

## **DRAFT COMPATIBILITY DETERMINATION**

**Use:** Rocket & Payload Impact and Recovery

**Refuge Name:** Arctic National Wildlife Refuge, Fairbanks, Alaska

### **Establishing and Acquisition Authority**

The Arctic National Wildlife Refuge (Refuge, Arctic Refuge) was established by the Alaska National Interest Lands Conservation Act (ANILCA) (Public Law 96-487 Stat. 2371) on December 2, 1980. The Refuge boundary encompassed 19.64 million acres of land, including the 8.83-million acre Arctic National Wildlife Range (Range), which was established on December 6, 1960, by Public Land Order 2214. ANILCA re-designated the Range as part of Arctic Refuge, designated 7.16 million acres of the Refuge as Wilderness, and designated three wild rivers. In 1988, Public Law 100-395 added 325,000 acres of lands managed by the Bureau of Land Management (BLM) to the Refuge. An additional 1.3 million acres of land, originally selected by the State of Alaska under the Alaska Statehood Act (Public Law 85-508) but later relinquished, was added to the Refuge in two actions occurring in 1983 and 1985. Both these additions were of lands already within the boundaries of the Refuge.

### **Refuge Purpose(s):**

ANILCA (Section 303(2)(B) ) established four purposes for the Refuge. 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.

Public Land Order 2214 established the original Arctic National Wildlife Range "for the purpose of preserving unique wildlife, wilderness and recreational values...." These pre- ANILCA purposes apply only to those lands and waters in the original Range, and they remain in force and effect only to the extent they are not

inconsistent with ANILCA or the Alaska Native Claims Settlement Act (ANILCA Section 305; 603 FW 2.8).

The Wilderness Act of 1964 (Public Law 88-577) creates the following additional purposes for the designated Wilderness area in the Refuge's boundaries; these purposes are within and supplemental to the Refuge's ANILCA and Range purposes: secure an enduring resource of Wilderness; protect and preserve the Wilderness character of areas in the National Wilderness Preservation System (NWPS); administer the NWPS for the use and enjoyment of the American people in a way that will leave these areas unimpaired for future use and enjoyment as Wilderness; and gather and disseminate information regarding the use and enjoyment of Wilderness areas.

### **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]).

### **Introduction**

This compatibility determination re-evaluates the use of federal lands within Arctic NWR as a program component of Poker Flat Research Range (PFRR) that supports research programs from across the country in the study of northern atmospheric phenomenon and climate change. Since 1983, the Refuge has annually issued Special Use Permits to PFRR authorizing the deposition and recovery (removal) of rocket parts from Refuge lands. In 2005, the Refuge found these activities compatible with refuge purposes. The Refuge is considering issuing a Special Use Permit for deposition and removal activities for an average of four, but no more than eight launches per year, and removal of any debris (according to a Recovery Plan) located from previous launches, during a ten year period. It is the intention of the Refuge to ensure that proposed actions by PFRR are compatible with Refuge purposes prior to the issuance of this permit.

### **Background**

The Geophysical Institute's Poker Flats Research Range, University of Alaska-Fairbanks (UAF) in cooperation with the National Aeronautics and Space Administration (NASA), Goddard Space Flight Center have been conducting auroral and middle to upper atmospheric research via a sounding rockets program since the late 1960's. An impact zone for research rockets and payloads occurs within the boundaries of Arctic Refuge outside the Refuge's designated wilderness. Since 1983, the Refuge has issued Special Use Permits to PFRR authorizing the deposition and removal of rocket parts from Refuge lands. In 2005, the Refuge

found these activities compatible with refuge purposes and authorized PFRR to operate on Federal lands classified as minimally managed, which are managed to maintain natural environmental conditions with very little evidence of human-caused change, and to minimize disturbance to habitats and resources, including avoiding ground-disturbing activities. In 2011, NASA began an examination of alternatives for the continued operation of their rocket program at Poker Flats and an environmental analysis of the impacts of those alternatives. The Fish and Wildlife Service and the Bureau of Land Management (permitting agencies) were cooperating agencies on this effort (Final Environmental Impact Statement, Sounding Rocket Program at Poker Flats Research Range. July 2013).

### **Description of Use(s)**

The University and NASA predict that an average of four (but up to eight in any given year) sounding rockets may be launched from the PFRR each winter. The range is located approximately 150 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 are launched high into the upper atmosphere (about 20,000 feet) and carry instrumented payloads 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.

As the rockets launched from PFRR are suborbital, meaning that they do not place objects into orbit around the earth, all items onboard return to earth, most following a ballistic trajectory. Along its flight path, a sounding rocket “sheds” various components, including rocket motors once their propellant is consumed, and small doors and nosecones prior to the collection of the desired scientific information. Ultimately the scientific experiment, referred to as the payload, also returns to earth. 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 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.

The first stage of the rocket (booster) falls back to earth close to PFRR and does not impact the Refuge. The second stages and payload follow the flight trajectory at lower altitudes and impact from three to 183 miles from the launch site, which includes Arctic Refuge. On the occasion when a three or four-stage rocket is utilized, landings can be as far as 680 miles from the launch site and commonly land in international waters to the north. Most landings in the Arctic NWR occur in the Brooks Range in Flight Zones 3, and 4 (and few in 4 Extended- See attached map). In general, planned impact locations within Arctic Refuge are not further north than the Ivishak River; water landings in the Beaufort Sea/Arctic Ocean are generally not closer than 220 miles north of Barter Island.

Managers planning rocket operations intentionally avoid impacts and landings in designated wilderness of Arctic 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 PFRR are recovery payloads that are tracked via radar, and generally recovered with a helicopter or a small airplane if a landing area is nearby. All rockets launched from PFRR are unguided after launch. A risk assessment prepared by NASA is used to determine impact point to reduce risk to life and property to an absolute minimum. For each launch in a given year, operations managers provide a detailed list of the potential launch vehicle, launch windows, amount and composition of payloads (especially any hazardous materials), and predicted impact zones for each stage (see attached map).

Since 2011 PFRR has implemented a launch vehicle and payload recovery plan 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 plan pertains to future launches and to hardware remaining on downrange lands from previous launches. The Plan includes a rewards program to stimulate reporting of found rocket debris by the general public. Plan details can be found in the 2013 Final Environmental Impact Statement-Sounding Rockets Program at Poker Flat Research Range, Volume II, appendix E.

Recovery operations are two-fold. For current launches, a search operation will normally occur the day following the launch if weather permits and an aircraft is available. Aircraft will overfly the predicted impact zone and search and verify the exact location of the rocket parts and the location entered into the recovery database. This could include some low-level flying (less than 2,000' AGL) at the immediate site to search for rocket parts. The total hours of flight time are recorded as well. If the rocket parts are not located immediately, or if snow conditions preclude location, at least one additional flight would be conducted after snowmelt to attempt to locate the parts. Once located, a joint decision between PFRR and the Refuge will be made whether and how to recover the rocket parts. A decision tree for this process is included in the Recovery Plan and recovery is closely coordinated with Refuge staff. Considerations include access, safety, and potential environmental impacts of recovery. If deemed safe and practical, recovery operations will commence as soon as practical and would include any mitigation necessary to minimize impacts to refuge resources and user groups. When they are recovered, any disturbance to the landscape is repaired as much as feasible. Simple means and lightweight hand tools would be used to recover rockets. Deeply buried rockets would be cut-off at ground level and buried parts generally left in place to avoid extensive ground disturbance and covered with native soil and rock. These decisions would be site-specific and done in consultation with the Refuge. Mitigation measures could include timing of recovery, type of aircraft used to access the site and extent to which items are removed. A post-recovery report detailing the operations is submitted annually.

## **Availability of Resources**

Adequate Refuge personnel and base operational funds are available to manage this use 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, annual proposal and report review, permit issuance and personal interaction with PFFR. Field work associated with administering the program primarily involves coordinating recovery work and monitoring PFFR's 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. Additionally, each recovery operation could include a few hours of aircraft overflights, which could include low level flights to search the area of expected impact, and a few hours of helicopter flight hours and 1-2 landings to retrieve rocket payloads and debris, and perform site remediation might be necessary.

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 activity. Winter conditions (frozen soil) limit impact and landing damage. There is potential for infrequent, localized, short term and minimal disturbance to visitor's experience from aircraft noise during the retrieval of rocket payloads and debris and/or access for site remediation. Attempts to recover rockets occur outside the peak recreational season and in many recent years only a single launch and recovery operation has been conducted. Therefore it is not anticipated that this will impact visitors over and above the on-going recreational use during the summer recovery period. Visitors could experience some adverse effects from encountering a rocket, a rare event, in a wild setting but other visitors have no negative experience with such an encounter.

Direct impacts from rocket launches to subsistence users or resources (i.e. wildlife) from rocket impacts are highly improbable. The Refuge and PFFR coordinate recovery operations to minimize the likelihood of indirect impacts, e.g. startle of wildlife, although some minor effects may occasionally occur inadvertently. Subsistence users may be impacted (infrequent, localized, short term and minimal) by the noise of aircraft during recovery operations.

The PFFR recovery program would have a net benefit to refuge resources through the removal of the remains of past launches on the refuge, although minor, localized

and short term impacts from the noise of the recovery operations (as described above) could still occur.

## **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 includes a public notice on the US Fish and Wildlife Service – Alaska Region web site and the Arctic Refuge web site, and a 14-day public comment period. This draft compatibility determination is 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> and at <https://arctic.fws.gov/>.

Public notice letters will also be sent out to the affected Villages/Tribes of the Arctic Refuge region including: Arctic Village, and Kaktovik, and to other entities that commented on the Poker Flats EIS.

## **Determination**

Use is Not Compatible

Use is Compatible

## **Stipulations Necessary to Ensure Compatibility (Permit Conditions)**

This Compatibility Determination is valid only for launch and recovery operations covered in the Poker Flats Final EIS (July 2013) and outlined in the description of use above. Exceptions will be considered on a case by case basis and will require additional impact analysis and possibly a new authorization to include an amended or new individual Permit and/or a new Compatibility Determination for the given activity. Such activities could include: an increase in launch rates or total launches within the ten-year period, proposed launches between May 1 and September 30, recovery operations within Arctic Refuge’s designated wilderness, or recovery operations outside the scope or conditions described in NASA/PFRR Recovery Plan (Poker Flats Final EIS- Volume II, Appendix E (July 2013)).

Refuge staff will monitor all launch and recovery activities 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 activities remain compatible with Refuge purposes. Monitoring of all authorized activities will be continued to ensure compliance with specific terms and conditions tailored for each permit as well as with the following general conditions that are incorporated into all similar 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.*
- *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.*
- *At least 30 days prior to beginning activities authorized by this permit, the permittee shall provide the refuge manager with an Annual Launch Plan. This plan will include the number of proposed launches, and, for each proposed launch, the: (1) launch window, (2) expected launch impact zones, and (3) launch vehicle and payload with detailed information on the type and amount of any hazardous waste predicted to land within the Refuge, 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 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.*
  - (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.*
- *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 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.*
  - *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 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 tracking device is incorporated with each payload to facilitate tracking and recovery after launch.*

- *The permittee will maintain a viable rocket component recovery program to track, locate, and remove rocket debris at least once every two years. The Refuge Manager will be informed of locations (GPS coordinates in decimal degrees) of impact sites, un-recovered rockets and/or payloads and proposed schedule for removal, actual activities and equipment to locate and remove rocket debris, and any potential operational hazards prior to recovery operations. The Refuge Manager will make all final determinations to remove debris in coordination with PFRR.*
  
- *A 1-2 page Annual Report with a summary with actual launches and recovery activities (including a map) should be submitted annually within 30-days of the end of the calendar year and prior to permit expiration. This can be submitted with the Annual Launch Plan. 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 flight hours,*
  - (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.*
  
- *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. If proposed changes are significantly different than those outlined in the Poker Flats FEIS (2013) a new Compatibility Determination and Permit may be necessary for the activity.*

- *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.*
- *The permittee will not make launches with a planned impact site within designated Wilderness, (Mollie Beattie Wilderness area).*
- *Activities may not occur in some special use areas within Arctic Refuge 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.*
- *Raptor species typically build nests along cliff and bluff faces, which are extensive throughout the Arctic Refuge. Active nest sites may be in your intended work area. Helicopter activity is prohibited within one-half mile of these active raptor nest sites north of the continental divide during the period May 1 through August 31 and south of the continental divide from May 1 through August 15.*

## **Justification**

The use of federal lands within Arctic NWR for deposition of rocket parts and their ultimate removal was determined by NASA as necessary for the continued viability of Poker Flat Research Range's (PFRR) research into northern atmospheric phenomenon and climate. Since 1983, the Refuge has annually issued Special Use Permits to PFRR authorizing Refuge lands for this use. 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. A Compatible use of a National Wildlife Refuge is one that does "not materially interfere with or detract" from the Refuge's purposes or Refuge System mission. Rocket deposition and removal has been an ongoing

activity on the Refuge, and past experiences over the long-term have shown that minimal impacts on Refuge resources have occurred. Stipulations in permits issued to PFRR since 2009 have become more restrictive and require a viable recovery program to ensure continued minimal impact to Refuge resources. The Service supports research conducted by the PFRR because it contributes to the greater understanding of the natural world, including global climate change. As a science based agency, the Service encourages scientific research that benefits the American public and does not detract from the purposes for which the Refuge was established.

**Mandatory 10-Year Re-Evaluation Date** (provide month and year for allowed uses only): October, 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**

- Final Environmental Impact Statement, Sounding Rockets Program at Poker Flat Research Range, NASA, July 2013.
- 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: \_\_\_\_\_  
(Signature) (Date)

Refuge Manager /  
 Project Leader Approval: \_\_\_\_\_  
(Signature) (Date)

**Concurrence**

Refuge Supervisor: \_\_\_\_\_  
(Signature) (Date)

Regional Chief,  
National Wildlife  
Refuge System: \_\_\_\_\_  
(Signature) (Date)

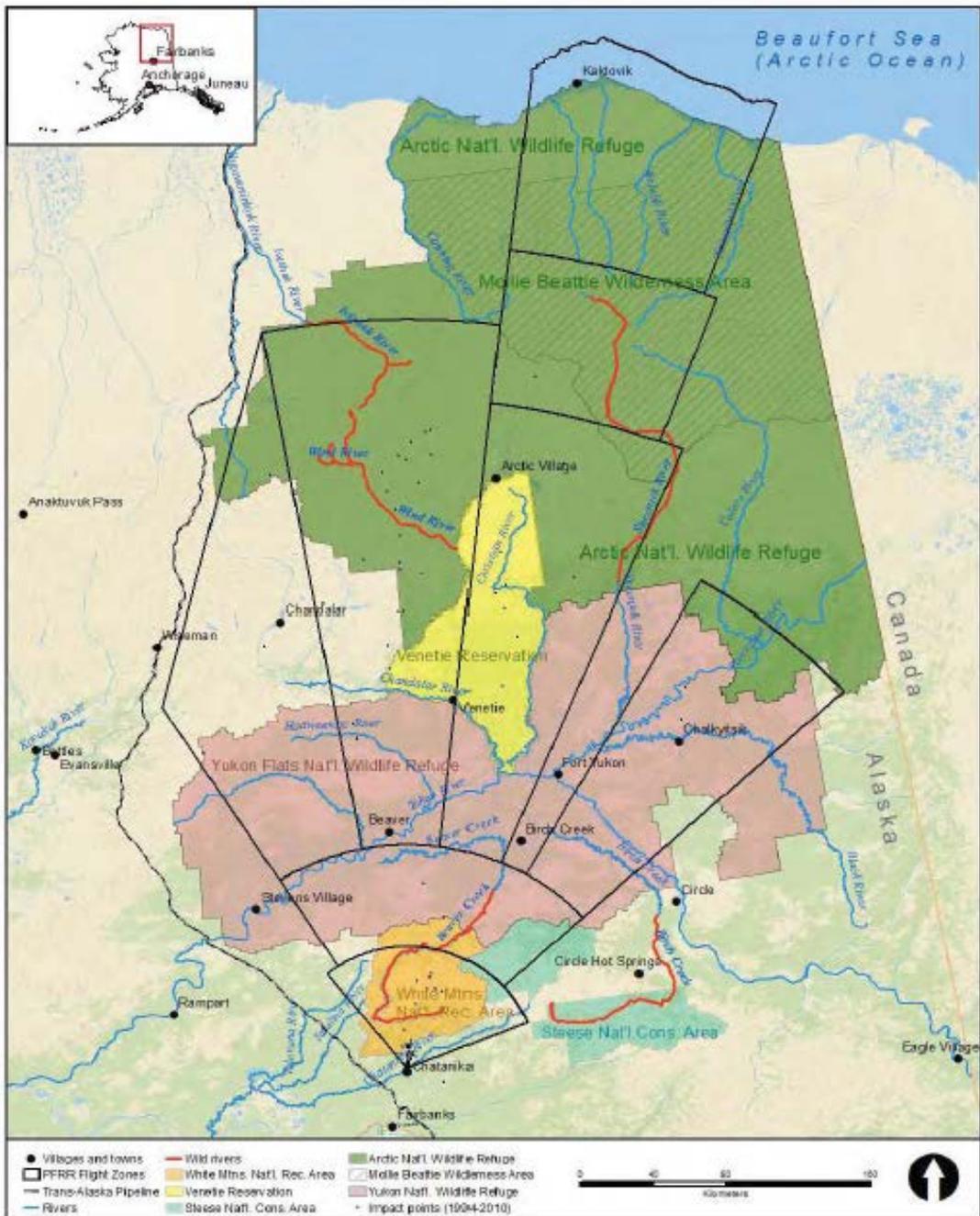


Figure 1. Poker Flat Research Range Launch Corridor and Downrange Lands