

TECHNICAL MEMO

CREATING AND DELIVERING BETTER SOLUTIONS

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TO: David Morrison
Yukon Energy Corporation

DATE: September 17, 2009
ISSUED FOR USE

C: Bengt Pettersson, Stephan Klump, Jack Dennett

MEMO NO: 1

FROM: George Carlson, Morgan Zondervan

FILE: W23101159.012

SUBJECT: Yukon Geothermal Project - Results of Thermal Infrared Imagery Analysis

1.0 INTRODUCTION

This Technical Memo outlines and documents the results of efforts completed under Phase 012, Low-level Thermal Infrared (TIR) Survey, for Yukon Energy Corporation (YEC), as part of the Yukon Geothermal Project (EBA project W23101159). The work associated with this phase was initially proposed as a follow-up in the context of an overall 'proof of concept' approach initiated in Phase 011, Satellite Image Survey. Phase 011 involved using satellite thermal data to facilitate the identification of potential thermal anomalies at a regional scale in the Yukon. Potential thermal anomalies identified from satellite imagery were reviewed in the context of regional and local geologic information by the Project Team geologist, Jack Dennett, EBA Whitehorse. Mr. Dennett selected the most promising anomalies in each Study Area (Figure 1) as candidates for a finer level of assessment using a short-wave TIR camera system.

For Phase 012, Spectrum Infrared Ltd., Calgary, Alberta, was contracted to conduct helicopter thermal infrared (TIR) surveys of the selected targets in each Study Area. The objective of the surveys was to test the application of short-wave thermal infrared (TIR) imaging in identifying and confirming thermal anomalies identified from the satellite image analysis. The surveys were conducted from June 9 - 15, 2009. Figure 1 shows the locations of the five study areas.

2.0 DATA ACQUISITION AND ANALYSIS METHODS

The project TIR data acquisition team consisted of George Carlson, Senior Scientist, EBA, Kelowna, British Columbia; Grant Eliuk, Spectrum Infrared, Ltd, Calgary, Alberta, and the helicopter pilot, Ben Tanner, Trans North Helicopters, Whitehorse, Yukon. A safety briefing was completed prior to each helicopter survey flight. At the first pre-flight briefing, the pilot was instructed how to position the aircraft to allow data acquisition while in flight. Following each flight, a meeting was held with the pilot and team to discuss the recent flight and any required adjustments.

Each day's flight plan was developed and discussed prior to the flight. As noted above, areas identified for TIR data acquisition had been selected from an analysis of satellite data and screened by the project geologist, Jack Dennett, EBA, Whitehorse. Mr. Dennett selected areas thought to correspond with favourable geologic features, i.e. faults, known

hot springs. The flight lines were arranged to allow imaging of the selected areas, as well as, several additional mapped satellite thermal anomalies along the flight routes.

A Trimble XT GPS was used to record each survey flight path. The TIR data was acquired with a P660 SC FLIR Infrared Camera System (specifications provided in Appendix A). The thermal data acquired by the P660 was recorded on a Sony 505 digital camera DVD. Table 1 provides a breakdown of the dates, flight times, existing weather conditions, altitude, and notes for each study area.

TABLE 1: TIR DATA ACQUISITION PARAMETERS					
STUDY AREA	DATE	TIMES (sunrise)	WEATHER ¹ T°G / T°A / RH / V / E	ALTITUDE (ft ASL)	NOTES
Whitehorse	9 June	02:40 – 04:40 (04:32)	11.7 / 5 / 38 / U / 0.95	7,500– 9,500	Recorded 2 data disks.
Jarvis	11 June	02:32 – 04:39 (04:39)	11 / 6 / 45 / U / 0.95	6,000– 8,000	Recorded 1 data disk.
McArthur	13 June	10:59 – 13:24 (03:50)	11.7 / 3 / 90 / 20 / 0.95	4,000– 6,000	Morning flight scrubbed, rain, low ceiling. Cool temps/overcast allowed later flight. Recorded 2 data disks.
Volcano	14 June	00:32 – 02:25 (03:49)	7.3 / 3 / 62 / U / 0.95	5,100– 7,000	Recorded 1 data disk.
Nash Creek	15 June	01:00 – 03:11 (03:49)	11 / 3 / 40 / U / 0.95	6,000– 6,100	Recorded 1 data disk.

¹ **Weather:** T°G = Ground Temperature; T°A = Ambient Air Temperature; RH = Relative Humidity, V = Visibility (U = Unlimited); E = Emissivity.

Following each flight, the raw footage recorded on the DVD was reviewed to insure complete data recording and quality. Areas identified on the recordings as potential thermal anomalies or areas of interest were identified and noted for follow-up during post-processing analysis. Post-processing was completed using FLIR proprietary software to scan the recorded images and separate obvious heat signatures due to solar gain (heating of the earth's surface then releasing that heat during cooler periods). The data were further analyzed using the FLIR software to adjust level and span, or thermal focus, to facilitate interpretation of the remaining anomalies.

To separate and prioritize thermal anomalies deemed of interest for further assessment, each anomaly was analyzed for:

- type of local “thermal pattern”, or physical configuration in comparison to surrounding geomorphology (qualitative assessment by experienced thermographer);
- relative size;

- temperature differences from calculated ground temperatures (quantitative assessment); and,
- relationship to geologic features (i.e. faults, folds, hot springs).

Figures 2 to 6 are maps of each Study Area showing the recorded flight lines and potential thermal anomalies surveyed. Table 2 provides a summary of the thermal anomalies surveyed by study area, (respective map figure reference provided); altitude and heading the information was recorded; and comments.

TABLE 2: SUMMARY OF TIR SURVEY				
Study Area (figure #)	Thermal anomaly assessed	Date	Altitude (Ft ASL) / Heading	Comments
Whitehorse (Fig. 2)	WH-1	9 June	8000/NNW	Anomaly due to solar gain
	WH-2		9,500/SW	Anomaly due to solar gain
	WH-3		8,500/NE	Anomaly due to solar gain
	WH-4		7,800/SW	
	SA-1		9,500/SW	Anomaly due to solar gain
	SA-2		9,400/SW	Anomaly due to solar gain
	SA-3		9,400/WNW	Anomaly due to solar gain
	SA-4		8,500/NE	Anomaly due to solar gain
	SA-5		8,500/NE	Anomaly due to solar gain
	SA-6		7,800/NE	
	SA-7		7,500/NE	Anomaly due to solar gain
Jarvis (Fig. 3)	J-1	11 June	8,000/SE	
	J-2		7,500/SSE	Anomaly due to solar gain
	J-3		7,500/SE	Anomaly due to solar gain
	SA-1		7,500/SE	
	SA-2		7,800/NNE	
	SA-3		8,000/NNE	
	SA-4		8,000/NE	Anomaly due to solar gain
	SA-5		8,000/ENE	Anomaly due to solar gain
	Previous water sampling area		6,000/SE	Area where water samples were collect in 2008.
McArthur (Fig. 4)	McA-1	13 June	6,000/SE	
	McA-2		5,900/SE	Anomaly due to solar gain
	McA-3		5,500/SSE	Anomaly due to solar gain
	McA-4		5,500/ENE	
	McA-5		5,000/E	

TABLE 2: SUMMARY OF TIR SURVEY				
Study Area (figure #)	Thermal anomaly assessed	Date	Altitude (Ft ASL) / Heading	Comments
	McA-6		N/A	Low fuel did not survey
	McA-7		4,000-4,600/SSE	
	McA-8		5,500/NE	Anomaly due to solar gain
	SA-1		5,900/SE	Anomaly due to solar gain
	SA-2		6,000/E	Anomaly due to solar gain
	SA-3		5,100/ESE	Anomaly due to solar gain
	SA-4		5,000/E	
	SA-5		5,500/NE	Anomaly due to solar gain
	Hot Springs		4,900-5,600/E	
Volcano Mt (Fig. 5)	VM-1	14 June	6,500/E	
	VM-2		5,100/ESE	
	SA-1		5,400/E	
	SA-2		5,300/SE	
	WS-1		7,000/SW	
	WS-2		5,400/E	
Nash Creek (Fig. 6)	NC-1	15 June	6,000/E	Anomaly due to solar gain
	NC-2		6,100/E	
	NC-3		6,100/N	
	NC-4		6,000/NNE	Anomaly due to solar gain
	NC-5		6,000/NNE	
	NC-6		6,000/NNE	
	SA-1		6,200/NE	
	SA-2		6,000/E	Anomaly due to solar gain
	SA-3		6,100/ENE	

3.0 ANALYSIS AND RESULTS

Table 3 provides a breakdown by study area of the results for each anomaly assessed during post-processing. The GPS location provided for each anomaly in the table was recorded by the FLIR P660 camera system and represents the position of the helicopter at that time. A ranking as to the potential for the anomaly to be associated with a thermal feature, or priority for further assessment, was assigned to each anomaly based on the criteria presented in Section 2.0 above. If the anomaly was due to ‘solar gain’, it is noted in the table. “Thermogram Number” in the table refers to the respective thermogram, or recorded thermal image, for the anomaly listed and discussed in Appendix B.

TABLE 3: BREAKDOWN OF THERMAL ANOMALIES SCANNED IN EACH STUDY AREA					
Study Area	Thermogram # (Anomaly)	Priority # ¹	GPS Latitude	GPS Longitude	Notes
Whitehorse	# 1	3	60.298765	135.363722	Point of interest found along flight line.
	#2 (WH - 2)	0	No GPS Recorded at this position		Solar Gain
	#3 (WH - 3)	0	60.430927	135.229327	Solar Gain
	#4 (WH - 4)	1	60.3873467	135.229327	
	#5 (Satellite Anomaly - 6)	2	60.3722633	135.210608	
Jarvis	# 6 (J - 1)	1	60.8822683	138.608238	
	# 7 (Satellite Anomaly - 1)	2	60.6978483	138.06811	Large anomaly, priorities changed along feature.
	# 8 (Satellite Anomaly - 1)	1	60.6926083	138.047317	
	# 9 (Satellite Anomaly - 2)	2	60.6741633	137.78878	
	# 10 (J - 2)	0	60.60698	137.680285	Solar Gain
	# 11 (J - 2)	0	60.599875	137.681438	Solar Gain
	# 12 (Satellite Anomaly - 3)	1	No GPS recorded at this position		Large anomaly extending over several km.
	# 13 (Satellite Anomaly - 3)	1	60.4875233	137.318122	
# 14 Water Samples Location	-	60.57623	137.325975	Area where samples collected.	
McArthur	# 15 (Mc - 1)	1	63.0331883	134.826967	
	# 16 (Mc - 4)	1	63.025705	134.897488	
	# 17 (Mc - 5)	3	62.878035	135.190442	
	# 18 (Satellite Anomaly - 4)	2	62.8866667	135.08249	
	# 19 (Satellite Anomaly - 4)	2	62.9002917	134.983615	
	# 20 (Mc - 7)	3	62.9006883	135.814323	
	# 21 (McArthur Hot Springs)	1	63.0713467	135.70885	

TABLE 3: BREAKDOWN OF THERMAL ANOMALIES SCANNED IN EACH STUDY AREA					
Study Area	Thermogram # (Anomaly)	Priority # ¹	GPS Latitude	GPS Longitude	Notes
Volcano Mt	# 22 (VM – 1)	1	62.92501	137.446843	
	# 23 Previous Water Samples	2	62.9113983	137.446845	Area where samples collected in 2008.
	# 24 (VM – 1)	3	62.8774483	137.42167	Large anomaly, priorities changed along feature.
	# 25 (Satellite Anomaly – 1)	3	62.856067	137.27761	
	# 26 (Satellite Anomaly – 2)	2	62.841233	137.315953	
	# 27 (VM – 2)	2	62.7499783	137.283248	
Nash Creek	# 28 (Satellite Anomaly – 1)	2	See Figure 6	No GPS satellites, no positions recorded.	Large anomaly, priorities changed along feature.
	# 29 (Satellite Anomaly – 1)	3			
	# 30 (Satellite Anomaly – 1)	1			
	# 31 (NC – 5)	2			
	# 32 (NC – 5)	2			
	# 33 (NC – 6)	1			
	# 34 (Satellite Anomaly – 3)	2			
	# 35 (NC – 2)	0			Solar Gain
	# 36 (NC – 2)	2	64.4974833	134.75154	
	# 37 (NC – 2)	3	64.4986133	134.748773	
	# 38 (NC – 3)	1	64.4992567	134.741755	
	# 39 (Satellite Anomaly – A)	2	64.476525	134.72804	Anomalies recorded outside original study area.
	# 40 (Satellite Anomaly – B)	1	64.4818083	134.727488	
	# 41 (Satellite Anomaly – C)	2	64.4482882	134.639702	
# 42 (Satellite Anomaly – D)	2	64.4482333	134.629925		

¹Priority #: 1 = High, 2 = Moderate, 3 = Low

For the thermograms provided in Appendix B, thermal anomalies or areas of thermal activity identified from the TIR helicopter survey data are delineated and labelled 'Ar' on each thermogram. These polygons outline the general patterns of potential thermal activity in the area surveyed, which is known as 'qualitative infrared analyses'. The crosshairs on each thermogram identify several points where absolute ground temperatures were calculated (Sp) during post-processing. In some cases, a temperature difference (rise) from a reference Sp is reported in the respective discussion. This process is referred to as 'quantitative infrared analyses'. The associated discussion with each thermogram highlights and describes the thermal anomalies observed and the results of the post-processing analysis.

A Google Earth icon appears at the bottom left under the majority of thermogram figures. This is a hyperlink that will take the reader to the GPS spatial location of that thermogram in Google Earth. To use this feature the reader's computer must be online. For those thermograms without a Google Earth link, a GPS location lock could not be obtained due to satellite configuration.

A DVD is provided with this report and contains video records of the TIR data acquired. The reader may be referred to specific "times" on the DVD that correspond to the anomaly being discussed.

Please Note: The times shown on the video recordings are "Mountain Time", one hour later than the actual time the data was recorded. Also, the following acronyms appear in each frame and are defined below.

DIST = Distance – parameter set at 1000 meters, maximum level.

TREFL = Reflective ambient earth temperature – value confirms calibration while operating the TIR camera.

E = Emissivity – parameter set at 0.95.

4.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the TIR surveys and data analysis conducted for this Phase, our conclusions and recommendations are as follows:

- The use of a short-wave thermal infrared sensor did confirm potential thermal anomalies identified from the satellite image survey analysis. Because of differences in scale between the two sensors, the TIR-identified anomalies were more defined and exhibited features that cannot be seen at the scale of a satellite image. Also, the TIR data revealed additional thermal anomalies within the larger satellite-defined areas and did not reveal any anomalies outside these areas where scanned.
- The TIR survey identified areas of thermal activity that could not be explained as 'solar gain' and may be associated with a geothermal heat source.

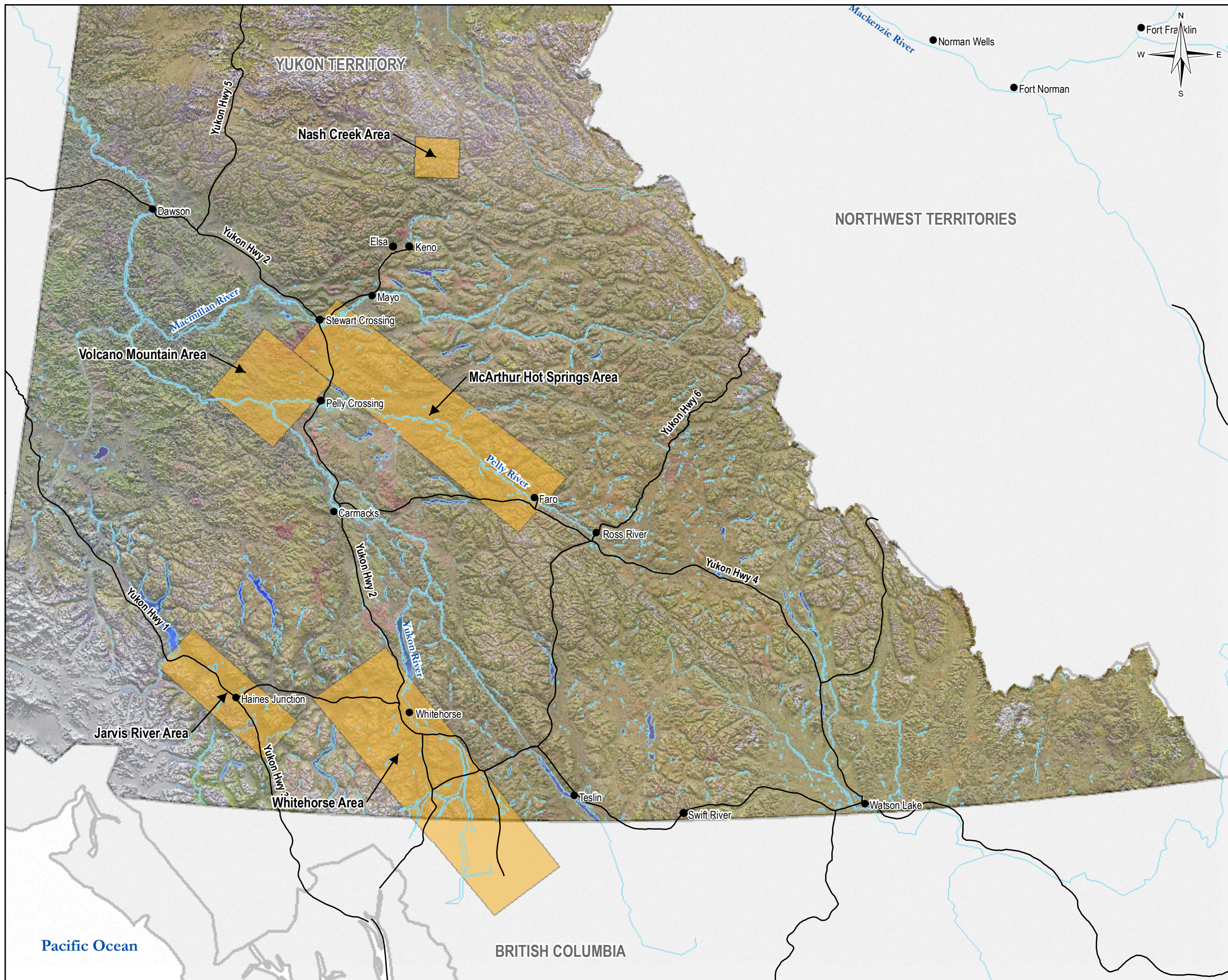
- The results have provided potential ‘targets’ for further study. We would recommend several anomalies be selected for ‘temperature profiling’ based on the results of the TIR survey, geophysical surveys, and geologic data. In general terms, the proposed methodology would involve measuring ground temperatures along a transect, across and perpendicular to the anomaly. This would provide a relatively quick and cost effective assessment of a sample of the potential thermal anomalies identified. Further recommendations for follow-up assessment of other TIR anomalies will be based on the results of this initial ground assessment of selected sample anomalies.

Attachments:	Figure 1	Study Areas
	Figure 2	Whitehorse Area TIR Survey Results
	Figure 3	Jarvis Area TIR Survey Results
	Figure 4	McArthur Hot Springs Area TIR Survey Results
	Figure 5	Volcano Mountain Area TIR Survey Results
	Figure 6	Nash Creek Area TIR Survey Results
	Appendix A	P660 SC FLIR System Specifications
	Appendix B	Thermograms

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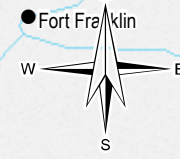


FIGURES



LEGEND

- Study Areas
- Communities
- Roads
- Water



ISSUED FOR USE

NOTES
Base data source: Geomatics Yukon

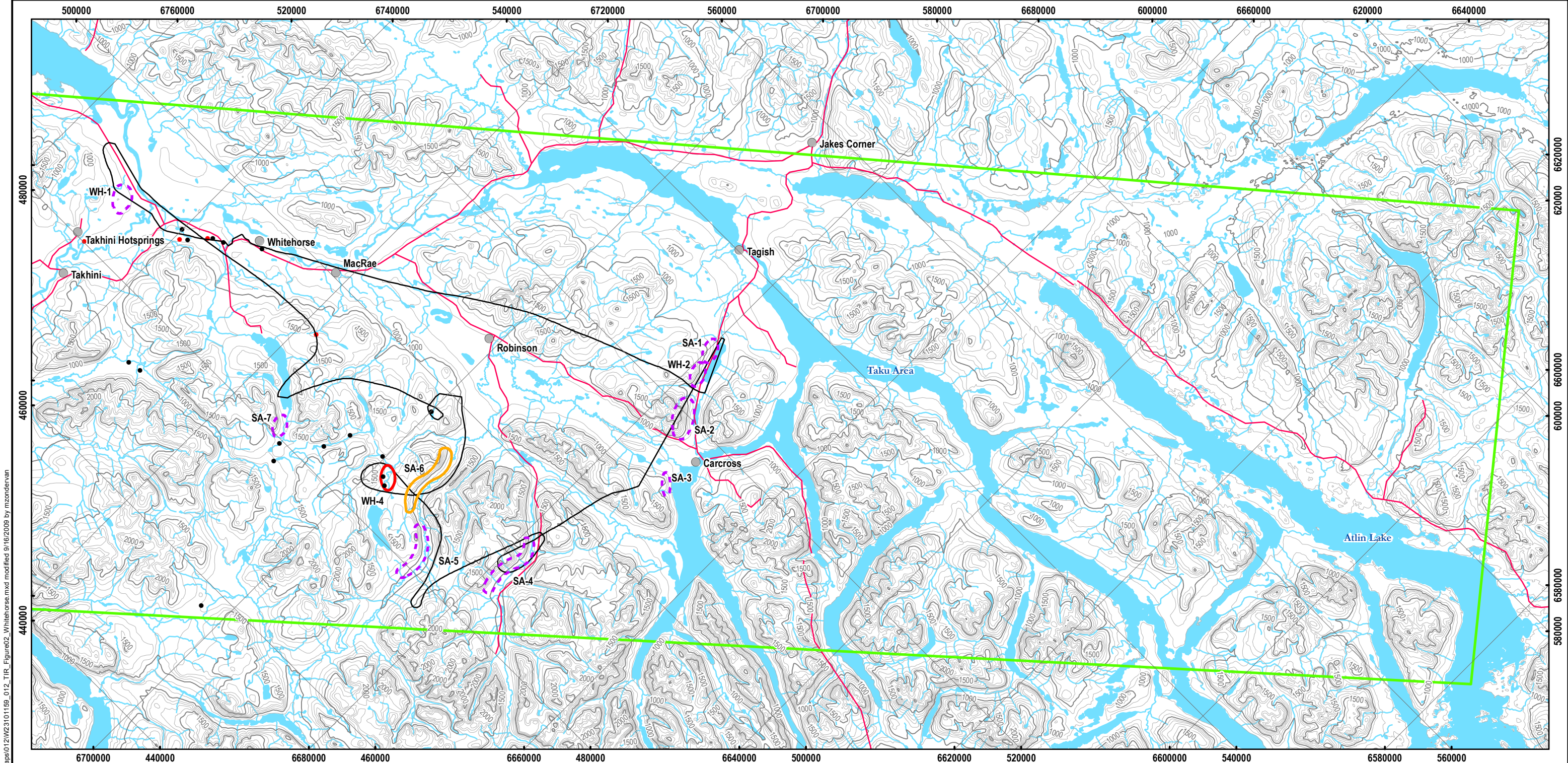
YUKON-WIDE GEOTHERMAL EXPLORATION PROGRAM

TIR Survey Areas

PROJECTION UTM Zone 11	DATUM NAD83			
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FILE NO. W23101159_012_TIR_Figure01_SA.mxd	EBA Engineering Consultants Ltd.			
PROJECT NO. W23101159.012	DWN MEZ	CKD GC	REV 0	Figure 1
OFFICE EBA-VANC	DATE July 16, 2009			



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LEGEND

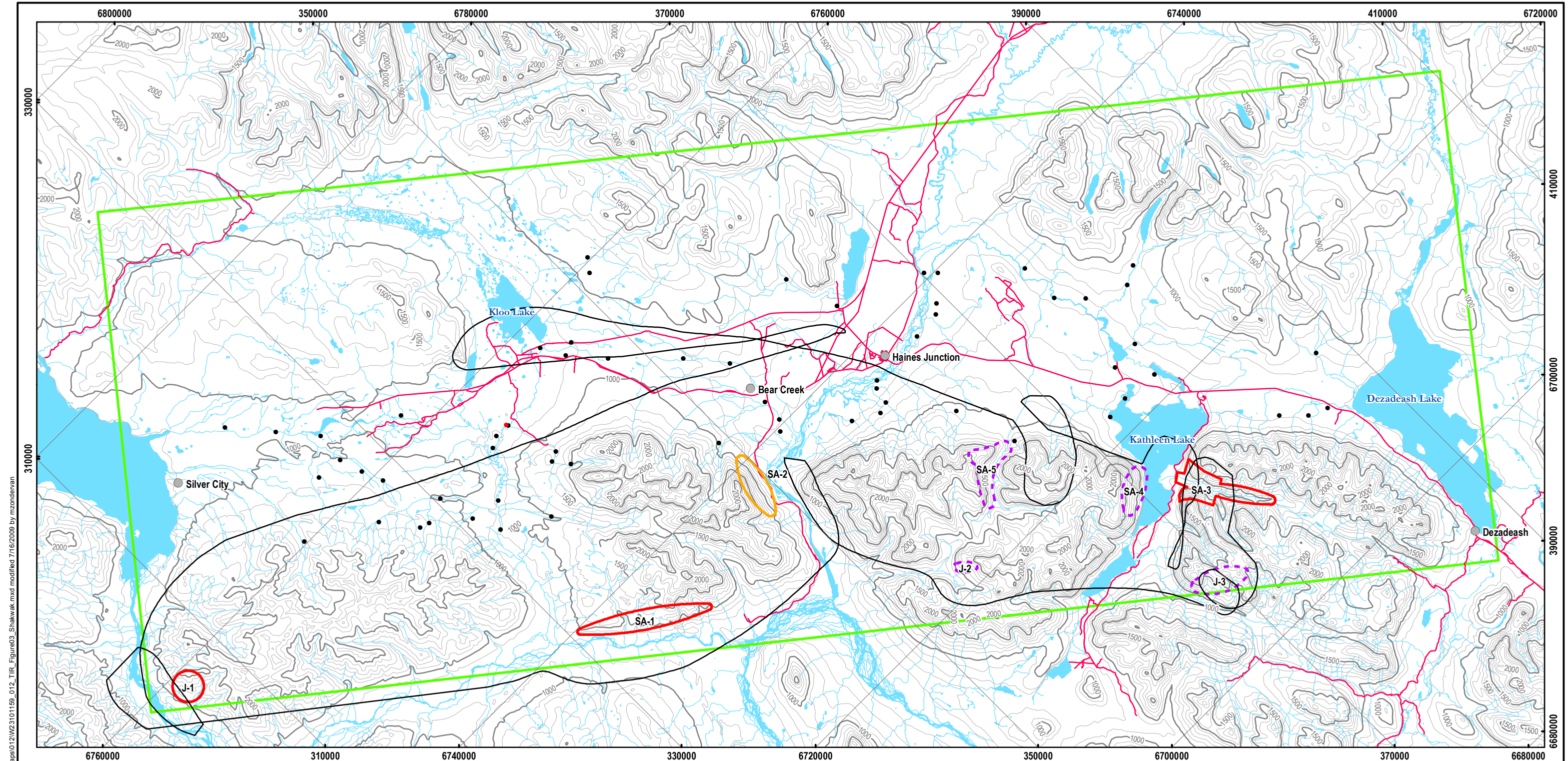
- Open Water Survey Sites
- Populated Place
- Approximate Locations of Known Hot Springs
- ▭ Study Area
- Flight Line
- Road
- ▭ Solar Gain
- Contours**
- Index (500m)
- Intermediate (100m)
- Watercourse
- Waterbody
- TIR Anomalies**
- Priority**
- 1
- 2
- 3



NOTES
 Base data sources:
 Water layers from NTDB 1:50K
 Contours from NTDB 1:250K

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YUKON-WIDE GEOTHERMAL EXPLORATION PROGRAM			
Whitehorse Area TIR Survey Results			
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FILE NO. W23101159_012_TIR_Figure02_Whitehorse.mxd			
PROJECT NO. W23101159.012			
OFFICE EBA-VANC	DATE September 16, 2009		
Figure 2			



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LEGEND

- Open Water Survey Sites
 - Populated Place
 - Jarvis River Warm Springs
 - Roads
 - Flight Line
 - Study Area
 - Solar Gain
 - Contours
 - Index (500m)
 - Intermediate (100m)
 - Watercourse
 - Waterbody
- TIR Anomalies**
- Priority**
- 1
 - 2
 - 3



YUKON-WIDE GEOTHERMAL EXPLORATION PROGRAM

Jarvis River Area TIR Survey Results

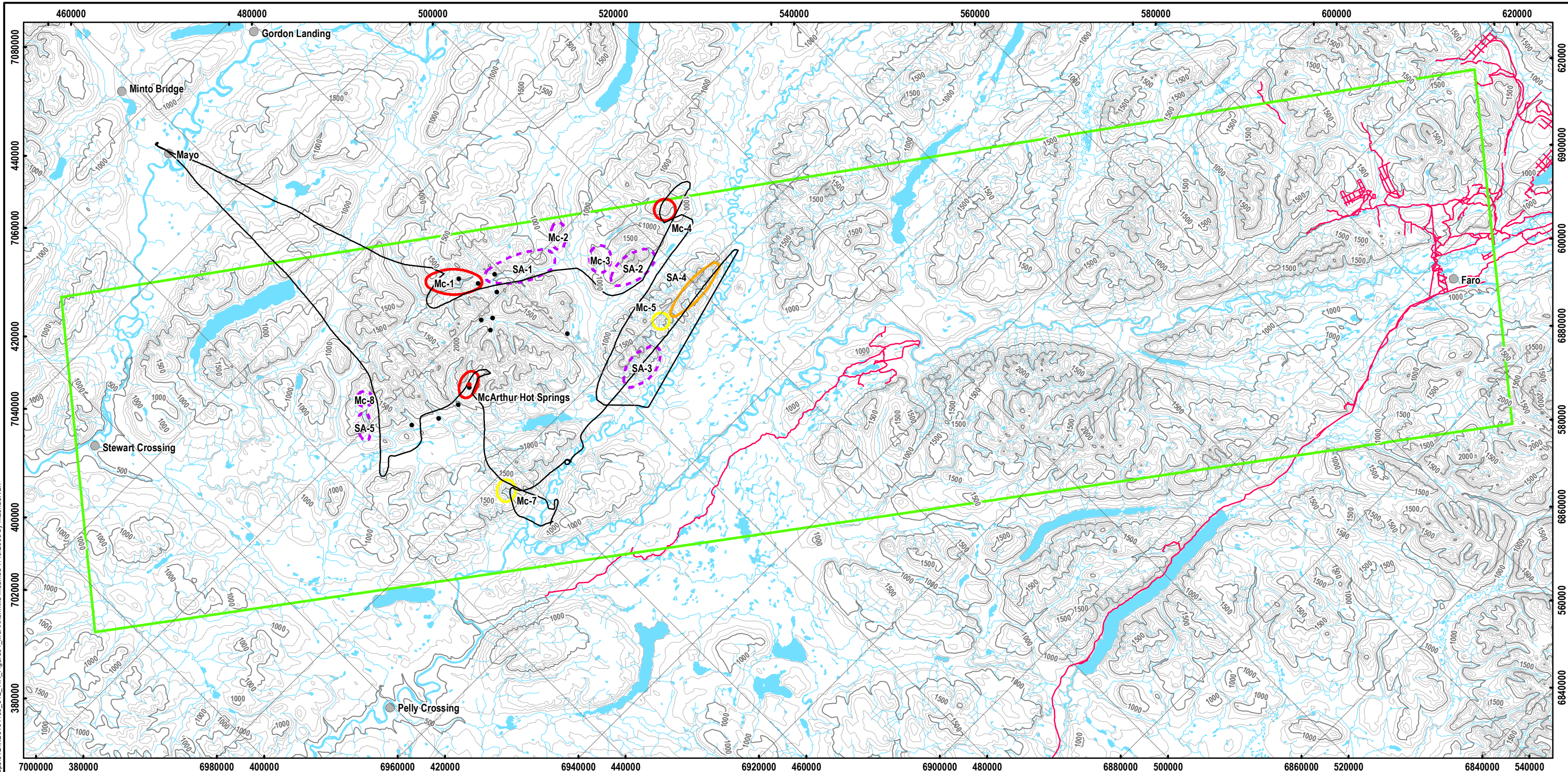
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OFFICE EBA-VANC	DATE July 16, 2009		



NOTES
Base data sources:
Water layers from NTDB 1:50K
Contours from NTDB 1:250K

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Figure 3



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LEGEND

- Open Water Survey Sites
- Populated Place
- McArthur Hot Springs
- ▭ Study Area
- Flight Line
- Roads
- ▭ Solar Gain
- Contours**
- Index (500m)
- Intermediate (100m)
- Watercourse
- Waterbody
- TIR Anomalies**
- Priority**
- 1
- 2
- 3



NOTES
 Base data sources:
 Water layers from NTDB 1:50K
 Contours from NTDB 1:250K

YUKON-WIDE GEOTHERMAL EXPLORATION PROGRAM

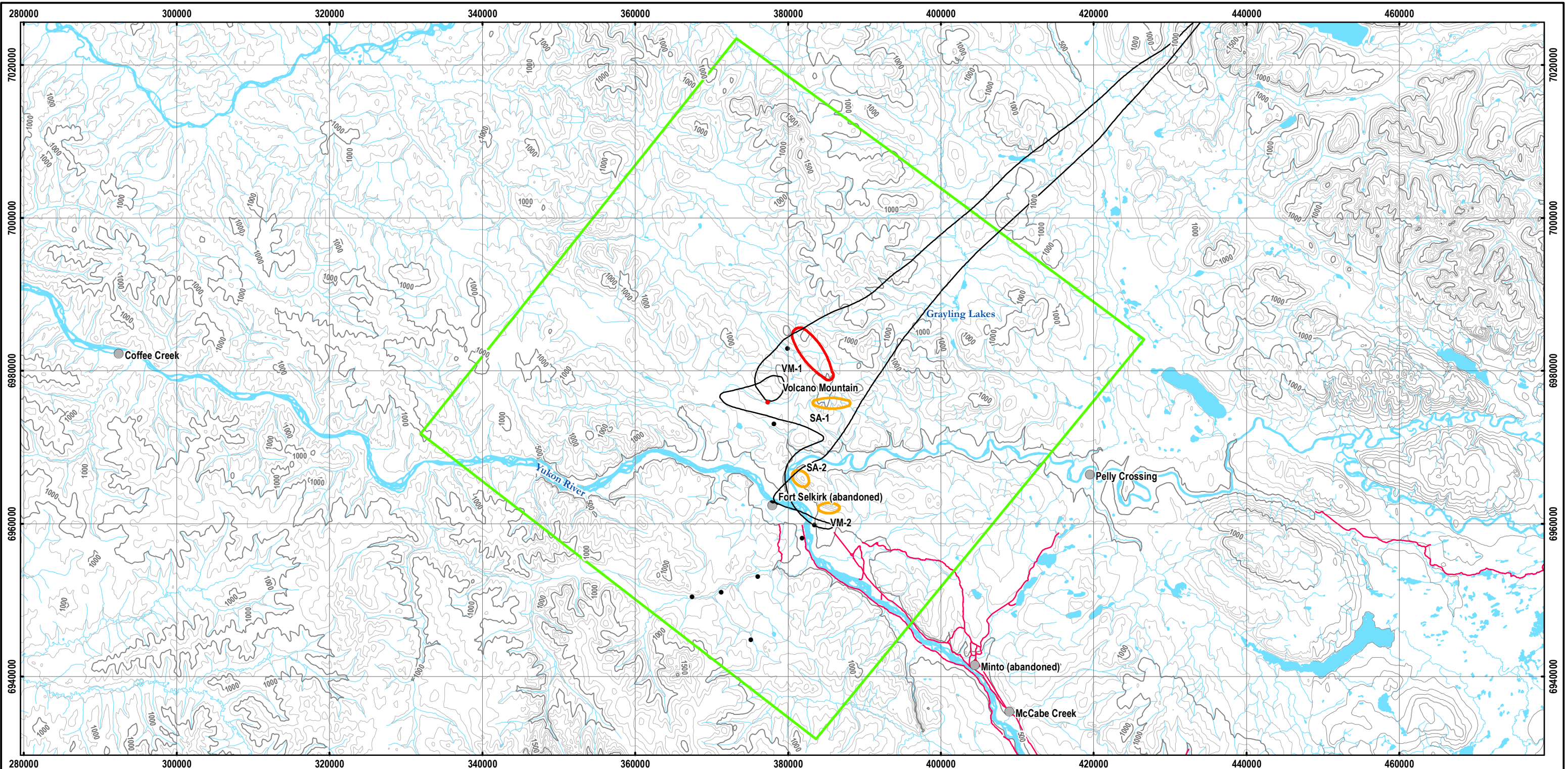
McArthur Hot Springs Area TIR Survey Results

PROJECTION UTM Zone 8	DATUM NAD83		
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PROJECT NO. W23101159.012	DWN MEZ	CKD GC	REV 0
OFFICE EBA-VANC	DATE July 16, 2009		

EBA Engineering Consultants Ltd.

Figure 4

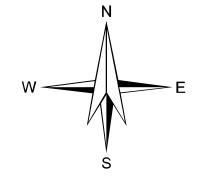
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LEGEND

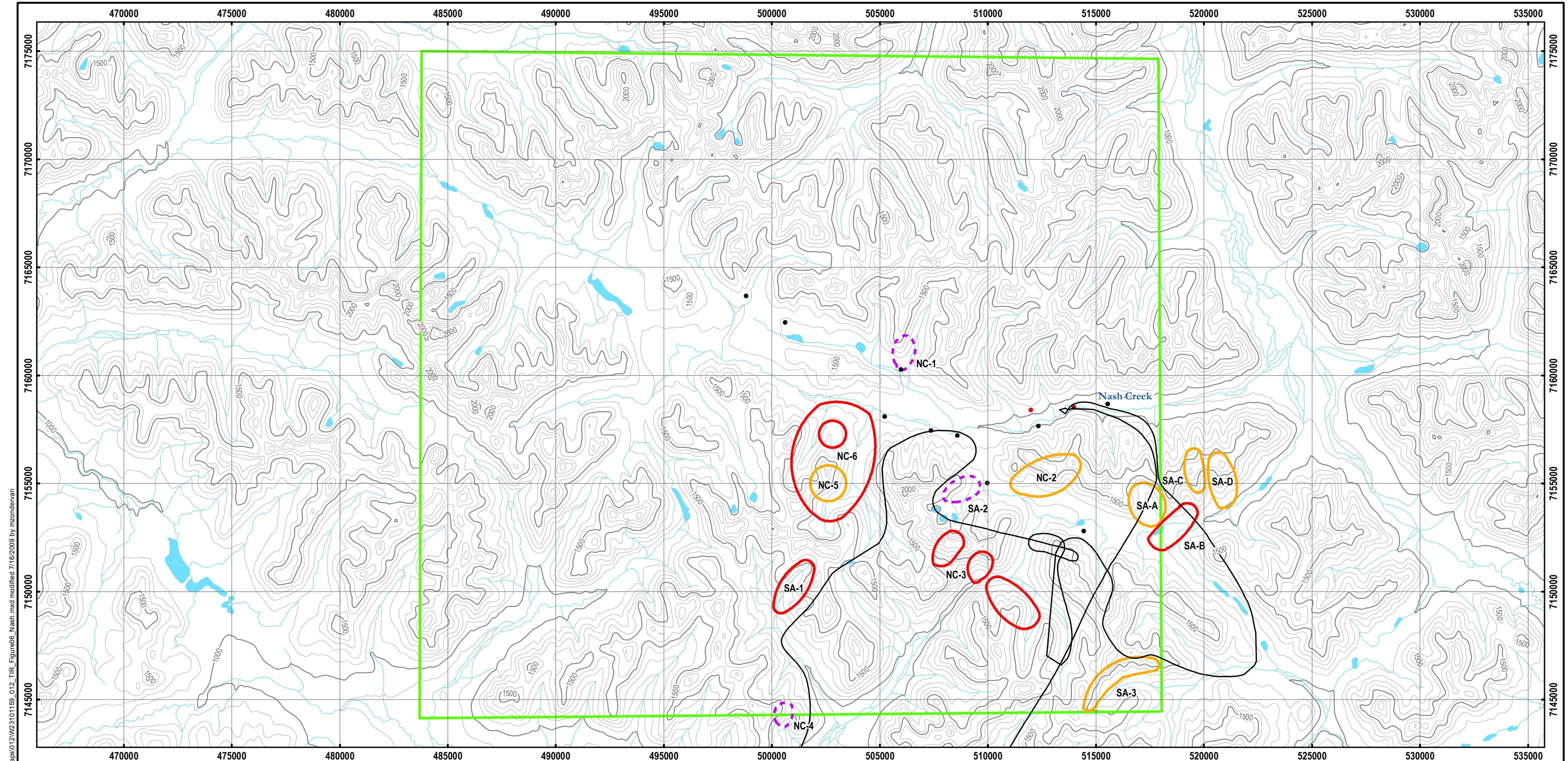
- Location of Previous Volcano Mountain Field Work
- Open Water Survey Sites
- Flight Line
- Populated Place
- ▭ Study Area
- Roads
- TIR Anomalies**
- Priority**
- 1
- 2
- 3
- Contour**
- Index (500m)
- Intermediate (100m)
- Watercourse
- Waterbody



NOTES
 Base data sources:
 Water layers from NTDB 1:50K
 Contours from NTDB 1:250K

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YUKON-WIDE GEOTHERMAL EXPLORATION PROGRAM			
Volcano Mountain Area TIR Survey Results			
PROJECTION UTM Zone 8	DATUM NAD83		 EBA Engineering Consultants Ltd.
Scale: 1:500,000 			
FILE NO. W23101159_012_TIR_Figure05_Volcano.mxd	DWN MEZ	CKD GC	REV 0
PROJECT NO. W23101159.012	OFFICE EBA-VANC	DATE July 16, 2009	Figure 5



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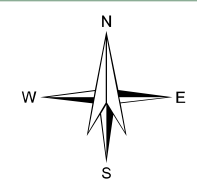
LEGEND

- Open Water Survey Sites
- Populated Place
- Approximate Locations of Known Hot Springs
- Study Area
- Nash Creek Flight Line
- Contours
- Index (500m)
- Intermediate (100m)
- Watercourse
- Waterbody
- ▭ Solar Gain

TIR Anomalies

Priority

- 1
- 2
- 3



NOTES
 Base data sources:
 Water layers from NTDB 1:50K
 Contours from NTDB 1:250K

YUKON-WIDE GEOTHERMAL EXPLORATION PROGRAM

**Nash Creek Area
TIR Survey Results**

PROJECTION UTM Zone 8	DATUM NAD83		
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OFFICE EBA-VANC	DATE July 16, 2009		

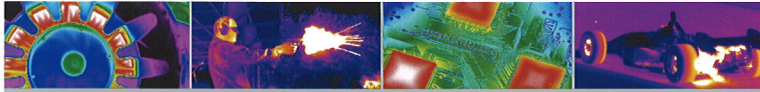
Figure 6

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APPENDIX

APPENDIX A P660 SC FLIR SYSTEM SPECIFICATIONS



Highest sensitivity and most advanced feature set available. Supplies a combination of infrared and visible spectrum images of superior quality and temperature measurement accuracy – plus GPS, voice annotation, and a host of other advanced features.



- > Uncooled 640x480 IR Detector Array
- > Thermal Sensitivity $\leq 45\text{mK}$
- > Built-in 3.2 Mpixel visual camera
- > Temperature Range: -40°C to 1500°C
- > Full Radiometric Real-time Video to PC
- > Automatic GPS Data
- > Text and Voice Annotation
- > Optional Wireless Remote Operation

Features both thermal and visual camera capabilities – at the touch of a button!

Highest Sensitivity

The SC660's high-definition 640x480 infrared detector delivers exceptional sensitivity, resolution, and image quality for scientific and research applications. Its 0.04°C sensitivity and $\pm 1^{\circ}\text{C}$ (1.8°F) accuracy means precise readings, taken on smaller objects, at safer distances. The Dynamic Detail Enhancement (DDE) feature further improves thermal image sharpness.

Visual Image Integration

The SC660 includes an integrated 3.2 megapixel digital video camera to aid in data presentation. Infrared and visual images can also be stored in standard JPEG formats. The visual camera includes a matching Field Of View (FOV) lens, so IR and visual images correlate over various distances. Moreover, full flexibility in the fusion of images allows user adjusted sizing and location of a picture-on-picture (PoP) view.

Multifunction Video Capture

The SC660's 5.6" widescreen LCD allows on-camera viewing of images. Its FireWire interface can transfer 14-bit radiometric or RAW data directly into a PC for real-time analysis of captured images. Furthermore, radiometric sequences can be stored on high capacity (1 GB) SD-cards, an advantage when viewing moving targets. MPEG-4 non-radiometric video sequences can also be streamed to a PC via USB.

Voice and Text Annotation

The user can record a full 30 seconds of digital voice and embed it with each IR image. This allows a full description of the target and situation to be recorded and then documented in a data presentation. In addition, data from the built-in GPS system can be used to denote the camera's location. For added flexibility,

text comments for each image can be entered manually or preloaded from a PC. Similarly, thermal and visual images, temperature measurements, and annotations can be transferred to the PC via USB.

Productivity Features

An abundance of features enhance the convenience and productivity of the SC660. Its tiltable viewfinder provides high-resolution color imagery. The multi-angle handle has an integrated joystick and buttons and for easy point-and-shoot operation – functions like auto-focus, freeze-frame, and image storage are just a button click away. Manual focus allows operators greater flexibility, while the auto-focus is helpful in hard-to-focus situations, and allows new users to become productive sooner. A visual target illuminator (lamp) ensures good visual reference images, even under low lighting conditions.

Safety Enhancements

The laser locator on the SC660 helps associate a spot on the IR image with the exact location of the target object. This greatly enhances user safety by eliminating the tendency to "finger point" at hazardous areas. The camera's large target-distance to spot-size ratio allows users to do accurate measurement and analysis, while quickly and safely conducting IR studies in dangerous environments. An optional wireless remote control unit is very useful in hard to access areas, or when the operator needs to be away from the camera for safety reasons. This feature is WLAN based, and allows MPEG video to appear on the remote display.

Lightweight and Rugged

The ergonomic magnesium housing is designed for rugged portability and meets the IP54 standard,

thereby protecting internal parts from shock, vibration, dust and water-splash. The result is a camera that weighs only 1.7kg (3.8lb) with battery, for the comfort of users that need to carry a camera several hours a day.

3-hour Run Time Battery

The SC660 can run up to three hours on a single, fully charged battery. It comes with an intelligent charging station capable of conditioning and charging two batteries at a time. In addition, you can plug the SC660 into an AC outlet or optional 12V cable and charge the battery while still in the camera.

Optional Research Package

The optional SC660 Research Package consists of the SC660 camera and the ThermoVision ExaminIR analysis software. FLIR's ThermoVision ExaminIR Software seamlessly stores, retrieves, and analyzes IR images and temperature data directly from the SC660 camera, allowing in depth and precise evaluation of thermal performance. This powerful Windows®-based package for R&D professionals is easy to use for both static and real-time image analysis. It includes temperature display and analysis functions such as isotherms, line profiles, area histograms, and much more. Its high-speed data acquisition capabilities add another level of power and flexibility to thermal imaging and temperature measurements.

Infrared Certification Training and Support

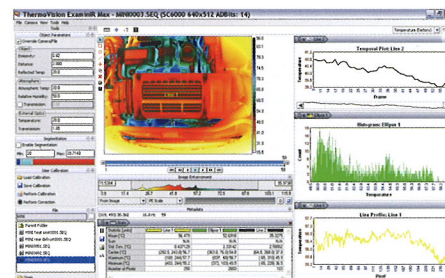
In addition to worldwide service and support, FLIR Systems offers Thermographer certification classes at its state-of-the-art facilities near Boston, Massachusetts. The FLIR Systems Infrared Training Center (ITC) is the Global leader in IR Thermography Training.

FLIR SC660 Technical Specifications

Imaging Performance	
Thermal	
Field of view/min focus distance	24° × 18° / 0.3m
Spatial resolution (IFOV)	0.65 mrad
Thermal sensitivity @ 50/60Hz	45mK at 30°C
Electronic Zoom	1–8x continuous, including pan
Focus	Automatic or manual
Digital image enhancement	Normal and enhanced
Detector type	Focal plane array (FPA) uncooled microbolometer; 640 × 480 pixels
Spectral range	7.5 to 13µm
Visual	
Built-in digital video	3.2 Mpixel, full color / built-in Target Illuminator / exchangeable lens
Standard lens performance	f=8mm / FOV 32°
Image Presentation	
Viewfinder	Built-in, tiltable, high-resolution color viewfinder (800 × 480 pixels)
External display	Built-in 5.6" LCD (1024 × 600 pixels)
Video output	RS170 EIA/NTSC or CCIR/PAL composite video
Measurement	
Temperature ranges	–40°C to +1500°C, in 3 ranges; up to +2000°C, optional (–40°F to 2732°F with option to 3,632°F)
Accuracy (% of reading)	±1°C or ±1% of reading (object within +5°C to to 120°C, ambient within +9°C to 35°C); otherwise ±2°C or ±2%.
Measurement modes	3 Spots/Areas (Boxes, Circles), Isotherms (above, below, interval), Delta T
Menu controls	Palettes, load custom palettes, auto adjust (manual/continuous/based on histogram equalization), image gallery, sequence storage, programmable storage, on-screen live and reference image (PoP)
Emissivity correction	Variable from 0.1 to 1.0 or select from listings in pre-defined material list
Measurement features	Automatic corrections based on user input for reflected ambient temperature, distance, relative humidity, atmospheric transmission, and external optics
Optics transmission correction	Automatic, based on signals from internal sensors
Atmospheric transmission correction	Automatic, based on inputs for distance, atmospheric temperature and relative humidity
Reflected ambient temperature correction	Automatic, based on input of reflected temperature
External optics/window correction	Automatic, based on input of optics/window transmission and temperature
Alarm functions	Automatic alarm on any selected measurement function, audible/visible alarm above/below
Image Storage	
Type	Removable SD-card (1GB)
File format – THERMAL	Standard JPEG; 14 bit thermal measurement data included
File format – VISUAL	Standard JPEG inked with corresponding thermal image
Voice annotation of images	30 sec. of digital voice "clip" stored together with the image wired headset
Text annotation of images	Predefined by user and stored with image
Laser LocatIR™	
Classification type	Class 2, Semiconductor AlGaInP Diode Laser: 1 mW/635 nm (red)
Power Source	
Battery type	Li-Ion, rechargeable, field-replaceable
Battery operating time	3 hours continuous operation
Charging system	In camera (AC adapter or 12V from car) or 2 bay intelligent charger
External power operation	AC adapter 110/220 VAC, 50/60Hz or 12V from car (cable with standard plug optional)
Power saving	Automatic shutdown and sleep mode (user-selectable)
Environmental	
Operating temperature range	–15°C to +50°C (5°F to 122°F)
Storage temperature range	–40°C to +70°C (–40°F to 158°F)
Humidity	Operating and storage 10% to 95%, non-condensing
Encapsulation	IP 54 IEC 529
Shock	Operational: 25G, IEC 68-2-29
Vibration	Operational: 2G, IEC 68-2-6
Physical Characteristics	
Weight	1.7kg (3.8 lbs) w/battery
Size	120mm × 145mm × 220mm
Tripod mounting	1/4" – 20

Camera includes:	
Camera with visual and IR lens	
Power supply	
2 batteries (3 hours operating time on each)	
2 bay charging station	
QuickReport software	
Manual and Quick Reference Card	
Headset	
Cables	
Lenses (optional)	
<i>Automatic lens identification</i>	
Field of view/minimum focus distance	
12° × 9° / 0.9m telelens	
45° × 34° / 0.1m wide angle lens	
Close-up 32 mm × 24 mm / 75 mm	
Interfaces	
1394 Firewire	Fully radiometric 14bit real time image video to PC
USB	Image (thermal and visual), measurement data, voice and text transfer to PC
IrDA	Wireless communication
SD-card (2)	I/O slot; storage slot

NEW! RUGGED & LIGHTWEIGHT MAGNESIUM HOUSING!



ThermoVision ExaminIR example display



LAZAR RADIATION
DO NOT STARE INTO BEAM
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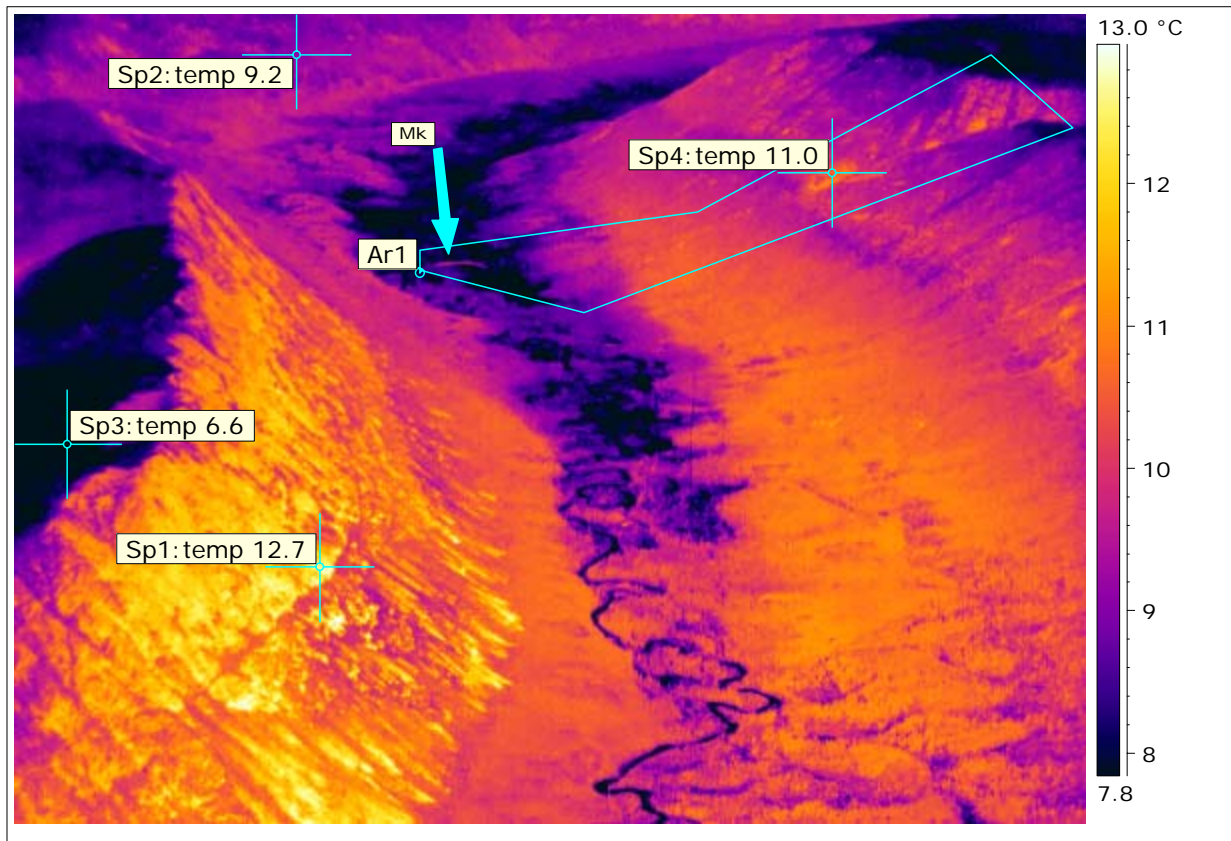
www.infraredresearchcameras.com



APPENDIX

APPENDIX B THERMOGRAMS

Thermogram # 1. Whitehorse Area – Point of Interest along Flight Line.
Video reference 4:06:27 AM.

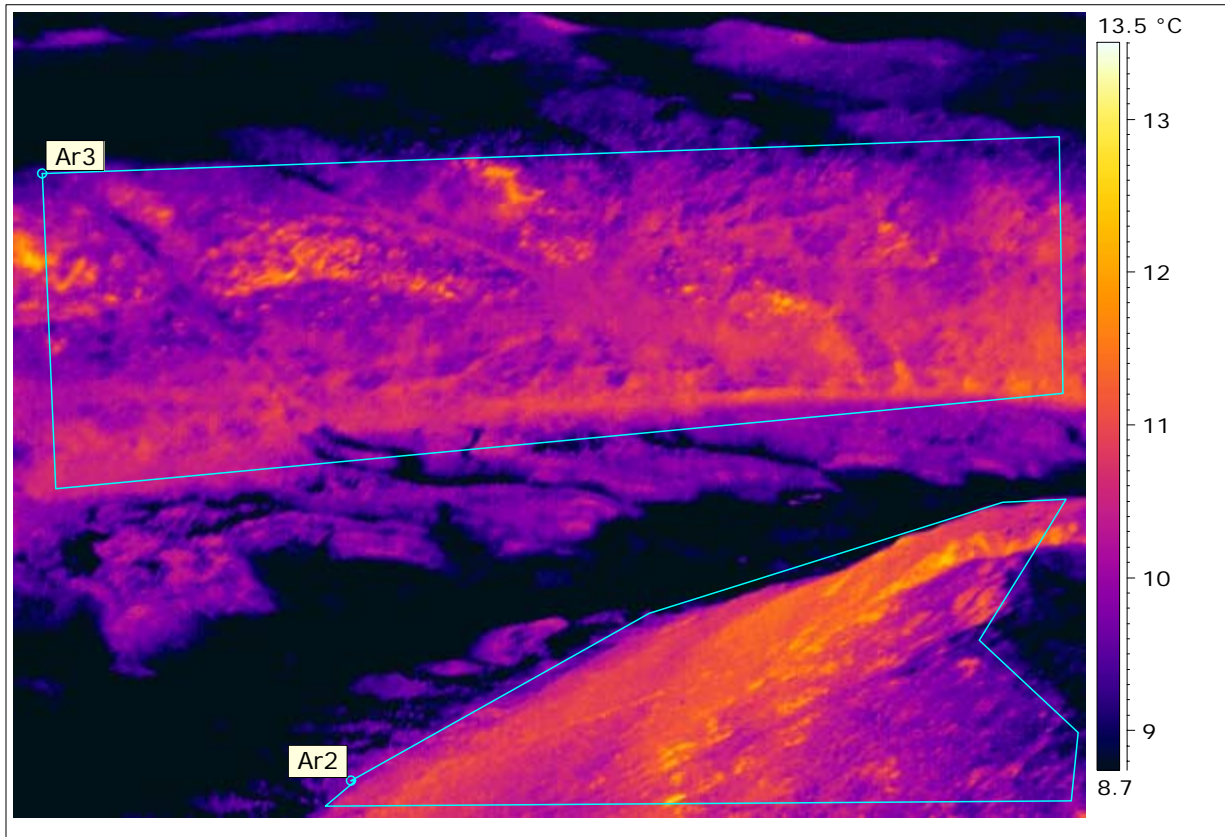


60.298765,-135.363722.kmz

This thermogram shows a small area of interest labelled Ar1. This area was delineated during post-processing based on temperatures and thermal pattern. Spot crosshairs (Sp) # 1, 2 and 3 are reference temperatures and Sp4 is the temperature of the thermal anomaly area. The temperature difference from Sp3 to Sp4 is a rise of 4.4 Deg C. There is a temperature rise of 1.8 deg C between Sp2 and the anomaly. Sp1 is associated with solar gain. The thermal pattern identified as Ar1 runs up the valley and has a thermal flare at the base (See 'Mk' label on thermogram).

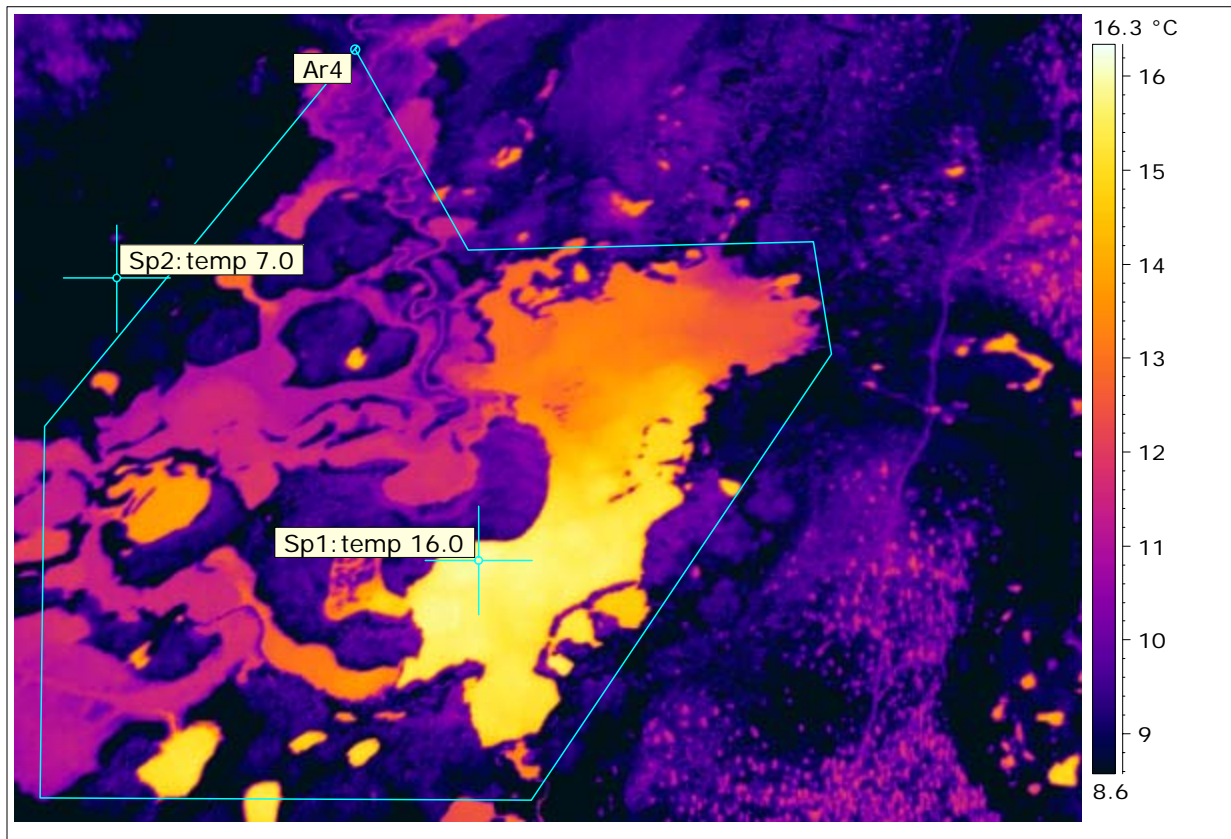
Due to the small area and small temperature differences we would prioritize this as # 3-Low. This priority may change when other data is collected and applied.

Thermogram # 2. Whitehorse Area Anomaly WH -2 (Figure 2).
Video reference 4:06:46 AM.



Ar2 and Ar3 are examples of solar gain.

Thermogram # 3. Whitehorse Area Anomaly # WH-4 (Figure 2), Alligator Lake Area.
Video reference 4:12:24 AM.



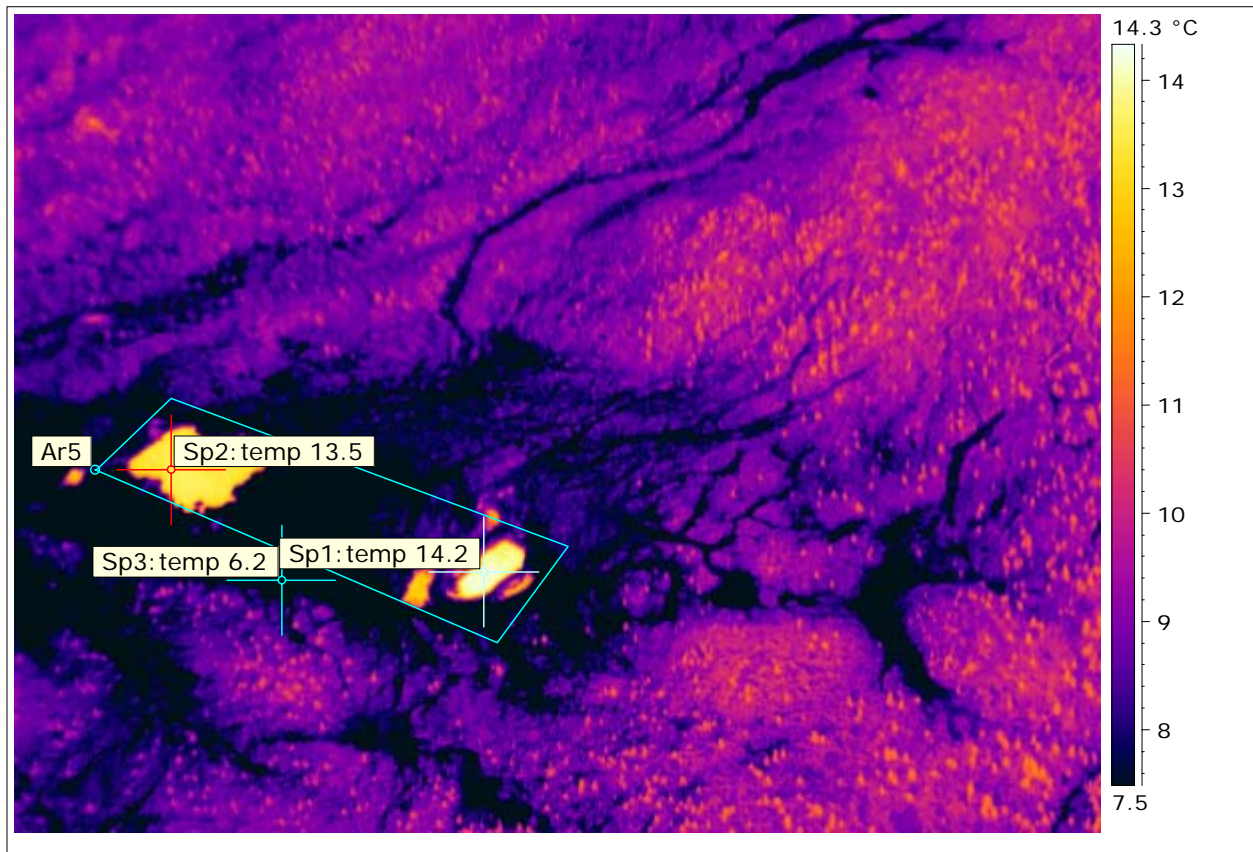
60.4309267,-135.229327.kmz

This thermogram reveals mottling thermal patterns that are indicative of moisture. The sharp temperature contrast between the different bodies of water alerted us to this area, as well as, the close proximity to the features shown in the next thermogram, # 4, and the general thermal patterns of this whole area (see video). This is an example of ‘qualitative infrared’ discussed earlier.

The temperature rise as seen in the immediate area from Sp1 to Sp2 is 9.0 Deg C, (‘quantitative infrared’).

The priority assigned to the feature in this thermogram is # 1-High. Further assessment is recommended.

Thermogram # 4. Whitehorse Area Anomaly # WH-4 (Figure 2), Alligator Lake Area.
Video reference 4:16:11 AM.



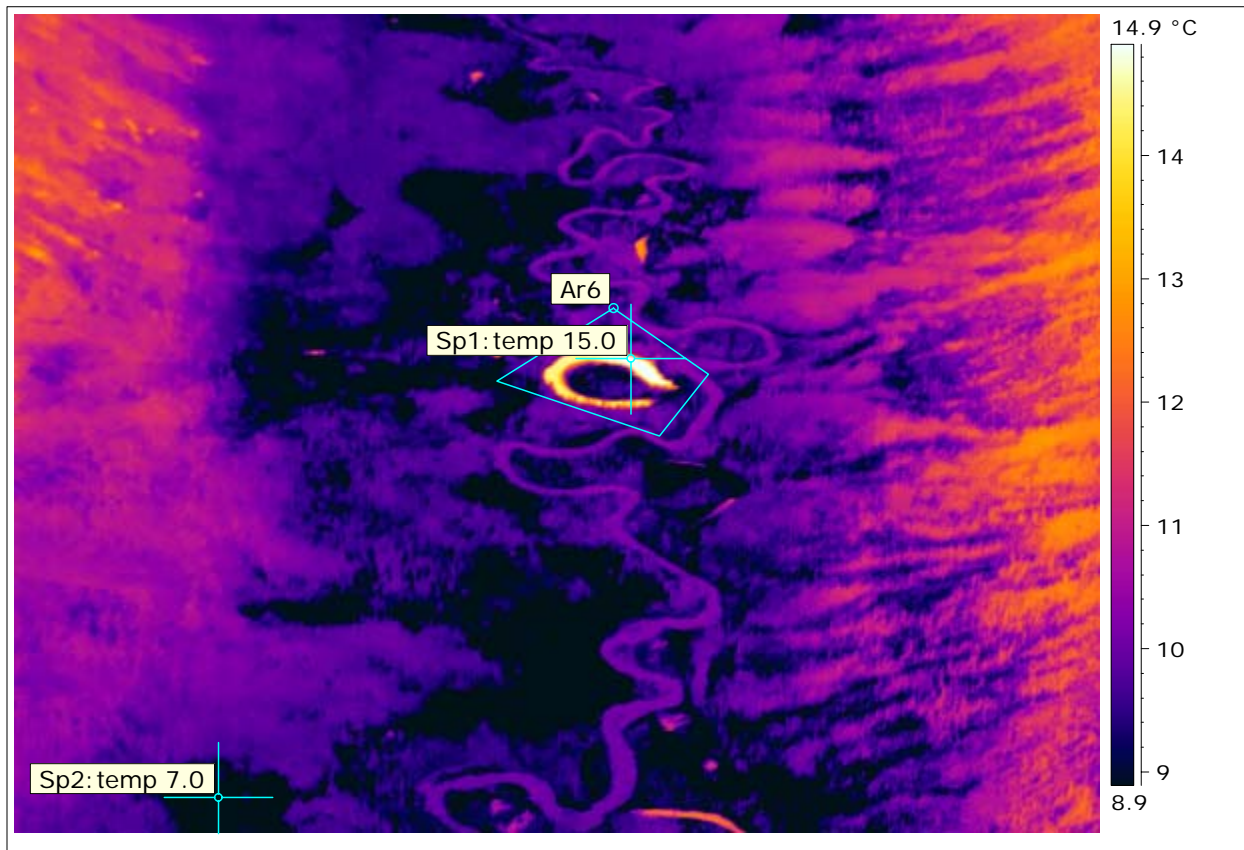
60.3873467,-135.24513.kmz

This thermogram reveals two warmer bodies of water and fairly large thermal patterns of the earth that surround these ponds and lead to the previous thermogram (#3). The ponds may contain stagnant surface water, which would explain the warmer temperatures. Further study is required to determine the cause of the warmer temperature readings. Reader is also referred to the video.

Within the immediate area, the temperature rise from Sp3 to Sp1 is 8.0 Deg C, and from Sp3 to Sp2 is 7.3 Deg C.

This area was assigned a priority of # 1-High, further assessment is recommended.

Thermogram # 5. Whitehorse Area Satellite Anomaly – 6 (Figure 2), Alligator Lake Area.
Video reference 4:16:34 AM.

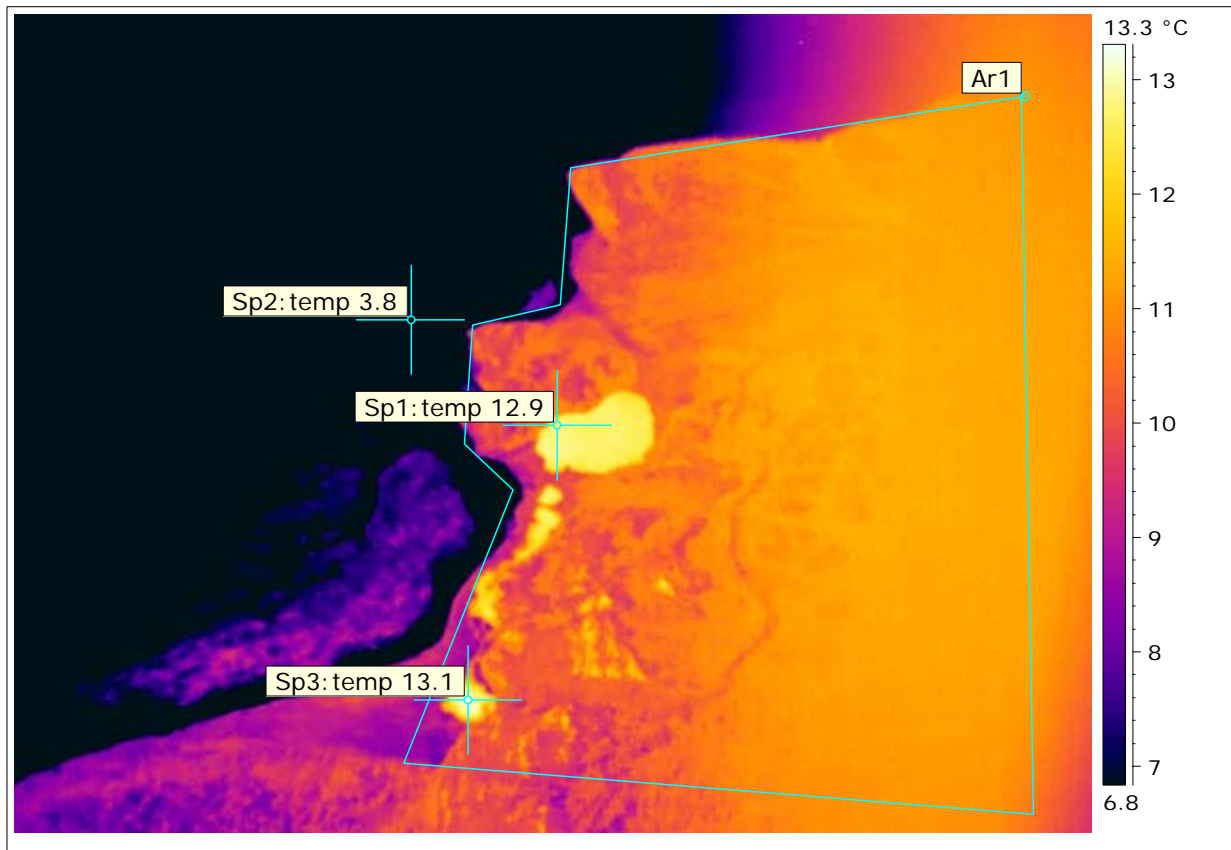


60.3873467, -135.24
513.kmz

This thermogram reveals an oxbow which is warmer than the surrounding area, yet the thermal patterns do not carry into the slow flowing creek next to the anomaly. The oxbow may contain stagnant surface water, which would explain the warmer temperatures. Further study is required to determine the cause of the warmer temperature readings. The temperature rise is 8 Deg C. as measured from reference SP2.

This feature was assigned a priority of # 2-Moderate. Further assessment may be warranted.

Thermogram # 6. Jarvis Area – Alluvial Fan of Anomaly # J –1 (Figure 3).
Video reference 3:24:09 AM.



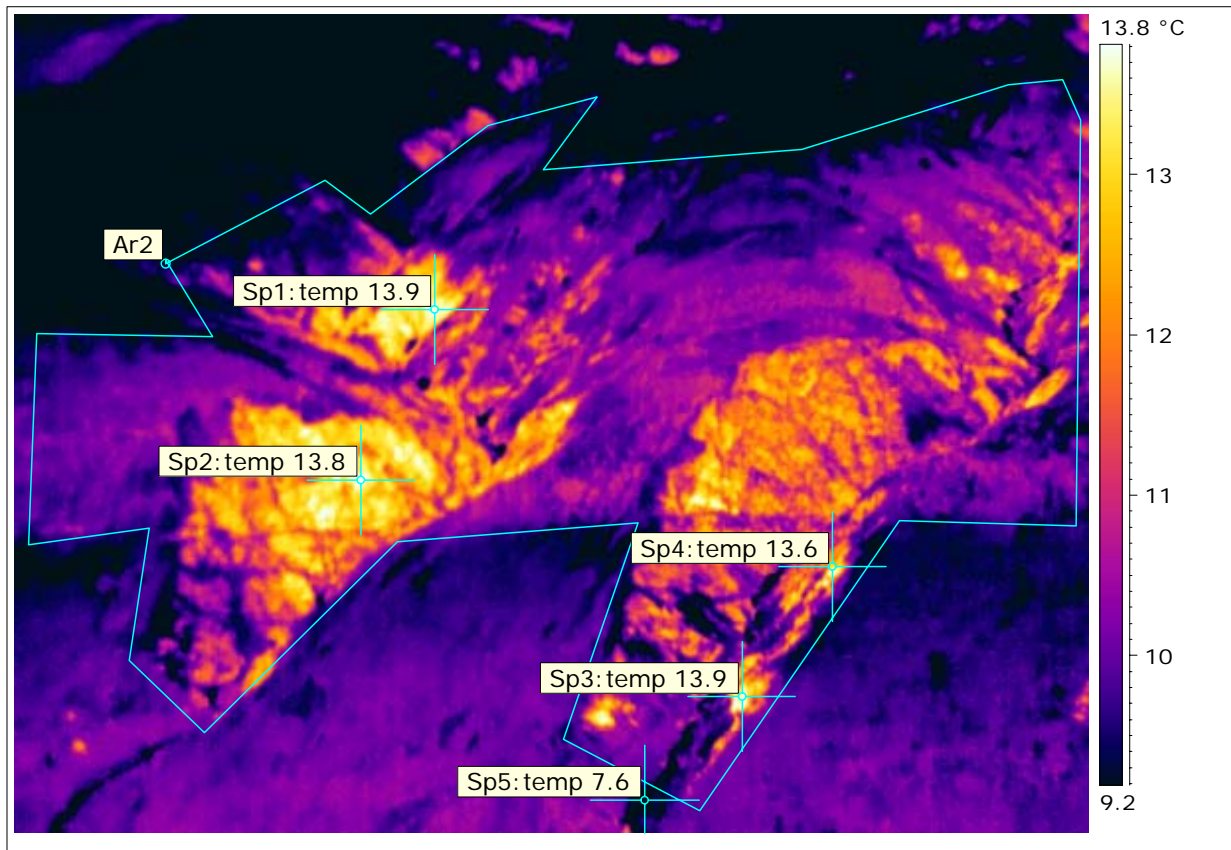
60.599875,-137.681
438.kmz

This thermogram reveals an area of warmer ponds next to the lake (black body on left side of thermogram). The large thermal pattern anomalies within the valleys above this fan could not be still recorded (captured as a thermogram) because of our altitude. The reader is referred to the video for a qualitative overview of this area.

The temperature rise from Sp2 to Sp1 is 9.1 Deg C., and from Sp2 to Sp3 is 9.3 Deg C.

Assigned priority for this area is # 1-High, it should be reviewed in the context of other data. Further investigation is recommended.

Thermogram # 7. Jarvis Area Satellite Anomaly – 1 (Figure 3).
Video reference 3:44:09 AM.



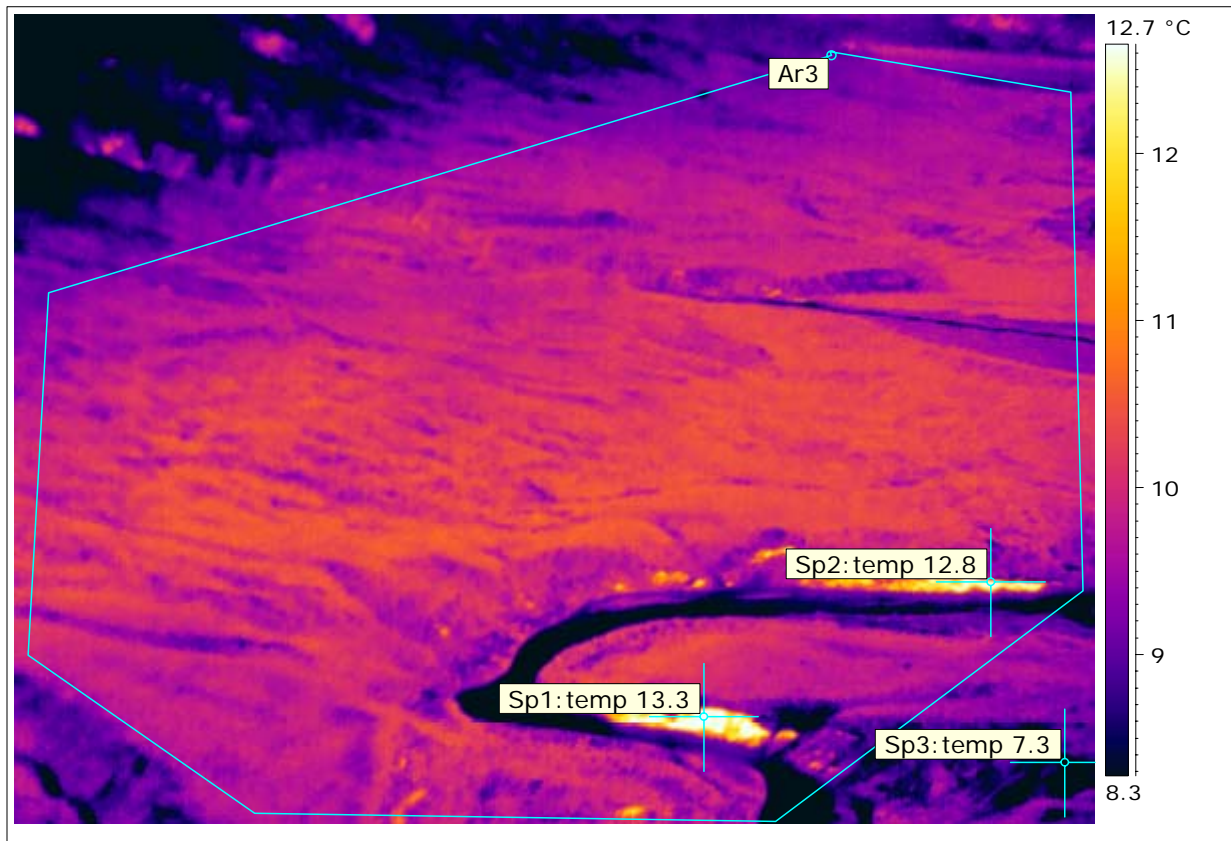
60.6978483, -138.06
811.kmz

This thermogram reveals area Ar2 as a point of interest. Since the thermal patterns are on both sides of the valleys and extend deep into the valleys, solar gain is ruled out.

The temperature rise from reference Sp5 to Sp1 is 6.3 Deg C., and SP2, 3 and 4 are within a few degrees of that temperature rise.

This feature was assigned a priority of # 2-Moderate. Further assessment may be warranted.

Thermogram # 8. Jarvis Area Satellite Anomaly – 1 (Figure 3).
Video reference 3:45:05 AM.



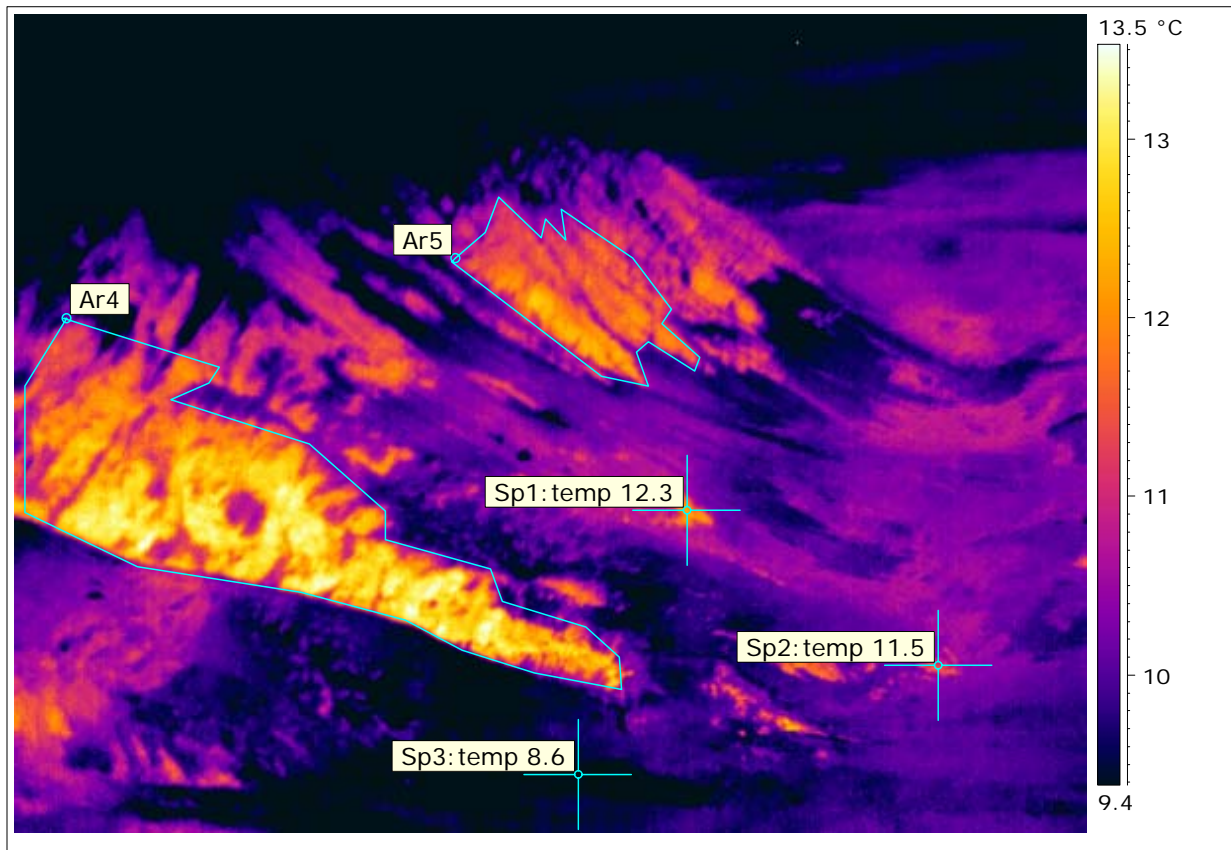
60.6926083,-138.04
7317.kmz

This thermogram shows a large area of thermal activity labelled Ar3. Please note that the water around the 'Sp' labels is brighter, which could suggest warmer temperatures.

The temperature rise from reference Sp3 to SP1 is 6.0 Deg C.; and from Sp3 to Sp2 the temperature rise is 5.5 Deg C.

Assigned priority for this area is # 1-High, it should be reviewed in the context of other data. Further investigation is recommended.

Thermogram # 9. Jarvis Area Satellite Anomaly – 2 (Figure 3).
Video reference 3:50:57 AM.



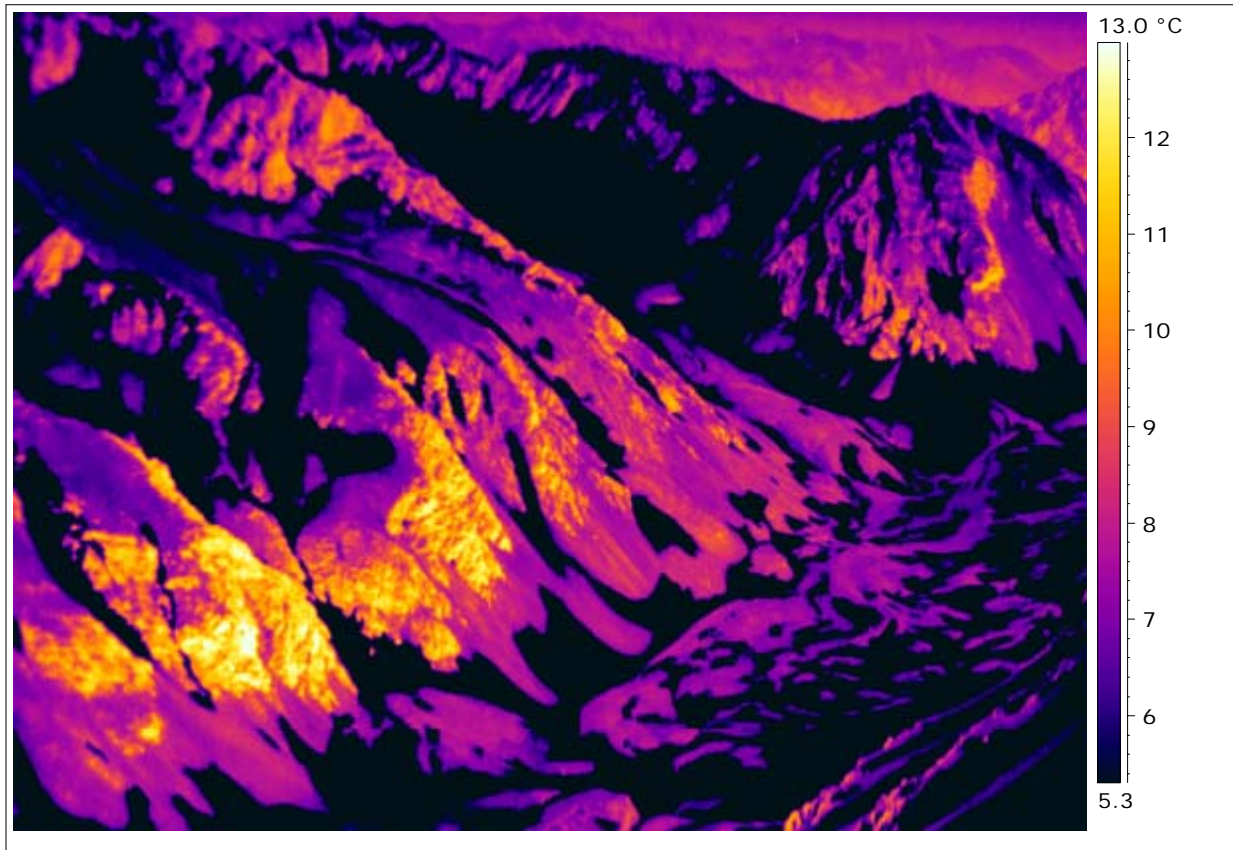
60.6741633, -137.78
878.kmz

This may be a large area of thermal activity. The areas that are labelled Ar4 and Ar5 may be solar gain, whole or in part. However, the other thermal mottling patterns within this thermogram may be indicative of geothermal activity.

The temperature rise from reference Sp3 to SP1 is 3.7 Deg C. and from Sp3 to Sp2 is 2.9 Deg C.

This feature was assigned a priority of # 2-Moderate due to the large area of thermal activity seen on the thermogram and the temperature increases. Further assessment may be warranted.

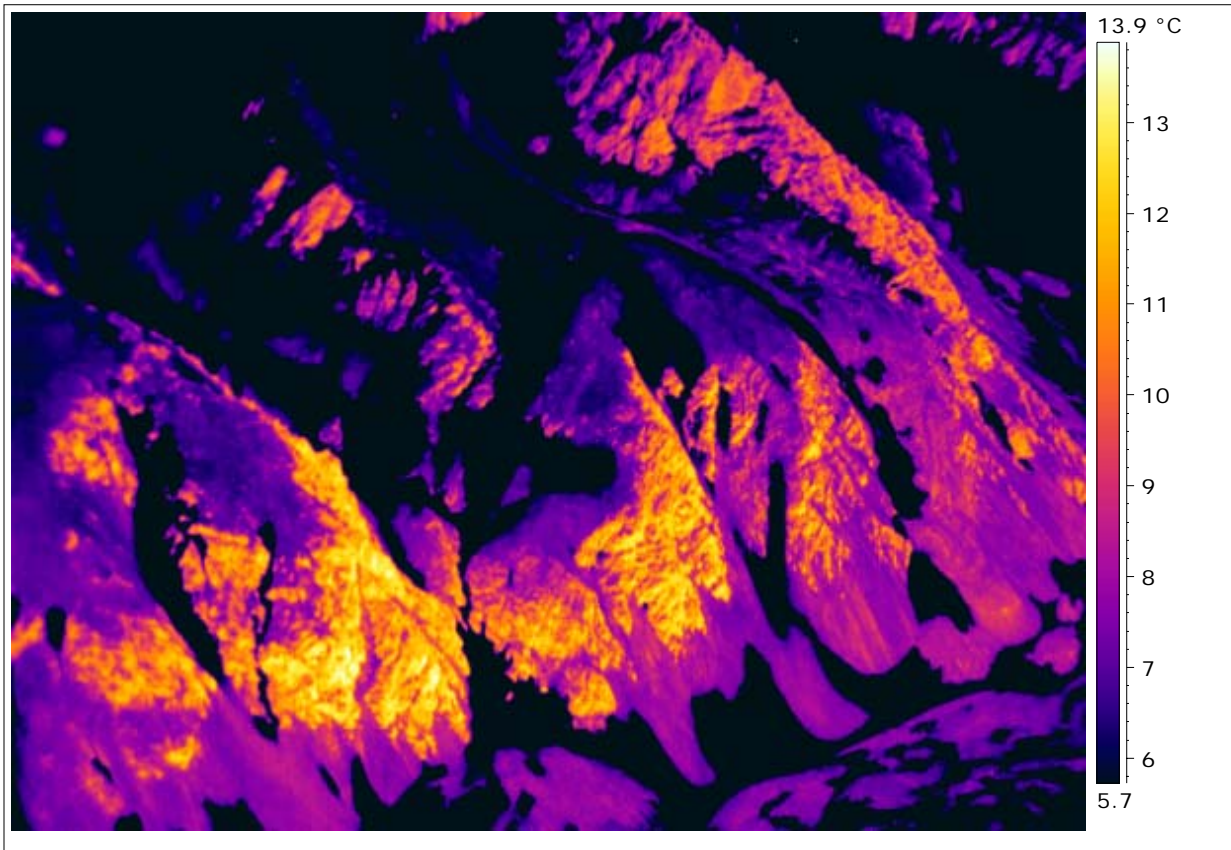
Thermogram # 10. Jarvis Area Anomaly # J - 2 (Figure 3).
Video reference 4:00:07 AM



60.60698, -137.6802
85.kmz

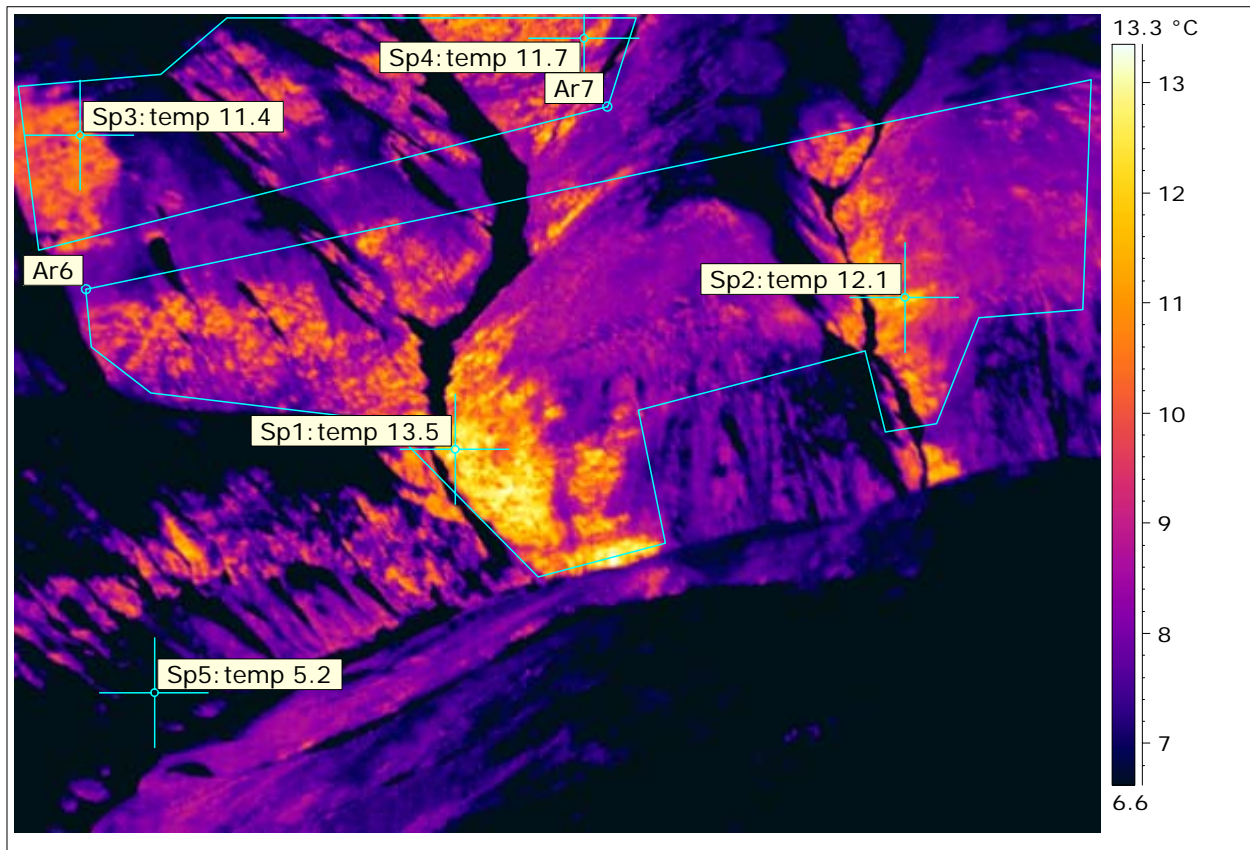
This thermogram shows a good example of solar gain.

Thermogram # 11. Jarvis Area Anomaly # J - 2 (Figure 3).
Video reference 4:00:23 AM.



Close up of solar gain example in Jarvis area # J - 2,

Thermogram # 12. Jarvis Area Satellite Anomaly – 3 (Figure 3).
Video reference 4:14:04 AM.



60.4875233, -137.31
8122.kmz

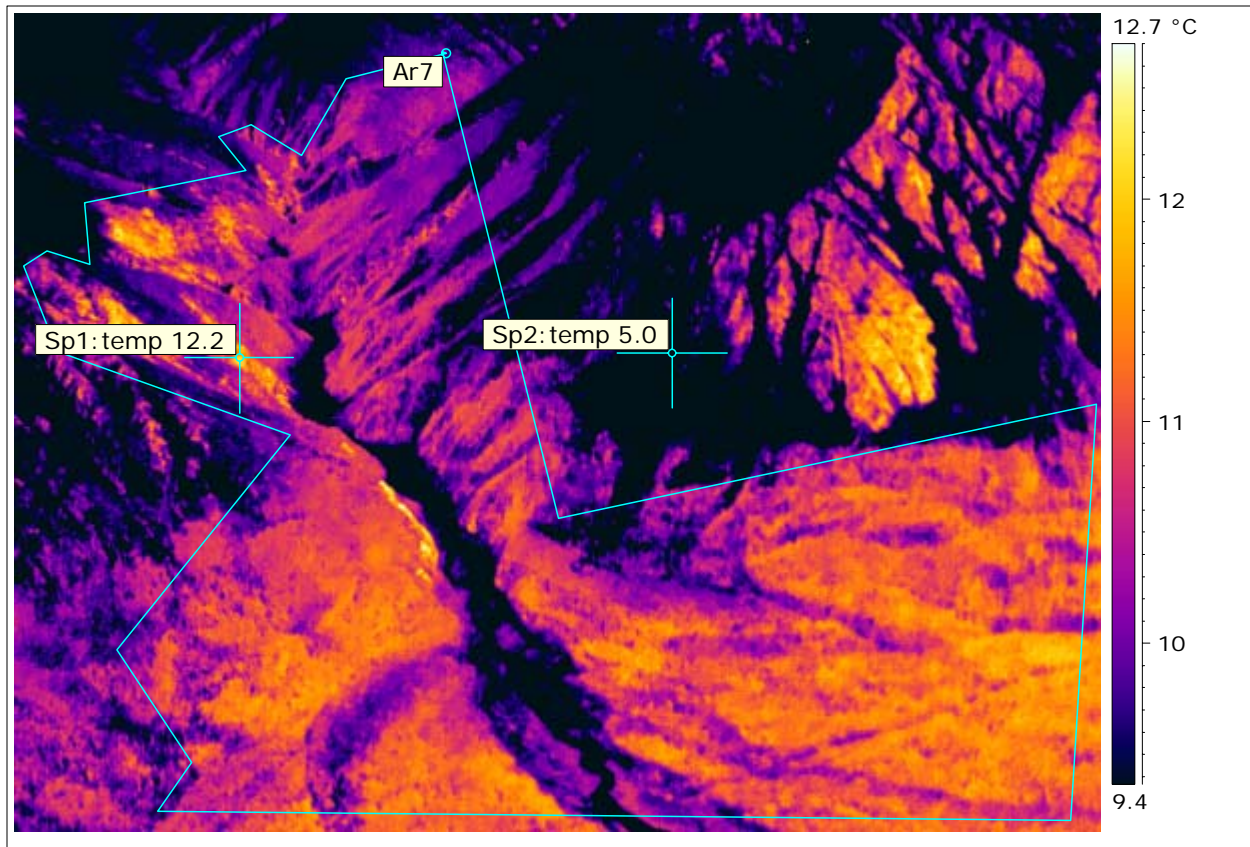
This thermogram shows thermal activity within Ar6 and Ar7, with thermal patterns on both sides of the valleys and deep into the valleys. This may be an area with considerable thermal activity. This area is also connected to the areas shown on Thermogram # 13.

The reference temperature at Sp5 indicates a rise of 8.3 Deg C at Sp1. This represents the highest temperature rise in this area.

Assigned priority for this area is # 1-High, due to a large area of thermal activity and a significant temperature rise; it should be reviewed in the context of other data. Further investigation is recommended.

Thermogram # 13. Jarvis Area Alluvial Fan at Satellite Anomaly – 3 (Figure 3).

No video reference; still image acquired looking up the valley from the opposite side of Kathleen Lake.



60.57623, -137.3259
75.kmz

This thermogram also reveals a large area of thermal activity which is connected to the features shown on Thermogram # 12. The thermal patterns are on both sides of the valley and are not due to solar gain.

The temperature rise from Sp2 to Sp1 is 7.2 Deg C.

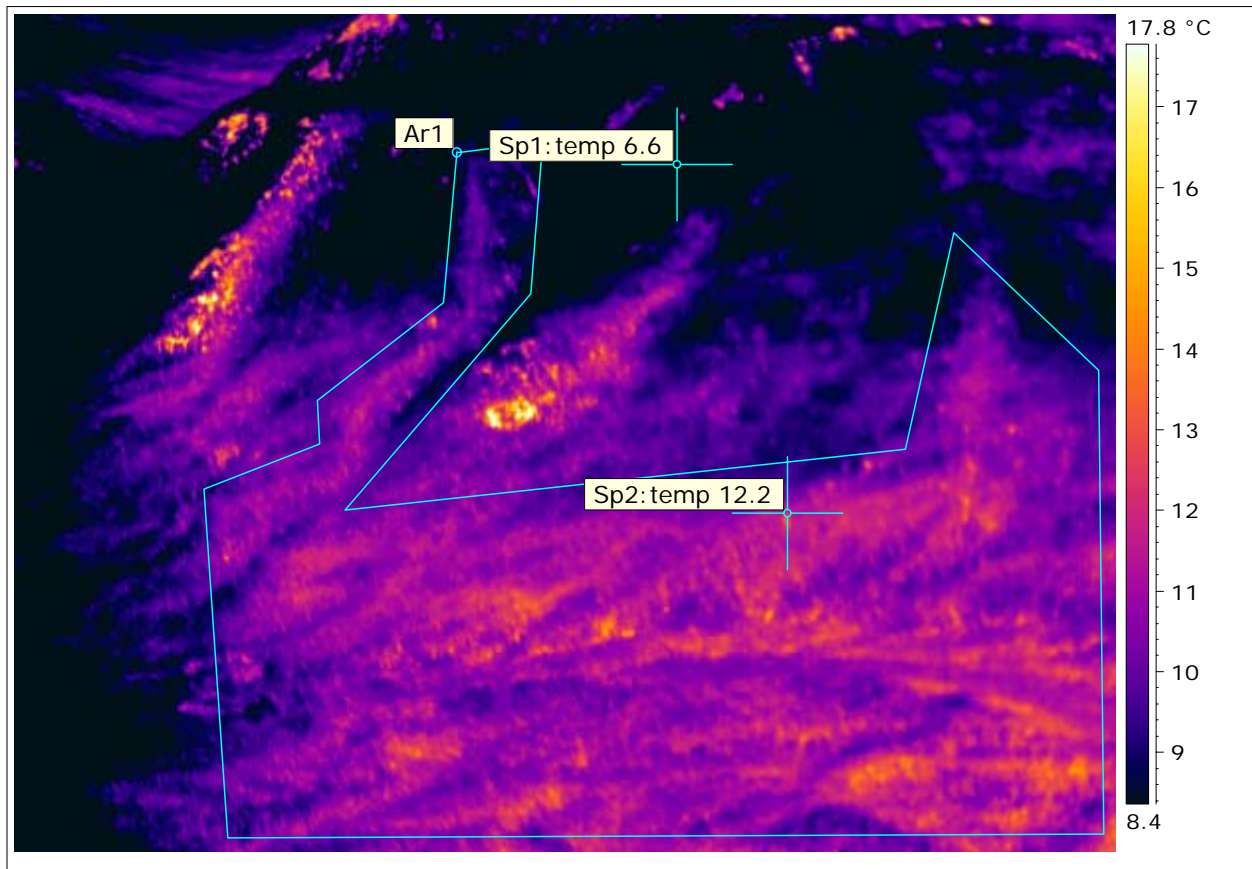
Assigned priority for this area is # 1-High; it should be reviewed in the context of other data. Further investigation is recommended.

Thermogram # 14. Jarvis Area Water Samples Location (Figure 3).
Video reference 4:52:11 AM.



This thermogram is for documentation only, showing the area where water samples have been collected.

Thermogram # 15. MacArthur Area Anomaly # Mc - 1 (Figure 4).
Video reference 11:53:51 AM.



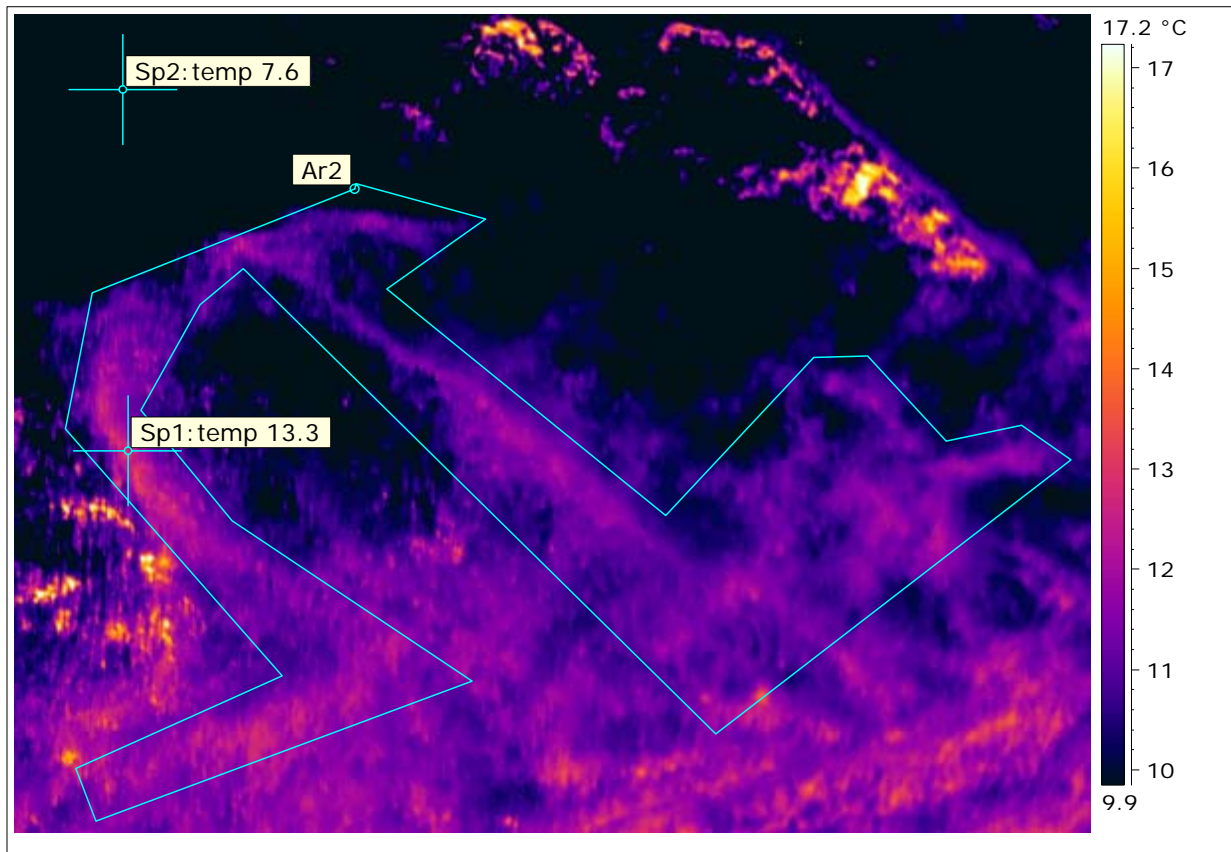
63.0331883, -134.82
6967.kmz

This thermogram reveals vein-like thermal patterns that may be indicative of thermal activity.

The crosshair Sp1 is a reference point to Sp2 and the temperature rise is 5.6 Deg C.

Assigned priority for this area is # 1-High, due to a large area of thermal activity and a significant temperature rise; it should be reviewed in the context of other data. Further investigation is recommended.

Thermogram # 16. MacArthur Area Anomaly # Mc - 4 (Figure 4).
Video reference 11:52:51 AM.



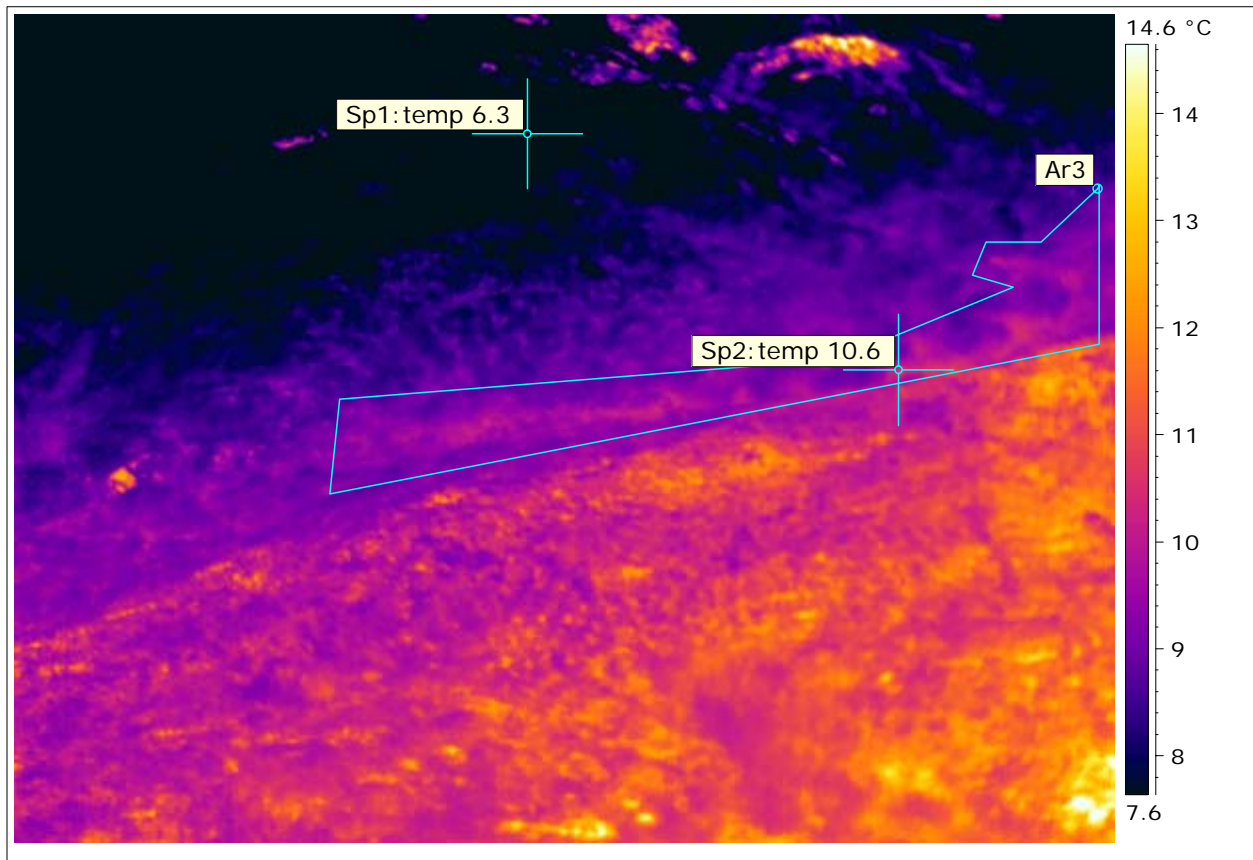
63.025705,-134.897
488.kmz

This thermogram shows vein-like thermal patterns, labelled Ar2 that may be indicative of thermal activity

The temperature increase from the Sp2 reference point to Sp1 is 5.7 Deg C.

Assigned priority for this area is # 1-High, due to the pattern of thermal activity and temperature rise; it should be reviewed in the context of other data. Further investigation is recommended.

Thermogram # 17. MacArthur Area Anomaly # Mc - 5 (Figure 4).
Video reference 12:17:02 PM.



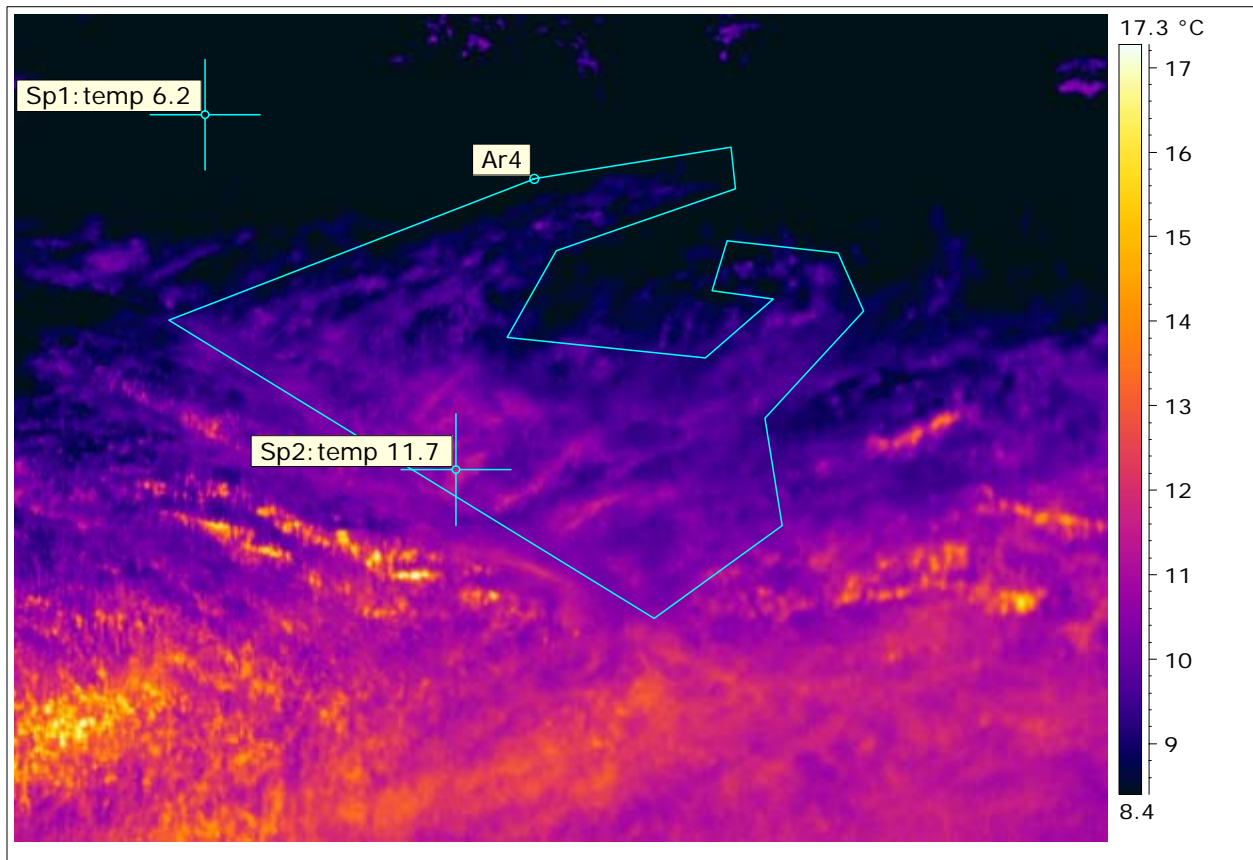
62.878035, -135.190
442.kmz

This thermogram reveals a small vein-like thermal pattern, labelled Ar3 that may be indicative of thermal activity.

The temperature rise from reference Sp1 to Sp2 is 4.3 Deg C.

Priority assigned to this anomaly is # 3-Low, due to the small size of the thermal pattern and the low temperature rise.

Thermogram # 18. MacArthur Area Satellite Anomaly – 4 (Figure 4).
Video reference 12:19:02 PM.



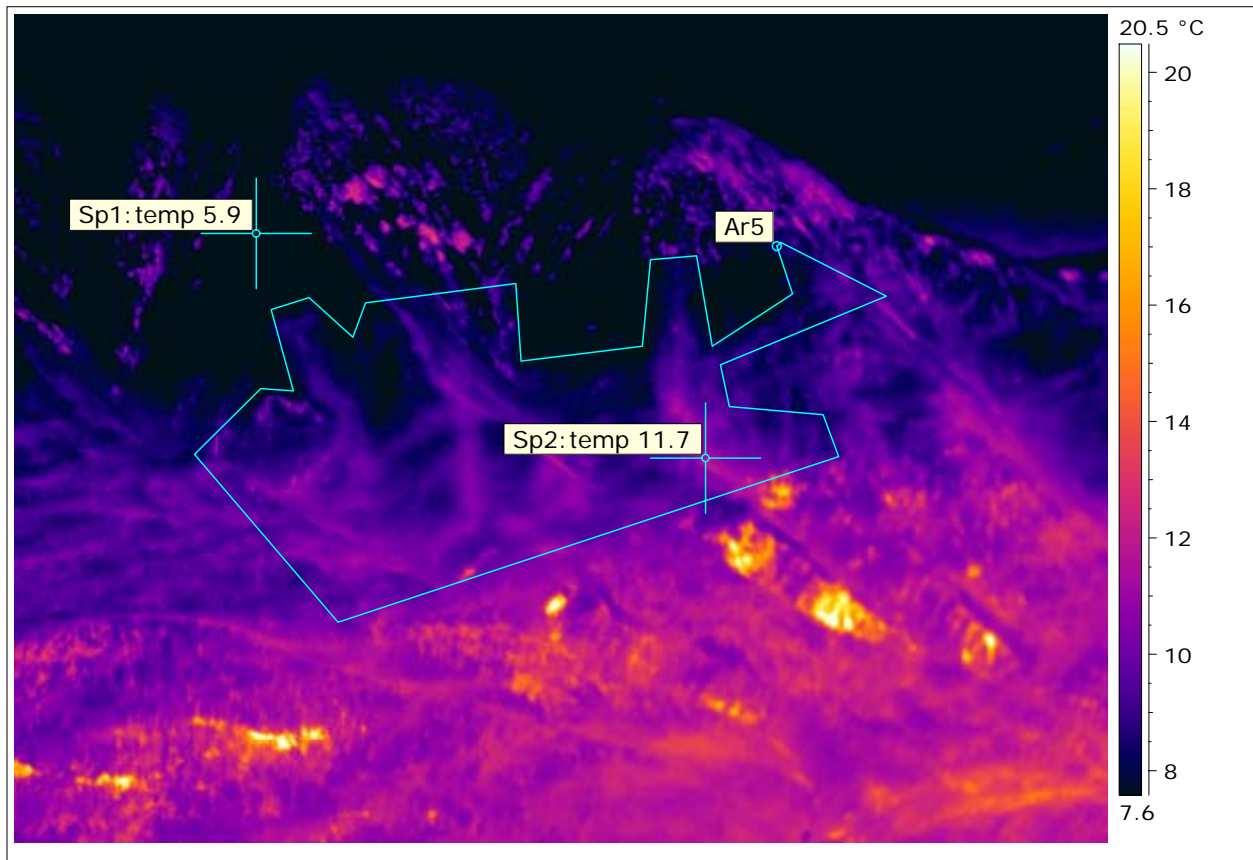
62.878035, -135.190
442.kmz

This thermogram reveals vein-like thermal patterns that may be indicative of thermal activity.

The temperature rise from reference Sp1 to Sp2 is 5.5 Deg C.

Priority assigned to this anomaly is # 2-Moderate due to the size of the thermal patterns and the temperature rise.

Thermogram # 19. MacArthur Area Satellite Anomaly – 4 (Figure 4).
Video reference 12:20:42 PM.



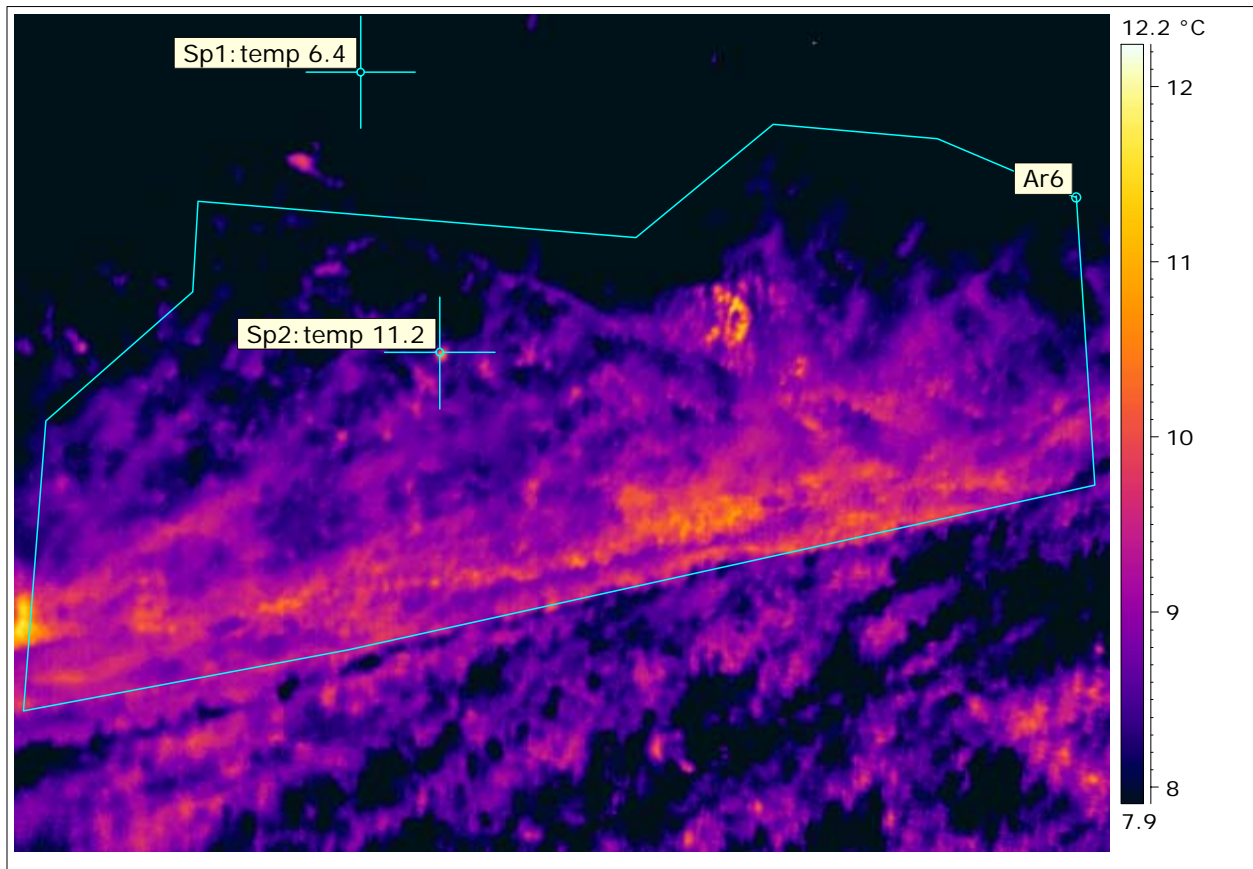
62.878035, -135.190
442.kmz

This thermogram reveals vein-like thermal patterns that may be indicative of thermal activity.

The temperature rise from reference Sp1 to Sp2 is 5.8 Deg C.

Priority assigned to this anomaly is # 2-Moderate due to the size of the thermal patterns and the temperature rise.

Thermogram # 20. MacArthur Area Anomaly # Mc - 7 (Figure 4).
Video reference 1:04:47 PM.



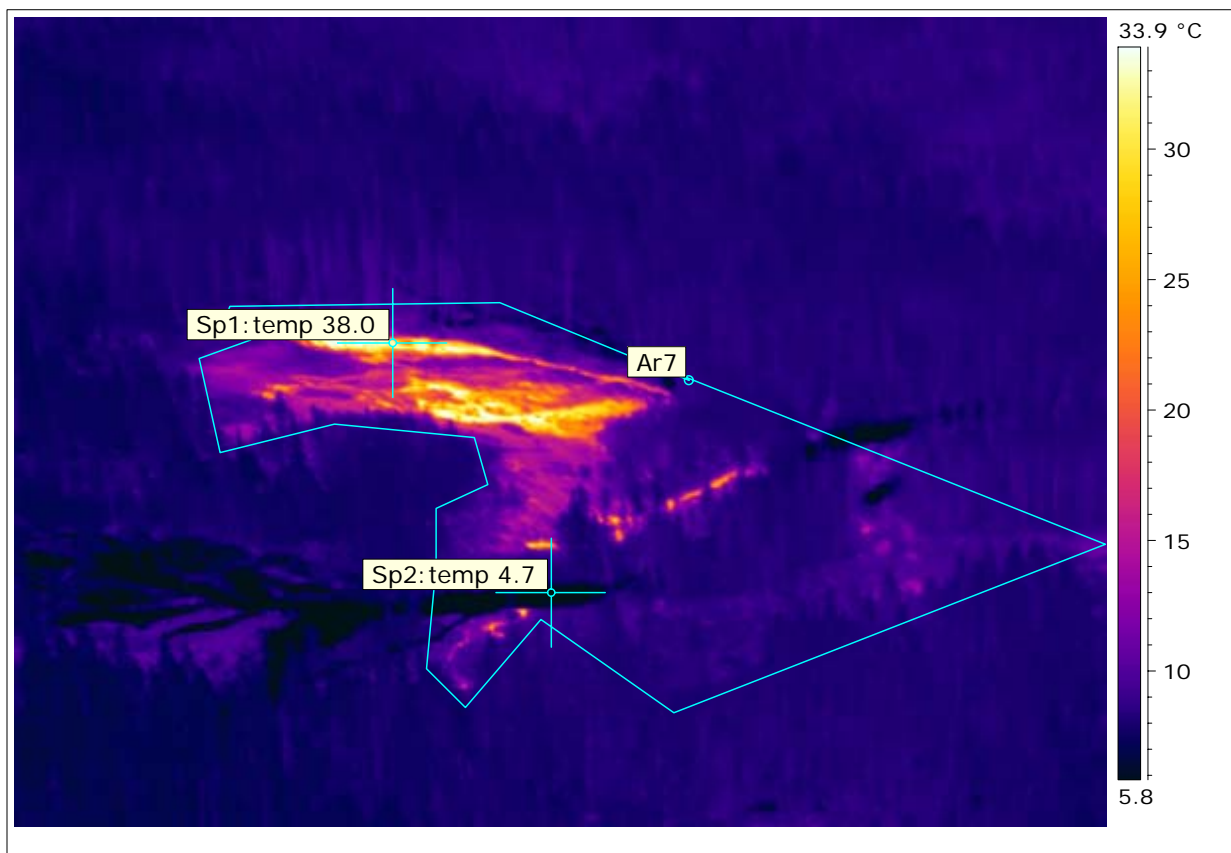
62.9006883, -135.81
4323.kmz

This thermogram reveals vein-like thermal patterns that may be indicative of thermal activity.

The temperature rise from reference Sp1 to Sp2 is 4.8 Deg C.

Priority assigned to this anomaly is # 3-Low, due to the small size of the thermal pattern and the low temperature rise.

Thermogram # 21. MacArthur Hot Springs (Figure 4).
Video reference 1:16:04 PM.



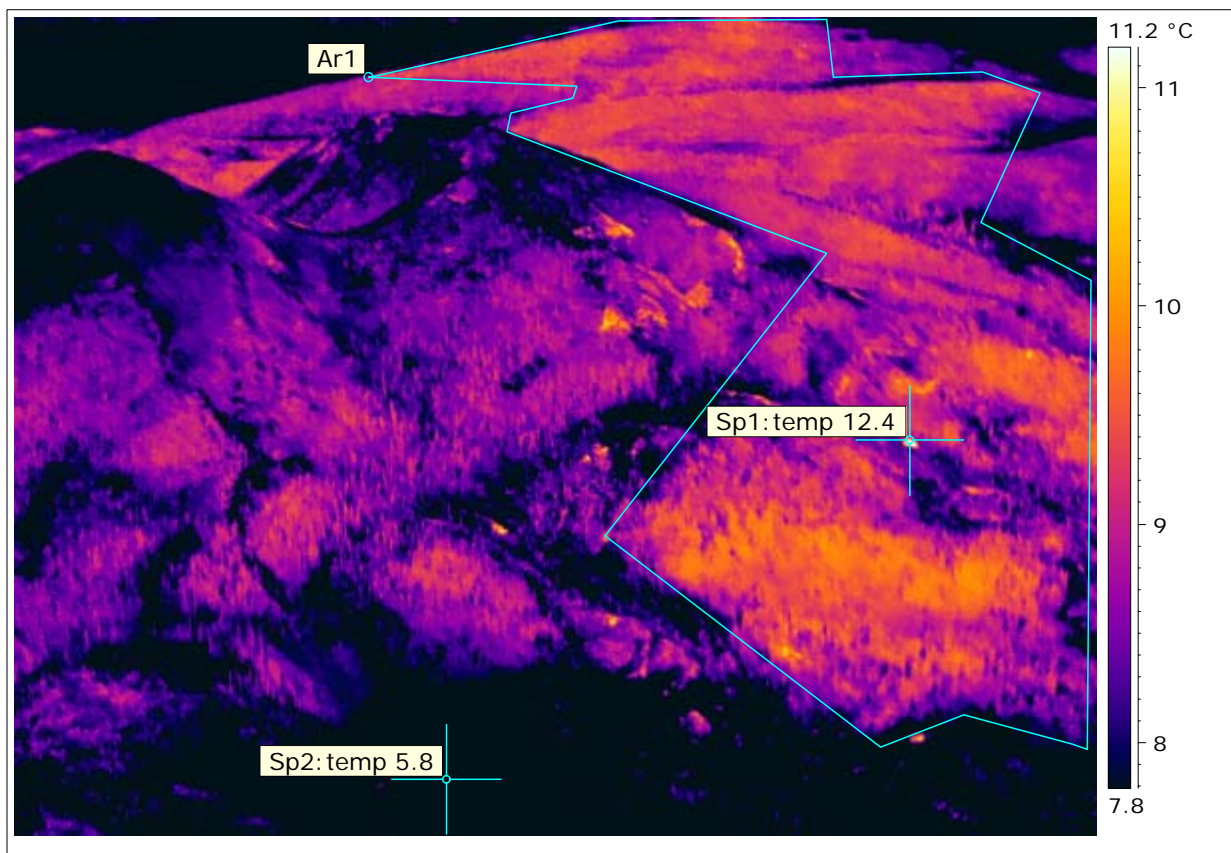
63.0713467,-135.70
885.kmz

This thermogram shows the heat signature of the MacArthur Hot Springs. Please note the vein-like thermal patterns and mottling patterns within the area of Ar7.

The temperature rise from Sp1 to reference Sp2 is 33.3 Deg C.

This area has a priority # 1-High due to the surface hot springs, type of thermal patterns and the temperature rise.

Thermogram # 22. Volcano Mountain Area Anomaly # VM - 1 (Figure 5).
Video reference 1:38:18 AM.



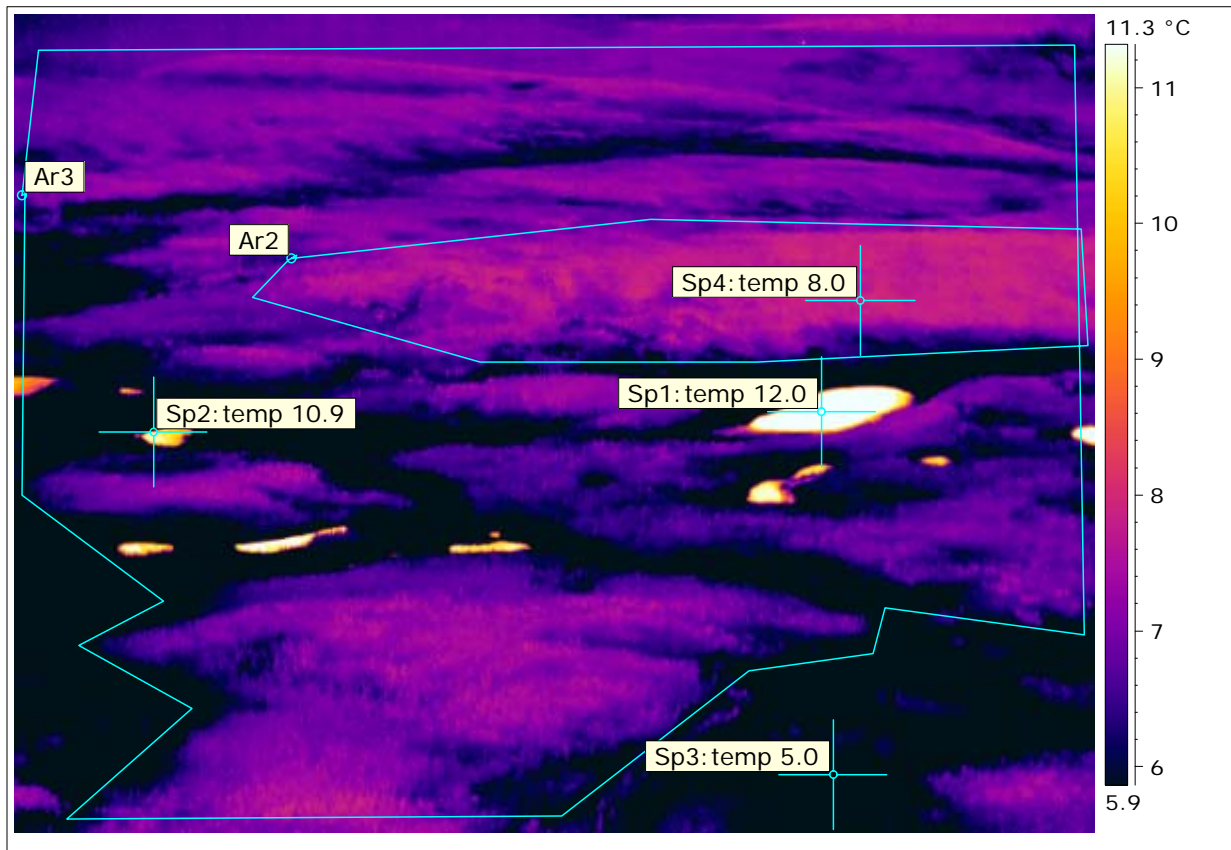
62.92501, -137.4468
45.kmz

This thermogram reveals a large area of thermal activity (Ar1) with vein-like and mottling patterns.

The reference Sp2 to Sp1 temperature rise is 6.6 Deg C.

Assigned priority for this area is # 1-High, due to the pattern and size of thermal activity and temperature rise; it should be reviewed in the context of other data. Further investigation is recommended.

Thermogram # 23. Volcano Mountain Area, Water Samples Location (Figure 5).
Video reference 1:44:22 AM



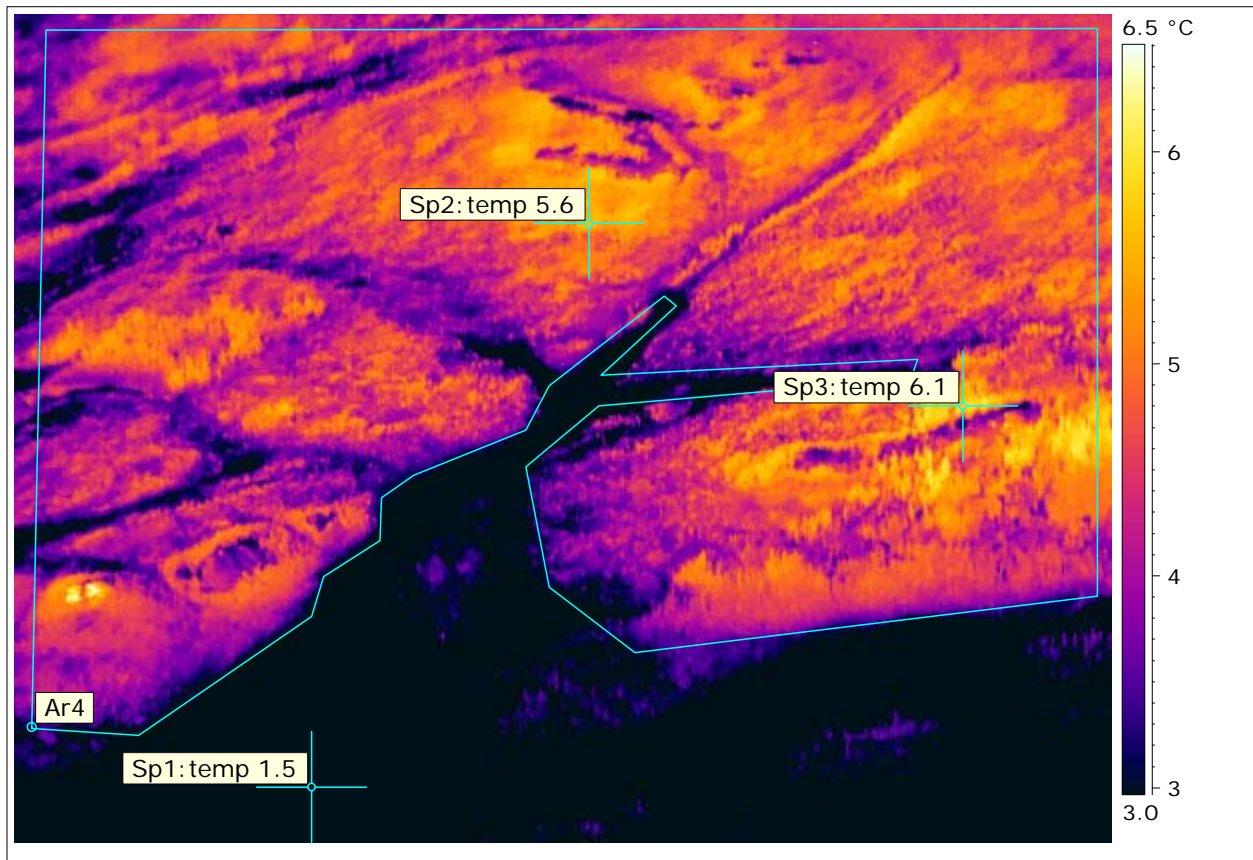
62.9113983, -137.45
343.kmz

This thermogram reveals a smaller thermal pattern (Ar2) within a larger thermal pattern labelled Ar3. Please note the slight mottling patterns of the larger Ar3.

The temperature rise from reference Sp3 to Sp1 is 7.0 Deg C.

Priority assigned to this anomaly is # 2-Moderate due to the weaker vein-like and mottling thermal patterns.

Thermogram # 24. Close-up view of Volcano Mountain Area Anomaly # VM – 1 (Figure 5).
Video reference 1:47:32 AM.



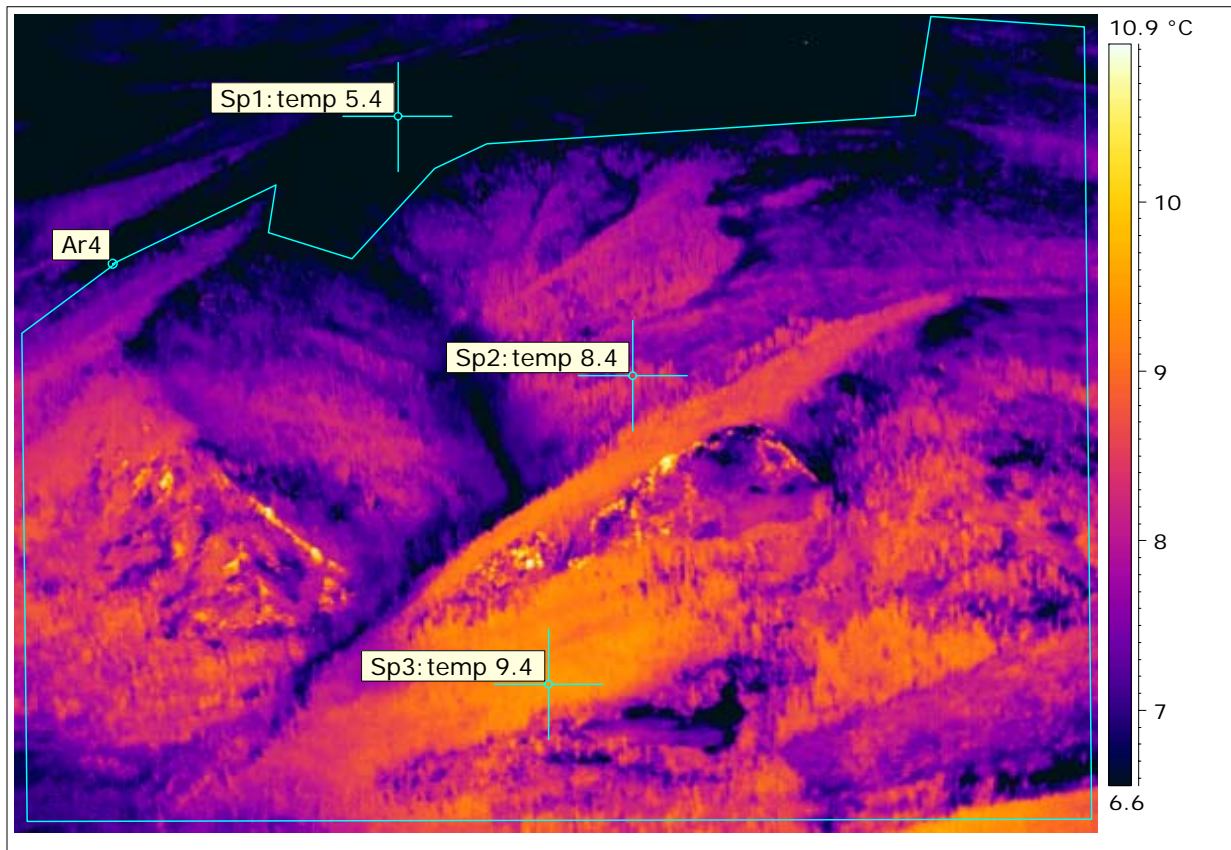
62.8774483,-137.42
1697.kmz

This thermogram shows minor mottling thermal patterns which may be indicative of thermal activity.

The temperature rise from reference Sp1 to Sp3 is 4.6 Deg C.

Priority assigned to this anomaly is # 3-Low, due to the lack of mottling and veins in the thermal pattern and the low temperature rise.

Thermogram # 25. Volcano Mountain Area Satellite Anomaly – 1 (Figure 5).
Video reference 1:51:08 AM.



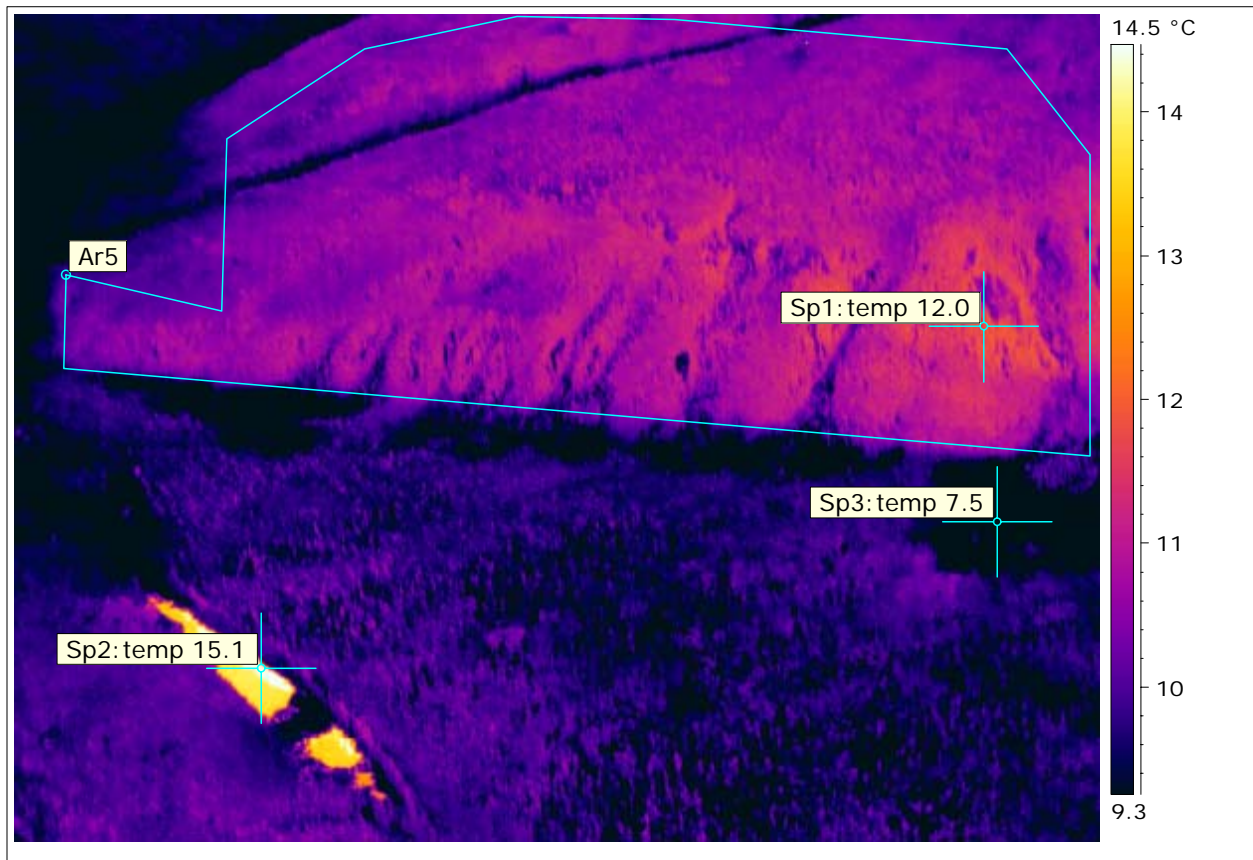
62.8576067,-137.27
761.kmz

This thermogram shows slight mottling patterns and slight vein-type patterns within AR4.

The temperature rise from reference Sp1 to Sp3 is 4.0 Deg C.

Priority assigned to this anomaly is # 3-Low, due to minor mottling and minor vein-like thermal patterns and the low temperature rise.

Thermogram # 26. Volcano Mountain Area Satellite Anomaly – 2 (Figure 5).
Video reference 1:53:35 AM.



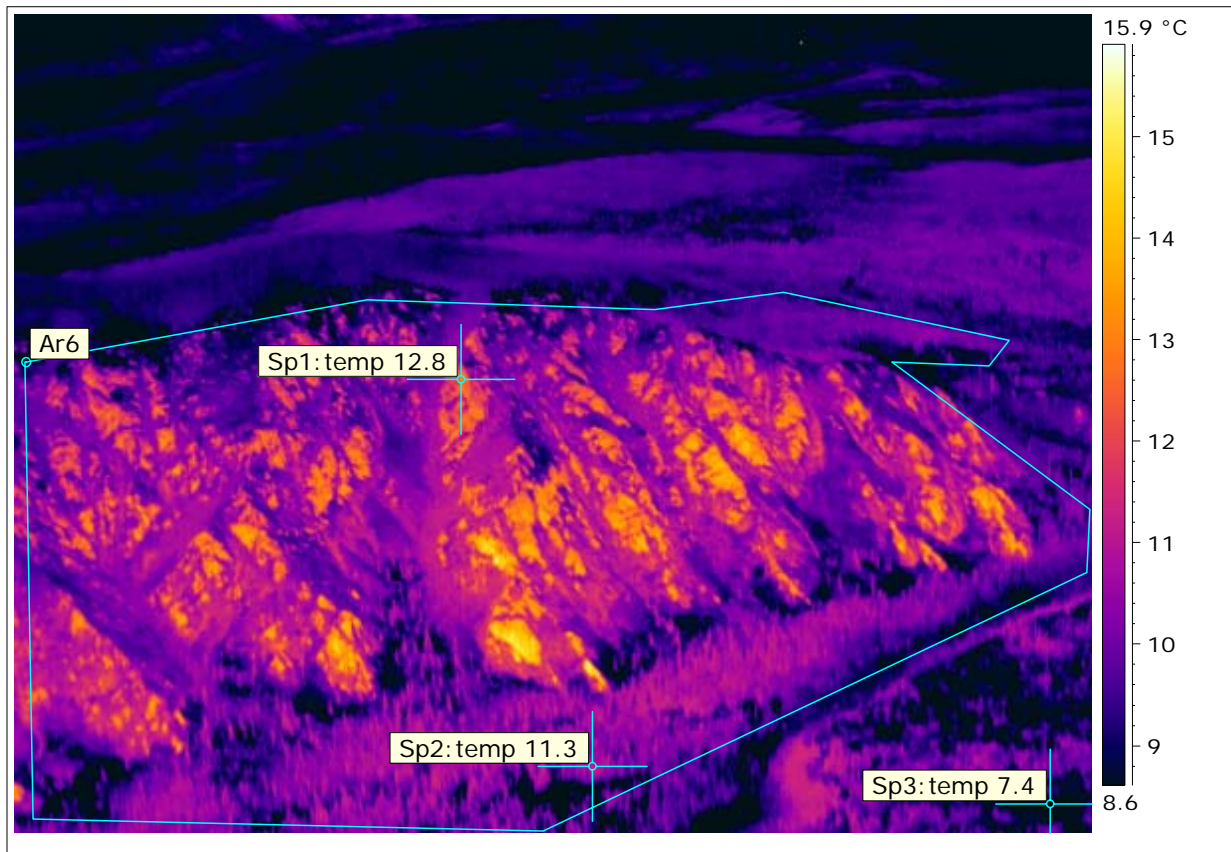
62.8401233,-137.31
5953.kmz

This thermogram reveals slightly mottled and vein-like thermal patterns, and a body of water that shows warmer patterns.

The temperature rise from reference Sp3 to Sp2 is 7.6 Deg C., and from Sp3 to Sp1 is 4.5 Deg C.

Priority assigned to this anomaly is # 2-Moderate due to the warmer body of water and large area of thermal patterns in Ar5.

Thermogram # 27. Volcano Mountain Area Anomaly # VM - 2 (Figure 5).
Video reference 1:58:44 AM.



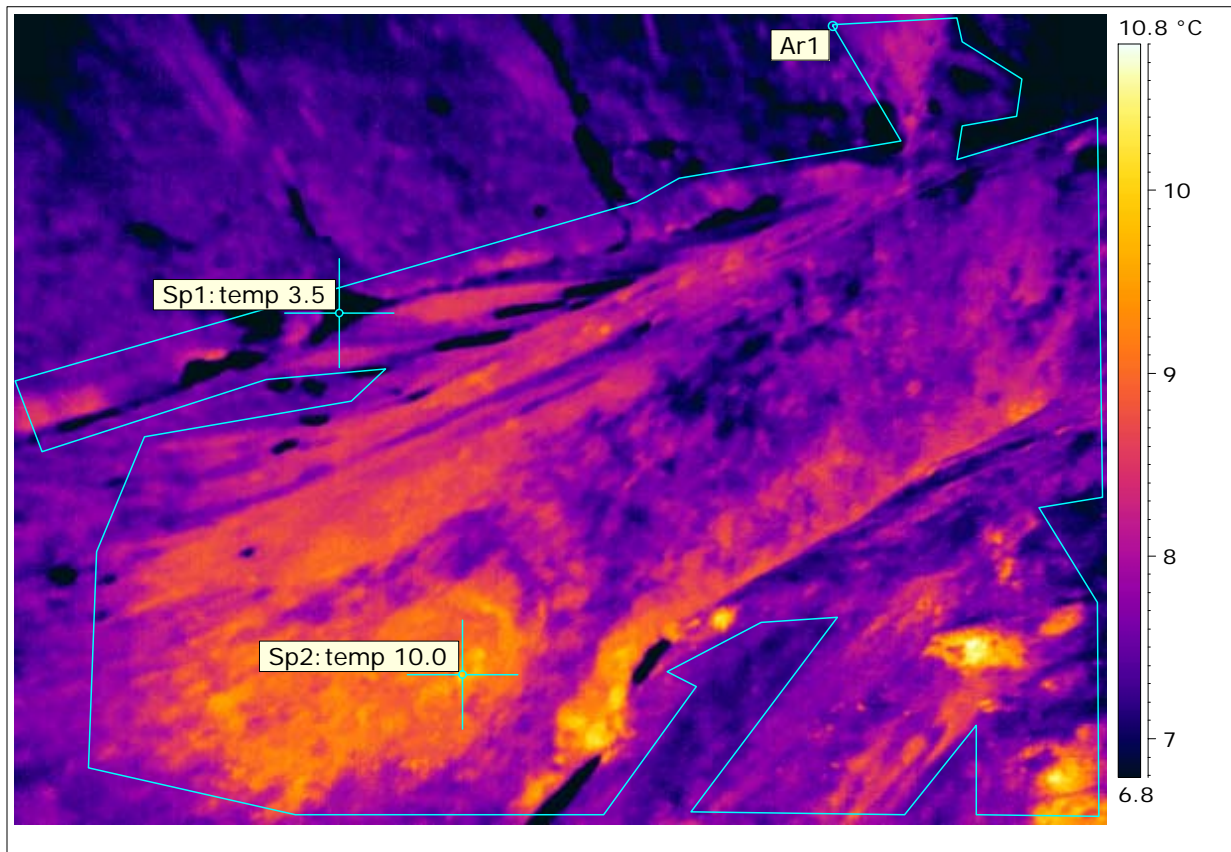
62.7499783, -137.28
3248.kmz

This thermogram shows a large area of thermal activity; however the thermal signatures along the outcrops are probably due to solar gain. Vein-like thermal patterns are present within the area labelled Ar6. Also note the thermal patterns spread to the back of this ridge and to the base of the ridge.

The temperature rise from reference Sp3 to Sp2 is 3.9 Deg C.

Priority assigned to this anomaly is # 2-Moderate due to the large area, weaker vein-like patterns and temperature rise.

Thermogram # 28. Nash Creek Area Satellite Anomaly – 1 (Figure 6).
Video reference 2:01:06 AM.

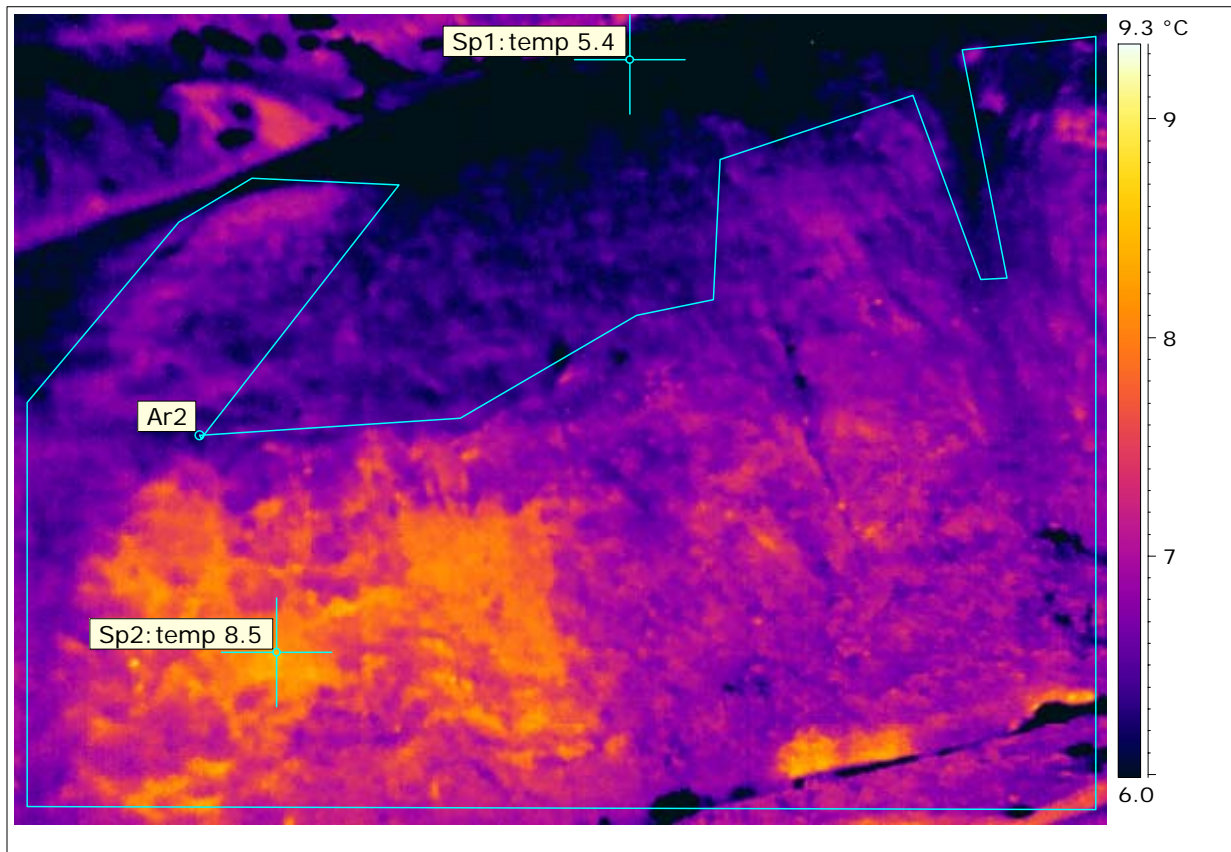


This thermogram reveals vein-like and mottling thermal patterns that may be indicative of thermal activity.

The temperature rise from reference Sp1 to Sp2 is 6.5 Deg C.

Priority assigned to this anomaly is # 2-Moderate due to the vein-like patterns and temperature rise.

Thermogram # 29. Nash Creek Area Satellite Anomaly - 1 (Figure 6).
Video reference 2:01:37 AM.

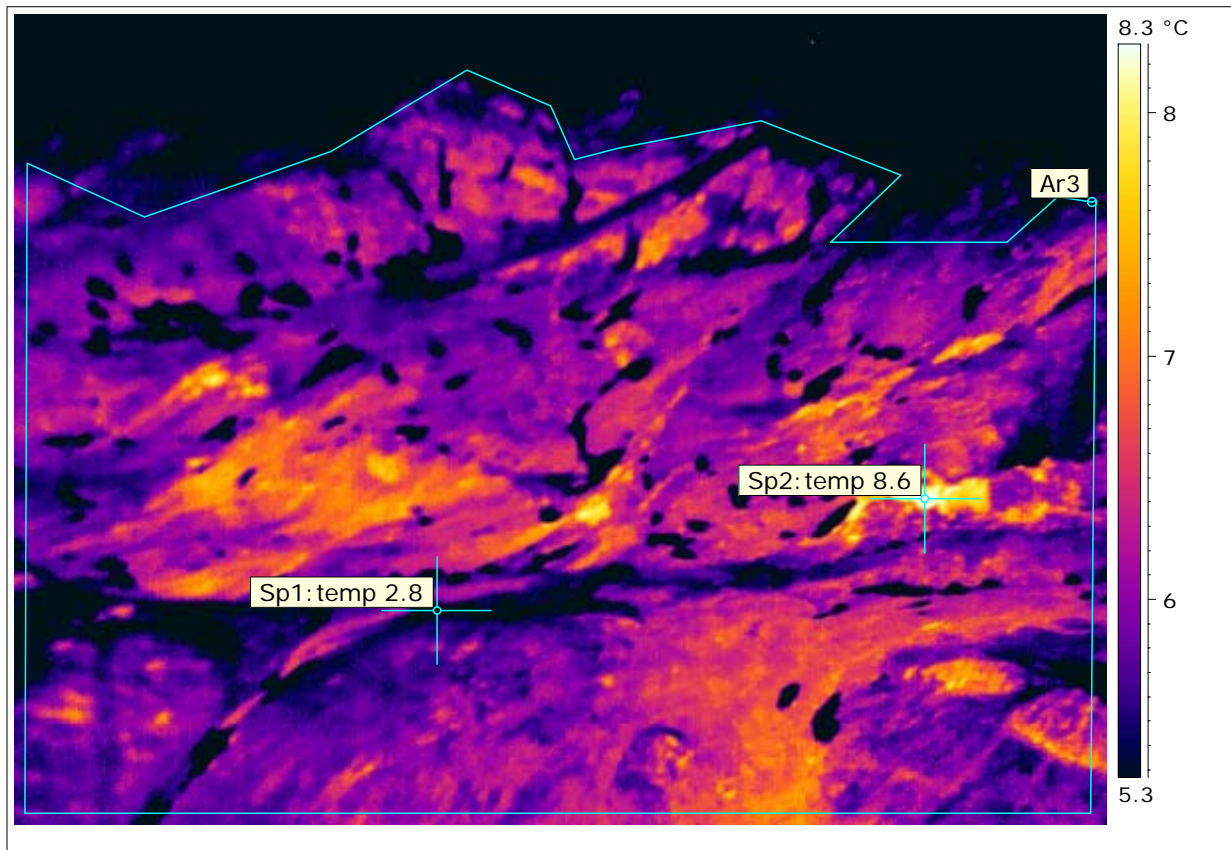


This thermogram shows slight vein-like thermal patterns, as well as some mottling patterns. Please note the brighter areas in the deeper part of the valleys.

The temperature rise from reference Sp1 to Sp2 is 3.1 Deg C.

Priority assigned to this area is # 3-Low, due to the weak thermal patterns and the low temperature rise.

Thermogram # 30. Nash Creek Area Satellite Anomaly – 1 (Figure 6).
Video reference 2:02:15 AM.

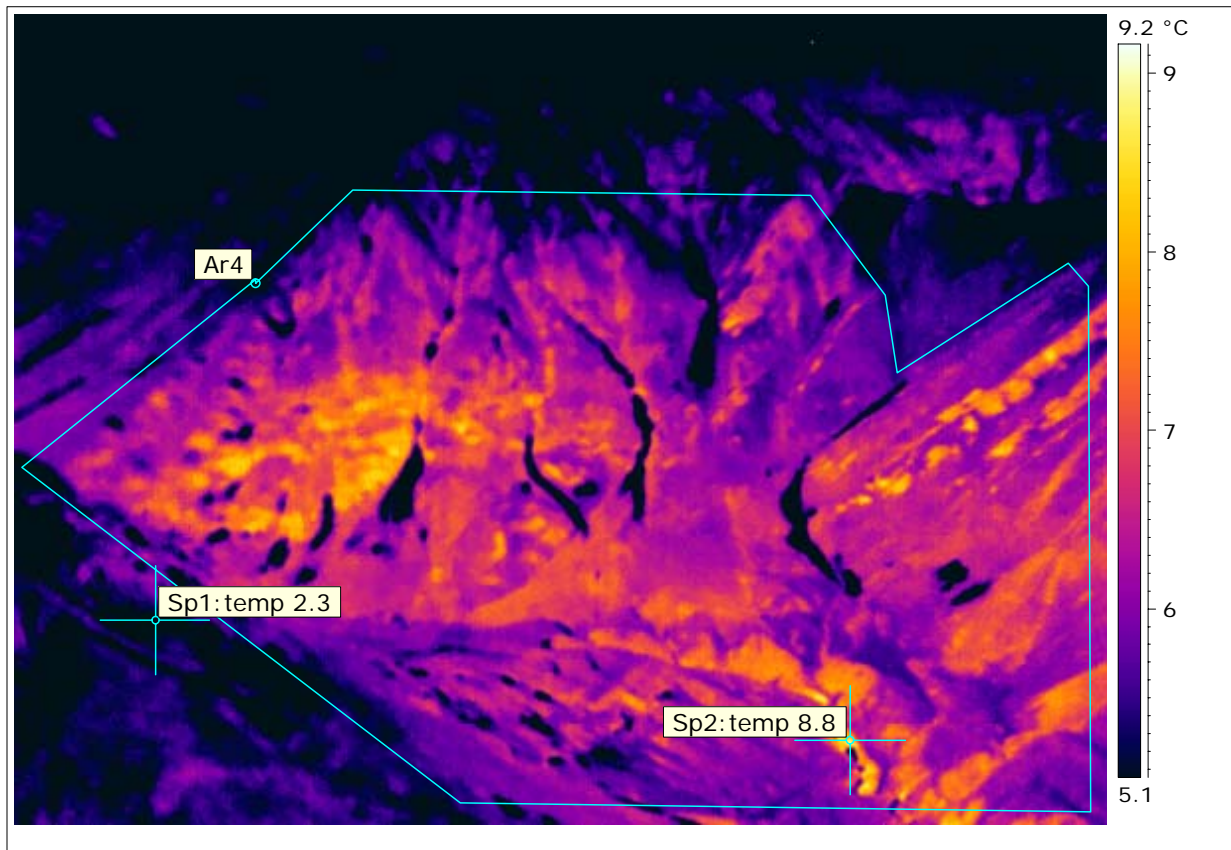


This thermogram shows mottling thermal patterns and vein-like patterns over a fairly large area

The temperature rise from Sp1 to Sp2 is 5.8 Deg C. Please note that the temperature rise in this case is the difference in temperature of the mottling patterns.

Assigned priority for this area is # 1-High, due to the pattern and size of thermal activity and temperature rise; it should be reviewed in the context of other data. Further investigation is recommended.

Thermogram # 31. Nash Creek Area Anomaly # NC - 5 (Figure 6).
Video reference 2:04:03 AM.

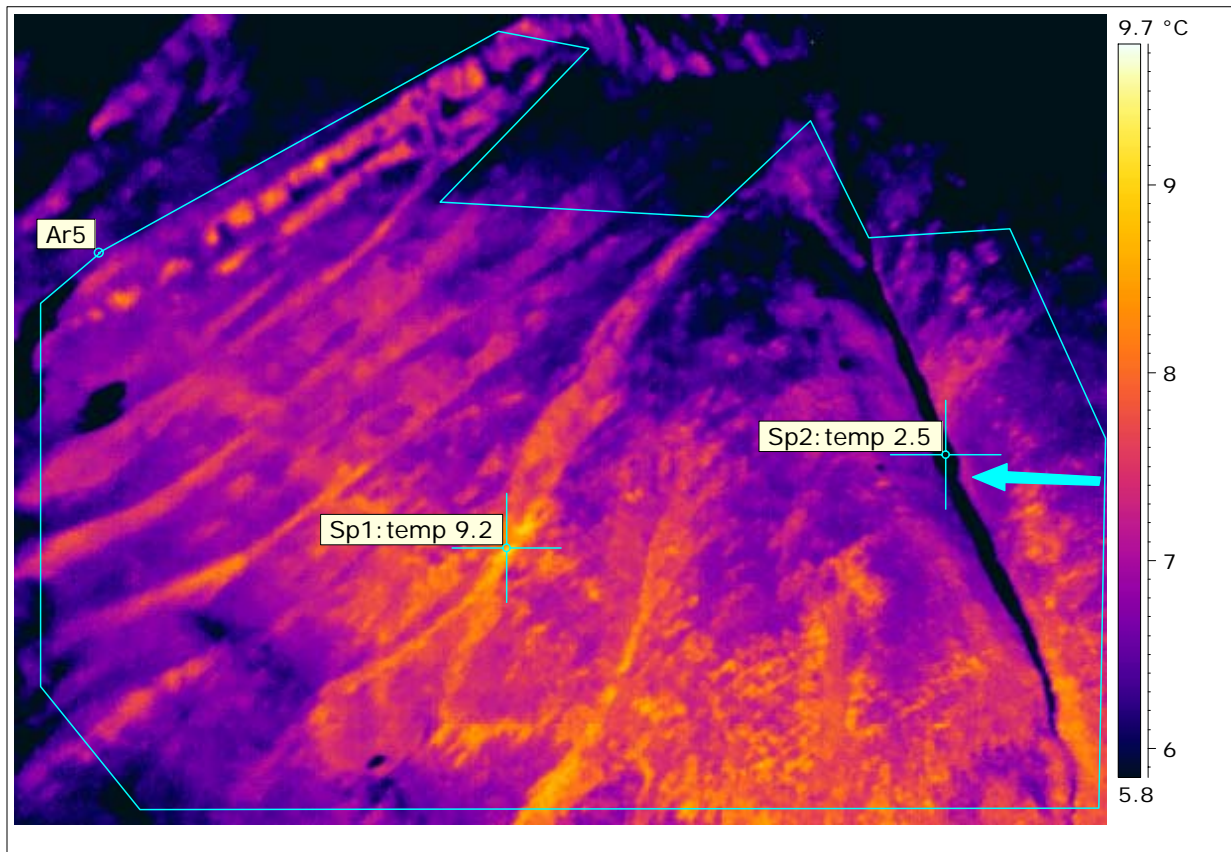


This thermogram reveals mottling thermal patterns that cover a large area and also occur on all sides of the valleys, this may be indicative of thermal activity.

The temperature rise from Sp1 to Sp2 is 6.5 Deg C.

Even with the promising features noted, the priority assigned to this anomaly is # 2-Moderate as the brighter spots may be solar gain.

Thermogram # 32. Nash Creek Area Anomaly # NC - 5 (Figure 6).
Video reference 2:04:15 AM.

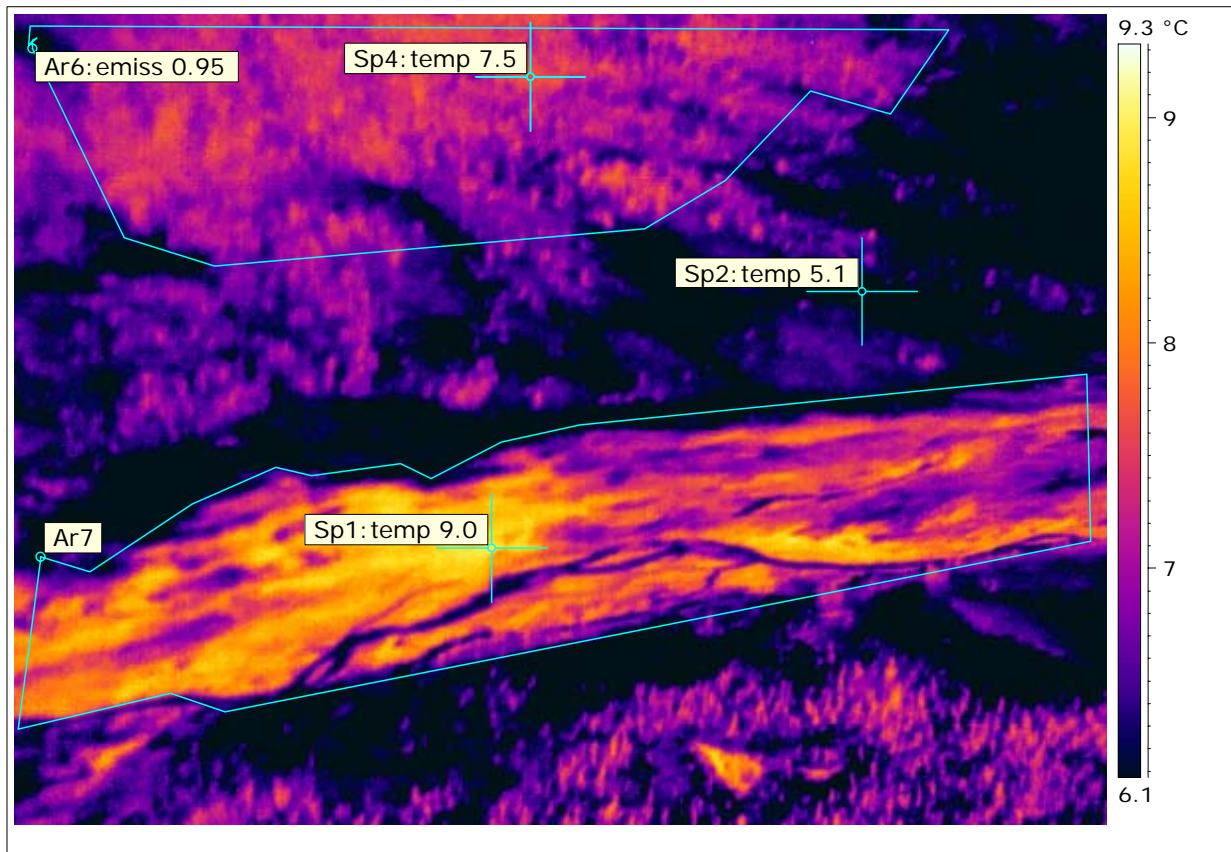


This thermogram shows vein-like thermal patterns, some of which are deep within the valleys (see arrow). Some of the brighter areas may be due to solar gain.

The temperature rise from reference Sp2 to Sp1 is 6.7 Deg C.

Priority assigned to this anomaly is # 2-Moderate due to the large area and thermal patterns.

Thermogram # 33. Nash Creek Area Anomaly # NC - 6 (Figure 6).
Video reference 2:04:55 AM.

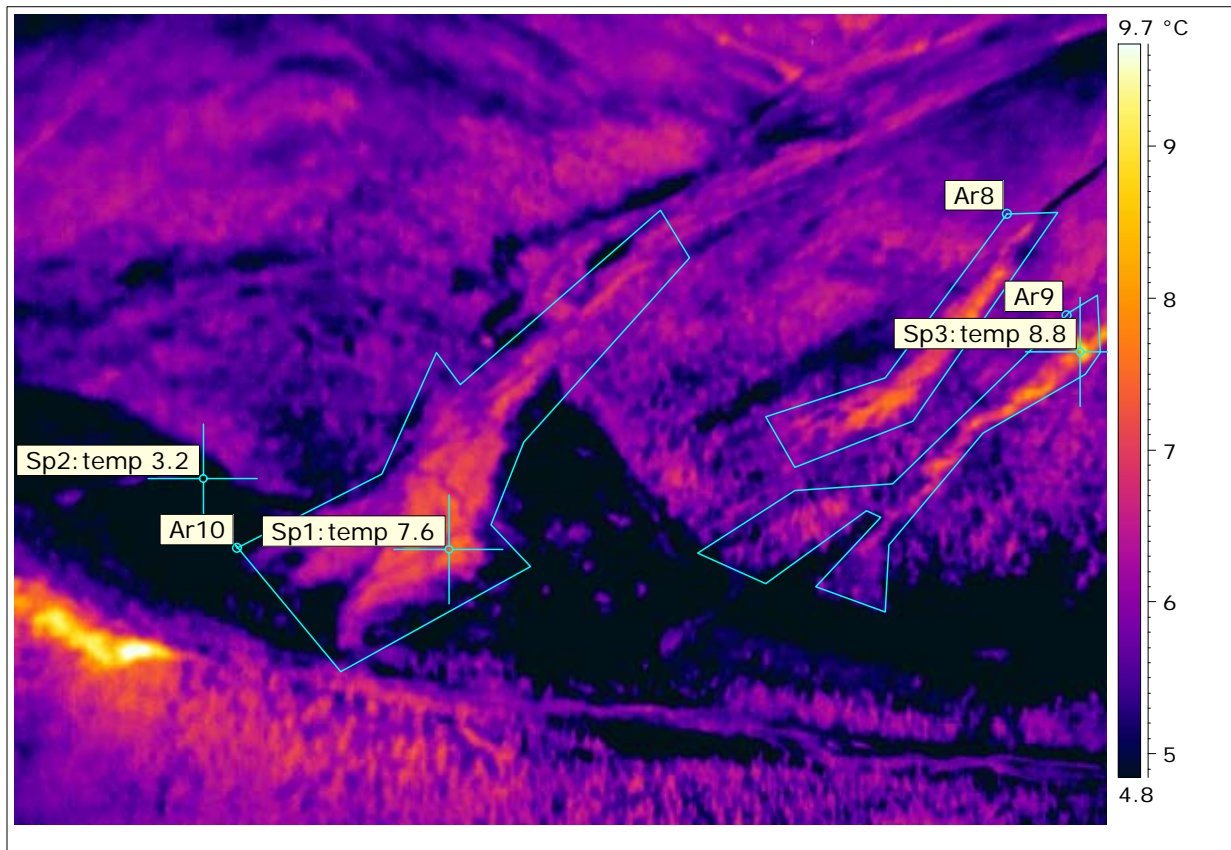


This thermogram shows defined vein-like thermal patterns in the area marked Ar7. The area of Ar6 reveals thermal patterns that seem to be related to Ar7 but do not appear as vein-like.

The temperature rise from reference Sp2 to Sp1 is 3.9 Deg C.

Assigned priority for this area is # 1-High, due to the strong thermal patterns; it should be reviewed in the context of other data. Further investigation is recommended.

Thermogram # 34. Nash Creek Area Satellite Anomaly – 3 (Figure 6).
Video reference 2:05:32 AM.

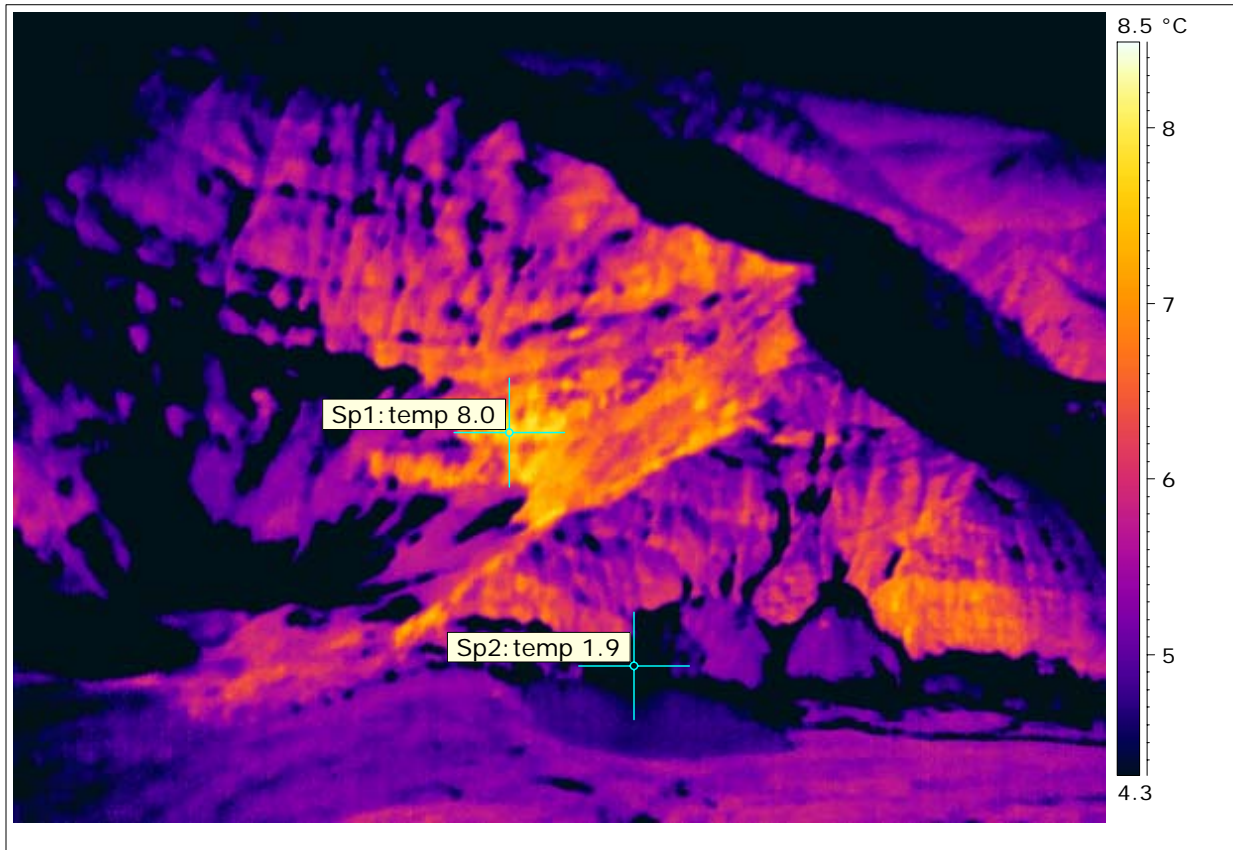


This thermogram reveals vein-like thermal patterns that are fairly area specific, the thermal patterns also seem to continue into the valley above the Ar marked areas shown by the bright spots in the top of the valley.

The temperature rise from reference Sp2 to Sp3 is 5.6 Deg C.

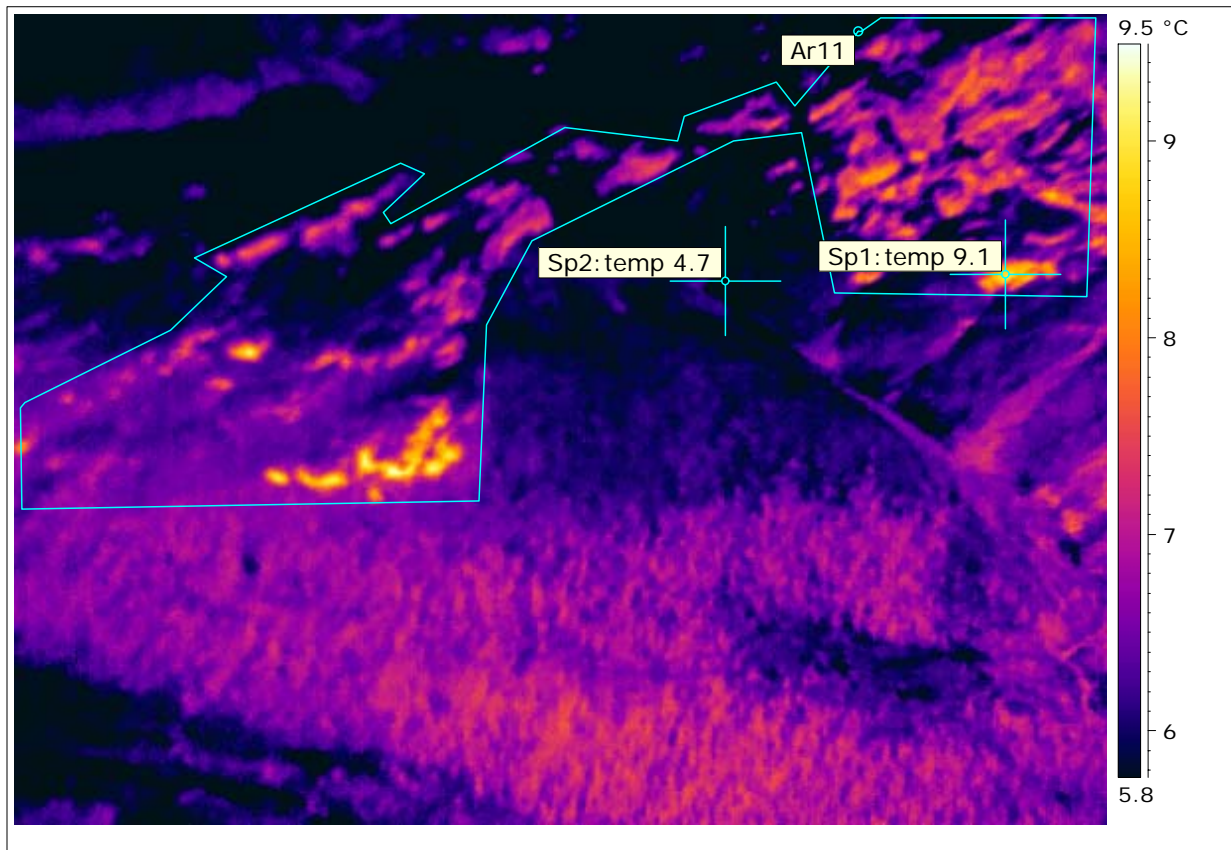
Priority assigned to this anomaly is # 2-Moderate due to the small areas of thermal activity and lack of activity in the main valley bottom.

Thermogram # 35. Nash Creek Area Anomaly # NC-2 (Figure 6).
Video Reference 2:07:54 AM.



This thermogram shows solar gain in the brighter areas of the rock outcrops.

Thermogram # 36. Nash Creek Area Anomaly # NC-2 (Figure 6).
Video reference 2:10:12 AM.



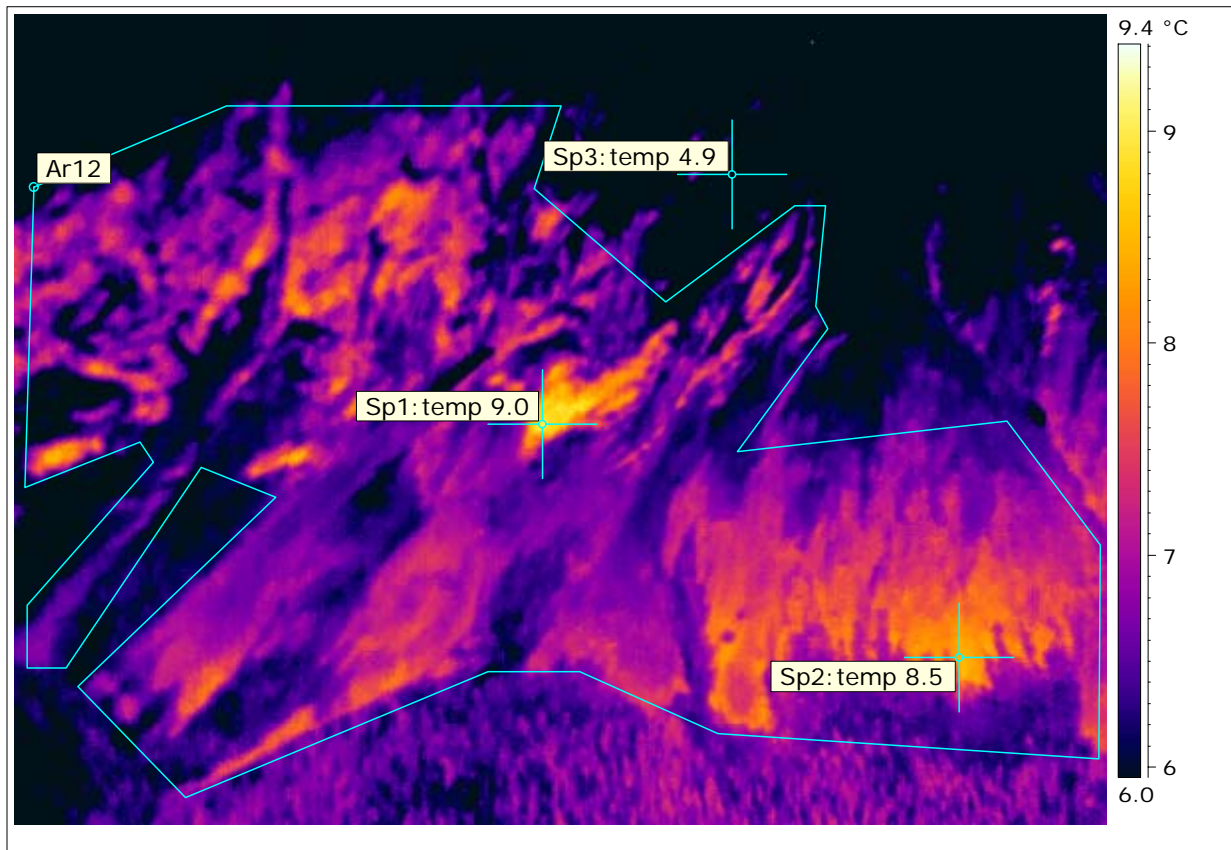
64.4974833, -134.75
154.kmz

This thermogram reveals defined mottling patterns that may be indicative of thermal activity.

The temperature rise from reference Sp2 to Sp1 is 4.4 Deg C.

Priority assigned to this anomaly is # 2-Moderate due to the strong signature of the thermal patterns.

Thermogram # 37. Nash Creek Area Anomaly # NC-2 (Figure 6).
Video reference 2:10:38 AM.



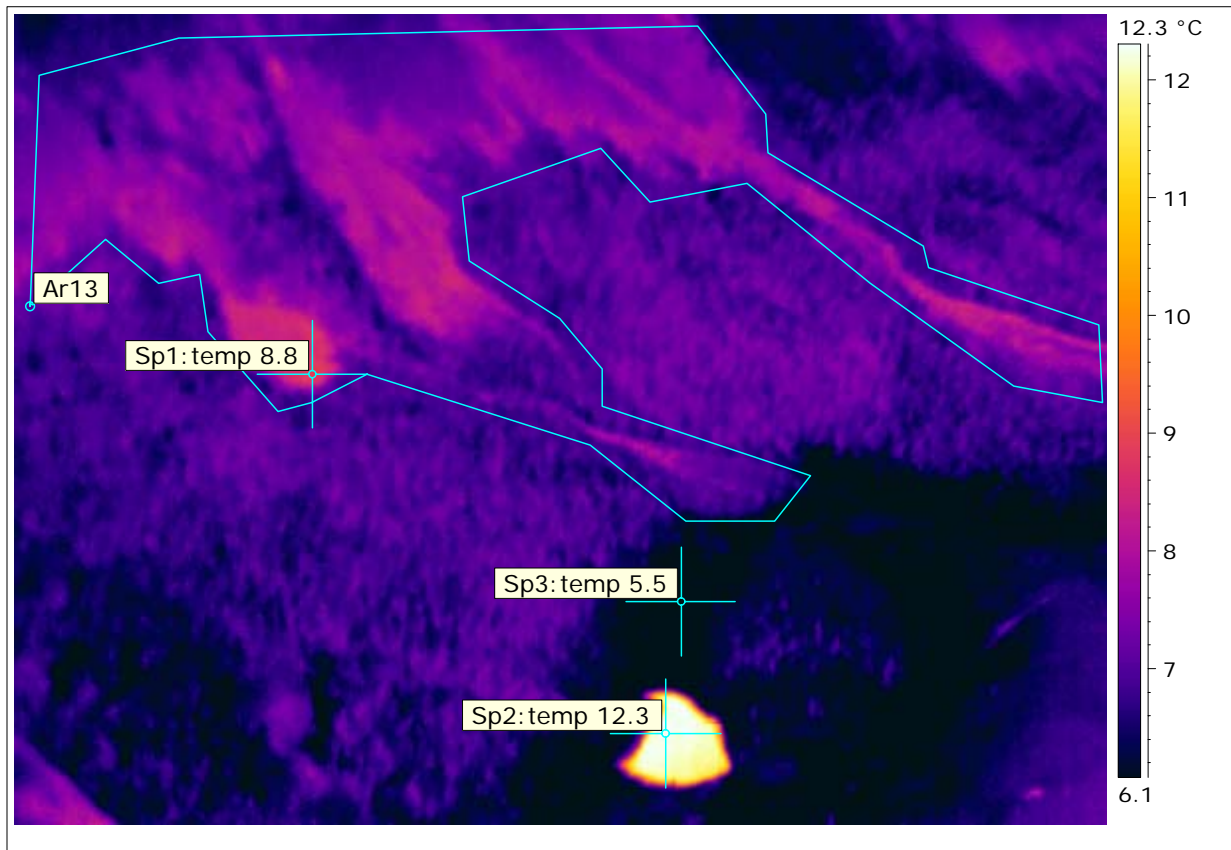
64.4974833, -134.75
154.kmz

This thermogram shows vein-like thermal patterns that occur on all sides of the mountain. This may or may not be solar gain in some of the areas, Sp2 for example.

The temperature rise from reference Sp3 to Sp2 is 3.6 Deg C.

Priority assigned to this area is # 3-Low, due to the weak thermal patterns and the low temperature difference.

Thermogram # 38. Nash Creek Area Anomaly # NC - 3 (Figure 6).
Video reference 11:09 AM.



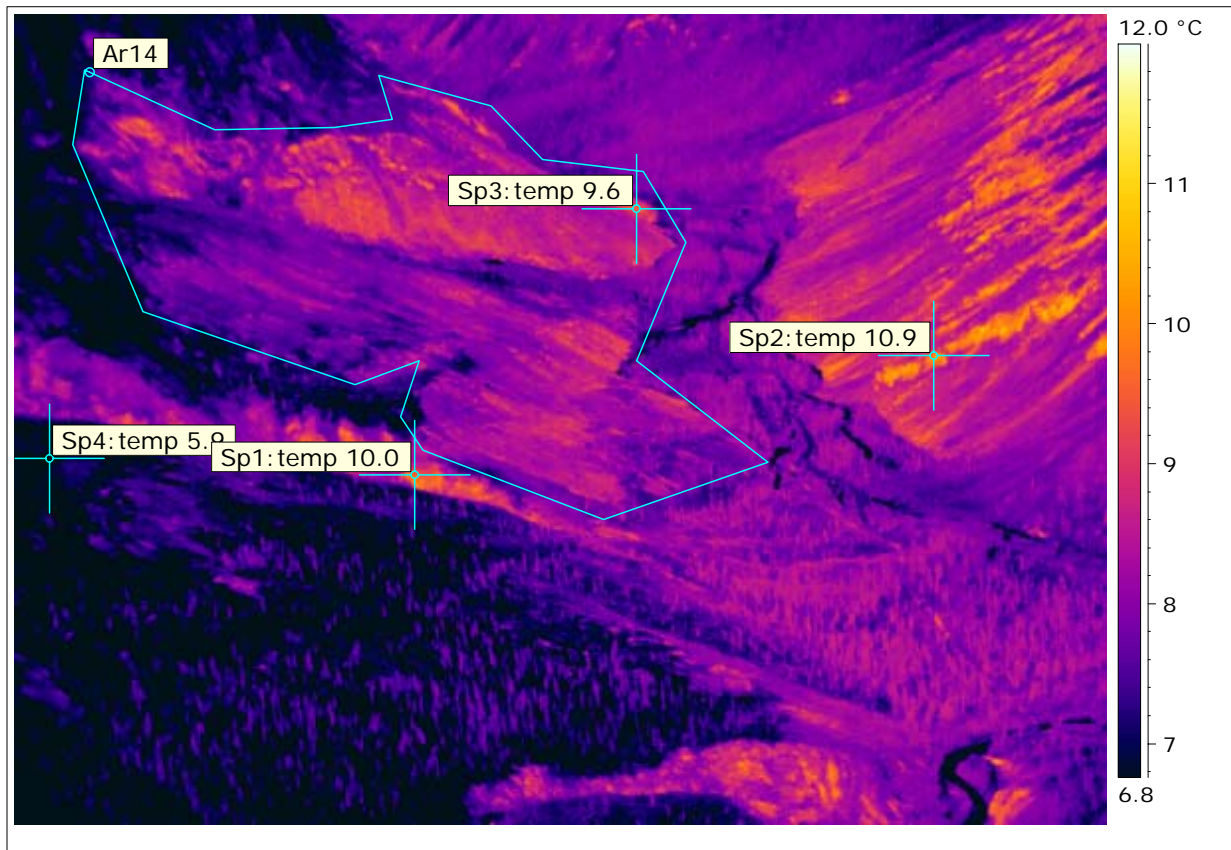
64.4992567, -134.74
1755.kmz

This thermogram reveals vein-like thermal patterns that may be indicative of thermal activity.

The temperature rise from reference Sp3 to Sp2 is 6.8 Deg C.

Assigned priority for this area is # 1-High, due to the strong thermal patterns, temperature, and warm water body; it should be reviewed in the context of other data. Further investigation is recommended.

Thermogram # 39. Nash Creek Area Offsite (outside study area boundary) Satellite Anomaly – A
(Figure 6). Video reference 2:18:14 AM.



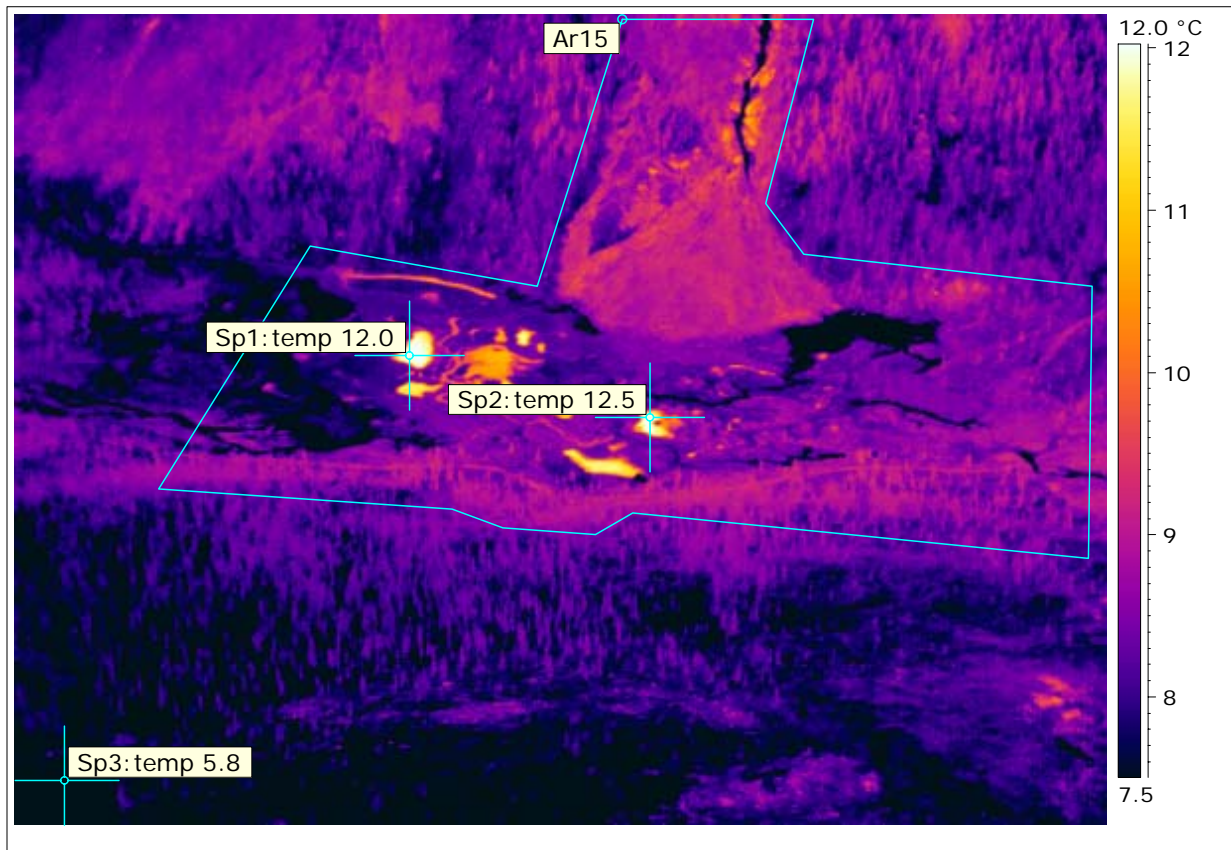
64.476525, -134.728
04.kmz

This thermogram shows a large area of thermal patterns extending up both sides of the valley. The brighter area labelled Sp2 may be solar gain.

The temperature rise from reference Sp4 to Sp3 is 3.7 Deg C.

Priority assigned to this anomaly is # 2-Moderate due to the weaker thermal patterns and lower temperature difference.

Thermogram # 40. Nash Creek Area Offsite (outside study area boundary) Satellite Anomaly – B
(Figure 6). Video reference 2:18:30 AM.



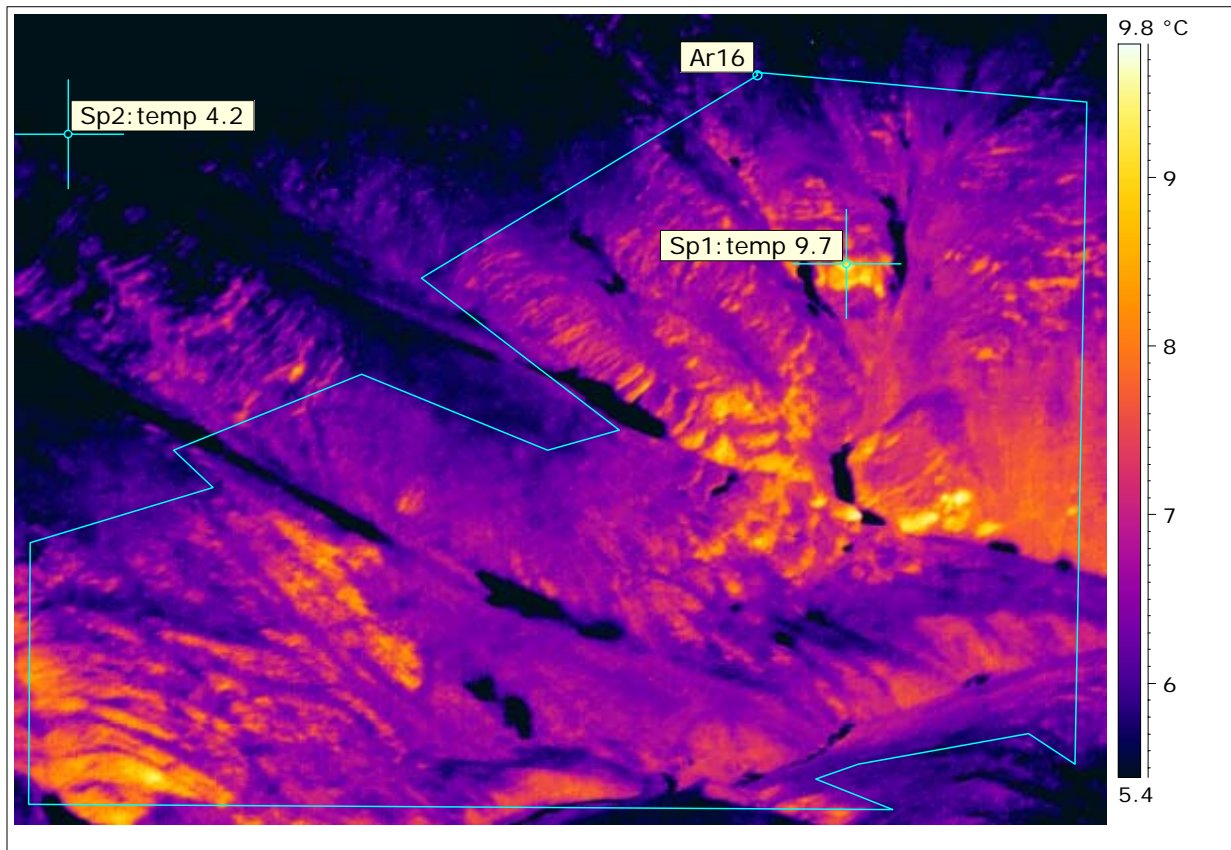
64.4818083, -134.72
7488.kmz

This thermogram reveals an area of strong vein-like thermal patterns.

The temperature rise from reference Sp3 to Sp2 is 6.7 Deg C.

Assigned priority for this area is # 1-High, due to the strong thermal patterns and temperature; it should be reviewed in the context of other data. Further investigation is recommended.

Thermogram # 41. Nash Creek Offsite (outside study area boundary) Satellite Anomaly – C
(Figure 6). Video reference 2:23:16 AM.



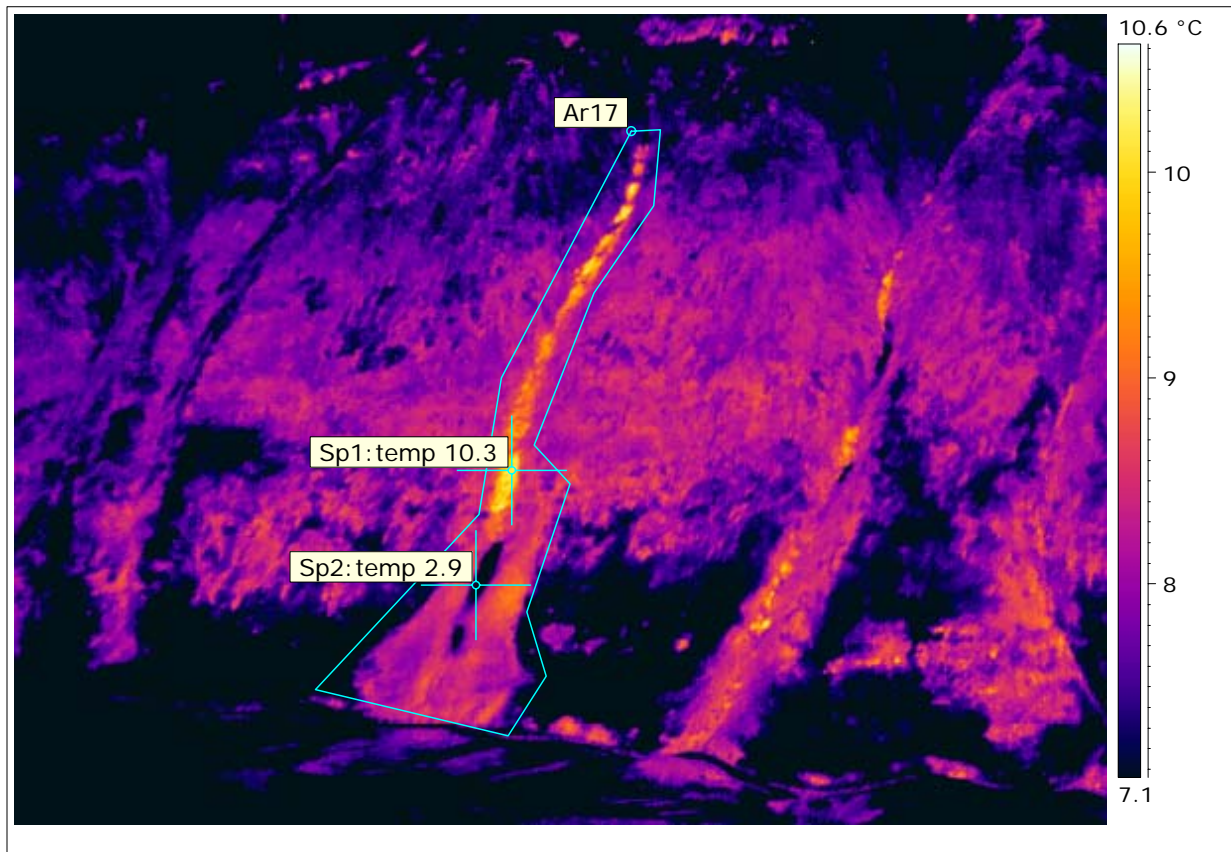
64.4483883, -134.63
9702.kmz

This thermogram shows a large area of thermal patterns, however they are fairly weak and not vein-like.

The temperature rise from reference Sp2 to Sp1 is 5.5 Deg C.

Priority assigned to this anomaly is # 2-Moderate due to the temperature difference even though the thermal patterns are weaker.

Thermogram # 42. Nash Creek Area Offsite (outside study area boundary) Anomaly – D (Figure 6).
Video reference 2:23:30 AM.



64.4482333, -134.62
9925.kmz

This thermogram reveals a small area of vein-like thermal patterns.

The temperature rise from reference Sp2 to Sp1 is 7.4 Deg C.

Priority assigned to this anomaly is # 2-Moderate due to the strong the thermal patterns and temperature difference in a small area.