **SUPPLEMENTARY INFORMATION** below.

DATES: Interested parties are invited to submit comments on environmental issues and concerns, preferably in writing, on or before June 1, 2011, to assure full consideration during the scoping process.

ADDRESSES: Comments submitted by mail should be addressed to Joshua Bundick, Manager, Poker Flat Research Range EIS, NASA Goddard Space Flight Center's Wallops Flight Facility, Wallops Island, Virginia 23337. Comments may be submitted via e-mail to *Joshua.A.Bundick@nasa.gov.*

FOR FURTHER INFORMATION CONTACT: Joshua Bundick, Manager, Poker Flat Research Range EIS, NASA Wallops Flight Facility, Wallops Island, Virginia 23337; telephone (757) 824–2319; e-mail: *Joshua.A.Bundick@nasa.gov.* Additional information about NASA's Sounding Rocket Program (SRP) and the University of Alaska-Fairbanks' PFRR may be found on the internet at *http://sites.wff.nasa.gov/code810* and *http://www.pfrr.alaska.edu,* respectively. Information regarding the NEPA process for this proposal and supporting documents (as available) are located at *http://sites.wff.nasa.gov/code250/pfrr_eis.html.*

SUPPLEMENTARY INFORMATION:

Programmatic Background

NASA's SRP, based at the Goddard Space Flight Center's Wallops Flight Facility (WFF), supports the NASA Science Mission Directorate's strategic vision and goals for understanding the phenomena affecting the past, present, and future of Earth and the solar system and supports the Agency's educational mission. The suborbital missions enabled by the SRP provide researchers with opportunities to build, test, and fly new instrument concepts while simultaneously conducting world class scientific research. With its hands-on approach to mission formulation and execution, the SRP also helps ensure that the next generation of space scientists receives the training and experience necessary to move on to NASA's larger, more complex missions

Launch Sites

Sounding rockets can be launched from permanently established ranges or from temporary launch sites using NASA's mobile range assets. Permanent ranges include WFF in Wallops Island, Virginia; PFRR near Fairbanks, Alaska; White Sands Missile Range (WSMR) in White Sands, New Mexico; Kwajalein Island, Marshall Islands Republic; Esrange, Kiruna, Sweden; and the Norwegian Rocket Range, Andøya, Norway. In the past, temporary launch sites have included Australia, Brazil, Greenland, and Puerto Rico. The majority of sounding rocket launches occur at WSMR, WFF, and PFRR.

Where the SRP conducts its work is highly dependent on the scientific goals of each mission. For example, if equatorial phenomena must be observed, a site such as Brazil is used. For middle latitudes, Wallops Island, Virginia, or White Sands, New Mexico, are selected. If the aurora borealis must be observed, a northern latitude is required, such as at PFRR.

PFRR Background

The PFRR, located northeast of the unincorporated village of Chatanika, Alaska, consists of approximately 2,100 hectares (5,200 acres) of land that house rocket and payload support facilities, launch pads, and tracking infrastructure. Since the late 1960s, NASA, other government agencies, and educational institutions have supported suborbital rocket launches from the PFRR. While the PFRR is owned and managed by the Geophysical Institute of UAF, the NASA SRP has exclusively funded and managed the support contract with PFRR for more than 25 years.

The northern location of the PFRR is strategic for launching sounding rockets for scientific research in auroral space physics and earth science. The PFRR is the only high-latitude, auroral-zone rocket launching facility in the United States where a sounding rocket can readily study the aurora borealis and the sun–Earth connection. Recent Earth science-based missions have furthered the understanding of ozone depleting substances in the upper atmosphere. Such studies are critical for the continual refinement of theories and research on the topics of ozone depletion, global warming, and climate change. Recent space physics-focused missions have measured the upper atmospheric winds and auroras in the ionosphere. The information collected further assists the nation's scientists in understanding the interactions between the sun and Earth as well as the origin and evolution of the solar system. Technology development and validation enabled by the SRP at the PFRR is critical in furthering the development of Earth and space science instruments at a fraction of the size and cost that would result from using other launch methods. The PFRR facility also supports educational outreach programs where students and scientists from various universities are able to conduct aeronautics and space research.

Additionally, from an operational perspective, PFRR is an ideal location for sounding rocket missions. Directly north (downrange) from the launch site are vast areas of open, very sparsely populated lands of interior Alaska and the Arctic Ocean to the extreme north. Having the ability to launch rockets over such a vast area with very low population density is critical to ensuring public safety.

Existing SRP NEPA Documents and Context

In 2000, NASA published a Final Supplemental EIS (FSEIS) for the SRP. The 2000 FSEIS considered SRP operations at a programmatic level and expanded upon the original SRP EIS prepared in 1973, to include multiple launch sites, new launch vehicles, and updated environmental conditions. In its Record of Decision for the 2000 FSEIS, NASA decided to continue SRP operations at its current level of effort at all launch sites, including PFRR. Since then, NASA has launched approximately four (4) sounding rockets annually from PFRR primarily during the winter months. It is expected that this launch rate at PFRR would continue to satisfy NASA's needs into the reasonably foreseeable future.

NASA recently reviewed its 2000 SRP FSEIS and determined that the overall environmental analysis in the 2000 SRP FSEIS remains sufficient to support the Agency's broad programmatic decision to continue the SRP, however potential changes in both PFRR operations and the environmental context of the launch corridor north of PFRR warrant preparation of additional PFRR-specific environmental analysis to better inform Agency decisions regarding PFRR. For example, PFRR is now considering a more rigorous rocket and payload recovery process. Additionally, a large portion of downrange lands are undergoing wilderness review, which could ultimately affect how rocket and payload recoveries are handled.

Accordingly, NASA began the preparation of an Environmental Assessment to determine if those changes presented potentially a significant impact necessitating an EIS. During the scoping process for the EA in the fall of 2010, NASA solicited input from over 75 potentially interested agencies and organizations. A number of conservation organizations expressed concern regarding NASA's continued operations at PFRR and requested that a more detailed assessment be performed. As such, NASA decided that an EIS would be the most appropriate level of NEPA documentation for the proposal. The subject EIS will tier from the programmatic 2000 FSEIS and provide a focused analysis of SRP operations at PFRR.

Cooperating Agency Actions

The PFRR EIS will serve as a decision-making tool not only for NASA but also for its two Federal Cooperating Agencies, BLM and USFWS. Directly north of the PFRR facility are its downrange flight zones, over which rockets are launched and within which spent stages and payloads impact the ground. Within these flight zones are landmasses owned or managed by several Federal, State and Native Alaskan organizations, including the USFWS, BLM, Alaska Department of Natural Resources, Doyon Regional Corporation, and the Native Village of Venetie Tribal Government. More specifically, the subject Federal lands within the PFRR flight corridor are BLM's North Steese Conservation Area and White Mountain National Recreational Area, and the UFWS-managed Arctic and Yukon Flats National Wildlife Refuges (NWRs). Historically, the managing entities have issued UAF annual or multi-year special-use authorizations and agreements for impact of rockets and recovery operations on these lands. BLM and USFWS are currently considering if and how future authorizations for rocket landing and recovery would be issued for the properties under their management. Additionally, both agencies are currently preparing long-term management plans for their respective landholdings. BLM is currently drafting its Eastern Interior Resource Management Plan; Arctic NWR is currently updating its Comprehensive Conservation Plan (CCP); and the revision of the Yukon Flats NWR CCP is expected to begin within the next two years. The results of these planning processes will play a significant role in how future launches from PFRR would occur. As such, the PFRR EIS will consider the effects of each agency's respective permitting actions within the context of their long-term management objectives.

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Alternatives

The EIS will consider a range of alternatives that meet NASA's needs for obtaining the requisite earth and space science data afforded by high-latitude sounding rocket launches in support of both NASA's science and educational missions.

Alternatives currently being considered for evaluation in the EIS include:

• Continuing the SRP in its present form and at the current level of effort;

• Continuing SRP launches from PFRR within the existing flight zones with differing requirements for identification and recovery of spent stages and payloads;

• Modifying the trajectories of the existing flight zones; and

• Conducting a subset of launches at other high-latitude launch sites, thereby avoiding the federally-managed lands.

The No Action Alternative is to discontinue sounding rocket launches from PFRR. NASA anticipates that the areas of potential environmental impact from each alternative of most interest to the public will be: The effects of rocket and payload landing and recovery on special interest lands (including Wilderness Areas and Wild Rivers), considerations to ensure public safety during rocket flight, and potential effects on subsistence uses on lands within the flight zones.

Scoping Meetings

NASA and its Cooperating Agencies plan to hold three public scoping meetings to provide information on the PFRR EIS and to solicit public comments regarding environmental concerns and alternatives to be considered in the EIS. The public scoping meetings are scheduled as follows:

—Friday, April 29, 2011, at the Tribal Hall, Third and Alder Streets, Fort Yukon, Alaska, 1 p.m.–4 p.m.

—Monday, May 2, 2011, at the University of Alaska-Fairbanks, William R. Wood Student Center, 505 South Chandalar Drive, Fairbanks, Alaska, 2 p.m.–4 p.m.

—Monday, May 2, 2011, at the Pioneer Park, Blue Room, 2300 Airport Way, Fairbanks, Alaska, 6 p.m.–8 p.m.

—Tuesday, May 3, 2011, at the United States Fish and Wildlife Service Alaska Regional Office, Gordon Watson Conference Room, 1011 East Tudor Road, Anchorage, Alaska, 2 p.m.–4 p.m. and 6 p.m.–8 p.m.

As the EIS is prepared, the public will be provided several opportunities for involvement, the first of which is during scoping. Even if an interested party does not have input at this time, other avenues, including reviews of the Draft and Final EIS, will be offered in the future. The availability of these documents will be published in the **Federal Register** and through local news media to ensure that all members of the public have the ability to actively participate in the NEPA process.

In conclusion, written public input on alternatives and environmental issues and concerns associated with NASA's SRP launches at PFRR that should be addressed in the EIS are hereby requested.

Olga M. Dominguez,

Assistant Administrator, Office of Strategic Infrastructure.

[FR Doc. 2011–8844 Filed 4–12–11; 8:45 am]

BILLING CODE 7510–13–P

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

[Notice: (11–035)]

NASA Advisory Council; Space Operations Committee; Meeting.

AGENCY: National Aeronautics and Space Administration.

ACTION: Notice of meeting.

SUMMARY: In accordance with the Federal Advisory Committee Act, Public Law 92–463, as amended, the National Aeronautics and Space Administration announces a meeting of the NASA Advisory Council (NAC) Space Operations Committee.

DATES: Tuesday, May 3, 2011, 8 a.m.–2 p.m. local time.

ADDRESSES: Doubletree Hotel, 2080 North Atlantic Ave, Cocoa Beach, FL 32931.

FOR FURTHER INFORMATION CONTACT: Mr. Jacob Keaton, NAC Space Operations Committee Executive Secretary, National Aeronautics and Space Administration Headquarters, Washington, DC 20546, 202/358–1507, *jacob.keaton@nasa.gov*.

SUPPLEMENTARY INFORMATION: The agenda for the meeting includes the following topics:

—Space Operations Mission Directorate FY2012 Budget.

—Commercial Crew Development Program status.

—Commercial Orbital Transportation System status.

—21st Century Launch Complex status.

—Recommendation preparation and discussion.

The meeting will be open to the public up to the seating capacity of the room. It is imperative that the meeting be held on this date to accommodate the scheduling priorities of the key participants.

P. Diane Rausch,

Advisory Committee Management Officer, National Aeronautics and Space Administration.

[FR Doc. 2011–8845 Filed 4–12–11; 8:45 am]

BILLING CODE 7510–13–P

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

[Notice: (11–036)]

NASA Advisory Council; Audit, Finance and Analysis Committee; Meeting

AGENCY: National Aeronautics and Space Administration.

ACTION: Notice of meeting.

SUMMARY: In accordance with the Federal Advisory Committee Act, Public Law 92–463, as amended, the National Aeronautics and Space Administration announces a meeting of the Audit, Finance and Analysis Committee of the NASA Advisory Council.

DATES: Tuesday, May 3, 2011, 9 a.m.–11:45 a.m., Local Time.

ADDRESSES: NASA Headquarters, Conference Room 8D48, 300 E Street, SW., Washington, DC 20546.

FOR FURTHER INFORMATION CONTACT: Ms. Charlene Williams, Office of the Chief Financial Officer, National Aeronautics and Space Administration Headquarters, Washington, DC 20546, Phone: 202–358–2183, fax: 202–358–4336.

SUPPLEMENTARY INFORMATION: The agenda for the meeting includes the following topics:

• Overview of the GAO Quick Look Book.

• Overview of the NASA Strategic Plan.

• Committee Discussion.

The meeting will be open to the public up to the seating capacity of the room. It is imperative that the meeting be held on this date to accommodate the scheduling priorities of the key participants. Visitors will need to show a valid picture identification such as a driver's license to enter the NASA Headquarters building (West Lobby—Visitor Control Center), and must state that they are attending the Audit, Finance, and Analysis Committee meeting in room 8D48 before receiving an access badge. All non-U.S. citizens

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Road, Suite A, Concord, OH 44077. *Active ingredient:* Flonicamid. *Product Name:* Technical Flonicamid Insecticide. *Proposed Use(s):* Berry, low-growing (subgroup 13–07G); Cucumber (for greenhouse use); and Rapeseed (subgroup 20A).

2. *Registration Number:* 71512–9. *Docket Number:* EPA–HQ–OPP–2011–0985. *Company name and address:* ISK Bioscience Corporation, 7470 Auburn Road, Suite A, Concord, OH 44077. *Active ingredient:* Flonicamid. *Product Name:* Flonicamid 50WG. *Proposed Use(s):* Berry, low-growing (subgroup 13–07G); Cucumber (for greenhouse use); and Rapeseed (subgroup 20A).

3. *Registration Number:* 71512–10. *Docket Number:* EPA–HQ–OPP–2011–0985. *Company name and address:* ISK Bioscience Corporation, 7470 Auburn Road, Suite A, Concord, OH 44077. *Active ingredient:* Flonicamid. *Product Name:* Beleaf 50SG Insecticide. *Proposed Use(s):* Berry, low-growing (subgroup 13–07G); Cucumber (for greenhouse use); and Rapeseed (subgroup 20A).

4. *Registration Number:* 71512–14. *Docket Number:* EPA–HQ–OPP–2011–0985. *Company name and address* ISK Bioscience Corporation, 7470 Auburn Road, Suite A, Concord, OH 44077. *Active ingredient:* Flonicamid. *Product Name:* Flonicamid 50WG for Manufacturing and Repacking Use Only. *Proposed Use(s):* Berry, low-growing (subgroup 13–07G); Cucumber (for greenhouse use); and Rapeseed (subgroup 20A).

List of Subjects

Environmental protection, Pesticides and pests.

Dated: September 21, 2012.

Daniel J. Rosenblatt,

Acting Director, Registration Division, Office of Pesticide Programs.

[FR Doc. 2012–23981 Filed 9–27–12; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[ER–FRL–9005–3]

Environmental Impacts Statements; Notice of Availability

Responsible Agency: Office of Federal Activities, General Information (202) 564–7146 or *http://www.epa.gov/compliance/nepa/*. Weekly receipt of Environmental Impact Statements Filed 09/17/2012 Through 09/21/2012 Pursuant to 40 CFR 1506.9.

Notice

Section 309(a) of the Clean Air Act requires that EPA make public its comments on EISs issued by other Federal agencies. EPA's comment letters on EISs are available at: *http://www.epa.gov/compliance/nepa/eisdata.html.*

SUPPLEMENTARY INFORMATION: Starting October 1, 2012, EPA will not accept paper copies or CDs of EISs for filing purposes; all submissions on or after October 1, 2012 must be made through e-NEPA. While this system eliminates the need to submit paper or CD copies to EPA to meet filing requirements, electronic submission does not change requirements for distribution of EISs for public review and comment. To begin using e-NEPA, you must first register with EPA's electronic reporting site—*https://cdx.epa.gov/epa_home.asp.*

EIS No. 20120305, Final EIS, USFS, OR, Ogden Vegetation Management Project and Forest Plan Amendment, Proposes to Conduct Vegetation and Fuel Management Activities that will Protect, Maintain, and/or Enhance the Forests Natural Resources and Recreational Opportunities, Bend/Ft. Rock Ranger District, Deschutes National Forest, Deschutes County, OR, Review Period Ends: 10/29/2012, Contact: Beth Peer 541–383–4769.

EIS No. 20120306, Final EIS, USFS, WI, Park Falls Hardwoods Vegetation and Transportation Management Activities, Implementation, Chequamegon-Nicolet National Forest, Medford-Park Falls Ranger District, Price County, WI, Review Period Ends: 10/29/2012, Contact: Jane Darnell 715–748–4875, ext. 38.

EIS No. 20120307, Draft EIS, USFS, AZ, Rim Lakes Forest Restoration Project, Amendment to the Apache-Sitgreaves National Forests Land and Resource Management Plan, Coconino County, AZ, Comment Period Ends: 11/13/2012, Contact: Sandy Hurlocker 505–753–7331.

EIS No. 20120308, Draft EIS (Tiering), NASA, AK, Sounding Rocket Program (SRP) at Poker Flat Research Range (PFRR), Continuing Sounding Rocket Launches, Alaska, Comment Period Ends: 11/26/2012, Contact: Joshua Bundick 757–824–2319.

Amended Notices

EIS No. 20100234, Final EIS, USAF, 00, ADOPTION—Shaw Air Base Airspace Training Initiative (ATI) of Bulldog Military Operating Areas, 20th Fighter Wing Proposal to Modify the Training Airspace Overlying Parts, South Carolina and Georgia, Review Period Ends: 07/26/2010, Contact: Linda Devine 757–764–9434 ADOPTION—The U.S. Department of Transportation's Federal Aviation Administration adopted partial of the U.S. Air Force's Final EIS filed with EPA. The FAA was a cooperating Agency with the USAF's EIS therefore, no distribution was needed for this adoption and there is no comment period.

Dated: September 25, 2012.

Cliff Rader,

Director, NEPA Compliance Division, Office of Federal Activities.

[FR Doc. 2012–23928 Filed 9–27–12; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[EPA–HQ–OPP–2012–0390; FRL–9363–7]

Notice of Receipt of Pesticide Products; Registration Applications

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice.

SUMMARY: EPA has received applications to register pesticide products containing active ingredients not included in any previously registered pesticide products. Pursuant to the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), EPA is hereby providing notice of receipt and opportunity to comment on these applications.

DATES: Comments must be received on or before October 29, 2012.

ADDRESSES: Submit your comments, identified by docket identification (ID) number and the EPA File Symbol for the product of interest as shown in the body of this document, by one of the following methods:

- *Federal eRulemaking Portal: http://www.regulations.gov.* Follow the online instructions for submitting comments. Do not submit electronically any information you consider to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute.
- *Mail:* OPP Docket, Environmental Protection Agency Docket Center (EPA/DC), (28221T), 1200 Pennsylvania Ave. NW., Washington, DC 20460–0001.
- *Hand Delivery:* To make special arrangements for hand delivery or delivery of boxed information, please follow the instructions at *http://www.epa.gov/dockets/contacts.htm.*

Additional instructions on commenting or visiting the docket, along with more information about dockets generally, is available at *http://www.epa.gov/dockets.*

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and Federal legislation pertaining to juvenile justice and delinquency prevention. More information may be found at *www.facjj.org*.

Meeting Agenda: The agenda will include: (a) Welcome and introductions; (b) remarks from the Administrator; (c) subcommittee meetings (closed to public); (d) reports and discussions; (e) presentation by and discussion with staff of the Juvenile Justice Evaluation Center; (f) presentations on trends in state juvenile justice-related legislation and on juvenile justice reform; (g) other business; and (h) adjournment.

For security purposes, members of the public who wish to attend must pre-register online at *www.facjj.org* by Tuesday, October 16, 2012. Should problems arise with web registration, call Daryel Dunston at 240–221–4343. [**Note:** these are not toll-free telephone numbers.] Photo identification will be required. Additional identification documents may be required. Space is limited.

Written Comments: Interested parties may submit written comments in advance to Robin Delany-Shabazz, Designated Federal Official, by email to *Robin.Delany-Shabazz@usdoj.gov* no later than Tuesday, October 16, 2012. Alternatively, fax your comments to 202–307–2819 and call Joyce Mosso Stokes at 202–305–4445 to ensure that they are received. [**Note:** These are not toll-free numbers.]

Marilyn M. Roberts,

Deputy Administrator for Programs, Office of Juvenile Justice and Delinquency Prevention.

[FR Doc. 2012–24857 Filed 10–9–12; 8:45 am]

BILLING CODE 4410–18–P

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

[Notice 12–079]

National Environmental Policy Act; Sounding Rockets Program; Poker Flat Research Range

AGENCY: National Aeronautics and Space Administration (NASA).

ACTION: Notice of availability of the Draft Environmental Impact Statement (DEIS) for the NASA Sounding Rockets Program (SRP) at Poker Flat Research Range (PFRR), Alaska.

SUMMARY: Pursuant to the National Environmental Policy Act, as amended, (NEPA) (42 U.S.C. 4321 et. seq.), the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 CFR Parts 1500–1508), and NASA's NEPA policy and procedures (14 CFR Part 1216, subpart 1216.3), NASA has prepared and issued a DEIS for its continued use of the University of Alaska Fairbanks (UAF) owned and managed PFRR, outside of Fairbanks, Alaska. The U.S. Fish and Wildlife Service (USFWS), Bureau of Land Management (BLM), and UAF have served as Cooperating Agencies in preparing the DEIS. The purpose of this notice is to apprise interested agencies, organizations, tribal governments, and individuals of the availability of the DEIS and to invite comments on the document. In cooperation with BLM, UAF, and USFWS, NASA will hold public meetings as part of the DEIS review process. The meeting locations and dates identified at this time are provided under **SUPPLEMENTARY INFORMATION** below.

DATES: Interested parties are invited to submit comments on environmental issues and concerns, preferably in writing, within sixty (60) days from the date of publication in the **Federal Register** of the U.S. Environmental Protection Agency's Notice of Availability of the DEIS. Once known, this date will be published on the project Web site presented under **ADDRESSES** below.

ADDRESSES: Comments submitted by mail should be addressed to Joshua Bundick, Manager, Poker Flat Research Range EIS, NASA Goddard Space Flight Center's Wallops Flight Facility, Mailstop: 250.W, Wallops Island, Virginia 23337. Comments may be submitted via email to *Joshua.A.Bundick@nasa.gov*.

The DEIS may be reviewed at the following locations:

(a) ARLIS, 3211 Providence Drive, Anchorage, Alaska, 99508 (907–272–7547).

(b) Z.J. Loussac Public Library, 3600 Denali Street, Anchorage, Alaska, 99503 (907–343–2975).

(c) Elmer E. Rasmuson Library, 310 Tanana Loop, Fairbanks, Alaska, 99775 (907–474–7481).

(d) Noel Wien Library, 1215 Cowles Street, Fairbanks, Alaska 99701 (907–459–1020).

(e) Juneau Public Library, 292 Marine Way, Juneau, Alaska 99801 (907–586–5249).

(f) NASA Headquarters Library, Room 1J20, 300 E Street SW., Washington, DC 20546–0001 (202–358–0168).

A limited number of hard copies of the DEIS are available, on a first request basis, by contacting the NASA point of contact listed under **FOR FURTHER INFORMATION**. The DEIS is available on the internet in Adobe® portable document format at *http://sites.wff.nasa.gov/code250/pfrr_eis.html*. The **Federal Register** Notice of Intent to prepare the DEIS, issued on April 13, 2011, is also available on the internet at the same Web site address.

FOR FURTHER INFORMATION CONTACT: Joshua Bundick, Manager, Poker Flat Research Range EIS, NASA Wallops Flight Facility, Mailstop: 250.W, Wallops Island, Virginia 23337; telephone (757) 824–2319; fax (757) 824–1819; email: *Joshua.A.Bundick@nasa.gov*. A toll-free telephone number, (800) 521–3415, is also available for persons outside the local calling area. When using the toll-free number, please follow the menu options and enter the "pound sign (#)" followed by extension numbers "2319."

Additional information about NASA's SRP and UAF's PFRR may be found on the internet at *http://sites.wff.nasa.gov/code810* and *http://www.pfrr.alaska.edu*, respectively. Information regarding the NEPA process for this proposal and supporting documents (as available) are located at *http://sites.wff.nasa.gov/code250/pfrr_eis.html*.

SUPPLEMENTARY INFORMATION: Since the late 1960s, NASA, other government agencies, and educational institutions have conducted suborbital rocket launches from the PFRR. While the PFRR is owned and managed by the Geophysical Institute of UAF, the NASA SRP has exclusively funded and managed the support contract with PFRR for more than 25 years. The PFRR is the only high-latitude, auroral-zone rocket launching facility in the United States where a sounding rocket can readily study the aurora borealis and the sun-earth connection.

Related Environmental Documents

In recent years, concerns raised by agencies and organizations regarding the potential impact of its operations at PFRR prompted NASA to review its 2000 SRP Final Supplemental Environmental Impact Statement (FSEIS). In doing so, NASA determined that while the overall environmental analysis in the 2000 SRP FSEIS remains sufficient to support the Agency's broad decision to continue the SRP at PFRR, potential changes in both operations and the environmental context of the launch corridor north of the site warranted preparation of additional site-specific environmental analysis. Accordingly, the DEIS tiers from the programmatic 2000 FSEIS and provides a focused analysis of SRP operations at PFRR.

Cooperating Agency Actions

The PFRR EIS will serve as a decision-making tool not only for NASA but also for its two Federal Cooperating Agencies, BLM and USFWS. Directly north of the PFRR facility are its downrange flight zones, over which rockets are launched and within which spent stages and payloads impact the ground. Within these flight zones are BLM's Steese National Conservation Area and White Mountain National Recreational Area, and the USFWS-managed Arctic and Yukon Flats National Wildlife Refuges. Historically, the managing entities have issued UAF annual or multi-year special-use authorizations and agreements for impact of rockets and recovery operations on these lands.

BLM and USFWS are currently considering if and how future authorizations for rocket landing and recovery would be issued for the properties under their management. As such, the DEIS considers the effects of each agency's respective permitting actions.

Alternatives

The DEIS evaluates the environmental consequences of five alternative means for continuing sounding rocket launches at PFRR. The alternatives differ primarily in the level of effort that would be exerted to locate and recover past and future launch related items in downrange lands. Two alternatives also include a restriction on planning rocket motor or payload impacts within designated Wild or Scenic Rivers.

Public Meetings

NASA and its Cooperating Agencies plan to hold public meetings in Alaska to discuss the SRP at PFRR and to solicit comments on the DEIS.

The public meetings are currently scheduled for:

—Wednesday, October 24, 2012, at the USFWS Alaska Regional Office, Gordon Watson Conference Room, 1011 East Tudor Road, Anchorage, Alaska, 6:00 p.m.–8:00 p.m.

—Thursday, October 25, 2012, at the BLM Fairbanks District Office, 1150 University Avenue, Fairbanks, Alaska, 6:00 p.m.–8:00 p.m.

Times and locations of additional meetings, particularly those with interior Villages, will be coordinated with the respective governing bodies and published locally as they are scheduled. NASA will consider all comments received in developing its Final EIS; comments received and responses to comments will be included in the Final document. In conclusion, written public input on environmental issues and concerns associated with NASA's SRP launches at PFRR are hereby requested.

Olga M. Dominguez,

Assistant Administrator, Office of Strategic Infrastructure.

[FR Doc. 2012–24891 Filed 10–9–12; 8:45 am]

BILLING CODE 7510–13–P

NATIONAL FOUNDATION ON THE ARTS AND THE HUMANITIES

National Council on the Arts 177th Meeting

AGENCY: National Endowment for the Arts, National Foundation on the Arts and the Humanities.

ACTION: Notice of meeting.

SUMMARY: Pursuant to section 10 (a)(2) of the Federal Advisory Committee Act (Pub. L. 92–463), as amended, notice is hereby given that a meeting of the National Council on the Arts will be held at the Nancy Hanks Center, 1100 Pennsylvania Avenue NW., Washington, DC 20506. Agenda times are approximate.

DATES: October 26, 2012 from 9 a.m. to 11:30 a.m. in Room M–09.

FOR FURTHER INFORMATION CONTACT: Office of Public Affairs, National Endowment for the Arts, Washington, DC 20506, at 202/682–5570.

SUPPLEMENTARY INFORMATION: The meeting, on Friday, October 26th, will be open to the public on a space available basis. The meeting will begin with opening remarks, swearing in of new Council member Paul W. Hodes, and voting on recommendations for funding and rejection and guidelines, followed by updates by the Chairman. There will also be the following presentations: from 9:45 a.m. to 10:30 a.m.—London Cultural Olympiad/2012 Summer Olympics Presentation (Elizabeth Streb, Director of STREB Lab for Action Mechanics); from 10:30 a.m. to 11 a.m.—NEA/Bureau of Economic Analysis Partnership Presentation (David Wasshausen, Division Chief, U.S. Department of Commerce/Bureau of Economic Analysis); from 11 a.m. to 11:15 a.m.—Media Arts Presentation (Sue Schardt, Executive Director of The Association of Independents in Radio); 11:15 a.m. to 11:30 a.m.—concluding remarks and voting results. The meeting will adjourn at 11:30 a.m.

For information about webcasting of the open session of this meeting, go to the Podcasts, Webcasts, & Webinars tab at *www.arts.gov*.

If, in the course of the open session discussion, it becomes necessary for the Council to discuss non-public commercial or financial information of intrinsic value, the Council will go into closed session pursuant to subsection (c)(4) of the Government in the Sunshine Act, 5 U.S.C. 552b, and in accordance with the February 15, 2012 determination of the Chairman. Additionally, discussion concerning purely personal information about individuals, such as personal biographical and salary data or medical information, may be conducted by the Council in closed session in accordance with subsection (c)(6) of 5 U.S.C. 552b.

Any interested persons may attend, as observers, Council discussions and reviews that are open to the public. If you need special accommodations due to a disability, please contact the Office of Accessibility, National Endowment for the Arts, 1100 Pennsylvania Avenue NW., Washington, DC 20506, 202/682–5733, Voice/TTY 202/682–5496, at least seven (7) days prior to the meeting.

Dated: October 4, 2012.

Kathy Plowitz-Worden,

Panel Coordinator, Office of Guidelines and Panel Operations.

[FR Doc. 2012–24892 Filed 10–9–12; 8:45 am]

BILLING CODE 7537–01–P

NATIONAL FOUNDATION ON THE ARTS AND THE HUMANITIES

Arts Advisory Panel Meeting

AGENCY: National Endowment for the Arts, National Foundation on the Arts and Humanities.

ACTION: Notice of meeting.

SUMMARY: Pursuant to Section 10(a)(2) of the Federal Advisory Committee Act (Pub. L. 92–463), as amended, notice is hereby given that sixteen meetings of the Arts Advisory Panel to the National Council on the Arts will be held at the Nancy Hanks Center, 1100 Pennsylvania Avenue NW., Washington, DC 20506 as follows (ending times are approximate):

Arts Education (application review): In room 627. This meeting will be closed.

Dates: October 29–30, 2012; 9 a.m. to 5 p.m. EDT each day.

Design (application review): In room 714. This meeting will be closed.

Dates: October 30, 2012; 9 a.m. to 5:30 p.m. EDT.

Design (application review): In room 714. This meeting will be closed.

Dates: November 1, 2012, from 9 a.m. to 5:30 p.m. EDT.

Opera (application review): In room 716. This meeting will be closed.

APPENDIX B

SITING ANALYSIS

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APPENDIX B.
SITING ANALYSIS

B.1 SITING OPTIONS

In Chapter 1 of the *Final Environmental Impact Statement for the Sounding Rockets Program at Poker Flat Research Range*, "Purpose and Need for the Action," the National Aeronautics and Space Administration (NASA) indicated that it intends to maintain a high-latitude launch site in the United States (U.S.) to support research critical to the understanding of the Sun–Earth connection and upper atmosphere. However, due to concerns raised by project stakeholders during the scoping process for the Environmental Impact Statement (EIS), NASA considered several other sounding rocket launch sites that might meet some or all of the science requirements that have been identified for performing high-latitude and auroral science. The other sites considered are the Kodiak Launch Complex (KLC) in Alaska; the now-decommissioned Fort Churchill Rocket Range near Churchill, Manitoba; the Andøya Rocket Range (ARR) launch sites in Andøya, Norway, and Ny-Ålesund, Svalbard (an archipelago in the northernmost part of Norway); and the Esrange Space Center near Kiruna, Sweden. This Appendix summarizes NASA's evaluation to determine if either site could be considered a reasonable alternative to Poker Flat Research Range (PFRR) and should thereby be evaluated in detail in the EIS.

B.1.1 Kodiak Launch Complex

The KLC on Kodiak Island, Alaska, is the only other U.S. facility at a latitude potentially compatible with the needs of the typical science missions supported by PFRR. However, the KLC is designed to launch in the southeast-to-southwest direction, over the open water of the Pacific Ocean **(FAA 1996)**. The approved launch trajectories would prohibit reaching the northern launch azimuths necessary to obtain data that support the types of scientific missions conducted at PFRR. The large population centers north of the KLC (Anchorage and Matanuska-Susitna Valley areas) greatly increase the risk for rocket stages to impact populated areas following launch.

B.1.2 Churchill Research Range

The Churchill Research Range near Churchill, Manitoba, was a primary sounding rocket launch site for Arctic science, including auroral science, from its start in 1954 **(Pfister 1967)** (see **Figure B–1**). The rocket launching facilities were constructed adjacent to the Fort Churchill military base and operated by the U.S. Army and later U.S. Air Force until 1970, when management and funding became the responsibility of the Canadian National Research Council. Operations continued with limited funding until 1984, when the Canadian rocket program was canceled and funding for the Churchill Research Range terminated **(Shepherd and Kruchio 2008)**.

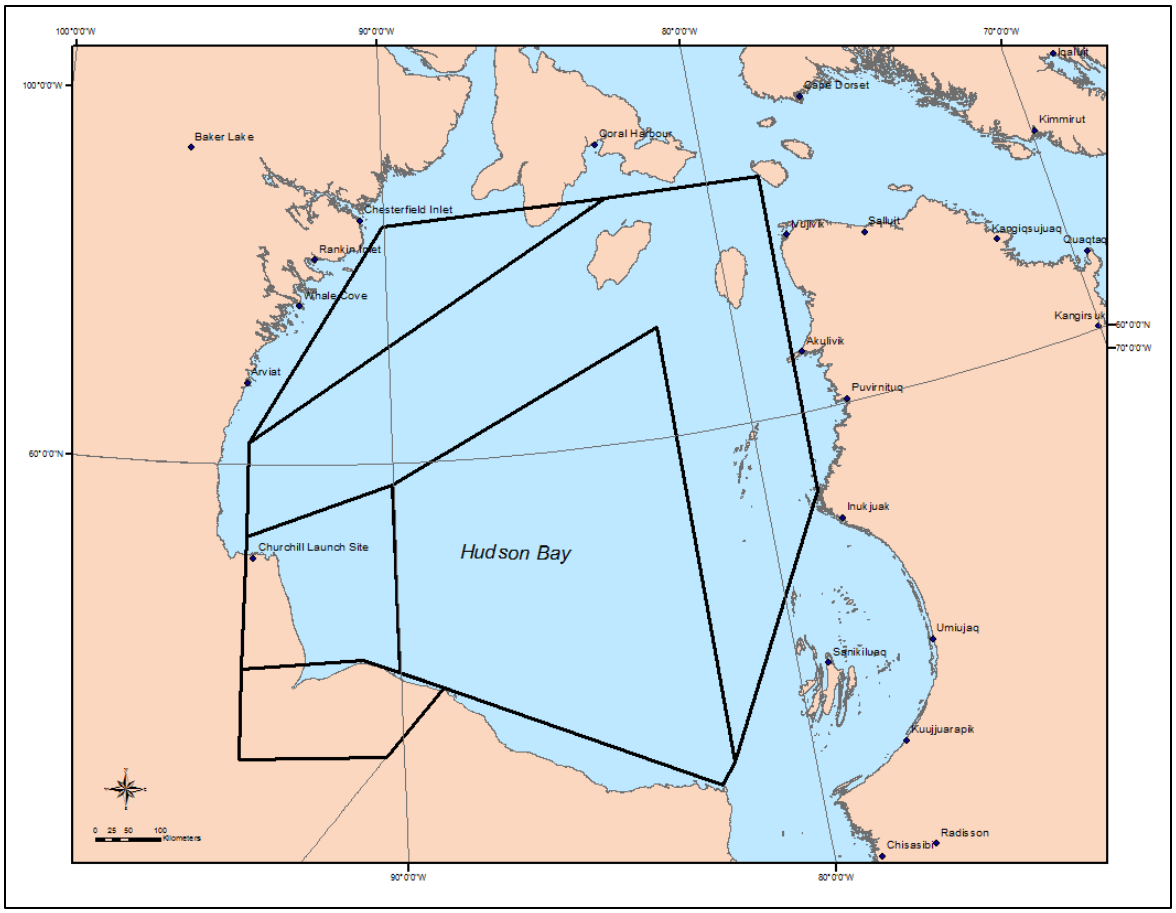


Figure B–1. Historic Fort Churchill Range Boundaries

The facilities were extensively used for northern latitude and auroral research until many U.S.-sponsored launches shifted to PFRR in the late 1960s. Launches continued at Fort Churchill through 1989, when two NASA launches occurred. Operations were then discontinued. A single launch occurred in April 1998 during an attempt to privatize the launch complex and turn it into a commercial launch site at an announced cost of $300 million **(Astronautix 2011)**.

All Fort Churchill launch and support facilities are now decommissioned and the actual remaining Fort Churchill launch facilities are designated the "Churchill Rocket Research Range National Historic Site of Canada." The site is now home to the Churchill Northern Studies Centre, a non-profit environmental and biological research organization which occupies a number of the facilities that were used by the launch operation.

There is little, if any, ground-based support instrumentation at the launch site. Any launches carried out there would presumably be toward east into the Hudson Bay, and it would be essentially impossible to find downrange sites under the trajectories that could be used to deploy critical ground-based instruments. Churchill Research Range is also on foreign soil, which makes many operations more difficult.

For Churchill Research Range to be a viable alternative to PFRR it would need to be outfitted comparably as a permanent launch facility capable of supporting annual launch operations; temporary placement of mobile equipment is not practical on a regular basis. Accordingly, at least two, and most likely three, sheltered launchers would be required. In addition, new facilities, including a motor storage and assembly building and a payload processing building (both with bridge cranes), would be needed. Downrange science instrumentation would need to be installed at least two, and possibly three, sites on the perimeter of Hudson's Bay at considerable expense **(Hickman 2011)**. Communications infrastructure would also be needed, and it is likely that at least a large portion of this infrastructure, if not all, would need to be resurrected. This would be both a cost and environmental impact of considerable undertaking **(Hickman 2011)**.

B.1.3 Andøya Rocket Range

ARR is located in northern Norway (see **Figure B–2**). The range cooperates with the European Space Agency and supports orbital satellite, sounding rocket, and balloon operations. ARR has two launch sites for sounding rocket operations **(NASA 2005)**, as follows:

- Andøya, Norway: N 69°17' E 16°01'
- Ny-Ålesund, Svalbard: N 78°55', E 11°51'

Figure B–2. Andøya Rocket Range

Launch Facilities – ARR has seven launch pads in the launch area and can, if required, launch rockets simultaneously (generally not more than two). Several launch pads are covered by heated shelters. See **Figure B–3** for a photograph of launch facilities at ARR.

The launch facility in Ny-Ålesund, Svalbard, has one covered launch pad equipped with a universal launcher.

Source: NASA 2005.

Figure B–3. Launch Facilities at Andøya Rocket Range

Support Facilities – The launch site at Andøya has offices and two payload preparation facilities, both fitted with gantry cranes, and associated infrastructure for payload systems checkout. ARR has two fixed telemetry systems and one mobile system. A Science Operation Centre is available onsite for determining optimum scientific launch conditions.

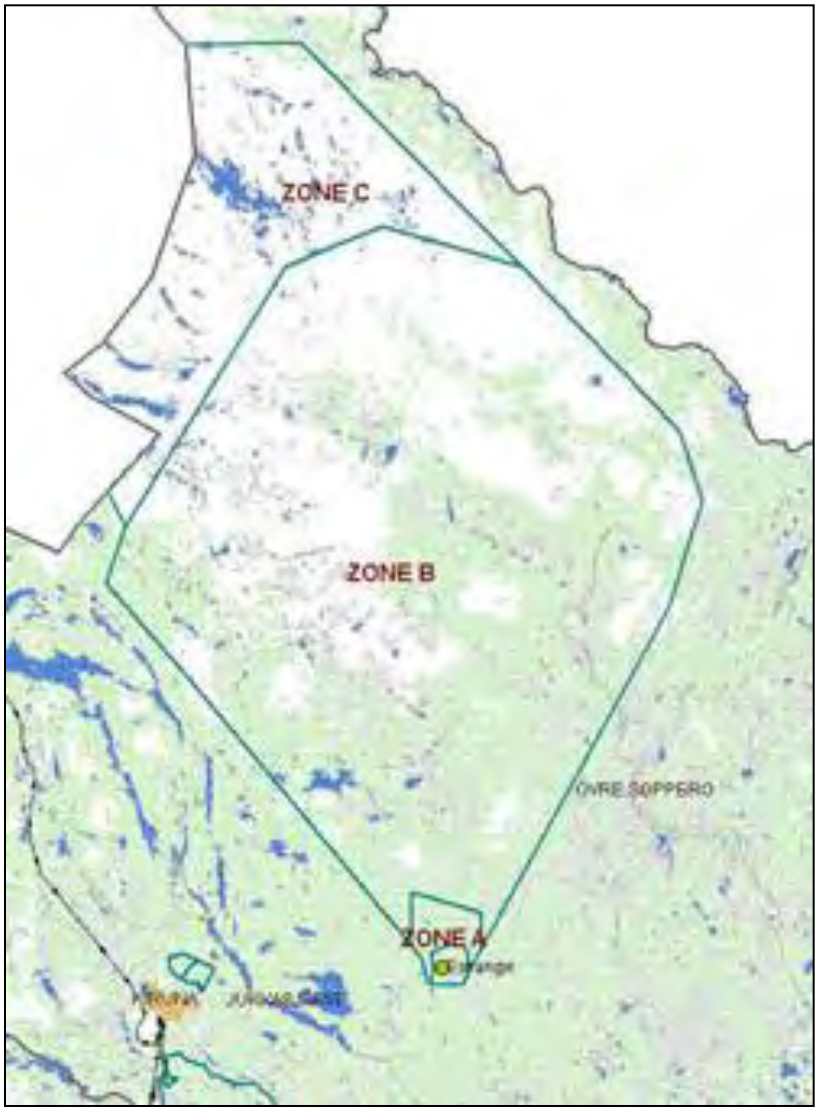
Recovery – ARR also provides recovery of the payload from the Norwegian Sea, provided that the payload is equipped with a recovery system (parachute and flotation system).

B.1.4 Esrange Space Center

Esrange Space Center is situated in northern Sweden above the Arctic Circle near Kiruna, Sweden at latitude 67° 53'N, longitude 21° 04'E. The base supports orbital satellite, sounding rocket, and balloon operations. The base is managed by the Swedish Space Corporation, which is a state-owned limited corporation under the Ministry of Industry **(NASA 2005)**.

Launch Range – The rocket stages and payloads land in the Esrange Impact Area, a large uninhabited diamond shaped area north of Esrange Space Center in the Swedish tundra region, 120 kilometers (74 miles) long and 75 kilometers (46 miles) wide (see **Figure B–4**). The Esrange Impact Area is divided into three zones, A, B, and C, with a total area of 5,600 square kilometers (2,162 square miles). Zone A, the impact area for boosters, can be extended when rockets with long-range boosters are launched. Zones B and C are impact areas for second and

third stages, as well as payloads. Zone C is not allowed for use from May 1st through September 15th. The nominal impact point normally chosen is situated 75 kilometers (46 miles) north of the launch pads **(SSC 2011)**.



Source: SSC 2011.

Figure B–4. Esrange Impact Area

Launch Facilities – The site includes six permanent launchers and support facilities, including environmental shelters and a blockhouse. Multiple rockets (up to 2) can be launched in succession.

Support Facilities – There are two large rocket preparation buildings equipped with gantry cranes. A ground observation station, Kiruna Esrange Optical Platform System (KEOPS), is located onsite **(SSC 2011)**. Downrange observations can be made from two different sites within the impact area north of the launch site. Additionally, a network of ground-based scientific instrumentation has been established in northern Scandinavia. One is the Swedish Institute of Space Physics. Another installation is the European Incoherent Scatter (EISCAT) Facility,

comprising a system of stations in Norway, Sweden, and Finland. In Sweden is a climate research center, which supports scientific research in Arctic regions and location of ground-based instrumentation **(SSC 2011)**.

Recovery – Recovery of payloads is a common requirement, with approximately 50 percent equipped with recovery systems. Recovery missions are generally successful.

Rocket motors are not recovered immediately following the launch. People visiting the impact area during non-winter months occasionally find the motors and are offered a small reward for finding the motor. It is then typically recovered.

B.2 SITE SELECTION PROCESS

The NASA Sounding Rockets Program (SRP) defined several criteria to determine if there are any reasonable alternative launch sites to PFRR for meeting the purpose and need for NASA's action. These criteria included:

Criterion 1: Site and Range Must Meet the Research Needs of the Scientific Community

The site and range must provide scientists the ability to meet the research goals identified in Chapter 1 of the EIS, including studies of aurora and the sun-earth connection. Since the stated purpose and need for this action is only for high-latitude science, this effectively restricts launch sites to those that would permit rocket flights within the northern (or southern) high-latitude areas of the Earth. For much of the expected future scientific needs of the NASA SRP, this area is further restricted to the auroral areas around the Earth's magnetic poles.

Figure B–5 illustrates the area around the magnetic pole where the aurora intensity is greatest and the northern launch sites that have historically been used for sounding rocket research. Most aurorae occur in a band known as the auroral zone, which is typically 3 to 6 degrees in latitudinal extent and extends around the magnetic pole. The auroral zone is typically 10 to 20 degrees from the magnetic pole. During a geomagnetic storm, the auroral zone will expand to lower latitudes. Auroral research with sounding rockets is typically performed during periods of high activity and intense auroral displays. During these periods, the launches from PFRR can be made such that the payload transverses both sides of the auroral oval, which increases the scientific data returned.

The site should also have practical range characteristics that are necessary to directly support the collection of scientific data or substantially enhance the science that might be achieved. As a "land" range, PFRR has the advantage of having villages downrange with commercial aircraft access and the ability to establish permanent or semi-permanent monitoring stations. Prior to a launch, support staff can be safely deployed to these sites for weeks at a time, which is critical when awaiting a natural phenomenon, such as the aurora. PFRR's access to an array of established, ground-based research instruments (*e.g.*, magnetometers, all-sky cameras, and lidars) enables researchers to gauge optimum scientific conditions before deciding to launch. PFRR also has a database of observations from ground-based instruments that provides the environmental context into which the rocket measurements may be interpreted.

Figure B–5. General Graphic Depiction of the Auroral Oval

In addition to providing information vital to the understanding of optimal launch conditions, the downrange instrumentation often provides a significant contribution to the research objectives. For example, scientists can observe the aurora with ground-based optics and other instrumentation to put in context the measurements taken by the in situ instruments on board the payload during the flight. A good example is the measurement of neutral winds, which is an important aspect of auroral studies. This can only be done reliably using ground-based optics to track artificial clouds made in the ionosphere and employing triangulation to obtain wind speed and direction (triangulation requires three geographically separated sites) **(Hickman 2010)**.

The range should also facilitate the recovery of the payload as desired for scientific reasons. Whether desired for re-use of an instrument (as in the case of a telescope-type payload) or analysis of samples collected (as in the case of an air sampler payload), the ability to recover proves to be a major advantage of PFRR for some missions.

Evaluation

Kodiak Launch Complex – the site is designed to launch in the southeast-to-southwest direction, over the open water of the Pacific Ocean **(FAA 1996)**. The approved launch trajectories would prohibit reaching the northern launch azimuths necessary to obtain data that support the types of scientific missions conducted at PFRR. Therefore, the KLC is eliminated as a reasonable alternative and will not be discussed further in this appendix.

Fort Churchill – During periods of high auroral activity, the site is well with the auroral oval, and at times available scientific conditions may be similar to those that can be obtained at PFRR; however it is at a much lower geographic latitude than PFRR (58.76 degrees versus 65.08 degrees), making it much less suitable for those experiments that depend on high geographic latitude, such as the study of Polar Mesosperic Clouds and Polar Mesospheric Summer Echoes **(Conde 2012)**.

By contrast, Fort Churchill's geomagnetic latitude is three degrees higher than PFRR, which could be considered a detriment for many auroral studies. Assuming that launches would fly generally in a northerly direction, it would place the rockets well north of the aurora in many cases. Even at PFRR scientists often face the challenge that if the aurora is active, it can be too far south to permit a launch. This challenge would be much worse at Churchill.

The same problem arises with any science mission targeting active aurora. Magnetic activity moves the aurora equatorward, so that PFRR is actually about as far north as researchers want to be to study bright and active auroral phenomena.

Fort Churchill could in fact have advantages for a very limited number of experiments for which it may be advantageous to fly eastward, along the auroral oval, which cannot be done from PFRR due to concerns regarding safety (discussed in more detail below) as well as the limitation for crossing the Canadian border.

Norway and Sweden – During periods of high auroral activity, these sites are at high geographic latitudes, but the magnetic latitudes, which determine the location relative to the auroral oval, are much lower than those at PFRR for the site at Andøya and the site at Esrange Space Center and much higher than those at PFRR for the site at Svalbard. PFRR provides access to the auroral oval that is not easily reached from these northern Scandinavian sites **(Larsen 2011)**.

Depending on the type of science and the range/altitude of the experiment, only PFRR would be suitable as it is further north magnetically, which affects the location of the auroral substorms. The more disturbed the substorm, the further south it moves, and if the scientists want to study a particular phenomenon, Norway may not be suitable **(Hickman 2010)**. There is good ground-based instrumentation support in the vicinity of all three ranges, including science radars and optical instrumentation. However, these sites have the same limitation as Fort Churchill in that locations for instrumentation under the rocket trajectories are not available for rockets launched over the ocean **(Larsen 2011)**.

For typical SRP launches from Norway or Sweden, much of the flights would be over water and ship-based observations would be necessary. While not impossible, the cost of ship-based

observations at multiple sites would substantially raise the costs of equivalent science and introduce added uncertainty to the launch windows given the concerns related to long-duration (*e.g.*, for weeks at a time) ship-borne operations in areas with highly variable weather conditions.

A key limitation of the Swedish range it its size; thereby limiting launches to single-stage and smaller two-stage rockets. The inability to launch the most frequently employed vehicles for recent heliophysical research (*e.g.*, Terrier-Improved Orion, multi-stage Black Brants [BBs]) from the Sweden site precludes it from being considered a reasonable alternative to PFRR.

Conclusion – Based on the evaluation of the "Scientific Need" criterion, only Churchill Research Range in Canada can achieve the majority of auroral and high-latitude science identified as needed by NASA in Chapter 1 of the EIS. However, its lack of downrange observatories would limit the types of missions conducted.

Although well-suited for conducting certain types of auroral research, the characteristics of the launch sites in Norway and Sweden do not permit them to fulfill the science objectives identified in the purpose and need of the EIS, and are therefore not considered reasonable alternatives to PFRR.

Criterion 2: Site and Range Would Allow Operations to be Conducted Safely

NASA strictly follows range safety requirements that are consistent with other Federal agencies and require that the safety risks to people, aircraft, and structures be extremely low, as described in Chapter 2 of the EIS. The practical implication for unguided sounding rockets is that the downrange areas over which the sounding rocket motors and stages travel and land must be remote with very few people. Thus, sounding rockets must be launched over water or, when over land, in areas where the population is very low.

Evaluation

Fort Churchill – Employing the same methodology as it uses in developing Flight Safety Plans and Risk Assessments for sounding rocket missions, NASA evaluated the potential for the Fort Churchill Range to safely support the flight of its BB-class of vehicles (BBIX, BBX, BBXI, and BBXII). These vehicles were chosen as they are the highest performing in the SRP's fleet and are most likely to be specified by auroral scientists in the future.

The analysis, which employed the same risk acceptance criteria that is utilized for mission planning at PFRR, indicated that the BBIX could be flown safely at a wide range of azimuths, however the BBX, BBXI, and BBXII required much more easterly azimuths (greater than 30 degrees from true north for the BBXI and greater than 60 degrees for BBX) **(Computer Sciences Corporation 2012)**. To provide context, typical missions flown from PFRR fly azimuths in the 5 degree (from true north) range. The analysis of the most powerful vehicle, the BBXII, returned a range of acceptable launch azimuths (greater than 35 degrees); however, it was limited to a launcher setting that would provide a lower payload apogee, which could have some effect on its meeting both safety and scientific requirements. In all cases, trajectories were over the Hudson Bay, which avoided the populated Hudson Bay shoreline.

Conclusion – In summary, when compared to PFRR, Fort Churchill would provide only a very limited set of permissible northerly azimuths for the SRP's highest performing vehicles; thereby, limiting the range of scientific opportunities available. Therefore, when safety considerations are weighed, Fort Churchill's ability to support PFRR-like science is marginal at best.

Criterion 3: Site and Range Would Provide Practical and Cost-Effective Facilities and Infrastructure

The site and range must provide practical and cost-effective facilities and infrastructure that enhance the ability of the SRP to support the scientific and research community. Even the optimum location from purely a scientific perspective may not be practical if the logistics of conducting a launch, including installation of launchers, downrange support equipment, and facilitation of recovery, are not practical. Budgets within the SRP have always been quite limited, and its goal has always been to obtain the most scientific return at the lowest possible cost.

Evaluation

Fort Churchill – The practicality of PFRR stands out in comparison to Churchill Research Range as it does not contain any active launch infrastructure. Moreover, its remaining facilities have been retrofitted to support ecological research. While it is still technically possible to launch from Fort Churchill using mobile launchers, employing the "mobile campaign" approach as a long-term solution does not meet NASA's needs as a PFRR site alternative, especially when considered within the context of its geographic limitations (that affect the scientific value), safety restrictions (that limit equivalent northerly azimuths), and lack of downrange support infrastructure. The cost of building new permanent launch and support facilities at a new site on foreign soil, such as at Fort Churchill, would be above the future budgets of the SRP, requiring severe curtailment of its activities, thereby not meeting NASA's purpose and need. Due its lack of infrastructure, Churchill Research Range is eliminated as reasonable alternative launch site to PFRR.

B.2.1 Overall Evaluation of Launch Sites

Based on the three criteria which were science, safety, and available facilities, PFRR is the only site that fully meets all program requirements. Other existing U.S. launch sites cannot achieve the needed science objectives. Churchill Research Range could in principle meet some science needs; except it does not permit northward launches and its geomagnetic latitude would preclude it from providing the same level of scientific opportunities as PFRR. Furthermore, the practical details and costs associated with equipping the launch area and downrange sites with the needed scientific observation equipment would make this an impractical alternative for future scientific missions as currently envisioned. Other northern launch sites in Norway and Sweden are practical and will continue to be used for some NASA SRP missions, but because of their geographic location relative to the auroral zone, and certain range characteristics, they cannot achieve the science that is obtainable at PFRR. Based on this evaluation process, PFRR is the only site that fully meets the purpose and need for the SRP and the only site considered reasonable for the *PFRR EIS*. Therefore, the EIS only addresses alternative approaches for continuing NASA's SRP mission at PFRR.

B.3 REFERENCES

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APPENDIX C

LAND USE PERMITS AND MEMORANDA OF UNDERSTANDING

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APPENDIX C.
LAND USE PERMITS AND MEMORANDA OF UNDERSTANDING

C.1 UNITED STATES DEPARTMENT OF THE INTERIOR, U.S. FISH AND WILDLIFE SERVICE, ARCTIC NATIONAL WILDLIFE REFUGE

United States Department of the Interior
U.S. Fish and Wildlife Service

OMB Control Number 1018-0102
Expiration Date: 06/30/2014

National Wildlife Refuge System Research and Monitoring Special Use Application and Permit

Name of Refuge: Arctic National Wildlife Refuge

Address: 101 12th Avenue, Room 236 Fairbanks, AK 99701

Attn: (Refuge Official) _____

Phone #: 907-456-0450 E-mail _____

Application

(To be filled out by applicant. Note: Not all information is required for each use. See instructions at the end of the notice for specific information required.)

1) ○ New ◉ Renewal ○ Modification ○ Other _____

Applicant Information

2) Principal Investigator: University of Alaska

3) Is curriculum vitae or resume attached? ○ Yes ○ No ○ N/A

4) Address: P.O. Box 755280

5) City/State/Zip: Fairbanks, AK 99775-5280

6) Phone #: 907-450-8133 7) Fax #: 907-450-8131 8) E-mail: deslegfried@alaska.edu

9a) Affiliation/organization: UAF Poker Flat Research Range

9b) Relationship to affiliation/organization: (professor, staff, student, etc.) _____

10) Assistants/subcontractors/subpermittees: (List full names, addresses and phone #'s and specifically describe services provided if subcontractors are used.)

Project Information

(Depending on the project for which you are requesting a permit, we may ask you for the following project information. Please contact the specific refuge where the project is being conducted to determine what project information is required.)

11) Title: Impact Lands for Poker Flat Research Range launch activities in 2013

12a) Is full research proposal required? ○ Yes ○ No 12b) Is full research proposal attached? ○ Yes ○ No

13) Describe activity: (Specifically identify timing, frequency, and how the project is expected to proceed.)

Impact of one or more stages of a multistage rocket and entrance onto refuge lands to recover spent motors

14) Location: (Identify specific location; GPS location preferred.)

Generally in the western portion of Arctic NWR

15a) Is map of location(s) required? ○ Yes ◉ No ○ N/A 15b) Is map of location(s) attached? ○ Yes ◉ No

16) Project/site occupancy timeline: (Specifically identify beginning and ending dates, site occupation timeline, hours, clean-up and other major events.)

February 2, 2013 through February 17, 2013 for the launch window. Entry for recovery operations will be in summer months and will be dependent on weather. All entry onto refuge lands will be coordinated with the refuge prior to entry.

FWS Form 3-1383-R
03/11

OMB Control Number 1018-0102
Expiration Date: 06/30/2014

17) Species or habitats being studied:

na

18) Purpose/hypothesis:

na

19) Expected benefits of research/monitoring:

Upper atmospheric and auroral research using scientific sounding rockets as part of the NASA science mission directorate

20) Briefly describe project history and context of research/monitoring project:

21) Briefly describe project's relationship to other research/monitoring projects either known of or conducted by the applicant:

This has been on ongoing project since 1969 and there are annual launches which explore upper atmospheric phenomena

22) Identify the types of samples to be taken or data to be collected during the proposed project:

NA

23) List other cooperators and institutions involved in the project:

NASA Science Mission Directorate
NASA Sounding Rocket Program Office

24) Generally identify the anticipated timeline for analysis, write-up and publication:

UNKNOWN

25) For research involving animals, has an Assurance of Animal Care Form, Institutional Animal Care and Use Committee approval (or equivalent) been completed? ○ Yes ○ No ◉ N/A

Is form attached? ○ Yes ◉ No

FWS Form 3-1383-R
03/11

OMB Control Number 1018-0102
Expiration Date: 06/30/2014

Certifications/Permits

26a) Is rat free certification required?
○ Yes ○ No ◉ N/A

Copy of certification provided:
○ Yes ○ No

26b) Is hull inspection certification required?
○ Yes ○ No ◉ N/A

Copy of certification provided:
○ Yes ○ No

26c) Is EMT/first aid certification required?
○ Yes ○ No ◉ N/A

Copy of certification provided:
○ Yes ○ No

26d) Are other certifications required?
○ Yes ○ No ◉ N/A

Copy of certification provided:
○ Yes ○ No

27a) Are State permits required?
○ Yes ◉ No ○ N/A

Copy of permits provided:
○ Yes ○ No

27b) Are Federal permits required?
○ Yes ◉ No ○ N/A

Copy of permits provided:
○ Yes ○ No

27c) Are tribal permits required?
◉ Yes ○ No ○ N/A

Copy of permits provided:
○ Yes ◉ No

27d) Are other permits required?
○ Yes ◉ No ○ N/A

Copy of permits provided:
○ Yes ○ No

Logistics and Transportation

28a) Does activity require personnel to stay overnight onsite?

○ Yes ◉ No

28b) Personnel involved:
2 PFRR EMPLOYEES

29) Specifically describe all equipment/gear and materials used:

Generally one stage marked "US Government" will impact. Recovery will be via small helicopter using 2 people and will take less than one day

30a) Dates of installation of instrumentation:

NA

30b) Dates of instrumentation removal:

NA

30c) If instrumentation is permanent, describe need:

NA

30d) Instrumentation maintenance schedule:

NA

30e) Data collection schedule:

NA

FWS Form 3-1383-R
03/11

OMB Control Number 1018-0102
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31) Logistical arrangements for offsite transportation of samples:

NA

32a) Transportation description(s) and license number(s) to access refuge(s): (Provide description of and specific auto license/boat/plane registration number(s).)

Via helicopter

32b) Specifically describe ship-to-shore transportation:

na

32c) Specifically describe intersite transportation:

32d) Specifically describe onsite transportation:

33a) Is fuel cache needed?

○ Yes ◉ No

33b) Specific location(s) of fuel caches: (GPS Coordinates preferred)

34a) Is Safety Plan required?

◉ Yes ○ No

34b) Safety Plan attached:

○ Yes ◉ No

Work and Living Accommodations

35) Specifically describe onsite work and/or living accommodations, including spike camps:

NA

36) Specifically describe on or offsite hazardous material storage or other on or offsite material storage space (including on and offsite fuel caches):

NA

37) Signature of Applicant _____ Date of Application: 12·5·12

Sign, date, and print this form and return it to the refuge for processing.
Do not fill out information below this page.

PRINT FORM

FWS Form 3-1383-R
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For Official Use Only **(This section to be filled out by refuge personnel only.)**

Special Use Permit

Permit #: 2013-S1

1) Date: 01/30/2013 - 12/31/2013 2) ☒ Permit Approved ○ Permit Denied 3) Station #: ARCTIC NWR

4) Additional special conditions required: (Special conditions may include activity reports, before and after photographs, and other conditions.)

☒ Yes ○ No ○ N/A

Additional sheets attached:

☒ Yes ○ No

5) Other licenses/permits required:

○ Yes ☒ No ○ N/A

Verification of other licenses/permits, type:

6) Minimum requirements analysis has been conducted:

○ Yes ○ No ☒ N/A

Assessment attached:

○ Yes ○ No

7) Assurance of Animal Care Form or Institutional Animal Approval form attached:

○ Yes ○ No ☒ N/A

Approval form attached:

○ Yes ○ No

8) Record of Payments: ☒ Exempt ○ Partial ○ Full

Amount of payment: NA Record of partial payment: NA

9) Bond Paid: ○ Yes ○ No ☒ N/A

This permit is issued by the U.S. Fish and Wildlife Service and accepted by the applicant signed below, subject to the terms, covenants, obligations, and reservations, expressed or implied herein, and to the notice, conditions, and requirements included or attached. A copy of this permit should be kept on hand so that it may be shown at any time to any refuge staff.

Permit approved and issued by (Signature and title):

Date: 1·30·2013

Permit accepted by (Signature of applicant):

Date: 1·30·13

University of Alaska
Kit Duke, AVP Facilities and Land Management

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Notice

In accordance with the Privacy Act (5 U.S. C. 552a) and the Paperwork Reduction Act (44 U.S. C. 3501), please note the following information:

1. The issuance of a permit and collection of fees on lands of the National Wildlife Refuge System are authorized by the National Wildlife Refuge System Administration Act (16 U.S. C. 668dd-ee) as amended, and the Refuge Recreation Act (16 U.S. C. 460k-460k-4).

2. The information that you provide is voluntary; however submission of requested information is required to evaluate the qualifications, determine eligibility, and document permit applicants under the above Acts. It is our policy not to use your name for any other purpose. The information is maintained in accordance with the Privacy Act. All information you provide will be considered in reviewing this application. False, fictitious, or fraudulent statements or representations made in the application may be grounds for revocation of the Special Use Permit and may be punishable by fine or imprisonment (18 U.S.C. 1001). Failure to provide all required information is sufficient cause for the U.S. Fish and Wildlife Service to deny a permit.

3. No Members of Congress or Resident Commissioner shall participate in any part of this contract or to any benefit that may arise from it, but this provision shall not pertain to this contract if made with a corporation for its general benefit.

4. The Permittee agrees to be bound by the equal opportunity "nondiscrimination in employment" clause of Executive Order 11246.

5. Routine use disclosures may also be made: (a) to the U.S. Department of Justice when related to litigation or anticipated litigation; (b) of information indicating a violation or potential violation of a statute, rule, order, or license to appropriate Federal, State, local or foreign agencies responsible for investigating or prosecuting the violation or for enforcing or implementing the statute, rule, regulations, order, or license; (c) from the record of the individual in response to an inquiry from a Congressional office made at the request of the individual (42 FR 19083; April 11,1977); and (d) to provide addresses obtained from the Internal Revenue Service to debt collection agencies for purposes of locating a debtor to collect or compromise a Federal Claim against the debtor, or to consumer reporting agencies to prepare a commercial credit report for use by the Department (48 FR 54716; December 6, 1983).

6. An agency may not conduct or sponsor and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. This information collection has been approved by OMB and assigned control number 1018-0102. The public reporting burden for this information collection varies based on the specific refuge use being requested. The relevant public reporting burden for the Research and Monitoring Special Use Permit Application form is estimated to average 4 hours per response, including time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Comments on this form should be mailed to the Information Collection Clearance Officer, U.S. Fish and Wildlife Service, 4401 N. Fairfax Drive, MS 2042-PDM, Arlington, Virginia, 22203.

General Conditions and Requirements

1. Responsibility of Permittee: The permittee, by operating on the premises, shall be considered to have accepted these premises with all facilities, fixtures, or improvements in their existing condition as of the date of this permit. At the end of the period specified or upon earlier termination, the permittee shall give up the premises in as good order and condition as when received except for reasonable wear, tear, or damage occurring without fault or negligence. The permittee will fully repay the Service for any and all damage directly or indirectly resulting from negligence or failure on his/her part, and/or the part of anyone of his/her associates, to use reasonable care.

2. Operating Rules and Laws: The permittee shall keep the premises in a neat and orderly condition at all times, and shall comply with all municipal, county, and State laws applicable to the operations under the permit as well as all Federal laws, rules, and regulations governing national wildlife refuges and the area described in this permit. The permittee shall comply with all instructions applicable to this permit issued by the refuge official in charge. The permittee shall take all reasonable precautions to prevent the escape of fires and to suppress fires and shall render all reasonable assistance in the suppression of refuge fires.

3. Use Limitations: The permittee's use of the described premises is limited to the purposes herein specified and does not, unless provided for in this permit, allow him/her to restrict other authorized entry onto his/her area; and permits the Service to carry on whatever activities are necessary for: (1) protection and maintenance of the premises and adjacent lands administered by the Service; and (2) the management of wildlife and fish using the premises and other Service lands.

4. Transfer of Privileges: This permit is not transferable, and no privileges herein mentioned may be sublet or made available to any person or interest not mentioned in this permit. No interest hereunder may accrue through lien or be transferred to a third party without the approval of the Regional Director of the Service and the permit shall not be used for speculative purposes.

5. Compliance: The Service's failure to require strict compliance with any of this permit's terms, conditions, and requirements shall not constitute a waiver or be considered as a giving up of the Service's right to thereafter enforce any of the permit's terms or conditions.

6. Conditions of Permit not Fulfilled: If the permittee fails to fulfill any of the conditions and requirements set forth herein, all money paid under this permit shall be retained by the Government to be used to satisfy as much of the permittee's obligation as possible.

7. Payments: All payment shall be made on or before the due date to the local representative of the Service by a postal money order or check made payable to the U.S. Fish and Wildlife Service.

8. Termination Policy: At the termination of this permit the permittee shall immediately give up possession to the Service representative, reserving, however, the rights specified in paragraph 11. If he/she fails to do so, he/she will pay the government, as liquidated damages, an amount double the rate specified in this permit for the entire time possession is withheld. Upon yielding possession, the permittee will still be allowed to reenter as needed to remove his/her property as stated in paragraph 11. The acceptance of any fee for the liquidated damages or any other act of administration relating to the continued tenancy is not to be considered as an affirmation of the permittee's action nor shall it operate as a waiver of the Government's right to terminate or cancel the permit for the breach of any specified condition or requirement.

9. Revocation Policy: This permit may be revoked by the Regional Director of the Service without notice for noncompliance with the terms hereof or for violation of general and/or specific laws or regulations governing national wildlife refuges or for nonuse. It is at all times subject to discretionary revocation by the Director of the Service. Upon such revocation the Service, by and through any authorized representative, may take possession of the said premises for its own and sole use, and/or may enter and possess the premises as the agent of the permittee and for his/her account.

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10. Damages: The United States shall not be responsible for any loss or damage to property including, but not limited to, growing crops, animals, and machinery or injury to the permittee or his/her relatives, or to the officers, agents, employees, or any other who are on the premises from instructions or by the sufferance of wildlife or employees or representatives of the Government carrying out their official responsibilities. The permittee agrees to save the United States or any of its agencies harmless from any and all claims for damages or losses that may arise to be incident to the flooding of the premises resulting from any associated Government river and harbor, flood control, reclamation, or Tennessee Valley Authority activity.

11. Removal of Permittee's Property: Upon the expiration or termination of this permit, if all rental charges and/or damage claims due to the Government have been paid, the permittee may, within a reasonable period as stated in the permit or as determined by the refuge official in charge, but not to exceed 60 days, remove all structures, machinery, and/or equipment, etc. from the premises for which he/she is responsible. Within this period the permittee must also remove any other of his/her property including his/her acknowledged share of products or crops grown, cut, harvested, stored, or stacked on the premises. Upon failure to remove any of the above items within the aforesaid period, they shall become the property of the United States.

12. Collected Specimens: You may use specimens collected under this permit, any components of any specimens (including natural organisms, enzymes, genetic materials or seeds), and research results derived from collected specimens for scientific or educational purposes only, and not for commercial purposes unless you have entered into a Cooperative Research and Development Agreement (CRADA) with us. We prohibit the sale of collected research specimens or other transfers to third parties. Breach of any of the terms of this permit will be grounds for revocation of this permit and denial of future permits. Furthermore, if you sell or otherwise transfer collected specimens of any components without a CRADA, you will pay us a royalty rate of 20 percent of the gross revenue from such sales. In addition to such royalty, we may seek other damages and injunctive relief against you.

Instructions for Completing Application

You may complete the application portion verbally, in person or electronically and submit to the refuge for review. Note: Please read instructions carefully as not all information is required for each activity. Contact the specific refuge where the activity will take place if you have questions regarding the applicability of a particular item. Special conditions or permit stipulations may be added to permit prior to approval.

1. Identify if application is for a new permit or renewal or modification of an existing permit. Permit renewals may not need all information requested. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

2-3. Provide principal investigator's or applicant's full name. Attach principal investigator's Curriculum Vitae or Resume, if required. Permit renewals generally do not require a Curriculum Vitae or Resume if the project is a continuation of a previously issued permit being conducted by the same investigator. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

4-9. Provide investigator's address, phone, fax, e-mail, affiliation and or organization, and relationship to affiliation or organization (title, professor, student, etc.).

10. Provide the names and addresses of assistants, subcontractors or subpermittees. Names and address are only required if the assistants, subcontractors or subpermittees will be operating on the refuge without the permittee being present. Volunteers, assistants, subcontractors or subpermittees that are accompanied by the permittee need not be identified.

11. Provide title of research or monitoring project.

12a-12b. Attach a full research or monitoring proposal, if required. Permit renewals generally do not require a project proposal if the project is a continuation of a previously issued permit being conducted by the same investigator. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

13. Describe Activity: provide detailed information on the activity, including timing, frequency, how the project is expected to proceed, etc. Permit renewals may not need activity description, if the activity is unchanged from previous permit. Most repetitive research projects do not require an activity description for each visit to the refuge. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

14. Location: Identify specific location (GPS coordinates preferred), if not a named facility. Permit renewals may not require a location if the project is essentially unchanged from the previous permit. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

15a-15b. Attach a map of location, if required and project is not conducted at a named facility. Permit renewals may not require a map if the project is essentially unchanged from the previous permit. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

16. Activity/site occupancy timeline: identify beginning and ending dates, site occupation timeline, hours, clean-up and other major events. Permit renewals may not need an activity/site occupancy timeline, if the activity is unchanged from previous permit. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

17. Identify species or habitats being studied.

18-19. Specifically identify purpose or hypothesis of the research or monitoring project and describe expected benefits. Permit renewals may not need to identify purpose or hypothesis, if the project is a continuation of a previously issued permit being conducted by the same investigator. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

20. Briefly describe project history and context. Permit renewals should describe previous research activities as part of a previously issued permit being conducted by the same investigator. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

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21. Briefly describe project's relationship to other research/monitoring projects either known of or conducted by the applicant, if applicable. Include a brief statement of how the research or monitoring permit being applied for will add to or supplement other ongoing research or monitoring on the same, or related, species or habitats. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

22. Identify samples to be taken or types of data to be collected. Permit renewals may not need to identify samples taken if the project is a continuation of a previously issued permit being conducted by the same investigator. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

23. List other cooperators and institutions involved in the project, if applicable. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

24. Generally, identify the anticipated time line for analysis, write-up and publication of project results. Include whether the project is a single, or multiple year project. Identification of an actual publication where the results are printed is not necessary. However, applicants should include the anticipated dissemination of project results. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

25. Check box acknowledging a completed Assurance of Animal Care Form or an institutional Animal Care and Use Committee (or equivalent) has granted approval been completed, and has been submitted to refuge station, if required. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

26a-26c. Specifically identify types and numbers of other certifications, if required. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement, and to coordinate the simultaneous application of several types of certifications. This Special Use Permit may be processed while other certifications are being obtained.

27a-27d. Specifically identify types and numbers of other State, Federal or tribal permits, if required. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement, and to coordinate the simultaneous application of several types of State, Federal or tribal permits. This Special Use Permit may be processed while other State, Federal or tribal permits are being obtained.

28a-28b. Provide name(s) of any personnel required to stay overnight, if applicable.

29. Identify all equipment and materials, which will be used, if required. Permit renewals may not require a list of equipment if the project is essentially unchanged from a previously issued permit. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

30a-30e. Identify types and dates of installation of any instrumentation, and data collection and maintenance schedule of instrumentation, if required. Permit renewals may not require a list of equipment if the project is essentially unchanged from a previously issued permit. However, dates of installation of any instrumentation, and data collection and maintenance schedule of instrumentation may still be required. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

31. Identify logistic arrangements for offsite transportation of samples taken, if applicable.

32a-32d. Describe and provide vehicle descriptions and license plate or identification numbers of all vehicles, including boats and airplanes, if required. Motor vehicle descriptions are only required for permittee vehicle, and/or if the vehicle will be operated on the refuge without the permittee being present. Motor vehicles that are accompanied by the permittee as part of a group (convoy) activity need not be identified if cleared in advance by refuge supervisor. Specifically describe ship-to-shore, intersite (between islands, camps, or other sites) and onsite transportation mechanisms, and license plate or identification numbers, if required.

33a-33b. Identify specific location(s) of fuel cache(s) (GPS coordinates preferred), if required.

34a-34b. Attach safety plan, if required. Contact the specific refuge headquarters office where the project is going to be conducted to determine if a safety plan is required.

35. Specifically describe onsite work and/or living accommodations, if required. Include descriptions and locations (GPS coordinates preferred) of spike camps or other remote work and/or living accommodations that are not part of the base of operations. Contact the specific refuge headquarters office where the project is going to be conducted to determine if descriptions of onsite work and/or living accommodations are required.

36. Specifically describe onsite and offsite hazardous material storage, or other onsite material storage space (including on and offsite fuel caches), if required. Contact the specific refuge headquarters office where the project is going to be conducted to determine if descriptions of hazardous material storage or other onsite material storage are required.

37 Sign, date and print the application. Click on the Print button to print the application (if using the fillable version). The refuge official will review and, if approved, fill out the remaining information, sign, and return a copy to you for signature and acceptance.

The form is not valid as a permit unless it includes refuge approval, a station number, a refuge-assigned permit number, and is signed by a refuge official.

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Arctic National Wildlife Refuge
Special Conditions
Permit 2013 – S1, University of Alaska - Duke

1. Failure to abide by any part of this special use permit; violation of any refuge related provision in Titles 43 (Part 36) or 50 Code of Federal Regulations (sub-chapters B and C); or violation of any pertinent state regulation (e.g., fish or game) will, with due process, be considered grounds for immediate revocation of this permit and could result in denial of future permit requests for lands administered by the U.S. Fish and Wildlife Service. This provision applies to all persons working under the authority of this permit. Appeals of decisions relative to permits are handled in accordance with 50 Code of Federal Regulations 36.41.

2. The permittee is responsible for ensuring that all employees, party members, aircraft pilots and other persons working for the permittee and conducting activities allowed by this permit are familiar with and adhere to the conditions of this permit.

3. Any problems with wildlife and/or animals taken in defense of life or property must be reported immediately to the refuge manager and Alaska Department of Fish and Game, and be salvaged in accordance with state regulations.

4. This permit does not grant the permittee and his/her clients exclusive use of the site(s) or lands covered by the permit.

5. This permit may be canceled or revised at any time by the refuge manager due to high fire danger, flooding, unusual resource problems, or other significant problems or emergencies.

6. The permittee or his/her designee shall notify the refuge manager during refuge working hours in person or by telephone before beginning and upon completing activities allowed by this permit.

7. Prior to beginning activities allowed by this permit, the permittee shall provide the refuge manager with: (1) the name and method of contact for the field party chief/supervisor; (2) the aircraft and other vehicle types to be used, including identification information; (3) names of assistants and helpers; and (4) any changes to information provided in the original permit application.

8. In accordance with the Archaeological Resources Protection Act (16 U.S.C. 470aa), the removal, excavation, disturbance, collection, or purchase of historical, recent, ethnological, or archaeological specimens or artifacts is prohibited.

9. The permittee will not make launches with a planned impact site within the Mollie Beattie Wilderness area. The use of helicopters outside the wilderness area is authorized provided that:

   (a) Landing is prohibited except for the direct support of the activity covered by this permit and emergencies. No recreational use of helicopters is permitted.

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Initials: KD
Date: 1-30-13

Arctic National Wildlife Refuge
Special Conditions
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(b) Clearing of vegetation for landing/takeoff is prohibited. Incidental hand removal of rocks and other minor obstructions may be permitted.

(c) Activities are restricted to day use only. No overnight stays are anticipated.

(d) Personnel transported are restricted to only those necessary to conduct the debris recovery. Recreational use is not permitted.

(e) Low level slinging of gear from site to site is prohibited.

10. The use of off-road vehicles (except snow machines) is prohibited.

11. The operation of aircraft at altitudes and in flight paths resulting in the herding, harassment, hazing, or driving of wildlife is prohibited. It is requested that all aircraft maintain a minimum altitude of 2000 feet above ground level, except during take-off, landing, and when safety considerations require a lower altitude.

12. Fuel caches are allowed only in designated areas, must be identified on a US Geological Survey map (or map photocopy), and submitted in writing for approval by the refuge manager before they are established. Storage will meet standards of USFWS, Alaska Region, Fuel Storage Policy.

13. Any action by a permittee or the permittee's employees that unduly interferes with or harasses refuge visitors or impedes access to any site is strictly prohibited. Examples of prohibited acts include, but are not limited to: 1) parking aircraft or placing other objects (rocks, tents, etc.) on any area so as to restrict use by other aircraft; 2) otherwise intentionally interfering in the activity of other refuge users; and 3) engaging in activity that is contrary to state and federal laws.

14. The permit is for refuge lands only. This permit does not authorize use of private lands such as land owned by ANCSA Native corporations, individuals, or the State of Alaska.

15. The permittee will take no action that interferes with subsistence activities of rural users or restricts the reasonable access of subsistence users to refuge lands. This may include, but is not limited to, disturbance of wildlife and their movements near subsistence hunters, and damage to cabins, trails, traditional campsites or caches used by subsistence users.

16. All rocket launches will be well publicized in advance to forewarn travelers and residents of the area involved. A minimum of two weeks notice of rocket launch dates and impact zones will be provided in writing to the refuge manager.

17. The permittee will insure that a transponder or other radio location aid is incorporated with each payload to facilitate tracking and recovery after launch.

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Initials: KD
Date: 1.2013

Arctic National Wildlife Refuge
Special Conditions
Permit 2013 – S1, University of Alaska - Duke

18. The permittee will maintain a viable rocket component recovery program to track, locate, and remove rocket debris at least once every two years. All determinations to remove or not remove debris will be made by the refuge manager. The refuge manager will be informed of locations (GPS coordinates in decimal degrees) of impact sites, un-recovered rockets and/or payloads, schedule for removal, actual activities to locate (see special condition #19) and remove rocket debris, and any potential hazards that may thereby be created. This information should be a 1-2 page summary with map submitted within 30-days of the permit expiration.

19. An annual trip report of activities on the refuge shall be provided to the Refuge Manager within 30-days of the permit expiration (normally 1-2 pages). In addition to potential impact sites within the refuge, an annual report must include a detailed summary of surveillance flights to locate and recover payload debris. Specific information of surveillance flights must include:

    (a) type of aircraft used (helicopter or fixed-wing),
    (b) aircraft model
    (c) operator company or ownership,
    (d) Special Use Permit number of operator
    (e) date and time of surveillance flights,
    (f) number of hours flown,
    (g) map showing flight lines,
    (h) landing locations with GPS coordinates in decimal degrees,
    (i) and date and time of each landing.

20. Paragraph No. 10. Damages, under "General Conditions and Requirements" does not apply to this Permit. The following replaces it:

    Damages and Indemnity: The United States shall not be responsible for any injuries to or death of the officers or employees of it or its agents or contractors, or for the loss or damage to the property of the permittee, its officers, employees, agents, or contractors, arising out of the activities authorized under this permit. The permittee shall defend, indemnify and hold the United States harmless from any and all claims, demands, losses liabilities and judgments, including costs and expenses, which may be suffered by, accrued against, be charged to, or recoverable from the United States by reason of injuries to or death of persons and damage to or losses to property arising out of the launch, impact, and recovery of permittee's rockets.

21. The permittee will be responsible for reporting any fires arising from these activities and will immediately notify the Alaska Fire Service and the Fish and Wildlife Service.

22. Rocket or debris impacts within the refuge are prohibited from 1 May through 30 September to avoid periods of high public use. However, exceptions to this prohibition may be authorized for specific time periods and areas. Requests for impact use during this

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Initials: AD
Date: 1-30-13

Arctic National Wildlife Refuge
Special Conditions
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period must be received by the refuge manager forty-five days before intended use. (A launch schedule is not considered a request.) Exception requests must include a complete project description, a statement affirming that the proposed dates are essential, the alternatives considered an analysis of the increased risk incurred and a justification for this risk.

23. Recovery of rockets that enter the wilderness area inadvertently may be authorized on a case by case basis. If debris is located in the wilderness area a permittee must inform the manager who will consider the appropriate action under provisions of the Wilderness Act of 1964. Changes in the launch program that elevate the probability of impact into the wilderness area may require a new compatibility determination before a permit request can be considered.

24. Activities may not occur in some special use areas and/or during some time periods (e.g., caribou calving, snow goose staging, Sadlerochit Springs). Prior to specific recovery operations the permittee shall consult with the Refuge Manager to gain approval. Special area boundaries or the effective dates may be modified by the refuge manager as needed. Specific authorization to use localities within special areas may sometimes be obtained on a case-by-case basis, depending on the location of animal concentrations, access route, proposed activity, etc.

25. Occupied raptor nest sites may occur within your intended work area. Unless explicitly exempted, all activities including helicopter flights are prohibited within one-half mile of occupied nest sites during the following periods: (1) north of the continental divide, March 15 – August 15; and (2) south of the continental divide, April 15 – August 15. Sites may be approached on foot or by boat to determine if an occupied nest is located at the site.

26. The preeminent value of the Arctic Refuge lies in its unsurpassed wilderness condition. The permittee shall ensure that all employees and clients seek to minimize the effect of their activities on the wilderness character of the land, wildlife, and the unique experience available here.

Permittee: _____ Date: 1·30·13
Kit Duke, AVP
Facilities and Land Management

Issuing Officer: _____ Date: 1·30·2013
Anne Marie LaRosa
Acting Refuge Manager

4

ARCTIC NATIONAL WILDLIFE REFUGE
Special Use Permit 2013-S1
FINDING OF NO SIGNIFICANT RESTRICTION OF SUBSISTENCE USES

The U.S. Fish and Wildlife Service, acting for the Secretary, is required by section 810 of the Alaska National Interest Lands Conservation Act to evaluate effects on subsistence uses and needs of proposed land use decisions on National Wildlife Refuges in Alaska. Evaluation is necessary to determine whether such decisions would result in significant restriction to subsistence uses and needs and compel initiation of further procedural requirements of Section 810.

Based on review and evaluation of available information (see special use permit activity description and evaluation table following), I have determined that the activities proposed under this Special Use Permit will not significantly restrict subsistence uses.

Issuing Officer: _____ **Date:** 1·30·2013
Anne Marie LaRosa
Acting Refuge Manager
Arctic National Wildlife Refuge

Description of Use: This permit authorizes direct helicopter flights to and landing at the area of study. Helicopter use is authorized only as a minimum tool and use is minimized as much as possible within the scope of the study. Number of personnel transported is restricted to the minimum necessary for the study purposes. Low level reconnaissance of the study area by aircraft is prohibited to avoid disturbance to wildlife. Routes are selected to avoid disturbance to caribou, nesting raptors, and recreation and subsistence users.

Anticipated Impacts on Refuge Purposes: Reference supporting documents listed below. Most of the impacts associated with these uses are localized and temporary displacement of wildlife, and localized and temporary impacts on vegetation at landing sites. No long term, wide spread impacts have occurred in the past nor are any expected.

Evaluation of the subsistence effects of special use permit 2013-S1.

I. Effect of Small-party Biological Studies on Subsistence Uses and Needs.

Criteria	Comments	Impact
Allotments	Many allotments are clustered near villages and lakes in areas rarely used by operators. However, remaining allotments are widely scattered on the refuge.	A potential for trespass on allotments, and/or conflict with allotment owners.
Village Corporation Land	Most corporation land is not attractive to visitors, and thus the potential for conflicting use is low. However, the portions of KIC land used for caribou calving/post-calving are susceptible to trespass.	Potential for trespass on village corporation lands.
Regional Corporation Land	Regional corporation inholdings are sparse. Navigable streams flow through some inholdings and a few are attractive to these users.	Potential for trespass on Regional Corporation lands.
Subsistence Hunting Areas	Subsistence hunters primarily use the coastal areas in the north and areas near Arctic Village and along motorboat accessible streams in the South.	Potential for impact on subsistence hunting areas
Trapping Areas	Subsistence trapping occurs on the refuge, but the use period does not coincide with most other visitor use periods.	None or minimal.
Other Subsistence Uses	Some local people fish, and harvest berries, firewood and house logs along the Porcupine and East Fork Chandalar and Junjik rivers when audio visual users are present.	Low potential for conflict with these subsistence uses.
Communications with Local Residents	Comments have been received from Kaktovik regarding most uses occurring when caribou are on the coastal plain. Kaktovik villagers object to the presence of aircraft, especially helicopters, when caribou are present. Kaktovik residents have occasionally commented unfavorably on other users being present during summer caribou seasons. Few comments regarding other areas have been received.	Most helicopter use has been eliminated or restricted to use that does not impinge on caribou hunting. The potential negative impact from other uses exists, but it is minimal and from all indications, insignificant.
Summary of Subsistence Impacts	Although these uses occur while subsistence activities take place, they are either insignificant or are separated by distances that eliminate or render insignificant their impact on subsistence activities (primarily caribou hunting by Kaktovik). Avoidance zones are set by SUP that eliminate or render insignificant conflicts	

COMPATIBILITY DETERMINATION

Special Use Permit Number: Arctic NWR 2013-S1

Permittee: Kit Duke, AVP Facilities and Land Management, Poker Flat Research Range, Geophysical Institute, University of Alaska-Fairbanks

Authorized Use: Approved areas within the Arctic National Wildlife Refuge can be used as research rocket and payload impact zones. Helicopters can be used to retrieve scientific payloads and debris.

Supporting Documents: Compatibility Determination - Public Leases and Uses - Permitted special use (Other): Atmospheric Rocket Research, Arctic National Wildlife Refuge, January 10, 2005. Activities authorized by the permit listed above have been found compatible with the purposes of Arctic National Wildlife Refuge.

Refuge Manager: _____ Date 11·30·2013
(Name/Signature)

Review and Concurrence: _____ Date _____
(Name/Title/Signature)

_____ Date _____
(Name/Title/Signature)

COMPATIBILITY DETERMINATION

Use: Rocket & Payload Impact and Recovery

Refuge Name: Arctic National Wildlife Refuge. Fairbanks. Alaska

Establishing and Acquisition Authority

December 6, 1960 (Arctic National Wildlife Range). Name changed to Arctic National Wildlife Refuge and expanded on December 2, 1980. Establishing and Acquisition Authorities: The Arctic National Wildlife Range was established by Public Land Order 2214. December 6, 1960. Arctic National Wildlife Refuge (Arctic Refuge), incorporating the Wildlife Range, was established by Public Law 96-487: the Alaska National Interest Lands Conservation Act (ANILCA), December 2, 1980. Public Law 100-395 (1988) added 325,000 acres to Arctic Refuge.

Refuge Purpose(s)

In 1960 Public Land Order 2214 established the Arctic National Wildlife Range "For the purpose of preserving unique wildlife, wilderness and recreational values. . ." These purposes, to the extent they are consistent with the purposes established by ANILCA. apply to that portion of the refuge that was originally the Arctic National Wildlife Range (about 8.9 million acres, 8 million acres of which was designated wilderness by ANILCA).

In 1980, additional purposes for which Arctic Refuge, in its entirety, were established for management. As set forth in Section 303(2)(B) of ANILCA, they are:

(i) to conserve fish and wildlife populations and habitats in their natural diversity including, but not limited to, the Porcupine caribou herd (including participation in coordinated ecological studies and management of this herd and the Western Arctic caribou herd), polar bears, grizzly bears, muskox, Dall sheep, wolves, wolverines, snow geese, peregrine falcons and other migratory birds, and Arctic char and grayling;

(ii) to fulfill the international treaty obligations of the United States with respect to fish and wildlife and their habitats;

(iii) to provide, in a manner consistent with purposes set forth in subparagraphs (i) and (ii), the opportunity for continued subsistence uses by local residents; and

(iv) to ensure, to the maximum extent practicable and in a manner consistent with the purposes set forth in subparagraph (i), water quality and necessary water quantity within the refuge.

- Failure to abide by any part of this special use permit; violation of any refuge related provision in Titles 43 (Part 36) or 50 Code of Federal Regulations (sub-chapters B and C); or violation of any pertinent state regulation (e.g., fish or game) will, with due process, be considered grounds for immediate revocation of this permit and could result in denial of future permit requests for lands administered by the U.S. Fish and Wildlife Service. This provision applies to all persons working under the authority of this permit. Appeals of decisions relative to permits are handled in accordance with 50 Code of Federal Regulations 36.41.

- The permittee is responsible for ensuring that all employees, party members, aircraft pilots and other persons working for the permittee and conducting activities allowed by this permit are familiar with and adhere to the conditions of this permit.

- Any problems with wildlife and/or animals taken in defense of life or property must be reported immediately to the refuge manager and Alaska Department of Fish and Game, and be salvaged in accordance with state regulations.

- This permit does not grant the permittee and his/her clients exclusive use of the site(s) or lands covered by the permit.

- This permit may be canceled or revised at any time by the refuge manager due to high fire danger, flooding, unusual resource problems, or other significant problems or emergencies.

- The permittee or his/her designee shall notify the refuge manager during refuge working hours in person or by telephone before beginning and upon completing activities allowed by this permit.

- Prior to beginning activities allowed by this permit, the permittee shall provide the refuge manager with: (1) the name and method of contact for the field party chief/supervisor; (2) the aircraft and other vehicle types to be used, including identification information; (3) names of assistants and helpers; and (4) any changes to information provided in the original permit application.

- In accordance with the Archaeological Resources Protection Act (16 U.S.C. 470aa), the removal, excavation, disturbance, collection, or purchase of historical, recent, ethnological, or archaeological specimens or artifacts is prohibited.

- The permittee will not make launches with a planned impact site within the Mollie Beattie Wilderness area. The use of helicopters outside the wilderness area is authorized provided that:

  (a) Landing is prohibited except for the direct support of the activity covered by this permit and emergencies. No recreational use of helicopters is permitted.

Mandatory 10-Year Re-Evaluation Date (provide month and year for allowed uses only): January 2014

Mandatory 15-Year Re-Evaluation Date (for priority public uses):

NEPA Compliance for Refuge Use Decision

_____ Categorical Exclusion without Environmental Action Memorandum
_____ Categorical Exclusions and Environmental Action Memorandum
_____ Environmental Assessment and Finding of No Significant Impact
__X__ Environmental Impact Statement and Record of Decision

Supporting Documents

- Environmental Analysis for Poker Flat Research Range, Geophysical Institute, University of Alaska Fairbanks, November 1991.
- Arctic National Wildlife Refuge, Final Comprehensive Conservation plan, Environmental Impact Statement, Wilderness Review, Wild River Plan. Record of Decision Signed November 10, 1988.
- Compatibility Determination, Public Leases and Uses (Other): Atmospheric Rocket Research. Found compatible: signed 10 August 1994.
- ACIA, Arctic Climate Impact Assessments. 2004. Impact of a Warm Arctic. Cambridge University Press. Cambridge. UK.

Refuge Determination

Prepared by: Terra Underwood (Signature) 1/10/05 (Date)

Refuge Manager / Project Leader Approval: Gary D. Stauber (Signature) 1/10/05 (Date)

Concurrence

Refuge Supervisor: Mike Bonfe (Acting) (Signature) 1/13/05 (Date)

Regional Chief, National Wildlife Refuge System: Richard Hotung (Signature) 1/13/05 (Date)

9

From: Dian Siegfried
To: Anne Marie La Rosa
Subject: Re: Permit for Poker Flats Activities on Arctic Refuge in 2013
Date: Thursday, January 24, 2013 2:14:50 PM

Anne Marie,

I have the answers to your questions below. Let me know if there is anything else you need from us.
I can send the SUP electronically to Anchorage tomorrow and have it signed and over-nighted back up here.
We would have it on Tuesday and I can hand carry it to you for signature.

Arctic has requested additional information for the SUP.

1) How many rocket launches?

One this year

2) What kind of rocket(s)?

An Oriole Brant, 4 stage rocket

3) What is in the payload(s)?

Electronic equipment, antennas, and batteries

4) What is the potential debris area within Arctic NWR?

Predicted impact area is northwest of Arctic Village. Only the third stage is predicted to land in Arctic. The payload and forth stage will be in the Arctic Ocean.

On Wed, Jan 23, 2013 at 1:23 PM, Anne Marie La Rosa <annemarie_larosa@fws.gov> wrote:

> Dian – can you please call me at 456-0549 or 888-7355 if you can't get me at that number
>
> Thanks
>
> Anne MaRie

C.2 UNITED STATES DEPARTMENT OF THE INTERIOR, U.S. FISH AND WILDLIFE SERVICE, YUKON FLATS NATIONAL WILDLIFE REFUGE

OMB Control Number 1018-0102
Expiration Date: 06/30/2014

For Official Use Only (This section to be filled out by refuge personnel only.)

Special Use Permit

Permit #: 13-SR1-PFRR-YF

1) Date: 1/27/13 - 1/26/14 2) ◎ Permit Approved ○ Permit Denied 3) Station #: Yukon Flats NWR

4) Additional special conditions required: (Special conditions may include activity reports, before and after photographs, and other conditions.)
◎ Yes ○ No ○ N/A

Additional sheets attached:
◎ Yes ○ No

5) Other licenses/permits required:
○ Yes ◎ No ○ N/A

Verification of other licenses/permits, type:

6) Minimum requirements analysis has been conducted:
○ Yes ◎ No ○ N/A

Assessment attached:
○ Yes ◎ No

7) Assurance of Animal Care Form or Institutional Animal Approval form attached:
○ Yes ○ No ◎ N/A

Approval form attached:
○ Yes ◎ No

8) Record of Payments: ◎ Exempt ○ Partial ○ Full

Amount of payment: _____ Record of partial payment: _____

9) Bond Paid: ○ Yes ○ No ◎ N/A

This permit is issued by the U.S. Fish and Wildlife Service and accepted by the applicant signed below, subject to the terms, covenants, obligations, and reservations, expressed or implied herein, and to the notice, conditions, and requirements included or attached. A copy of this permit should be kept on hand so that it may be shown at any time to any refuge staff.

Permit approved and issued by (Signature and title):
Date: 1/20/2013

Permit accepted by (Signature of applicant):
Date: 1·3·13

Kit Duke, Associate Vice President
UA Facilities and Land Management

FWS Form 3-1383-R
03/11

OMB Control Number 1018-0102
Expiration Date: 06/30/2014

Notice

In accordance with the Privacy Act (5 U.S. C. 552a) and the Paperwork Reduction Act (44 U.S. C. 3501), please note the following information:

1. The issuance of a permit and collection of fees on lands of the National Wildlife Refuge System are authorized by the National Wildlife Refuge System Administration Act (16 U.S. C. 668dd-ee) as amended, and the Refuge Recreation Act (16 U.S. C. 460k-460k-4).

2. The information that you provide is voluntary; however submission of requested information is required to evaluate the qualifications, determine eligibility, and document permit applicants under the above Acts. It is our policy not to use your name for any other purpose. The information is maintained in accordance with the Privacy Act. All information you provide will be considered in reviewing this application. False, fictitious, or fraudulent statements or representations made in the application may be grounds for revocation of the Special Use Permit and may be punishable by fine or imprisonment (18 U.S.C. 1001). Failure to provide all required information is sufficient cause for the U.S. Fish and Wildlife Service to deny a permit.

3. No Members of Congress or Resident Commissioner shall participate in any part of this contract or to any benefit that may arise from it, but this provision shall not pertain to this contract if made with a corporation for its general benefit.

4. The Permittee agrees to be bound by the equal opportunity "nondiscrimination in employment" clause of Executive Order 11246.

5. Routine use disclosures may also be made: (a) to the U.S. Department of Justice when related to litigation or anticipated litigation; (b) of information indicating a violation or potential violation of a statute, rule, order, or license to appropriate Federal, State, local or foreign agencies responsible for investigating or prosecuting the violation or for enforcing or implementing the statute, rule, regulations, order, or license; (c) from the record of the individual in response to an inquiry from a Congressional office made at the request of the individual (42 FR 19083; April 11,1977); and (d) to provide addresses obtained from the Internal Revenue Service to debt collection agencies for purposes of locating a debtor to collect or compromise a Federal Claim against the debtor, or to consumer reporting agencies to prepare a commercial credit report for use by the Department (48 FR 54716; December 6, 1983).

6. An agency may not conduct or sponsor and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. This information collection has been approved by OMB and assigned control number 1018-0102. The public reporting burden for this information collection varies based on the specific refuge use being requested. The relevant public reporting burden for the Research and Monitoring Special Use Permit Application form is estimated to average 4 hours per response, including time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Comments on this form should be mailed to the Information Collection Clearance Officer, U.S. Fish and Wildlife Service, 4401 N. Fairfax Drive, MS 2042-PDM, Arlington, Virginia, 22203.

General Conditions and Requirements

1. Responsibility of Permittee: The permittee, by operating on the premises, shall be considered to have accepted these premises with all facilities, fixtures, or improvements in their existing condition as of the date of this permit. At the end of the period specified or upon earlier termination, the permittee shall give up the premises in as good order and condition as when received except for reasonable wear, tear, or damage occurring without fault or negligence. The permittee will fully repay the Service for any and all damage directly or indirectly resulting from negligence or failure on his/her part, and/or the part of anyone of his/her associates, to use reasonable care.

2. Operating Rules and Laws: The permittee shall keep the premises in a neat and orderly condition at all times, and shall comply with all municipal, county, and State laws applicable to the operations under the permit as well as all Federal laws, rules, and regulations governing national wildlife refuges and the area described in this permit. The permittee shall comply with all instructions applicable to this permit issued by the refuge official in charge. The permittee shall take all reasonable precautions to prevent the escape of fires and to suppress fires and shall render all reasonable assistance in the suppression of refuge fires.

3. Use Limitations: The permittee's use of the described premises is limited to the purposes herein specified and does not, unless provided for in this permit, allow him/her to restrict other authorized entry onto his/her area; and permits the Service to carry on whatever activities are necessary for: (1) protection and maintenance of the premises and adjacent lands administered by the Service; and (2) the management of wildlife and fish using the premises and other Service lands.

4. Transfer of Privileges: This permit is not transferable, and no privileges herein mentioned may be sublet or made available to any person or interest not mentioned in this permit. No interest hereunder may accrue through lien or be transferred to a third party without the approval of the Regional Director of the Service and the permit shall not be used for speculative purposes.

5. Compliance: The Service's failure to require strict compliance with any of this permit's terms, conditions, and requirements shall not constitute a waiver or be considered as a giving up of the Service's right to thereafter enforce any of the permit's terms or conditions.

6. Conditions of Permit not Fulfilled: If the permittee fails to fulfill any of the conditions and requirements set forth herein, all money paid under this permit shall be retained by the Government to be used to satisfy as much of the permittee's obligation as possible.

7. Payments: All payment shall be made on or before the due date to the local representative of the Service by a postal money order or check made payable to the U.S. Fish and Wildlife Service.

8. Termination Policy: At the termination of this permit the permittee shall immediately give up possession to the Service representative, reserving, however, the rights specified in paragraph 11. If he/she fails to do so, he/she will pay the government, as liquidated damages, an amount double the rate specified in this permit for the entire time possession is withheld. Upon yielding possession, the permittee will still be allowed to reenter as needed to remove his/her property as stated in paragraph 11. The acceptance of any fee for the liquidated damages or any other act of administration relating to the continued tenancy is not to be considered as an affirmation of the permittee's action nor shall it operate as a waiver of the Government's right to terminate or cancel the permit for the breach of any specified condition or requirement.

9. Revocation Policy: This permit may be revoked by the Regional Director of the Service without notice for noncompliance with the terms hereof or for violation of general and/or specific laws or regulations governing national wildlife refuges or for nonuse. It is at all times subject to discretionary revocation by the Director of the Service. Upon such revocation the Service, by and through any authorized representative, may take possession of the said premises for its own and sole use, and/or may enter and possess the premises as the agent of the permittee and for his/her account.

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10. Damages: The United States shall not be responsible for any loss or damage to property including, but not limited to, growing crops, animals, and machinery or injury to the permittee or his/her relatives, or to the officers, agents, employees, or any other who are on the premises from instructions or by the sufferance of wildlife or employees or representatives of the Government carrying out their official responsibilities. The permittee agrees to save the United States or any of its agencies harmless from any and all claims for damages or losses that may arise to be incident to the flooding of the premises resulting from any associated Government river and harbor, flood control, reclamation, or Tennessee Valley Authority activity.

11. Removal of Permittee's Property: Upon the expiration or termination of this permit, if all rental charges and/or damage claims due to the Government have been paid, the permittee may, within a reasonable period as stated in the permit or as determined by the refuge official in charge, but not to exceed 60 days, remove all structures, machinery, and/or equipment, etc. from the premises for which he/she is responsible. Within this period the permittee must also remove any other of his/her property including his/her acknowledged share of products or crops grown, cut, harvested, stored, or stacked on the premises. Upon failure to remove any of the above items within the aforesaid period, they shall become the property of the United States.

12. Collected Specimens: You may use specimens collected under this permit, any components of any specimens (including natural organisms, enzymes, genetic materials or seeds), and research results derived from collected specimens for scientific or educational purposes only, and not for commercial purposes unless you have entered into a Cooperative Research and Development Agreement (CRADA) with us. We prohibit the sale of collected research specimens or other transfers to third parties. Breach of any of the terms of this permit will be grounds for revocation of this permit and denial of future permits. Furthermore, if you sell or otherwise transfer collected specimens of any components without a CRADA, you will pay us a royalty rate of 20 percent of the gross revenue from such sales. In addition to such royalty, we may seek other damages and injunctive relief against you.

Instructions for Completing Application

You may complete the application portion verbally, in person or electronically and submit to the refuge for review. Note: Please read instructions carefully as not all information is required for each activity. Contact the specific refuge where the activity will take place if you have questions regarding the applicability of a particular item. Special conditions or permit stipulations may be added to permit prior to approval.

1. Identify if application is for a new permit or renewal or modification of an existing permit. Permit renewals may not need all information requested. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

2-3. Provide principal investigator's or applicant's full name. Attach principal investigator's Curriculum Vitae or Resume, if required. Permit renewals generally do not require a Curriculum Vitae or Resume if the project is a continuation of a previously issued permit being conducted by the same investigator. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

4-9. Provide investigator's address, phone, fax, e-mail, affiliation and or organization, and relationship to affiliation or organization (title, professor, student, etc.).

10. Provide the names and addresses of assistants, subcontractors or subpermittees. Names and address are only required if the assistants, subcontractors or subpermittees will be operating on the refuge without the permittee being present. Volunteers, assistants, subcontractors or subpermittees that are accompanied by the permittee need not be identified.

11. Provide title of research or monitoring project.

12a-12b. Attach a full research or monitoring proposal, if required. Permit renewals generally do not require a project proposal if the project is a continuation of a previously issued permit being conducted by the same investigator. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

13. Describe Activity: provide detailed information on the activity, including timing, frequency, how the project is expected to proceed, etc. Permit renewals may not need activity description, if the activity is unchanged from previous permit. Most repetitive research projects do not require an activity description for each visit to the refuge. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

14. Location: Identify specific location (GPS coordinates preferred), if not a named facility. Permit renewals may not require a location if the project is essentially unchanged from the previous permit. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

15a-15b. Attach a map of location, if required and project is not conducted at a named facility. Permit renewals may not require a map if the project is essentially unchanged from the previous permit. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

16. Activity/site occupancy timeline: Identify beginning and ending dates, site occupation timeline, hours, clean-up and other major events. Permit renewals may not need an activity/site occupancy timeline, if the activity is unchanged from previous permit. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

17. Identify species or habitats being studied.

18-19. Specifically identify purpose or hypothesis of the research or monitoring project and describe expected benefits. Permit renewals may not need to identify purpose or hypothesis, if the project is a continuation of a previously issued permit being conducted by the same investigator. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

20. Briefly describe project history and context. Permit renewals should describe previous research activities as part of a previously issued permit being conducted by the same investigator. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

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21. Briefly describe project's relationship to other research/monitoring projects either known of or conducted by the applicant, if applicable. Include a brief statement of how the research or monitoring permit being applied for will add to or supplement other ongoing research or monitoring on the same, or related, species or habitats. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

22. Identify samples to be taken or types of data to be collected. Permit renewals may not need to identify samples taken if the project is a continuation of a previously issued permit being conducted by the same investigator. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

23. List other cooperators and institutions involved in the project, if applicable. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

24. Generally, identify the anticipated time line for analysis, write-up and publication of project results. Include whether the project is a single, or multiple year project. Identification of an actual publication where the results are printed is not necessary. However, applicants should include the anticipated dissemination of project results. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

25. Check box acknowledging a completed Assurance of Animal Care Form or an Institutional Animal Care and Use Committee (or equivalent) has granted approval been completed, and has been submitted to refuge station, if required. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

26a-26c. Specifically identify types and numbers of other certifications, if required. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement, and to coordinate the simultaneous application of several types of certifications. This Special Use Permit may be processed while other certifications are being obtained.

27a-27d. Specifically identify types and numbers of other State, Federal or tribal permits, if required. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement, and to coordinate the simultaneous application of several types of State, Federal or tribal permits. This Special Use Permit may be processed while other State, Federal or tribal permits are being obtained.

28a-28b. Provide name(s) of any personnel required to stay overnight, if applicable.

29. Identify all equipment and materials, which will be used, if required. Permit renewals may not require a list of equipment if the project is essentially unchanged from a previously issued permit. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

30a-30e. Identify types and dates of installation of any instrumentation, and data collection and maintenance schedule of instrumentation, if required. Permit renewals may not require a list of equipment if the project is essentially unchanged from a previously issued permit. However, dates of installation of any instrumentation, and data collection and maintenance schedule of instrumentation may still be required. Contact the specific refuge headquarters office where the project is going to be conducted to determine applicability of this requirement.

31. Identify logistic arrangements for offsite transportation of samples taken, if applicable.

32a-32d. Describe and provide vehicle descriptions and license plate or identification numbers of all vehicles, including boats and airplanes, if required. Motor vehicle descriptions are only required for permittee vehicle, and/or if the vehicle will be operated on the refuge without the permittee being present. Motor vehicles that are accompanied by the permittee as part of a group (convoy) activity need not be identified if cleared in advance by refuge supervisor. Specifically describe ship-to-shore, intersite (between islands, camps, or other sites) and onsite transportation mechanisms, and license plate or identification numbers, if required.

33a-33b. Identify specific location(s) of fuel cache(s) (GPS coordinates preferred), if required.

34a-34b. Attach safety plan, if required. Contact the specific refuge headquarters office where the project is going to be conducted to determine if a safety plan is required.

35. Specifically describe onsite work and/or living accommodations, if required. Include descriptions and locations (GPS coordinates preferred) of spike camps or other remote work and/or living accommodations that are not part of the base of operations. Contact the specific refuge headquarters office where the project is going to be conducted to determine if descriptions of onsite work and/or living accommodations are required.

36. Specifically describe onsite and offsite hazardous material storage, or other onsite material storage space (including on and offsite fuel caches), if required. Contact the specific refuge headquarters office where the project is going to be conducted to determine if descriptions of hazardous material storage or other onsite material storage are required.

37 Sign, date and print the application. Click on the Print button to print the application (if using the fillable version). The refuge official will review and, if approved, fill out the remaining information, sign, and return a copy to you for signature and acceptance.

The form is not valid as a permit unless it includes refuge approval, a station number, a refuge-assigned permit number, and is signed by a refuge official.

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03/11

Yukon Flats National Wildlife Refuge
Special Conditions
Permit 2013–SR1-PFRR-YF, University of Alaska, Poker Flat Research Range

1. Failure to abide by any part of this special use permit; violation of any refuge related provision in Titles 43 (Part 36) or 50 Code of Federal Regulations (sub-chapters B and C); or violation of any pertinent state regulation (e.g., fish or game) will, with due process, be considered grounds for immediate revocation of this permit and could result in denial of future permit requests for lands administered by the U.S. Fish and Wildlife Service. This provision applies to all persons working under the authority of this permit. Appeals of decisions relative to permits are handled in accordance with 50 Code of Federal Regulations 36.41.

2. The permittee is responsible for ensuring that all employees, party members, aircraft pilots and other persons working for the permittee and conducting activities allowed by this permit are familiar with and adhere to the conditions of this permit.

3. Any problems with wildlife and/or animals taken in defense of life or property must be reported immediately to the refuge manager and Alaska Department of Fish and Game, and be salvaged in accordance with state regulations.

4. This permit does not grant the permittee and his/her clients exclusive use of the site(s) or lands covered by the permit.

5. This permit may be canceled or revised at any time by the refuge manager due to high fire danger, flooding, unusual resource problems, or other significant problems or emergencies.

6. The permittee or his/her designee shall notify the refuge manager during refuge working hours in person or by telephone before beginning and upon completing activities allowed by this permit.

7. Prior to beginning activities allowed by this permit, the permittee shall provide the refuge manager with: (1) the name and method of contact for the field party chief/supervisor; (2) the aircraft and other vehicle types to be used, including identification information; (3) names of assistants and helpers; and (4) any changes to information provided in the original permit application.

8. In accordance with the Archaeological Resources Protection Act (16 U.S.C. 470aa), the removal, excavation, disturbance, collection, or purchase of historical, recent, ethnological, or archaeological specimens or artifacts is prohibited.

9. The use of helicopters is authorized provided that:

   (a) Landing is prohibited except for the direct support of the activity covered by this permit and emergencies. No recreational use of helicopters is permitted.

   (b) Clearing of vegetation for landing/takeoff is prohibited. Incidental hand removal of rocks and other minor obstructions may be permitted.

1

Initials: KD
Date: 1-3-13

Yukon Flats National Wildlife Refuge
Special Conditions
Permit 2013–SR1-PFRR-YF, University of Alaska, Poker Flat Research Range

(c) Activities are restricted to day use only. No overnight stays are anticipated.

(d) Personnel transported are restricted to only those necessary to conduct the debris recovery. Recreational use is not permitted.

(e) Low level slinging of gear from site to site is prohibited.

10. The use of off-road vehicles (except snow machines) is prohibited.

11. The operation of aircraft at altitudes and in flight paths resulting in the herding, harassment, hazing, or driving of wildlife is prohibited. It is requested that all aircraft maintain a minimum altitude of 2000 feet above ground level, except during take-off, landing, and when safety considerations require a lower altitude.

12. Fuel caches are allowed only in designated areas, must be identified on a US Geological Survey map (or map photocopy), and submitted in writing for approval by the refuge manager before they are established. Storage will meet standards of USFWS, Alaska Region, Fuel Storage Policy.

13. Any action by a permittee or the permittee's employees that unduly interferes with or harasses refuge visitors or impedes access to any site is strictly prohibited. Examples of prohibited acts include, but are not limited to: 1) parking aircraft or placing other objects (rocks, tents, etc.) on any area so as to restrict use by other aircraft; 2) otherwise intentionally interfering in the activity of other refuge users; and 3) engaging in activity that is contrary to state and federal laws.

14. The permit is for refuge lands only. This permit does not authorize use of private lands such as land owned by ANCSA Native corporations, individuals, or the State of Alaska.

15. The permittee will take no action that interferes with subsistence activities of rural users or restricts the reasonable access of subsistence users to refuge lands. This may include, but is not limited to, disturbance of wildlife and their movements near subsistence hunters, and damage to cabins, trails, traditional campsites or caches used by subsistence users.

16. All rocket launches will be well publicized in advance, using print media and radio, to forewarn travelers and residents of the area involved. A minimum of two weeks notice of rocket launch dates and impact zones will be provided in writing to the refuge manager.

17. The permittee will insure that a transponder or other radio location aid is incorporated with each payload to facilitate tracking and recovery after launch.

18. The permittee will maintain a viable rocket component recovery program to track, locate, and remove rocket debris at least once every two years. All determinations to remove or

2

Initials: KD
Date: 1-3-13

Yukon Flats National Wildlife Refuge
Special Conditions
Permit 2013–SR1-PFRR-YF, University of Alaska, Poker Flat Research Range

not remove debris will be made by the refuge manager. The refuge manager will be informed of locations (GPS coordinates in decimal degrees) of impact sites, un-recovered rockets and/or payloads, schedule for removal, actual activities to locate (see special condition #19) and remove rocket debris, and any potential hazards that may thereby be created. This information should be a 1-2 page summary with map submitted within 30-days of the permit expiration.

19. An annual trip report of activities on the refuge shall be provided to the Refuge Manager within 30-days of the permit expiration (normally 1-2 pages). In addition to potential impact sites within the refuge, an annual report must include a detailed summary of surveillance flights to locate and recover payload debris. Specific information of surveillance flights must include:

    (a) type of aircraft used (helicopter or fixed-wing),
    (b) aircraft model
    (c) operator company or ownership,
    (d) Special Use Permit number of operator
    (e) date and time of surveillance flights,
    (f) number of hours flown,
    (g) map showing flight lines (for example, GPS track log),
    (h) landing locations with GPS coordinates in decimal degrees,
    (i) and date and time of each landing.

20. Paragraph No. 10. Damages, under "General Conditions and Requirements," does not apply to this Permit. The following replaces it:

    Damages and Indemnity: The United States shall not be responsible for any injuries to or death of the officers or employees of it or its agents or contractors, or for the loss or damage to the property of the permittee, its officers, employees, agents, or contractors, arising out of the activities authorized under this permit. The permittee shall defend, indemnify and hold the United States harmless from any and all claims, demands, losses liabilities and judgments, including costs and expenses, which may be suffered by, accrued against, be charged to, or recoverable from the United States by reason of injuries to or death of persons and damage to or losses to property arising out of the launch, impact, and recovery of permittee's rockets.

21. The permittee will be responsible for reporting any fires arising from these activities and will immediately notify the Alaska Fire Service and the Fish and Wildlife Service.

22. Rocket or debris impacts within the refuge are prohibited from 1 May through 30 September to avoid periods of high public use. However, exceptions to this prohibition may be authorized for specific time periods and areas. Requests for impact use during this

3

Initials: KD
Date: 1-3-13

Yukon Flats National Wildlife Refuge
Special Conditions
Permit 2013–SR1-PFRR-YF, University of Alaska, Poker Flat Research Range

period must be received by the refuge manager forty-five days before intended use. (A launch schedule is not considered a request.) Exception requests must include a complete project description, a statement affirming that the proposed dates are essential, the alternatives considered an analysis of the increased risk incurred and a justification for this risk.

23. Peregrine falcons (*Falco peregrines anatum*) and other raptors may have active nest sites on cliffs and bluff races with the refuge. Helicopter activity is prohibited within one-half mile of these active raptor nest sites during the period 1 May through 15 August. Sites may be approached on foot or by boat to determine if an occupied nest is located at the site.

24. All information, reports, photos, data, collections, and observations obtained as a result of this permit must be accessible from the permittee at any time upon request by the Service at no cost, unless specific arrangements are made to the contrary. The Service recognizes the proprietary nature of scientific data and will respect the researchers' privileged position regarding first publication. These data may be used in resource management decisions by the Service before their publication, however. Proprietary data of commercial value will be treated confidentially upon request, but may also be used in management decisions.

25. Before implementing field work, the permittee must provide documentation that activities involving an invasive procedure that harms, potentially harms or materially alters the behavior of an animal under study have been reviewed and approved by an Institutional Animal Care and Use committee (IACUC) pursuant to the Animal Welfare Act.

I have read and agree to abide by all the special conditions and requirements for this permit.

Permittee: _____ Date: 1.3.13
Kit Duke, Associate Vice President
UA Facilities and Land Management

Issuing Officer: _____ Date: 1/20/2013
Steve Berendzen
Refuge Manager

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Rocket and Payload Impact and Recovery
Yukon Flats National Wildlife Refuge

COMPATIBILITY DETERMINATION

Special Use Permit Number: Yukon Flats NWR 2005-S1

Permittee: Kathe S. Rich, Operations Controller, Poker Flat Research Range, Geophysical Institute, University of Alaska-Fairbanks

Authorized Use: Approved areas within the Yukon Flats National Wildlife Refuge can be used as research rocket and payload impact zones. Helicopters can be used to retrieve scientific payloads and debris.

Supporting Documents: Compatibility Determination - Public Leases and Uses - Permitted special use (Other): Atmospheric Rocket Research, Yukon Flats National Wildlife Refuge, January 10, 2005. Activities authorized by the permit listed above have been found compatible with the purposes of Yukon Flats National Wildlife Refuge.

Refuge Manager: _____ Date 1/11/05
(Name/Signature)

Review and Concurrence: _____ Date _____
(Name/Title/Signature)

_____ Date _____
(Name/Title/Signature)

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COMPATIBILITY DETERMINATION

Use: Rocket & Payload Impact and Recovery

Refuge Name: Yukon Flats National Wildlife Refuge, Fairbanks, Alaska

Establishing and Acquisition Authority

In 1978, President Jimmy Carter established the 10.6 million-acre Yukon Flats National Wildlife Monument with Presidential Proclamation 4627. The monument was established from lands in the public domain. In 1980, the Alaska National Interest Lands Conservation Act (ANILCA) (§ 302) adjusted the boundary to 8.6 million acres, and established the Yukon Flats National Wildlife Refuge as part of the National Wildlife Refuge System.

Refuge Purpose(s)

ANILCA sets out the primary purposes for each refuge in Alaska. The purposes of the Yukon Flats National Wildlife Refuge (NWR) are described in Section 302(9)(B). The ANILCA purposes for the Yukon Flats NWR are as follows:

- to conserve fish and wildlife populations and habitats in their natural diversity including, but not limited to, canvasbacks and other migratory birds, Dall sheep, bears, moose, wolves, wolverines and other furbearers, caribou (including participation in coordinated ecological studies and management of the Porcupine and Fortymile caribou herds) and salmon
- to fulfill the international treaty obligations of the United States with respect to fish and wildlife and their habitats
- to provide, in a manner consistent with the purposes set forth above, the opportunity for continued subsistence uses by local residents
- to ensure, to the maximum extent practicable and in a manner consistent with the purposes set forth above, water quality and necessary water quantity within the refuge.

[Supplemental Purposes of the Beaver Creek Wild River and the recommended Lower Sheenjek Wild River] The River Management Plan for Beaver Creek National Wild River, dated December, 1983, states the river will be managed for the following long-term objectives. These are the outstandingly remarkable values and conditions to be protected and enhanced:

- preserve the river and its immediate environment in its natural, primitive condition;
- preserve the free-flowing condition of the river;
- protect water quality and quantity;
- provide high quality primitive recreational opportunities for present and future generations;

- provide a variety of opportunities for interpretive, scientific, educational and wildlands oriented uses;
- assure preservation and interpretation of historic and archeological values; and
- maintain and improve fish and wildlife habitat.

The Final Wild and Scenic River Study/EIS for the Lower Sheenjek, dated September 1999, found the river to be suitable and thus recommended to congress that it be designated part of the National Wild and Scenic Rivers System. Congress has not acted on this recommendation. In the meantime, management of the river should preserve the free-flowing condition of the river, and protect the outstandingly remarkable cultural (subsistence), wildlife, scenic and recreational values associated with the Lower Sheenjek, its water quality, and the adjacent lands.

National Wildlife Refuge System Mission

The mission of the National Wildlife Refuge System is "to administer a national network of lands and waters for the conservation, management, and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (National Wildlife Refuge System Administration Act of 1966, as amended [16 U.S.C. 668dd-668ee]).

Description of Use(s)

This compatibility determination reevaluates the use of federal lands within Yukon Flats NWR as a program component of Poker Flat Research Range that supports research programs from across the country in the study of northern atmospheric phenomenon and climate change. In 1994, the refuge found these activities compatible with refuge purposes. The refuge provides an impact zone for research rockets and payloads. This research requires associated landings of helicopters to retrieve scientific payloads and rocket debris. The University of Alaska Fairbanks – Geophysical Institute's Poker Flat Research Range has been conducting auroral and middle to upper atmospheric research in Alaska for over ten years, including use of lands within the refuge.

From four to ten sounding rockets are launched from the Poker Flat Research Range each winter. The range is located approximately fifty miles south of the refuge, and about thirty miles north of Fairbanks, Alaska (see attached map). The sounding rockets are single, two, three or four-stage solid fuel rockets. The rockets carry instrumented payloads into the earth's upper atmosphere to make direct measurements of the aurora borealis, ozone, solar protons, electric and magnetic fields, ultraviolet and other atmospheric phenomena unique to these high latitudes.

The first stage of the rocket propels it to about 20,000 feet, separates from the remaining stages and payload, and falls back to earth about two miles from the launch site at Poker Flat. The second stage and payload follow the flight trajectory to typical altitudes of 50 to 300 miles and impact 50 to 225 miles from the launch

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site. On the occasion when a three-stage rocket is utilized, both the rocket and payload over fly Alaska and land in international waters to the north.

It is the second stages and payloads that occasionally impact the Yukon Flats NWR. The refuge is but one of several federal, state and private land managers that authorize the use of a combined twenty-five million acres of land for rocket and payload impact and recovery. The dimensions of the empty rocket and payload are approximately fifteen to twenty feet long, thirty inches in diameter and weigh a few hundred pounds. Most payloads launched on sounding rockets from Poker Flat are recovery payloads that contain locator beacons and descend slowly to earth by an orange and white parachute. They are tracked via radar, and recovered with a helicopter. When they are recovered, any disturbance to the landscape is repaired as much as feasible. All rockets launched from Poker Flat are unguided after launch. The Poker Flat managers use a risk assessment prepared by the National Aeronautics and Space Administration that takes into account wind speed, direction of flight and type of rocket to determine launch elevation and flight azimuth, and impact point to reduce risk to life and property to an absolute minimum. For a given year, operations managers provide a detailed list of potential launch vehicle, launch windows, and potential impact zones for each launch (see attached map).

Any deviation from this description will require a separate compatibility determination.

Availability of Resources

Adequate refuge personnel and base operational funds are available to manage research activities at existing (approximately two requests to retrieve components are made annually) and projected levels. Administrative staff time (not more than five days) primarily involves phone conversations, written correspondence, proposal review, permit issuance and personal interaction with researchers. Field work associated with administering the program primarily involves monitoring researchers' compliance with the terms of the permit.

Anticipated Impacts of the Use(s)

Factors such as impact area(s), number of rockets or payloads, number of aircraft and anticipated amount of aircraft use will determine the extent of impacts on the refuge. Past impacts from this use have resulted in minor damage to vegetation, which is repaired as much as practical, and a few hours of helicopter flight time and landings to retrieve rocket payloads and debris, and perform site remediation.

At current levels, rocket and payload impact and recovery and associated activities should not have significant impacts on the wildlife resources, other refuge resources (e.g., water quality, soil, and vegetation), and other refuge users, especially subsistence users, due to the limited scope and complete administrative oversight of this research. Winter conditions (frozen soil) limit impact and landing damage.

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Public Review and Comment

The refuge considers the proposed use to be a minor use with history of minimal impact. Public involvement for this document included a public notice in the Fairbanks Daily News Miner newspaper and a thirty-day public comment period. This compatibility determination was also available for review on the US Fish and Wildlife Service – Alaska Region's compatibility determination Web site, http://alaska.fws.gov/nwr/planning/index.htm

Determination

_____Use is Not Compatible

__X__ Use is Compatible

Stipulations Necessary to Ensure Compatibility

Refuge staff will monitor all research being conducted on the refuge. Findings from these monitoring efforts will be used to determine what additional management actions, if any, are needed to ensure that research activities remain compatible with refuge purposes. Monitoring of all authorized research activities will be continued to ensure compliance with specific terms and conditions tailored for each research permit as well as with the following general conditions that are incorporated into all research permits to minimize impacts on refuge lands and resources.

- Failure to abide by any part of this special use permit; violation of any refuge related provision in Titles 43 (Part 36) or 50 Code of Federal Regulations (sub-chapters B and C); or violation of any pertinent state regulation (e.g., fish or game) will, with due process, be considered grounds for immediate revocation of this permit and could result in denial of future permit requests for lands administered by the U.S. Fish and Wildlife Service. This provision applies to all persons working under the authority of this permit. Appeals of decisions relative to permits are handled in accordance with 50 Code of Federal Regulations 36.41.

- The permittee is responsible for ensuring that all employees, party members, aircraft pilots and other persons working for the permittee and conducting activities allowed by this permit are familiar with and adhere to the conditions of this permit.

- Any problems with wildlife and/or animals taken in defense of life or property must be reported immediately to the refuge manager and Alaska Department of Fish and Game, and be salvaged in accordance with state regulations.

- This permit does not grant the permittee and his/her clients' exclusive use of the site(s) or lands covered by the permit.

- This permit may be canceled or revised at any time by the refuge manager due to high fire danger, flooding, unusual resource problems, or other significant problems or emergencies.

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- The permittee or his/her designee shall notify the refuge manager during refuge working hours in person or by telephone before beginning and upon completing activities allowed by this permit.

- Prior to beginning activities allowed by this permit, the permittee shall provide the refuge manager with: (1) the name and method of contact for the field party chief/supervisor; (2) the aircraft and other vehicle types to be used, including identification information; (3) names of assistants and helpers; and (4) any changes to information provided in the original permit application.

- In accordance with the Archaeological Resources Protection Act (16 U.S.C. 470aa), the removal, excavation, disturbance, collection, or purchase of historical, recent, ethnological, or archaeological specimens or artifacts is prohibited.

- The use of off-road vehicles (except snow machines) is prohibited.

- The operation of aircraft at altitudes and in flight paths resulting in the herding, harassment, hazing, or driving of wildlife is prohibited. It is recommended that all aircraft maintain a minimum altitude of 2000 feet above ground level, except during take-off and landing, and when safety considerations require a lower altitude. 500' AGL FOR RECON

- The use of helicopters is authorized, provided that landing is prohibited except for the direct support of the activity covered by this permit and emergencies, and no clearing of vegetation for landing/takeoff is permitted.

- Fuel caches are allowed only in designated areas, must be identified on a US Geological Survey map (or map photocopy), and submitted in writing for approval by the refuge manager before they are established. Storage will meet standards of USFWS, Alaska Region, Fuel Storage Policy.

- Any action by a permittee or the permittee's employees that unduly interferes with or harasses refuge visitors or impedes access to any site is strictly prohibited. Examples of prohibited acts include, but are not limited to: 1) parking aircraft or placing other objects (rocks, tents, etc.) on any area so as to restrict use by other aircraft; 2) otherwise intentionally interfering in the activity of other refuge users; and 3) engaging in activity that is contrary to state and federal laws.

- The permit is for refuge lands only. This permit does not authorize use of private lands such as land owned by ANCSA Native corporations, individuals or the State of Alaska.

- The permittee will take no action that interferes with subsistence activities of rural users or restricts the reasonable access of subsistence users to refuge lands. This may include, but is not limited to, disturbance of wildlife and their movements

SHARE CABIN LOCATIONS w/ KATHE

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near subsistence hunters, and damage to cabins, trails, traditional campsites or caches used by subsistence users.

- All rocket launches will be well publicized in advance to forewarn travelers and residents of the area involved. A minimum of two weeks notice of rocket launch dates and impact zones will be provided in writing to the refuge manager.

- The permittee will insure that a transponder or other radio location aid is incorporated with each payload to facilitate tracking and recovery after launch.
BUT NOT MOTOR (DEBRIS)

- The permittee will maintain a viable rocket component recovery program to track, locate, and remove rocket debris annually. The refuge manager will be informed of locations (latitude and longitude) of impact sites, un-recovered rockets and/or payloads, and any potential hazards that may thereby be created.
TRACK, LOCATE - 1 YR. REMOVE - 1

- The Fish and Wildlife Service will not be liable for any act or omission of the permittee (or its employees, hereinafter referred to jointly as "permittee") in operation of permittee's rockets during all phases of operation from launch through recovery. The permittee agrees to hold harmless the Fish and Wildlife Service against any and all claims for loss or liability by any party arising out of launch, impact, and recovery of permittee's rockets, however caused.

- The permittee will be responsible for reporting any fires arising from these activities and will immediately notify the Alaska Fire Service and the Fish and Wildlife Service.

- Rocket or debris impacts within the refuge are prohibited from 1 May through 30 September to avoid periods of high public use. However, exceptions to this prohibition may be authorized for specific time periods and areas. Requests for impact use during this period must be received by the refuge manager forty-five days before intended use. (A launch schedule is not considered a request.) Exception requests must include a complete project description, a statement affirming that the proposed dates are essential, the alternatives considered an analysis of the increased risk incurred and a justification for this risk.

- Peregrine falcons (*Falco peregrinus anatum*) and other raptors may have active nest sites on cliffs and bluff faces within the refuge. Helicopter activity is prohibited within one-half mile of these active raptor nest sites during the period 1 May through 15 August.
RECONN FLIGHT → CONTACT RM → RETRIEVAL

Justification

It is the policy of the Service (4 RM 6.1) to encourage and support research and management studies in order to provide scientific data upon which to base decisions regarding management of units of the refuge system.

500' AGL RECONN

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The Service may permit the use of a refuge for investigatory scientific purposes when such use is compatible with the objectives for which the refuge is managed. Priority will be given to studies that contribute to the enhancement, protection, use, preservation and management of current, indigenous wildlife populations and their habitats in their natural diversity. All proposed research conducted by other agencies or entities will be thoroughly evaluated prior to authorization and then monitored closely to ensure the activities do not materially interfere with or detract from the purposes of the refuge or the mission of the National Wildlife Refuge System.

Scientific investigations of wildlife, resources, and social interactions will support the refuge's ability to provide for wildlife-dependent priority public uses and to meet other refuge purposes. These investigations must be conducted safely.

Public notice of the draft compatibility determination was published by the Fairbanks Daily News-Miner on Friday December 10, 2004. The draft compatibility determination was posted on the publicly-accessible bulletin board at Refuge Headquarters, and it was available at the U.S. Fish and Wildlife Service, Alaska Region Web site for viewing and downloading during the thirty-day comment period. No public comments were received. The Service concludes this as further evidence that this decision is sufficient as written.

Mandatory 10-Year Re-Evaluation Date (provide month and year for allowed uses only): _____

Mandatory 15-Year Re-Evaluation Date (for priority public uses):

NEPA Compliance for Refuge Use Decision

_____ Categorical Exclusion without Environmental Action Memorandum
_____ Categorical Exclusions and Environmental Action Memorandum
_____ Environmental Assessment and Finding of No Significant Impact
__X__ Environmental Impact Statement and Record of Decision

Supporting Documents

- Environmental Analysis for Poker Flat Research Range, Geophysical Institute, University of Alaska Fairbanks, November 1991.
- Compatibility Determination and ANILCA Section 810 Evaluations, Atmospheric Rocket Research, Yukon Flats National Wildlife Refuge, 23 July 1994.
- Compatibility Determination, Uses (includes research) allowed by the 1987 Yukon Flats National Wildlife Refuge Comprehensive Conservation Plan, 19 July 1994.
- Final Yukon Flats National Wildlife Refuge Comprehensive Conservation Plan, Environmental Impact Statement and Wilderness Review, Record of Decision, 29 December 1987.

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Refuge Determination

Prepared by: Jimmy Fox (Signature) 1/10/05 (Date)

Refuge Manager / Project Leader Approval: (Signature) 1/10/05 (Date)

Concurrence

Refuge Supervisor: Mike Bodfa (Acting) (Signature) 1/13/05 (Date)

Regional Chief, National Wildlife Refuge System: Richard Ott (Acting) (Signature) 1/13/05 (Date)

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YUKON FLATS NATIONAL WILDLIFE REFUGE
Special Use Permit 2005-S1
FINDING OF NO SIGNIFICANT RESTRICTION OF SUBSISTENCE USES

The U.S. Fish and Wildlife Service, acting for the Secretary, is required by section 810 of the Alaska National Interest Lands Conservation Act to evaluate effects on subsistence uses and needs of proposed land use decisions on National Wildlife Refuges in Alaska. Evaluation is necessary to determine whether such decisions would result in significant restriction to subsistence uses and needs and compel initiation of further procedural requirements of Section 810.

Based on review and evaluation of available information (see special use permit activity description and evaluation table following), I have determined that the activities proposed under this Special Use Permit will not significantly restrict subsistence uses.

Issuing Officer: _____
Ted Heuer
Refuge Manager
Yukon Flats National Wildlife Refuge

Date: 1/11/05

Description of Use: Poker Flat Research Range uses part of Yukon Flats Refuge as research rocket/payload impact zone. Helicopters are used to retrieve scientific payloads and debris. Poker Flat is a sounding rocket launch facility dedicated to auroral and middle atmosphere research located about 30 miles north of Fairbanks, Alaska. From five to ten rockets transporting instrumented payloads are launched from this facility each year. Launches generally occur at night from mid-October through April (rocket debris impacts on Yukon Flats Refuge are prohibited from 25 May through 1 October). Depending on atmospheric study requirements, rockets range from single to two, three, or four-stage solid fuel vehicles that are used to convey instrument payloads into the earth's upper atmosphere. During their passage through the upper atmosphere instruments make direct measurements of the aurora borealis, ozone, solar protons, electric and magnetic fields, ultraviolet, and other atmospheric phenomena unique to high latitudes.

The first stage of the rocket propels it to about 20,000 feet, separates from the remaining stages and payload, and falls back to earth about two miles from the launch site (about 160 miles south of the Refuge). The second stage and payload follow the flight trajectory to typical altitudes of 50 to 300 miles and impact 50 to 225 miles from the launch site. On the occasions when a three or four-stage rocket is used, typically only the tubular second stage may impact the Refuge, while both the third stage and payload overfly Alaska and land in International waters to the north.

The rocket's second stages and payloads occasionally impact Yukon Flats Refuge. The refuge is but one

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of several federal, state, and private land managers which authorize the use of a combined 25 million acres of land for rocket and payload impact, and recovery. The dimensions of the empty rocket and payload are approximately 15 to 20 feet long, 30 inches in diameter, and weigh a few hundred pounds. Most payloads launched on sounding rockets from Poker Flat are recovery payloads which contain locator beacons and descend slowly to earth by a orange and white parachute. They are tracked via radar and recovered with a helicopter. When feasible, any disturbance to the land is repaired when empty rockets and payloads are recovered. All rockets launched from Poker Flat are unguided after launch. All launches use a risk assessment prepared by NASA which takes into account wind speed, direction of flight, and type of rocket to determine launch elevation, flight azimuth and impact point to reduce the risk to life and property to an absolute minimum. Poker Flat follows standards set for U.S. Government ranges.

Anticipated Impacts on Refuge Purposes: Reference Table 1 (enclosed) and the supporting documents listed below. A very small, localized area is affected when the hollow second stage rocket tube impacts the earth; thus, minor to negligible long-term impacts occur to vegetation and natural features. Vegetation and natural feature impacts are partially offset by landscape repair performed by the recovery helicopter team. Parachute-landed instrument packages usually cause negligible damage to vegetation. Localized and temporary displacement of wildlife will result from the helicopter landings made to retrieve rocket stages and payloads. Subsistence uses could be disrupted by the retrieval operations or by wildlife displacement. However, because the majority of launches occur during the cold months, periods of high use by people and animals is avoided. During the launch period an estimated 25 persons may be present, on the average, on refuge lands (8.1 million acres). Effects to subsistence use from this special use are negligible to minimal at the current use level, up to ten sounding research rockets per year. According to the Environmental Analysis for Poker Flat Range, the odds of hitting wildlife or people are one in ten million.

Based on review and evaluation of information contained in the supporting references indicated below, I have determined that the action proposed under this Special Use Permit will not significantly restrict subsistence uses.

Supporting References:

Caulfield, R.A. 1983. Subsistence land use in upper Yukon-Porcupine communities, Alaska. Alaska Dept. of Fish & Game, Subs. Div., Fairbanks.

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C.3 STATE OF ALASKA DEPARTMENT OF NATURAL RESOURCES DIVISION OF MINING, LAND AND WATER

STATE OF ALASKA DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINING, LAND AND WATER

[X] Northern Region
3700 Airport Way
Fairbanks, AK 99709
(907) 451-2705

[ ] Southcentral Region
550 W 7th Ave Suite 900C
Anchorage, AK 99501-3577
(907) 269-8552

[ ] Southeast Region
400 Willoughby, #400
Juneau, AK 99801
(907) 465-3400

LAND USE PERMIT
Under AS 38.05.850

LAS 19102

The University of Alaska/Geophysical Institute, Statewide Office of Land Management is issued this permit to use the following described lands: within state-owned lands located in numerous townships throughout the Northern Region. (see attached map)

This permit is issued for the purpose of: continuing research, collecting rocket debris, and as a payload safety area related to the Poker Flats Research Range.

This permit is issued subject to: payment of a use fee in the amount of $N/A; posting of a performance guaranty bond in the amount of $N/A; proof of insurance in the amount of $N/A: and compliance with the Special Stipulations on Attachment A, in addition to those noted in this document.

This permit is **not a property right**. It is a **temporary** authorization, **revocable by the state with or without cause.** This permit is effective beginning **March 1, 2009** and ending on **February 28, 2014** unless sooner terminated at the state's discretion.

Signature of Authorized State Representative	Title	Date
	Natural Resource Specialist II	04-15-09

Signature of Permittee or Authorized Representative	Title	Date
Mari E. Montgomery	Director, Land Management	03 30 09
Mari E. Montgomery	Director, University of Alaska Land Management	

Permittee's Address	City	State	Zip
PO Box 755280	Fairbanks	Ak	99775-5280

Home Phone	Work Phone	Contact Person
	907-450-8133	Dian Siegfried

***Permittee is responsible for maintaining a current address with the division during the life of this authorization.**
***Permittee is responsible for obtaining authorizations required by other agencies for the permitted activity.**

ATTACHMENT A

SPECIAL STIPULATIONS

1. **Authorized Officer.** The Authorized Officer for the Department of Natural Resources is the Manager, Northern Region Lands Section, or his/her designee. The Authorized Officer may be contacted at 3700 Airport Way, Fairbanks, Alaska 99709, 04 (907) 451-2740.

2. **Indemnification.** In leiu of indemnification, the permitee shall be responsible for any claim or demand for loss or damage, including property damage, personal injury, wrongful death, and wage or employment claims, arising out of or in connection with the use or occupancy of the permit site.

3. **Valid Existing Rights**. This authorization is subject to all valid existing rights in and to the land under this authorization. The State of Alaska makes no representations or warranties whatsoever, either expressed or implied, as to the existence, number, or nature of such valid existing rights.

4. **Reservation of Rights.** The Division reserves the right to grant additional authorizations to third parties for compatible uses on or adjacent to the land under this authorization.

5. **Preference Right**. No preference right for use or conveyance of the land is granted or implied by this authorization.

6. **Alaska Historic Preservation Act.** The Alaska Historic Preservation Act (AS 41.35.200) prohibits the appropriation, excavation, removal, injury, or destruction of any state-owned historic, prehistoric (paleontological) or archaeological site without a permit from the commissioner. Should any sites be discovered during the course of field operations, activities that may damage the site will cease and the Office of History and Archaeology in the Division of Parks and Outdoor Recreation (907) 269-8720 shall be notified immediately.

7. **Fuel and Hazardous Substances.** No fuel or hazardous substances are to be stored on the subject parcel. Prior written approval from the Authorized Officer or designee is required for a change in this restriction.

8. **Notification.** The permittee shall immediately notify DNR and DEC by phone of any unauthorized discharge of oil to water, any discharge of hazardous substances (other than oil), and any discharge of oil greater than 55 gallons on land. All fires and explosions must also be reported.

The DNR 24 hour spill report number is (907) 451-2678; the Fax number is (907) 451-2751. The DEC spill report number is (800) 478-9300. DNR and DEC shall be supplied with all follow-up incident reports.

9. **Compliance with Governmental Requirements; Recovery of Costs.** Permittee shall, at its expense, comply with all applicable laws, regulations, rules and orders, and the requirements and stipulations included in this authorization. Permittee shall ensure compliance by its employees, agents, contractors, subcontractors, licensees, or invitees.

10. **Violations.** This authorization is revocable immediately upon violation of any of its terms, conditions, stipulations, nonpayment of fees, or upon failure to comply with any other applicable laws, statutes and regulations (federal and state).

11. **Public Access.** All operations must be conducted in a manner that will ensure minimum conflict with other users of the area. There shall be no interference with free public use of state lands and waters.

12. **Site Restoration.** Upon expiration, completion, or termination of this authorization, the site shall be restored to a condition acceptable to the Authorized Officer.

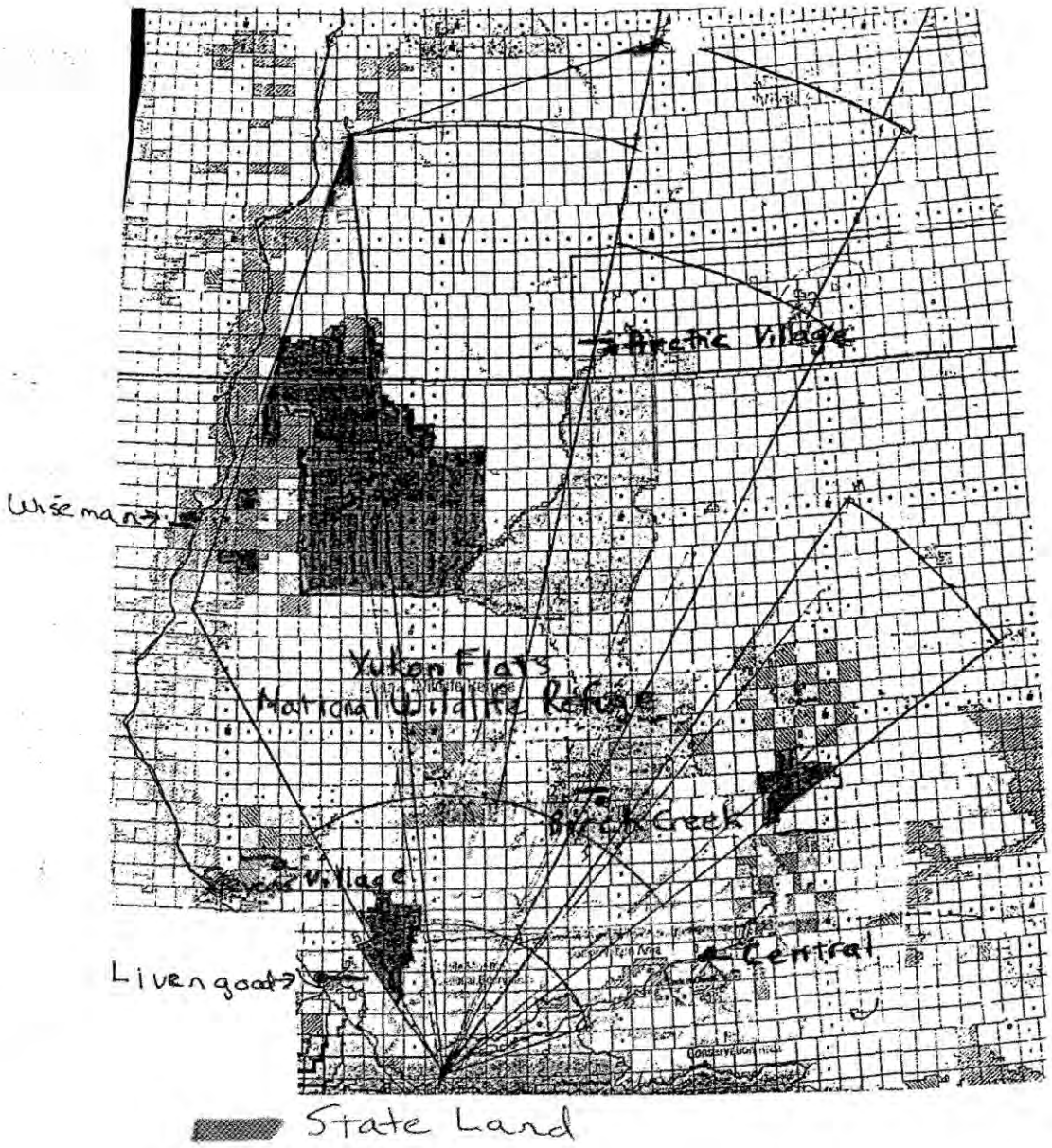
13. **Assignment**. This permit may not be transferred or assigned to another individual or corporation.

14. **Inspection.** Authorized representatives of the State of Alaska shall have reasonable access to the subject parcel for purposes of inspection.

15. Site Maintenance. The area subject to this authorization shall be maintained in a neat, clean and safe condition, free of any solid waste, debris or litter.

16. Holes and Excavations All Holes created as a result of the activities authorized under this permit shall be back-filled with sand, gravel, native materials, or a substitute approved by the Division.

UA LANDS/ LAS 19102 3


Arctic Village
Wiseman
Yukon Flats
National Wildlife Refuge
Beaver Village
Central
Livengood
State Land

C.4 MEMORANDUM OF AGREEMENT BY AND BETWEEN THE NATIVE VILLAGE OF VENETIE TRIBAL GOVERNMENT AND THE GEOPHYSICAL INSTITUTE OF THE UNIVERSITY OF ALASKA FAIRBANKS

Memorandum of Agreement

by and between

The Native Village of Venetie Tribal Government, in this document referred to as VENETIE, and the Geophysical Institute of the University of Alaska Fairbanks, in this document referred to as UNIVERSITY, jointly establish this agreement for the conditional use by the UNIVERSITY of the tribal lands controlled by VENETIE.

Whereas, the UNIVERSITY has successfully launched hundreds of rockets since 1968 from the Poker Flat Research Range, a research sounding rocket launch facility located at Chatanika, Alaska, and

Whereas, the Poker Flat Research Range engages in a government-funded public service mission of research and research support, and

Whereas, the UNIVERSITY and VENETIE have in the past established agreements to their mutual satisfaction for the support of scientific rocket launch and impact operations from Poker Flat Research Range, and

Whereas, the rocket launch program planned at Poker Flat Research Range for the year commencing July 1, 1989 through June 30, 1990 includes rocket launch directions and altitudes which include a mathematical probability of possible rocket vehicle impact points within the Venetie lands, and

Whereas, Poker Flat Research Range rules prohibit the launch of rockets where the mathematical probability is greater than one chance in 100 of rocket impact on lands for which permission for impact is not secured,

Therefore, this agreement for the use of Venetie Tribal Lands is documented and signed by the legally authorized representatives of VENETIE and the UNIVERSITY. The agreement in whole is as follows:

(1) The UNIVERSITY agrees to pay to VENETIE the sum of One Thousand Dollars ($1,000.00) for the use of Venetie Tribal Lands for each full year of this agreement, payable on or before July 31st of each year that this agreement remains in effect. However, for the period September 1, 1989 through June 30, 1990 the UNIVERSITY agrees to pay to VENETIE the sum of Seven Hundred and Fifty Dollars ($750.00) for the use of Venetie Tribal Lands, payable upon finalization of this agreement by signature of all cognizant individuals.

(2) The UNIVERSITY agrees to pay to the Arctic Village and the Venetie Village Traditional Councils Five Thousand Dollars ($5,000.00) each per year for the right to launch two rockets for which there is a mathematical probability of impact on VENETIE tribal lands, as determined by the UNIVERSITY, of one chance in 100 or greater, regardless if these rockets are subsequently ever actually launched. These payments shall be made on or before July 31st of each year that this agreement remains in effect.

(3) The UNIVERSITY agrees to pay to the Arctic Village and Venetie Village Traditional Councils an additional Two Thousand Five Hundred Dollars ($2,500.00) each for each additional rocket launched from Poker Flat Research Range which has a mathematical probability of impact on VENETIE lands of one chance in 100 or greater. These payments shall be made within forty-five (45) days following the actual launch of a rocket which qualifies the two councils for compensation.

Memorandum of Agreement
by and between
UNIVERSITY and VENETIE

(4) The UNIVERSITY will pay Five Hundred Dollars ($500.00) each to the Arctic Village and Venetie Village Traditional Councils for each whole rocket motor or whole payload found by the citizens of Arctic Village and Venetie Village on VENETIE lands if the location is reported to the designated contact person for the UNIVERSITY and can be relocated by the UNIVERSITY within the agreement term.

(5) The UNIVERSITY agrees to remove within a reasonable time any portions of rocket vehicles or payloads found on VENETIE lands and will attempt, where practical in the judgment of the UNIVERSITY, to engage the people of Arctic Village and Venetie Village to assist in removing those items for reasonable compensation.

(6) The period of this agreement is from September 1, 1989 through June 30, 1990 and the agreement will be automatically renewed for successive terms of one year beginning on July 1 of each successive year unless notice is received by April 1st in writing at the offices specified below of either party's desire to discontinue or modify the agreement.

(7) The UNIVERSITY agrees to save VENETIE and the Arctic Village and Venetie Traditional Councils from any liability for the actions of the UNIVERSITY and UNIVERSITY employees which result in property damage or casualty as a result of the rocket launch operations from Poker Flat Research Range.

(8) This agreement supersedes any and all other agreements between the two parties. The interim agreement entered into by the two parties for the period July 15, 1989 through August 31, 1989 qualified the two village traditional councils for the initial payment as described in paragraph (3) above. This long-term agreement does not duplicate that initial payment qualification standard but continues where the interim agreement ended. Specifically, the initial sum of $5,000.00 has been paid to each respective village council for the first two rockets qualifying under this agreement, for the year commencing July 1, 1989 and ending June 30, 1990.

This agreement is the complete understanding of the parties with respect to the subject matter hereof.

The contact person for the UNIVERSITY is:

Charles Deehr
Scientific Director
Poker Flat Research Range
Geophysical Institute
University of Alaska Fairbanks
Fairbanks Alaska 99775-0800

The contact person for VENETIE is:

Eddie Frank
Box 119
Venetie 99781
Ph- 849-8229

Memorandum of Agreement
by and between
UNIVERSITY and VENETIE

In witness hereof, the undersigned have signed this agreement this 22nd day of September 1989 in full understanding of its contents by the legally authorized representatives of VENETIE and the UNIVERSITY.

For VENETIE:

First Chief, Native Village of Venetie Tribal Government

Second Chief, Tribal Government

Tribal Government member

Tribal Government Secretary

Tribal Government member

Tribal Government Treasurer

Tribal Government member

Tribal Government Sergeant ~~at Arms~~

Tribal Government member

In witness hereof:

Lincoln Tritt, Witness
Arctic Village, Alaska

Concur:

Trimble Gilbert, First Chief
Arctic Village Traditional Council

Eddie Frank, First Chief
Venetie Village Traditional Council

For the UNIVERSITY:

University of Alaska
Syun-Ichi Akasofu, Director
Geophysical Institute

C.5 UNITED STATES DEPARTMENT OF THE INTERIOR, BUREAU OF LAND MANAGEMENT, EASTERN INTERIOR FIELD OFFICE

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Eastern Interior Field Office
1150 University Avenue
Fairbanks, Alaska 99709-3844
http://www.blm.gov/ak

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
FF095084
2920 (020)

February 1, 2013

UA Facilities and Land Management
Attn: Dian Siegfried, Real Estate Technician
910 Yukon Drive, Suite 106
Fairbanks, Alaska 99775-5280

Dear Mrs. Siegfried:

The purpose of this letter is to acknowledge the University's payment of annual rental for calendar year 2013 and to advise you that the Land Use Permit under BLM case file FF095084 is renewed for one year. It will expire on December 31, 2013 unless it is again renewed by payment of annual rental on or before that date. All other terms and conditions of the permit will remain the same. If you have any questions, please contact Vic Wallace of my staff at (907) 474-2363 or you may give me a call at (907) 474-2320.

Sincerely,

/s/ Lenore Heppler

Lenore Heppler, Manager
Eastern Interior Field Office

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Eastern Interior Field Office
1150 University Avenue
Fairbanks, Alaska 99709
(907) 474-2200
Fax: (907) 474-2282
http://www.blm.gov/ak

TAKE PRIDE IN AMERICA

C Cogley 2/8/10

IN REPLY REFER TO:
F-95084 (2920.01)

HAND DELIVERED BY _____ ON DATE 2/8/10

RECEIVED BY _____ ON DATE 2/8/10

DECISION

Permittee:	University of Alaska Fairbanks Geophysical Institute-Poker Flat Rocket Range	Permit Application F-95084
Address:	PO Box 757320	
City/ State:	Fairbanks, AK 99775-7320	

Land Use Authorized

Your land use proposal to retrieve rocket debris from BLM administered lands has been approved. This land use authorization is subject to the terms, conditions and stipulations attached to the grant. This authorization will terminate on December 31, 2012, and may be renewed at that time subject to compliance with the terms. If renewed, the land use authorization shall be subject to new regulations existing at the time of renewal and any other terms and conditions that the authorized officer deems necessary to protect public interest.

Please review the stipulations attached to the authorization and notify us in writing within 30 days of receipt of this letter if any information is not correct; otherwise you are confirming the information enclosed is correct and that you agree to the conditions and stipulations of this land use authorization.

Within 30 days of receipt of this decision, you have the right of appeal to the Interior Board of Land Appeals, Office of the Secretary, in accordance with the regulations at 43 CFR 4.400. If an appeal is taken, you must follow the procedures outlined on the enclosed Form 1842-1, Information on Taking Appeals to the Interior Board of Land Appeals.

If you feel this decision is adverse, it may be appealed to the Interior Board of Land Appeals, Office of the Secretary, in accordance with the regulations 43 CFR, Part 4 and the enclosed Form 1842-1. If an appeal is taken, your Notice of Appeal must be filed in this office (at the

above address) within 30 days from receipt of this decision. The appellant has the burden of showing that the decision appealed from is in error.

If you wish to file a petition pursuant to regulation 43 CFR 4.21 (58 Federal Register (FR) 4939, January 19, 1993) or 43 CFR 2804.1 for a stay of the effectiveness of this decision during the time that your appeal is being reviewed by the Board, the petition for a stay must accompany your notice of appeal. A petition of a stay is required to show sufficient justification based on the standards contained on Form 1842-1. Copies of the notice of appeal and petition for a stay ***must*** *also be submitted to each party named in this decision and to the Interior Board of Land Appeals and to the appropriate Office of the Solicitor (see 43 CFR 4.413) at the same time the original documents are filed with this office. If you request a stay, you have the burden of proof to demonstrate that a stay should be granted.*

Please contact Collin Cogley at (907) 474-2382 if you have any questions.

Sincerely,

Larry P. Jackson
acting for

Lenore Heppler,
Field Manager
Eastern Interior Field Office

Attachments:

1. 2920 Land Use Permit – FF095084
2. Stipulations associated with Permit – FF095084
3. Appeal Information (Form 1842-1)

PERMIT

Permission is hereby granted to **Geophylical Intitute, University of Fairbanks-Alaska, Poker Flat RR**
of **State of Alaska**
to use the following described lands: **BLM administered lands north of Fairbanks and east of the Dalton Highw**

Permit Number
FF095084

TOWNSHIP	RANGE	SECTION	SUBDIVISION
T6N	R2E	1	**Primary Township, but including all BLM administered lands north of Fairbanks and east of the Dalton Highway. Primary impact areas will be in the White Mountains National Recreation Area and Western Steese National Conservation Area.**

Meridian	State	County	Acres *(number)*
Fairbanks	**Alaska**	**NA**	**5**

for the purpose of
Recovering rocket debris that may fall on BLM administered lands and any possible mitigation of the impact sites.

and subject to the following conditions:

1. This permit is issued for the period specified below. It is revocable at the discretion of the BLM, at any time upon notice. This permit is subject to valid adverse claims heretofore or hereafter acquired.
2. This permit is subject to all applicable provisions of the regulations (43 CFR 2920) which are made a part hereof.
3. This permit may not be assigned without prior approval of the BLM.
4. Permittee must not enclose roads or trails commonly in public use.
5. Authorized representatives of the Department of the Interior, other Federal agencies, and State and local law officials will at all times have the right to enter the premises on official business.
6. Permittee must pay the United States for any damage to its property resulting from the use.
7. Permittee must notify the BLM of address change immediately.
8. Permittee must observe all Federal, State, and local laws and regulations applicable to the premises and to erection or maintenance of signs or advertising displays including the regulations for the protection of game birds and game animals, and must keep the premises in a neat, orderly, and sanitary condition.
9. Permittee must pay the BLM, in advance, the lump sum of $ for the period of use authorized by this permit or **$ 250.00** , annually, as rental or such other sum as may be required if a rental adjustment is made.
10. Use or occupancy of land under this permit will commence within months from date hereof and must be exercised at least days each year.
11. Permittee must take all reasonable precautions to prevent and suppress forest, brush, and grass fires and prevent pollution of waters on or in the vicinity of the lands.
12. Permittee must not cut any timber on the lands or remove other resources from the land without prior written permission from the BLM. Such permission may be conditioned by a requirement to pay fair market value for the timber or other resources.
13. Permittee agrees to have the serial number of this permit marked or painted on each advertising display or other facility erected or maintained under the authority of such permit.
14. This permit is subject to the provisions of Executive Order No. 11246 of September 24, 1965, as amended, which sets forth the Equal Opportunity clauses. A copy of this order may be obtained from the BLM.
15. Permittee acknowledges, by signing below, that he/she knows, understands and accepts the terms and conditions under which this permit is issued.
16. Special conditions *(attach additional sheets, if necessary)*
Special Stipulations attached.
This will be a three year renewable permit with the option to renew. Permit fees will be $250 annually as required.

Mari E. Montgomery, Director UA Land Management

Permit issued for period

From **01/01/2010**

To **12/31/2012**

Mari E. Montgomery 01-28-10
(Permittee)

(BLM)

Field Manager 2/5/10
(Title) (Date)

INSTRUCTIONS

1. Submit, in *duplicate*, to any local office of the Bureau of Land Management having jurisdiction of the lands.
2. Applications for Land Use Permits will not be accepted unless a notification of the availability of the land for non-BLM use *(Notice of Realty Action)* has been published in the Federal Register and for 3 weeks thereafter in a newspaper of general circulation. This provision does not apply in those situations where the publication of a *(Notice of Realty Action)* has been waived by the BLM.
3. If the annual rental exceeds $250 dollars per year; costs of processing the application must be paid by the applicant in advance.
4. The BLM may require additional information to process an application. Processing will be deferred until the required information is furnished by the applicant.

(Continued on page 3)

(Form 2920 1, Page 2)

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NOTICES

The Privacy Act of 1974 and the regulation in 43 CFR 2.48(d) provide that you be furnished the following information in connection with information required by this application for a Land Use Permit.
AUTHORITY: 43 U.S.C. 1201; 43 CFR Part 2920
PRINCIPAL PURPOSE: The information is to be used to process your application.
ROUTINE USES: (1) The adjudication of the applicant's request for a Land Use Permit. (2) Documentation for public information. (3) Transfer to appropriate Federal agencies when concurrence is required prior to granting a right in public lands or resources. (4)(5) Information from the record and/or the record will be transferred to appropriate Federal, State, local or foreign agencies, when relevant to civil, criminal or regulatory investigations or prosecutions.
EFFECT OF NOT PROVIDING INFORMATION: Disclosure of the information is voluntary. If all the information is not provided, the application may be rejected.

The Paperwork Reduction Act of 1995 requires us to inform you that:
Information is needed to process application for land use authorizations, pursuant to 43 CFR Section 2920.
Information shows if the applicant and proposed user meet the requirements of 43 CFR Section 2920.1.
Applicant must respond before he/she can be granted an authorization to use public lands.
BLM would like you to know that you do not have to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

BURDEN HOURS STATEMENT: Public reporting burden for this form is estimated to average 1 hour per response for the majority of responses, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. For proposed uses the scope of which is more complex, the public reporting burden is estimated to average 120 hours per response. Direct comments regarding the burden estimate or any other aspect of this form to U.S. Department of the Interior, Bureau of Land Management (1004-0009), Bureau Information Collection Clearance Officer (WO-630), 1849 C Street, N.W., Mail Stop 401 LS, Washington, D.C. 20240.

(Form 2920-1, page 3)

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SPECIAL STIPULATIONS for Land Use Permit FF095084

These Special Stipulations are in addition to the stipulations found on the Land Use Permit, and apply to use of BLM managed public lands.

BLM Contact Points- Lenore Heppler, Field Office Manager, or Collin Cogley, Resource Specialist, will be your primary points of contacts for reporting and involvement in any unscheduled event that may take place.
Lenore Heppler – 474-2320
Collin Cogley - 474-2382
Home -479-8357

- This authorization is for the use of BLM administered lands only.
- The Bureau of Land Management shall not be held responsible or liable for any injury or damage from any rocket component impact to the public, their personal equipment or property including dog teams or structures.
- Permittee will post, three days prior to launch, notices of planned rocket launches over BLM administered lands at the following trail heads:

  Steese Highway
  McKay Creek Trailhead, mile 42.5
  Davidson Ditch Wayside, mile 57

  Elliott Highway
  Wickersham Dome Trailhead, mile 28
  Colorado Creek Trailhead, mile 57

- Annual Information: The permittee shall provide BLM with a list of tentative launch dates by November 1st of the year preceding any proposed rocket launches. The permittee shall provide BLM with a list of impact sites on BLM managed lands by May 31 after each launch season. At least two weeks prior to recovery, the permittee shall provide BLM with a list of recovery sites on BLM managed lands, as well as the planned time period (weeks) of recovery actions. Some restrictions may be applied at that time to avoid impacts to sensitive wildlife resources. Impact and recovery sites may be identified by GPS coordinates or plotted on a 1:250,000 scale topographical map.
- Access: The permittee must comply with all Special Rules and Regulations for the White Mountains National Recreation Area, the Beaver and Birch Creeks National Wild and Scenic River Prohibited Acts and the Steese National Conservation Area. Any overland moves shall be done within the confines of current OHV regulations pertaining to the area or be limited to winter between December 1 and April 15 and with a minimum of 6 inches of snow cover and 12 inches of frost depth are present. A map showing the motorized use areas in the White Mountains NRA and Steese NCA is attached as part of this permit.

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- Site Rehabilitation: The permittee accepts responsibility for the condition of any impact sites and will be liable for all site damages, which occur as a result of the activity. Any excavation or disturbance during the recovery needs to be filled to avoid water ponding, soil erosion or thermokarsting from these activities. If the permittee fails to restore the site, they will be held liable for the cost of restoration.

- Vegetation Clearing: Minor clearing of brush, less than 20 foot by 20 foot total area, for extracting rocket parts is allowed by this permit, although extensive clearing of trees or brush for helipads is prohibited.

- Refuse: All refuse will be hauled out by the permittee and disposed of in a proper landfill. This includes any partially burned items and the removal of any markers or survey tape associated with this trip.

- Cultural and Paleontological Resources: The Antiquities Act of June 8, 1906 (34 Stat. 225; 16 USC 431-433), prohibits the appropriation, excavation, injury, or destruction of any historic or prehistoric ruin or monument, or any object of antiquity, situated on lands owned or controlled by the United States. The Archaeological Resource Protection Act, P.L. 96-95 protects archaeological resources and sites on public lands by providing stiff penalties to those found guilty of excavation, removing, transporting or selling these resources without a permit. The Act provides the Bureau and other Federal land managers with a strong legal position from which to curtail the illegal removal and excavation of cultural resources from the public lands. No historic site, archaeological site, or camp, either active or abandoned, shall be disturbed in any manner or shall any item be removed there from. Should such sites be discovered during the course of field operations the Authorized Officer will be promptly notified.

- Hazardous Materials: All rocket components will be removed from the public lands within three years of the last general range clean-up.
  All rocket components, including unspent propellant, will be removed from the public lands as soon as reasonable access is available if it is determined by BLM or permittee the component(s) are a hazard to the public or resources.
  Appropriate spill response equipment and supplies should be on hand when hazardous materials or petroleum products are being used. It is recommended that secondary containment or drip pans be placed under all fuel container inlet and outlet points, hose connections and hose ends during fuel transfers. All petroleum product or hazardous material spills outside secondary containment should be cleaned up immediately taking precedence over all other matters except health and safety of personnel and, reported within 24 hours to the DEC at (907) 478-9300.

- Use of Aircraft and Improvement of Airstrips: This permit does not authorize construction of new airstrips or helicopter landing areas. Use of helicopters and commercial air services are already allowed without permit in the resource management plan. Actual construction of new strips or helipads by extensive clearing would require conformance with FAA guidelines, and a long-term authorization such as a lease. Minor improvements, such as moving rocks or logs, to allow an area to be used for aircraft landings must be conducted under the limitations of 43 CFR 8365.1-5 to limit impacts to

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vegetation and soils. This permit does not authorize exclusive use of airstrips on Public Lands.

- Fire: Gas powered equipment shall be equipped with manufacturer approved and functional spark arresters. Helicopters used for any activity, which requires landing in wildland fuels, must have the exhaust/cooling system located high on the fuselage. Helicopters, which have exhaust/cooling systems that are located low on the fuselage and expels the exhaust straight back or downward, may not be used. Any helicopter that has a history of igniting wildland fuels when they land may not be used.

- All operations will be conducted in such a manner as not to cause damage or disturbance to any fish or wildlife and subsistence resources.

- All activities shall be conducted so as to avoid or minimize disturbance to vegetation.

- Appropriate action will be taken to clean equipment used to recover rocket debris to prevent propagating invasive and noxious weeds and plant species at recovery sites.

- All operations must not impede rural residents from pursuing their traditional subsistence activities (ANILCA, PL 96-487).

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APPENDIX D

ALASKA NATIONAL INTEREST LANDS CONSERVATION ACT SECTION 810(A) SUMMARY OF EVALUATIONS AND FINDINGS

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APPENDIX D.
ALASKA NATIONAL INTEREST LANDS CONSERVATION ACT SECTION 810(A) SUMMARY OF EVALUATIONS AND FINDINGS

D.1 INTRODUCTION

This summary of evaluations and findings has been prepared to comply with the requirements incumbent upon the U.S. Fish and Wildlife Service (USFWS) and U.S. Bureau of Land Management (BLM) as established by Title VIII, Section 810, of the Alaska National Interest Lands Conservation Act (ANILCA). It evaluates the potential restrictions on subsistence activities that could result from implementation of the alternatives considered in the National Aeronautics and Space Administration's (NASA's) *Final Environmental Impact Statement for the Sounding Rockets Program at Poker Flat Research Range (PFRR EIS)*.

As described in the *PFRR EIS*, the NASA Sounding Rockets Program (SRP) has conducted missions from Poker Flat Research Range (PFRR) in interior Alaska since the late 1960s. The environmental impact statement (EIS) evaluates four action alternatives that include continuation of the SRP at PFRR with varying amounts of search and recovery to retrieve payloads and spent rocket stages. The EIS also evaluates a No Action Alternative, in which SRP operations, including launches and subsequent search and recovery efforts, would continue as currently conducted.

Chapters 3 and 4 of the EIS provide a detailed description of the baseline conditions and the potential adverse effects on subsistence of the alternatives. The analysis in this appendix leverages the detailed information presented in the EIS to evaluate the potential impacts on subsistence pursuant to Section 810(a) of ANILCA.

D.2 THE EVALUATION PROCESS

Section 810(a) of ANILCA states:

> "In determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands…the head of the Federal agency…over such lands…shall evaluate the effect of such use, occupancy, or disposition on subsistence uses and needs, the availability of other lands for the purposes sought to be achieved, and other alternatives which would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes. No such withdrawal, reservation, lease, permit, or other use, occupancy or disposition of such lands that would significantly restrict subsistence uses shall be affected until the head of such Federal agency:
>
> 1. gives notice to the appropriate State agency and the appropriate local committees and regional councils established pursuant to Section 805;

2. gives notice of, and holds, a hearing in the vicinity of the area involved; and

3. determines that (a) such a significant restriction of subsistence uses is necessary, consistent with sound management principles for the utilization of the public lands, (b) the proposed activity would involve the minimal amount of public lands necessary to accomplish the purposes of such use, occupancy, or other disposition, and (c) reasonable steps would be taken to minimize adverse impacts upon subsistence uses and resources resulting from such actions."

To determine if a significant restriction of subsistence uses and needs may result from any one of the alternatives discussed in the EIS, the following three factors in particular are considered:

- A reduction in subsistence uses due to factors such as direct impacts on the resource, adverse impacts on habitat, or increased competition for the resources;

- A reduction in the subsistence uses due to changes in the availability of resources caused by an alteration in their distribution, migration, or location; and

- A reduction in subsistence uses due to limitations on the access to harvestable resources such as physical or legal barriers.

Subsistence evaluations and findings under ANILCA Section 810 also must consider cumulative impacts. In the context of this evaluation, cumulative impacts are additive limitations on subsistence uses or resources caused by the proposed alternatives when considered within the context of past, present, and future activities affecting those same uses or resources. Cumulative impacts are discussed in Chapter 4, Section 4.15, of the *PFRR EIS*.

When analyzing the effects of the five alternatives, those villages that may harvest subsistence resources within or adjacent to the PFRR flight zones are considered (see Section D.4, below).

D.3 PROPOSED ACTION ON FEDERAL LANDS

Chapter 2 of the *PFRR EIS* ("Description and Comparison of Alternatives") describes in detail the alternatives under consideration. Following is a brief summary of each. The primary focus of activity would take place within the PFRR flight zones, which include Federal, state, and tribal lands.

Under all alternatives, impact and recovery of flight hardware would require the use of Federal lands. As such, USFWS and BLM are required to respond to a request for such authorization, thereby taking an action connected to those alternatives proposed by NASA. It is not known if USFWS and BLM will continue to issue authorizations for launch impacts on their respective lands in the future. As such, the *PFRR EIS* considers both possibilities under the No Action Alternative and each of the alternatives described below.

D.3.1 No Action Alternative – Continue NASA SRP at PFRR in its Present Form and at the Current Level of Effort

Under the No Action Alternative, the SRP activities at PFRR would continue in their present form and at the current level of effort (approximately four launches per year). NASA would continue to avoid the Mollie Beattie Wilderness Area within Arctic NWR. Under this alternative, no significant efforts would be taken to recover spent stages unless desired for programmatic reasons, and payloads would be recovered as planned by the scientists. See Chapter 2, Section 2.3.1.2, of the *PFRR EIS* for a full description of this alternative.

D.3.2 Alternative 1 – Continue NASA SRP Activities and Flights at PFRR Within Existing Flight Zones, with Environmental Screening for Recovery of New and Existing NASA Stages and Payloads (Environmentally Responsible Search and Recovery Alternative)

Alternative 1 would continue NASA SRP launch and recovery operations at PFRR as in the recent past with enhanced efforts to track and locate existing spent stages and payloads. Launches would average 4 per year with a maximum of 8 per year. Attempts would be made to recover newly expended stages and payloads within the PFRR flight corridor. Spent stages and payloads would be recovered in an environmentally responsible manner if it is determined that they can be recovered safely. See Chapter 2, Section 2.3.1.3, of the *PFRR EIS* for a full description of this alternative.

D.3.3 Alternative 2 – Continue NASA SRP Activities and Flights at PFRR Within Existing Flight Zones, with Removal of Spent Stages and Payloads (Maximum Cleanup Search and Recovery Alternative)

Alternative 2 is the same as Alternative 1, except maximum practicable effort would be exerted to recover newly expended and existing spent stages from downrange lands if it is determined that they can be recovered safely, even if the efforts result in some long-term environmental impacts. See Chapter 2, Section 2.3.1.5, of the *PFRR EIS* for a full description of this alternative.

D.3.4 Alternative 3 – Continue NASA SRP Activities and Flights at PFRR with Restricted Trajectories to Reduce Impacts on Designated Environmentally Sensitive Areas (Environmentally Responsible Search and Recovery Alternative with Restricted Trajectories)

Alternative 3 is the same as Alternative 1, except trajectories of future NASA launches would be restricted to reduce the possibility of stages or payloads landing within areas identified as environmentally sensitive, such as designated Wilderness or Wild and Scenic Rivers. See Chapter 2, Section 2.3.1.6, of the *PFRR EIS* for a full description of this alternative.

D.3.5 Alternative 4 – Continue NASA SRP Activities and Flights at PFRR with Restricted Trajectories to Reduce Impacts on Designated Environmentally Sensitive Areas (Maximum Cleanup Search and Recovery Alternative with Restricted Trajectories)

Alternative 4 would be the same as Alternative 2, except trajectories of future PFRR missions would be restricted to reduce the possibility of payloads or stages landing within areas identified as environmentally sensitive, such as designated Wilderness or Wild and Scenic Rivers. See Chapter 2, Section 2.3.1.7, of the *PFRR EIS* for a full description of this alternative.

D.3.6 Landowner Non-Issuance of Authorizations

In the instance that future authorizations for launch impacts are not issued by either of the Federal land management agencies, there would be notably different effects on NASA's SRP at PFRR, depending on the landowner. Should BLM not issue its authorization, NASA could continue to launch a majority of its rockets; however, its largest rocket could no longer be used. Should USFWS not issue its authorization, NASA would discontinue its operations at PFRR.

Only under the non-issuance of the BLM authorization would recovery of newly launched items take place. However, under either non-issuance scenario, recovery of items from previous launches would still occur. In the case of USFWS non-issuance, recovery of such items would discontinue 10 years following the denial of the authorization. For both non-issuance scenarios, the level of effort associated with recovery operations, both for future and historic items, would correspond directly to that described under each of the five alternatives summarized above.

D.4 AFFECTED ENVIRONMENT

The region of influence (ROI) for subsistence use resources includes communities under or within 37 kilometers (20 nautical miles) of the PFFR launch site and flight corridor. These communities include Arctic Village, Beaver, Birch Creek, Central-Circle Hot Springs, Chalkyitsik, Circle, Coldfoot, Fort Yukon, Kaktovik, Livengood, Stevens Village, Venetie, and Wiseman. The ROI includes these areas because there are communities directly under the PFRR flight zones or ones that may travel into the areas beneath the flight zones to harvest subsistence resources in response to wildlife or vegetation availability (see **Figures D–1** through **D–9** for composite subsistence use maps for the larger communities). A distance of 37 kilometers (23 miles) was used as a best estimate for the maximum distance traveled without the use of aircraft to harvest subsistence resources. Detailed characteristics of these communities and the Game Management Units (GMUs) in which these communities are located and characteristics of the Federal and state subsistence uses, are provided in Chapter 3, Section 3.10, Table 3–17, of the EIS.

The PFRR launch site is within the Fairbanks North Star Borough, which is considered a nonrural area under Federal subsistence regulations and a non-subsistence area under State regulations. Therefore, it is assumed that subsistence activities are not conducted in the immediate vicinity of the PFRR launch site.

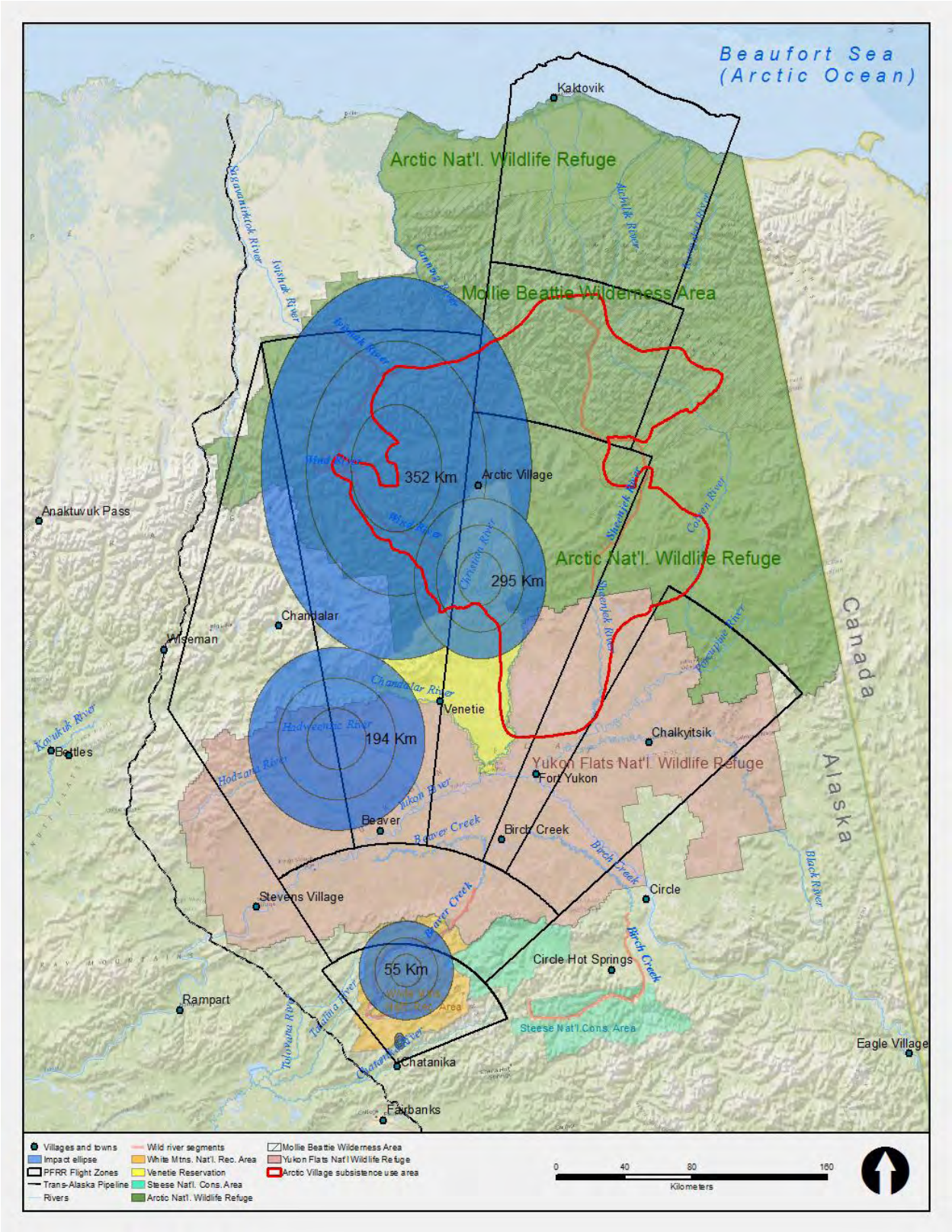

Figure D–1. Primary Subsistence Use Area Surrounding Arctic Village

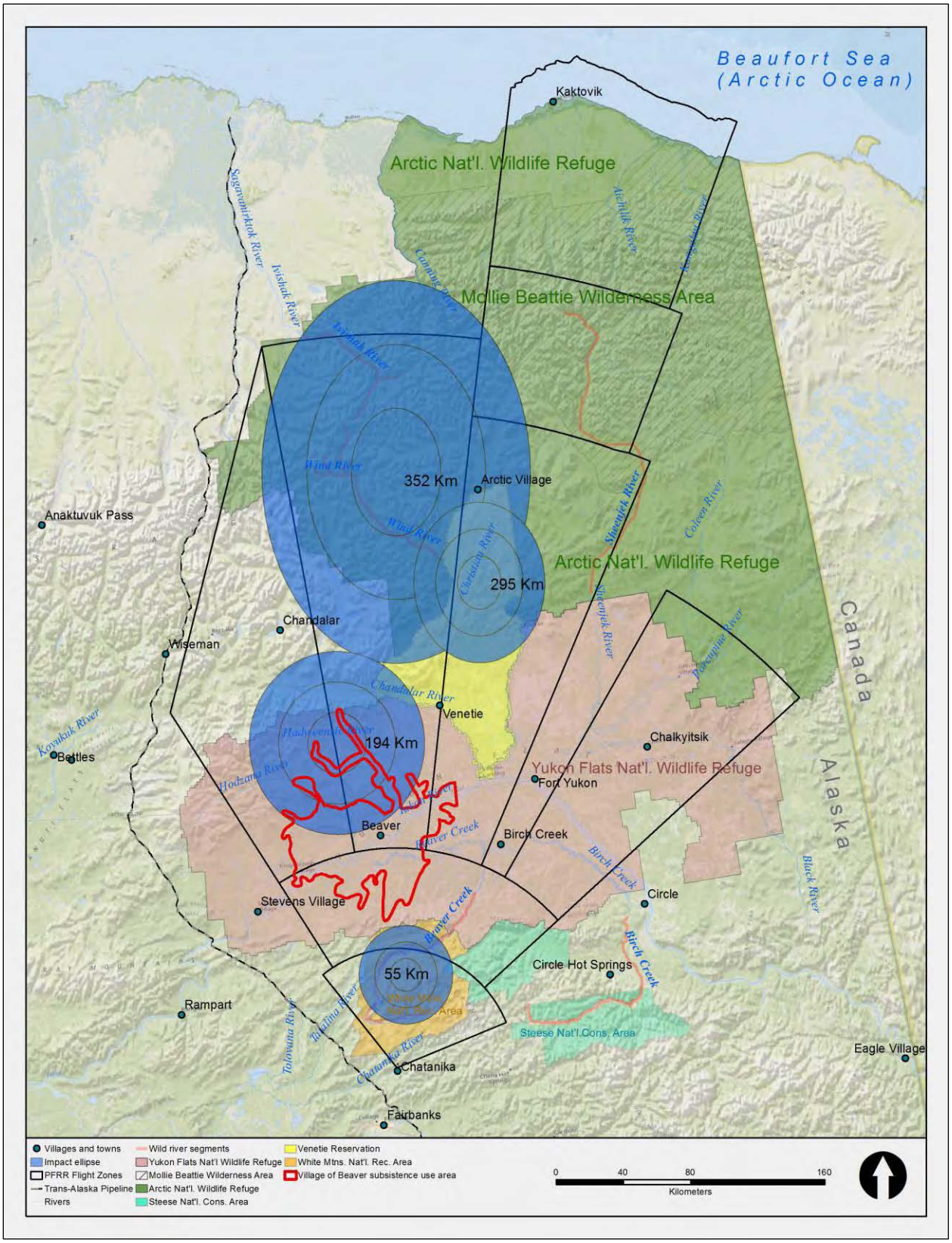

Figure D–2. Primary Subsistence Use Area Surrounding Beaver

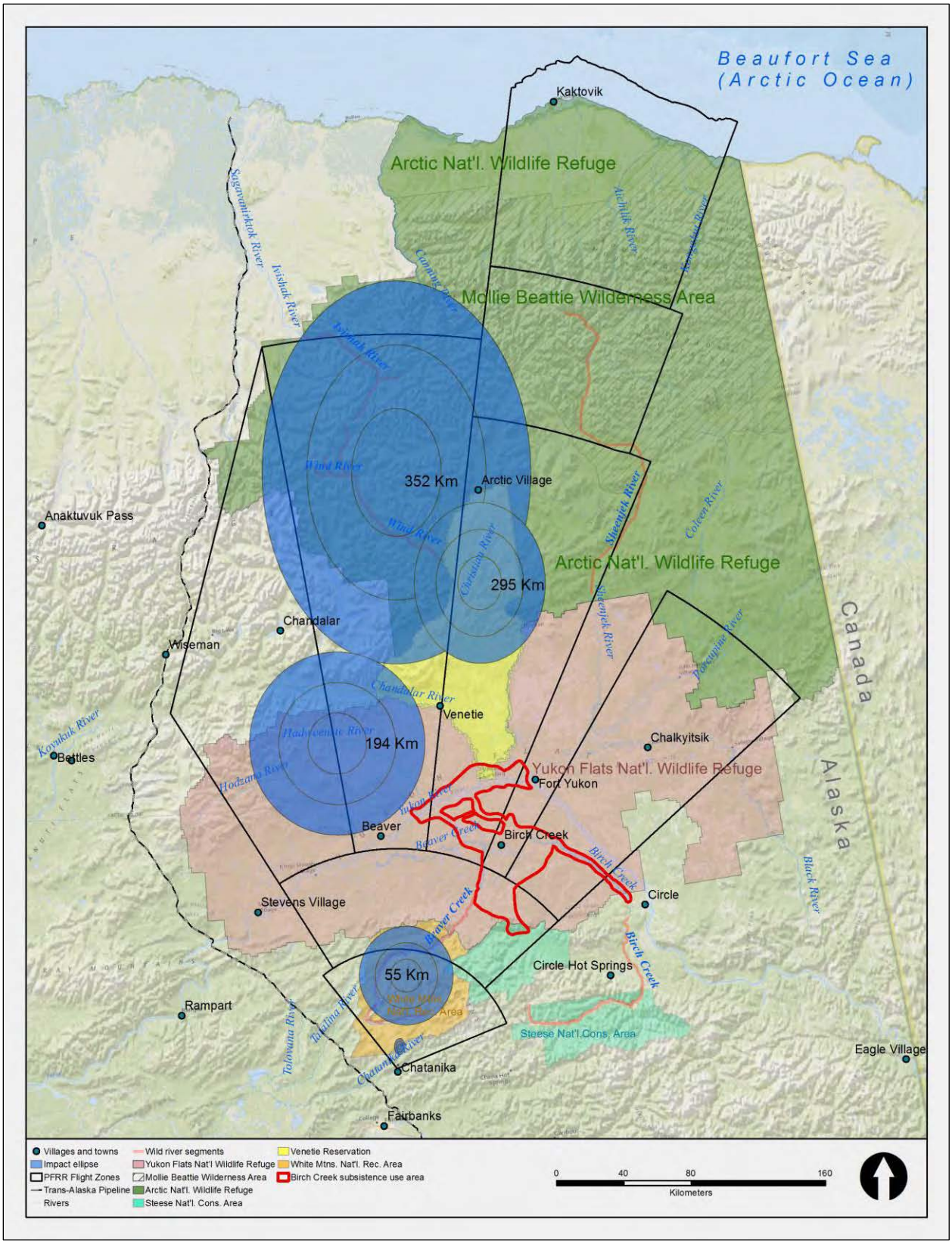

Figure D–3. Primary Subsistence Use Area Surrounding Birch Creek

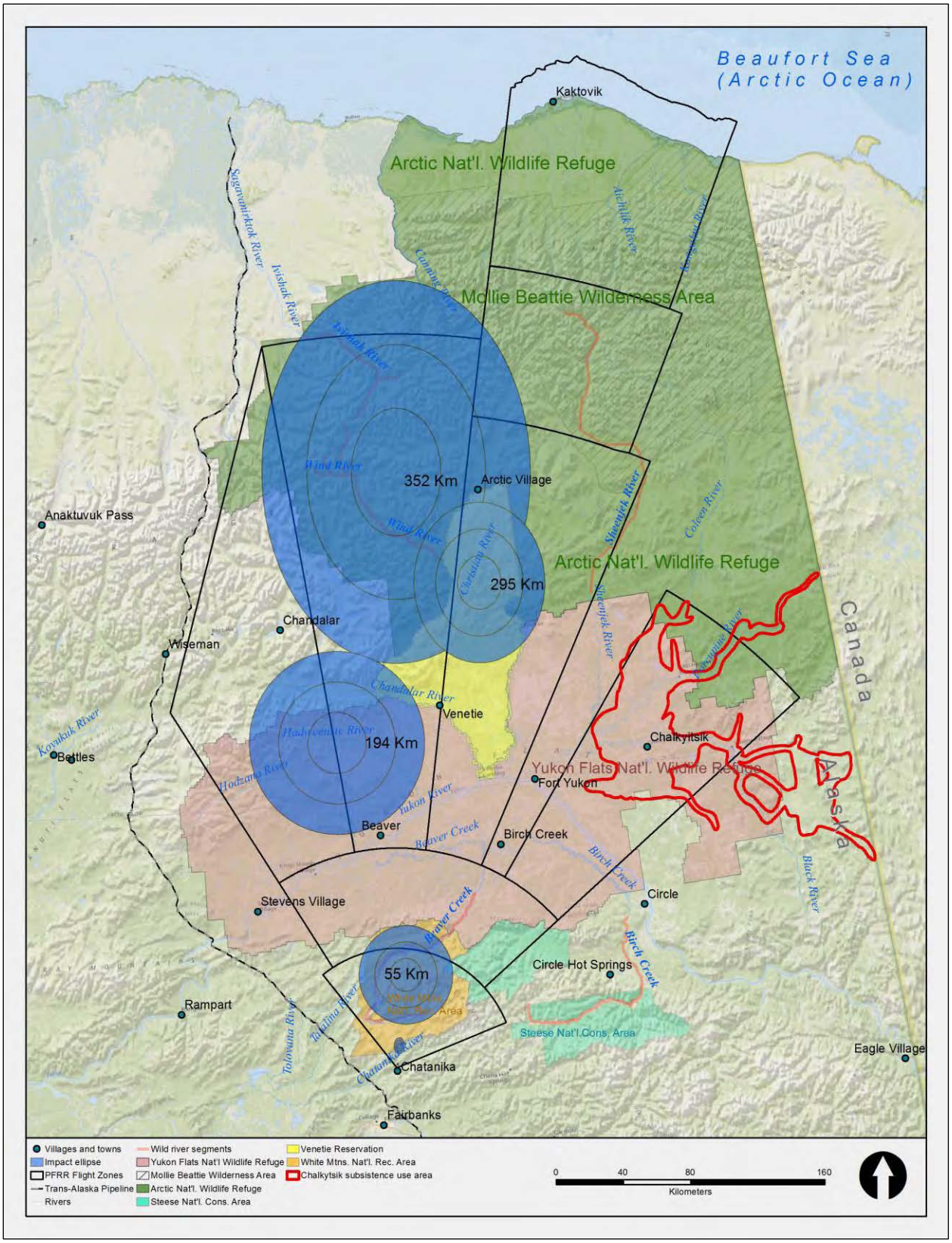

Figure D–4. Primary Subsistence Use Area Surrounding Chalkyitsik

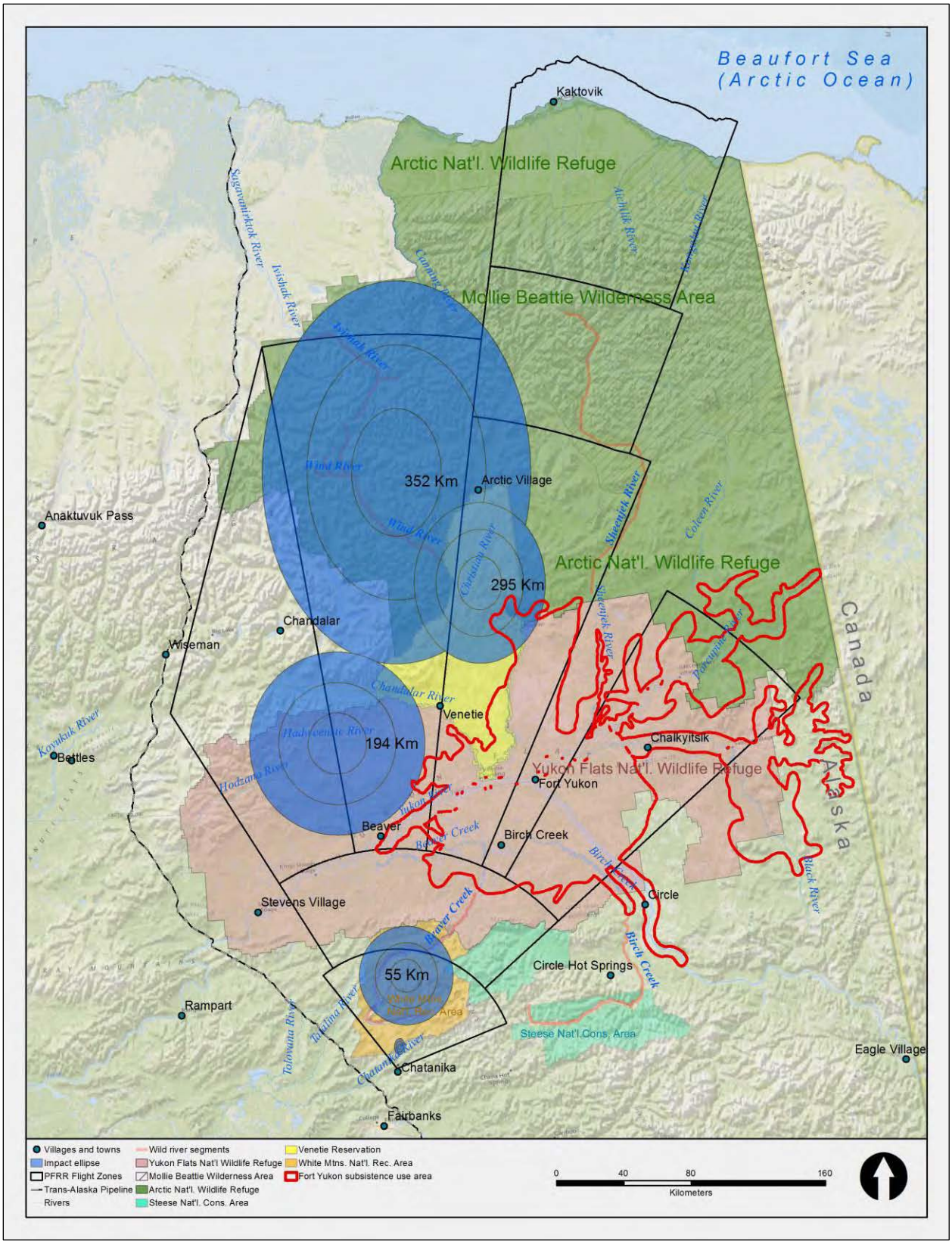

Figure D–5. Primary Subsistence Use Area Surrounding Fort Yukon

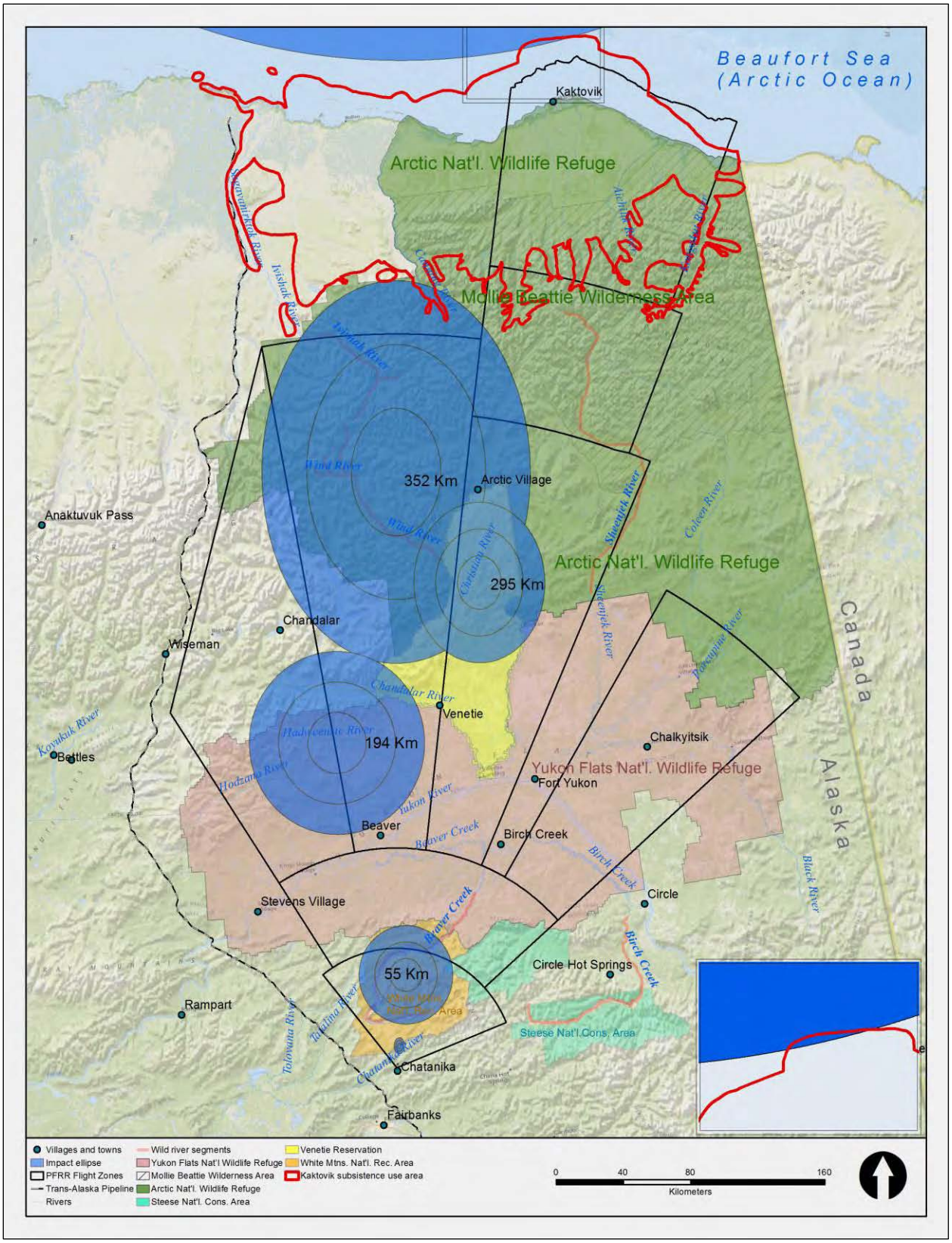

Figure D–6. Primary Subsistence Use Area Surrounding Kaktovik

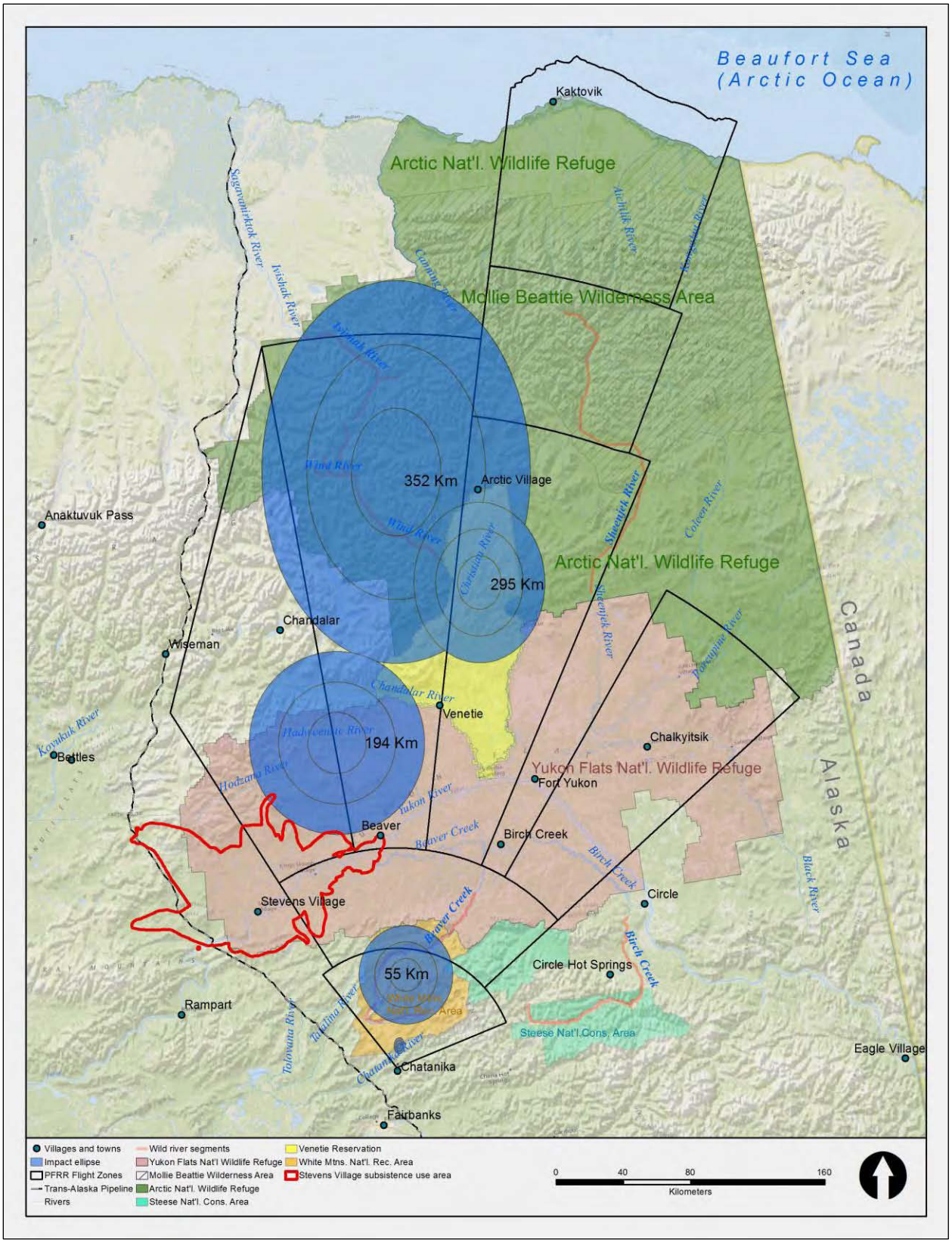

Figure D–7. Primary Subsistence Use Area Surrounding Stevens Village

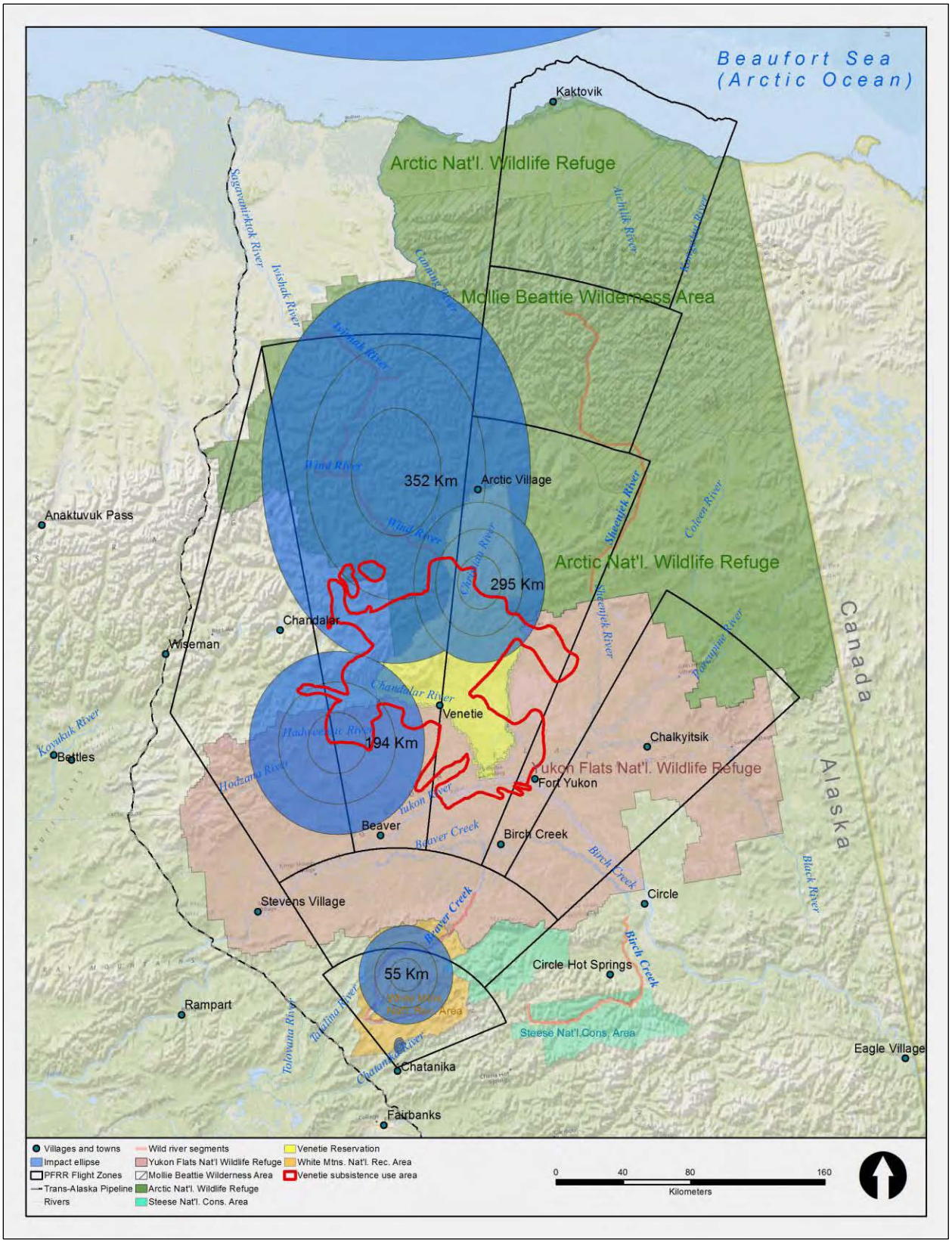

Figure D–8. Primary Subsistence Use Area Surrounding Venetie

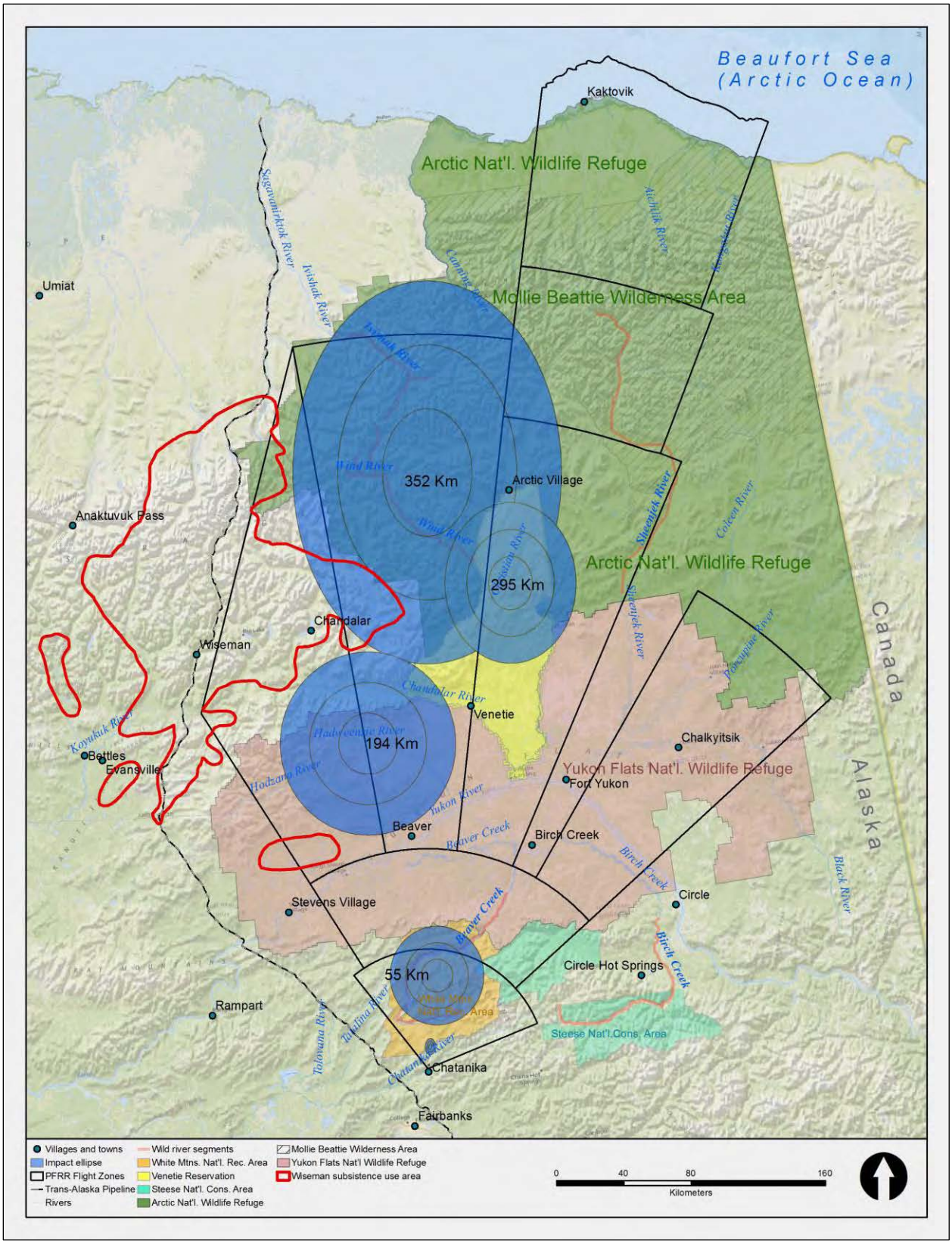

Figure D–9. Primary Subsistence Use Area Surrounding Wiseman

Available Resources

Within the PFFR launch corridor, many subsistence-based communities rely on fishing for both salmon and non-salmon species, and hunting and trapping large and small land mammals, and a variety of bird species. Fish is one of the most reliable sources of meat that can be harvested nearly year-round either through nets or ice fishing. The Yukon River, the Chandalar River, the Black River, and the Porcupine River are main providers of salmon species **(Caulfield 1983)**. A number of other lakes and creeks within the PFRR flight zones provide non-salmon species. Land mammals such as caribou, moose, and Dall sheep in particular are used as sources of meat. These species are often hunted by boat or snow machine as they are usually found in close proximity to rivers. Furbearers, including muskrat, lynx, beaver, and wolf, are commonly pursued for use in traditional garments. Waterfowl are hunted as food sources, particularly in the spring and early fall months. Marine mammals can be harvested for subsistence purposes, but only by Alaska Natives, as permitted in the Marine Mammals Protection Act **(16 U.S.C. 1361 *et seq*.)**. The regulations governing subsistence harvests of marine mammals are co-managed by Alaska Natives, USFWS, and the National Marine Fisheries Service. In addition to caribou, Dall sheep, small mammals, migratory birds, and fish, the Kaktovik community is dependent on the subsistence hunting of marine mammals, including bowhead whale, bearded seal, ringed seal, and occasionally polar bears **(Bacon *et al.* 2009)**.

Seasonality of Activities

Harvesting vegetation such as berries or other roots or vegetables typically occurs in late summer as the vegetation ripens. Subsistence hunting and trapping are regulated by the hunting and trapping seasons established by species. These seasons can vary among the GMUs and between Federal and state regulations, depending on the population of the species in question. For example, on Federal and state lands, there is no closed season for black bears in GMU-25 **(ADF&G 2011; USFWS 2010a)**. For caribou, open season in GMU-25 is different, depending on the GMU subunit. In portions of GMU-25A, there is no closed season for hunting caribou bulls; however, hunting caribou cows is not permitted between early July and mid-May **(ADF&G 2011; USFWS 2010a)**. Therefore, subsistence activities occur year-round, depending on the open seasons and availability of the variety of vegetation and wildlife species harvested.

Geographic Extent of Activities

As a component of previously conducted studies, several of the villages within the PFRR flight corridor have identified areas within which subsistence activities would be expected on a regular basis. Maps of the various subsistence use areas for the larger villages included in this appendix (Figures D–1 through D–9) were identified during the *Proposed Land Exchange Yukon Flats National Wildlife Refuge Final Environmental Impact Statement* **(USFWS 2010b)** and the *Arctic National Wildlife Refuge Draft Revised Comprehensive Conservation Plan* **(USFWS 2011)**. These areas are defined by a number of factors including habitat and migration patterns of the wildlife and accessibility of the areas to individuals participating in subsistence. It is recognized that these do not likely represent the full geographic extent of subsistence activities within the ROI; however, they can be viewed in relation to the "typical" impact areas of spent stages and payloads to identify the communities mostly likely affected. Of these subsistence use areas, the

areas for Arctic Village, Beaver, Fort Yukon, and Venetie overlap probable impact points for spent stages and payloads. As a result, subsistence activities conducted by residents in these villages are more likely to experience potential impacts as a result of continued launches from PFRR. Information on subsistence use areas associated with the smaller villages or towns (Coldfoot, Chandalar, and Livengood) is not readily available but it is likely that the Chandalar use area would overlap with probable impact points and that the Coldfoot use area would be similar to the Wiseman subsistence use area given the proximity of the two.

D.5 SUBSISTENCE USES AND NEEDS EVALUATION

In 1980, Congress established a framework for protecting subsistence uses by both Native Alaskans and non-Native Alaskans in Title VIII of ANILCA. Title VIII authorizes the State of Alaska to regulate subsistence uses on Federal public lands if several requirements are met.

The State of Alaska managed statewide subsistence harvests until late 1989, when the Alaska Supreme Court ruled that the residency preference required by Federal law violated the Alaska Constitution. The state was unable to come into compliance and on July 1, 1990, the Federal Government assumed responsibility for the management of subsistence taking of wildlife on Federal public lands in Alaska. Further litigation and court decisions resulted in the October 1, 1999, assumption of Federal subsistence fisheries management in Alaskan rivers and lakes within and adjacent to Federal public lands.

The Federal Government, through the Federal Subsistence Board, manages subsistence use of fish and wildlife resources on Federal lands, and the State of Alaska, through the Boards of Fisheries and Game, manages general subsistence and commercial use of fish and wildlife resources on non-federal lands and National Preserve lands open to multiple use. The Federal and state management systems operate under individual legislation and enforce separate regulations.

Both Federal and state laws define subsistence as the “customary and traditional” uses of wild resources for food, clothing, fuel, transportation, construction, art, crafts, sharing, and customary trade. Customary and traditional uses of fish and game are important to Alaskans from diverse cultural backgrounds.

Federal and state law differs in who qualifies for subsistence uses. Under Federal law, only local rural residents and communities with customary and traditional use of Federal lands qualify for subsistence fishing and hunting on Federal lands. Currently, all state residents qualify for subsistence fishing and hunting under state law.

Within the PFRR flight zones, Federal subsistence use is permitted on federally owned land and state subsistence use is permitted on state-owned land. For Alaska Native land, such as the land owned by Doyon, Limited, subsistence use is permitted under state regulations, but Doyon, Limited, controls access to the lands. On federally owned land, state general hunting is also allowed unless specifically closed by Federal law.

D.5.1 Potential Impacts on Subsistence

Potential impacts on subsistence from the alternatives considered in the *PFRR EIS* include impacts on wildlife and the harvest of wildlife from the noise and disturbance created by the launch and reentry of the sounding rockets and the fixed-wing aircraft and helicopters used in the search and recovery operations. Impacts on subsistence would depend on the level of intensity and duration of these disturbances.

D.5.2 Evaluation Criteria

To determine the potential impacts of the alternatives on existing subsistence activities, three evaluation criteria were analyzed relative to existing subsistence resources:

1. The potential to reduce important subsistence fish and wildlife populations by (a) reductions in number, (b) redistribution of subsistence resources, or (c) habitat losses;

2. What effect the action might have on subsistence fisher or hunter access; and

3. The potential for the action to increase fisher or hunter competition for subsistence resources.

D.5.2.1 *The Potential to Reduce Populations*

Reduction in Numbers

Neither the direct, indirect, or cumulative impacts resulting from the alternatives considered in the *PFRR EIS* are expected to reduce numbers of wildlife (see Chapter 4, Sections 4.7, 4.10, and 4.15, of the EIS).

Redistribution of Resources

Neither the direct, indirect, or cumulative impacts resulting from the alternatives considered in the *PFRR EIS* are expected to permanently redistribute resources. Disturbance caused by noise from low-flying aircraft may cause terrestrial wildlife to temporarily vacate the overflown area. However, recovery operations would be planned in consultation with downrange landowners, all of whom would provide season-specific input regarding appropriate means to minimize effects on wildlife and subsistence activities. Additionally, low-level overflights would be of short duration (*i.e.*, only while actively searching or during landing/takeoff), infrequent, and the wildlife species would be expected to return to the area once the source of the noise has left the area (see Chapter 4, Sections 4.7, 4.10, and 4.15, of the EIS).

If BLM or USFWS no longer issue authorizations for launch impacts on their respective lands in the future, temporary noise disturbances from low-flying recovery aircraft would be less frequent. Subsistence hunters may gain a negligible benefit from this change.

Habitat Loss

Neither the direct, indirect, or cumulative impacts resulting from the alternatives considered in the *PFRR EIS* are expected to result in measurable habitat loss. Only small disturbances of land, water, or vegetation would result; such impacts would be confined to the footprint of where flight hardware would land and recovery activities would occur (see Chapter 4, Sections 4.7, 4.10, and 4.15, of the EIS).

D.5.2.2 *Restriction of Access*

None of the alternatives would restrict access to subsistence resources.

D.5.2.3 *Increase in Competition*

None of the alternatives are expected to result in increased competition for subsistence resources.

D.6 AVAILABILITY OF OTHER LANDS

No other lands can be substituted in the alternatives. A detailed discussion of consideration of other launch sites or trajectories is located within Chapter 2, Section 2.2.1, and Appendix B of the *PFRR EIS*.

D.7 FINDINGS

This analysis concludes that none of the alternatives under consideration would result in a significant restriction of subsistence users, resources, or opportunities.

D.8 REFERENCES

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United States Code

16 U.S.C. 1361 *et seq.*, Marine Mammal Protection Act.

APPENDIX E

LAUNCH VEHICLE AND PAYLOAD RECOVERY PLAN
NASA SOUNDING ROCKETS PROGRAM AT
POKER FLAT RESEARCH RANGE

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LAUNCH VEHICLE AND PAYLOAD RECOVERY PLAN

NASA SOUNDING ROCKETS PROGRAM AT POKER FLAT RESEARCH RANGE

National Aeronautics and Space Administration

Goddard Space Flight Center

Wallops Flight Facility

Wallops Island, VA 23337

May 2013

CHANGE RECORD SHEET

ISSUE	DATE OF RELEASE	REASONS FOR REVISION	APPROVAL
0	09/01/2010	Initial Draft by John Hickman	**JCH**
-		Baseline	
1	03/15/2012	Inclusion of additional requirements	**JCH**
2	07/20/2012	Incorporation of USFWS, PFRR comments on Revision 1	**JCH**
3	11/28/2012	No comments received during Draft EIS comment period.	**JAB**
3	05/03/2013	Incorporation of minor edits and revisions to plan.	**JAB**

IMPORTANT CONTACT INFORMATION:

U.S. Bureau of Land Management

Eastern Interior Field Office
Colin Cogley: (907) 474-2200
E-mail: ccogley@blm.gov
Lenore Heppler: (907) 474-2320
E-mail: lheppler@blm.gov
1150 University Avenue
Fairbanks, AK 99709
Fax: (907) 474-2280

U.S. Fish and Wildlife Service

Arctic National Wildlife Refuge
Brian Glaspell: (907) 456-0250
E-mail: brian_glaspell@fws.gov
Anne Marie LaRosa: (907) 456-0250
E-mail: AnneMarie_LaRosa@fws.gov
Fax: (907) 456-0428
101 12th Avenue, Room 236
Fairbanks, AK 99701
Yukon Flats National Wildlife Refuge
Steve Berendzen: (907) 456-0440
E-mail: steve_berendzen@fws.gov
Mark Bertram: (907) 456-0446
E-mail: mark_bertram@fws.gov
101 12th Avenue, Room 264 MS 575
Fairbanks, AK 99701
Fax: (907) 456-0447

Native Village of Venetie Tribal Government

Tribal Office
(907) 849-8105
E-mail: venetietribal@yahoo.com
P.O. Box 81080
Venetie, AK 99781

Doyon, Limited

Lands and Natural Resources Department
(907) 459-2000
1 Doyon Place, Suite 300
Fairbanks, AK 99701

Poker Flat Research Range

Launch Site
Kathe Rich: (907) 455-2103
E-mail: krich@gi.alaska.edu
30 Mile Steese Highway
P.O. Box 757320
Fairbanks, AK 99775

NASA Wallops Flight Facility

Sounding Rockets Program, Code 810
John Hickman: (757) 824-2374
E-mail: John.C.Hickman@nasa.gov
Environmental Office, Code 250
Josh Bundick: (757) 824-2319
E-mail: Joshua.A.Bundick@nasa.gov
34200 Fulton Street
Wallops Island, VA 23337
Fax: (757) 824-1819

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1.0 INTRODUCTION

1.1 BACKGROUND

The National Aeronautics and Space Administration (NASA) Sounding Rockets Program (SRP) has launched suborbital sounding rockets from the University of Alaska Fairbanks (UAF) managed Poker Flat Research Range (PFRR) since the late 1960s in support of basic space and atmospheric science research. Until now, there has been no formal plan or policy specifically addressing recovery of flight hardware from downrange lands. Historically, recovery of payload and vehicle components has been performed on an as-needed basis with the requirement to do so dictated primarily by the respective mission's scientific investigator.

1.2 POLICY

It is now NASA's policy to provide for a "clean range" at PFRR whereby all launch-related hardware that can be effectively located and identified on downrange lands will be removed when deemed practicable by the landowner, UAF, and NASA. This policy applies to future launches, as well as hardware remaining in downrange lands from past sounding rocket flights, including those sponsored by non-NASA entities. It is recognized that locating all of the small objects over such a vast area presents a number of technical challenges that cannot be addressed by current technology. However, NASA is committed to implementing a multi-tiered recovery approach that addresses both past and future launches including a continued long-term effort in pursuit of a functional recovery system of rocket parts for all future missions in order to continue operations at PFRR within a sensitive environmental context.

1.3 PURPOSE OF THIS DOCUMENT

The purpose of this document is to outline the general practices that NASA and UAF will employ to locate and remove flight hardware from within PFRR's downrange lands (see **Figure 1**). It is not intended to provide details of specific recovery operations, as these will be situation specific and dependent on multiple factors, including weather, location of the hardware, etc. Additionally, this document does not provide a comprehensive discussion of PFRR operations or an assessment of potential environmental effects. For this information, the reader is directed to the 2000 *Final Supplemental Environmental Impact Statement for the NASA Sounding Rockets Program* and the 2013 *Final Environmental Impact Statement for the NASA Sounding Rockets Program at Poker Flat Research Range*.

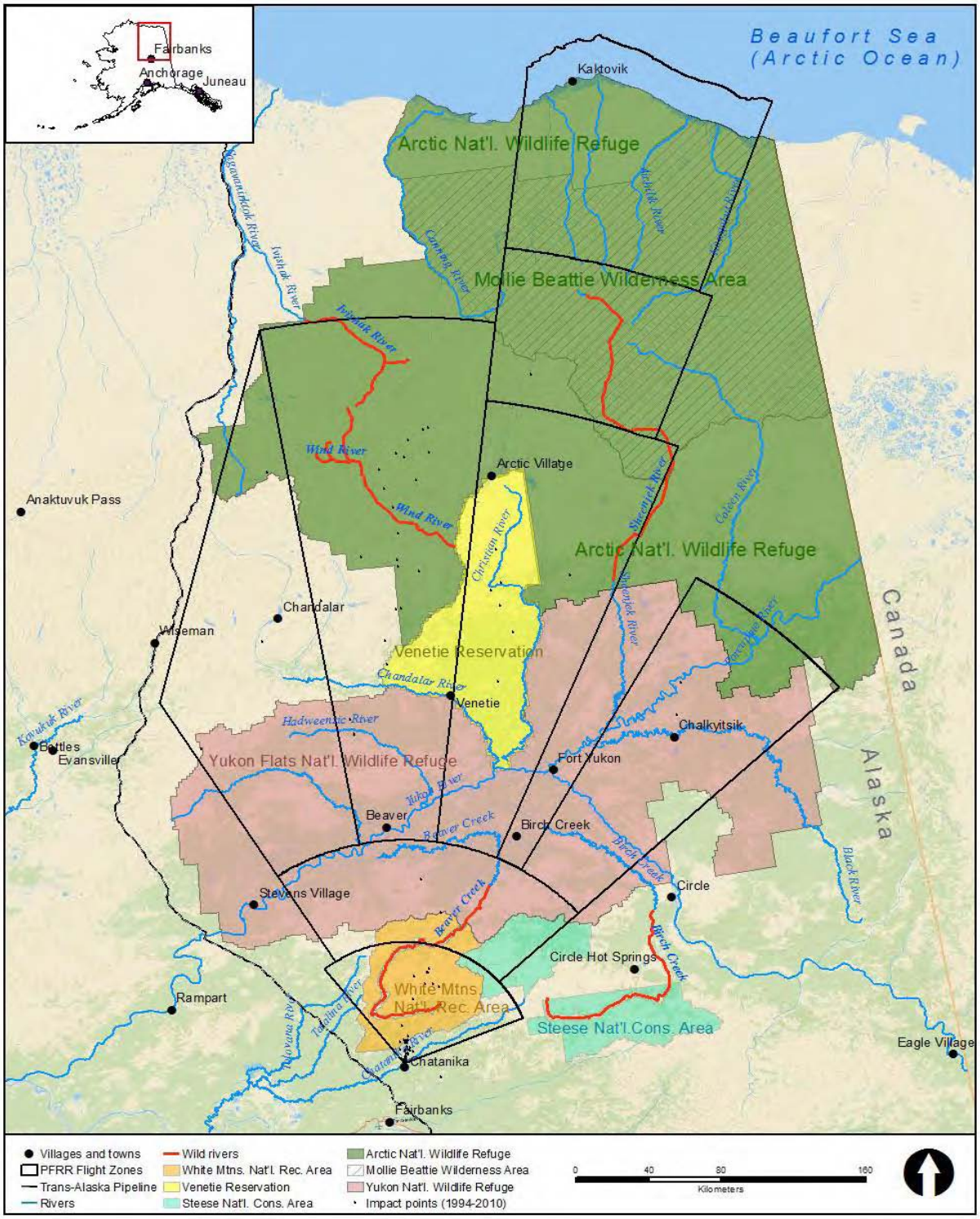


Figure 1. Poker Flat Research Range Launch Corridor and Downrange Lands

2.0 PROGRAMMATIC COMMITMENTS

2.1 CONTINUAL IMPROVEMENT OF LOCATION AIDES

Accurately locating flight hardware in downrange lands is very difficult given the vast area encompassed within the range boundaries (approximately 114,000 square kilometers) and the relatively small size of the targeted items. Given this challenge, NASA will continue to research and evaluate technologies and methods that could improve its ability to locate all major sections of flight hardware, including each rocket motor and the main payload assembly. Listed below are methods/practices currently being tested and/or flown that have shown the most promise:

Radar/Global Positioning Systems – GPS systems that do not require a line-of-sight telemetry link to the launch site have been successfully tested on several recent sounding rocket flights. One system, which relies on the Iridium constellation of Earth-orbiting satellites, survived flight and provided reliable coordinates for the location of two parachuted payloads in the 2011 launch season. It should be noted that this system had been flown several times before with no success; however, the continual testing uncovered a technical detail that once resolved has provided very promising results.

Implementation of a system to provide location data for rocket motors, however, has proven to be more challenging due to the harsher flight environment. A system that relies on a commercially available GPS was flown on an April 2011 mission; however, it did not survive flight. Given this challenge, NASA is currently working with providers of location devices designed specifically for high-impact environments to determine if such a system may be technically feasible for sounding rockets.

Analytical Predictions – The NASA Safety Office has recently developed enhanced techniques for determining the impact location of rocket motor stages and payload components. Once the vehicle is no longer thrusting (all its fuel has been consumed), the objects follow a simple ballistic trajectory. To enhance the probability of locating these objects, flight safety analysts have more effectively combined datasets provided from payload telemetry systems (known as the "state vector," which encompasses position, velocity, direction, and momentum) with atmospheric wind measurements taken during the launch process. This provides the most accurate prediction of the impact site, as it is based on the actual flight path of the rocket, and it can be performed for all objects released as part of the experiment (nose cone, sub-payloads, main payload, etc.). Using current computer-aided analytical tools, it can be accomplished within several hours of the actual launch, thus expediting the search phase of the recovery operations. The methodology has been employed on recent PFRR-launched missions and has proven helpful in refining location estimates for items that are not tracked by radar nor have onboard telemetry equipment (*e.g.*, rocket motors). NASA will continue to refine this process that has become a standard post-launch procedure for PFRR launches.

Non-Traditional Location Aides – In addition to electronic devices, NASA has recently employed visual aides to assist in the location of rocket motors. For example, on an April 2011 mission, both ejectable strobe lights and search and recovery streamers were added to the head cap of the second-stage motor; however, neither proved to be successful as the motor was not located. The application of fluorescent colored markings on the rocket motors has recently been employed at PFRR. Although this technique would only prove effective if the motor landed on its side (and was not covered by snow), it is possible that these markings could assist in the location of stages during the non-winter months when snow would be absent. NASA and UAF will continue to evaluate the use of non-traditional location aides deemed technically feasible.

2.2 RECOVERY BUDGET

Each Fiscal Year, NASA will allocate a minimum of $250,000 of the PFRR annual budget for recovery activities. Actual expenditures are expected to vary from year to year, and would be dictated primarily by launch activity, the amount of hardware reported by agencies and members of the public (discussed in more detail below), the limited time available to recover hardware dictated by weather, and the limited seasonal availability of recovery assets (primarily rotary wing aircraft). If needed, available recovery funding from one previous Fiscal Year could be utilized to augment the $250,000 recovery budget if circumstances warranted, such as if members of the public report a much larger amount of hardware.

Prioritization of Recovery Funds – As the PFRR annual recovery budget would be essentially fixed from year to year, and to maximize available funds, NASA would have to assign priority to recovery from downrange lands. Highest priority would be given to Wilderness Areas, followed by Wild and Scenic River corridors. After these areas are addressed, priority would be dictated by which identified recovery would remove the most flight hardware in the least amount of time for the least cost. In performing recovery, it would be NASA's intent to maximize economies of scale or "out of the box" recovery opportunities, such as the employment of government firefighting or natural resources related personnel who may already be present in the vicinity of an identified flight hardware item. Accordingly, these opportunities would be given elevated priority once recovery of items within the most sensitive lands was satisfied.

2.3 SEARCH FOR ALL NEWLY LAUNCHED STAGES AND PAYLOADS; RECOVER IF PRACTICABLE

NASA and UAF will conduct post-launch searches for the on-land flight hardware components (*i.e.*, rocket stages and main payload) for all future missions. This has been implemented for the 2011–2013 launch seasons with varying degrees of success. Missions are planned such that a fixed-wing search of the predicted impact areas is conducted as soon as practical after launch—generally the next day at first light. The concept is to look for freshly disturbed areas of snow before the objects are covered with windblown snow or additional precipitation. If flight hardware is successfully located within downrange lands, a decisionmaking process (involving

the respective landowner) then follows to determine the necessity and practicality of performing a recovery operation as outlined below.

It is important to note that the focus of the recovery efforts is the downrange lands located north of the State of Alaska special use property just across the Steese Highway from the PFRR launch site. Given the land use within the special use property, there is heightened sensitivity to land-disturbing activities, particularly those associated with a recovery operation. Therefore, regular (*i.e.*, annual) recovery activities would likely not take place within this property. NASA and UAF intend to remove easily accessible spent rocket motors on an occasional basis in coordination with the property's managing organization; however, it is expected that these efforts would be less frequent (*e.g.*, every several years) and would likely result in a greater proportion of those left in place (as compared to other properties within the flight corridor) if it is determined that a measurable amount of land disturbance would be required.

2.4 LEVERAGE AVAILABLE OUTSIDE RESOURCES

NASA is aware of the numerous commercial and private aircraft that overfly the downrange lands, particularly during the non-winter months. Also, the large amount of downrange land that is either hunted or fished on a regular basis, particularly by hundreds of subsistence users, lends itself to a partnership opportunity for locating flight hardware. UAF will employ Alaska Native Village residents in search efforts to the extent practicable. For certain missions that have expected hardware landing locations within either tribal lands or within areas historically used by a particular village regardless of land ownership, PFRR will consult with the respective Village Council.

Rewards Program – NASA and PFRR will institute a formal Rewards Program to assist in locating and recovering rocket and payload hardware. A public awareness campaign (discussed below under ***Outreach***) will be mounted to inform villages, hunters, resource agency personnel, and others, as appropriate, of the Rewards Program. The public will be instructed to contact PFRR and provide GPS coordinates and a photograph (or verbal description) of the suspected item. Assuming that the report appears credible, PFRR would then commission a flight to confirm the item's location and its disposition. If the item were confirmed to be a component of a sounding rocket flight, UAF would then pay the reward to the person who originally reported the item. The reward will vary depending on what the item is; the highest reward would be paid for spent rocket motors, and all other flight hardware (*e.g.*, payload, nose cone, doors) would have the same lesser reward value. To avoid the potential for paying multiple rewards for the same object before its ultimate recovery, the reported item's location will be recorded in the UAF-managed database for future reference. Funding for rewards will be taken from the ***Recovery Budget*** discussed above. In the 2011 and 2012 launch seasons this concept has been tested, and has proven to be one of the most successful means of locating expended flight hardware.

When possible, each major component on future missions, including each vehicle stage and main payload, will have contact information affixed to it for positive identification. Depending on mission requirements, this could be a plate attached with words inscribed, stamped, or stenciled in paint.

Rewards Eligibility – Consistent with the goal of focusing recovery efforts on lands north of the special use areas immediately across the Steese Highway from the PFRR (Alaska Department of Natural Resources Poker Flat North and South Special Use Areas), the Rewards Program will not apply to these lands. Additionally, resource agency personnel who locate items when performing their official duties as public employees will not be eligible for payment.

2.5 EVALUATE REPORTS OF ITEMS FROM PAST FLIGHTS; RECOVER IF PRACTICABLE

Consistent with the process outlined above under ***Rewards Program***, when agency personnel or members of the public report items, UAF will evaluate the report, perform a reconnaissance flight if necessary, and then recover the items as described below.

3.0 LOCATION AND RECOVERY PROCEDURES

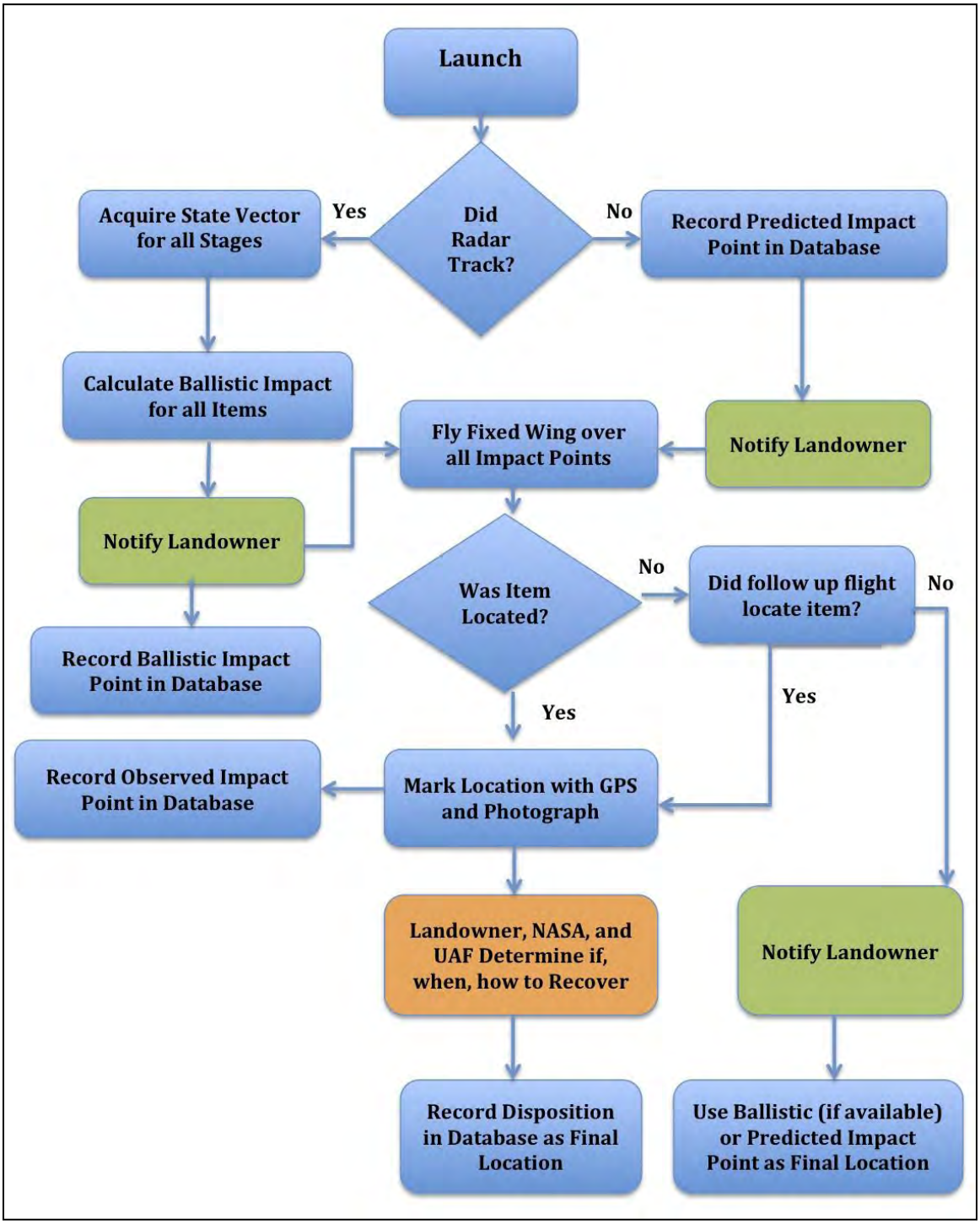
3.1 LOCATION

Figure 2 outlines the process by which post-launch search operations would be executed. The most effective way to predict the location of the major launch-related items is to use the actual burnout conditions (state vector) and calculate a ballistic impact using state-of-the-art trajectory programs.

This process would involve immediate collection of the last available position data (either GPS or radar) and use of these data in trajectory simulation programs to calculate impact points for all stages and major payload pieces (as described above under ***Analytical Predictions***).

Once NASA's flight analyst has provided these points, they will be entered into the PFRR recovery database (discussed below under ***Recordkeeping***), and arrangements would then be made to fly an aircraft over the points. The goal would be to do this as soon as possible after launch (within 24 hours if practicable), such that snow would not cover the items prior to the search. Due to launch times driven by scientific conditions, coordination with aircraft providers, limited daylight or weather constraints in winter months, and the impact range of some objects, it may not always be practical to meet the 24-hour goal. In these instances, it may be elected to wait until the snow has melted to begin the search. Regardless, coordination with the landowner will be part of the decision process. In all cases, the landowner (*e.g.*, Yukon Flats National Wildlife Refuge [NWR], Arctic NWR, and/or U.S. Bureau of Land Management [BLM]) will be offered a seat on the recovery aircraft to assist in spotting any objects. Given the potential for either short-notice or early morning search flight, or both, the landowner will be asked to provide a phone number and point of contact each launch season. The designated point of contact will be

notified of pending search operations as soon as practicable; however, if no response is obtained, the search flight will be initiated in an effort to maximize the potential for locating an object prior to new snowfall. If the objects are not located immediately after launch, at least one additional flight will be conducted as soon as practical after snowmelt to see if the object can be located.



*****Green shapes indicate landowner consultation required; orange shapes indicate landowner approval required before proceeding.***

Figure 2. Post-Launch Search Process Flow Chart

3.2 RECOVERY

Once an object has been located, pertinent information needs to be collected about the impact site such that an objective decision can be made whether to attempt a recovery. During the decisionmaking process, the recovery team will consult local landowners to seek their input as recovering pieces of hardware in remote lowlands or mountainous terrain presents a number of technical and logistical challenges. Proximity to roads or landing sites, the type of terrain, type of vegetation, safety of personnel, the size of the object, season, and sensitivity of the impact site are all factors that must be considered when planning a recovery operation. If recovery is to be attempted, the team will need sufficient information in all areas discussed above. If there is insufficient information to make these determinations, further investigation of the impact site would be conducted to collect relevant information to aid in the decisionmaking process.

The first major decision point is to determine whether it is safe for personnel to access the impact site. If the natural location of the impact site is deemed too hazardous for personnel to enter/operate (*e.g.*, side of a cliff), the object would be left in place and duly noted in the database.

The second major decision point is to evaluate both the environmental and cost impacts of executing the recovery operation. If there is minimal environmental impact of retrieving an object and reasonable cost associated with doing so, recovery would be performed as soon as practicable. If this is not immediately obvious, an analysis considering both environmental impact and cost will be conducted. Both are equally relevant considerations that must be evaluated before the decision is made to execute a recovery operation. For example, if recovering this one object would exhaust available funds due to the extremely difficult nature of the operation, it would make logical sense to allocate the funds to recovery of several other objects that may be pending. Regardless, all located objects will be tracked in the database and logical decisions on when and how to recover will be made in consideration of the larger context of all downrange lands and NASA's commitment to providing a "clean range."

The third major decision point is whether the impact site can be mitigated in the event the decision is made to forego a full recovery operation. Impact site mitigation may entail burial of the object, partial recovery, or other activity deemed appropriate to mitigate its effects. Again, these decisions will be situation-specific and made in consultation with the respective landowner. However, the following standard operating principles will guide the recovery process.

- Employ the least invasive recovery tools as the situation dictates;
- Clean all tools of soil and plant material before leaving site to prevent the spread of invasive species;
- Give priority to locating and removing electronic components that could contain batteries or other potentially hazardous materials;
- All fins, wires, and related items dispersed about the impact site shall be collected and removed;

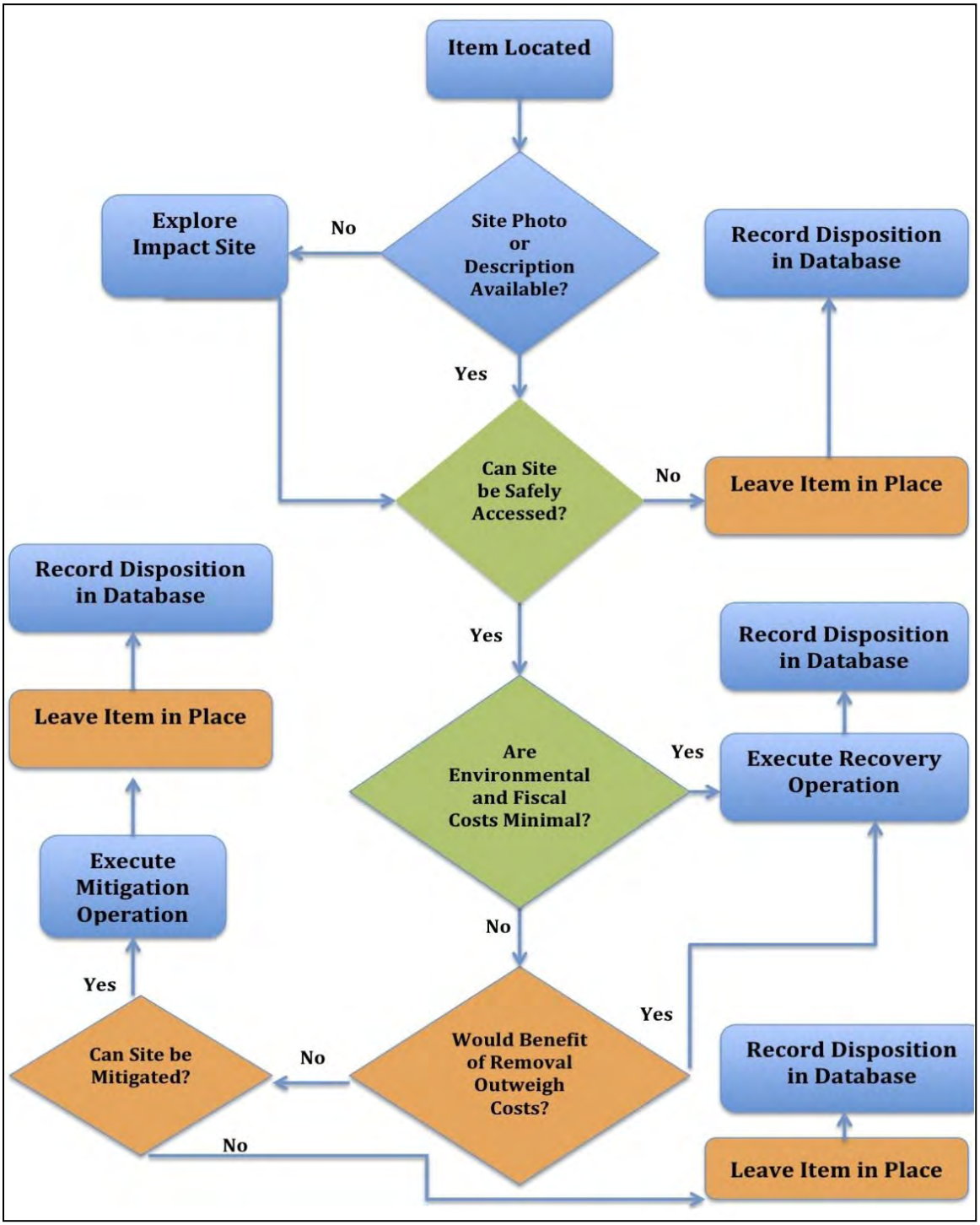
- If left in place, the embedded item shall be severed such that it is does not protrude above the ground surface, as practicable; and
- The impact site and any remaining embedded hardware shall be backfilled with native material (*e.g.*, soil, rock) before recovery crew departure.
- Document the impact site mitigation with both "before" and "after" photographs.

While not anticipated, the potential exists for a recovery operation to be needed within a designated Wilderness Area. If this were to happen, extensive coordination would be required with the respective landowner due to restrictions on helicopter landings and a requirement to utilize the minimum tools necessary to accomplish the task. Items within designated Wilderness Areas will rank as NASA's highest priority for recovery.

The following flow chart summarizes the recovery decisionmaking process (see **Figure 3**), throughout which the landowner would be involved.

3.3 DISPOSAL OF RECOVERED HARDWARE

The disposal of recovered hardware will be managed by UAF. All hardware recovered will be taken to PFRR and temporarily stored until proper disposal in accordance with applicable regulations. For the most part, this will consist of scrap metals and associated "rocket parts" and will be of a nonhazardous nature. Those materials classified as hazardous (*e.g.*, asbestos-containing insulation, nickel-cadmium batteries) will be handled and disposed of in accordance with applicable Federal, state, and local regulations (*e.g.*, Comprehensive Environmental Response, Compensation, and Liability Act **(42 U.S.C. 9601 *et seq*.)** and Resource Conservation and Recovery Act **(42 U.S.C. 6901 *et seq*.)**.



***Green* shapes indicate landowner *consultation* required; *orange* shapes indicate landowner *approval* required before proceeding.**

Figure 3. Recovery Process Flow Chart

4.0 OUTREACH AND RECORDKEEPING

4.1 OUTREACH

A key component of ensuring the effectiveness of this program and to best leverage the "eyes and ears" of users of downrange lands is to establish and maintain active public outreach efforts.

Accordingly, at least two weeks prior to the opening of a launch window, UAF will post a notice in local media (*e.g.*, newspaper) to inform the public of the upcoming launch. Concurrently with publishing this notice, UAF will provide downrange landowners a mission "fact sheet" that includes a brief summary of the mission's objectives, the launch vehicle and recovery aides to be used, a map and location of the planned impact points, and span of the launch window. Included with this fact sheet will be a list of any onboard materials that could be potentially hazardous. Material Safety Data Sheets (MSDS) for such materials will be kept on file at the PFRR launch site, and will be provided to landowners upon request. An example of a mission fact sheet is included as **Appendix A**. Prior to launch, UAF will also post notices of the planned launch at all trailheads within the White Mountains National Recreation Area as directed by BLM.

Each year, by June 1 (the approximate start of the "snow free" season), UAF will distribute a handout (similar to that shown in **Appendix B**) to all local commercial aircraft companies, the local chapter of the private pilots association, and local guides. The purpose of this handout will be to remind aviators and guides of the Rewards Program and the process to follow should either a staff member or client encounter a suspected piece of flight hardware. This same handout will also be distributed to all Alaska Native Village Councils within and adjacent to the PFRR flight corridor.

4.2 RECORDKEEPING

UAF will maintain an up-to-date database to compile data regarding rockets launched and the locations at which the objects return to Earth. The primary purpose of the database is to ensure all relevant data are gathered and stored in one central location. Data from past launches will be imported to the greatest extent possible. The database allows entry of the following information:

a. Rocket type, number of stages, date and time of launch
b. Predicted impact location of each stage, payload or sub-payload
c. Actual impact point from radar or GPS (if available)
d. Predicted ballistic impact points from post-burnout analysis (if available)
e. Date, time, and name of landowner representative contacted
f. Type of aircraft used for search and recovery
g. Confirmation of objects located, including latitude and longitude
h. Final disposition of located items
i. Reward monies paid (if applicable)

Any objects located will be photographed, their GPS coordinates logged, and any adjacent identifying landmarks noted and photographed as they may assist in recovery planning/operations. All information contained within the database will be made available to downrange landowners upon request.

4.3 REPORTING

UAF will submit a report to downrange landowners on an annual basis detailing the extent of its launch and recovery operations for the previous year. This report will include inputs to the aforementioned database and a summary of recovery operations for each rocket launched and historic items reported by users of downrange lands. Additionally, as NASA evaluates new methods for locating flight hardware, the results of these efforts will be provided.

5.0 CONTINGENCY OPERATIONS

By the very nature of sounding rockets, hazardous systems are often flown that may occasionally malfunction, therefore presenting a potential safety hazard on the ground. It is NASA and UAF policy to ensure that no acutely hazardous hardware is unaccounted for following such an unplanned event. For example, through either interpretation of telemetry data or visual inspection, it may be evident that either a high-pressure gas system did not vent its contents or a pyrotechnic device did not perform its intended function (*e.g.*, deploying a door). In these cases, NASA has developed procedures where trained technicians are deployed to the impact site to restrain and "safe" the electronically activated pyrotechnic system or to manually vent the contents of the high-pressure gas system.

Furthermore, in some cases it may be necessary to immediately initiate recovery actions to mitigate a particular hazard. For example, following the failure of a Terrier-Orion flight in March 2003, NASA enlisted specialists from the Air Force's Explosive Ordinance Disposal Team to puncture the payload's trimethylaluminium canister before PFRR crews returned the second-stage motor and payload back to the range via helicopter for analysis. In such cases, landowners will be notified as soon as practicable and apprised of the situation and the proposed final disposition of the item. Landowners will have the final approval over proposed remedies prior the issue being considered "closed." Further coordination will be implemented as the dictated by the situation.

APPENDIX A

EXAMPLE LANDOWNER LAUNCH NOTIFICATION

Poker Flat Research Range
Downrange Landowner Mission Summary Sheet

Mission: Powell 36.273 UE; Cornell University

The MICA (Magnetosphere-Ionosphere Coupling in the Alfvén resonator) mission will measure ion temperature and density, electron temperature and density, electron precipitation, ion upflow, convection and ULF electric fields, magnetic fields from which field-aligned current (FAC) can be inferred, and plasma waves. The objectives of the experiment are to investigate the role of active ionospheric feedback in the development of large amplitude and small scale electromagnetic waves and density depletions in the low altitude (< 400 km), downward current, auroral ionosphere.

Launch Window:	2/13/12 – 3/1/2012; 7pm-2am local time
Launch Vehicle:	Black Brant IX
Planned Impacts:	First Stage 65.1411; -147.4831
	Second Stage 68.0250; -146.7470
Location Aides:	GPS receiver on payloads; C-band transponder on main payload
Hazardous Materials:	Ni-Cd batteries on motors and main payload.
	MSDS available upon request

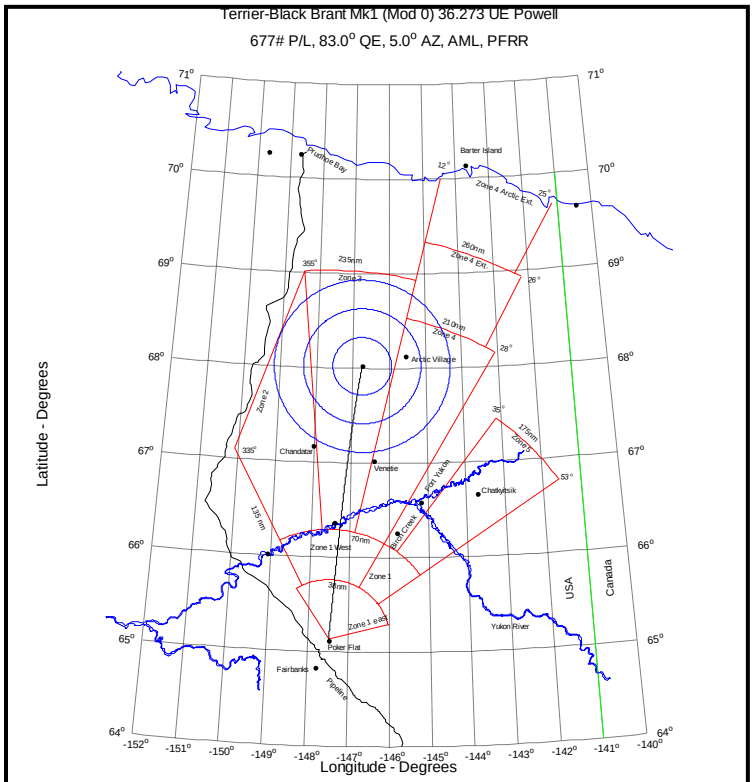


Figure 3.5-1. PFRR Impact Map

APPENDIX B

EXAMPLE PUBLIC OUTREACH FLYER

WANTED

SOUNDING ROCKET LOCATIONS

REWARD

$1,200 FOR ROCKET MOTORS (PICTURED)
$500 FOR OTHER ITEMS

CALL (907) 455-2110

WHAT TO PROVIDE:

1. GPS COORDINATES
2. PICTURE OR DESCRIPTION OF ITEM

PLEASE DO NOT TOUCH ANYTHING!

SOME ITEMS MAY BE DANGEROUS
REPORT IT AND WE WILL REMOVE IT
THANKS FOR HELPING US KEEP THE LANDS CLEAN!

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APPENDIX F

SEARCH AND RECOVERY ASSUMPTIONS

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APPENDIX F.
SEARCH AND RECOVERY ASSUMPTIONS

F.1 PURPOSE OF THIS APPENDIX

The characteristics (*e.g.*, launch vehicle, trajectory, and payload) and frequency of missions conducted at the Poker Flat Research Range (PFRR) are highly dependent upon the scientific objectives of the sponsoring researcher and the National Aeronautics and Space Administration's (NASA's) scientific priorities. Therefore, it is not possible to assess every possible mission scenario that could be proposed for PFRR in the next 10 years.

Accordingly, certain assumptions were made regarding the types of rocket, payload, and recovery operations that would most likely occur; these were based primarily upon past experience, interviews with key personnel, and best professional judgment.

It is important to recognize that recovery efforts would only be undertaken if a post-launch (or post-report in the case of an existing stage or payload) search flight resulted in the positive identification of hardware associated with the NASA Sounding Rockets Program (SRP). In the case of newly launched hardware, recent searches have resulted in the identification of approximately half of the known items. This success rate is expected to increase as location devices are improved; however, the reader should not assume that all downrange flight hardware would be found in every case. Therefore, the most reliable (and conservative) product of these assumptions is an estimated quantification of fuel usage (and resulting air emissions) of recovery-related vehicles. Estimates of flight times (and fuel usage) associated with both search and recovery would be considered conservative in that greater emissions would occur compared to recovery efforts alone. However, when other resource areas, including the wilderness values of special use lands, are considered, these scenarios may underestimate impacts in that not all hardware would be removed. Therefore, within certain resource sections of the *Final Environmental Impact Statement for the NASA Sounding Rockets Program at Poker Flat Research Range* (*PFRR EIS*), ranges of potential impacts are presented for the reader's consideration.

F.2 GENERAL ASSUMPTIONS

For all searches, it is assumed that the search plane would be a two-person, fixed-wing aircraft that would depart from Fairbanks International Airport. Flights to and from the search area would be about 610 meters (2,000 feet) above ground level (AGL) at a speed of approximately 225 kilometers (120 knots) per hour. Once the search area is reached, the plane would fly between approximately 61 meters (200 feet) and 150 meters (500 feet) AGL and slow to allow for searching. Searches are assumed to last an average of 2 hours or as long as a single tank of fuel would allow. If a payload is not located on the first search operation, a maximum of 2 days would be spent searching for it. For this analysis, it is assumed that payload search operations would take 2 days and spent stage search operations would take 1 day.

For recovery operations, helicopters are assumed to depart from Fairbanks. Flights to the recovery area would be about 460 meters (1,500 feet) AGL at a speed of approximately 225 kilometers (120 knots) per hour. Once the recovery area is reached, it is assumed that the

helicopter would spend approximately 30 minutes hovering at the recovery site and 2 hours of downtime while the payload or spent stage was rigged for transport away from the site. While transporting a payload or spent stage, it was assumed that the helicopter would fly about 60 to 150 meters (200 to 500 feet) AGL at an average speed of about 65 kilometers (35 knots) per hour. For recovery operations within 50 kilometers (30 miles) of the PFRR launch site, it was assumed that the recovered object would be flown back to the PFRR launch site underneath the helicopter. For distances beyond 50 kilometers (30 miles), it was assumed that the recovered object would be transported to a nearby airstrip (assumed to be within 30 kilometers [20 miles] of the recovery site), where the object would be left for pickup by a fixed-wing transport plane. Objects returned by transport plane to Fairbanks would be trucked from Fairbanks to the PFRR launch site.

In general, spent stages and payloads would not be recovered during the winter months (October through April). Only in special cases, such as recovery of a payload for scientific reasons or response to an off-nominal flight, would a payload or a spent stage be recovered in the winter. In the event of a winter recovery, two helicopters (for safety reasons) would be used to support the recovery.

F.3 STAGE RECOVERY WITHIN 2 KILOMETERS (1.2 MILES) OF THE PFRR LAUNCH SITE (TARGETING TALOS [1ST STAGE BLACK BRANT XII], TERRIER [1ST STAGE TERRIER-IMPROVED ORION], OR TERRIER [1ST STAGE BLACK BRANT X])

On its way to search for a more distant spent stage or payload, a two-person search plane would briefly search the immediate area near the PFRR launch site for the spent stage in question. After the spent stage was located, the search plane would mark the location using global positioning system (GPS) coordinates and take pictures of the site for the recovery crew and continue on to its primary search destination.

At a later date, the recovery helicopter would depart from Fairbanks and travel to the location marked by the search plane. The helicopter crew would then land and begin rigging the spent stage for transport back to the PFRR launch site. During this time, the helicopter would be turned off so no fuel is burned. After the rigging has been completed, the helicopter would recover the spent stage to be transported and would travel back to the PFRR launch site at 65 kilometers per hour (35 knots). The spent stage would be dropped off and the helicopter would return to its base of operations.

In some cases for recoveries close-in to the PFRR launch site, it may be possible to recover the spent stages using an off-road vehicle (*e.g.*, snow machine) without causing any environmental damage in the area. However, to be conservative in terms of estimating the environmental impacts in the *PFRR EIS*, all recovery operations in this area are assumed to be accomplished with a helicopter. **Table F–1** shows a summary of transportation time and fuel usage for this recovery operation.

Table F–1. Transportation Times and Fuel Used During Search and Recovery Operations (Spent Stages) to the State Lands Above the PFRR Launch Site

	Helicopter Used for Stage Recovery[a]
Travel time	4 hours
Fuel used	450 liters

a. It is assumed that a more robust helicopter would be needed to handle these stages due to their weight.

Note: To convert liters to gallons, multiply by 0.26417.

F.4 STAGE RECOVERY WITHIN 20 KILOMETERS (12 MILES) OF THE PFRR LAUNCH SITE (TARGETING TAURUS [2ND STAGE BLACK BRANT XII])

A two-person search plane would depart from Fairbanks International Airport and travel toward the recovery site. Once on site, it would circle around searching for the spent stage in question. After the spent stage was located, the search plane would mark the location using GPS coordinates and take pictures of the site for the helicopter crew and return to Fairbanks.

At a later date, the recovery helicopter would depart from Fairbanks and travel to the location marked by the search plane. The helicopter crew would then land and begin rigging the spent stage for transport back to the PFRR launch site. During this time, the helicopter would be turned off so no fuel is burned. After the rigging has been completed, the helicopter would recover the spent stage to be transported and would travel back to the PFRR launch site at 65 kilometers (35 knots) per hour. The spent stage would be dropped off and the helicopter would return to its base of operations. **Table F–2** shows a summary of transportation times and fuel usage for this recovery operation.

Table F–2. Transportation Times and Fuel Used During Search and Recovery Operations (Spent Stages) to the State Lands Above the PFRR Launch Site

	Fixed-Wing Search Plane	Helicopter Used for Stage Recovery[a]
Travel time	4 hours	5 hours
Fuel used	75 liters	640 liters

a. It is assumed that a more robust helicopter would be needed to handle these stages due to their weight.

Note: To convert liters to gallons, multiply by 0.26417.

F.5 STAGE RECOVERY WITHIN WHITE MOUNTAINS NATIONAL RECREATION AREA (APPROXIMATELY 50 KILOMETERS [30 MILES] FROM THE PFRR LAUNCH SITE) (TARGETING IMPROVED ORION [IO] AND PAYLOAD FROM SINGLE STAGE VEHICLE [30.XXX])

A two-person search plane would depart from Fairbanks International Airport and travel toward the recovery site. Once on site, it would circle around searching for the spent stage in question. After the spent stage was located, the search plane would mark the location using GPS coordinates and take pictures of the site for the helicopter crew and return to Fairbanks.

At a later date, the recovery helicopter would depart from Fairbanks and travel to the location marked by the search plane. The helicopter crew would then land and begin rigging the spent stage for transport back to the PFRR launch site. During this time, the helicopter would be turned off so no fuel is burned. After the rigging has been completed, the helicopter would recover the spent stage to be transported and would travel back to the PFRR launch site at 65 kilometers (35 knots) per hour. The spent stage would be dropped off and the helicopter would return to its base of operations. **Table F–3** shows a summary of transportation times and fuel usage for this recovery operation.

Table F–3. Transportation Times and Fuel Used During Search and Recovery Operations (Spent Stages) to the White Mountains NRA

	Fixed-Wing Search Plane	Helicopter Used for Stage Recovery
Travel time	4 hours	5 hours
Fuel used	75 liters	190 liters

Note: To convert liters to gallons, multiply by 0.26417.
Key: NRA=National Recreation Area.

F.6 PAYLOAD OR STAGE RECOVERY IN THE YUKON FLATS NWR (APPROXIMATELY 200 KILOMETERS [120 MILES] FROM THE PFRR LAUNCH SITE) (TARGETING IMPROVED ORION [IO] AND PAYLOAD FROM MK 12 T-TIO CONFIGURATION)

A two-person search plane would depart from Fairbanks International Airport and travel toward the recovery site. Once on site, it would circle around searching for the spent stage or payload in question. After the spent stage or payload was located, the search plane would mark the location using GPS coordinates and take pictures of the site for the helicopter crew and return to Fairbanks.

At a later date, the recovery helicopter would depart from Fairbanks and travel to the location marked by the search plane. The helicopter crew would then land and begin rigging the spent stage for transport back to the PFRR launch site. During this time, the helicopter would be turned off so no fuel is burned. After the rigging has been completed, the helicopter would recover the spent stage to be transported and would travel to a nearby landing strip at 65 kilometers (35 knots) per hour. The spent stage or payload would be dropped near the landing strip for pickup by a fixed-wing plane, and the helicopter would refuel before returning to its base of operations.

At the landing strip, the spent stage or payload would be loaded onto a chartered fixed-wing transport plane and transported back to Fairbanks, where it would be loaded onto a flatbed truck and transported to the PFRR launch site. **Tables F–4** (for spent stages) and **F–5** (for payloads) show a summary of transportation times and fuel usage for this recovery operation.

Table F–4. Transportation Times and Fuel Used During Search and Recovery Operations (Spent Stages) to the Yukon Flats NWR

	Fixed-Wing Search Plane	Helicopter Used for Stage or Payload Recovery[a]	Fixed-Wing Transport Plane (from Venetie to Fairbanks)	Flatbed Truck (round trip from Fairbanks to the PFRR launch site)
Travel time	5 hours	6 hours	4 hours	1 hour
Fuel used	130 liters	1,600 liters	450 liters	20 liters

a. It is assumed that a more robust helicopter would be needed to recover these stages because the helicopter would carry extra fuel.

Note: To convert liters to gallons, multiply by 0.26417.

Key: NWR=National Wildlife Refuge.

Table F–5. Transportation Times and Fuel Used During Search and Recovery Operations (Payloads) to the Yukon Flats NWR

	Fixed-Wing Search Plane[a]	Helicopter Used for Stage or Payload Recovery[b]	Fixed-Wing Transport Plane (from Venetie to Fairbanks)	Flatbed Truck (round trip from Fairbanks to the PFRR launch site)
Travel time	10 hours	6 hours	4 hours	1 hour
Fuel used	260 liters	1,600 liters	450 liters	20 liters

a. Search time and fuel used is doubled assuming a 2-day search for payloads.

b. It is assumed that a more robust helicopter would be needed to recover these stages because the helicopter would carry extra fuel.

Note: To convert liters to gallons, multiply by 0.26417.

Key: NWR=National Wildlife Refuge.

F.7 PAYLOAD OR STAGE RECOVERY IN THE VENETIE RESERVATION (APPROXIMATELY 305 KILOMETERS [190 MILES] FROM THE PFRR LAUNCH SITE) (TARGETING PAYLOAD AND IMPROVED-ORION [2ND STAGE FROM MK 70 T-IO CONFIGURATION] OR BLACK BRANT VC MOTOR [2ND STAGE FROM BLACK BRANT X])

A two-person search plane would depart from Fairbanks International Airport and travel toward the recovery site. Once on site, it would circle around searching for the spent stage or payload in question. After the spent stage or payload was located, the search plane would mark the location using GPS coordinates and take pictures of the site for the helicopter crew and return to Fairbanks.

At a later date, the recovery helicopter would depart from Fairbanks and travel to the location marked by the search plane. The helicopter crew would then land and begin rigging the spent stage for transport back to the PFRR launch site. During this time, the helicopter would be turned off so no fuel is burned. After the rigging has been completed, the helicopter would recover the spent stage to be transported and would travel to a nearby landing strip at 65 kilometers (35 knots) per hour. The spent stage or payload would be dropped near the

landing strip for pickup by a fixed-wing plane, and the helicopter would refuel before returning to its base of operations.

At the landing strip, the spent stage or payload would be loaded onto a chartered fixed-wing transport plane and transported back to Fairbanks, where it would be loaded onto a flatbed truck and transported to the PFRR launch site. **Tables F–6** (for spent stages) and **F–7** (for payloads) show a summary of transportation times and fuel usage for this recovery operation.

Table F–6. Transportation Times and Fuel Used During Search and Recovery Operations (Spent Stages) to the Venetie Reservation

	Fixed-Wing Search Plane	Helicopter Used for Stage or Payload Recovery[a]	Fixed-Wing Transport Plane (from Venetie to Fairbanks)	Flatbed Truck (round trip from Fairbanks to the PFRR launch site)
Travel time	6 hours	7 hours	5 hours	1 hour
Fuel used	150 liters	2,000 liters	680 liters	20 liters

a. It is assumed that a more robust helicopter would be needed to recover these stages because the helicopter would carry extra fuel.

Note: To convert liters to gallons, multiply by 0.26417.

Table F–7. Transportation Times and Fuel Used During Search and Recovery Operations (Payloads) to the Venetie Reservation

	Fixed-Wing Search Plane[a]	Helicopter Used for Stage or Payload Recovery[b]	Fixed-Wing Transport Plane (from Venetie to Fairbanks)	Flatbed Truck (round trip from Fairbanks to the PFRR launch site)
Travel time	12 hours	7 hours	5 hours	1 hour
Fuel used	320 liters	2,000 liters	680 liters	20 liters

a. Search time and fuel used is doubled assuming a 2-day search for payloads.

b. It is assumed that a more robust helicopter would be needed to recover these stages because the helicopter would carry extra fuel.

Note: To convert liters to gallons, multiply by 0.26417.

F.8 STAGE RECOVERY IN THE WIND RIVER AREA (APPROXIMATELY 370 KILOMETERS [230 MILES] FROM THE PFRR LAUNCH SITE) (TARGETING BLACK BRANT VC MOTOR [BLACK BRANT XII 3RD STAGE])

A two-person search plane would depart from Fairbanks International Airport and travel toward the recovery site. Once on site, it would circle around searching for the spent stage or payload in question for as long as a single tank of fuel would allow. After the spent stage or payload was located, the search plane would mark the location using GPS coordinates and take pictures of the site for the helicopter crew and return to Fairbanks.

At a later date, the recovery helicopter would depart from Fairbanks and travel to the location marked by the search plane. The helicopter crew would then land and begin rigging the spent

stage for transport back to the PFRR launch site. During this time, the helicopter would be turned off so no fuel is burned. After the rigging has been completed, the helicopter would recover the spent stage to be transported and would travel to a nearby landing strip at 65 kilometers (35 knots) per hour. The spent stage or payload would be dropped near the landing strip for pickup by a fixed-wing plane, and the helicopter would refuel before returning to its base of operations.

At the landing strip, the spent stage or payload would be loaded onto a chartered fixed-wing transport plane and transported back to Fairbanks, where it would be loaded onto a flatbed truck and transported to the PFRR launch site. **Table F–8** shows a summary of transportation times and fuel usage for this recovery operation.

Table F–8. Transportation Times and Fuel Used During Search and Recovery Operations (Spent Stages) to the Wind River Area

	Fixed-Wing Search Plane	Helicopter Used for Stage or Payload Recovery[a]	Fixed-Wing Transport Plane (from Venetie to Fairbanks)	Flatbed Truck (round trip from Fairbanks to the PFRR launch site)
Travel time	7 hours	8 hours	5 hours	1 hour
Fuel used	190 liters	2,300 liters	830 liters	20 liters

a. It is assumed that a more robust helicopter would be needed to recover these stages because the helicopter would carry extra fuel.

Note: To convert liters to gallons, multiply by 0.26417.

F.9 ANNUAL ESTIMATES OF TRANSPORTATION REQUIREMENTS ASSOCIATED WITH THE RECOVERY OF PAYLOADS AND SPENT STAGES UNDER THE DIFFERENT ALTERNATIVES

Table F–9 shows the number of attempted recoveries of new and existing spent stages and payloads that are projected to be recovered each year under the different alternatives being considered in the *PFRR EIS*. These numbers assume an average of four new launches per year.

Table F–9. Annual Projected Recovery of Spent Stages and Payloads

	No Action Alternative	Alternatives 1 and 3	Alternatives 2 and 4
Payloads	1	2	4
Spent Stages	0	11	16

Payload recoveries are assumed to be from the Venetie Reservation and Yukon Flats National Wildlife Refuge and spent stage recoveries are assumed to be from the various locations discussed above. Using these projected recoveries, the airplane, helicopter, and truck transport times were estimated for each alternative, along with the fuel that would be burned under each alternative, as shown in **Tables F–10** and **F–11**.

Table F–10. Annual Projected Airplane, Helicopter, and Truck Transport Times (hours)

	No Action Alternative	Alternatives 1 and 3	Alternatives 2 and 4
Airplane Transit Time	6	30	47
Airplane Search Time	4	28	44
Helicopter Transit Time	3	25	37
Helicopter Down Time	2	26	40
Helicopter Hovering Time	0.5	7	10
Helicopter Recovery Time	0.5	6	9
Airplane Transport Time	2	14	21
Truck Transport Time	1	5	8

Table F–11. Annual Projected Airplane, Helicopter, and Truck Fuel Usage (liters)

	No Action Alternative	Alternatives 1 and 3	Alternatives 2 and 4
Airplane	1,000	6,700	10,000
Helicopter	2,000	17,000	25,000
Truck	20	120	180
Total	**3,000**	**23,000**	**35,000**

Note: To convert liters to gallons, multiply by 0.26417.

Assuming an average of four launches per year, the following recovery actions would take place. **Table F–12** shows the number and location of recoveries of new and existing spent stages and payloads that are projected to be recovered each year under the different alternatives being considered in the *PFRR EIS*.

Table F–12. Summary of Recovery Operations Based on an Average of Four Launches per Year

	Assumes 2 BBXII and 2 T-IO			Assumes 1 BBX and 3 T-IO			
	No Action Alternative	**Alternatives 1 and 3**	**Alternatives 2 and 4**	**No BLM Authorization Scenario with Alternatives 1 and 3 Recovery**	**No BLM Authorization Scenario with Alternatives 2 and 4 Recovery**	**No USFWS Authorization Scenario with Alternatives 1 and 3 Recovery**	**No USFWS Authorization Scenario with Alternatives 2 and 4 Recovery**
New Payloads Recovered	1 from Venetie Reservation	1 from Yukon Flats NWR 1 from Venetie Reservation	Same as Alternatives 1 and 3	2 from Yukon Flats NWR 1 from Venetie Reservation	2 from Yukon Flats NWR 1 from Venetie Reservation	No new launches; therefore, no recovery operations	No new launches; therefore, no recovery operations
Existing Payloads Recovered	0 based on past history	0 based on past history	1 from Yukon Flats NWR 1 from Venetie Reservation	Same as Alternatives 1 and 3	Same as Alternatives 2 and 4	Same as Alternatives 1 and 3	Same as Alternatives 2 and 4
Newly Spent Stages Recovered	0 based on past history	1 from Wind River 1 from Venetie Reservation 2 from Yukon Flats NWR 2 from White Mountains NRA	1 from Wind River 1 from Venetie Reservation 2 from Yukon Flats NWR 2 from White Mountains NRA 2 from ADNR land	1 from Venetie Reservation 3 from Yukon Flats NWR	1 from Venetie Reservation 3 from Yukon Flats NWR 2 from ADNR land	No new launches; therefore, no recovery operations	No new launches; therefore, no recovery operations
Existing Spent Stages Recovered	0 based on past history	1 from Wind River 1 from Yukon Flats NWR 1 from White Mountains NRA 2 from ADNR land	1 from Wind River 1 from Venetie Reservation 2 from Yukon Flats NWR 2 from White Mountains NRA 2 from ADNR land	Same as Alternatives 1 and 3	Same as Alternatives 2 and 4	Same as Alternatives 1 and 3	Same as Alternatives 2 and 4

Key: ADNR=Alaska Department of Natural Resources; BB=Black Brant; BLM=U.S. Bureau of Land Management; NRA=National Recreation Area; NWR=National Wildlife Refuge; T-IO=Terrier-Improved Orion; USFWS=U.S. Fish and Wildlife Service.

F.10 NON-ISSUANCE OF U.S. BUREAU OF LAND MANAGEMENT AUTHORIZATION FOR FUTURE IMPACTS

If the U.S. Bureau of Land Management (BLM) does not authorize future use of the White Mountains National Recreation Area (NRA) and Steese National Conservation Area (NCA) to the University of Alaska Fairbanks (UAF) for stage/payload impact, NASA would be required to ensure that the 3-sigma dispersion of its stages or payloads could not overlap either of the BLM-managed lands. Search and recovery of historic items could continue within the BLM lands; however, search and recovery of future launched items would be limited to U.S. Fish and Wildlife Service (USFWS), Tribal, and state lands.

Under this scenario, NASA would still perform an average of four launches per year and would perform recovery operations for existing and newly spent payloads and stages as shown under the No BLM Authorization Scenarios with Alternatives 1 through 4 in Table F–12. These launches would be limited to multi-stage rockets such as the Terrier Improved-Orion (T-IO) or Black Brant X (BBX).

These changes to the number of projected recovery operations under this No BLM Authorization Scenario would change the annual projected fuel usage for search and recovery activities as follows: (1) the No Action Alternative requirement under this scenario would not change, (2) up to 24,000 liters (6,300 gallons) would be required for Alternatives 1 and 3 under this scenario, and (3) up to 36,000 liters (9,500 gallons) would be required for Alternatives 2 and 4 under this scenario. When compared to the totals from Table F–11, Alternatives 1 through 4, under this scenario, would use approximately the same amount of fuel, and there would be about the same amount of search and recovery activity.

F.11 NON-ISSUANCE OF U.S. FISH AND WILDLIFE SERVICE AUTHORIZATION FOR FUTURE IMPACTS

If USFWS does not authorize future use of the Arctic and Yukon Flats NWRs by UAF for stage/payload impact, NASA would be required to ensure that the 3-sigma dispersion of its stages or payloads could not overlap USFWS lands. Denial of USFWS authorization would preclude NASA from launching all of its multi-stage rockets, and as a result, it is expected that NASA would discontinue funding PFRR altogether. Search and recovery activities associated with future launches would not be needed, and search and recovery activities associated with past launches would be expected to continue for a period of up to 10 years after the USFWS authorization was denied.

Under this scenario, NASA would perform recovery operations for existing payloads and stages as shown under the No USFWS Authorization Scenarios with Alternatives 1 through 4 in Table F–12 for a period of 10 years.

These changes to the number of projected recovery operations under this No USFWS Authorization Scenario would change the annual projected fuel usage for search and recovery activities as follows: (1) the No Action Alternative requirement related to search for new payloads would change due to the cessation of future launches; as a result, no search and recovery activities would take place under this scenario; (2) up to 7,000 liters (1,800 gallons)

would be required for Alternatives 1 and 3 under this scenario; and (3) up to 18,000 liters (4,800 gallons) would be required for Alternatives 2 and 4 under this scenario. When compared to the totals from Table F–11, the No Action Alternative, under this scenario, would not require any fuel; Alternatives 1 and 3, under this scenario, would use approximately 70 percent less fuel; and Alternatives 2 and 4, under this scenario, would use approximately 50 percent less fuel. There would be similar reductions in the amount of search and recovery activity.

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APPENDIX G

IMPACT PROBABILITIES

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APPENDIX G.
IMPACT PROBABILITIES

G.1 PURPOSE OF THIS APPENDIX

This appendix describes the method by which payload and spent stage impact probabilities are calculated for National Aeronautics and Space Administration (NASA) Sounding Rockets Program launches. This information was used to support various resource area impact analyses in the *Final Environmental Impact Statement for the NASA Sounding Rockets Program at Poker Flat Research Range* (*PFRR EIS*).

G.2 PROBABILITY OF IMPACT WITHIN DIFFERENT AREAS OF CONCERN

Typical impact points were analyzed for seven different distances from the Poker Flat Research Range (PFRR) launch site, covering a range of possible launch vehicles, both to determine the probability of a spent stage or payload landing within a number of potential areas of concern and to develop search and recovery scenarios. These impact points represent composite points for a number of rocket launches from PFRR over approximately the past 10 years. They are not intended to represent the predicted impact points for all future launches from PFRR, but are intended to show the typical distances flown by the different launch vehicles in use at PFRR and the relative uncertainty associated with predicted impact points at various distances from the launch site. The distances analyzed are as follows:

- 2 kilometers (1.2 miles) – 1st stage of Black Brant (BB) IX or BBXII
- 3 kilometers (1.9 miles) – 1st stage of BBX
- 13 kilometers (8.1 miles) – 1st stage of Terrier-Orion or Terrier-Improved Orion or 2nd stage of BBXII
- 55 kilometers (35 miles) – Orion
- 200 kilometers (120 miles) – 2nd stage of Terrier-Orion
- 300 kilometers (180 miles) – 2nd stage of BBIX or BBX
- 350 kilometers (220 miles) – 3rd stage of BBXII or 2nd stage of Terrier-Improved Orion
- 1,000 kilometers (620 miles) – 3rd stage of BBX or 4th stage of BBXII

The potential impact areas were determined using downrange and cross-range dispersion estimates from past NASA launches at PFRR. During the launch sequence, NASA calculates the estimated impact points for the stages and the payload based on information known about the launch (*e.g.*, azimuth, payload weight, direction, and wind speed). These calculations provide a starting point for any subsequent searches. Note that while these calculations provide NASA's best estimates of where these items are expected to impact the Earth, there is a level of uncertainty associated with these estimates because of the large number of variables associated

with each launch. These variables include payload weight, wind, temperature, and variations in the performance of the solid rocket fuel. These variations become even more pronounced the higher the payload or spent stage is launched from the launch site. The biggest variants are thrust misalignment, which is a measure of how straight the rocket really is, and uncompensated winds. This is the change in wind from the time it is last measured prior to launch until the instant the rocket is launched (for example, a wind gust).

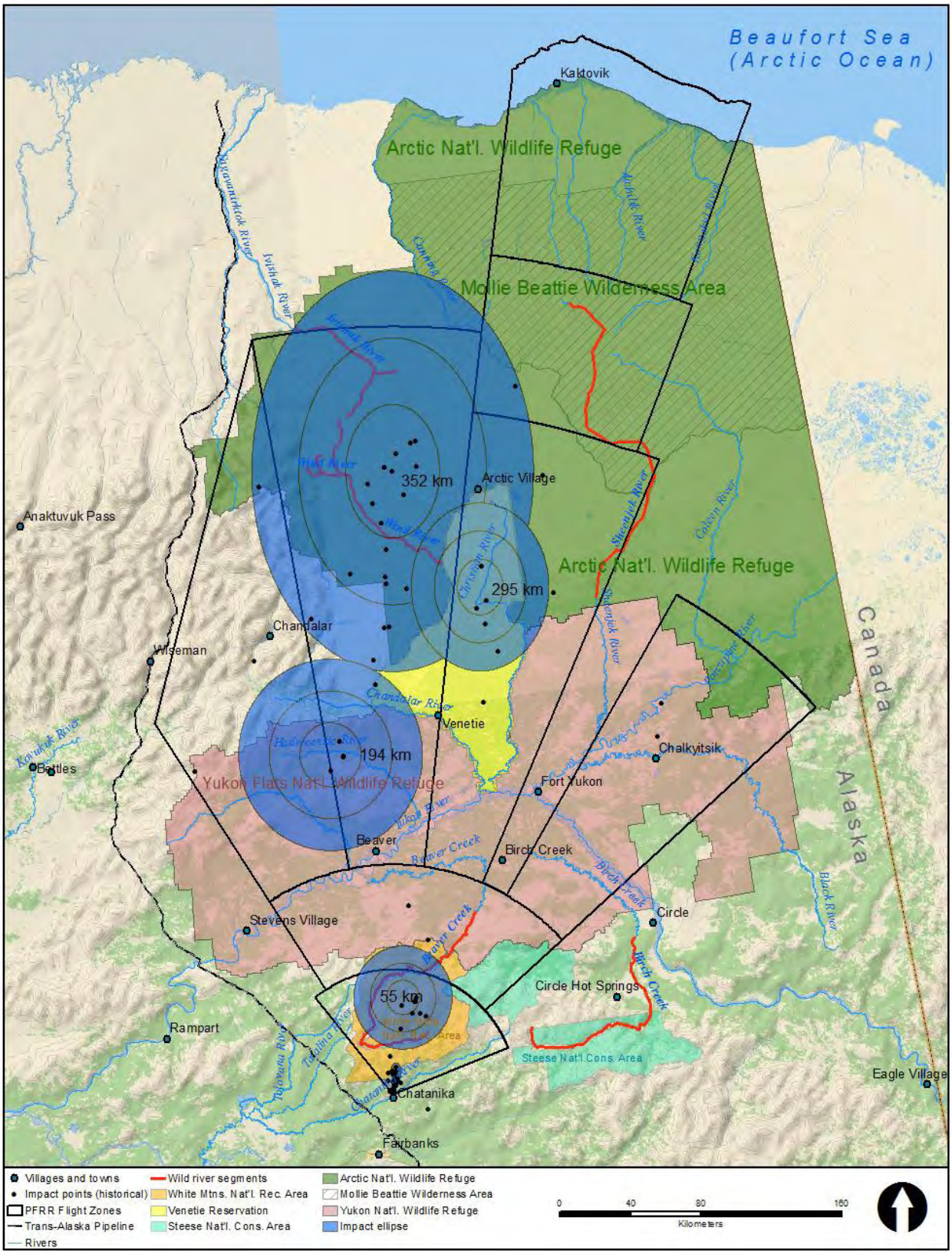
As a result, the predicted impact points have bands of uncertainty associated with them that can vary north and south (downrange) and east and west (cross-range) by relatively small amounts on a percentage basis (for example, 5 to 10 percent), but that end up being relatively large distances for spent stages or payloads that are predicted to land further from the launch site. For example, a typical BBXII launch has a third stage that would be predicted to land approximately 350 kilometers (220 miles) from the launch site with a 1-sigma[1] downrange dispersion of approximately 38 kilometers (24 miles) and a 1-sigma cross-range dispersion of 27 kilometers (17 miles).[2] Using these dispersion estimates, it is possible to estimate a predicted impact area within the ellipse formed by these dispersion factors. The 1-sigma impact area for this example would be an ellipse with an area of approximately 3,200 square kilometers (1,235 square miles).

Using a bivariate circular probability distribution, approximately 39 percent of BBXII's launches are expected to land within 1 sigma of the predicted impact point, 86 percent within 2 sigma, and 99 percent within 3 sigma. Expanding the predicted impact area to account for 2-sigma dispersion increases the potential impact area by a factor of 4, and expanding the area to account for 3-sigma dispersion increases the potential impact area by a factor of 9 compared to the 1-sigma predicted impact area.

Figure G–1 shows the typical 1-, 2-, and 3-sigma ellipses for different distances evaluated as typical impact points for launches from PFRR within PFRR on White Mountains National Recreation Area, the Venetie Reservation, and Yukon Flats and Arctic National Wildlife Refuges. These ellipses were used to calculate the probability of a payload or spent stage landing within these areas as well as other areas of concern that may reside within these areas, such as Wilderness Areas and Wild River segments. **Figure G–2** shows the potential overlap of a typical impact point within the Beaufort Sea on the northern border of PFRR and polar bear critical habitat. **Figure G–3** shows the potential overlap of a typical impact point within the Beaufort Sea on the areas where ringed seals are known to congregate during the winter months when launches are assumed to take place from PFRR and the potential overlap with sea ice out to 200 nautical miles where ringed seals could be present during such launches. **Figure G–4** shows the potential overlap of the typical impact points within PFRR on areas where caribou herds are known to congregate during the winter months when launches are assumed to take place from PFRR. **Figure G–5** shows the potential overlap of a typical impact point within the Beaufort Sea on areas that are covered with sea ice year-round (sea ice in this region of the Beaufort Sea retreats until early September each year and then begins to freeze over again until it is hard up against the Alaska coastline during the winter months) **(NSIDC 2011).**

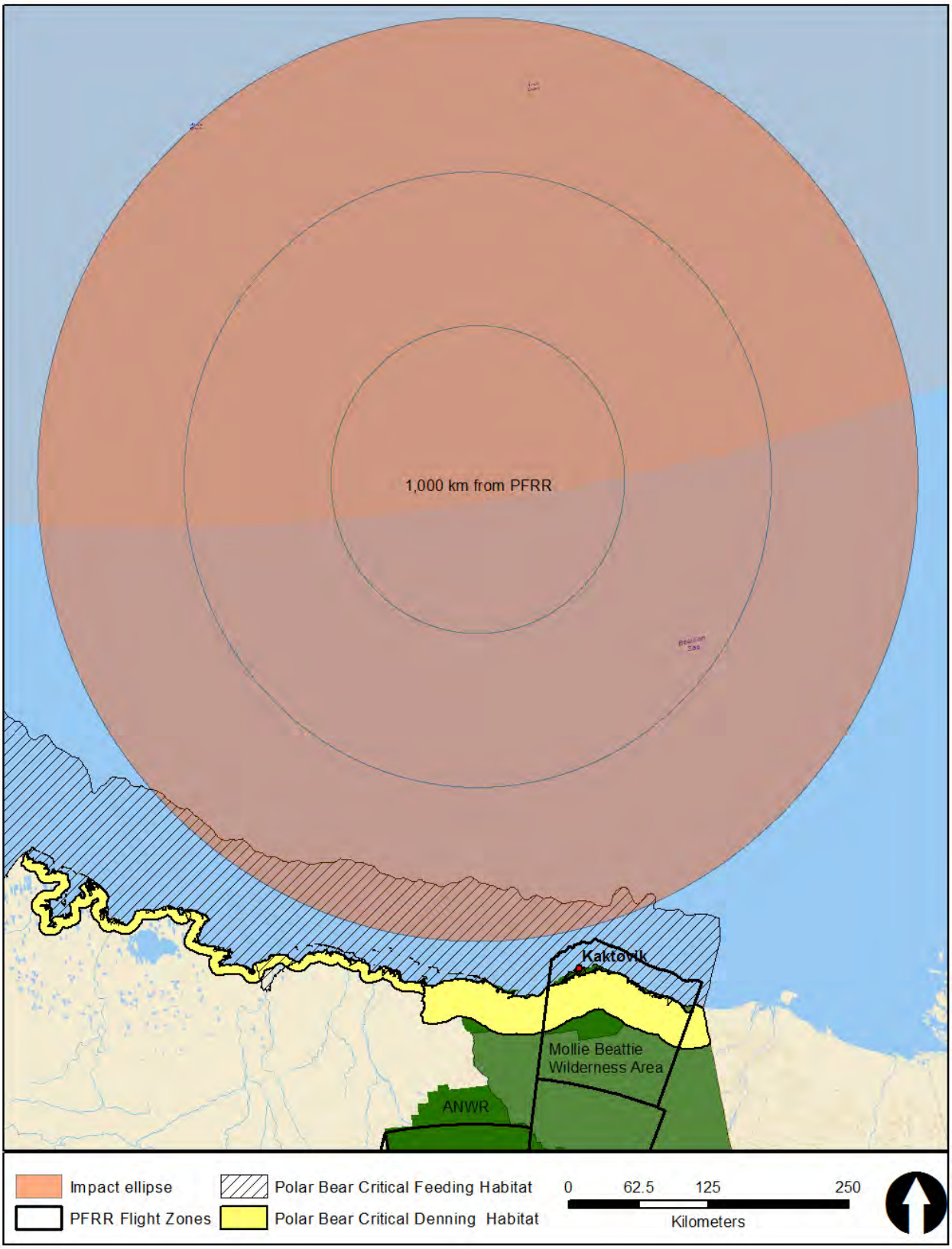
[1] Sigma or standard deviation is a measure of how much variation or "dispersion" there is from the average (the mean, or, in this case, predicted impact point).

[2] Since the launches from PFRR are generally from south to north, downrange dispersion refers to differences in the actual impact point along the south-to-north axis and cross-range dispersion refers to possible differences in the actual impact point along the west-to-east axis.



Key: km=kilometers.

Figure G–1. Typical Impact Areas Within the Poker Flat Research Range



Key: km=kilometers.

Figure G–2. Typical Impact Areas Within the Beaufort Sea

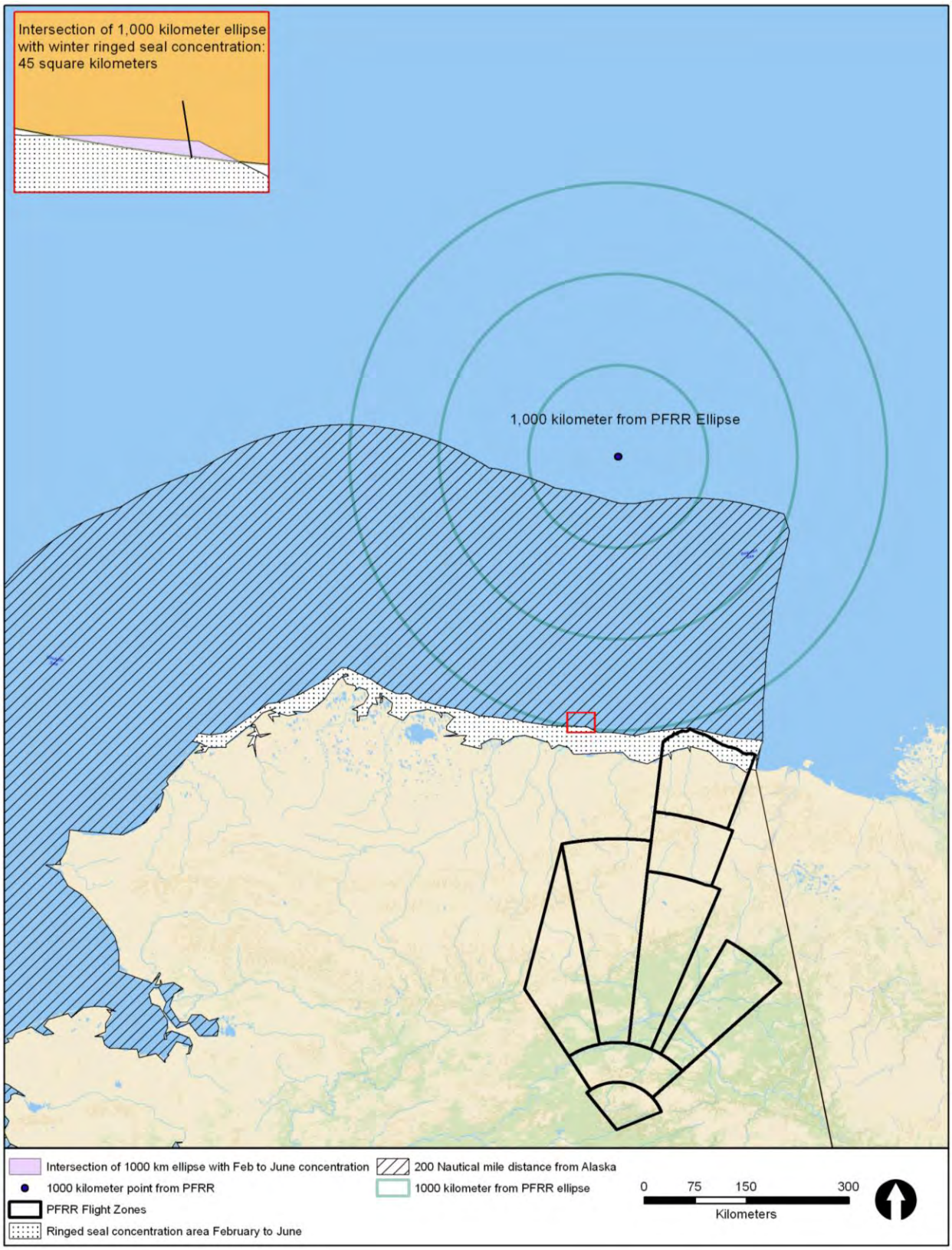
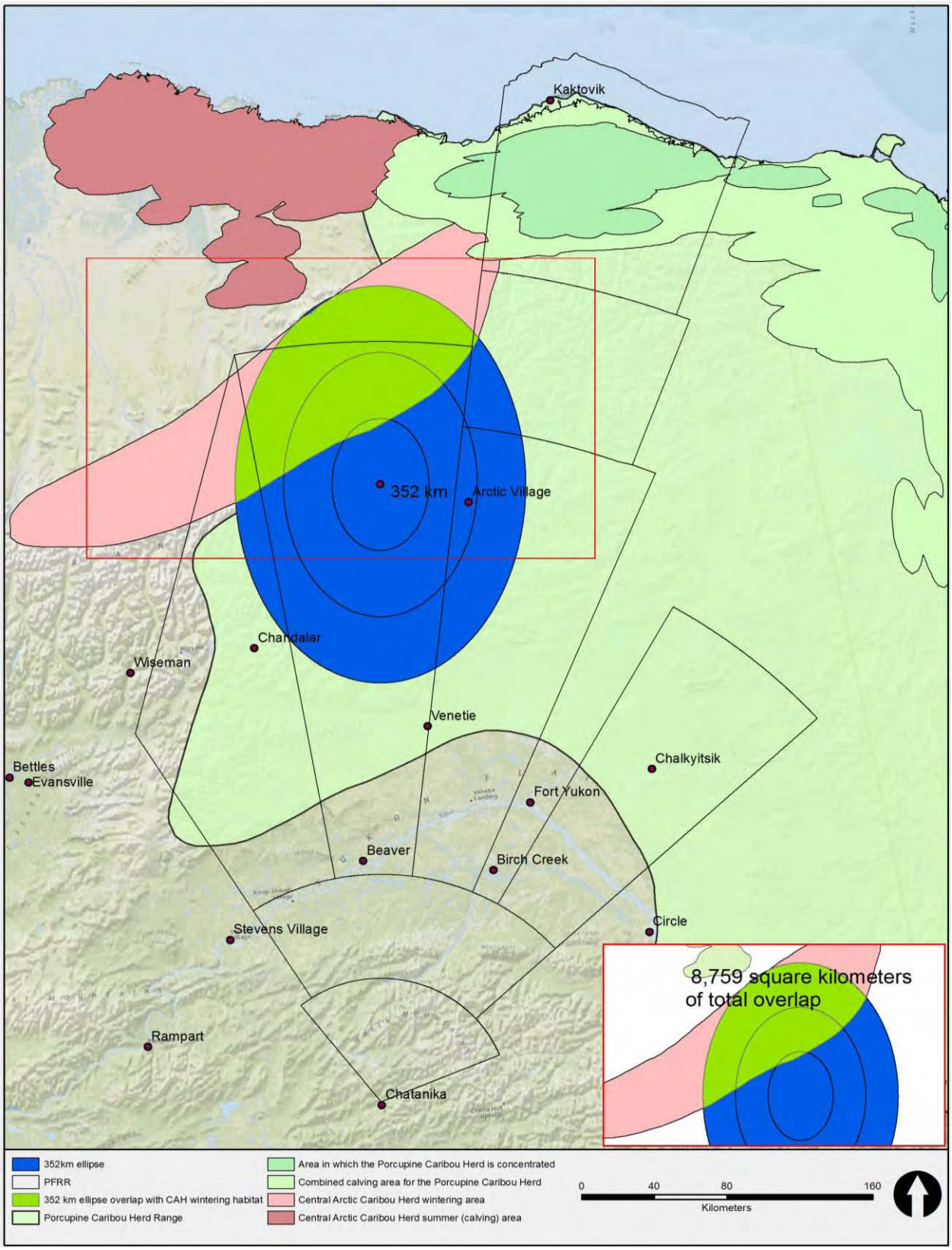
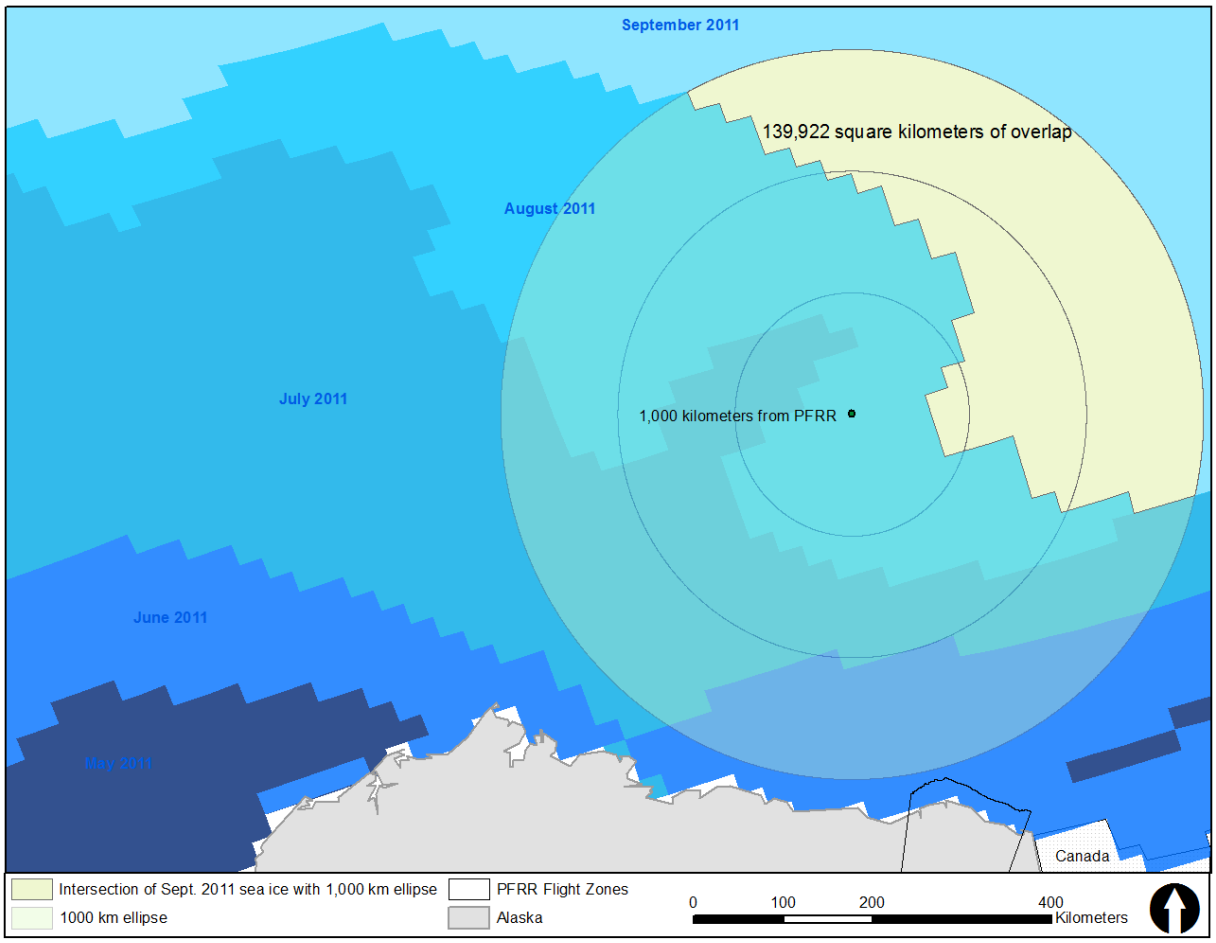


Figure G–3. Typical Impact Points Related to Ringed Seal



Key: CAH=Central Arctic Herd; km=kilometers.

Figure G–4. Typical Impact Points Related to Caribou Herds



Key: km=kilometers.

Figure G–5. Typical Impact Points Related to Permanent Sea Ice

The *PFRR EIS* evaluates the potential impact of these spent stages and payloads on a variety of natural areas, land ownership, land designations, and wildlife habitats. **Tables G–1 through G–7** show the probability of a typical spent stage or payload impacting in these different areas of concern.

Table G−1 shows the probability of a typical spent stage or payload impacting Federal lands for the different potential impact points. Depending on the launch vehicle, these probabilities range from less than 1 chance in 12,000 (8.3×10^{-5}) that an Orion rocket would land within Yukon Flats National Wildlife Refuge to a 98 percent probability that an Orion rocket would land within the White Mountains National Recreation Area.

Table G–1. Probability of Impact on Federal Lands

Distance from the PFRR Launch Site (kilometers)	Federal Land	Potential Impact Ellipse (square kilometers)	Amount of Federal Land Within Ellipse (square kilometers)	Probability of a Spent Stage or Payload Landing on Federal Land
13	White Mountains NRA	45	20	0.42
55	White Mountains NRA	2,551	2,461	0.98
55	Steese NCA	2,551	24	0.0021
55	Yukon Flats NWR	2,551	1	8.3×10^{-5}
194	Yukon Flats NWR	8,856	6,367	0.84
295	Yukon Flats NWR	5,808	70	0.0027
295	Arctic NWR	5,808	1,941	0.14
352	Mollie Beattie Wilderness Area	28,370	603	0.0047
352	Arctic NWR	28,370	21,843	0.91

Key: NCA=National Conservation Area; NRA=National Recreation Area; NWR=National Wildlife Refuge.
Note: To convert kilometers to miles, multiply by 0.62137; square kilometers to square miles, by 0.38610.

Table G−2 shows the probability of a typical spent stage or payload impacting designated Wild River segments, including the lands on either side of the rivers, for the different potential impact points based on information provided by **USFWS (2011)**. Depending on the launch vehicle, these probabilities range from less than 1 chance in 230 (0.0043) that the second stage of a BBX would land within the designated Wind River Wild River segment to a 6 percent probability that an Orion rocket would land within the designated Beaver Creek Wild River segment.

Table G–2. Probability of Impact on Designated Wild River Segments

Distance from the PFRR Launch Site (kilometers)	Designated Wild River Segment	Potential Impact Ellipse (square kilometers)	Amount of Wild River Segment Within Ellipse (square kilometers)	Probability of a Spent Stage or Payload Landing in the Wild River Segment
55	Beaver Creek	2,551	216	0.062
295	Wind River	5,808	63	0.0043
352	Wind River	28,370	786	0.053
352	Ivishak River	28,370	795	0.036

Note: To convert kilometers to miles, multiply by 0.62137; square kilometers to square miles, by 0.38610.

Table G−3 shows the probability of a typical spent stage or payload impacting lands owned by regional landowners with significant holdings within the PFRR launch corridor. Depending on the launch vehicle, these probabilities range from less than 1 chance in 2,700 (3.6×10^{-4}) that the third stage of a BBXII or second stage of a Terrier-Improved Orion would land within Venetie lands to an 87 percent probability that the second stage of a BBX would land within Venetie lands.

Table G–3. Probability of Impact on Regional Landowners

Distance from the PFRR Launch Site (kilometers)	Regional Landowner	Potential Impact Ellipse (square kilometers)	Amount of Regional Land Within Ellipse (square kilometers)	Probability of a Spent Stage or Payload Landing on Regional Lands
194	Venetie Reservation	8,856	311	7.8×10^{-3}
194	Doyon, Limited	8,856	301	7.6×10^{-3}
295	Venetie Reservation	5,808	3,993	0.87
295	Doyon, Limited	5,808	105	4.1×10^{-3}
352	Venetie Reservation	28,370	3,436	0.054
352	Doyon, Limited	28,370	188	9.7×10^{-3}

Note: To convert kilometers to miles, multiply by 0.62137; square kilometers to square miles, by 0.38610.

Table G−4 shows the probability of a typical spent stage or payload impacting polar bear critical habitat within PFRR. The only launch vehicles capable of reaching these areas would the third stage of the BBX or the fourth stage and payload of a BBXII. Typically these items would land far offshore in the Beaufort Sea or Arctic Ocean but there is a small chance that they could land along the shore that includes designated critical polar bear feeding and denning habitat. Critical denning habitat would not typically be affected by these launches. The chance that one of these launches would typically impact designated critical feeding habitat is less than 1 chance in 150 (6.6×10^{-3}).

Table G–4. Probability of Impact on Polar Bear Critical Habitat and Dens

Distance from the PFRR Launch Site (kilometers)	Polar Bear Critical Habitat	Potential Impact Ellipse (square kilometers)	Amount of Polar Bear Critical Habitat Within Ellipse (square kilometers)	Probability of a Spent Stage or Payload Landing in Polar Bear Critical Habitat
1,000	Feeding habitat	503,375	14,964	6.6×10^{-3}
1,000	Denning habitat	503,375	0	0
1,000	Polar bear dens within potential impact area[a]	503,375	0.022	4.6×10^{-8}

a. An estimated 69 known polar bear dens could be within the area potentially impacted by a typical National Aeronautics and Space Administration launch into the Beaufort Sea (based on information from **Amstrup and Gardner [1994]**) based on information collected over the years by the National Oceanic and Atmospheric Administration. Assuming each den covers an area of approximately 3 square meters (30 square feet) (**Stirling 1988)**, this analysis assumes a safety zone within a 10-meter (33-foot) radius of the den. The potential area of disturbance around a polar bear den that could result in either damage to the den or injury or death to the polar bear is estimated to be approximately 315 square meters (380 square yards) per den, or 0.022 square kilometers (0.0085 square miles) for 69 dens.

Note: To convert kilometers to miles, multiply by 0.62137; square kilometers to square miles, by 0.38610.

The probability of one of these items actually impacting a polar bear den was also estimated using information on known polar bear dens in the area. The chance that one of these launches would directly impact a polar bear den is less than 1 chance in 21 million (4.6×10^{-8}).

Table G−5 shows the probability of a typical spent stage or payload impacting areas where ringed seals congregate during the winter within PFRR. Similar to polar bear critical habitat, the only launch vehicles capable of reaching these areas would be the third stage and payload of a BBX or the fourth stage and payload of a BBXII. Typically these items would land far offshore in the Beaufort Sea or Arctic Ocean but there is a small chance that they could land along the shore that includes areas where ringed seals are known to congregate during the winter when such launches would take place. The chance that one of these launches would typically impact areas where ringed seals are known to congregate is 1 chance in 50,000 (2.0×10^{-5}). The probability of one of these items actually impacting a ringed seal was also estimated using information on ringed seal concentrations in the Beaufort Sea. Assuming a conservative density of 1 individual per square kilometer throughout the Beaufort Sea and Arctic Ocean and allowing for a 10-meter-radius (33-foot-radius) buffer zone around each seal, the per-launch chance of an impact near a ringed seal is very low, approximately 3.1×10^{-4}, or 1 chance in 3,200 (see Table G–5).

Table G–5. Probability of Impact on Ringed Seals in the Beaufort Sea

Ringed Seal Resource	Potential Impact Ellipse (square kilometers)	Ringed Seal Resource Area (square kilometers)	Probability of Spent Stage or Payload Impacting Ringed Seal Resource
Nearshore ice[a]	503,375	45	2.0×10^{-5}
Individual within 3-Sigma Dispersion[b]	503,375	159	3.1×10^{-4}

a. Assumed to be concentrated on the nearshore ice during the winter months. Wintering concentration areas for the ringed seal (*Pusa hispida*) were interpreted and mapped from **Smith *et al.* 2010**, Figure 37.

b. Based on information collected over the years, a population density of 1 ringed seal per square kilometer was assumed across the entire Beaufort Sea **(Ireland *et al.* 2009)** within the typical 3-sigma dispersion. Assuming a safety zone within a 10-meter (33-foot) radius of seal, the potential area of disturbance around a ringed seal that could result in either injury or death is estimated to be approximately 315 square meters (380 square yards) per seal, or 159 square kilometers (61 square miles) for the approximately 503,375 ringed seals that could be within the impact ellipse.

Note: To convert kilometers to miles, multiply by 0.62137; square kilometers to square miles, by 0.38610.

Table G−6 shows the probability of a typical spent stage or payload impacting areas where caribou herds congregate during the winter within PFRR. The chance that the third stage of a BBXII or second stage of a Terrier-Improved Orion would land where the Central Arctic Caribou Herd is known to congregate is approximately 1 chance in 5 (0.20). During the winter months, the Porcupine Caribou Herd is largely located east and south of the predicted impact points; hence no additional impacts are anticipated. See Figure G–4 for more information regarding seasonal locations of the regional caribou herd.

Table G–6. Probability of Impact on Caribou Herds

Distance from the PFRR Launch Site (kilometers)	Caribou Herd Area	Potential Impact Ellipse (square kilometers)	Area Within Ellipse Frequented by Caribou Herds During the Winter Months (square kilometers)	Probability of a Spent Stage or Payload Hitting the Area of Caribou Concentration
352	Central Arctic Caribou Herd	28,370	8,759	0.20
352	Porcupine Caribou Herd	28,370	0	0

Note: To convert kilometers to miles, multiply by 0.62137; square kilometers to square miles, by 0.38610.

Table G−7 shows the probability of a typical spent stage or payload impacting permanent sea ice off the coast of Alaska. The chance that the third stage or payload of a BBX or the fourth stage or payload of a BBXII would land on permanent sea ice is approximately 1 chance in 6 (0.17) based on information from the National Sea Ice Data Center **(NSIDC 2011)**.

Table G–7. Probability of Impact on Permanent Sea Ice

Distance from the PFRR Launch Site (kilometers)	Sea Ice Coast of Alaska	Potential Impact Ellipse (square kilometers)	Area Within Ellipse Covered by Permanent Sea Ice (square kilometers)	Probability of a Spent Stage or Payload Hitting the Area of Permanent Sea Ice
1,000	Permanent Sea Ice	503,735	140	0.17

Note: To convert kilometers to miles, multiply by 0.62137; square kilometers to square miles, by 0.38610.

G.3 REFERENCES

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APPENDIX H

BIOLOGICAL ASSESSMENT

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National Aeronautics and
Space Administration

Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, VA 23337

Reply to Attn of: 250.W

July 24, 2012

Mr. Brad Smith
Protected Resources Division
NOAA Fisheries Service
222 West 7th Avenue, #43
Anchorage, Alaska 99513-7577

Dear Mr. Smith:

In accordance with Section 7 of the Endangered Species Act of 1973 (ESA), as amended, and its implementing regulations, this letter serves as the National Aeronautics and Space Administration's (NASA) request for conference and concurrence with its determinations of effect on listed and proposed species.

The action that is the subject of this conference is NASA's continued launch of sounding rockets from the University of Alaska Fairbanks-owned Poker Flat Research Range (PFRR). In consideration of the scope of the proposed action and the extent of species and habitat within the action area, NASA has concluded that it is "not likely to jeopardize the continued existence of" Ringed seal *(Phoca hispida)*. Other listed and proposed species identified by NOAA Fisheries as potentially occurring within the action area have been assessed and given a "no effect" determination. Please find enclosed a Biological Assessment (BA) that provides analysis and justification for NASA's determinations of effect.

As the Federal agency funding the launch of sounding rockets from PFRR, NASA is serving as the lead agency for ESA compliance. The U.S. Department of the Interior's Bureau of Land Management and U.S. Fish and Wildlife Service would undertake actions connected to NASA's and are participating in NASA's ESA process. The effects of their actions are also considered in the enclosed BA. As such, please include all three action agencies in future correspondence regarding this conference.

If you have any questions, please contact me at (757) 824-2319 or Joshua.A.Bundick@nasa.gov.

Sincerely,

Joshua A. Bundick
Lead, Environmental Planning

Enclosure

cc:
BLM/Ms. L. Heppler
USFWS Arctic NWR/Mr. R. Voss
USFWS Yukon Flats NWR/Mr. M. Bertram

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National Aeronautics and
Space Administration

Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, VA 23337

Reply to Attn of: 250.W

July 24, 2012

Mr. Ted Swem
Ecological Services Office
U.S. Fish and Wildlife Service
101 12th Avenue, Room 110
Fairbanks, Alaska 99701

Dear Mr. Swem:

In accordance with Section 7 of the Endangered Species Act of 1973 (ESA), as amended, and its implementing regulations, this letter serves as the National Aeronautics and Space Administration's (NASA) request for U.S. Fish and Wildlife Service (USFWS) concurrence with its determinations of effect on listed species and designated critical habitat.

The action that is the subject of this consultation is NASA's continued launch of sounding rockets from the University of Alaska Fairbanks-owned Poker Flat Research Range (PFRR). In consideration of the scope of the proposed action and the extent of species and habitat within the action area, NASA has concluded that it "may affect, not likely to adversely affect," Polar bear *(Ursus maritimus)* and its designated critical habitat. Other listed and candidate species identified by USFWS as potentially occurring within the action area are assessed and have been given a "no effect" determination. Please find enclosed a Biological Assessment (BA) that provides analysis and justification for NASA's determinations of effect.

As the Federal agency funding the launch of sounding rockets from PFRR, NASA is serving as the lead agency for ESA compliance. The U.S. Department of the Interior's Bureau of Land Management and USFWS would undertake actions connected to NASA's and are participating in NASA's ESA consultation. The effects of their actions are also considered in the enclosed BA. As such, please include all three action agencies in future correspondence regarding this consultation.

If you have any questions, please contact me at (757) 824-2319 or Joshua.A.Bundick@nasa.gov.

Sincerely,

Joshua A. Bundick
Lead, Environmental Planning

Enclosure

cc:
BLM/Ms. L. Heppler
USFWS Arctic NWR/Mr. R. Voss
USFWS Yukon Flats NWR/Mr. M. Bertram

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Biological Assessment

NASA Sounding Rockets Program at Poker Flat Research Range

National Aeronautics and Space Administration
Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, VA 23337

July 2012

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1. Introduction

1.1. Purpose of this Document

Section 7(c) of the Endangered Species Act (ESA) of 1973 requires that a Biological Assessment (BA) be prepared for all Federal actions that may affect Federally-listed threatened or endangered species or critical habitat. The National Aeronautics and Space Administration (NASA) has prepared this BA to consider the potential impacts of its Sounding Rockets Program (SRP) at the University of Alaska Fairbanks (UAF) – owned Poker Flat Research Range (PFRR), Alaska (AK). This BA considers the potential effects of the SRP on listed, proposed, and candidate species, as well as designated critical habitat under the jurisdiction of both the NOAA Fisheries Service (NOAA Fisheries) and U.S. Fish and Wildlife Service (USFWS) (collectively, "the Services").

Also considered in this BA are connected Federal actions undertaken by two independent agencies of the Department of the Interior - the Bureau of Land Management (BLM) and the USFWS. Each agency manages lands within the eastern Interior of Alaska and issue authorizations to UAF (on NASA's behalf) for sounding rocket launches; specifically BLM manages the Steese National Conservation Area and White Mountains National Recreation Area under the Federal Land Policy and Management Act of 1976, as amended; USFWS manages Arctic and Yukon Flats National Wildlife Refuges in accordance with its responsibilities under the National Wildlife Refuge System Administration Act of 1966, as amended.

This BA has been prepared to assist NASA and its cooperating agencies in determining whether the proposed action is "likely to adversely affect" listed species or critical habitat, thereby warranting formal consultation pursuant to the ESA. In the case of proposed species, a determination of "likely to jeopardize the continued existence of" would trigger the need to undertake formal conference. If, based upon the findings within this BA, NASA determines that the proposed action would have "no effect" or is "not likely to adversely affect" listed species or critical habitat, or "not likely to jeopardize the continued existence of" proposed species, NASA would request written concurrence from the Services with its determinations. In the case of a "likely to adversely affect" or "likely to jeopardize the continued existence of" determination, formal consultation (or conference in the case of proposed species) with the Services would then ensue.

Although including candidate species in this BA is not required by law, it is USFWS policy to consider candidate species during its decision-making process. Therefore, NASA has included an assessment of potential effects on candidate species in this BA.

1.2. Previous ESA Communications

<u>NOAA Fisheries</u>

On September 6, 2011 NASA sent a letter requesting information from NOAA Fisheries regarding listed species within the PFRR flight corridor. NOAA Fisheries responded in a September 6, 2011 email, providing the requested information.

On February 3, 2012, NASA and UAF met with NOAA Fisheries at its office in Anchorage, AK to continue project-related ESA discussions.

On March 21, 2012, NASA requested confirmation that the project's species list was still valid; NOAA Fisheries provided confirmation.

USFWS

On April 14, 2011, NASA sent a letter to USFWS requesting information regarding ESA listed species within the PFRR flight corridor. On May 23, 2011, USFWS provided the requested species list.

Subsequent to the written correspondence, NASA and its environmental contractor held a teleconference with USFWS on September 30, 2011 to discuss the proposed action and the ESA consultation. On February 2, 2012, NASA met with USFWS at its office in Fairbanks, AK to continue such discussions.

On March 21, 2012, NASA requested confirmation that the project's species list was still valid; USFWS provided confirmation.

2. Description of the Action

NASA has prepared a Draft Environmental Impact Statement (EIS) that addresses both its launch and recovery operations at PFRR; the Draft EIS considers four action alternatives as well as a no action alternative. Although NASA has not yet identified a preferred alternative in the EIS (upon which an ESA consultation would typically be based), the key difference among all alternatives is the level of recovery or avoidance of interior lands, none of which would have a potential effect on areas known to harbor ESA listed, proposed, or candidate species.

The component common to all alternatives that would have the potential to affect areas ESA species or habitat is the flight and subsequent re-entry of sounding rocket motors and payloads within the Beaufort Sea/Arctic Ocean. Accordingly, this section of the BA provides only a description of the launch, flight, and re-entry of NASA sounding rockets with no further reference to recovery operations. Furthermore, only those sounding rocket configurations (and typically associated payloads) that have the potential to overfly or land within ESA species habitat are presented in detail.

For a full description of the NASA SRP and its operations at PFRR, the reader is directed to the *Sounding Rockets Program Final Supplemental EIS* **(NASA 2000)** and the *Sounding Rockets Program at Poker Flat Research Range EIS* **(NASA 2012).**

2.1. Poker Flat Research Range

PFRR is located in the center of Alaska near Fairbanks, approximately 1.5 degrees below the Arctic Circle at 65°2' N latitude and 147°5' W longitude. The facility consists of approximately 2,100 hectares (5,200 acres) on Steese Highway (Alaska Route 6) in the village of Chatanika, approximately 48 kilometers (30 miles) northeast of Fairbanks. Directly north of PFRR are its downrange flight zones, over which rockets are launched and within which spent stages and payloads impact the ground.

Since the late 1960s, NASA and other government agencies have launched suborbital rockets from PFRR **(Davis 2006)**. While PFRR is owned and managed by the Geophysical Institute of UAF, since the 1980s, the NASA SRP has provided sole funding support to PFRR.

2.2. NASA Sounding Rockets

Each NASA sounding rocket consists of one to four ground-launched; solid-propellant rocket motors staged in series, the purpose of which is to propel a scientific payload to the upper atmosphere. These rocket motors are configured to meet scientific requirements driven by payload size, flight time, and target altitude desired by the researchers. As NASA sounding rockets are suborbital, their upper stages or payloads do not enter an Earth orbit, rather they return to Earth along parabolic trajectories **(Figure 1)**.

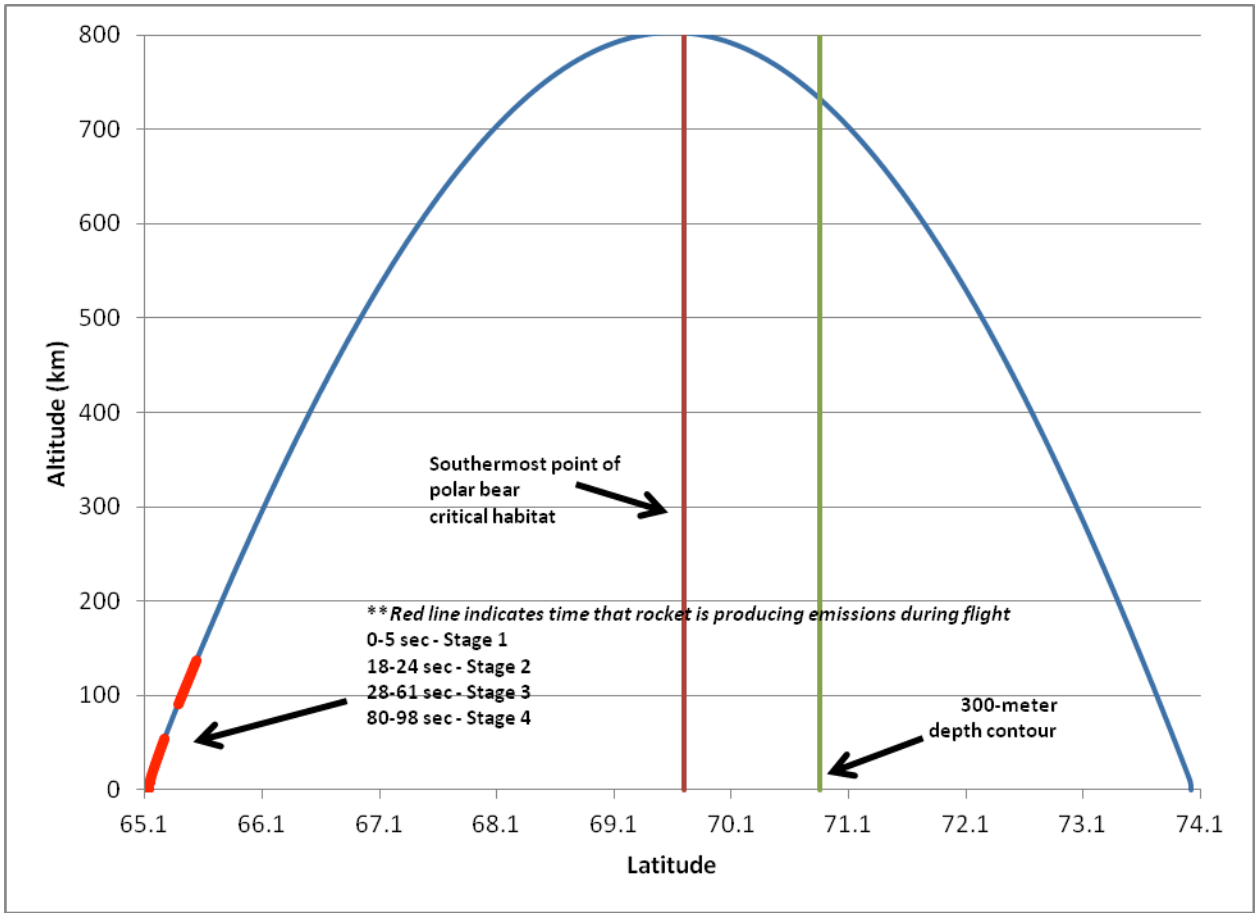

Figure 1. Example Sounding Rocket Trajectory (only 4th stage and payload depicted for clarity)

The rockets having the potential to either overfly or land within the Beaufort Sea/Arctic Ocean are the Black Brant-class vehicles which employ either three or four rocket motors. Although only the Black Brant XII is shown below in **Figure 2,** other similar vehicles, including the Black Brant X, could be flown, however they would not materially differ from the Black Brant XII in terms of potential effects on listed species or habitat. In fact, the Black Brants X and XII share the same final stage (the Nihka rocket motor), which is discussed in more detail below.

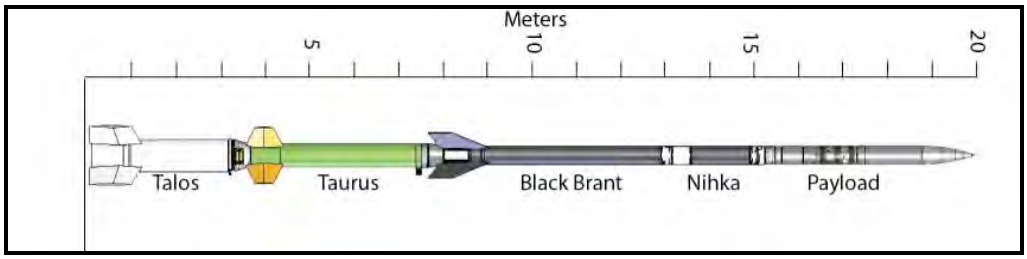

Figure 2. Black Brant XII Sounding Rocket

Rocket Motors

All rocket motors launched by NASA at PFRR are spin stabilized, unguided, and solid fueled. Propellants typically include ammonium perchlorate and aluminum or nitrocellulose and nitroglycerine. Section 2.2 of the *SRP SEIS* **(NASA 2000)** defines these propellants and their exhaust products in full detail. Individual motors range in size from 36 to 78.7 centimeters (14 to 31 inches) in diameter and are 1.9 to 5.7 meters (76 to 223 inches) long. In **Figure 2**, the Black Brant XII's motors are identified as the Talos, Taurus, Black Brant, and Nihka. Of those motors, only the fourth stage Nihha would overfly or land within the Beaufort Sea/Arctic Ocean.

The diameter of the Nihka is about 44 centimeters (17 inches) and its length is about 1.90 meters (76 inches). The loaded motor weight is 408 kilograms (900 pounds), which includes 320 kilograms (700 pounds) of propellant of the ammonium perchlorate/aluminum/plastic binder type, with carbon black, iron, sulfur, and ferric oxide additives. The rocket exhaust emissions are mainly aluminum oxide, hydrogen chloride, carbon monoxide, water, and nitrogen. They occur during the 18-second burning time over a typical altitude range from 96 to 150 kilometers (60 to 96 miles), with a spent rocket weight at final impact of 93 kilograms (200 pounds). Due to the nature of solid rocket motors, all propellant is burned once ignited; therefore, only trace residual amounts remain on each stage after flight.

The rocket motors used by NASA consist of steel cases and steel, aluminum, or similar metallic alloy fins and attachment hardware. The Nihka is finless due to its exo-atmospheric flight. Future rocket motor cases may be made of composite materials such as fiberglass, Kevlar, or similar materials. However, the dimensions and overall appearance would remain consistent with current inventory for the foreseeable future.

Payloads

There are a variety of payloads and experiments that are flown on SRP missions at PFRR. These payloads/experiments range in size from 0.76 to 5.3 meters (30 to 210 inches) long, are of similar diameter to the rocket motor on which they are flown, and weigh from less than 45 kilograms (100 pounds) to over 140 kilograms (300 pounds). They all utilize mechanical structures made of a variety of materials, including aluminum, steel, magnesium, other lightweight metals, or occasionally composites such as fiberglass, graphite/epoxy, etc. Internal components consist mainly of electronic subsystems, batteries, pressure systems (pressure vessels, tubing, regulators, valves, etc.), and a variety of sensors and instruments such as magnetometers, optical devices, and antennas of varying shapes and sizes. A drawing of a typical payload after deployment is shown below in **Figure 3**.

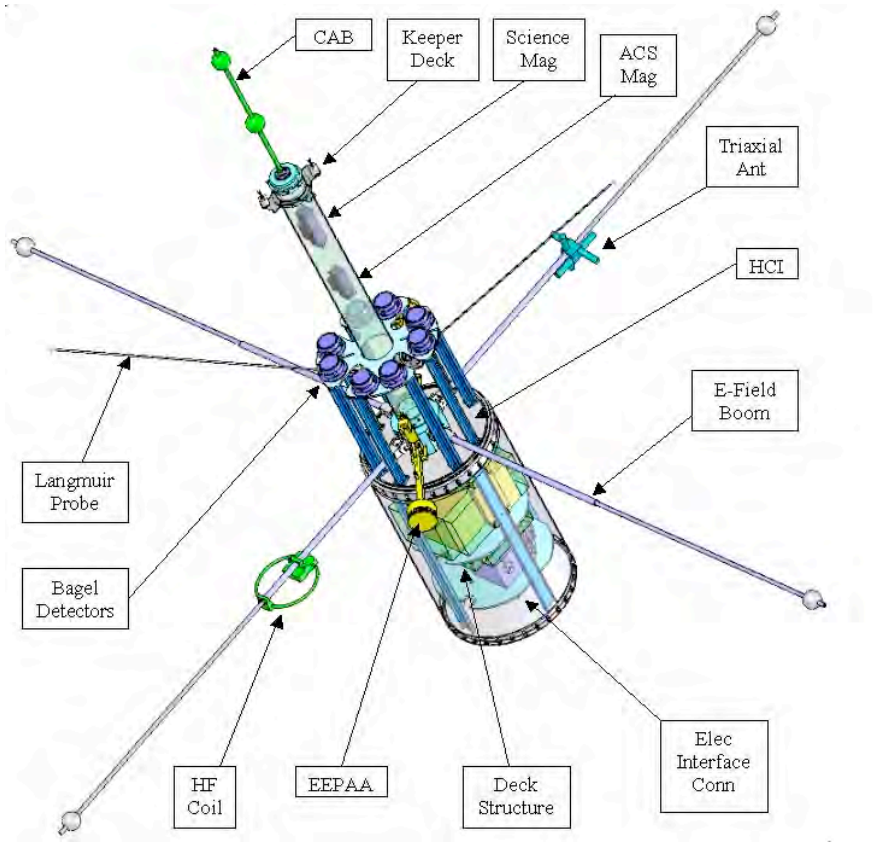

Figure 3. Typical PFRR Sounding Rocket Payload

The payloads often contain deployable devices, such as a nose cone used to cover sensitive electronic instruments during ascent, releasable doors, antennas, de-spin weights, cables, and other similar components. In many cases, a payload flown on a single rocket will be separated in flight into multiple pieces, each designed to carry out a specific scientific objective.

Re-Entry

All metallic and other solid heavier-than-air objects that are propelled into the atmosphere by sounding rockets land back on Earth in more or less ballistic trajectories. The objects include spent rocket stages, payloads; nose cone doors (released in flight for instruments to "see" their targets); and spin weights, which were released to change rotation of a rocket stage of a launch.

Recent data on average sea ice thickness in the Beaufort Sea **(Kwok and Rothrock 2009)** was used as a gauge to determine whether the re-entering objects would fully penetrate the ice. Assuming an average sea ice thickness of 1 meter (3.3 feet), it is highly unlikely that re-entry would result in a penetration depth that would exceed the average ice thickness. Payloads and spent motors would likely impact the ice and undergo elastic and plastic deformation while creating an impact crater but would not pierce the ice and immediately sink into the water **(Wilcox 2012)**.

Upon impacting the sea ice, it is expected that the enclosed sections of the payload (telemetry sections, attitude control systems, etc.) would experience damage but would be largely intact as a

result of impact. On the other hand, exposed experiment sections (such as the booms and probes shown in **Figure 3**) would be broken up as a result of the impact; a resulting debris field would include structural elements as well as experiment components of various material make-up.

It is expected that extreme re-entry dynamics would result in deployed booms and detectors being separated from their primary structures. However, the primary structures without aluminum skin sections would survive until impact. It is likely that these structures would undergo sufficient deformation such that they, along with any components housed in these locations, would be dispersed around the impact point. It is possible that batteries could be located in these exposed assemblies but this is not the typical case. Electronic boards, wiring, connectors and other small components are likely to be numerous in the debris field.

Spent motors and enclosed portions of payloads would experience plastic deformation and significant damage but are not likely to break apart to the extent that internal elements would be significantly exposed (e.g. residual propellant, telemetry components such as batteries, etc.).

A description of materials and equipment that would be relevant in assessing potential effects on listed species or habitat is presented below.

Materials of Interest

Pyrotechnics **-** In addition to the rocket propellant, each rocket motor contains a series of small explosive charges. To provide perspective regarding size, the largest charge currently employed is just less than 0.3 grams (0.01 ounce). These charges serve two primary functions: rocket motor ignition and separation of the stage after it has finished burning.

Payloads also contain a number of the above-described pyrotechnic charges for purposes such as removing doors and nosecones to expose the scientific experiment. The size and number of these charges would be mission-specific and would vary; however even in the case that all charges were of the largest variety, the total charge mass would be less than 28 grams (g) (1ounce [oz]). Once activated, under normal flight conditions, these pyrotechnic systems would pose no hazard to wildlife on the ground.

Batteries **–** Small electrical systems are required on each rocket motor such that the ignition and separation functions described above may occur. As only the first stage can be ignited from a ground-based circuit, rechargeable batteries are employed **(Figure 4)**. On the forward end of each motor, approximately 1.8 kg (4 lbs) of nickel-cadmium cells are housed within rigid plastic containers bolted to the head cap of the motor. To assist in providing perspective, this quantity of batteries is comparable to approximately 48 “AA” cells typically used in consumer electronic devices. Of the total battery mass, approximately 15 percent is the cadmium metal, totaling approximately 270 g (0.6 lb) per stage. In addition to the nickel-cadmium cells, small quantities of silver oxide cells are used in the motor ignition systems. Weighing less than a gram each, this equates to an approximate mass of 50 grams (0.1 lb) onboard each motor. These types of batteries are most commonly used in small personal electronic devices, including wristwatches.

Figure 4. Typical Rocket Motor Ignition Battery Pack

In addition to the batteries onboard the rocket motor, the payload would contain batteries for the attitude control system, telemetry, and scientific experiments **(Figure 5)**. The total mass of batteries onboard would vary based upon mission requirements; however, a typical mission would be expected to employ approximately 9 kg (20 lb) of nickel-cadmium batteries. This would equate to approximately three packs of 24 "C" cells and single packs of 24 and 16 "A" cells. Assuming that the payload's batteries contain 15 percent cadmium by mass, the total cadmium returning to Earth would be approximately 1.4 kg (3 lb) per flight.

Figure 5. Typical Payload Battery Configuration

In addition to the cadmium found in the batteries themselves, very small quantities of lead containing solder are used on sounding rocket electrical systems. Although the majority of electrical systems are connected with crimps, some soldered connections are still employed, including those in the battery packs. It is estimated that approximately 100 g (3.5 oz) of solder would be used on a rocket's entire electrical system, with 40 percent (40 g [1.4 oz]) of this solder consisting of lead. To assist in providing perspective, this quantity of lead is slightly more than what is contained within a single 12-gauge shotgun shell used for small-game hunting.

Balance Weights – To ensure that the spinning rocket components do not "wobble," between 2.3 and 4.5 kg (5-10 lb) of lead balance weights are employed on most sounding rocket payloads. These weights would typically be in the form of 0.6 or 1.3 cm (0.25 or 0.5 in) thick curved plates that are bolted to the inside of the payload skin sections. It would be highly unlikely that these weights would be dislodged such that they would separate from the payload upon impact.

Pressure Systems – Onboard the payload section of the rocket are small cylinders of high pressure (generally 5,000 psi) compressed gas, typically argon or nitrogen **(Figure 6)**. These gases are vented during normal flight to align the payload in optimum position for taking its respective measurement. The typical quantity onboard a sounding rocket is small, estimated to be approximately 0.009 m^3 (0.05 ft^3). Although both gases are non-hazardous, damage to the cylinder could cause the cylinder to rupture or act as a projectile. However, the likelihood of such an incident occurring would be very low as this system is designed to vent its contents during reentry.

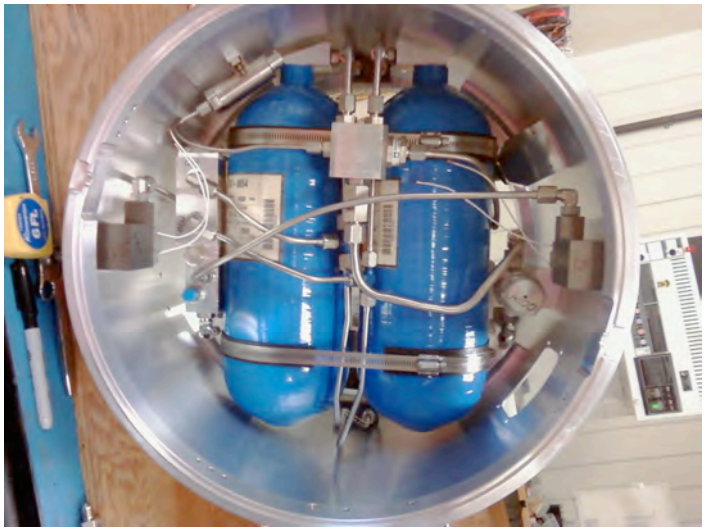

Figure 6. Typical 43 cm (17 inch) diameter Payload High Pressure Tank Configuration

Chemical Tracers – Payloads launched from PFRR sometimes carry small quantities of metal vapors (including barium, lithium sodium, strontium, and samarium) or trimethyl aluminum (TMA) that are intentionally dispersed at high altitude to study high-altitude phenomena. Sodium and lithium releases are produced by burning a mixture of thermite (titanium diboride, the reaction product of boron and titanium) and the metal to produce a vapor. TMA, on the other hand, is a pyrophoric liquid that reacts on contact with oxygen to produce chemiluminescence.

To provide the reader perspective, compounds containing several of these elements are commonly used in non-science-related applications requiring luminescence. In particular, barium creates the green color in fireworks whereas strontium produces the red color.

To provide perspective regarding size, for some TMA payloads (the most commonly employed tracer), modules are released during flight with each containing approximately 380 ml (12.9 oz) of the liquid; slightly more than the contents of a typical soda can. Larger canisters are most commonly used as they release the material along a longer duration of the trajectory and typically hold approximately 6 liters (1.6 gallons). In general, the primary on-the-ground hazard associated with these materials is the potential for fire or burns. During normal flight, these materials are released high in the atmosphere, with only trace amounts (estimated to be less than 100 g [3.5 oz]) present in hardware that returns to earth. The small soda can sized modules would not contain any residual as they rupture during flight; the most likely location of the trace quantities would be within the piping of the canister-type systems.

Dispersion in Impact Locations

A key concept to understand when discussing sounding rockets is the effect that dispersion can have on the ultimate landing location of spent stages, payloads, and other miscellaneous flight hardware. The term "dispersion" in this BA means the statistical deviation of the actual impact location of a spent rocket stage from the predicted value. All sounding rocket launch vehicles lack onboard guidance systems, which are typically employed on larger rocket systems such that the vehicle will fly along a pre-programmed route, correcting its flight path along the way.

Due to slight differences in the physical properties of each rocket (e.g., fin misalignment, weight variation) and the variability of atmospheric conditions, actual trajectories deviate from the predicted ones. The dispersion has downrange (short or long) and cross-range (left or right) components and is used to calculate the probability of impacting within a given distance of the nominal impact point. This distance is referenced to a standard deviation, or "sigma" value, from the mean point of impact **(Figure 7)**. In the case of sounding rockets, a circular dispersion is employed; such that for each launch the probability of a stage landing within 1-sigma of its predicted impact point is approximately 40 percent; within 2-sigma, 87 percent; and within 3-sigma, 99 percent.

In general, dispersion is dependent on apogee, e.g., dispersion is higher for a light payload with higher apogee than for a heavy payload with lower apogee (for a given launch vehicle), and dispersion is somewhat higher as the number of rocket stages in a launch vehicle increases. Although dispersion values will be mission-specific, a "typical" 1-sigma dispersion for the fourth stage or payload of a Black Brant XII would be between 125 and 150 km (78 and 93 mi), with the downrange component being the longer of the two.

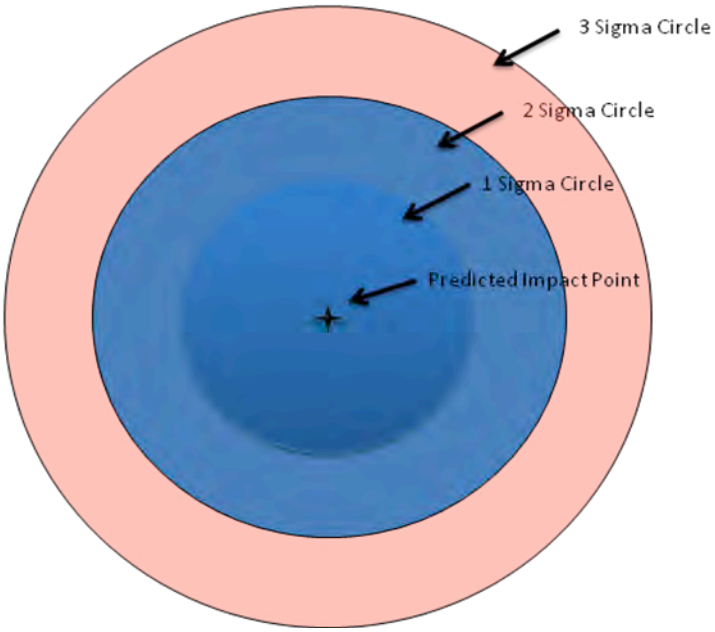

Figure 7. Illustration of a Sounding Rocket Dispersion

2.3. Launch Frequency

Future NASA SRP missions at PFRR could average from two to four launches every year. It is expected that no more than eight multi-stage suborbital rockets would be launched in any one year from PFRR under any action alternative. The eight launches could be spread across 8 separate days or concentrated into only 2 or 3 separate days with multiple launches.

This launch frequency estimate is based upon the past ten years of PFRR activity; this timeframe was selected to be representative of recent launch activity at PFRR and to demonstrate the anticipated future level of activity and resultant impact associated with SRP at PFRR. Sounding rocket launches at PFRR prior to this time were typically of shorter range and are therefore not representative of recent SRP activities at PFRR.

2.4. Launch Season

Future launches are expected to occur within the winter months, consistent with PFRR launch activity over the past ten years. However, the potential for a researcher to propose an experiment during the non-winter months cannot be discounted. Furthermore, the potential environmental effects from a non-winter launch would be highly mission-specific. In the event that a future non-winter launch were to be proposed, supplemental analysis would be required to determine potential effects on ESA species or habitat, potentially requiring further consultation with the Services.

2.5. Cooperating Agency Actions

BLM and USFWS would continue to review UAF-submitted permit applications and decide whether the proposed activities could be authorized, which would allow NASA to continue to land rocket motors and payloads on Federal properties. BLM-managed properties to which this action would apply are the White Mountains National Recreation Area and Steese National Conservation Area; USFWS-managed properties are the Arctic and Yukon Flats National Wildlife Refuges. Authorizations by BLM and USFWS, if granted, would be issued to the UAF on NASA's behalf.

3. Action Area

The action area is defined in 50 CFR 402.02 as "All areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." **Figure 8** depicts the action area for the SRP at PFRR. The action area for this BA includes the following:

- The land, water, and airspace within PFRR Flight Zones 1, 2, 3 , 4, 4 extended, 4 arctic extension, and 5; and
- The land, water, and airspace within a 400 km (248 mi) circle centered approximately 1,000 km (620 mi) north of the PFRR launch site.

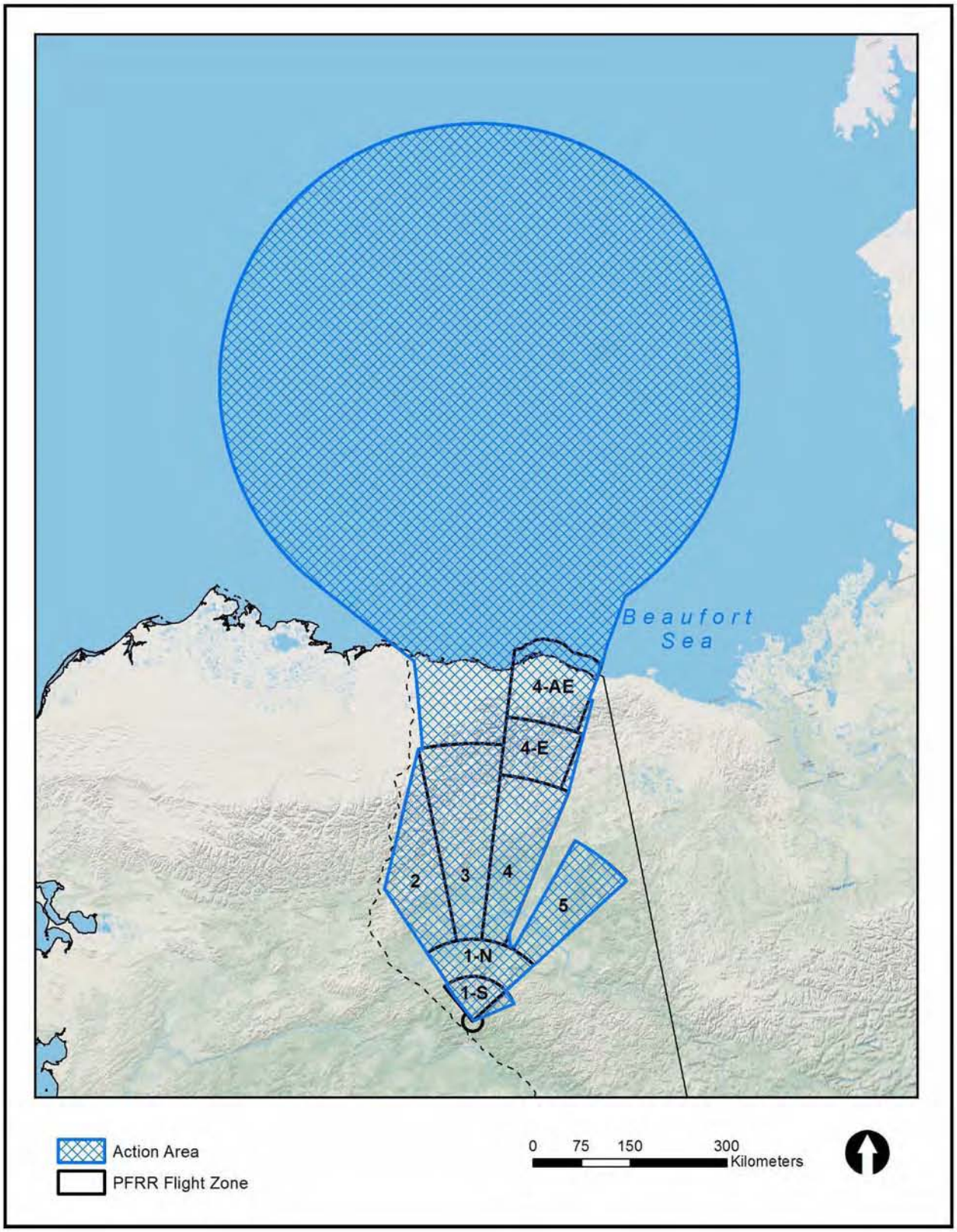

Figure 8. SRP at PFRR Action Area

4. Species Potentially within the Action Area

4.1. Species under NOAA Fisheries' Jurisdiction

4.1.1. Bowhead Whale

The western Arctic stock of bowhead whales *(Balaena mysticetus)* was listed as endangered on June 2, 1970, and has been on the endangered species list since then. Because of the ESA listing, the stock is classified as a depleted and a strategic stock under MMPA **(Angliss and Allen 2009)**. However, the western Arctic bowhead whale population appears to be healthy and growing under a managed hunt and has recovered to historic abundance levels. NMFS will use criteria developed for the recovery of large whales in general **(Angliss *et al.* 2002)** and bowhead whales in particular in the next 5-year ESA status review to determine if a change in listing status is needed **(Shelden *et al.* 2001)**.

The bowhead whale spends its entire life in the Arctic. There are four stocks recognized, of which the Bering-Chukchi-Beaufort stock occurs within the PFRR launch corridor. Based on a bowhead whale census in 2001, the population growth rate was estimated to be about 3.4 percent and the estimated population size, 10,470 **(George *et al.* 2004)**, revised to 10,545 by **Zeh and Punt (2005)**. Most of the western Arctic bowhead whales migrate annually from wintering areas in the northern Bering Sea, through the Chukchi Sea in the spring, and into the Beaufort Sea, where they spend the summer. In autumn, they migrate through nearshore and offshore waters of the Beaufort Sea to return to their wintering grounds in the Bering Sea. Alaskan coastal villages along this migratory route, mainly Kaktovik, participate in traditional subsistence hunts of these whales **(Angliss and Allen 2009)** along the coast of the Beaufort Sea and within the PFRR launch corridor. Bowheads appear to migrate farther offshore during heavy-ice years and nearer shore during years of light sea ice **(Treacy *et al.* 2006)**.

4.1.2. Ringed Seal

Ringed seals *(Phoca hispida)* have a circumpolar distribution and are year-round residents of the Beaufort Sea, where they are the most commonly encountered seal species in the area. No reliable population size estimate of the Alaska ringed seal stock is currently available **(Angliss and Allen 2009)**. Ringed seal population estimates in the Bering-Chukchi-Beaufort area ranged from 1–1.5 million **(Frost 1985)** to 3.3–3.6 million **(Frost *et al.* 1988)**. **Frost and Lowry (1981)** estimated the population in the Alaskan Beaufort Sea to be 80,000 during the summer and 40,000 during the winter. More recent estimates based on extrapolation from aerial surveys and on predation estimates for polar bears **(Amstrup 1995)** suggest an Alaskan Beaufort Sea population of approximately 326,500 animals. NMFS is considering listing the Alaska stock of ringed seals species under the ESA due to the potential loss of seal habitats resulting from current warming trends. On December 10, 2010, NMFS published a proposed rule to list three subspecies of the ringed seal as threatened under the ESA **(75 FR 77496)**. This proposed listing includes the Arctic subspecies *(Phoca hispida hispida)*, the distribution of which includes the Beaufort Sea. Ringed seal densities depend on food availability, water depth, ice stability, and distance from human disturbance. Seal densities reflect changes in the ecosystem's overall productivity in different areas **(Stirling and Oritsland 1995)**. When sexually mature, they establish territories during the fall and maintain them during the pupping season (time of year

seals give birth to seal pups). Pups are born in late March and April in lairs that seals excavate in snowdrifts and pressure ridges. During the breeding and pupping season, adults on shorefast ice (floating ice attached to land) usually move less than individuals in other habitats. In this habitat, they depend on a relatively small number of holes and cracks in the ice for breathing and foraging. During nursing (4 to 6 weeks), pups usually stay in the birth lair. This species is a major resource harvested by Alaskan subsistence hunters. Ringed seal is also the chief prey species for polar bears.

4.1.3. Bearded Seal

Bearded seals *(Erignathus barbatus)* are the largest of Alaska's seals, weighing up to 340 kilograms (750 pounds). Bearded seals are found throughout the Arctic Ocean and usually prefer areas of less stable or broken sea ice, a zone where breakup occurs early **(Cleator and Stirling 1990)**. Most of the 300,000 to 450,000 bearded seals estimated to occur in the Alaskan outer continental shelf area are found in the Bering and Chukchi Seas **(USDOI 1996)**. Reliable estimates of the abundance of bearded seals in Alaska Beaufort Sea waters currently are unavailable, although bearded seals are reported annually during aerial surveys for other marine mammals. Seasonal movements of bearded seals are directly related to water depth and the advance and retreat of sea ice **(Boveng *et al.* 2009)**. During winter, most bearded seals in Alaskan waters are found in the Bering Sea. Favorable conditions are more limited in the Chukchi and Beaufort Seas, and consequently, bearded seals are not abundant there during winter. Pupping takes place on the ice from late March through May, mainly in the Bering and Chukchi Seas, although some pupping might take place in the Beaufort Sea. Bearded seals do not form herds, but sometimes form loose groups. Bearded seals are a main subsistence resource and a highly valued food of subsistence hunters. The form of bearded seal that occurs in the Beaufort Sea under the PFRR launch corridor is part of the Beringia Distinct Population Segment of *Erignathus barbatus barbatus*, which was proposed for listing as endangered on December 10, 2010 **(75 FR 77496)**.

4.2. Species under USFWS Jurisdiction

4.2.1. Polar Bear

Polar bears *(Ursus maritimus)* and are the top predator in the Arctic ecosystem and the largest land carnivore in the world. Occurring in 19 relatively discrete subpopulations, polar bears have a circumpolar Arctic distribution. The total number of polar bears worldwide is estimated to be between 20,000 and 25,000 **(Schliebe *et al.* 2008)**. The subpopulation ranges overlapping the action area are the Southern Beaufort Sea (SBS), Northern Beaufort Sea (NBS), and Arctic Basin (AB). The most recent population estimate for the SBS subpopulation is approximately 1,526 **(Regehr *et al.* 2006)**; 980 for the NBS subpopulation **(Stirling *et al.* 2011)**; and unknown for the AB.

Polar bears are classified as marine mammals because of their dependence on sea ice; as such, they are protected under MMPA as well as the ESA. On May 15, 2008, USFWS listed the polar bear as threatened throughout its range under the ESA **(73 FR 28212)**. The listing is in part a response to increased concerns about the effect of climate change on sea ice. Sea ice provides a hunting platform for polar bears and has been in decline in recent years. A polar bear's diet is

made up almost exclusively of marine mammals, mainly ice seals that also depend on sea ice habitat. Additionally, sea ice provides a portion of winter denning habitat for pregnant female polar bears. On November 24, 2010, USFWS announced the designation of 484,000 square kilometers (187,000 square miles) of polar bear critical habitat containing sea ice, terrestrial denning habitat, and barrier islands. The designated critical habitat occurs under the northern portion of the PFRR launch corridor **(Figure 10)**. The critical habitat includes the Beaufort Sea and land within 32 kilometers (20 miles) inland from the Beaufort Sea coast within the PFRR launch corridor. For purposes of this BA, NASA assumes polar bears may occur up to 40 kilometers (25 miles) inland from the Beaufort Sea coast **(USFWS 2011c)**.

Polar bear movements are influenced by sea ice conditions and follow a predictable seasonal pattern. In July and August, polar bears move offshore as the pack ice recedes. In the case of the SBS and CBS populations, polar bears may move hundreds of miles to stay with the ice during summer. From August through October, polar bears hunt ringed seals (their most important prey species) near shore in areas of unstable ice and leads between ice floes. From November to June, male polar bears remain on offshore ice. Years with less sea ice seem to result in bears being on land for longer periods of time. Their preferred habitat is the annual ice over the relatively shallower waters of the continental shelf and inter-island channels, where biological productivity is higher and seals are more abundant than in the deep polar basin **(Stirling and Øritsland 1995)**.

Mating occurs from March to May **(Ramsay and Stirling 1986)**. Approximately 50 percent of females den on drifting pack ice from November until April, although evidence suggests that this number is decreasing with recent changes in sea ice extent and distribution **(Fischbach *et al.* 2007)**. The remaining females that are in reproductive condition den on land from November through April then move offshore.

November through April is the most sensitive period of the year for polar bears. Dens are dug in snow drifts in areas of shallow relief along sea ice pressure ridges, creek and stream banks, river bluffs, and shorelines. Cubs are born in December and continue to develop in the den until April. Dens have been located up to 40 kilometers (25 miles) inland in landscape features that trap drifting snow in sufficient depth to allow a female polar bear to dig a den **(Durner *et al.* 2006)**. The highest density of land dens in Alaska occurs along the coastal barrier islands of the eastern Beaufort Sea and within Arctic NWR **(Angliss and Allen 2009)**.

Current regulations prohibit work activities within a 1.6-kilometer (1-mile) radius of a known den location. Denning females are sensitive to disturbance and may abandon cubs if disturbed. Cubs are very vulnerable at this stage, so protection of the maternal den habitat is vital to polar bear conservation **(Angliss and Allen 2009)**. The results of surveys for polar bears confirm that large numbers of polar bears aggregate around Barter Island (on which Kaktovik is located) and Cross Island (west of the ROI between Prudhoe Bay and Point Barrow), probably due to the presence of hunter-harvested bowhead whale remains, which provide an alternate food source for polar bears.

4.2.2. Spectacled Eider

Spectacled eiders *(Somateria fischeri)* are large sea ducks and rare breeder and uncommon visitor along Alaska's north coast. They spend most of the year in marine waters feeding on bottom-dwelling mollusks and crustaceans. Nesting and breeding typically occur in wet coastal tundra to the west of the PFRR launch corridor, although the historical range extended along the Arctic coastal plain, including the coastal portion of the PFRR launch corridor, nearly as far east as the Canadian border **(USFWS 2011a)**. Critical habitat designated for this species is far outside the boundaries of the PFRR launch corridor. Primary molting areas are generally west and south of Point Lay, well outside of the action area. Spectacled eiders winter primarily in the Bering Sea, moving far offshore, following areas of open water **(USFWS 2011a)**.

4.2.3. Steller's Eider

Although formerly considered locally common at a few sites on both the Yukon-Kuskokwim Delta in western Alaska and the Arctic coastal plain of northern Alaska, Steller's eiders *(Polysticta stelleri)* have nearly disappeared from most nesting areas in Alaska **(USFWS 2011b)**, and the Alaska population is listed as threatened. Of the world breeding population of Steller's eiders, most nest in Russia. The nearest known nesting area is located to the west of the action area at Prudhoe Bay. Molting and wintering is in the southern Alaska from the eastern Aleutians to the lower Cook Inlet, well outside of the action area.

4.2.4. Yellow-Billed Loon

The yellow-billed loon *(Gavia adamsii)* is listed as a candidate species. Feeding mostly on small fish and invertebrates, it breeds in low densities in coastal and inland low-lying tundra within the arctic coastal plain of Alaska. The greatest breeding concentrations in Alaska are found on the North Slope, with highest densities between the Meade and Ikpikpuk rivers, on the Colville River Delta, and in areas west, southwest and east of Teshekpuk Lake **(USFWS 2006)**. These areas are west of the action area. It is possible that individuals may migrate through coastal plain portion of the action area during either spring or fall migration. The wintering range includes coastal waters of southern Alaska from the Aleutian Islands to Puget Sound, well outside of the action area.

5. Effects of the Action

This section addresses potential impacts on listed, proposed, and candidate endangered or threatened species that NOAA Fisheries and USFWS have identified as having the potential to occur within the action area. There are no listed, proposed, or candidate species known to live in the vicinity of the PFRR launch site or under the launch corridor until it approaches the coast of the Beaufort Sea. Of the species discussed in Section 4 of this BA, only the ringed seal (proposed threatened) and the polar bear (threatened) have the potential to occur year-round within the action area and could be affected by descending payloads or spent stages.

The bowhead whale (endangered), bearded seal (proposed endangered), and yellow-billed loon (candidate) are summer residents and would be absent during the winter season when launches would occur. Spectacled and Steller's eiders (threatened) are accidental in occurrence and

uncommon within the action area. They would also most likely be present during the summer months, if they were present at all. Therefore, given these species' seasonal absence from the action area, they will not be discussed further.

5.1. Species under NOAA Fisheries' Jurisdiction

5.1.1. Ringed Seal

Potential impacts on ringed seals from launch operations would be associated with re-entering payloads and/or stages landing within seal habitat, and more specifically, seal concentration areas. During the months when the sea ice extends to the coast (October to June), ringed seals tend to concentrate on shorefast ice adjacent to the coastal areas of Alaska **(Marz 2004)**. From July to September, when the sea ice retreats northward and large stretches of open water appear along the coast, the seals tend to expand their range both northward and westward, diminishing their overall density in the project area.

Probability of Impact

To evaluate the probability of a direct impact adversely affecting a ringed seal, a typical 3-sigma impact ellipse was created for a spent stage or payload predicted to land in the Beaufort Sea (1,000 kilometers [621 miles] from PFRR). The large size of this ellipse (over 500,000 square kilometers [190,000 square miles]) is due to the various factors (such as winds) that affect the flight and descent of the unguided rocket. The impact point location is typical of launches from PFRR into the Beaufort Sea. Of the 24,000-square-kilometer (9,400-square-mile) winter habitat concentrated along the coast, only 45 square kilometers (17 square miles) were intersected by the ellipse (see **Figure 4**). This equates to a probability of approximately 2.0×10^{-5} (one chance in 50,000 per launch) that a spent stage or payload would land within the winter concentration area of the ringed seals (see **Table 1**).

It is possible that ringed seals could exist throughout the entire Beaufort Sea on sea ice during the winter. Expected density values for ringed seal in areas of concentrated occurrence in the Beaufort Sea are 0.35 individuals per square kilometer (average density) and 1.42 individual per square kilometer (maximum density) for nearshore areas, where the seals are most concentrated, and 0.25 individuals per square kilometer (average density) and 1.00 individual per square kilometer (maximum density) for ice margins **(Shell Exploration and Production, Inc. and LGL Alaska Research Associates, Inc. 2010, referencing Moulton and Lawson [2002] and Kingsley [1986])**. Assuming a conservative density of 1 individual per square kilometer throughout the Beaufort Sea and Arctic Ocean and allowing for a 10-meter (33-foot) radius buffer zone around each seal, the per-launch chance of an impact near a ringed seal is very low, approximately 3.1×10^{-4}, or 1 chance in 3,200 (see **Table 1**).

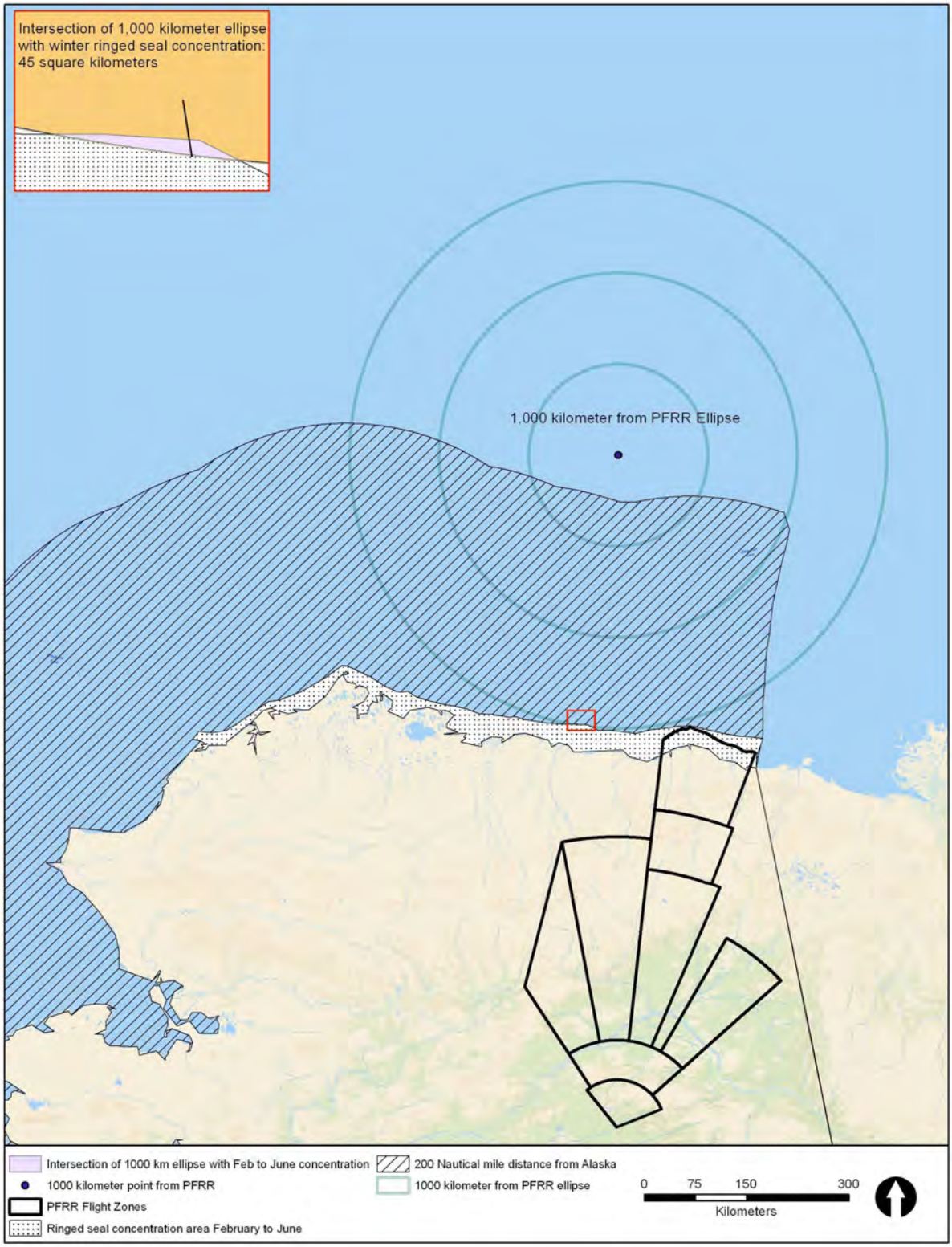

Figure 9. Typical Offshore Impact Location with Respect to Highest Winter Ringed Seal Concentration (adapted from Smith 2010)

Table 1. Probability of Impact on Ringed Seals in the Beaufort Sea

Ringed Seal Resource	Potential Impact Ellipse (square kilometers)	Ringed Seal Resource Area (square kilometers)	Probability of Spent Stage or Payload Impacting Ringed Seal Resource
Nearshore ice [a]	503,375	45	2.0×10^{-5}
Individual within 3-Sigma Dispersion [b]	503,375	159	3.1×10^{-4}

a. Assumed to be concentrated on the nearshore ice during the winter months. Wintering concentration areas for the ringed seal *(Pusa hispida)* were interpreted and mapped from **Smith *et al.* 2010**, Figure 37.

b. Based on information collected over the years, a population density of 1 ringed seal per square kilometer was assumed across the entire Beaufort Sea **(Shell Exploration and Production, Inc. and LGL Alaska Research Associates, Inc. 2010)** within the typical 3-sigma dispersion. Assuming a safety zone within a 10-meter (33-foot) radius of seal, the potential area of disturbance around a ringed seal that could result in either injury or death is estimated to be approximately 315 square meters (380 square yards) per seal, or 159 square kilometers (61 square miles) for the approximately 503,375 ringed seals that could be within the impact ellipse.

Note: To convert kilometers to miles, multiply by 0.62137; square kilometers to square miles, by 0.38610.

Sounding Rocket-Generated Sound

Sounding rockets reach supersonic speeds very quickly (i.e., after several seconds); however they generally would not generate a sonic boom noticeable on the ground due to their high angle of ascent **(Downing 2011)**. As long as the rockets motors are burning, noise would be generated, especially at the lower altitudes when the air density is appreciable. Above a 10-kilometer (6-mile) altitude, where vacuum conditions are approached, no sound would be propagated. A typical Black Brant XII would be expected to reach this altitude at just over 25 seconds of flight time, well south of the action area **(Figure 1)**. When the rockets motors are no longer burning, only aerodynamic noise will prevail.

The ballistic re-entry of a representative stage or payload would generate a mild sonic boom (0.2 pounds per square foot) at an altitude between 18,000 m (60,000 ft) and 9,000 m (30,000 ft) AGL. The peak instantaneous sound pressure received on the ice would be approximately 114 dB and be of very low frequency (less than 100 Hz) **(Downing 2011)**. The duration on the low frequency sound would be very brief at approximately 30 milliseconds. In an unrelated study of sonic booms of similar magnitude, observers on the ground who were operating the sonic boom recording equipment within the predicted footprint of the sounding rocket boom "heard the boom but felt that they would not have noticed it had they been engaged in an unrelated activity" **(Plotkin *et al*. 2006)**. By comparison, sonic booms generated by supersonic aircraft typically have overpressures 5 to 10 times as large (5 to 10 kilograms per square meter [1 to 2 pounds per square foot]) and last for 100 to 500 milliseconds.

In addition to the sonic boom, the stage or payload would eventually land on the presumably frozen surface of snow-covered ice, generating a momentary impulse sound estimated to be 131 dB (at 15 m [50 ft] distance from the impact site) in air; 192 dB in the water below the impact site. This conservative estimate is based upon the kinetic energy of the impacting piece of flight hardware.

Applicable Regulatory Criteria

Under the MMPA, NOAA Fisheries has defined levels of harassment for marine mammals. Level A harassment is defined as "…any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild." Level B harassment is defined as "…any act of pursuit, torment, or annoyance which has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering." NOAA Fisheries has adopted the MMPA take definition for assessing effects on ESA listed marine mammals.

Since 1997, NOAA Fisheries has been using generic sound exposure thresholds to determine when an activity in the ocean produces sound potentially resulting in impacts to a marine mammal and causing take by harassment **(70 FR 1871)**. The current Level A (injury) threshold for underwater impulse noise is 190 dB root mean square (rms) for pinnipeds (e.g., seals). The current Level B (disturbance) threshold for underwater impulse noise is 160 dB rms for cetaceans and pinnipeds.

In addition, NOAA Fisheries is developing new science-based thresholds to improve and replace the current generic exposure level thresholds, but the criteria have not been finalized **(Southall *et al.* 2007)**. Based upon the recommendations of the referenced study, the generic exposure criteria are likely conservative, however they are currently in use by NOAA Fisheries for ESA consultations. Therefore, this BA assesses potential effects within the context of both the generic and the science-based criteria.

Physiological Effects

A primary concern of sound exposure on pinnipeds is whether the source would result in either temporary or permanent hearing loss. Although based upon the conservatively derived source levels from flight hardware impacting the sea ice, it is possible that individuals directly under the area of impact could be exposed to levels above the 190 dB Level A threshold (which in essence would be equivalent to a direct hit), it is highly unlikely that this would occur based upon the probability of impact calculations presented in **Table 1**.

Regarding science-based criteria, **Southall *et al*. (2007)** proposed a 149 dB exposure criterion for assessing the potential injury to pinnipeds in air exposed to a single sound pulse. Likewise, a similar conservative criterion for injury (218 dB) was suggested for pinnpeds in water. Therefore, when considered within the context of these recommended criteria, the expected sonic boom and snow/ice impact of a re-entering sounding rocket payload or stage would cause no temporary or permanent hearing damage to ringed seals.

Behavioral Effects

Similar to the discussion of potential physiological effects from the impact of a flight hardware on the sea ice, it is likely that the sound levels in the immediate vicinity of the landing site would exceed the 160 dB criterion that is used to gauge a behavioral response, however as shown in **Table 1**, the chance of landing near an individual such that it would be exposed to elevated sound levels would be slight.

Regarding science-based criteria, the same study **(Southall *et al.* 2007)** also proposed a 109 dB criterion for single pulse sound behavioral disturbance of pinnipeds in air. The criterion, noted by the authors as likely conservative, was mostly based upon observation of strong responses (e.g., stampeding behavior) of some species, especially harbor seals, to sonic booms from aircraft and missile launches in certain conditions **(Berg *et al.*, 2001, 2002; Holst *et al.*, 2005a, 2005b)**. A 212 dB criterion for pinnipeds in water was proposed based upon the level at which some temporary hearing effects may be observed in some species.

The most notable sound-related behavioral response for out-of-water seals would be the potential for trampling and/or separation of young from females, especially following birth. PFRR launch operations could overlap the general birthing and suckling period (i.e., mid-March to April). During much of this time, female seals and their young remain in snow dens, which have been found to be very effective in muffling sound **(Blix and Lentfer 1992)**. In the referenced article, the authors highlight one particular event during which a helicopter noise level of 115 dB was reduced to 77 dB in an artificial polar bear den covered by less than 1 m (3 ft) of snow just 3 m (10 ft) away. The snow dens were also found to be effective in absorbing vibration. Even with relatively modest attenuation, it may be concluded that in-den received sound levels from an incoming sounding rocket section would be below the criteria proposed by **Southall *et al.* (2007)** and would have negligible adverse effects. Furthermore, as nearly all of the sound energy of the sonic boom is below 75 Hz (the minimum estimated range of hearing as presented in **Southall *et al.* [2007]**), it is doubtful that boom-induced sounds received outside of dens would be detected by seals. Impacts on in-water seals would be negligible as source levels of the impacting flight hardware are estimated to be below the 212 dB recommended criterion.

In summary, the sound resulting from the impact on the snow and ice would not be expected to cause adverse effects on individuals in or out of water. Although this analysis cannot discount the possibility that ringed seals would hear the sounds generated by stage and payload reentry, it is reasonable to conclude that such effects would be temporary and similar to other natural sounds in their marine environment, such as the sounds of ice cracking, popping, and colliding **(Greening and Zakarauskas 1994; Milne 1972; Milne and Ganton 1964; Xie and Farmer 1991)**.

<u>Effects of Remaining Flight Hardware</u>

Although a re-entered sounding rocket payload is unlikely to fully penetrate the sea ice, given the buildup of heat generated by friction with the atmosphere, some items may be expected to sink into the ice where they would eventually be frozen over and covered by drifting or blown snow. Other items would remain on the ice surface until covered by snow and would remain there until

the summer thaw. This is the same expected fate of a spent rocket stage, with the exception that it would be less susceptible to breakup.

Based on the melting patterns of sea ice in the Beaufort Sea over the last few years **(NSIDC 2011)**, over 80 percent of the payloads and spent fourth stages are expected to land on sea ice that melts annually, at which time they would sink to the bottom of the ocean. Employing the same analysis, less than 20 percent of the payloads and spent fourth stages are expected to land on "permanent" ice. Assuming an average of four launches per year, the maximum number of items that would enter the Beaufort Sea annually would be four payloads and up to four spent stages (from the final stage).

Payloads and spent stages that enter the marine environment are expected to reach the ocean floor and lodge in oxygen-poor sediments or remain on the ocean floor and corrode or become encrusted by marine organisms. In nearly all cases, these items would ultimately be interred at water depths greater than 300 m (1,000 ft). Under normal conditions, spent stages are essentially inert steel tubes with an electronic system on the forward end, which contains batteries and wiring. Payloads contain small quantities of batteries and other materials that would gradually enter the water column, resulting in limited and localized contamination that would be rapidly dispersed by currents.

Summary

Considering the low per-launch probability of landing near an individual, the limited number of launches per year (an average of four), the relatively small size of spent stages and payloads, and the largely inert or non-reactive nature of the items, negligible adverse impacts on ringed seals and their habitat are anticipated.

5.2. Species under USFWS Jurisdiction

5.2.1. Polar Bear

Potential impacts on polar bears from launch operations would be associated with re-entering payloads and/or stages landing within their habitat. Given their trophic relationship to ringed seals, during the winter months polar bears are also in greatest concentrations along the coast. Defined by the offshore extent of the 300 m (1,000 ft) depth contour **(Regehr *et al.* 2006)**, this area of preferred habitat also corresponds with the boundaries of designated critical feeding habitat. Within the general extent of this preferred area is where the majority (70-80 percent) of individuals would be expected to occur based on past observations **(Durner *et al.* 2009)**.

Probability of Impact

To quantify potential impacts on polar bears, NASA performed a similar probability calculation to that described for ringed seals. **Table 2** shows the probability of a typical spent stage or payload landing within polar bear critical habitat. Typically these items would land far offshore in the Beaufort Sea or Arctic Ocean but there is a small chance that they could land closer to shore in areas that include designated critical feeding and denning habitat. Critical denning habitat would not typically be affected by these launches as it is outside the 3-sigma dispersion. The chance that one of these launches would typically impact designated critical feeding habitat is less than one chance in 150 (6.6×10^{-3}).

The probability of a piece of flight hardware landing on a polar bear den was also estimated using information on known polar bear dens in the area. The chance that one of these launches directly impacting a polar bear den is less than one chance in 21 million (4.6×10^{-8}).

Table 2. Probability of Impact on Polar Bear Critical Habitat and Dens

Distance from the PFRR Launch Site (kilometers)	Polar Bear Critical Habitat	Potential Impact Ellipse (square kilometers)	Amount of Polar Bear Critical Habitat Within Ellipse (square kilometers)	Probability of a Spent Stage or Payload Landing in Polar Bear Critical Habitat
1,000	Feeding habitat	503,375	14,964	6.6×10^{-3}
1,000	Denning habitat	503,375	0	0
1,000	Polar bear dens within potential impact area[a]	503,375	0.022	4.6×10^{-8}

[a.] An estimated 69 known polar bear dens could be within the area potentially impacted by a typical National Aeronautics and Space Administration launch into the Beaufort Sea (Based on information from **Amstrup and Gardner 1994**) based on information collected over the years by the National Oceanic and Atmospheric Administration. Assuming each den covers an area of approximately 3 square meters (30 square feet) **(Stirling 1988)**; this analysis assumes a safety zone within a 10-meter (33-foot) radius of the den. The potential area of disturbance around a polar bear den that could result in either damage to the den or injury or death to the polar bear is estimated to be approximately 315 square meters (380 square yards) per den, or 0.022 square kilometers (0.0085 square miles) for 69 dens.

Note: To convert kilometers to miles, multiply by 0.62137; square kilometers to square miles, by 0.38610.

In addition, **Figure 10** provides a graphic representation of the analysis presented in **Table 2**.

This analysis shows that the potential for direct impact on polar bears or their critical habitat would be very low.

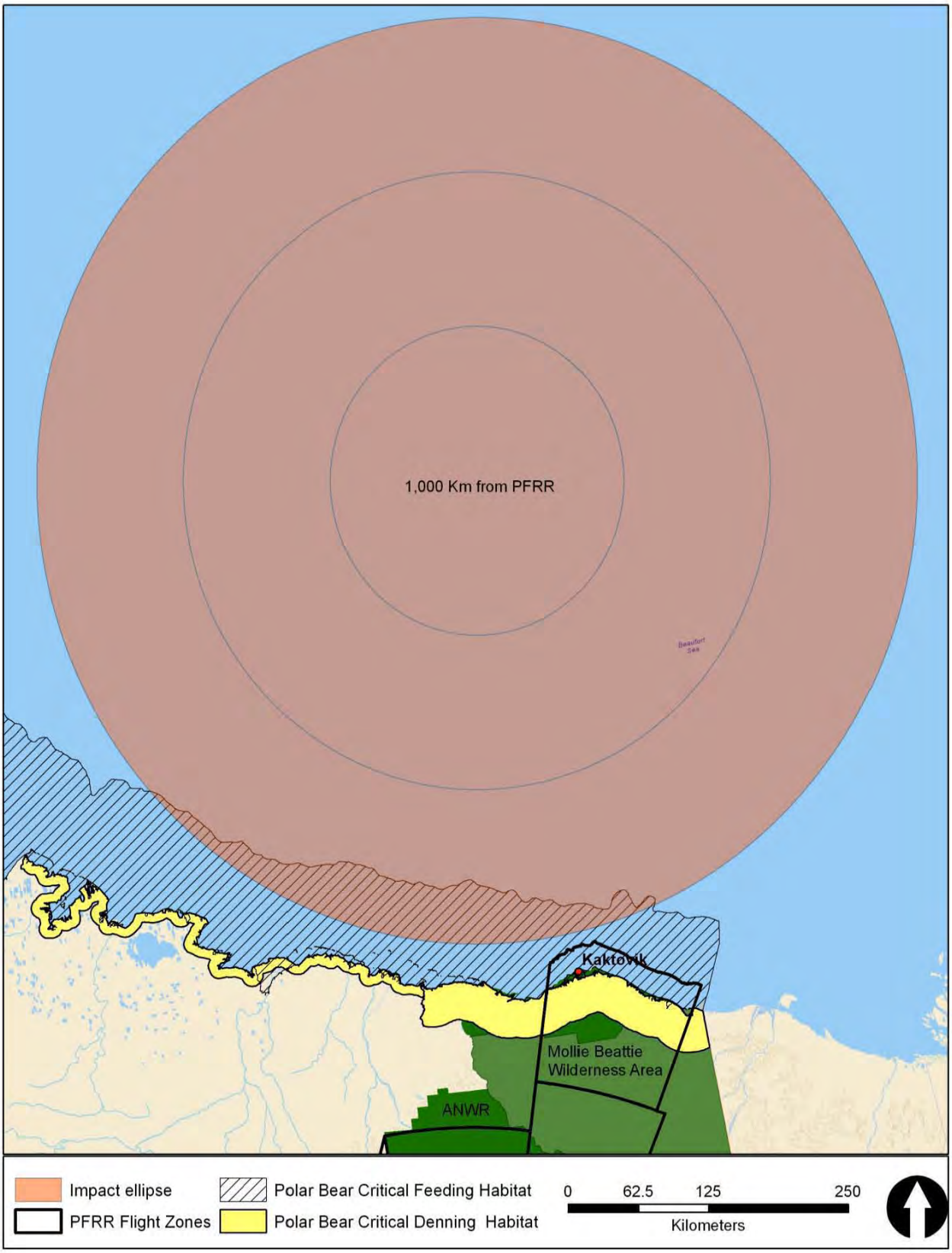

Figure 10. Likelihood of a Spent Stage or Payload Landing within Polar Bear Critical Habitat

Effects of Sound

Sounds associated with an incoming spent stage or payload are discussed in **Section 5.1.1** of this BA under *Sounding Rocket-Generated Sound*.

Polar bears have relatively acute hearing (**Nachtigall *et al*. 2007; Owen and Bowles 2011**). As with ringed seals, the primary noise-induced, disturbance-related concern would be the time following the birth of young, which generally occurs in December or early January **(Ramsay and Dunbrack 1986)**. The cubs remain in dens for several months following birth and therefore are potentially vulnerable to disturbances near dens **(Amstrup 1993)**.

As summarized under the discussion of potential effects on Ringed seals, **Blix and Lentfer (1992)** observed that only seismic testing less than 100 m (330 ft) from a den and a helicopter taking off at a distance of 3 m (10 ft) produced noises inside artificial dens that were notably above background levels. The authors also concluded that a polar bear in its den is unlikely to feel vibrations unless the source is very close. Supporting their findings is **Amstrup (1993)** and **(MacGillivray *et al.* 2003)**, both of which also reported that polar bears residing within dens are well insulated from outside sound and vibration.

Similar to the analysis for ringed seals, this analysis cannot discount the possibility that a polar bear would hear the sounds generated by stage and payload reentry, however it is reasonable to conclude that such effects would be temporary, minor, and similar to other natural sounds in their marine environment, such as the sounds of ice cracking, popping, and colliding **(Greening and Zakarauskas 1994; Milne 1972; Milne and Ganton 1964; Xie and Farmer 1991)**. Therefore, effects of sound would be negligible.

Effects of Remaining Flight Hardware

A potential concern could be flight hardware - related injury as polar bears are curious animals that typically investigate objects or smells that catch their attention **(Stirling 1988)**. Polar bears have been observed to ingest a wide range of indigestible and hazardous materials and to feed at dumps (**Clarkson and Stirling 1994**). Instances of polar bear injury related to human made materials (e.g., pieces of a lead battery, ethylene glycol antifreeze) have been documented (**Amstrup *et al.* 1989**). However, these have been in unnatural settings (including roadsides treated with antifreeze and dye and the Churchill, Manitoba, municipal landfill) that are much different from the habitat within the PFRR flight corridor. The dump example involved individual bears habituated to finding supplemental food in landfills (**Lunn and Stirling 1985**).

Payloads and spent stages that land on sea ice would be unlikely to harm a polar bear in the unlikely event that an individual polar bear were to encounter one. The item is expected to rapidly become covered by ice or drifting snow, essentially isolating it from the environment. As the ice melts the rocket hardware would subsequently enter the marine environment, as discussed above for Ringed seals. Any accumulation of spent stages or payloads that remained would be on the permanent sea ice approximately 400 kilometers (250 miles) from the coast and over 300 kilometers (185 miles) from the nearest designated Critical Habitat (based on information from **NSIDC [2011]**).

Assuming four launches per year, the maximum number of items that would enter the Beaufort Sea annually would be four payloads and up to four spent stages (from the final stage). Typical water depths within these areas would be at least 300 m (1,000 ft). As discussed earlier, payloads and spent stages that enter the marine environment would sink to the bottom and be rapidly colonized by benthic encrusting organisms and become part of the substratum. Unrecovered payloads contain materials (e.g., batteries) that would result in limited and localized contamination as the materials gradually enter the aquatic environment. Considering the limited number of launches per year, the relatively small size and wide spatial dispersion of spent stages and payloads, and the largely inert or non-reactive nature of the items, no impacts on polar bears from these items on the ice or entering the marine environment are anticipated.

Summary

Considering the low per-launch probability of landing near an individual or within designated critical habitat, the limited number of launches per year (an average of four), the relatively small size and wide dispersion of spent stages and payloads, and the largely inert or non-reactive nature of the items, negligible adverse impacts on polar bears and their habitat are anticipated.

Regarding potential indirect effects, the analysis of potential effects on ringed seals (the polar bear's primary food source during the winter months) would also be negligible (see **Section 5.1.1** of this BA), rendering any resultant effects on the polar bear to be nearly non-existent.

5.3. Conclusion and Determinations of Effect

Based upon the analyses contained within this document, NASA expects the effects from its SRP at PFRR on ESA listed, proposed, and candidate species to be negligible. **Table 3** below presents a summary of its determinations:

Table 3. Summary of Endangered Species Act Determinations for Listed, Proposed, and Candidate Species Potentially Occurring within PFRR Flight Corridor

Species	ESA Status	Agency with ESA Jurisdiction	NASA ESA Determination
Bowhead whale	Endangered	NOAA Fisheries	No effect (seasonal absence)
Ringed seal	Proposed Threatened	NOAA Fisheries	Not likely to jeopardize continued existence of
Bearded seal	Proposed Endangered	NOAA Fisheries	No effect (seasonal absence)
Polar bear	Threatened	USFWS	May affect, not likely to adversely affect
Polar bear critical habitat	Designated	USFWS	May affect, not likely to adversely affect
Spectacled eider	Threatened	USFWS	No effect (seasonal absence)
Steller's eider	Threatened	USFWS	No effect (seasonal absence)
Yellow-billed loon	Candidate	USFWS	No effect (seasonal absence)

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APPENDIX I

BASIS FOR DISMISSING FROM FURTHER EVALUATION THE USE OF HEAVY MECHANIZED EQUIPMENT FOR RECOVERY

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APPENDIX I.
BASIS FOR DISMISSING FROM FURTHER EVALUATION THE USE OF HEAVY MECHANIZED EQUIPMENT FOR RECOVERY

I.1 INTRODUCTION

In preparing the *Final Environmental Impact Statement for the Sounding Rockets Program at Poker Flat Research Range (PFRR EIS)*, the National Aeronautics and Space Administration (NASA) considered the use of heavy mechanized equipment as part of its recovery efforts of sounding rockets launched from the Poker Flat Research Range (PFRR). Although the use of heavy mechanized equipment could provide for the full removal of most identified items, NASA determined that its use in remote areas would result in substantially more disruption to the impact area than the use of hand tools alone, would be extremely costly, and would not be feasible to add as a component of the Recovery Program. Based on this initial evaluation, NASA determined that the use of heavy mechanized equipment would not be further analyzed as part of the alternatives evaluated in the *PFRR EIS*.

This appendix describes the process NASA used to determine the types of equipment that would need to be used, the conditions in which each piece of equipment would need to be used, the availability of this equipment, and the feasibility of adding these types of equipment to the NASA Sounding Rockets Recovery Program at PFRR. NASA also considered the conditions outlined in the existing Special Use Permits with the U.S. Fish and Wildlife Service (USFWS) and U.S. Bureau of Land Management (BLM) for the ability to land and recover sounding rockets within their lands.

I.2 CONDITIONS POTENTIALLY NECESSITATING USE OF HEAVY MECHANIZED EQUIPMENT

NASA considered instances of when heavy mechanized equipment could be used to perform a full recovery when otherwise the item would be fully or partially left in place. These examples included removing deeply buried items (see **Figure I–1**), removing items from areas of saturated soils (see **Figure I–2**), and removing trees and shrubs to a greater degree than is normally necessary to allow the landing/staging of recovery equipment.

I.3 TYPES OF EQUIPMENT

The specific types of mechanized equipment that NASA considered for use in the Recovery Program were dictated by the potential conditions at the recovery site. Access to the site was determined to be the greatest limiting factor in conducting the recovery operation and was used to determine the general types, or classes, of probable equipment that could be used.

Given the limited ground transportation system (*i.e.*, roads) available within the PFRR launch corridor, almost any equipment would need to be transported to the impact site by helicopter. Limitations and availability of the helicopters used would also limit the size and weight of the equipment.

Figure I–1. Example of a Deeply Buried Rocket Motor

Figure I–2. Example of a Deeply Buried Rocket Motor in a Wetland/Bog Area

Also, due to the sensitivity of the downrange lands and the susceptibility of certain areas (*i.e.*, tundra, wetlands) to damage from overland travel during non-winter months, it was determined that the mechanized equipment must have a relatively low ground pressure.

The mechanized equipment must also have the ability to successfully travel through soft, muddy terrain commonly found within the interior lowlands and flats, as well as in areas of tundra. In addition, the selected equipment must have the ability to excavate and lift heavy, substantially buried items at depths up to approximately 2 meters (6 feet) or more.

In consideration of the above requirements, NASA identified two classes of equipment that would most likely meet the majority of its needs. A compact excavator (see **Figure I–3**), which could likely be used for removal actions in upland areas, and a mid-sized tracked amphibious vehicle with an excavator attachment (see Figure I–3), which could be employed in conditions requiring access to soft soils and/or non-flowing shallow bodies of water (*e.g.*, creeks, sloughs), were selected for further evaluation.

Photos courtesy of (L) Caterpillar, Inc. and (R) Coast Machinery, LLC.

Figure I–3. Compact Excavator (Left) and Tracked Amphibious Vehicle (Right)

Table I–1 presents a summary of key specifications for both the compact excavator and tracked amphibious vehicle.

Table I–1. Key Specifications of Potential Recovery Equipment

Feature	Compact Excavator	Tracked Amphibious Vehicle
Weight (kilograms)	600–5,000	1,400–3,000
Engine Power (kilowatts)	11–30	30–60
Ground Speed (kilometers per hour)	3–8	8–13 (over land) 3 (over water)
Ground Pressure (kilograms per square centimeter)	0.27–0.32	0.08
Excavation Depth (meters)	2.1–4.0	1.5

Note: To convert kilograms to pounds, multiply by 2.2046; kilometers to miles, by 0.6214; meters to feet, by 3.2808.

Given the approximate weight of each machine, a medium- to heavy-lift helicopter (*e.g.*, Bell 214, Columbia 107-II, Columbia 234 Chinook, U.S. Army CH-47 Chinook, see **Figure I–4**) would be necessary to deliver either machine to the recovery site and then return it to its point of origin once the recovery is complete.

Photo courtesy of the U.S. Army.

Figure I–4. Heavy-Lift Helicopter Sling Loading Equipment

I.4 EVALUATION CONSIDERATIONS

NASA evaluated a range of considerations when determining the feasibility of adding heavy mechanized equipment to its Recovery Program. These considerations include concept of operations, frequency of use, financial requirements, and availability of equipment.

I.4.1 Concept of Operations

The actual concept of operations would be planned prior to conducting the specific recovery operation; however, NASA considered a number of scenarios of using mechanized equipment. NASA assumed that for recoveries south of the White Mountains, a medium- to heavy-lift helicopter would sling-load the equipment from the Fairbanks area to the recovery site. For areas further north, it would be more efficient to transport the equipment north via the Dalton Highway to a location of approximate latitude of the recovery site (*e.g.*, Coldfoot, Toolik Lake). From that point, the helicopter would then sling the equipment to the recovery site, and once recovery is complete, back to the original point of origin.

Rigging of the equipment for pickup would likely be conducted prior to the helicopter's arrival. Pickups could be conducted without the helicopter needing to land, and would require at least three to four trained staff on the ground to provide visual signals to the pilot, discharge static electricity, and connect the lifting sling to the cargo hook(s) on the helicopter's undercarriage. NASA assumed that dropping off the equipment at or near the recovery site would also not require helicopter landing, as the load could be released by a crewmember onboard the aircraft. Given the potential travel distances necessary to recover some items, some recoveries would require multiple re-fueling stops. This could be accomplished by first transporting fuel drums to a nearby airstrip (either by truck along the Dalton Highway or by aircraft at one of the interior Villages or mining camps), then hauling them back on the return flight once empty.

Whether the helicopter would land near the recovery site (versus immediately departing the site to its point of origin) would be based upon the specific circumstances of the situation. First, the helicopter would need an adequate load-bearing surface (capable of supporting 5 or more tons for the heaviest models) upon which to land. Additionally, a substantial clear zone would be required for safe operations. For example, a CH-47 Chinook helicopter requires a landing site at least 80 meters (260 feet) in diameter if there are no nearby obstacles. When obstacles are in the approach or departure route, a 10-to-1 ratio is used to establish the landing site. For example, during the approach and departure, if the helicopter must fly over trees that are 10 meters (30 feet) tall, then the landing site must be at least 100 meters (305 feet) long. Therefore, in certain areas, particularly south of the Yukon River, dense stands of trees and/or soft soils could preclude landing. Conversely, in large, open river valleys, the helicopter could likely find a suitable landing location with relative ease, thereby avoiding the need make an extra round trip to retrieve the equipment.

For instances when the compact excavator would be used (stable soils, upland conditions), it is expected that the helicopter could release the equipment reasonably near the recovery site. However, in cases when the tracked amphibious vehicle would be required (wet, soft soil conditions), acceptable drop locations could be more challenging to find; therefore, it would be

very likely that the helicopter would need to release the equipment at a greater distance from the site, thereby requiring more overland travel to complete the recovery. Given the relatively slow ground speed of the tracked amphibious vehicle and the expected land disturbance that would be required for its operation in soft soils (approximately 0.4 hectares [1 acre] per 1.6 kilometers [1 mile] traveled), it is expected that the maximum reasonable distance from the drop-off site to the recovery site would be approximately 1.6 kilometers (1 mile).

Once at the recovery site, a team of at least two crewmembers would be responsible for operating the equipment, which would most likely dig around the item and/or then lift the item from the ground. The excavated area would then be backfilled to the extent practicable. Depending on the circumstances, the item could either be loaded onto the vehicle or towed behind it to the helicopter rendezvous point. Once at the pickup site, up to an additional three to four trained crewmembers would be required to safely rig the equipment for removal and transport back to its point of origin. A separate, smaller helicopter would provide crewmember transportation. Ideally, both equipment operators and helicopter riggers would remain at the site for the duration of the recovery, minimizing the number of helicopter flights. This same helicopter would also be responsible for sling-loading the recovered item to a central collection point (*e.g.*, Village or gravel airstrip) or directly back to the Fairbanks area.

I.4.2 Frequency of Operations

Recent experience gained while conducting operations under the Interim Recovery Program has shown that in general, a majority of items can be fully removed with simple hand tools. However, there have been, and would likely be in the future, items identified that are substantially buried that would require heavy mechanized equipment for full removal. Therefore, for the purposes of this evaluation, NASA determined that the expected frequency of needing to utilize heavy mechanized equipment for single full recovery would not be more than once per two launch seasons. This frequency was derived by assuming there would be 4 launches per year, with 1 launch in 10 requiring such a recovery.

I.4.3 Financial Considerations

Each Fiscal Year, NASA would allocate a minimum of $250,000 of the PFRR annual budget for recovery activities. Actual expenditures would vary from year to year, and would be dictated primarily by launch activity and the amount of hardware reported by users of downrange lands (discussed in more detail below). These funds are expected to have a 2-year expiration, meaning that if not spent within 2 years, the funds are required to be returned to the U.S. Treasury; therefore, if not spent, the funds would effectively be lost by the NASA Sounding Rockets Program (SRP). If circumstances warranted, available recovery funding from one previous fiscal year could be utilized to augment the $250,000 annual budget.

The use of heavy mechanized equipment was found to be extremely costly. For example, the use of a CH-47 Chinook helicopter would be between approximately 14 and 28 times more costly than a smaller helicopter (*e.g.*, Bell 206), and the cost of purchasing an amphibious tracked vehicle, compact excavator, and trailer for hauling them would cost between $167,000 and $182,000 as compared to less than $1,000 for hand tools only (see **Table I–2**).

Table I–2. Recovery Equipment Cost Comparison

Cost Item	Hand Tools Only	Heavy Equipment	
		Compact Excavator	Tracked Amphibious Vehicle
Initial Investment	<$1,000	$30,000–$45,000	$137,000
Hourly Cost of Recovery	$400–$800	$11,200	

Note: Hourly recovery cost only accounts for air transportation; does not include staff labor, ground transportation, etc.
Source: NASA 2013.

In consideration of both the costs presented in Table 1–2 and NASA's approximately $250,000 annual recovery budget, it would be likely that the expenditure of a larger amount of funding on a heavy mechanized equipment-based recovery operation would reduce the possibility of recovering other hardware that is reported later in the given year.

I.4.4 Availability

NASA considered the use of the Bell 214 B1, Columbia 107-II, Columbia 234 Chinook, and U.S. Army CH-47 Chinook helicopters that would be needed to transport the heavy mechanized equipment from PFRR to the impact site. The availability of each helicopter in relation to the launch corridor is shown in **Table I–3**. As shown in the table, the only model available near PFRR would be the CH-47 Chinook owned by the U.S. Army at Fort Wainwright. While it would be possible to utilize the U.S. Army's equipment on a cost-reimbursable basis, it could only be done if there were no competing needs related to the U.S. Army's primary mission. Therefore, availability of the heavy lift helicopters for NASA's use cannot be guaranteed.

Table I–3. Availability of Helicopters Near Poker Flat Research Range

Helicopter	Alaska Provider	Nearest Locations
Bell 214 B1	TEMSCO	Ketchikan, Alaska Juneau, Alaska
Columbia 107-II	None	Portland, Oregon
Columbia 234 Chinook	None	Portland, Oregon
CH-47 Chinook	U.S. Army	Fairbanks, Alaska

Source: Bundick 2013.

I.5 PERMIT CONDITIONS

Within the PFRR launch corridor are landmasses owned or managed by several Federal, state, and Alaska Native organizations, including BLM, USFWS, Alaska Department of Natural Resources, Doyon, Limited (an Alaska Native regional corporation created by the Alaska Native Claims Settlement Act), and the Native Village of Venetie Tribal Government.

I.5.1 BLM

BLM manages and administers the use of Federal public lands and resources on behalf of the U.S. Department of the Interior in accordance with the Federal Land Policy and Management Act of 1976, as amended **(43 U.S.C. 1701 *et seq.*)**. The agency's Eastern Interior Field Office in

Alaska manages approximately 8 million acres of public lands in east-central Alaska, including the north and south units of the Steese National Conservation Area and the White Mountains National Recreation Area.

Historically, the University of Alaska Fairbanks (UAF) has applied for authorization from BLM to allow rocket impacts and recovery of NASA SRP spent rocket stages and payloads from BLM-administered lands. To date, the use of heavy mechanized equipment has not been included in the authorizations from BLM to aid in the recovery of flight hardware within BLM-administered lands. In fact, recent authorizations have specifically indicated that recovery-related disturbances must be kept to a minimum.

I.5.2 USFWS

The USFWS administers National Wildlife Refuges (NWRs) on behalf of the U.S. Department of the Interior in accordance with the National Wildlife Refuge System Administration Act of 1966, as amended (NWRSAA) **(16 U.S.C. 668dd–668ee)**. These lands are administered for the conservation, management, and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats. The Alaska Region (Region 7) of USFWS administers 16 NWRs within the state of Alaska. The primary purpose of Arctic and Yukon Flats NWRs is to conserve fish and wildlife populations and their habitats in their natural diversity. The USFWS is authorized to provide authorizations for rocket impacts and recovery by regulations the use of any area within the NWR system provided "such uses are compatible with the major purposes for which such areas were established."

Similar to BLM, UAF applies for authorization from USFWS to allow rocket impacts and recovery of NASA SRP spent rocket stages and payloads from USFWS-administered lands. To date, the use of heavy mechanized equipment has not been included in the authorizations from USFWS to aid in the recovery of flight hardware within USFWS-administered lands. Additionally, given the requirement for such operations to be deemed a "compatible use" prior to authorization, it is unlikely that the use of heavy mechanized equipment for recovery could be done in a manner that would meet the compatibility threshold for use on USFWS lands **(USFWS 2013)**.

I.5.3 Native Village of Venetie Tribal Government

Venetie is located on the north side of the Chandalar River approximately 72 kilometers (45 miles) northwest of Fort Yukon. In 1971, Venetie and Arctic Village obtained the title to 730,000 hectares (1.8 million acres) of land, which they own as tenants in common through the Native Village of Venetie Tribal Government.

The Geophysical Institute of UAF and the Native Village of Venetie Tribal Government have a Memorandum of Agreement (MOA) for the conditional use by UAF of the tribal lands controlled by Venetie Tribal Government. This MOA details the requirements of UAF for the continued use of the Venetie Tribal Lands and does not specifically authorize the use of heavy mechanized equipment. While preparing the *PFRR EIS*, NASA discussed its proposed Recovery Program several times with tribal leaders. A continued concern voiced by tribal leaders was the need to

conduct recoveries in a manner that minimizes potential effects on subsistence activities, particularly hunting. While conducting a recovery with heavy mechanized equipment would likely be infrequent (*e.g.*, biennially), it would invariably result in greater potential disturbances to wildlife, and in turn, subsistence hunting.

I.6 CONCLUSION

In consideration of the above analysis, NASA determined that the use of heavy mechanized equipment in remote areas as part of the recovery efforts would result in more disruption to the impact area than the use of hand tools alone, would be extremely costly, and would not be feasible to add as a component of the Recovery Program. Consequently, NASA concluded that the use of heavy mechanized equipment would not be further analyzed as a component of the alternatives evaluated in the *PFRR EIS*.

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APPENDIX J

RECENT PUBLICATIONS ENABLED BY SCIENCE CONDUCTED AT POKER FLAT RESEARCH RANGE

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APPENDIX J.
RECENT PUBLICATIONS ENABLED BY SCIENCE CONDUCTED AT POKER FLAT RESEARCH RANGE

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APPENDIX K

COMMENT-RESPONSE DOCUMENT

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APPENDIX K.
COMMENT-RESPONSE DOCUMENT

This appendix provides the comments that were received during the public review of the National Aeronautics and Space Administration's (NASA's) Draft Environmental Impact Statement for the Sounding Rockets Program at Poker Flat Research Range (PFRR EIS) *and NASA's responses to those comments. Additional information about the process used to obtain public input on the* Draft PFRR EIS *can be found in Chapter 1 of the* Final PFRR EIS.

K.1 INTRODUCTION

The National Aeronautics and Space Administration (NASA) released the *Draft Environmental Impact Statement for the Sounding Rockets Program at Poker Flat Research Range (Draft PFRR EIS)* in September 2012 **(77 FR 59611)** for review and comment by Federal, state, and local agencies; tribal governments; organizations; and the public. NASA distributed copies to those agencies, organizations, and individuals who were known or expected to have an interest in the EIS, as well as to those who specifically requested a copy. Copies were also made available on the project website and in public libraries.

The formal public comment period was 60 days (longer than the 45-day minimum required by the National Environmental Policy Act [NEPA]), from September 28, 2012, through November 28, 2012. Public meetings were held in Anchorage and Fairbanks, Alaska, on October 24 and 25, 2012, respectively, to encourage public comments on the *Draft PFRR EIS* and to provide members of the public with information about the NEPA process and the proposed action. In addition to comments received during the public meeting process, the public was invited to submit comments on the *Draft PFRR EIS* to NASA via (1) the *PFRR EIS* website (http://sites.wff.nasa.gov/code250/pfrr_eis.html), (2) a toll-free telephone number, (3) e-mail (Joshua.A.Bundick@nasa.gov), and (4) the U.S. mail.

NASA received six comment documents, containing approximately 40 comments on the *Draft PFRR EIS*. The comment documents included five submitted in writing and one provided orally at the public meeting in Fairbanks, Alaska. NASA considered all comments to determine whether corrections, clarifications, or other revisions were required before publishing the *Final PFRR EIS*. All comments were considered equally, whether written, spoken, mailed, or submitted electronically. The comments received and NASA's responses to these comments are presented in Section K.2. The transcripts of the public meetings held in Anchorage and Fairbanks, Alaska, are presented in Section K.3.

K.2 COMMENT DOCUMENTS RECEIVED AND NASA'S RESPONSES

Table K–1 lists the comment documents received.

Table K–1. Comments Received on the *Draft PFRR EIS*

Comment Document	Agency or Organization	Commenter
001	U.S. Environmental Protection Agency	Christine B. Reichgott
002	U.S. Department of the Interior	Pamela Bergmann
003	U.S. Air Force	Ed Lasselle
004	U.S. Fish and Wildlife Service	Richard Voss and Steve Berendzen
005	Northern Alaska Environmental Center[a]	Pamela Miller
006	Wilderness Society[b]	Wendy Loya

a. Comments taken from transcript of the public meeting in Fairbanks, Alaska, on October 25, 2012.
b. Comments submitted on behalf of eight other conservation organizations and two individuals.

K.2.1 Comment Document No. 001
United States Environmental Protection Agency, Region 10
Christine B. Reichgott

001

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

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Mailstop: 250.W
Wallops Island, Virginia 23337

Re: EPA comments on the NASA Sounding Rockets Program at the Poker Flat Research Range (PFRR), Alaska Draft Environmental Impact Statement, EPA Project #11-017-NAS.

Dear Mr. Bundick:

Thank you for the opportunity to review the Draft Environmental Impact Statement (EIS) for the Sounding Rockets Program at the Poker Flat Research Range in interior Alaska (CEQ # 20120308). We have reviewed the EIS in accordance with our responsibilities under Section 309 of the Clean Air Act and the National Environmental Policy Act.

Section 309 specifically directs the EPA to review and comment in writing on the environmental impacts associated with all major federal actions as well as the adequacy of the EIS in meeting procedural and public disclosure requirements of NEPA. We have given this EIS an overall rating of LO (Lack of Objections). A description of our rating system is enclosed. 1

Although the NASA did not identify a preferred alternative, we believe, based on the analysis in the EIS, that Alternative 4-Maximum Cleanup Search and Recovery with Restricted Trajectories would be the environmentally preferable alternative, specifically due to the reduction of potential impacts to Wild and Scenic River segments and the Mollie Beattie Wilderness Area. We encourage the selection of Alternative 4 as the preferred alternative in the Final EIS. 2

We recognize that all action alternatives result in relatively minor impacts, with the exception of the generation of solid waste. Efforts to minimize the amount of waste as well as to properly manage it are incorporated into all alternatives; therefore, we do not have any specific recommendations to further reduce these impacts. 3 We encourage continued communication with interested stakeholders, particularly nearby residents and area users to ensure effective participation in the NEPA process. 4

001

Again, we appreciate the opportunity to offer comments on the Draft EIS. Please contact me at (206) 553-1601 or by email at reichgott.christine@epa.gov, or you may contact Jennifer Curtis of my staff in Anchorage at (907) 271-6324 or curtis.jennifer@epa.gov with any questions you have regarding our comments.

Sincerely,

Christine B. Reichgott, Manager
Environmental Review and Sediments Management Unit

Enclosure

001

U.S. Environmental Protection Agency Rating System for
Draft Environmental Impact Statements
Definitions and Follow-Up Action*

Environmental Impact of the Action

LO – Lack of Objections

The U.S. Environmental Protection Agency (EPA) review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC – Environmental Concerns

EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce these impacts.

EO – Environmental Objections

EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU – Environmentally Unsatisfactory

EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1 – Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis of data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2 – Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses or discussion should be included in the final EIS.

Category 3 – Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the National Environmental Policy Act and or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

* From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment. February, 1987.

K.2.1.1 *NASA's Response to Comment Document No. 001*

Comment Number	Response
1	NASA appreciates EPA's review of the EIS and notes EPA's rating of "LO."
2	NASA has identified a Preferred Alternative in the Final EIS. The Preferred Alternative is discussed in detail in Chapter 2, Section 2.4.
3	NASA notes EPA's comments regarding the impact assessments discussed in the EIS.
4	NASA agrees with EPA's comment regarding continued public outreach. A major component of the Launch Vehicle and Payload Recovery Plan (Appendix E of the EIS) is continued public outreach and coordination with landowners and stakeholders.

K.2.2 Comment Document No. 002
United States Department of the Interior
Pamela Bergmann

002

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
1689 C. Street, Room 119
Anchorage, Alaska 99501-5126

TAKE PRIDE IN AMERICA

VIA ELECTRONIC MAIL, NO HARD COPY TO FOLLOW

ER 12/695 November 26, 2012

NASA Wallops Flight Facility
PFRR EIS – Joshua Bundick, Manager
Mailstop: 250.W
Wallops Island, VA 23337

Subject: Comments for the Sounding Rockets Program Draft Environmental Impact Statement, Poker Flat Research Range, Alaska

Dear Mr. Bundick:

The U.S. Department of the Interior (DOI) has reviewed the September 2012, Draft Environmental Impact Statement for the National Aeronautics and Space Administration's (NASA) Sounding Rockets Program at the Poker Flat Research Range in Alaska (Draft EIS). We request that the following comments be taken into account by NASA in the Final Environmental Impact Statement (Final EIS). These comments are submitted in accordance with our expertise pursuant to the National Environmental Policy Act.

Chapter 3, Description of the Affected Environment, Section 3.7.2 Wildlife, Bearded Seals, Page 3-55. Cameron et al. 2010, in the 2010 Status Review for bearded seals, estimated 3,150 resident bearded seals residing in the Beaufort Sea year-round. However, in the Draft EIS, it was inaccurately stated that bearded seals are only seasonal migrants. While most bearded seals do migrate during the winter, many remain in the Beaufort Sea. [See Cameron, M. F., J. L. Bengtson, P. L. Boveng, J. K. Jansen, B. P. Kelly, S. P. Dahle, E. A. Logerwell, J. E. Overland, C. L. Sabine, G. T. Waring, and J. M. Wilder. 2010. Status review of the bearded seal (Erignathus barbatus). U.S. Dep. Commerce, NOAA Tech. Memo. NMFS-AFSC-211, 246 p.] This discrepancy needs to be corrected in the Final EIS. 1

Chapter 3, Description of the Affected Environment, Section 3.7.2 Wildlife, Muskoxen, Page 3-39. The Draft EIS states that muskoxen are the only ungulates residing on the North Slope year-round. This statement is inaccurate since the Teshekpuk Lake caribou herd mostly remains around Teshekpuk Lake throughout the year. Small numbers of caribou from the Porcupine Caribou herd, Central Arctic Caribou herd, and Western Arctic herd also reside year-round on the North Slope. [See Parrett, L.S. 2009. Unit 26A, Teshekpuk caribou herd. Pages 271-298 in P. Harper, editor. Caribou Management Report of Survey and Inventory Activities 1 July 2006 – 2

002

30 June 2008. Alaska Dept. Fish and Game. Project 3.0 Juneau, Alaska, USA.] This needs to be corrected in the Final EIS. 2 cont'd.

Chapter 3, Description of the Affected Environment, Section 3.7.2 Wildlife, Pages 3-38 – 3-58. We believe it is important for the Final EIS to include population estimates for all species in the existing environment, not just for some species (e.g. caribou and whales). 3

Thank you for the opportunity to review and comment on the Draft EIS. If you have any questions regarding these comments, please contact Sharon Warren with the Bureau of Ocean Energy Management at 907-334-5272 or sharon.warren@boem.gov.

Sincerely,

Pamela Bergmann

Pamela Bergmann
Regional Environmental Officer - Alaska

002

From: <Warren>, Sharon E <Sharon.Warren@boem.gov>
Date: Wednesday, November 28, 2012 7:30 PM
To: "Bundick, Joshua A. (WFF-2500)" <Joshua.A.Bundick@nasa.gov>
Cc: "Crews, Christopher E" <Christopher.Crews@boem.gov>
Subject: RE: DOI Comments for ER12-695 Sounding Rockets Draft EIS

Joshua,

I hope the following information provides an answer to your question. Chris Crews (a subject matter expert at BOEM) provided the response. He is available to provide you with any additional information or answer any further questions on this issue.

Bentzen et al. (2007) noted the presence of bearded seals in the winter diet of Southern Beaufort Sea polar bears. Generally bearded seals composed <18% of polar bear winter diets in the Southern Beaufort Sea indicating a relatively significant winter presence. Cameron et al. (2010) stated 3,150 bearded seal was an uncorrected estimate derived from surveys conducted in June, which is about the time when much of the sea ice breaks up. The status review (Cameron et al. 2010) went further to suggest such a low population number (3,150) would not explain the harvest of bearded seals in subsistence along the Beaufort Coast, and that the subsistence harvest levels for bearded seals in the Beaufort Sea are possible because of the numbers of bearded seals returning to the Beaufort Sea from the Chukchi and Bering Sea later in summer, after the time when the June surveys by Stirling et al. (1982) were conducted. These particular June surveys were the ones used to formulate the uncorrected population estimate of 3,150 bearded seals, which implies there is a population in June of around 3,150 bearded seals, that swells to a much higher number as seasonal migrants move into the area. This relationship suggests that there is a uncorrected year –round population estimate of about 3,150 bearded seals in the Beaufort Sea. The Bentzen et al. (2007) study clearly shows that there are bearded seals in the Beaufort Sea during winter, consequently it is reasonable to conclude that the 3,150 population estimate is best estimate of an overwinter Beaufort Sea bearded seal population that will increase later on during the summer with an influx of migrants from the Chukchi and Bering Seas. 1 cont'd.

Refs.

Cameron et al. 2010

1

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Bentzen et al. 2007
Bentzen, T.W., Follmann, E.H., Amstrup, S.C., York, G.S., Wooller, M.J. and O'Hara, T.M. 2007. Variation in winter diet of southern Beaufort Sea polar bears inferred from stable isotope analysis. Canadian Journal of Zoology 85: 596–608.

Sharon E. Warren
Regional Supervisor, Environment
Alaska Region
Bureau of Ocean Energy Management
3801 Centerpoint Drive, Suite 500
Anchorage, AK 99503-5823
Phone: 907-334-5272
Email: sharon.warren@boem.gov

From: Warren, Sharon E
Sent: Tuesday, November 27, 2012 2:37 PM
To: 'Bundick, Joshua A. (WFF-2500)'
Subject: RE: DOI Comments for ER12-695 Sounding Rockets Draft EIS

Joshua,

I will have our Subject Matter Expert review and provide you a response soon.

Sharon E. Warren
Regional Supervisor, Environment
Alaska Region
Bureau of Ocean Energy Management
3801 Centerpoint Drive, Suite 500
Anchorage, AK 99503-5823
Phone: 907-334-5272
Email: sharon.warren@boem.gov

From: Bundick, Joshua A. (WFF-2500) [mailto:joshua.a.bundick@nasa.gov]
Sent: Tuesday, November 27, 2012 1:17 PM
To: Warren, Sharon E
Subject: FW: DOI Comments for ER12-695 Sounding Rockets Draft EIS

Hi Sharon, thanks for the comments on the DEIS. I was hoping you could help clarify your first comment:

--
Chapter 3, Description of the Affected Environment, Section 3.7.2 Wildlife, Bearded Seals, Page 3-55. Cameron et al. 2010, in the 2010 Status Review for bearded seals, estimated 3,150 resident bearded seals residing in the Beaufort Sea year-round. However, in the Draft EIS, it was inaccurately stated that bearded seals are only seasonal migrants. While most bearded seals do migrate during the winter, many remain in the Beaufort Sea.

2

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[See Cameron, M. F., J. L. Bengtson, P. L. Boveng, J. K. Jansen, B. P. Kelly, S. P. Dahle, E. A. Logerwell, J. E. Overland, C. L. Sabine, G. T. Waring, and J. M. Wilder. 2010. Status review of the bearded seal (Erignathus barbatus). U.S. Dep. Commerce, NOAA Tech. Memo. NMFS-AFSC-211, 246 p.]

This discrepancy needs to be corrected in the Final EIS.

--

However, after researching the referenced document, I found the following, which doesn't seem to suggest that the estimate of 3,150 bearded seals applied to those overwintering; rather that it was a number derived from past surveys to estimate a summer population in both the Canadian and Alaskan Beaufort...please see below. Also, the current version of the EIS states that "bearded seals are not abundant there during winter...", which seems to correspond with the findings of a number of studies we have referenced...is there another document that you could point to that more than just a small amount of bearded seals overwinter in the Beaufort?

From Cameron et al 2010

2.8.1.4 Beaufort Sea

Aerial surveys of the eastern Beaufort Sea conducted in **June** during 1974 – 1979, provided estimates that averaged 2,100 bearded seals (Stirling et al. 1982), uncorrected for seals in the water. Annual variations in abundance (range = 1,300-3,100) may have been due to differences in sea ice conditions. It should be noted that because the surveys were designed chiefly for examining the distribution and density of ringed seals, their coverage of strata with the highest densities of bearded seals may not have been adequate. Bearded seals were much less abundant than ringed seals, and accurate estimates of their densities would have required greater coverage of survey areas (Kelly 1988). The ice-covered continental shelf of the western Beaufort Sea is roughly half the area surveyed by Stirling et al. (1982), **suggesting a crude estimate for the entire Beaufort Sea in June of about 2,100 X 1.5 = 3,150**, uncorrected for seals in the water.

--

Please let me know if you need any clarification. Thanks again for your review.

All the best,

Josh

Joshua Bundick
Lead, Environmental Planning
NASA Wallops Flight Facility
Wallops Island, VA 23337
O: (757) 824-2319
F: (757) 824-1819
Joshua.A.Bundick@nasa.gov

On 11/26/12 3:39 PM, "Cochon, Grace" <grace_cochon@ios.doi.gov> wrote:

3

002

Hi Joshua,

Attached are the comments from the U.S. Department of the Interior for ER12-695 Draft Environmental Impact Statement for the NASA Sounding Rockets Program at the Poker Flat Research Range, AK. Please let me know when you receive this message.

Thank you very much,
Grace

--
Grace Cochon
Regional Environmental Protection Assistant
U.S. Department of the Interior
Office of Environmental Policy and Compliance
1689 C Street, Room 119
Anchorage, Alaska 99501
phone: 907-271-5011
fax: 907-271-4102
grace_cochon@ios.doi.gov
http://www.doi.gov/pmb/oepc/anchorage.cfm

4

K.2.2.1 *NASA's Response to Comment Document No. 002*

Comment Number	Response
1	NASA notes the U.S. Department of the Interior's comment regarding bearded seals. Chapter 3 of the Final EIS has been revised to incorporate this information.
2	Chapter 3 of the Final EIS has been revised to incorporate this information.
3	NASA notes the U.S. Department of the Interior's comment regarding wildlife populations within the launch corridor. Wildlife species within the launch corridor are discussed in Chapter 3, Section 3.7.2. However, due to the low probability of impacting wildlife species within the launch corridor, population estimates for all species were not added to the Final EIS.

K.2.3 Comment Document No. 003
United States Air Force
Ed Lasselle

003

Subject: FW: DEIS for Sounding Rockets Program-Poker Flats

On 11/27/12 9:12 PM, "LASSELLE, J E JR GS-12 USAF PACAF 611 AOC/CODK" <j.lasselle@us.af.mil> wrote:

>Mr Bundick,
>
>I'm writing on behalf of the 11th Air Force Airspace and Range Team
>(611 AOC/CODK, JBER, AK).
>
>Based on my readings in the DEIS, we have "no comment" since this does
>not appear to affect military airspace (MOAs/ATCAAs); the rocket should
>be above the YUKON MOAs/ATCAAs, not in them. If this assumption is not
>true, further discussion is required. 1
>
>I would like to re-energize a courtesy notification that someone at
>Poker Flats used to provide the Air Force, but hasn't for the past
>several years. 2
>We're requesting that Eielson Range Control (comm. (907)377-3125) be
>notified prior to a launch. They can be reached during normal business
>hours and anytime the YUKON MOAs are active. Currently, we do not fly
>in the MOAs past 2200 hours (AK local time).
>
>We have a few questions regarding launches: How do you protect the
>airspace for a rocket launch at Poker Flats? Is there a TFR? NOTAM?
>Also, the YUKON ATCAAs can be active as high as 60,000 ft MSL - would
>the rocket trajectory have the rocket above 60,000 ft by 40 nm 3
>downrange if you used your easterly launch corridor?
>
>Good luck with your EIS!
>
>//signed//
>Ed Lasselle, GS-12, DAF
>611 AOC/CODK (Airspace & Ranges)
>DSN (317)552-5715
>COM (907)552-5715
>j.lasselle@us.af.mil
>
>

1

K.2.3.1 *NASA's Response to Comment Document No. 003*

Comment Number	Response
1	NASA appreciates the U.S. Air Force's review of the EIS and notes the Air Force's statement of "no comment" for the EIS. Regarding the military airspace, generally rockets fly above the Military Operations Areas (MOAs) and Air Traffic Control Assigned Airspace (ATCAAs); however, at times they do pass through them on either the up leg or down leg of a flight. To ensure that all activities within the airspace are de-conflicted, PFRR coordinates directly with FAA prior to launch.
2	As a standard practice, PFRR notifies Eielson Range Control, Fort Wainwright, and Elmendorf Air Force Base (AFB) prior to the launch window opening. NASA will work with PFRR to ensure that this practice continues.
3	Generally, rockets flown from PFRR would be far above 60,000 feet at 40 nautical miles downrange in any direction (with the exception of items re-entering). Regarding the airspace, it is protected in a number of ways. PFRR employs a combination of Temporary Flight Restrictions (TFRs) and Altitude Reservations (ALTRVs), all of which are issued as Notices to Airmen (NOTAMs) by Central Altitude Reservation Function (CARF). Additionally, range staff members are in direct contact with FAA during launch countdown and coordinate real-time to ensure there are no conflicts with airspace usage.

K.2.4 Comment Document No. 004
United States Fish and Wildlife Service
Richard Voss and Steve Berendzen

004

United States Department of the Interior
FISH AND WILDLIFE SERVICE
Yukon Flats National Wildlife Refuge
101 12th Avenue, Room 264
Fairbanks, Alaska 99701-6293

December 3, 2012

NASA Wallops Flight Facility
PFRR EIS – Joshua Bundick, Manager
Mailstop: 250.W
Wallops Island, VA 23337

Subject: U.S. Fish and Wildlife (FWS) comments on the Sounding Rockets Program Draft Environmental Impact Statement, Poker Flat Research Range, Alaska

Dear Mr. Bundick:

Thank you for the opportunity to review the September 2012, Draft Environmental Impact Statement for the National Aeronautics and Space Administration's (NASA) Sounding Rockets Program at the Poker Flat Research Range in Alaska (Draft EIS). We appreciate the inclusion of our earlier comments that we provided you on the pre-release draft. We request that the following comments be taken into account by NASA in their Final Environmental Impact Statement (Final EIS). These comments are submitted in accordance with our responsibilities pursuant to the National Environmental Policy Act and our status as a Cooperating Agency in the EIS.

We are having trouble discerning the tangible/significant differences in the alternatives with respect to the Recovery Plan Actions. Alternatives 1 and 3 include the Environmentally Responsible Search and Recovery of rockets feature. The narrative for these alternatives fails to clearly articulate what we understand to be the principal component of this feature, that the only parts of the rocket that may be routinely left on downrange lands, the safety of the recovery crew notwithstanding, would be those that are sufficiently buried in the ground such that removal would not be possible with simple hand or power tools. In those instances, it is our understanding from our conversations with you, the procedure would be to excavate a shallow trench around the rocket, cut off the above ground part for removal and bury the subterranean section. We would like to see this stated explicitly in the description of the alternatives section entitled "Recovery Procedures" on page 2-56 and in the summary table 2-11 on page 2-74. 1

Also per our conversations with NASA, we would like to see additional details in the same Recovery Plan Actions section for Alternatives 2/4 (Section 2.3.5, page 2-59, para2) as outlined below. Please include a detailed description of the types of recovery heavy equipment proposed (we understand this to be analogous to a bulldozer) and how that equipment might get to the recovery site – e.g. by heavy lift helicopter (e.g. Chinook) or by travel over land and the potential impacts that may occur from the various forms of travel to the site. Please describe which areas in the study area would lend itself to travel over land (from our perspective on refuges this would be limited to the immediate vicinity surrounding a village). Please acknowledge that any travel to the site or helicopter landing would have to be approved 2

004

in the special use permit issued by the land management agency. We agree with your assessment of the potential impacts from the heavy equipment itself as described on page 2-59.

Section 2.4.5 (pages 2-64 through 2-66) states that installation of a parachuted payload recovery system on all future missions is not a feasible alternative because it decreases NASA's ability to accomplish science objectives and is technically challenging. It should be made clear in this discussion that pursuit of a recovery system for all future missions and attaining science objectives are not mutually exclusive. This discussion should state that a continued long-term commitment to develop creative means to recover rocket parts will be pursued in concert with attaining science objectives. We appreciate the example of commitment to continued improvement of location aides found on page 2-51. Please also note that a viable rocket component recovery program is a current condition of the special use permits granted to University of Alaska Fairbanks by the FWS.

- To reinforce NASA's long term commitment to adoption of a full recovery rocket parts program please amend Section 1.2 Policy, page 1, last sentence, as follows (additions underlined): "However, NASA is committed to implementing a multi-tiered recovery approach that addresses both past and future launches including a continued long-term effort in pursuit of a functional recovery system of rocket parts for all future missions in order to continue operations at PFRR within a sensitive environmental context. This will be achieved with continuous technology improvements to track, locate, and remove rocket debris." 3
- Please also insert in Section 2.4.5 in the opening paragraph the total number of missions to date that did include a recovery system.

We offer the following component addition to Table2-11 which would apply to alternatives 1-4:

- Pursue long term efforts to implement a full rocket parts recovery program for all future missions through continuous technology improvements to track, locate, and remove rocket debris. 4

Although NASA did not identify a preferred alternative, we feel that if the above changes are made, Alternative 3, "Environmentally Responsible Search and Recovery with Restricted Trajectories", would be the best alternative for the National Wildlife Refuges found downrange. Specifically, we believe that removing buried rockets would likely cause more damage to the environment than leaving the buried parts in-situ and we therefore support the cleanup of all rocket parts except those buried deeply in the ground and restricting trajectories to protect the Wild and Scenic River Corridors. We feel that these provisions will reduce potential impacts and best protect the resources and visitor experiences at Arctic and Yukon Flats National Wildlife Refuges. 5

If you have any questions regarding these comments please contact Anne Marie La Rosa, Deputy Refuge Manager, Arctic NWR, 456-0549 or Mark Bertram, Wildlife Biologist, Yukon Flats NWR, 456-0446.

Sincerely,

Richard Voss
Refuge Manager
Arctic National Wildlife Refuge

Steve Berendzen
Refuge Manager
Yukon Flats National Wildlife Refuge

K.2.4.1 *NASA's Response to Comment Document No. 004*

Comment Number	Response
1	NASA notes USFWS's comment regarding the need for clarification between alternatives evaluated in the EIS. Chapter 2, Section 2.3, has been revised to add clarification regarding the alternatives evaluated in the *PFRR EIS*.
2	In response to the USFWS comment, NASA prepared additional detailed analysis of the possible effects of using heavy mechanized equipment for recovery of flight hardware in downrange lands (see Appendix I). In consideration of the logistical, fiscal, and potential environmental costs of conducting such a recovery, NASA has dismissed the regular use of heavy mechanized equipment in its Recovery Program. As such, a summary of this option has been added as an alternative considered but dismissed from further study in Chapter 2, Section 2.5.7.3, of the *PFRR EIS*.
3	Comment noted. The Launch Vehicle and Payload Recovery Plan (Appendix E) and Chapter 2 of the EIS have been revised per this suggestion.
4	Comment noted. Chapter 2 has been revised per this suggestion.
5	Comment noted. NASA has identified a Preferred Alternative in the Final EIS. The Preferred Alternative is discussed in detail in Chapter 2, Section 2.4.

K.2.5 Comment Document No. 005
Northern Alaska Environmental Center
Pamela Miller

1

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

SOUNDING ROCKETS PROGRAM AT POKER
FLAT RESEARCH RANGE
DRAFT ENVIRONMENTAL IMPACT STATEMENT

PUBLIC MEETING
DATE: OCTOBER 25, 2012
6:00 p.m.

BLM FAIRBANKS DISTRICT OFFICE
1150 UNIVERSITY AVENUE
FAIRBANKS, ALASKA 99709

Amy Hartley, Facilitator
PANEL MEMBERS:
Mr. Joshua Bundick, NASA Wallops Flight Facility
Mr. John Hickman, NASA Wallops Flight Facility

REPORTED BY: Natalie Gil
KRON ASSOCIATES
COURT REPORTING
(907) 276-3554

KRON ASSOCIATES
1113 W. Fireweed Lane, Suite 200
Anchorage, Alaska 99503
(907) 276-3554

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

DRAFT ENVIRONMENTAL IMPACT STATEMENT

SOUNDING ROCKETS PROGRAM AT POKER
FLAT RESEARCH RANGE

TRANSCRIPT OF PUBLIC COMMENT

PAMELA A. MILLER
Arctic Program Director
Northern Alaska Environmental Center

Fairbanks, Alaska
October 25, 2012
7:48 o'clock p.m.

KRON ASSOCIATES
1113 W. Fireweed Lane, Suite 200
Anchorage, Alaska 99503
(907) 276-3554

1 P R O C E E D I N G S

2 7:48 p.m.

3 MS. HARTLEY: Okay, so any other questions? All right, so
4 again, now we're in that formal comment period. And this is a
5 format or a forum for you to provide input regarding the
6 contents of the Draft EIS. So, when you're offering a comment,
7 please be as specific as possible. And if -- we're going to
8 start with Pamela Miller. Is Pamela Miller still here? All
9 right. And if you wouldn't mind coming over and just standing
10 near this table here because that's where the microphone is.
11 And if you would like -- any organization or if you are
12 affiliated with anyone, please state your name and that
13 organization.

14 MS. MILLER: My name is Pamela A. Miller. I'm
15 representing Northern Alaska Environmental Center. I'm the
16 Arctic Program Director and resident of Fairbanks. And I -- we
17 really appreciate the hard look that has gone into this EIS
18 process. And that an activity that has gone on for a long time
19 without a lot of scrutiny and thought about how its operations
20 are affecting the environment, that you have taken this really
21 good look. Clearly we support research endeavors of our great
22 university down the road from where our office is. And it's
23 importance in answering key questions of climate. And I'm
24 particularly interested in the air quality monitoring of 1
25 nitrogen oxides. I think that kind of research will

1 increasingly be important. And I guess, I would hope that this
2 -- these are not very formal comments at this stage in the game.
3 I would hope that the EIS looks forward to -- sometimes
4 it's unforeseen with technology -- may there be a different kind
5 of rocket, a different kind of launch that there will be a lot
6 of demand for the science in the future. And as all this -- 2
7 activities increasingly happening in the ocean as well in our
8 State. How will you adapt the decisions that are made for five
9 or ten years down the road to realize, hey, we've got a whole
10 lot more going here than we had up until now. I think there are
11 impacts to the local residents at the launch site. 3
12 By rumor at the last meeting, I heard from at least one
13 resident who lived in the area, and that there is noise. And 4
14 that it is disruptive. And to keep that in mind when timing of
15 the operations. And you probably address that in the EIS. But
16 that is an impact within our regional community here in
17 Fairbanks.
18 Clearly the public lands that are affected down range of
19 this project are a primary concern -- integrity in the purposes
20 of the Arctic Refuge, Yukon Flats Refuge, the White Mountains
21 National Recreation Area, State's conservation area. And I will 5
22 just note that Yukon Flats National Wildlife Refuge does have a
23 recommended wilderness area along the White Mountains flank
24 that's in existence today. There may be other similar areas

like that in the Arctic Refuge in the future.

And there's under consideration for the White Mountains in their ongoing plan that's on the table right now for public comment to have at least one of the alternatives -- recommends a White Mountains area of critical environmental concern to address the sheep and the caribou in the White Mountains. The map -- it looks like you've addressed that issue. But that particular -- that it could be designated in a more protective way than it is today. I think it's important to note. I did look at the map having to do with caribou and it shows the calving areas for the Porcupine Caribou herd. But I think it would be helpful for your operations and for the planning to also include on that map the migratory routes of the caribou and to acknowledge the wintering grounds of the porcupine caribou. Because those are animals that are hunted, as well as it is important habitat for the animals themselves.

5 cont'd.

6

I would say for the -- let's see here -- the recovery, it's a tough choice evaluating the trade offs of alternative three and four. How much effort and what kind of impact is there from the recovery effort? And so we're evaluating which alternative to recommend and we'll do that in writing.

7

Clearly, we would love to see an alternative analyzed that didn't have any of this in the Arctic Refuge and in these other prized public lands. Given that that's probably unrealistic

8

1 having had such a long use of this program, you know, we think
2 you've done a pretty good job of looking at some management 8 cont'd.
3 recommendations. I think the fall time and -- for the recovery
4 operation, perhaps more specifics should be identified of the
5 sensitive times, where and what. So that there's no having to
6 plan on the fly in the summer time or the fall time or whatever,
7 because the -- there's -- is a real busy time when the caribou
8 are moving south in August into September. There's hunting in
9 Artic Village. There's a lot of activity -- sports hunters. 9
10 There's activity of recreational use still. It's a really busy
11 time. And avoiding that time for the recovery efforts, other
12 than if you're piggy backing on something that's already
13 happening in the area or it might make sense. That's the one
14 time I saw that, I'm not sure, I know there's been good input
15 from the land management agencies and I really appreciate their
16 work on it. But that's one time period I could really see
17 issues with.
18 And, I am concerned about the cumulative impacts in the 10
19 Arctic Ocean when we're looking out five, ten years from now. I
20 think, taking for granted that it's not a problem to be dumping
21 these things up there. I would like to see a little bit more of
22 that addressed in the document. And as I said in the questions, 11
23 I think, with a lot of the science programs that are going on
24 right now, there's an effort to have the scientists let the

1 communities know when they're coming and give presentations in
2 the schools.
3 I think there's a good opportunity in Kaktovik, as well as
4 some of the other villages that you've already gotten that 11 cont'd.
5 started in and that could be something that the agencies could
6 consider in their permit aspects of the program.
7 And, I think -- we appreciate that you've done that -- the
8 communication with the villages. And I suggest just bringing up
9 the fall time period and just talking about where people are out
10 on the land. Assuming that you know where everybody is all the 12
11 time, I think is impossible. Because people do travel. We get
12 these crazy skiers who hike up in the winter and ski from
13 Fairbanks to the Arctic Ocean. The chances they're going to get
14 hit by, you know, it's a very low chance. But people can be out
15 there and just keep that in mind.
16 Let me just take a quick look to see if I've raised what I
17 wanted to. Oh, I -- with respect to the debris, when it -- in
18 the recovery program, I would recommend that there be a -- a
19 requirement for the mitigation that it not go into the landfills
20 of these villages. It's a burden to them and if there are 13
21 contaminated materials -- lead, whatever -- it's -- they didn't
22 ask for it to come into their part of the world. And I think it
23 should be properly disposed of. And not add to the long term
24 cost of remote landfills, where once it's here, it's not

1 leaving. And it could incur greater costs that way. But I
2 think it's a worthwhile thing to consider and to do. 13 cont'd.
3 So, thank you for your work on this. I think it's a
4 pretty well written, easy to read document. And we will be --
5 I'll be finishing looking at it and make some further, more
6 specific recommendations about the Alternative. Thank you.
7 MS. HARTLEY: Thank you for your comments. Are there any
8 other comments that anybody would like to place on the record?
9 Oh. Come on back.
10 MS. MILLER: I would -- this is Pam Miller again -- I
11 would be in remiss to say that I talked about the remarkable
12 values of these public lands, the conservation system units that
13 we're talking about and wilderness is a really important value.
14 And I think you've acknowledged that in the document. I think
15 it is a really important value for the Fish and Wildlife Service 14
16 in their permitting of these activities that have gotten into
17 the Refuge a long time ago. And we clearly want to do, you know
18 -- they're remarkable wilderness values and that should be
19 something we all strive to keep well into the future. So, thank
20 you.
21 MS. HARTLEY: So it doesn't look like anybody else is
22 interested in providing a formal comment. So we'll go ahead and
23 conclude the public comment portion.
24 7:59 p.m.

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1 END OF REQUESTED PORTION

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KRON ASSOCIATES
1113 W. Fireweed Lane, Suite 200
Anchorage, Alaska 99503
(907) 276-3554

TRANSCRIBER'S CERTIFICATE

I, Natalie Gil, hereby certify that the foregoing pages numbered 3 through 8 are a true, accurate and complete transcript of proceedings of the Public Comment for Environmental Impact Statement for the Sounding Rockets Program at Poker Flat Research Range, transcribed by me from a copy of the electronic sound recording to the best of my knowledge and ability.

December 7, 2012 — Natalie Gil

Date — Natalie Gil

KRON ASSOCIATES
1113 W. Fireweed Lane, Suite 200
Anchorage, Alaska 99503
(907) 276-3554

K.2.5.1 *NASA's Response to Comment Document No. 005*

Comment Number	Response
1	NASA notes the commenter's interest in weather and climate-related research. The summary of research enabled by PFRR has been expanded to include more discussion of its applicability to weather and climate-related sciences. Additionally, Appendix J has been added to provide the reader with a more detailed list of recent publications stemming from PFRR-enabled research.
2	Chapter 1, Section 1.1.5, of the EIS discusses the science that is conducted by the NASA Sounding Rockets Program at PFRR. As discussed in Chapter 2, Section 2.3.1, NASA forecasts that an average of about four launches per year would be conducted at PFRR, but could range up to eight launches per year. This is NASA's best estimate based upon recent and reasonably foreseeable future launch rates and program funding profiles. However, as noted by the commenter, given the possibility for future changes in launch frequency, types of launch vehicles, or the environmental conditions within the PFRR flight corridor, NASA undertakes an annual review of all PFRR sounding rocket launches. Should future changes to the program or environmental context have the potential to notably change environmental impacts presented in the EIS, NASA would prepare additional NEPA analysis, as appropriate.
3	Chapter 4 provides detailed discussion of the potential impacts from the alternatives evaluated in the EIS. As a matter of practice, PFRR posts public notices of its upcoming launches such that potential impacts on local residents are minimized.
4	Potential impacts of noise associated with the alternatives evaluated in the EIS are discussed in Chapter 4, Section 4.5. As a matter of practice, PFRR posts public notices of its upcoming launches such that potential impacts on local residents are minimized.
5	USFWS and BLM are cooperating agencies in the development of the EIS, and both have provided key information regarding the existing and potential future land uses within the launch corridor. Potential impacts on and compatibility with existing land use designations within the lands within the launch corridor are discussed in Chapter 4, Section 4.8. Potential future changes in land uses (*e.g.*, future recommended Wilderness, establishment of BLM Areas of Critical Environmental Concern [ACECs]) are discussed in Section 4.15, "Cumulative Effects."
6	Chapter 3, Figure 3–4, has been revised to include the general migratory routes of the Porcupine Caribou Herd.
7	Chapter 2, Table 2–12, "Summary of Potential Impacts by Alternative," provides a comparison of the potential impacts per alternative evaluated in the EIS. NASA has identified its Preferred Alternative in Section 2.4 of the Final EIS.
8	NASA evaluated a range of potential alternatives that would avoid impacts on the subject public lands; however, they were dismissed from further consideration due to their inability to meet NASA's purpose and need for conducting operations at PFRR. Chapter 2, Section 2.5, of the EIS discusses these alternatives. Additionally, NASA has updated Chapter 2, Section 2.6, and Chapter 4 to include further clarification and impacts analysis of scenarios if BLM and/or USFWS decided not issue an authorization.

Comment Number	Response
9	NASA analyzed the potential impacts on wildlife, recreation, and subsistence use resources from the alternatives evaluated in the EIS. The potential impacts on wildlife are discussed in Chapter 4, Section 4.7.4; the potential impacts on recreation are discussed in Chapter 4, Section 4.8; and the potential impacts on subsistence use resources are discussed in Chapter 4, Section 4.10. Regarding the suggestion of "piggy-backing" recovery efforts onto other operations within the launch corridor, NASA is very interested in leveraging all available resources, including land management agency activities or existing commercial flights, to remove flight hardware from downrange lands, and would direct PFRR to pursue them as appropriate. A recent example of leveraging such resources is when BLM "smoke jumpers" were employed to remove several items in 2011.
10	Cumulative effects are discussed in Chapter 4, Section 4.15, of the EIS.
11	A key component of ensuring the effectiveness of the Recovery Program is to establish and maintain active public outreach efforts. Appendix E, Section 4.0, outlines the outreach and recordkeeping component of the Recovery Program. This includes posting notices in local media (*e.g.*, newspaper) to inform the public of the upcoming launch; providing downrange landowners a mission "fact sheet" that includes a brief summary of the mission's objectives, the launch vehicle and recovery aides to be used, a map and location of the planned impact points, and span of the launch window; and distributing handouts to all local commercial aircraft companies, the local chapter of the private pilots association, and local guides to remind aviators and guides of the Rewards Program and the process to follow should either a staff member or client encounter a suspected piece of flight hardware. This same handout would also be distributed to all Alaska Native Village Councils within and adjacent to the PFRR flight corridor. Regarding outreach to Village schools, NASA and PFRR staff gave presentations to several schools in parallel with preparing the EIS. All were well received, and as such, NASA would encourage PFRR to continue this type of outreach as practicable.
12	Safety is NASA's top priority in conducting its operations at PFRR. As a matter of practice, each year PFRR coordinates with all Villages in the downrange lands to ensure that its population estimates are up to date and to confirm the areas of highest seasonal usage. The information is then utilized in developing safety plans for each mission.
13	Chapter 4, Section 4.12, discusses the potential impacts of waste management from the alternatives discussed in the EIS. As discussed in Section 4.12 and the Launch Vehicle and Payload Recovery Plan (Appendix E of the EIS), when rocket hardware is recovered from the launch corridor, it is returned to the launch site and disposed of in accordance with all Federal, state, and local regulations. Under no circumstances would a PFRR-commissioned recovery operation intentionally dispose of its waste in a Village landfill.
14	Comment noted. NASA recognizes the importance of the downrange lands, and as such has incorporated flight hardware recovery and/or avoidance of the most sensitive lands *(i.e.*, designated Wilderness, designated Wild Rivers) as integral components of each alternative considered in detail in the EIS.

K.2.6 Comment Document No. 006
The Wilderness Society
Wendy Loya

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THE WILDERNESS SOCIETY

December 7, 2012

NASA Goddard Space Flight Center
Wallops Flight Facility
Wallops, Island, VA 23337

RE: Comments on the Poker Flats Research Range (PFRR) Draft Environmental Impact Statement

Dear NASA:
Please accept the following comments on the Draft Environmental Impact Statement (DEIS) for the Sounding Rockets Program at Poker Flat Research Range (SRP at PFRR) with regards to additional important issues that we believe should be addressed in the final EIS. These comments are submitted by The Wilderness Society on behalf of: Alaska Wilderness League, Center for Biological Diversity, Defenders of Wildlife, Friends of Alaska National Wildlife Refuges, Natural Resources Defense Council, Sierra Club, Wilderness Watch, Winter Wildlands Alliance and individuals, Brad Meiklejohn and Allen Smith.

We continue to appreciate the time that individuals at NASA, PFRR, USFWS, BLM and others have taken to help us better understand the EIS process, history of NEPA analyses. We also appreciate the documents produced related to the sounding rockets program that better explain the rockets and debris falling on lands managed by the Department of the Interior.

We also appreciate the efforts put forth by NASA, PFRR and others the past two years to begin to recover debris from recent and past launches. We hope that our comments here can help minimize future impacts to the lands that many Alaskans, Americans and the global community appreciate for their wildness values.

In summary, we do not support any alternatives that diminish or endanger the values of the federal lands managed by USFWS and BLM that are downrange of PFRR and can only support an alternative that protects those values.

The DEIS fails to present a viable alternative as follows and detailed in our technical comments below:

1. The alternatives presented do not preserve the invaluable Wilderness characteristics of downrange lands. 1
2. Landing debris on National Wildlife Refuges (NWR) is not compatible with their purposes. 2
3. The current No Action Alternative should be dismissed because it fails to meet the requirements of the existing land use permits from USFWS. 3
4. The DEIS should include one or more reasonable alternatives which consider discontinuing the SRP at PFRR, which is essential for providing a baseline for comparing the impacts of the alternatives presented in the DEIS. 4
5. The DEIS fails to adequately describe the importance of the science conducted as part of the SRP at PFRR and its relationship to the purposes of the public lands which it impacts. 5
6. The DEIS dismisses adoption of NASA's own numerical risk criteria as a means to protect high value lands, including identified wilderness and wild rivers. 6
7. DEIS fails to establish USFWS and BLM's purposes in managing lands downrange of PFRR. 7
8. The amount of debris that is likely to be removed is overestimated. 8
9. The impact on Land Use and Recreation, and the wilderness within this category, has the potential to be significant under all alternatives presented in the DEIS. 9

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After carefully considering the information that has been presented in the DEIS, we could support a modified version of Alternative 3, but only if it:

1) Reduced the probability to zero (0.0%) of landing debris (stages, payloads or other)on USFWS and BLM lands designated, proposed, and/or recommended as Wilderness or Wilderness Study Areas as well as designated, proposed and recommended Wild and Scenic Rivers. Henceforth, we will define these as "**identified wilderness and wild rivers.**"
2) Did not plan to land debris on non-wilderness lands managed under the USFWS National Wildlife Refuge System, unless the research is directly related to providing scientific information to meet the purposes for which the refuges were established. 10
3) For all USFWS and BLM administered public lands, adopt a recovery program that maximizes recovery of all past and future debris while minimizing environmental impacts.
4) For all other state, tribal or private lands, establish a recovery program which conveys a responsible land ethic on behalf of NASA and PFRR to land owners and to investigators, especially student mentorees, regardless of permit requirements.

Our detailed analysis of the DEIS is as follows:

1. The alternatives presented do not preserve the invaluable Wilderness characteristics of downrange lands and the EIS must consider an alternative that does not allow program impacts on these lands.

When NASA looks at a map of the area north of PFRR, it sees a largely blank area with few towns, airports or high-value infrastructure and perceives this to be an appropriate area where it can drop its debris. For more than 40 years NASA has treated these lands as a dumping ground with no intention of cleaning these areas up. Even today, NASA is only willing to expend 10% of its budget for this program to attempt to cleanup past and future debris on federal lands. It continues to think that leaving all of its debris on state lands, administered by Alaska Department of Natural Resources, is acceptable and therefore exempt from recovery programs presented in the DEIS for the SRP at PFRR.

When our organizations and our members look at this map, we see one of the few remaining large wilderness areas in our nation. The lands administered by the USFWS and BLM remain predominantly free from roads and infrastructure because they are recognized for their wildlife habitat, wilderness and recreational values prior to, and as a result of, ANILCA. While neither Yukon Flats NWR nor Arctic NWR are designated Wilderness in their entirety, nor is there designated Wilderness in the Steese NCA or White Mountains NRA, there is no doubt that both refuges and much of the BLM lands have significant wilderness values. The fact that there is no "high-value infrastructure" in the lands downrange of PFRR makes this land invaluable. 1 cont'd.

An individual seeking a wilderness experience is likely to have a diminished experience if they are to come across rocket debris or to have their solitude disrupted by recovery operations. The overlap between the time when most people choose to explore the wilderness of Arctic NWR and the Yukon River wilderness in Yukon Flats NWR is during the summer, the season when recovery operations are permitted to occur. A once-in-a-lifetime experience could be altered by the debris and recovery operations. While the DEIS describes motorized users as less likely to be impacted by debris, we disagree with that generalization. Explorers seeking a wilderness experience in the remote BLM lands may expect to encounter other users, both mechanized and un-mechanized, cabins and intermittent fixed wing aircraft use. Individuals in Arctic NWR might expect to hear fixed wing aircraft but no other sounds, people or infrastructure. Few of any of these users are likely to want to observe garbage on the landscape, such as used toilet paper, abandoned snowmachines or rocket stages.

Wilderness areas hold values protected in law and great value for many people and therefore deserve protection. Because Wilderness designation requires complex legal steps until Congress acts, we feel it is important that wilderness quality lands at all stages of review (proposed, recommended, study areas and designated) be managed and protected to ensure preservation of their wilderness characteristics, as defined by the Wilderness Act of 1964. Wild Rivers are protected for similar unspoiled characteristics within a watershed.

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DEFINITION OF WILDERNESS

A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value. [Wilderness Act of 1964]

WILD RIVERS

Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.

As part of the revision of the Arctic NWR Comprehensive Conservation Plan (CCP), all lands within the Arctic Refuge are undergoing Wilderness Review, and we fully support that the lands be proposed or recommended by the FWS for Wilderness Designation. Rocket debris landings are inappropriate on lands that are proposed or recommended for Wilderness designation and should be managed to maintain their wilderness qualities. Our organizations have been working to protect this crown jewel of the National Wildlife Refuge System from all forms of threat to its wilderness character for decades, and we have been dismayed to find that NASA feels it is acceptable to land and leave rockets scattered across these wildlands. 1 cont'd.

It is also likely that the FWS will be revising the CCP for Yukon Flats in the coming year. This refuge is a mosaic of wetlands, rivers, ponds and forest that provide critical habitat for moose, caribou, migratory birds, fish, wolves, grizzly bears and many other species. As with the Arctic Refuge, the communities within the boundaries of Yukon Flats use these lands and their own lands for meeting their subsistence needs, and the refuge contains very high-value wildlife habitat overall. We are concerned about the potential impacts of this program to the entire Yukon Flats Refuge, and believe that, in particular, the USFWS designated Wilderness Study Area, which is along the southern portion of the Refuge and managed as if it were designated Wilderness, should not be a landing site. Impacts to Beaver Creek National Wild and Scenic River are a further concern, and this area should also be exempt (zero probability) from consideration as a landing site for debris. Virtually all of Yukon Flats NWR was found to qualify for Wilderness Area designation under the mandated ANILCA Sec. 1317 Wilderness Reviews.

It should also be noted that the Steese NCA and White Mountains NRA are undergoing evaluation for their wilderness value as part of the Eastern Interior Resource Management Plan and DEIS. In the preferred alternative of the DEIS, the BLM has recommended that wilderness characteristics be maintain 640,000 acres in the Steese and 312,000 acres White Mountains. While it appears unlikely that these areas will be proposed for Wilderness designation at this time, their wilderness characteristics should be maintained, including removal of any rocket debris.

The EIS should analyze an alternative where federal lands falling in the following categories will be exempt from consideration as a landing site for debris from the SRP at PFRR: Proposed Wilderness and Wild Rivers, Recommended Wilderness and Wild Rivers, Wilderness Study Areas and Designated Wilderness and Wild Rivers. This alternative meets the criteria outlined in the DEIS for selection of reasonable alternatives (2.2; DEIS at 2-45), including:

- Continued siting at PFRR;
- Continued ground-based research at Fort Yukon, Toolik, Kaktovik or other air-accessible communities with permission, such as Arctic Village and Venetie;

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- Addresses concerns about impacts to "sensitive areas" defined as designated Wild Rivers and Wilderness areas, but expanded to include lands proposed and recommended through the administrative process for identifying and/or designating Wilderness and Wilderness Study Areas, including USFWS CCPs and BLM Resource Management Plans (RMPs), ;
- Allows for the same launch and recovery operations presented in the DEIS (requires restriction or innovation of vehicles launched); and
- Allows for the same options for recovery of existing flight hardware.

1 cont'd.

Failure to consider this reasonable alternative violates NEPA.[1]

Although a vehicle to meet the criteria of our recommended alternative may not currently be in NASA's preferred arsenal, we believe in NASA's ability to adapt the program to meet research needs while eliminating impacts on wilderness and wild rivers and cleaning up past and future debris is an important outcome of this evaluation.

2. Landing debris on National Wildlife Refuges is not compatible with their purpose

Due to the incapability of the SRP at PFRR with the purposes of the Arctic NWR and Yukon Flats NWR, NASA should not plan to land debris on these lands. NASA should adopt a numerical risk criteria of 1:100 or greater for avoiding impacts to lands administered by USFWS.

We fail to understand how the USFWS has been able to make a Compatibility Determination and permit NASA's SRP for decades (stated as 1981 for Arctic and 1988 for Yukon Flats (DEIS at 2-21)). In the current compatibility determination (DEIS at C-15-23), the Justification (DEIS at C-22) states:

> It is the policy of the Service (4 RM 6.1) to encourage and support **research and management studies in order to provide scientific data upon which to base decisions regarding management of units of the refuge system.** The Service may permit the use of a refuge for investigatory scientific purposes when such use is compatible with the objectives for which the refuge is managed.
>
> Priority will be given to studies that contribute to the enhancement, protection, use, preservation and management of current, indigenous wildlife populations and their habitats in their natural diversity. All proposed research conducted by other agencies or entities will be thoroughly evaluated prior to authorization and then monitored closely to ensure the activities do not materially interfere with or detract from the purposes of the refuge or the mission of the National Wildlife Refuge System.
>
> Scientific investigations of wildlife, resources, and social interactions will support the refuge's ability to provide for wildlife-dependent priority public uses and to meet other refuge purposes. These investigations must be conducted safely.

2 cont'd.

According to the DEIS, most of the missions conducted in the past 10 years have been primarily to study space weather, disturbances to the magnetosphere and ionosphere, auroral science, and other high-

[1] NEPA requires that an EIS include "alternatives to the proposed action." NEPA § 102, 42 U.S.C. § 4332(2)(C)(iii). The alternatives analysis is "the heart of the environmental impact statement," 40 C.F.R. 1502.14, the purpose of which is to analyze a variety of impacts and present a range of choices to the decision maker. *Id*; 40 C.F.R. § 1505.1(e). Accordingly, the EIS must include an evaluation of "all reasonable alternatives," 40 C.F.R. § 1502.14(a), and provide the decisionmaker with a "range of alternatives" from which to elect. 40 C.F.R. § 1505.1(e). While what is considered a reasonable range will vary depending on the proposed action, the alternatives considered must "cover[] the full spectrum of alternatives." Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, 46 Fed. Reg. 18026 (1981) (hereinafter "CEQ 40 Questions"). The "existence of a viable but unexamined alternative renders an [EIS] inadequate." *Westlands*, 376 F.3d at 868 (quoting *Morongo Band of Mission Indians v. Fed. Aviation Admin.*, 161 F.3d 569, 575 (9th Cir. 1998)).

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atmosphere phenomena (DEIS Table 1-1 at 1-7-8). Only one study in February 2011 has even a tenuous link to science appropriate to the refuges through indirect climate science applications. None of these missions, or those focused on rocket engineering that are not listed, meet any elements in the Justification in the Compatibility Determination *for investigatory scientific purposes when such use is compatible with the objectives for which the refuge is managed*. Further, it is not at all clear how the data and scientific information gathered from past missions have been used to help FWS make management decisions for the refuges.

Further, as stated in the DEIS, the Fish and Wildlife Service may only authorize uses of refuges that they determine to be compatible with the purpose of the refuge and the mission of the Refuge System. A compatible use, as defined in law[2] and regulation, is "a proposed or existing wildlife-dependent recreational use or any other use of a national wildlife refuge that, based on sound professional judgment, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission or the purpose(s) of the national wildlife refuge. " In analyzing whether a use is compatible or not, the USFWS must also ensure that it maintains the biological integrity, diversity, and environmental health" of the Refuge System. As stated in the Refuge Compatibility Policy[3]:

> "A significant directive of the Refuge Administration Act is to ensure that we maintain the biological integrity, diversity, and environmental health of the National Wildlife Refuge System for present and future generations of Americans…Uses that we reasonably may anticipate to conflict with pursuing this directive to maintain the ecological integrity of the System are contrary to fulfilling the National Wildlife Refuge System mission and are therefore not compatible. Fragmentation of the National Wildlife Refuge System's wildlife habitats is a direct threat to the integrity of the National Wildlife Refuge System, both today and in the decades ahead. Uses that we reasonably may anticipate to reduce the quality or quantity or fragment habitats on a national wildlife refuge will not be compatible."[4]

2 cont'd.

While the proper forum to address our concerns with the Compatibility Determination is through the public review process for the Determination, , it is clear to us that the USFWS Compatibility Determination does not support the Arctic NWR purposes in ANILCA and does not justify the permitted rocket activity. Although the current Compatibility Determination does not come up for renewal until January 2014, given that there is now an EIS on this issue and increased public involvement, we encourage FWS to reevaluate the compatibility of the use. USFWS Policy 603 FW 2 Compatibility 2.11.H. Further, it appears that a Research and Monitoring Special Use Application and Permit (Research Permit) is submitted for each mission (e.g. DEIS at C-26). We encourage the USFWS, a cooperating agency on this DEIS, to take a hard look at proposed missions to ensure they are research and management studies that provide scientific data upon which to base decisions regarding management of units of the refuge system. Further, the science should be conducted in a way that meets basic academic rigor, including analysis, write-up and publication (Section 24 of the Research Permit). Because of the limited information presented in the DEIS on the outcomes of research through the SRP at PFRR, we have spent some time exploring web-based information from NASA and SRP Investigators to trace the outcomes of the SRP at PFRR from mission to publication. We have failed to find information on how much of the science conducted at PFRR results in publishable, credible science, how it might relate to refuge purposes, how it is used to assist USFWS in making management decisions about the refuges, or how it is applied in other ways to meeting our nation's most critical science needs. This information should be provided or referenced in the DEIS, as well as to USFWS as part of the Research Permit process, and if it is not adequate to justify the impacts to refuge lands, the permit should be denied.

We support the research elements of the SRP at PFRR that provide quality data in the field of heliophysics, as described in the DEIS, but do not believe that it should come at the cost of unrecoverable debris left on our public lands. Efforts in the past two years to recover debris have only resulted in a 50% recovery, leaving

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[2] United States. National Wildlife Refuge System Improvement Act of 1997. PL 105-57. Congressional Record. Washington DC: GPO, October 9, 1997.
[3] 603 FW 2 *Service Manual*.
[4] 603 FW 2.5A *Service Manual*.

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large stages of rockets on the landscape. We also have concerns about launches that are engineering in nature, which are not presented in the DEIS, as these may not need to be at PFRR to meet their goals and thus provide unnecessary impacts on our national conservation estate. PRFRR launches whose mission in improved engineering that will deposit debris on BLM and USFWS lands should only be permitted if they cannot be accomplished elsewhere based on latitude, not economics. We also are concerned that this program trains young scientists in a manner that appears to make it acceptable to leave debris on our public lands. Thus, we support the approach of alternative three, removing as much debris as is feasible without having to use heavy equipment, with previously noted expansion of restrictions on USFWS lands and all identified wilderness and wild river areas. 2 cont'd.

3. The current No Action Alternative is flawed.

Failure to meet the basic criteria of the Research Permit issued by USFWS that payloads be tracked and recovered means that the current No Action alternative is illegal and should therefore be eliminated from consideration in the EIS. NASA recognizes this, yet still proceeds with this alternative. As stated in the DEIS (e.g. at 4-79), "The removal of payloads or spent stages, as requested by scientists, as is expected to occur under the No Action Alternative, would not be consistent with existing land use permits." Further, NASA states that installing a recovery system would "have several key considerations that would render it unfeasible for the majority of missions conducted at PFRR " (DEIS at 2-64) and is therefore stating that it wll not meet the terms of the Research Permit .

Further, the permit stipulates that recovery overflights must be conducted at 2,000 feet, which would severely limit NASA's ability to locate debris for recovery. This altitude stipulation is important to protect wildlife from disturbance during the winter and to protect both wildlife and wilderness travelers during the summer. This important requirement further demonstrates the flaws with the current alternatives as well as incompatibility of the SRP at PFRR with the management of Arctic NWR and Yukon Flats NWR.

Based on the above discrepancy, the incompatibility of the current SRP at PFRR with the purpose of Arctic NWR and Yukon Flats NWR and our desire to protect identified wilderness and wild rivers, we feel that the DEIS should include an alternative which considers that the activities at PFRR are incompatible with USFWS and BLM lands and therefore no permit would be issued. In the DEIS, NASA explains that the University of Alaska Fairbanks is "seeking authorizations from USFWS and BLM to allow for continued impact on and recovery on their lands of sounding rockets launched from PFRR as part of the NASA Sounding Rocket Program (SRP)." DEIS at 1-1. NASA also explains that "The purpose of this *PFRR EIS* is to evaluate the potential environmental impacts associated with the proposed action and reasonable alternatives, including a No-Action Alternative." EIS at 1-1. The no-action alternative analyzed fails to comply with NEPA because it does fails to consider not receiving authorizations from USFWS and BLM to continue the program. The alternative identified in the current EIS as "no-action" is really an action alternative regarding the level of recovery efforts the agency should undertake, as it assumes that USFWS and BLM will grant permission to use federal lands and that the program will continue. To comply with NEPA, NASA must consider a no-action alternative where the program will not continue because USFWS and BLM will not grant permits to use federal lands. Considering the true no-action alternative ensures that all decision makers and the public understand the baseline against which they can measure the various action alternatives. 3 cont'd.

NASA appears to have eliminated the true no-action alternative from study for its failure to meet the purpose and need. EIS at ES-3. This fundamentally misunderstands the purpose of the no-action alternative. By not including an accurate no-action alternative that does not allow the program to continue and to use federal lands, the agencies do not have an accurate baseline against which to measure the action alternatives. While an agency may eliminate an action alternative for its failure to meet the purpose and need, the agency cannot eliminate consideration of a true no-action alternative from consideration given the purpose of the no-action alternative, *i.e.*, providing an environmental baseline. Having an alternative where SRP at PFRR is discontinued would allow the public to understand the debris that would not be added to public lands, how not having a recovery program would affect the amount of debris remaining on public lands and more.

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NEPA requires that federal agencies provide a detailed evaluation of alternatives to the proposed action in every environmental impact statement. 42 U.S.C. § 4332(C)(iii); 40 CFR § 1502.14(a). NEPA's implementing regulations recognize that the consideration of alternatives is "the heart of the environmental impact statement." 40 CFR 1502.14. An EIS must "[i]nclude the alternative of no action." 40 C.F.R. § 1502.14(d). *See Pit River Tribe v. U.S. Forest Serv.*, 469 F.3d 768, 786 (9th Cir. 2006) (holding the "no action" alternative inadequate because the EIS failed to take a hard look "at whether the leases should have been extended"); *Pennaco Energy, Inc. v. U.S. Dept. of Interior*, 377 F.3d 1147, 1150 (10th Cir. 2004) (stating, "In order to provide "a clear basis for choice among options by the decisionmaker and the public," an agency's EIS must consider the "no action" alternative."); *Or. Natural Res. Council v. U.S. Forest Serv.*, 445 F. Supp. 2d 1211, 1224 (D. Or. 2006) ("The Forest Service nowhere has analyzed whether the impacts . . . warrant the complete abandonment of this project."); *Friends of Yosemite Valley v. Scarlett*, 439 F. Supp. 2d 1074, 1105 (E.D. Cal. 2006) ("A no action alternative in an EIS is meaningless if it assumes the existence of the very plan being proposed.").

As the Ninth Circuit explained, the "no action" alternative must also be considered in detail:

3 cont'd.

The goal of the statute is to ensure that federal agencies infuse in project planning a thorough consideration of environmental values. The consideration of alternatives requirement furthers that goal by guaranteeing that agency decision-makers have before them and take into proper account all possible approaches to a particular project (*including total abandonment of the project*) which would alter the environmental impact and the cost-benefit balance.... Informed and meaningful consideration of alternatives—including the no action alternative—is ... an integral part of the statutory scheme.

Alaska Wilderness Recreation & Tourism Ass'n v. Morrison, 67 F.3d 723, 729 (9th Cir. 1995), (internal citations, quotations and alterations omitted), *quoting Bob Marshall Alliance v. Hodel*, 852 F.2d 1223, 1228 (9th Cir.1988) *cert. denied*, 489 U.S. 1066, 109 S.Ct. 1340, 103 L.Ed.2d 810 (1989).

As the Council on Environmental Quality ("CEQ") explained, when the agency is considering "instances involving federal decisions on proposals for projects," the no-action alternative "would mean the proposed activity would not take place, and the resulting environmental effects from taking no action would be compared with the effects of permitting the proposed activity or an alternative activity to go forward." Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, 46 Fed. Reg. 18026, 18,027 (March 23, 1981). Lack of a no action alternative may prevent consideration of the environmental baseline as NEPA requires. *Half Moon Bay Fishermans' Marketing Ass'n v. Carlucci*, 857 F.2d 505 (9th Cir. 1988).

4. The DEIS should include one or more reasonable alternatives which consider discontinuing the SRP at PFRR, which is essential for providing a baseline for comparing the impacts of the alternatives presented in the DEIS.

"In determining the scope of alternatives to be considered, the emphasis is on what is 'reasonable' rather than on whether the proponent or applicant likes or is itself capable of carrying out a particular alternative. Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant." CEQ, Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations at Question 2a (available at http://ceq.hss.doe.gov/nepa/regs/40/1-10.HTM#1).

4 cont'd.

"The purpose of NEPA is to require disclosure of relevant environmental considerations that were given a 'hard look' by the agency, and thereby to permit informed public comment on proposed action and any choices or alternatives that might be pursued with less environmental harm." *Te-Moak Tribe of W. Shoshone of Nev. v. U.S. Dep't of Interior*, 608 F.3d 592, 601 (9th Cir. 2010) (quoting *Lands Council v. Powell*, 395 F.3d 1019, 1027 (9th Cir. 2005)); *see also* 42 U.S.C. § 4332(E) (requiring agencies to "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources"). Agencies are required to consider alternatives in an EIS and must give full and meaningful consideration to all reasonable alternatives. *Te-Moak Tribe*, 608 F.3d at 601; *see also* 40 C.F.R. §§ 1502.14. To adequately consider alternatives to the proposed project, the

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agency "must look at every reasonable alternative within the range dictated by the nature and scope of the proposal." *Friends of Southeast's Future v. Morrison*, 153 F.3d 1059, 1065 (9th Cir. 1998). "The existence of a viable but unexamined alternative renders an environmental impact statement inadequate." *Te-Moak Tribe*, 608 F.3d at 601 (citing *Idaho Conservation League v. Mumma*, 956 F.2d 1508, 1519 (9th Cir. 1992) (quoting *Citizens for a Better Henderson v. Hodel,* 768 F.2d 1051, 1057 (9th Cir. 1985)).

Because "the EIS is intended to be used to guide decision making, the alternatives analysis is naturally 'the heart of the environmental impact statement.'" *ONDA v. BLM*, 625 F.3d at 1100 (quoting 40 C.F.R. § 1502.14). In the alternatives section, the agency must "[r]igorously explore and objectively evaluate all reasonable alternatives." C.F.R. § 1502.14. The action agency must "to the fullest extent possible . . . study, develop and describe appropriate alternatives to recommended courses of action in any proposal which includes unresolved conflicts concerning alternative uses of available resources." *Id*. at 54 (citing 42 U.S.C. § 4332(2)(E)). An alternative that is consistent with the policy goals of the project and is potentially feasible must be analyzed in depth. *Muckleshoot Indian Tribe v. U.S. Forest Serv.*, 177 F.3d 800, 813-14 (9th Cir. 1999). 4 cont'd.

The EIS fails to consider all reasonable alternatives in violation of NEPA. *See Natural Resources Defense Council v. U.S. Forest Serv.*, 421 F.3d 797, 813 (9th Cir. 2005), *quoting Citizens for a Better Henderson v. Hodel*, 768 F.2d 1051, 1057 (9th Cir. 1985) ("The existence of a viable but unexamined alternative renders an [EIS] inadequate.").

Important alternatives were not considered that could meet NASA's purpose and need because NASA is unwilling to invest more money into the SRP at PFRR to install tracking technology (DEIS 2.4.8), adopt reasonable numerical risk criteria for avoiding sensitive lands (DEIS 2.4.6) or be willing to limit, adapt or innovate vehicles (DEIS at 2.4.8.1, etc.) in order to avoid impacts to identified wilderness and wild rivers.

5. The DEIS fails to adequately describe the importance of the science conducted as part of the SRP at PFRR and its relationship to the purposes of the public lands which it impacts (1.1.5)

As stated previously, we have concerns about the quality and purpose of the science being conducted in the SRP at PFRR, given the impacts to Arctic NWR in particular. We feel that up-to-date information on publications and applications of the science conducted through the SRP at PFRR should be maintained on the internet and referenced in the DEIS. While the SRP does have a web-page, the information is not sufficient to know if the missions have produced science worthy of peer-reviewed publication and also how it has been used to inform the issues identified in the DEIS (e.g. communications, weather, etc.). 5 cont'd

6. The DEIS dismisses adoption of NASA's own numerical risk criteria as a means to protect high value lands, including identified wilderness and wild rivers (2.4.6).

The DEIS outlines a numerical risk criteria for evaluating the impacts of the SRP at PFRR on high-value public lands, but dismisses meeting this standard requirement for protection of identified wilderness and wild rivers. We feel that the probability of a rocket impacting identified wilderness and wild rivers should be equivalent to zero at 3 sigma. The DEIS states that impacts to the Wilderness Study Area in Yukon Flats is 5.5% (DEIS at 4-77) or 1 in 18, and of impacting the Wind River (a designated Wild River in Arctic NWR) is at least 3.5-7%. These levels of impacts are unacceptable for preserving our identified wilderness and wild river areas and protecting the values for which the NWRs were established. For this reason, we cannot support any of the alternatives as presented in the DEIS without modification. 6 cont'd.

7. The DEIS fails to establish USFWS and BLMs purpose in managing lands downrange of PFRR.

Our primary concern continues to be the "landing" of rockets in lands that have high wilderness, wildlife habitat and recreational value that include Arctic NWR, including its designated and recommended wilderness lands and designated Wild River corridors, and Yukon Flats NWR including its Wild River corridor and recommended Wilderness Study Area, as well as other BLM lands. As the USFWS and BLM are Cooperating Agencies on this EIS, it is important that their purposes be included in the EIS. We find the 7 cont'd.

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USFWS purpose for managing its Refuges, of which Arctic and Yukon Flats NWRs are affected by this program, in section 1.1.6.2, which states:

"The primary purpose of Arctic and Yukon Flats NWRs is to conserve fish and wildlife populations and their habitats in their natural diversity. The USFWS is authorized to permit by regulations the use of any area within the NWR system provided "such uses are compatible with the major purposes for which such areas were established.""

This section (1.1.6.2) should be expanded to capture the key elements of the original purposes of the Arctic Refuge (Range), which include: 7 cont'd.

"For the purpose of preserving unique wildlife, wilderness and recreational values..." Public Land Order 2214,

as well as the ANILCA purposes for the Arctic NWR and Yukon Flats NWR.

We would like to also see a better description of the purpose for BLM's management of the Steese NCA and White Mountains NRA spelled out, as the DEIS relies on the reader to explore FLPMA to understand the purpose of these areas (1.1.6.1) and the impact of the program and recovery operations on the values of the areas.

8. The amount of debris that is likely to be removed is overestimated.

By not evaluating an alternative where no future launches are permitted, it is difficult to elucidate how many total payloads and stages are likely to be landed in each of the different downrange land units. We are looking for a total number of stages and payloads that would be launched under four missions per year in order to evaluate Table4-31 "possible annual recovery of stages and payloads per alternative." From the information presented in the DEIS, it appears that recovery efforts can reasonably expect to be about 50% for one stage, potentially higher for payloads with required tracking devices and zero for other stages. Also, recovery of past debris is likely to diminish considerably from the past two years given that much of the highly visible and accessible debris has been reported, located and removed. Thus, the net weight of recovery for existing payloads and stages presented in Table 4-31 is likely overestimated. 8 cont'd.

We are unclear what information is presented in Table4-29. Please better describe what "Newly Launched" refers to, as it does not appear that the text or table caption convey when these launches occur.

9. The impact on Land Use and Recreation (Section 4.8), and the wilderness within this category, has the potential to be significant under all alternatives presented in the DEIS.

As stated previously, an individual seeking a wilderness experience is likely to have a diminished experience if they are to come across rocket debris or to have their solitude disrupted by recovery operations. The overlap between the time when most people choose to explore the wilderness of Arctic NWR and the Yukon River wilderness in Yukon Flats NWR is during the summer when recovery operations are permitted to occur. A once-in-a-lifetime experience could be altered by the debris and recovery operations. While the DEIS describes motorized users as less likely to be impacted by debris, we disagree with that generalizations. Explorers seeking a wilderness experience in the remote BLM lands may expect to encounter other users, both mechanized and un-mechanized, cabins and intermittent fixed wing aircraft use. Individuals in Arctic NWR might expect to hear fixed wing aircraft but no other sounds, people or infrastructure. Few of any of these users are likely to not want to observe garbage on the landscape, such as used toilet paper, abandoned snowmachines, latex weather balloons or rocket stages. 9 cont'd.

We therefore recommend that this section be revised to convey that the impacts could be significant under all four action alternatives.

Thank you again for your time and consideration of our concerns.

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Respectfully Submitted By:

The Wilderness Society
Wendy Loya
Ecologist
705 Christensen Drive
Anchorage, Alaska 99501
907-272-9453
wendy_loya@tws.org

On behalf of:

Alaska Wilderness League
Cindy Shogan
Executive Director
122 C St NW, Ste 240
Washington, DC 20001
Tel: 202-544-5205
Fax: 202-544-5197
Cindy@alaskawild.org

Center for Biological Diversity
Rebecca Noblin
Alaska Director
PO Box 100599
Anchorage, AK 99510-0599
907-274-1110
rnoblin@biologicaldiversity.org

Defenders of Wildlife
Karla Dutton
Alaska Program Director
333 W 4th Ave., #302,
Anchorage, AK 99501
907- 276-9453
KDutton@defenders.org

Friends of Alaska National Wildlife Refuges
David C. Raskin, Ph.D.
Advocacy Chair
59975 Eider Ave
Homer. AK 99603
907-235-0514 Work/Home
907-299-2420 mobile
davidcraskin@yahoo.com

Natural Resources Defense Council
Charles M. Clusen
Director, Alaska Project
1200 New York Ave., NW
Washington, D.C. 20005
cclusen@nrdc.org

Sierra Club
Dan Ritzman
Alaska Program Director
750 W. 2nd Ave, Suite 100
Anchorage, AK 99501
907-276-4048
dan.ritzman@sierraclub.org

Wilderness Watch
Fran Mauer
Alaska Chapter Chair
Fairbanks, AK 99709
fmauer@mosquitonet.com

Winter Wildlands Alliance
Forrest McCarthy
Public Lands Director
910 Main Street, Suite 235
Boise ID 83702
307-733-3742
fmccarthy@winterwildlands.org

Brad Meiklejohn
BradMeiklejohn@aol.com

Allen E. Smith
6123 Buckthorn Ct. NW
Olympia, WA 98502-3434
360-867-4111
snoshuak@comcast.net

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K.2.6.1 *NASA's Response to Comment Document No. 006*

Comment Number	Response
1	NASA recognizes the importance of the downrange lands, and as such has incorporated flight hardware recovery and/or avoidance of the most sensitive lands (*i.e.*, designated Wilderness, designated Wild Rivers) as integral components of each alternative considered in detail in the EIS. However, per input from USFWS, affording elevated protections to non-designated Wilderness or Wild Rivers would be inconsistent with USFWS's guiding policies. <u>From Service Manual 610 FW 5.18:</u> "The review provisions of ANILCA [Alaska National Interest Lands Conservation Act] (see section 1317(c)) do not affect the normal administration and management of the affected areas of the refuge until Congress takes action. We will manage WSAs [Wilderness Study Areas], recommended wilderness, and proposed wilderness according to the management direction in the CCP [comprehensive conservation plan] for these areas. In Alaska, MRAs [minimum requirement analyses] are not required for proposed refuge management activities and commercial services in WSAs, recommended wilderness, and proposed wilderness." Therefore, in consideration of the referenced policy, NASA did not consider in detail an alternative affording "no impact" protections to the lands referred to as "identified wilderness" by the commenter. However, Chapter 4, Section 4.8, of the EIS discusses in detail the potential impacts of the alternatives on both land use and recreational users of downrange lands seeking a wilderness experience.
2	***Compatibility*** Per input from USFWS, when a use by the public is proposed on a National Wildlife Refuge, the refuge will first determine if the use is compatible. "A compatible use is a proposed or existing wildlife-dependent recreation use *or any other use* of a national wildlife refuge that, based on sound professional judgment, would not materially interfere with nor detract from the fulfillment of the Refuge System mission or the purposes for which a national wildlife was established. A refuge compatibility determination, with associated protective stipulations to ensure compatibility, is then prepared by the Service [USFWS] and subject to public review and comment. If found compatible, the Refuge may then issue a Special Use Permit to authorize the use pursuant to the National Wildlife Refuge Administration Act (16 U.S.C. 668 dd-ee), as amended, and the Refuge Recreation Act (16 U.S.C. 460K-460K-4)." The permit will stipulate the conditions that are necessary to ensure compatibility of the use. Compatibility determinations are re-evaluated at least every 10 years, except for wildlife-dependent public uses which are re-evaluated every 15 years. In the case of an existing activity or use already under permit, as is the situation with PFRR, the Refuge Manager will work with the permit holder to modify the activity or use to make it compatible or will terminate the permit. Note that previous compatibility determinations conducted in 1994 and 2005 by the Arctic and Yukon Flats NWRs have authorized PFRR to operate on Federal lands classified as minimally managed. Minimally managed lands are managed to maintain natural environmental conditions with very little evidence of human-

Comment Number	Response
2 (*cont'd.*)	caused change and to minimize disturbance to habitats and resources. Ground-disturbing activities are to be avoided wherever possible. USFWS has served as a cooperating agency in preparing the EIS to ensure that proposed actions by PFRR are compatible with refuge purposes for both the Arctic and Yukon Flats NWRs. ***Types of Science Conducted*** Chapter 1, Section 1.1.5, of the EIS has been expanded to provide more information regarding the direct and indirect relationships between the research enabled by PFRR and weather and climate sciences, upon which Arctic and Yukon Flats NWRs depend for their management. Additionally, Appendix J has been added to provide the reader with a summary of recent publications resulting from PFRR-enabled research, many of which are from peer-reviewed scholarly journals.
3	Per Answer 3 in the *Forty Most Asked Questions Concerning CEQ's NEPA Regulations* (76 FR 18026), there are two distinct interpretations of "no action" that must be considered in a NEPA document, depending on the nature of the proposal being evaluated. The first situation might involve an action where ongoing programs will continue, even as new plans are developed. In these cases, "no action" is "no change" from current direction. Therefore, the "no action" alternative may be thought of in terms of continuing with the present course of action until that action is changed. The second interpretation of "no action" would involve Federal decisions on proposals for projects. "No action" in such cases would mean the proposed activity would not take place. In the case of the *PFRR EIS*, NASA's funding the operation of PFRR is an action that has occurred on a regular (*i.e.*, annual or semi-annual) basis since the late 1960s. Accordingly, NASA has adopted the "status quo" interpretation of "no action" in defining its No Action Alternative; this would mean that PFRR would continue to operate as it has in the recent past. However, for NASA to conduct its operations at PFRR, it requires independent authorizations from both BLM and USFWS. Therefore, to better inform both the BLM and USFWS decisionmaking processes, NASA has now included "no authorization" scenarios as integral components of each alternative evaluated in detail in the EIS, including the "status quo" No Action Alternative.
4	From NASA's perspective, discontinuing the Sounding Rockets Program at PFRR is neither a "reasonable alternative" under NEPA (as it does not meet purpose and need, discussed in Chapter 1) nor is it consistent with the "status quo" definition of the No Action Alternative discussed above under Comment 3. However, to better inform the BLM and USFWS decisionmaking process, non-issuance of each landowner's respective authorization is now included as an integral component of each alternative. In the case of non-issuance of the USFWS authorization, NASA would be precluded from launching all of its multi-stage rockets. Given that only the single-stage Orion could be launched from PFRR, it is expected that NASA would discontinue funding PFRR altogether; therefore, the consequences of this scenario are now included in the Final EIS.

Comment Number	Response
5	Chapter 1, Section 1.1.5, of the EIS has been expanded to provide more information regarding the direct and indirect relationships between the research enabled by PFRR and weather and climate sciences, upon which Arctic and Yukon Flats NWRs depend for their management. Additionally, Appendix J has been added to provide the reader with a summary of recent publications resulting from PFRR-enabled research, many of which are from peer-reviewed scholarly journals.
6	As stated in Chapter 2, Section 2.5.5, due to concerns raised during scoping regarding potential impacts on high-value lands, particularly Wilderness Areas and Wild and Scenic Rivers, NASA evaluated the possibility of adopting numerical risk criteria for reducing the probability of impacting those individual features. Two numerical criteria were evaluated. The first criterion, 1 chance in 1,000 (or 1×10^{-3}), was evaluated as it is established in NASA Procedural Requirement 8715.5, *Range Safety Program*, and the second criterion, a 1 in 100 chance (1×10^{-2}) was evaluated, as it is the criterion established by PFRR as the maximum allowable probability of impacting outside of the range boundaries. A key consideration in determining the reasonableness of this alternative is whether NASA could still conduct its missions within the confines of the newly adopted criteria. Adoption of 1 in 1,000 criteria would essentially result in the discontinuation of sounding rocket flights from PFRR due its elimination of nearly all Black Brant-class vehicles and more than half of the Terrier-Orions. For the 1 in 100 criterion, although impacts would be less in comparison, they would still be severe in that most flights of the Black Brant XII, one-half of the Black Brant IX flights, and one-third of the Terrier-Orion flights would be restricted. In summary, the three vehicles that are expected to be the most commonly specified to meet future scientific objectives at PFRR (Black Brant XII, Black Brant IX, and Terrier-Orion) would be those most affected by the adoption of numerical risk criteria for specially designated environmental features; therefore, this alternative was eliminated from detailed study in the EIS.
7	Additional text describing USFWS's and BLM's purposes in managing downrange lands within the PFRR launch corridor has been added to Chapter 1, Sections 1.2 and 1.3, of the EIS.
8	As stated in Chapter 4, Section 4.12.1 ("Methodology"), NASA understands that the actual quantity of material recovered is dependent on whether the items can be located and recovered. Therefore, the estimated weight of material recovered from future launches is presented as a range reflecting both a 50 percent location success rate (consistent with recent experience from launches) up to a 100 percent location success rate, which would be NASA's ultimate goal. The long-term location and recovery rate for historic items (from past launches) cannot be accurately estimated given the number of variables that would dictate whether something would be found and ultimately removed. One potential outcome is that, as the commenter notes, all of the obvious items have been located and therefore additional recoveries would be less likely. However, another possible outcome is that over time, more users of downrange lands would become aware of the Recovery/Rewards Program, effectively causing recovery rates to meet or exceed those in recent years. Therefore, for the purposes of analysis in the *PFRR EIS*, NASA assumed a steady recovery rate of historic items based upon recent experience.

Comment Number	Response
8 (*cont'd.*)	Per the commenter's request, the intent of Chapter 4, Table 4–30, has been clarified in the EIS. "Newly launched" refers to those sounding rockets that would be launched from PFRR in the future at an average rate of four per year and an associated recovery rate ranging from 50–100 percent.
9	NASA notes the commenter's opinion regarding the potential impacts on land use and recreation. Based upon the definition of impacts in the EIS, the primary driver as to whether an impact would be significant under NEPA is whether the activity would be non-compliant with existing land uses (*e.g.*, not in compliance with a landowner-issued authorization or operating without an authorization) or if the activity would restrict a recreational use from occurring. Neither of these cases is met with the exception of the No Action Alternative. As stated in Chapter 4, Section 4.8, the discovery of a piece of flight hardware has the potential to negatively affect the recreation experience of a user, particularly those persons intending to have a wilderness experience. However, NASA has also been informed that others have found it to be a positive experience to discover a spent stage or payload. It is expected that those persons engaged in hiking and rafting would be the most sensitive to finding flight hardware, with hunters, trappers, and snow machiners the most tolerant. The impact would be on a person-by-person basis and would be influenced by the perception of the individual. In summary, anticipated impacts on recreational activities would be adverse, localized, negligible in intensity, and short-term in duration.
10	NASA notes the commenter's statement. However, as discussed above in the response to Comment 1, providing additional Wilderness- or Wild River-like protections to non-designated lands would be inconsistent with USFWS land management policy.

K.3 DRAFT EIS PUBLIC MEETING TRANSCRIPTS

K.3.1 Anchorage, Alaska, October 24, 2012

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

SOUNDING ROCKETS PROGRAM AT POKER
FLAT RESEARCH RANGE
DRAFT ENVIRONMENTAL IMPACT STATEMENT

PUBLIC MEETING
DATE: OCTOBER 24, 2012
6:00 p.m.

U.S. FISH AND WILDLIFE SERVICE
ALASKA REGIONAL OFFICE
1011 EAST TUDOR ROAD
ANCHORAGE, ALASKA 99503

Amy Hartley, Facilitator
PANEL MEMBERS:
Mr. Joshua Bundick, NASA Wallops Flight Facility
Mr. John Hickman, NASA Wallops Flight Facility

REPORTED BY: Natalie Gil
KRON ASSOCIATES
COURT REPORTING
(907) 276-3554

KRON ASSOCIATES
1113 W. Fireweed Lane, Suite 200
Anchorage, Alaska 99503
(907) 276-3554

NASA Sounding Rockets Program at Poker Flat Research Range
Draft Environmental Impact Statement (EIS)
Public Meeting
October 24, 2012

I. POSTER SESSION:

The public meeting of the NASA Sounding Rockets Program at Poker Flat, held at 1011 East Tudor Road, Anchorage, Alaska, initiated promptly at 6:00 pm with a poster session for the public.

Present:

Amy Hartley
Joshua Bundick
John Hickman
Mike Bonsteel
Anne Marie LaRosa
Audra Upchurch
Donna Gindle
Marc Conde
Kathe Rich
Don Hampton
Peter Wikoff

II. PRESENTATION:

Environmental Impact Statement Power Point Presentation:

The project team gave an informational Draft EIS Power Point Presentation from 6:30-7:00 p.m. after the poster session.

III. Q & A:

After the Power Point presentation, the panel gave members of the public the opportunity to ask questions. Various public members asked questions.

IV. PUBLIC COMMENT:

No public comment was given during this period.

V. Adjournment

The Public Meeting concluded thereafter at 7:32 p.m.

Prepared and submitted by Kron Associates Court Reporting

KRON ASSOCIATES
1113 W. Fireweed Lane, Suite 200
Anchorage, Alaska 99503
(907) 276-3554

TRANSCRIBER'S CERTIFICATE

I, Natalie Gil, hereby certify that the foregoing pages numbered 2 through 3 are a true, accurate and complete account of proceedings of the Public Meeting for the Draft Environmental Impact Statement for the Sounding Rockets Program at Poker Flat Research Range, prepared by me to the best of my knowledge and ability.

December 7, 2012 — Natalie Gil

Date — Natalie Gil

KRON ASSOCIATES
1113 W. Fireweed Lane, Suite 200
Anchorage, Alaska 99503
(907) 276-3554

K.3.2 Fairbanks, Alaska, October 25, 2012

1

1 NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
2
3
4 SOUNDING ROCKETS PROGRAM AT POKER
5 FLAT RESEARCH RANGE
6 DRAFT ENVIRONMENTAL IMPACT STATEMENT
7
8 PUBLIC MEETING
9 DATE: OCTOBER 25, 2012
10 6:00 p.m.
11
12 BLM FAIRBANKS DISTRICT OFFICE
13 1150 UNIVERSITY AVENUE
14 FAIRBANKS, ALASKA 99709
15
16
17 Amy Hartley, Facilitator
18 PANEL MEMBERS:
19 Mr. Joshua Bundick, NASA Wallops Flight Facility
20 Mr. John Hickman, NASA Wallops Flight Facility
21
22 REPORTED BY: Natalie Gil
23 KRON ASSOCIATES
24 COURT REPORTING
25 (907) 276-3554

KRON ASSOCIATES
1113 W. Fireweed Lane, Suite 200
Anchorage, Alaska 99503
(907) 276-3554

NASA Sounding Rockets Program at Poker Flat Research Range
Draft Environmental Impact Statement (EIS)
Public Meeting
October 25, 2012

I. POSTER SESSION:

The public meeting of the NASA Sounding Rockets Program at Poker Flat, held at the BLM Fairbanks District Office, 1150 University Avenue in Fairbanks, Alaska, initiated promptly at 6:00 p.m. with a poster session for the public.

Present:

Amy Hartley
Joshua Bundick
John Hickman
Mike Bonsteel
Anne Marie LaRosa
Audra Upchurch
Donna Gindle
Marc Conde
Kathe Rich
Don Hampton
Peter Wikoff
Lenore Heppler
Bob McCoy

II. PRESENTATION:

Environmental Impact Statement Power Point Presentation:

The project team gave an informational Draft EIS Power Point Presentation from 6:30-7:00 p.m. after the poster session.

KRON ASSOCIATES
1113 W. Fireweed Lane, Suite 200
Anchorage, Alaska 99503
(907) 276-3554

III. Q & A:

After the PowerPoint presentation, the panel gave members of the public the opportunity to ask questions. Various public members asked questions to which the project team promptly answered.

IV. PUBLIC COMMENT:

Pamela A. Miller, Arctic Program Director of the Northern Alaska Environmental Center, gave public comment during this period.

V. Adjournment

The Public Meeting concluded thereafter at 7:59 p.m.

Prepared and submitted by Kron Associates Court Reporting

KRON ASSOCIATES
1113 W. Fireweed Lane, Suite 200
Anchorage, Alaska 99503
(907) 276-3554

TRANSCRIBER'S CERTIFICATE

I, Natalie Gil, hereby certify that the foregoing pages numbered 2 through 3 are a true, accurate and complete account of proceedings of the Public Meeting for the Draft Environmental Impact Statement for the Sounding Rockets Program at Poker Flat Research Range, prepared by me to the best of my knowledge and ability.

December 7, 2012 — Natalie Gil

Date — Natalie Gil

KRON ASSOCIATES
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Anchorage, Alaska 99503
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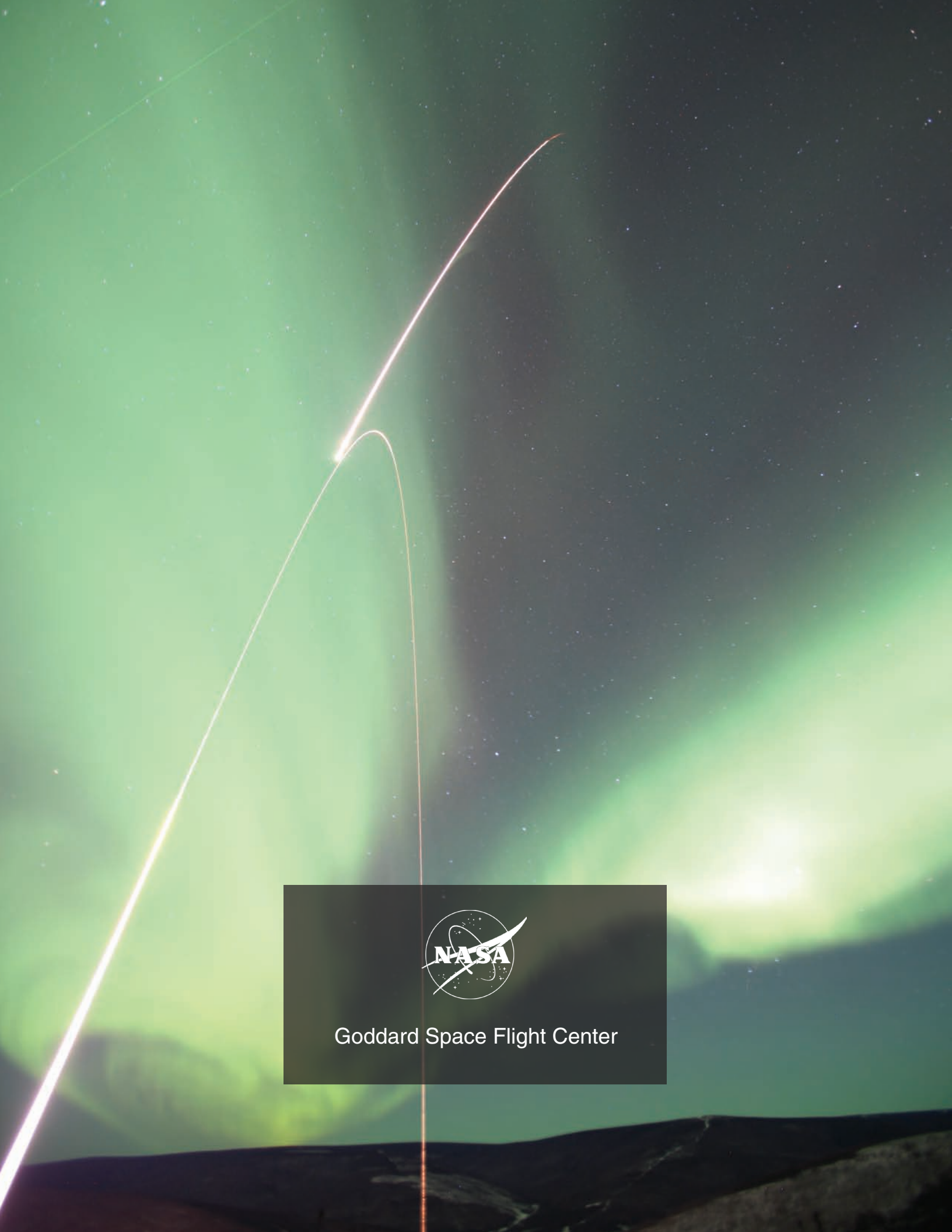

Goddard Space Flight Center