

FLIR Survey for Maternal Polar Bear (*Ursus Maritimus*) Denning Habitat

Survey conducted by ConocoPhillips Alaska, Inc.

Winter 2009/2010

Prepared for the United States Fish and Wildlife Service

Introduction

Between December 7th, 2009 and January 21st, 2010 ConocoPhillips Alaska, Inc. (CPAI) conducted two Forward Looking Infrared (FLIR) surveys on the North Slope of Alaska within a one mile buffer around proposed activity planned for the winter of 2009/2010. The 2009/2010 proposed activities include:

- West Mikkelsen State corrective action program
- Alpine oil field operations in the Colville River Delta area
- NPRA seismic data acquisition and Lookout 1 Exploratory Well operations
- CD5 and Fiord West pre-development operations

The FLIR surveys were conducted to identify the potential location of maternal polar bear dens in accordance with protocols developed by the US Fish and Wildlife Service (USFWS). The specific survey areas were identified by the USFWS during a pre-flight meeting. This report summarizes the results of the surveys.

Methodology

The surveys were conducted using the Shared Services Twin Otter (DHC-6) which was mounted with a STAR SAFIRE III FLIR unit. Survey times on December 7th, 9th, 15th, and January 21st were approximately 4 hours (17:40 to 21:32), 4 hours (17:30 to 21:11), 1 hour (18:10 to 19:27), and 2 hours (14:39 to 16:33) respectively.

David McElroy (pilot) and Richard Mallowney (co-pilot) operated the Twin Otter on the December 7th survey. The FLIR technician on the flight was Ben Bernstein. On December 9th Mark Mercier (pilot), Richard Mallowney (co-pilot) and Jason Wise (FLIR operator) comprised the crew, and Craig Perham (USFWS) and Justin Blank (Weston Solutions, Inc.) were on-board as observers. On December 15th, Mike Watson (pilot), Eric Feagle (co-pilot), and Jonathan Plummer (FLIR Operator) were accompanied by Justin Blank (observer). The January 21st, 2010 flight was operated by Andy Fowler (pilot), Mike Mercer (co-pilot), Peter Bjornstad (FLIR operator) and Justin Blank (observer). Mr. Perham was not in attendance on the final 2 flights, but was consulted prior to the surveys. Repeated transects across the one-mile buffer around planned activity areas were flown to ensure adequate coverage (Figures 1 through 5).

Results

Weather conditions for the surveys are shown on Table 1 below. Visibility was fair, providing adequate identification conditions, for all surveys.

Table 1: Weather Reported by CPAI ATAC

ALPINE WEATHER CONDITIONS	12/07/09 19:00	12/09/09 19:00	12/15/09 19:00	1/21/10 14:48
Wind Direction (magnetic)	100°	210°	360°	250°
Wind Speed (knots)	4	6	7	15
Visibility (miles)	10	10	10	1.5
Cloud cover	Scattered @ 2400 ft/ Overcast @ 3600 ft	Broken @ 19000 ft	Broken @ 2044 ft/ Overcast @ 4100 ft	Overcast @ 2000 ft
Temperature (degrees Celsius)	-6	-13	-28	-25
Dew Point (degrees Celsius)	-8	-15	-31	-28
Altimeter	3030	3012	3085	3003
Notes			Ice crystals	Light blowing snow
KUPARUK WEATHER CONDITIONS	12/07/09 18:16	12/09/09 18:46	12/15/09 18:45	1/21/10 14:54
Wind Direction (magnetic)	130°	Calm	30°	290°
Wind Speed (knots)	6	Calm	3	11
Visibility (miles)	One eighth	10	7	4
Cloud cover	100	Broken @ 19000 ft/ Mostly cloudy	Mostly cloudy	Overcast @ 2000 ft
Temperature (degrees Celsius)	-9	-13	-29	-25
Dew Point (degrees Celsius)	-10	-15	-33	-28
Altimeter	3034	3010	2984	3000
Notes	Freezing fog		Ice crystals	mist

On December 7th the FLIR survey began near Endicott and moved East along the coast to Badami to evaluate a proposed ice road route for the West Mikkelsen State corrective action (to be built by others in early 2010). After surveying the West Mikkelsen State Site, Shaviovik Minesite, and the Badami pad area, the plane flew a transect following another proposed ice road route (also to be built by others) between Badami and the Endicott areas. The second route generally follows the Badami Pipeline. The specific route of flight for this

area is shown on Figure 1. During this survey there were several ‘warmspots’ observed (Figure 1 inlays). They were all determined to have low probabilities of being dens; however, USFWS planned to revisit these areas in January 2010. CPAI anticipates that the respective ice road constructors will perform their own due diligence before and during construction. Therefore any areas of question will have already been addressed by the time CPAI mobilizes to the site.

On December 9th the survey began on the Colville River Delta. Multiple transects were flown to ensure adequate coverage. Various channels and locations were examined in anticipation of ice road construction, tundra travel, and planned seismic data acquisition. No heat signatures of concern were found on the Delta. The flight path is shown on Figure 2.

The December 9th survey also looked at the Fish Creek drainage in the National Petroleum Reserve-Alaska (NPR-A). Seismic data acquisition and possible work on the Lookout 1 exploration well site are slated for early 2010. No heat signatures were found during this part of the survey (Figure 3).

The CD-5 and Fiord West areas in the NPR-A were surveyed on December 15th. Two warm spots were found in these areas (Figure 4). Although they were initially determined to have low probabilities of den presence, CPAI elected to re-check these sites on January 21st, 2010.

The January 21st survey focused specifically on the two heat signatures found on December 15th. After review of the tapes the USFWS determined that no evidence of any den was detected (Figure 5).

All detected heat signatures are listed in Table 2.

Table 2: Location of Heat Signatures

Latitude	Longitude	Vicinity
N70 09.835	W147 16.104	Shaviovik Minesite
N70 07.614	W147 14.935	Shaviovik Minesite
N70 17.388	W147 47.959	Endicott
N70 16.319	W147 49.397	Endicott
N70 20.918	W151 09.686	Fiord West
N70 16.940	W151 09.796	CD-5

Summary

Although none of the identified heat signature anomalies could be confirmed as being den locations, caution should be used when operating near those vicinities. Additionally FLIR technology, while a prudent methodology for assessing potential polar bear den locations, may not locate 100% of the dens in the survey

area. With this in mind, work and travel should be done with caution in all areas following the guidelines listed in CPAI's Polar Bear/Human Interaction Plan. USFWS will advise on any supplemental findings (e.g., locations of USGS collared bear den locations) once they are obtained.

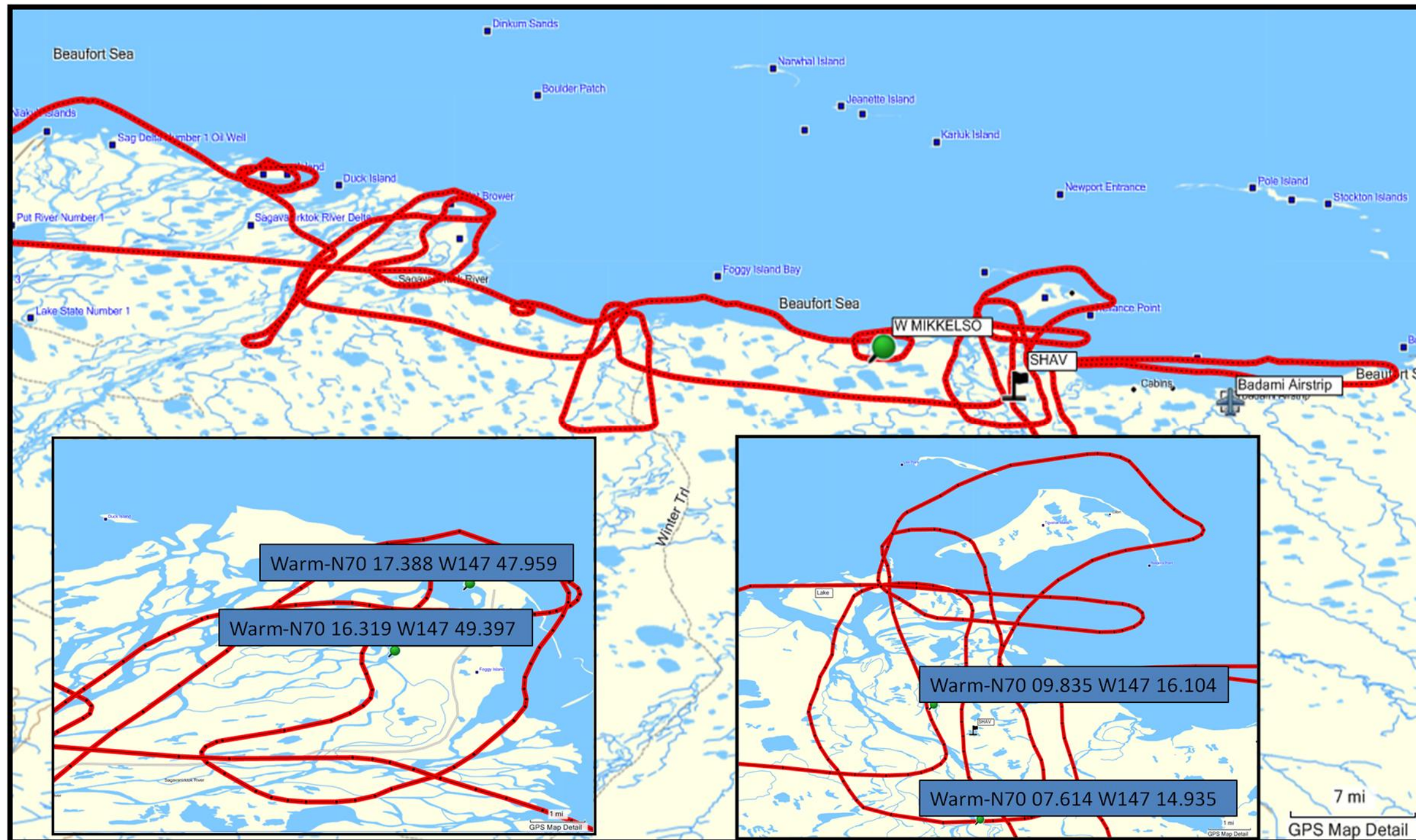


Figure 1: Actual flight lines (in red) of FLIR survey conducted for evaluation of the West Mikkelsen Corrective Action Area of Activity, December 7th, 2009. Warm spots are shown in the zoomed in inlay maps.

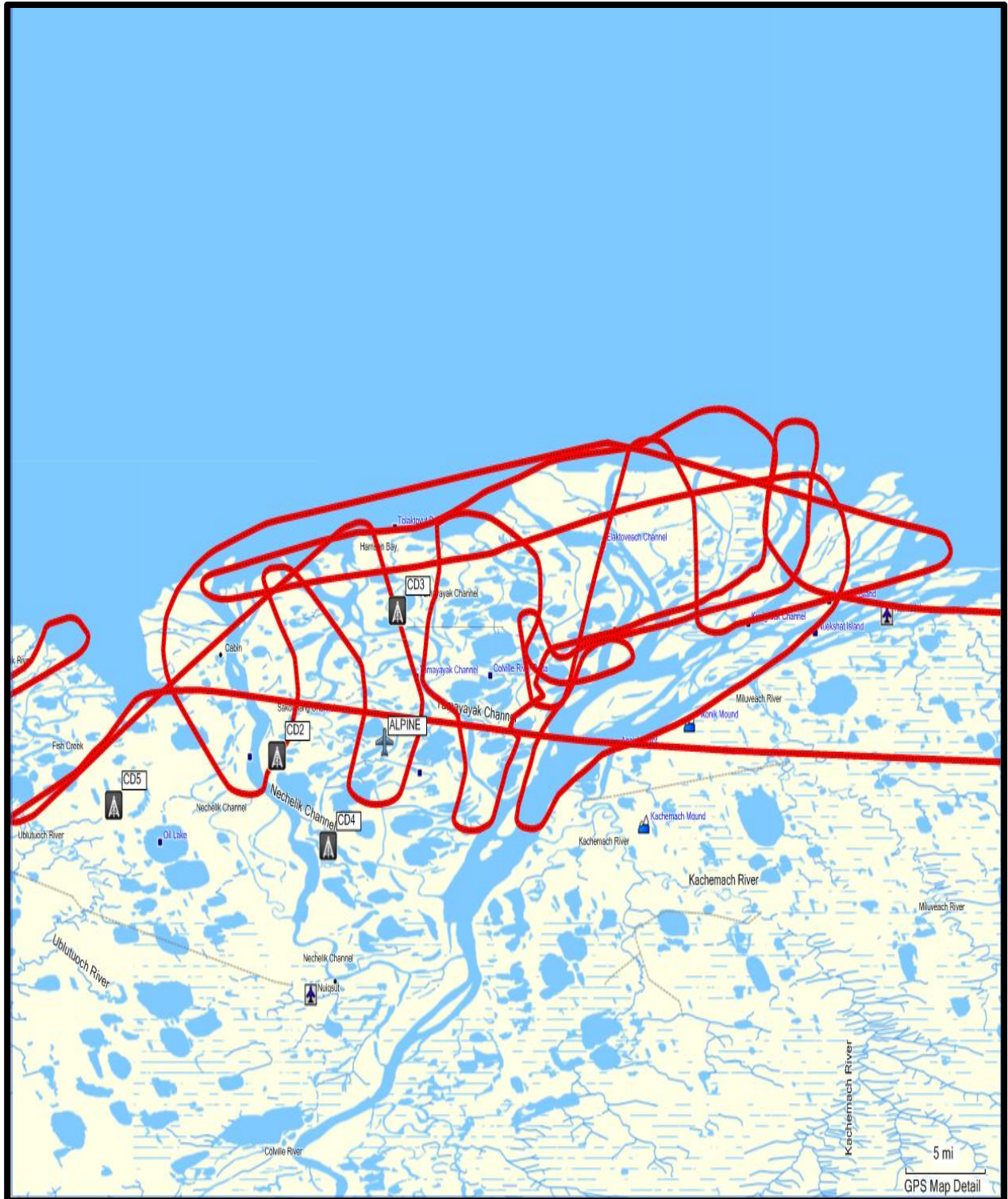


Figure 2: Actual flight lines (in red) of FLIR survey conducted for the Colville River Delta area, December 9th, 2009.

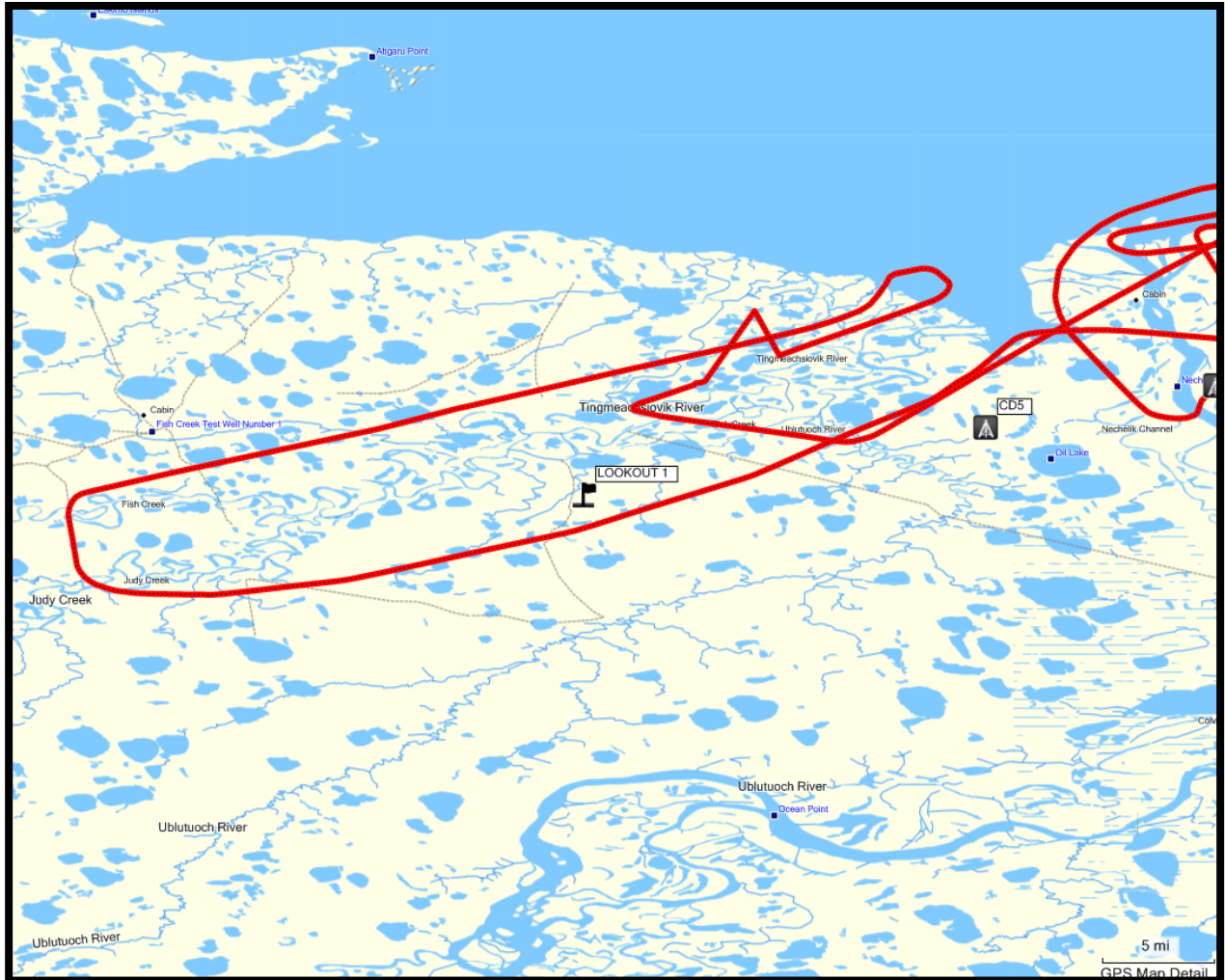


Figure 3: Actual flight lines (in red) of FLIR survey conducted for the NPR-A area, December 9th, 2009.

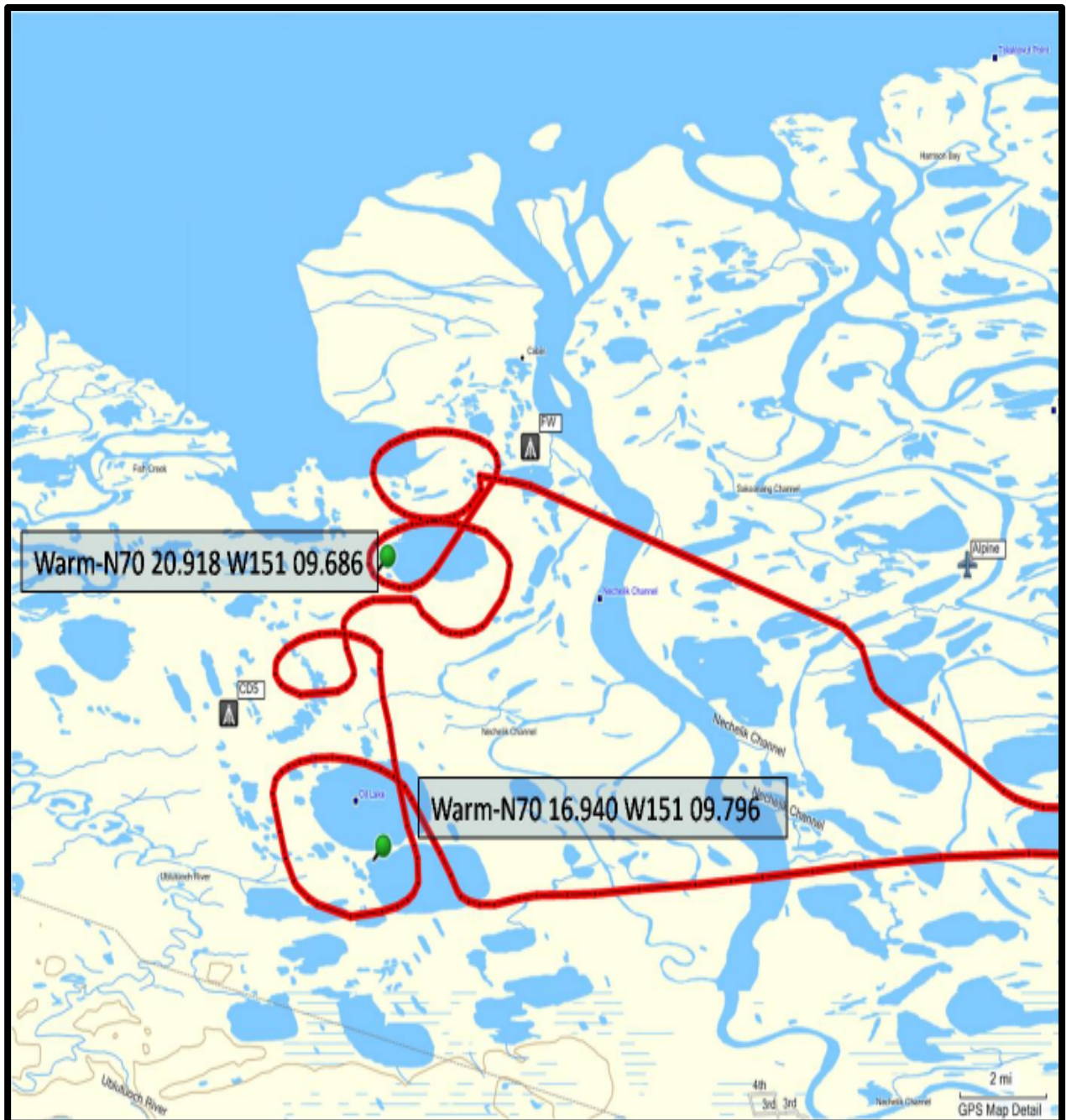


Figure 4: Actual flight lines (in red) of FLIR survey conducted for the CD-5 and Fjord West areas, December 15th, 2009.

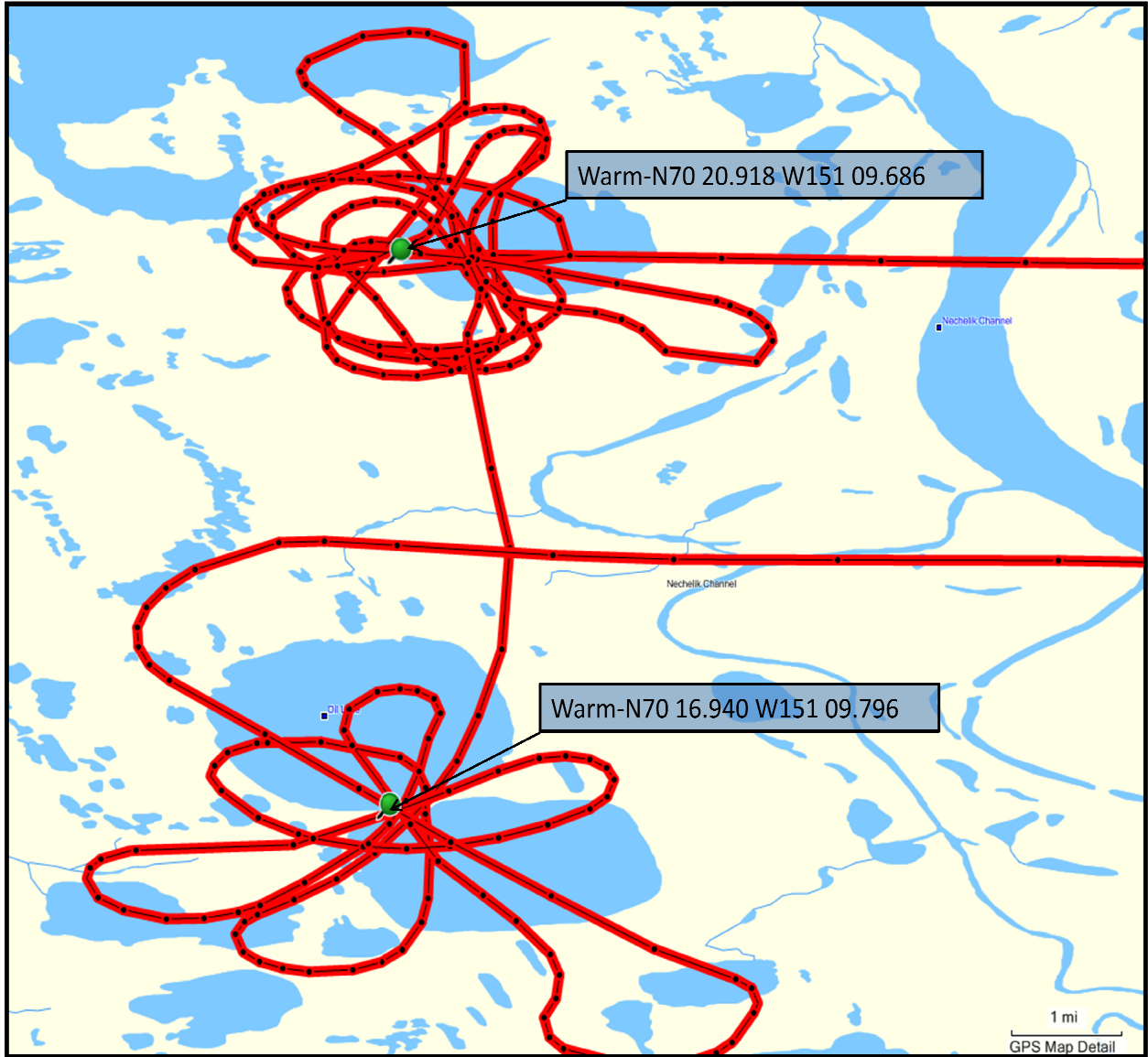


Figure 5: Actual flight lines (in red) of FLIR survey conducted for the CD-5 and Fjord West areas, January 21, 2010. This was a re-survey of warm spots encountered on December 15th, 2009.