

FOREST  
HEALTH  
MONITORING

2024  
FOCUS STUDY

# DEPOSITION IMPACTS ON TRADITIONAL FOOD



VOLUME 1 - ECOLOGICAL OBSERVATIONS





# ACKNOWLEDGEMENTS

The Wood Buffalo Environmental Association (WBEA) and our members operate on Treaty 8 territory, the ancestral and traditional territory of the Dene and Cree Peoples, and in the Métis Homeland. We thank the Indigenous community organizations who are members of the WBEA for participating in and giving feedback on our monitoring programs.

The WBEA acknowledges the following members who provided their time and expertise in the field for this study: Conklin Métis, Chipewyan Prairie First Nation, Fort McMurray 468 First Nation, McMurray Métis, and Fort McKay First Nation.

Community members' knowledge and lived experience provided an invaluable perspective on the state of the blueberries and ecosystem at the Forest Health sites. WBEA staff had the opportunity to learn about the concerns and priorities of the community participants.

The WBEA also acknowledges all participants from the Forest Health Monitoring (FHM) workshop who offered their time and input in reviewing and providing recommendations on the direction of the FHM program. Participants included representatives from local Indigenous communities, industry, government, and WBEA staff and science advisors. This support allows the FHM program to continue to adapt to meet the current best practices and the needs of the WBEA's members.

This work was partially funded under the Oil Sands Monitoring (OSM) Program. It is independent of any position of the OSM Program



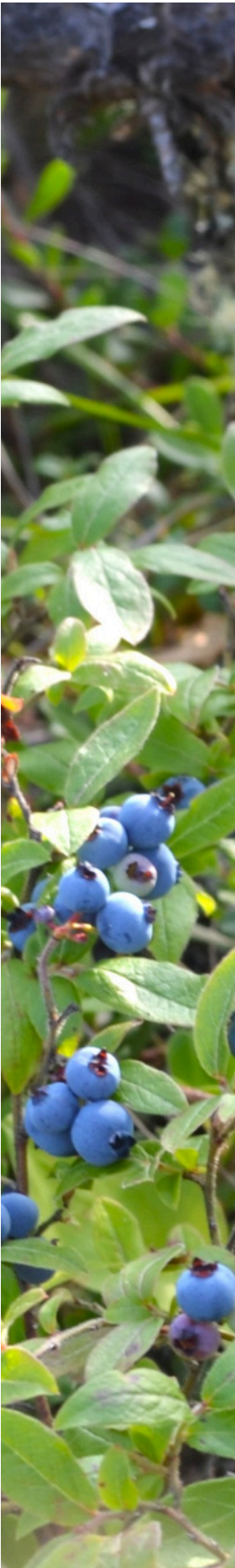
## BLUEBERRIES (*Vaccinium myrtilloides*)





# CONTENTS

|                                 |       |
|---------------------------------|-------|
| Summary -----                   | 1     |
| Overview Map -----              | 2     |
| Background -----                | 3-4   |
| Proposal -----                  | 5     |
| Field Campaign -----            | 6     |
| Sample Collection Process ----- | 7     |
| WBEA FHM Sites -----            | 8     |
| Day 1 - Site 1007 -----         | 9-10  |
| Day 1 - Site 2012 -----         | 11-12 |
| Day 2 - Site 3016 -----         | 13-14 |
| Day 2 - Site 3017 -----         | 15-16 |
| Day 3 - Site 1004 -----         | 17-18 |
| Day 4 - Site 4118 -----         | 19-20 |
| Day 5 - Site 2050 -----         | 21-22 |





## SUMMARY

Blueberries (*Vaccinium myrtilloides*), an important traditional Indigenous food source, were harvested at 7 WBEA Forest Health sites across the region. A total of 5,296g of blueberries were collected for laboratory analyses of nitrogen, sulphur, carbon, trace elements and health promoting compounds.

The sampling campaign occurred over 5 field days in mid-August 2024. Field teams collected ecological observations about the state of the blueberries and the jack pine forests while visiting each site.

There were 7 individuals representing 5 local Indigenous communities (Conklin Métis, Chipewyan Prairie First Nation, Fort McMurray 468 First Nation, McMurray Métis, and Fort McKay First Nation) that participated in the sampling campaign.

## KEY OBSERVATIONS

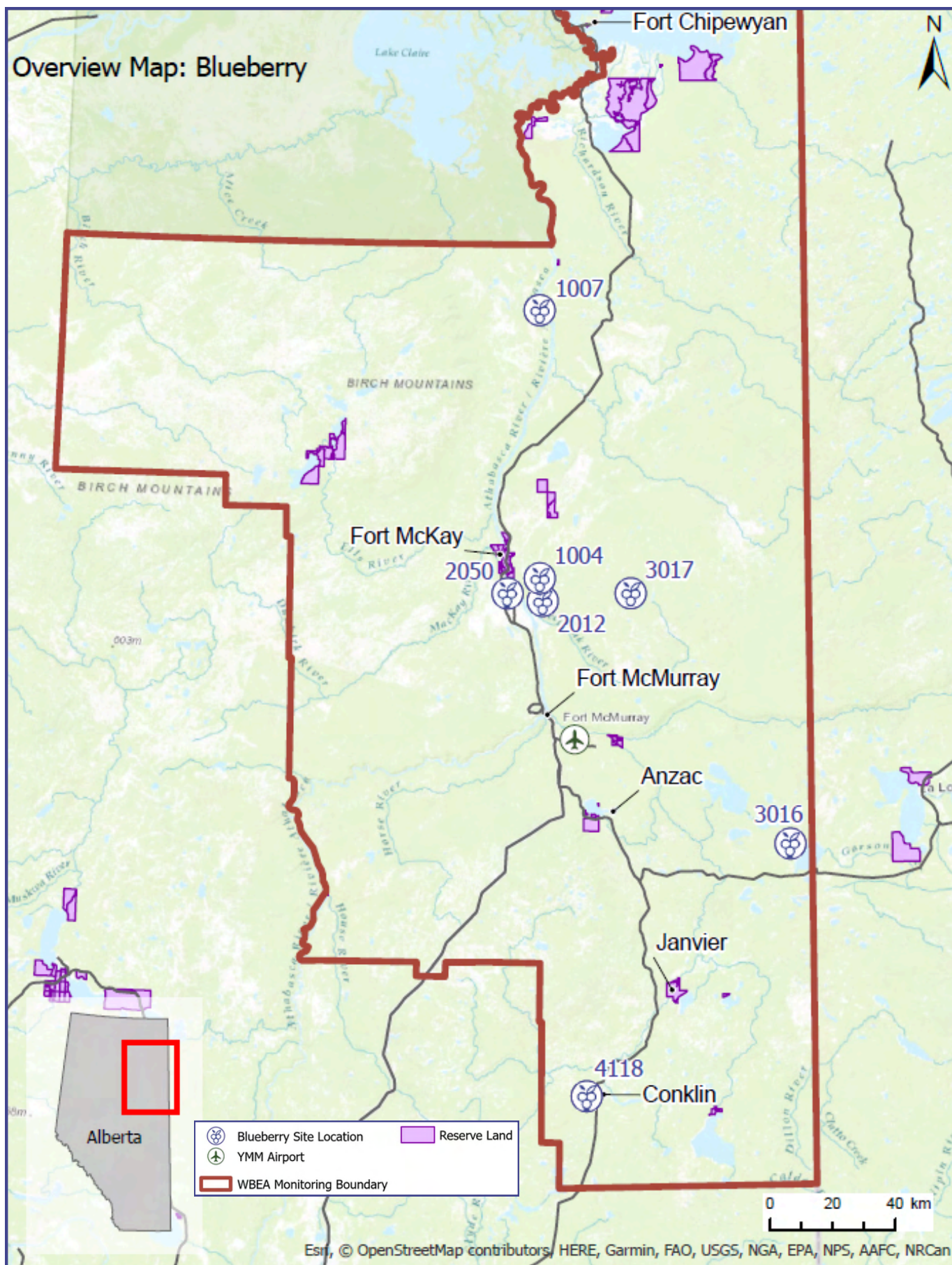
**Poor Yield** - Sites had few blueberries but lots of plants. The teams struggled to collect enough berries at some of the sites and collection took longer than anticipated.

**Small, Dry and Tart Berries** – Berries were small and were not very juicy. Community members highlighted that this was a poor berry season compared to what they are used to.

**Dry Conditions** – Sites were observed to be dry and dusty, and several people noted the lichen crunching below their feet.

**Wildlife Presence** – Most of the sites had signs of wildlife activity such as birds, squirrels, deer and bear.









## BACKGROUND

### FOREST HEALTH MONITORING PROGRAM

The WBEA's Forest Health Monitoring (FHM) Program aims to understand the effects of emission deposition on the surrounding forests. The program combines soil, vegetation, air quality and deposition monitoring at remote locations.

The FHM Program began in the mid-1990's with the initial focus on acid deposition. Due to increased dust noted in the region, monitoring has evolved to include base cation and trace metals.

In 2024, the Forest Health Monitoring workshop series began to discuss current monitoring and future direction of the program. The FHM program continues to evolve and adapt to best meet the needs of the WBEA's members.

### FHM WORKSHOP SERIES

The WBEA hosted three 2-day workshops between November 2023 and April 2024. The intent of the workshops was to bring WBEA members together and review the FHM program prior to the 2024 campaign, gain an understanding of what members wanted from the program, and adapt the program accordingly.

Over 80 individuals participated including representatives from 10 Indigenous community organizations, 7 industry organizations, 2 government organizations, and various WBEA staff and science advisors.

# BACKGROUND

## KEY MONITORING INDICATORS - BLUEBERRIES

Traditional foods were identified as important for understanding the impacts of deposition to the forest. Blueberries (*Vaccinium myrtilloides*) are a staple traditional food in this region and contain medicinal and health promoting properties, such as antioxidants. Blueberries are common at the WBEA's Forest Health sites. Exposure to increased deposition levels can lead to changes in blueberry plant condition.

A focus study on blueberries was strongly supported by the workshop participants and the WBEA technical committees. There was interest in understanding if the quality of the blueberries in the region is being impacted by local deposition as well as collecting ecological observations of the Forest Health sites.

## WORKSHOP PARTICIPANTS

Alberta Environment and Protected Areas  
Alberta Energy Regulator  
Athabasca Chipewyan First Nation  
Canadian Natural Resources Ltd.  
Cenovus Energy  
Chard Métis Nation  
Chipewyan Prairie First Nation  
CNOOC International  
Conklin Métis  
Fort McKay First Nation

Fort McKay Métis Nation  
Fort McMurray 468 First Nation  
Hammerstone Infrastructure Materials Ltd  
Imperial Oil Ltd.  
Lakeland Métis  
McMurray Métis  
Mikisew Cree First Nation  
Suncor Energy Inc  
Syncrude Canada Ltd.  
WBEA - Staff and Science Advisors





# PROPOSAL

Blueberry sampling was conducted at seven Forest Health sites across the region. Ecological observations from field teams were recorded at each site on the quality of the blueberries and the state of the collection site. Laboratory analysis of berries is to be conducted and data analyzed with the goal of understanding the following questions:

- What are the concentrations of nitrogen, sulphur and trace elements in blueberries at Forest Health sites?
- What are the concentrations of “health-promoting” compounds in the blueberries collected at Forest Health sites?
- Do these concentrations correlate with measured ambient and deposited concentrations of nitrogen, sulphur and trace elements?
- Do these concentrations correlate with the measured concentration of nitrogen, sulphur and base cations in the soil?
- What are the concentrations of “health-promoting compounds”? Do they correlate with measurements of deposition?
- What is the observed state of the berries at the Forest Health Interior sites? Do they correlate with measurements of deposition?
- Can blueberries collected at Forest Health sites be used as “reference berries” for how deposition affects blueberry quality throughout the Regional Municipality of Wood Buffalo (RMWB)?





# FIELD CAMPAIGN

## FIELD TIMING

Based on input from the Forest Health Monitoring workshop participants, mid-August was noted to be the most reliable time for collecting ripe blueberries. The field sampling campaign occurred from August 12-16th 2024.

## FIELD TEAMS

Members from 5 local Indigenous communities partnered with WBEA staff for the sampling campaign. The participating communities were:

Conklin Métis

Chipewyan Prairie First Nation (CPFN)

Fort McMurray 468 First Nation (FM468FN)

McMurray Métis

Fort McKay First Nation (FMFN)

## SAMPLE COLLECTION

Blueberries were collected and transported following methods outlined in the WBEA 2024 FHM Traditional Food (Blueberry) Focus Study standard operating procedure (SOP).

Ecological observations were recorded at the same time as sample collection. A list of questions focused around the blueberries, air/odour, and site/ecosystem were created beforehand.



# SAMPLE COLLECTION PROCESS

1. Harvest



2. Composite



3. Weigh



4. Label & store in cooler with ice



5. Collect site Ecological Observations



6. Prepare shipment for lab





## WBEA FOREST HEALTH MONITORING SITE AERIAL VIEW



## WBEA FOREST HEALTH MONITORING SITE GROUND VIEW





# DAY 1

## SITE 1007

**Date:** August 12, 2024

**Field Team:** Selena MacIsaac  
(WBEA), Nicole McCann (WBEA)

**Coordinates:** 57.89026, -111.43524

**RFMA#:** 2892

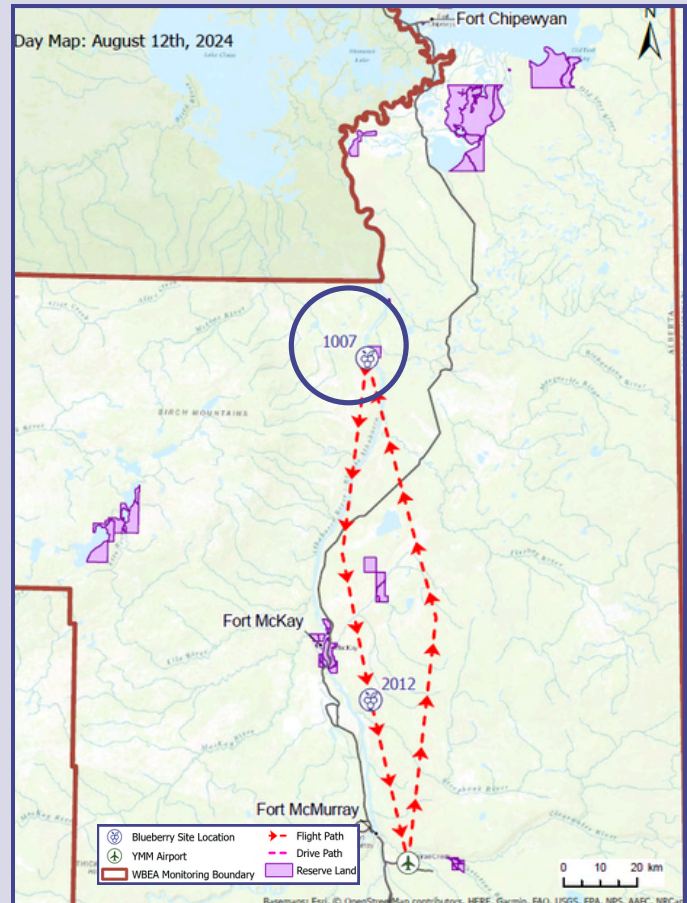
**Start Time:** 8:15 MST

**End Time:** 10:39 MST

**Temperature:** 22° C

**Transportation:** Helicopter

**Sample Weight:** 471g





## BERRY OBSERVATIONS

### Visual

- Very small
- Many unripe berries on plants

### Taste

- Firm
- Less juicy than desired

### Yield

- Many plants present with few berries per plant
- Poor Yield - Unable to collect 750g

### Other

- Would feel comfortable eating berries from this site



## SITE OBSERVATIONS

- Very Dry Conditions
- Visible dust on understory
- Would want to wash before eating berries from this site
- Lots of spider webs present on plants
- Constant industrial noise



## WILDLIFE OBSERVATIONS

- Audible squirrel sounds
- Bear scat observed





# DAY 1

## SITE 2012

**Date:** August 12, 2024

**Field Team:** Selena MacIsaac (WBEA),  
Nicole McCann (WBEA)

**Coordinates:** 57.05369, -111.40916

**RFMA#:** 3212

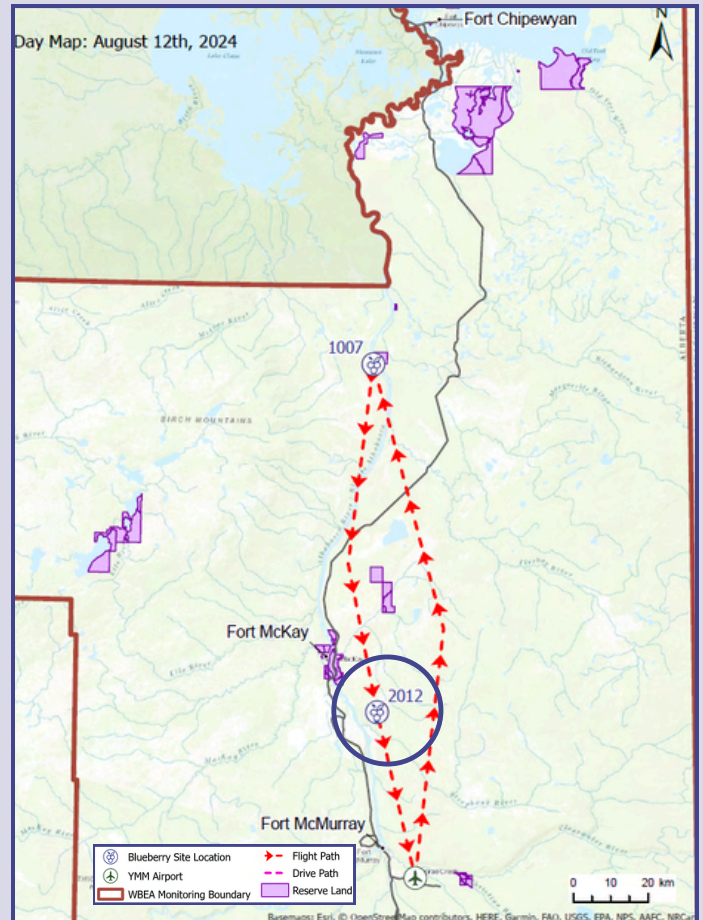
**Start Time:** 11:50 MST

**End Time:** 14:20 MST

**Temperature:** 31° C

**Transportation:** Helicopter

**Sample Weight:** 758g





## BERRY OBSERVATIONS

### Visual

- Very small Dust on leaves and berries
- Many unripe berries on plants

### Taste

- Firm Less juicy than desired
- Tart

### Yield

- Poor Yield Many plants present with few berries per plant

### Other

- Would want to wash before eating



## SITE OBSERVATIONS

- Very Dry Conditions
- No Canopy Cover
- Would eat berries from this site

## WILDLIFE OBSERVATIONS

- Audible squirrel sounds
- Bear scat observed





# DAY 2

## SITE 3016

**Date:** August 13, 2024

**Field Team:** Elder James Woodward (FM468FN), Joyce Woodward (FM468FN), Selena MacIsaac (WBEA), Nicole McCann (WBEA)

**Coordinates:** 56.35326, -110.11850

**RFMA#:** 577

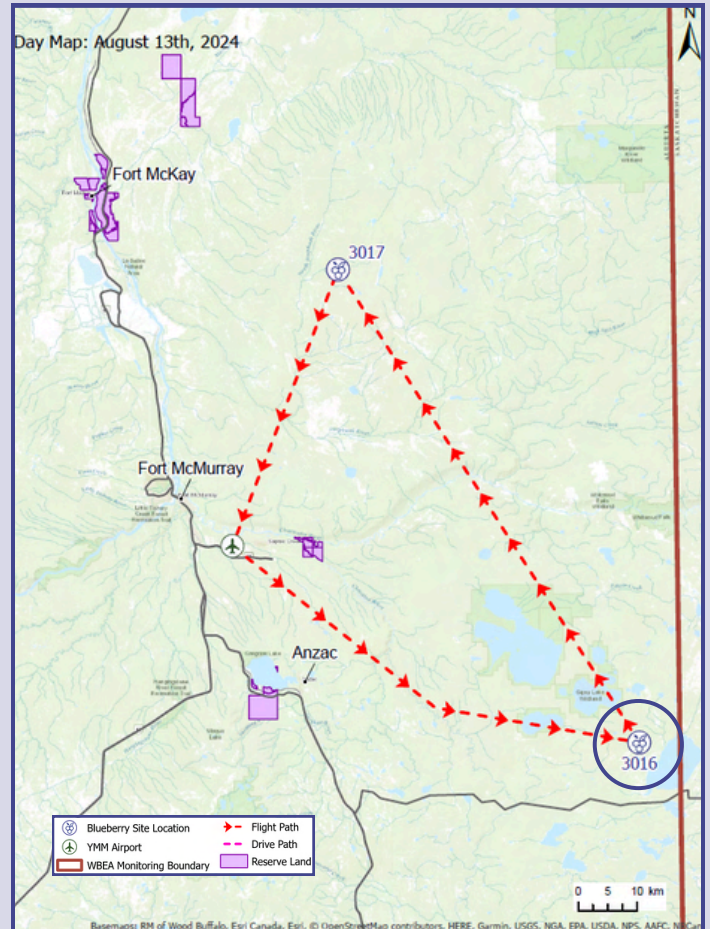
**Start Time:** 7:30 MST

**End Time:** 8:50 MST

**Temperature:** 23° C

**Transportation:** Helicopter

**Sample Weight:** 858g





## BERRY OBSERVATIONS

### Visual

- Very small
- Many unripe berries on plants

### Taste

- Not juicy
- Dry

### Yield

- Poor yield
- Many plants present with few berries per plant

### Other

- Both Elder James and Joyce commented that they have never seen such a bad berry season
- Joyce would eat berries from this site

## SITE OBSERVATIONS

- Very Dry Conditions
- Crunchy ground
- Lots of deadfall on ground
- Airplane sounds heard

## WILDLIFE OBSERVATIONS

- Audible squirrel sounds
- Audible sandhill crane sounds

---

***“Never seen berries this small”***

---

**Joyce Woodward,  
FM468FN**





# DAY 2

## SITE 3017

**Date:** August 13, 2024

**Field Team:** Elder James Woodward (FM468FN), Joyce Woodward (FM468FN), Selena MacIsaac (WBEA), Nicole McCann (WBEA)

**Coordinates:** 57.07646, -110.94505

**RFMA#:** 2925

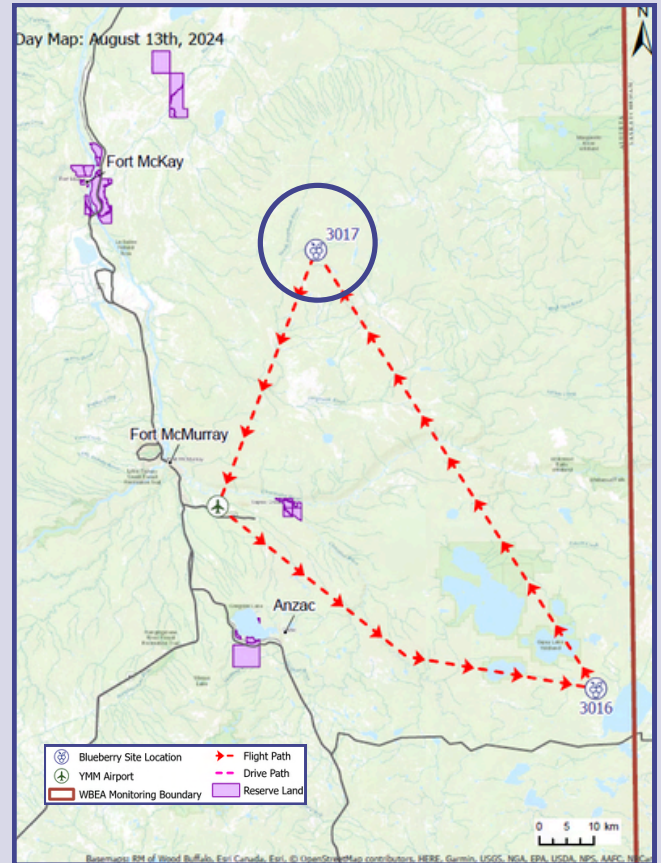
**Start Time:** 9:55 MST

**End Time:** 11:10 MST

**Temperature:** 26° C

**Transportation:** Helicopter

**Sample Weight:** 919g



## BERRY OBSERVATIONS

### Visual

- Very small
- Many unripe berries on plants.

### Taste

- Not juicy
- Dry

### Yield

- Poor yield
- Many plants present with few berries per plant

### Other

- Elder James mentioned that there is a lot of white berries for this time of year and it is too cold now for them to ripen
- Joyce would eat berries from this site but these are too small to bother

## SITE OBSERVATIONS

- Very Dry Conditions
- Crunchy ground
- Airplane sounds heard

## WILDLIFE OBSERVATIONS

- Audible bird sounds
- Elder James mentioned that the animals are moving south where there is more moisture. He goes south to hunt moose and maybe now will have to go south to gather blueberries.

---

*“It’s too dry, going to have more and more fires”*

---

*“Mother Nature is fighting but losing”*

---

Elder James Woodward,  
FM468FN





# DAY 3

## SITE 1004

**Date:** August 14, 2024

**Field Team:** Skylar Lipman (FMFN)  
Selena MacIsaac (WBEA), Nicole McCann (WBEA)

**Coordinates:** 57.11901, -111.42542

**RFMA#:** 2718

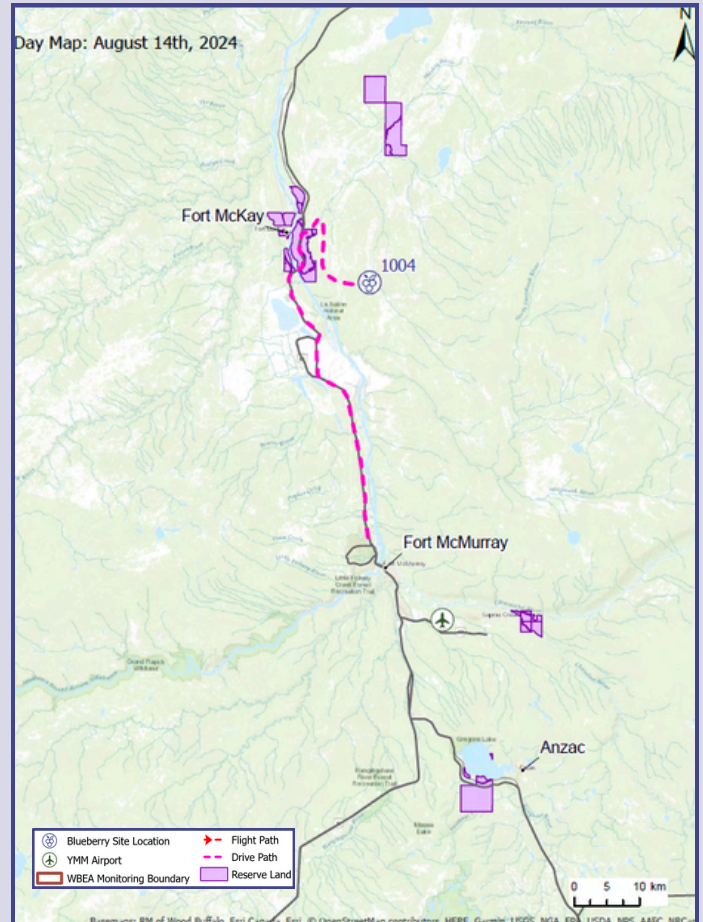
**Start Time:** 10:50 MST

**End Time:** 12:00 MST

**Temperature:** 22° C

**Transportation:** Truck

**Sample Weight:** 920g





## BERRY OBSERVATIONS

### Visual

- Small berries
- Many unripe berries on plants
- Film/layer of dust on berries and plants

### Taste

- Tart & sweet
- Not juicy

### Yield

- Poor yield
- Many plants present with few berries per plant

### Other

- Would prefer to wash berries before eating

## SITE OBSERVATIONS

- Dusty
- Industrial noise
- Near the East Athabasca Highway
- Airplane sounds heard

## WILDLIFE OBSERVATIONS

- Audible bird sounds
- Audible squirrel sounds





# DAY 4

## SITE 4118

**Date:** August 15, 2024

**Field Team:** Elder Florence Janvier (CPFN), Elder Grace Richards (Conklin Métis), Dale Quintal (Conklin Métis), Brandi Graham (McMurray Métis), Selena MacIsaac (WBEA), Nicole McCann (WBEA), Kim Wetten (WBEA)

**Coordinates:** 55.62897, -111.170475

**RFMA#:** 1532

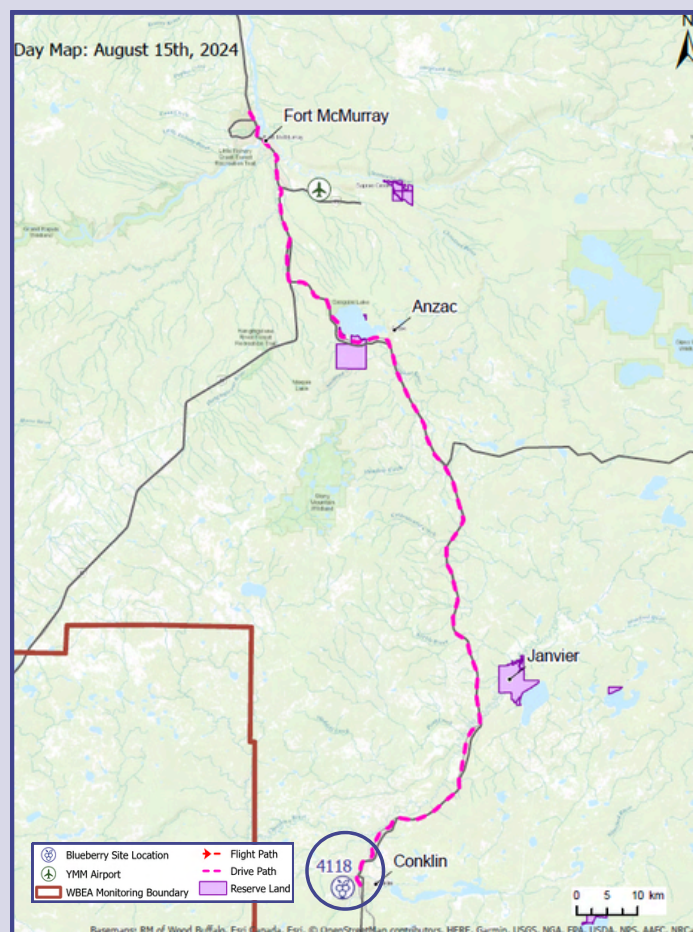
**Start Time:** 9:40 MST

**End Time:** 11:30 MST

**Temperature:** 21° C

**Transportation:** Truck

**Sample Weight:** 658g





## BERRY OBSERVATIONS

### Visual

- Very Small berries
- Many unripe berries on plants
- Elder Florence and Elder Grace both mentioned that these berries do not look appealing
- Brandi noted that the berries are very small and few

### Taste

- Dry
- Not juicy

### Yield

- Very Poor yield
- Many plants present with few berries per plant

### Other

- Elder Grace would feel comfortable eating berries from this site.

## SITE OBSERVATIONS

- Slightly smoky due to nearby wildfire
- Lots of helicopter noise (every few minutes)

## WILDLIFE OBSERVATIONS

- Audible bird sounds
- Audible squirrel sounds
- Dale observed smell and visual signs of deer urine and scat
- Dale noted bears signs in the form of destroyed deadfall and scat
- Florence observed rabbit tracks

---

***“Usually when you pick berries, you want to eat a few as you pick but these aren’t appealing”***

---

**Elder Grace Richards,  
Conklin Métis**





# DAY 5

## SITE 2050

**Date:** August 16, 2024

**Field Team:** Kate Platt (Indigenous Youth, Career Pathways Summer Intern WBEA), Selena MacIsaac (WBEA), Nicole McCann (WBEA)

**Coordinates:** 57.07451, -111.59484

**RFMA#:** N/A

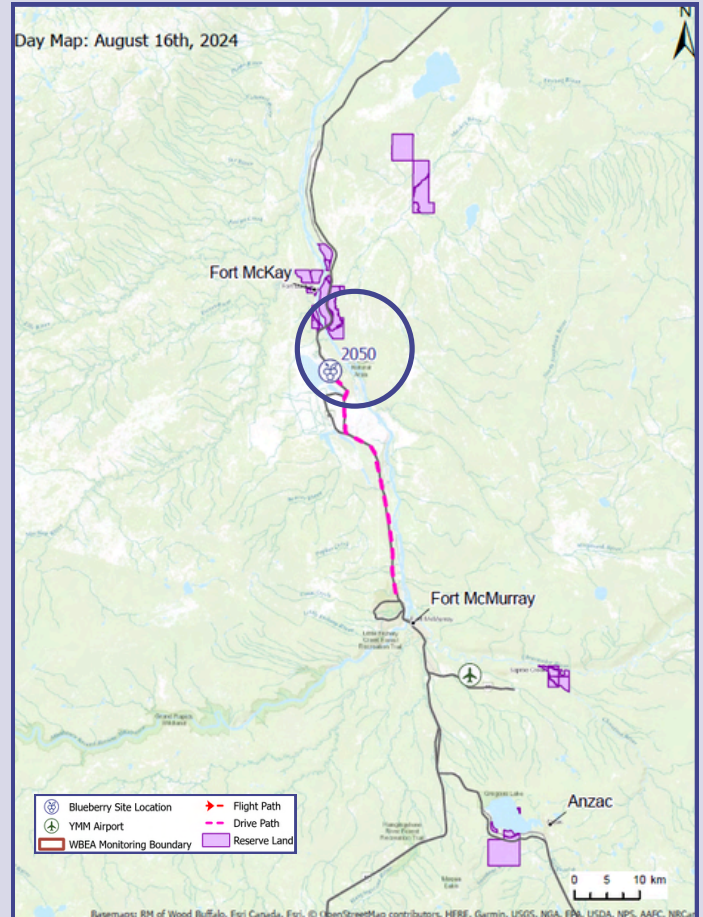
**Start Time:** 10:05 MST

**End Time:** 11:40 MST

**Temperature:** 19° C

**Transportation:** Truck

**Sample Weight:** 712g





## BERRY OBSERVATIONS

### Visual

- Small/ medium berries
- A few unripe berries on plants
- Dust/ film on berries and plants

### Taste

- Juicy
- Sweet

### Yield

- Medium yield
- Many plants present
- Some plants had no berries

### Other

- Would wash berries before eating here



## SITE OBSERVATIONS

- Industrial smells
- Traffic noise (near Hwy)
- Lots of Industrial noise
- Helicopter noisy
- Dusty
- Saw fabric tied around trees nearby

## WILDLIFE OBSERVATIONS

- Bear scat seen
- Ripped up deadfall likely from bear





[WWW.WBEA.ORG](http://WWW.WBEA.ORG)