

To: Kate Krebs[kate.krebs@empsi.com]
Cc: Miriam (Nicole) Hayes[mnhayes@blm.gov]; Chad Ricklefs[chad.ricklefs@empsi.com]; Amy Lewis[amy.lewis@empsi.com]
From: Wendy Loya
Sent: 2018-07-12T21:09:40-04:00
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Subject: Response: USFWS Action Items
Received: 2018-07-12T21:09:48-04:00
[K1C Springs revised 071218.docx](#)
[C-2 Snow depth fence monitor revised 071218.docx](#)
[CAH productivity.pdf](#)
[PCH summary.pdf](#)
[K5a and c caribou revised 071218.docx](#)

Hi Kate,

Attached are our edits to K-1C. We have removed the no-leasing stipulation and have asked for only No surface occupancy at 3,4 and 1 mi around respective springs, and 1 mi around aufeis.
Updated K1C for springs with revised study language and NSO buffers.

C-2 is revised for snowfences and to allow for agency personnel or their representative(s) to go out with seismic operators as monitors

K5a: attempt to clarify numbers. Original BLM language was vague, and that may have allowed authorized officer some flexibility. We are comfortable with either the original or our revision for the DEIS.

K5c: still draft, attempt to reduce density in a meaningful way while allowing development in each township area. Need to work with Rob at BLM once RFDS is available.

Have requested Casey Burns follow up on USGS ACP bird survey data as he is aware of it and that is his section.

Attaching calving success data. The attached tables show estimates of productivity (based on calf:cow ratios in late June) for both herds.

May be other small edits as we continue to go over partner suggested revisions with our experts.

Thanks you guys!!!
Wendy

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From: Kate Krebs <kate.krebs@empsi.com>
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Subject: [EXTERNAL] USFWS Action Items

Wendy:

Thank you so much for your participation this week. I think I speak for the BLM when I say that this week would not have gone as well if USFWS had not put such thought into the alternatives in advance of the meeting.

I have the following action items for you/USFWS:

- Update part a of Stip K-1c (springs/aufeis) because it would require drilling.
- Springs/Aufeis (K1c): FWS doesn't have a good understanding of groundwater and how to protect. Where is ice chip harvesting dealt with? Tamayarik and Okerokavik are both located in high potential area. FWS will think more about this with their hydrology specialists.
- Stip K-5a (caribou summer habitat):
 - Part b: Define significant
 - Part 2: one part uses 10 or more caribou, then goes on to say "a large number of caribou". Can there be consistency in using numbers versus more generic language
- Stip K-5c (post-calving): Update 0.6% if there is something more appropriate
- Birds: FWS asked to look to new USGS breeding bird maps to update this data shown on current map; suggests there are four species that use the Refuge more than others (jaegers, etc) (FWS TO PROVIDE?)
- Caribou: FWS might have data on calving success rates to share
- FWS: Wendy is drafting BMP re. snow fences

Kate Krebs

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K-1c Lease Stipulation/Best Management Practice – Springs/Aufeis

Objective: Protect the water quality, quantity and diversity of fish and wildlife habitats and populations associated with springs and aufeis across the coastal plain. River systems with springs provide year round habitat and host the most diverse and largest populations of fish, aquatic invertebrates, and wildlife and are associated with major subsistence activity and cultural resources. Aufeis is a unique feature associated with perennial springs and helps sustain river flow during summer and provides insect relief for caribou. Because the subsurface flow paths to perennial springs are unknown and could potentially be disturbed by drilling or fracking activity, we recommend buffer areas around the major perennial springs that support fish populations in which no leasing is permitted.

Requirement/Standard:

a. Prior to drilling activities, lessee shall conduct studies in watersheds containing springs necessary to ensure subsequent drilling activities will not disrupt flow of the perennial springs. Study plans will be developed in consultation with the BLM and US Fish and Wildlife Service and other agencies as appropriate.

Commented [LWM1]: Previously we stated groundwater studies, but this is more general to include but not necessarily limit studies to groundwater, such as well spacing modeling.

b. No surface occupancy of new non-subsistence infrastructure will be permitted within 3 miles of Sadlerochit Spring (04N031E) nor within 1 mi of the Saddlerochit river where aufeis forms (04N031E & 05N031E). It supports an isolated, dwarf population of Dolly Varden, unique plant and invertebrate communities, and an extensive aufeis field that persists through much of the summer providing insect relief habitat for caribou.

c. No surface occupancy of new non-subsistence infrastructure will be permitted within 4 miles of the perennial spring at Fish Hole 1 on the Hulahula River (05N032E) nor within 1 mile of the aufeis field (05N032E & 06N032E). The Fish Hole 1 spring provides overwintering habitat for Arctic grayling and a large population of anadromous Dolly Varden. Residents of Kaktovik routinely harvest Dolly Varden in Fish Hole 1 during winter. The spring produces an extensive aufeis field that persists through much of the summer.

d. No surface occupancy of new non-subsistence infrastructure will be permitted within 1 mile of the perennial Tamayariak Spring and associated aufeis field (07N026E).

e. No surface occupancy of new non-subsistence infrastructure will be permitted within 1 mile of Okerokavik Spring (04N036E) and associated aufeis field in the Jago River drainage (05N035E & 05N036E).

C-2 Best Management Practice

Objective: Protect stream banks, minimize compaction of soils, and minimize the breakage, abrasion, compaction, or displacement of vegetation.

Requirement/Standard:

- a. Ground operations shall be allowed only when frost depth are at sufficient depths and snow cover is at sufficient depths and density to protect the tundra, as determined by the authorized officer and the US Fish and Wildlife Service. Soils should be frozen to at least -5C at least 30 cm below the lowest surface height (e.g. intertussock space). Snow depth and snow density should amount to no less than a Snow Water Equivalent of 3" over the highest vegetated surface (e.g. top of tussock). Ground operations shall cease when the spring snowmelt begins when snow depth and density no longer meet criteria.
- b. Snow depth and density measurements should reflect conditions at the time of planned operations.

Table for Snow Depth x Density to achieve SWE of 3"	
Snow Specific Gravity	Needed Snow Depth (inches)
0.05	60
0.1	30
0.15	20
0.2	15
0.25	12
0.3	10
0.35	9
0.4	8
0.45	7
0.5	6

- b. Low-ground-pressure vehicles shall be used for on-the-ground activities off ice roads or pads. Low-ground-pressure vehicles shall be selected and operated in a manner that eliminates direct impacts to the tundra by shearing, scraping, or excessively compacting the tundra mat. Note: This provision does not include the use of heavy equipment such as front-end loaders and similar equipment required during ice road construction.
- c. Bulldozing of tundra mat and vegetation to create trails or seismic lines is prohibited. Clearing of drifted snow is allowed on existing snow trails, snow pads for camps, ice roads, or ice pads seismic to the extent that the tundra mat is not disturbed.

- d. To reduce the possibility of ruts, vehicles shall avoid using the same trails for multiple trips unless necessitated by serious safety or superseding environmental concern, as approved by the authorizing officer. This provision does not apply to hardened snow trails for use by low-ground-pressure vehicles such as Rolligons.
- e. The location of ice roads shall be designed and located to minimize compaction of soils and the breakage, abrasion, compaction, or displacement of vegetation. Offsets may be required to avoid using the same route or track in the subsequent year.
- f. To minimize changes in snow distribution resulting from oil and gas activities that could impact bear denning habitat and water quality and quantity, the use of snowfences will require approval by the authorized officer in consultation with the US Fish and Wildlife Service.
- g. Seismic operations and winter overland travel may be monitored by agency representative(s) and operator may be required to accommodate the agency representative(s) during operations.

Table 6. Central Arctic herd caribou late June calf:cow ratios (calves:100 cows) of radiocollared females ≥ 4 -years old, Alaska, 1997–2014.

Late June calf:cow ratios (calves:100 cows) by unit for females ≥4-years old ^a					
Year	Date(s)	Unit		All Unit 26B ±90% CI	Total (<i>n</i>)
		26B West ^b (<i>n</i>)	26B East (<i>n</i>)		
1997	29–30 Jun	85 (13)	64 (11)	75 ±14.8	(24)
1998	29–30 Jun	79 (14)	80 (15)	79 ±12.6	(29)
1999	22–24 Jun	92 (13)	67 (12)	80 ±13.4	(25)
2000	17–19 Jun	79 (14)	72 (18)	75 ±12.8	(32)
2001	23–25 Jun	78 (18)	81 (16)	79 ±11.6	(34)
2002	23–25 Jun	78 (28)	83 (24)	81 ±9.1	(52)
2003	24–26 Jun	77 (26)	78 (27)	77 ±9.5	(53)
2004 ^c	24 Jun	78 (27)	87 (17)	82 ±9.7	(44)
2005	24 Jun	77 (35)	61 (23)	71 ±9.7	(58)
2006	23–24 Jun	82 (22)	94 (33)	89 ±7.0	(55)
2007	22–23 Jun	87 (32)	71 (21)	81 ±8.9	(53)
2008	23–24 Jun	100 (3)	90 (42)	91 ±7.0	(45)
2009	23–24 Jun	56 (17)	48 (25)	52 ±12.8	(42)
2010	22–23 Jun	92 (12)	81 (27)	85 ±9.6	(39)
2011	20–21 Jun	80 (10)	75 (20)	77 ±12.9	(30)
2012	26–27 Jun	64 (11)	73 (15)	69 ±15.1	(26)
2013	26–27 Jun	60 (5)	55 (20)	56 ±16.7	(25)
2014	24–25 Jun	75 (24)	40 (10)	65 ±13.7	(34)

^a Data for females ≥ 4 -years old were stratified based on the location of caribou east and west of the Sagavanirktok River. In some years, we captured unknown-age adult females and these were included in the ≥ 4 -years old sample.

^b Unit 26B West is west of the west bank of the Sagavanirktok River and Unit 26B East is east of the west bank of the Sagavanirktok River.

^c Only GPS radiocollared females with radiocollared calves were relocated because the caribou were aggregated tightly, making identifying a calf with the correct cow impossible.

K-5a Lease Stipulation/Best Management Practice –Caribou Summer Habitat

Note: All lands within the Arctic Refuge Coastal Plain are recognized as habitat of the Porcupine and Central Arctic caribou herds and shall be managed to ensure unhindered movement of caribou through the area.

Objective: Minimize disturbance and hindrance of caribou, or alteration of caribou movements through portions the Coastal Plain that are essential for summer use by caribou, including calving and rearing, insect-relief, and migration.

Requirement/Standard: The following standards will be applied to permitted activities:

a. Lessees shall orient infrastructure when laying out oil and gas field developments to avoid impeding caribou migration and to avoid corralling effects.
b. Before authorization of construction of permanent facilities (limited as they may be by restricted surface occupancy areas established in other lease stipulations), the lessee shall design and implement and report a study of caribou movement unless an acceptable study(s) specific to the Porcupine and Central Arctic Caribou herds has been completed within the last 10 years.

c. Heavy equipment (e.g., sand/gravel extraction and transport, pipeline and pad construction, but not drilling from existing production pads) shall be suspended from no later than May 20 through no earlier than July 20, unless approved by the authorized officer in consultation with the appropriate federal, State, and North Slope Borough regulatory and resource agencies. The intent of this requirement is to restrict activities that will disturb caribou during calving and insect-relief periods. If caribou arrive on the calving grounds prior to May 20 or if they remain in the area in significant numbers (greater than approximately 10% of the estimated calving cow population or 1,000 during insect-relief periods) past July 20, major construction activities will be suspended. The lessee shall submit with the development proposal a “stop work” plan that considers this and any other mitigation related to caribou early arrival and/or late departure. The intent of this latter requirement is to provide flexibility to adapt to changing climate conditions that may occur during the life of fields in the region.

d. The following ground and air traffic restrictions shall apply in the areas and time periods indicated. Ground traffic restrictions apply to permanent oil and gas-related roads:

1. From May 20 through July 20, traffic speed shall not exceed 15 miles per hour when caribou are within 0.5 mile of the road. Additional strategies may include limiting trips, using convoys, using different vehicle types, etc., to the extent practicable. The lessee shall submit with the development proposal a vehicle use plan that considers these and any other mitigation. The vehicle use plan shall also include a vehicle-use monitoring plan. Adjustments will be required by the authorized officer if resulting disturbance is determined to be unacceptable.

2. The lessee or a contractor shall observe caribou movement from May 20 through July 20, or earlier if caribou are present prior to May 20. Based on these observations, traffic will be stopped:

a. Temporarily to allow a crossing by 10 or more caribou. Sections of road will be evacuated whenever an attempted crossing by a large number of caribou (group of approximately 100 or more) appears to be imminent. The lessee shall submit with the development proposal a vehicle use plan that considers these and any other mitigation.

b. by direction of the authorized officer throughout a defined area for up to four weeks to prevent displacement of calving caribou. The vehicle use plan shall also include a vehicle-use monitoring plan. Adjustments will be required by the authorized officer if resulting disturbance is determined to be unacceptable.

3. Major equipment, materials, and supplies to be used at oil and gas work sites shall be stockpiled prior to or after the period of May 20 through July 20 to minimize road traffic during that period.

4. Aircraft use shall be restricted in areas where caribou are present from May 20 through July 20 unless doing so endangers human life or violates safe flying practices. The lessee shall submit with the development proposal an aircraft use plan that considers these and other mitigation. The aircraft use plan shall also include an aircraft monitoring plan. Adjustments, including perhaps suspension of

all aircraft use, will be required by the authorized officer if resulting disturbance is determined to be unacceptable. This lease stipulation is not intended to restrict flights necessary to survey wildlife to gain information necessary to meet the stated objective of the stipulations and best management practices. However, flights necessary to gain this information will be restricted to the minimum necessary to collect such data.

5. Aircraft shall maintain a minimum height of 1,000 feet above ground level (except for takeoffs and landings) from May 20 through July 20, unless doing so endangers human life or violates safe flying practices. This lease stipulation is not intended to restrict flights necessary to survey wildlife to gain information necessary to meet the stated objective of the stipulations and best management practices. However, flights necessary to gain this information will be restricted to the minimum necessary to collect such data.

K-5b Best Management Practice – Porcupine Caribou Herd Calving Area

Objective: Minimize disturbance and hindrance of caribou, or alteration of caribou movements in the south/southeast portion of the Coastal Plain that has been identified as important caribou habitat during calving, post-calving, and insect relief periods.

Requirement/Standard: The Porcupine Caribou primary calving area is defined as the area with higher-than-average density of parturient caribou cows during more than 40% of years. This area is not available for leasing and no surface occupancy is permitted. This area includes approximately 653,000 acres, consisting of the entire area of the following townships, excluding areas that are within the Mollie Beattie Wilderness Area:

T03N, Ranges 34E-38E

T04N, Ranges 31E-39E

T05N, Ranges 32E-40E

T06N, Ranges 32E-40E

Peripheral calving areas include townships that partly overlap the calving area defined above. Portions of these townships may be offered for lease but no surface occupancy will be permitted. This area encompasses approximately 95,500 acres and includes the following areas:

T06N Range 31E

Southern one-half of T07N, Ranges 3E-35E and Ranges 37E-38E

K-5c Lease Stipulation – Porcupine Caribou Post-Calving Habitat Area (and Central Arctic Caribou Calving)

Objective: To protect key surface resources and subsistence resources/activities resulting from permanent oil and gas development and associated activities occurring in areas used by caribou during calving, post-calving, and insect relief periods .

Requirement Standard: No Central Processing Facilities shall be allowed in the Porcupine Caribou Post-Calving Habitat area. Well pads, roads, airstrips and pipelines will be permitted in accordance with the Caribou **K-5a Lease Stipulation/Best Management Practice –Caribou Summer Habitat**.

Infrastructure will be limited to 55 acres of the land area per township and oil and gas activity will be limited during periods when caribou are present (generally June 15-July 20).

This area encompasses approximately 245,000 acres and includes the following townships:

T05N, Ranges 27E-30E

T06N, Ranges 27E-30E

The southern one-half of T07, Ranges 27E-30E

Commented [LWM1]: FWS will continue to refine this to reflect reasonable, low density development once the RFDS is available. At this time, this would reflect approximately one pad and one 6 mi road.

Appendix A. Summary of biological parameters

Year	Cows Observed ^b	Parturition Rate	June Calf Survival ^c	Post-calving Survival ^d	Late June Calf:Cow ^e	March Calf:Cow ^f	Population Estimate	Peak of calving	Calving note
1985		0.77			0.46				
1986		0.74							
1987	51	0.78	0.71		0.55		165,000		
1988	91	0.84	0.65		0.55				
1989	74	0.78	0.74		0.58	0.43	178,000		
1990	74	0.82	0.90		0.74				
1991	77	0.74	0.82		0.61	0.22			
1992	78	0.86	0.57		0.49	0.33	160,000		
1993	63	0.81	0.56	0.83	0.45	0.32			
1994	98	0.91	0.77	0.93	0.70	0.40	152,000		
1995	95	0.69	0.85	0.92	0.59	0.41			
1996	74	0.89	0.81	0.91	0.72	0.46			
1997	48	0.75	0.77	0.90	0.58	0.38			
1998	58	0.83	0.82	0.94	0.68	0.27	129,000		
1999	39	0.84	0.83	0.86	0.70	0.56		3-Jun	1-5 June
2000	44	0.73	0.61	0.82	0.44	0.28		7-Jun	
2001	70	0.84	0.61	0.79	0.51	0.31	123,000	8-Jun	5-10 June
2002	68	0.87	0.65	0.85	0.56	0.38		5-Jun	
2003	70	0.87	0.79	0.85	0.69	0.33		1-Jun	
2004	74	0.82	g	g	g	0.24		3-Jun	3-4 June
2005	55	0.64	0.77	0.88	0.49	h		2-Jun	1 - 4 June
2006	66	0.79	0.73	0.86	0.58	0.39		2-Jun	
2007	67	0.88	0.83	0.90	0.73	h		30-May	
2008	63	0.79	0.73	0.92	0.59	h		30-May	29 or 30 May
2009	65	0.77	0.57	0.75	0.44	0.19		2-Jun	
2010	41	0.85	0.76	0.87	0.65	h	169,000	1-Jun	prior to 2 Jun

Year	Cows Observed ^b	Parturition Rate	June Calf Survival ^c	Post-calving Survival ^d	Late June Calf:Cow ^e	March Calf:Cow ^f	Population Estimate	Peak of calving	Calving note
2011	59	0.86	0.48	0.59	0.41	h		30-May	prior to 1 Jun
2012	g	g	g	g	g	g		30-May	prior to 1 Jun
2013	42	0.86	i	i	i		197,000	04-Jun	3-4 June
2014	39	g	g	g	0.49			no data	
2015	g	g	g	i	i			no data	
2016	28	0.75	0.61	1.00	0.46	0.36		3-Jun	
2017	42	0.88	0.81	0.90	0.72			3-Jun	
Mean		0.81	0.72	0.86	0.58	0.35			
5 yr mean		0.83	0.71	0.95	0.56	0.36			

^a Data are from Fancy et al. (1994, Can. J. Zool. 72:840–846), Alaska Department of Fish and Game, and Yukon Department of Environment.

^b Number of radiocollared adult cows for which parturition status was determined in early June, excluding those known to be <4 years old. Includes caribou of unknown age, but most likely > or equal to 4 years olds. Prior to 2003, all caribou were of unknown age.

^c Estimated as (July calf:cow ratio)/(parturition rate).

^d Includes only calves observed during early June that were subsequently observed in late June (i.e., does not include most perinatal mortality).

^e Excludes radiocollared cows known to be < 4 years old.

^f As of March of the year following birth of each cohort; includes all cows >1 year old.

^g No data due to adverse weather conditions.

^h No data due to mixing of herds on winter range.

ⁱ No data due to dense caribou groups making identification of cow:calf pairs not possible.