

Real Time Animal Movement

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Real Time Animal Movement

- **Project Development**
 - Conception
 - Tags
 - Tracking System
- **Technical Capabilities**
- **Future Developments**



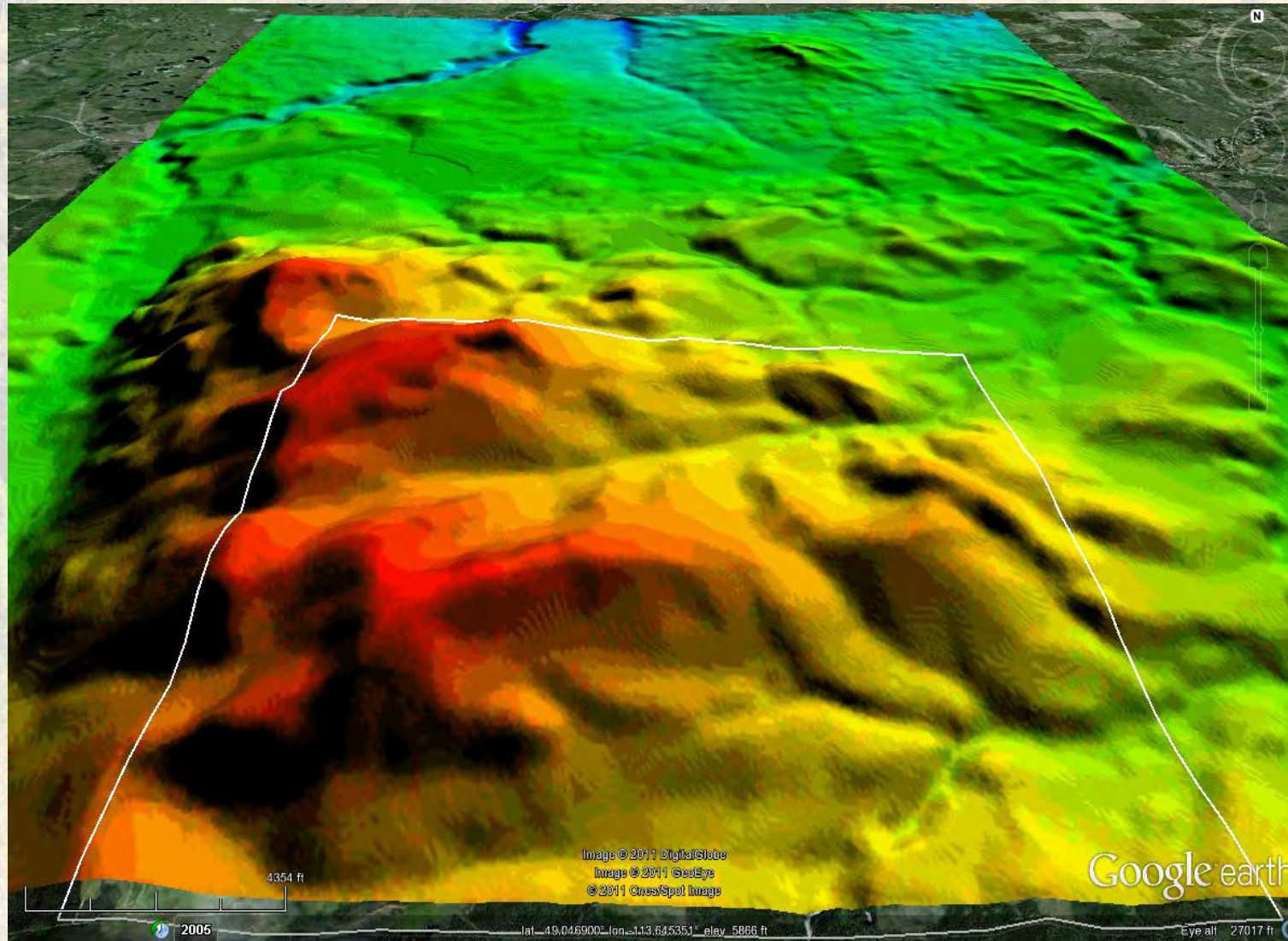


“would it be possible to track animal movement in real time using new and exiting technologies?”

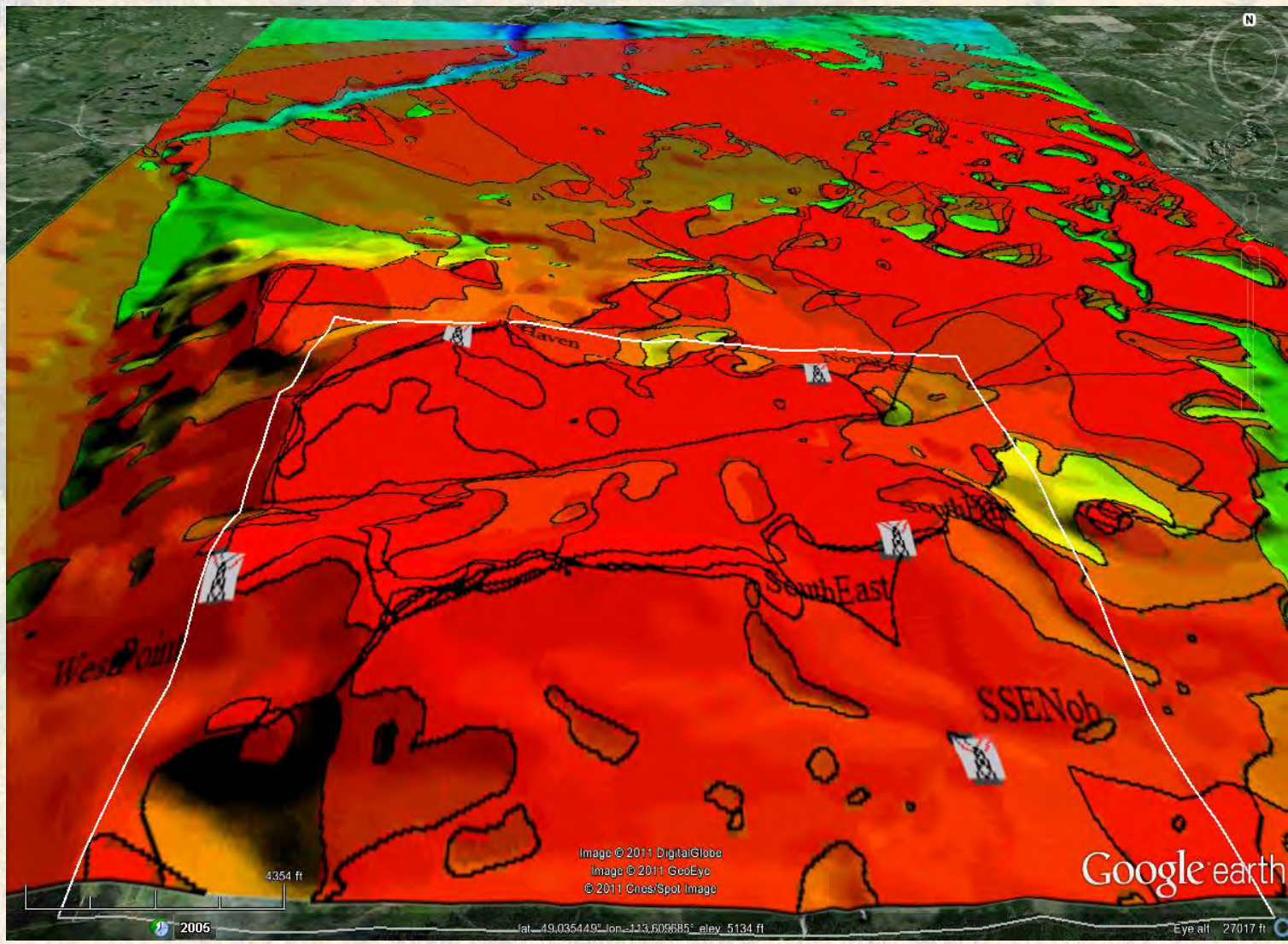
- **GPS**
- **ARFID tags**
- **Google Earth**
- **Wireless communication**
- **Triangulation**
- **Nano SAR**

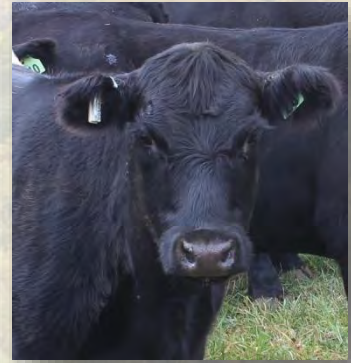
Pole Haven Community Pasture

Elevation Map



Triangulation Coverage Map in Red





Passive RFID Tags

Destron ARFID rTag

South Fork ARFID E tag

Fort Supply ARFID

South Fork ARFID

134.2 KHz 2006

2.4 GHz 2009

915 MHz 2010

2.4 GHz 2010

915MHz 2011



ARFID South Fork

ARFID TagSmyth 2012

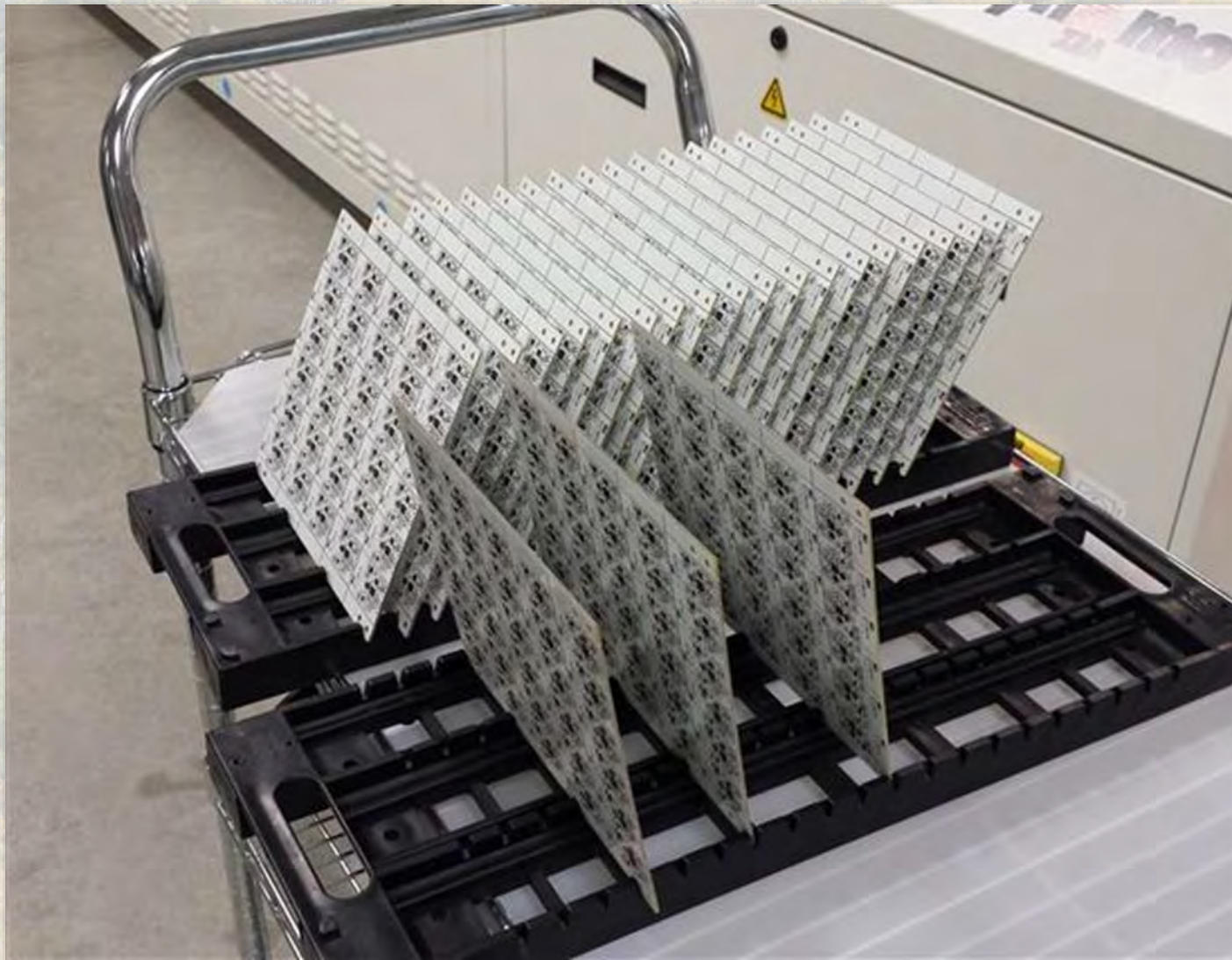
ARFID TagSmyth Solar Panels 2013

ARFID TagSmyth Monitoring 2014

ARFID Tag

- 900 MHz
- Pings every minute (adjustable)
- Long range > 5 Miles LOS
- Solar Powered
- Low power – sleep mode, Charged – wakes up
- Tracking mode ping every second





**30
Tags
per
Board**





- Cow with an ARFID tag on the back of left ear

Tracking Systems

1. Tower System

Uses
Triangulation
For
Animal
Location and tracking
24/7



**ARFID Tag Pings
at constant rate**

**Signal received by tower
receive**

**Signal relayed by radio
to base station**

**Base station calculates
triangulation location**

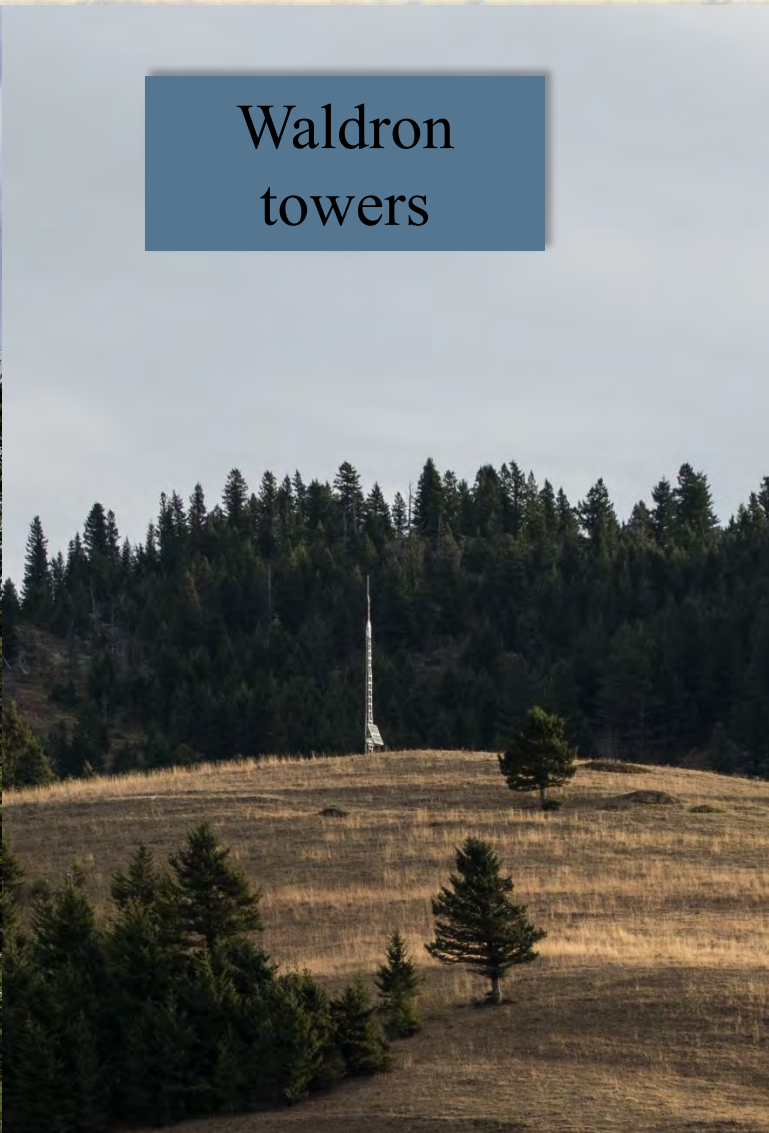
Base post on website

**Animal location
accessible by
livestock producer
on internet**



Waldron Tower Installation

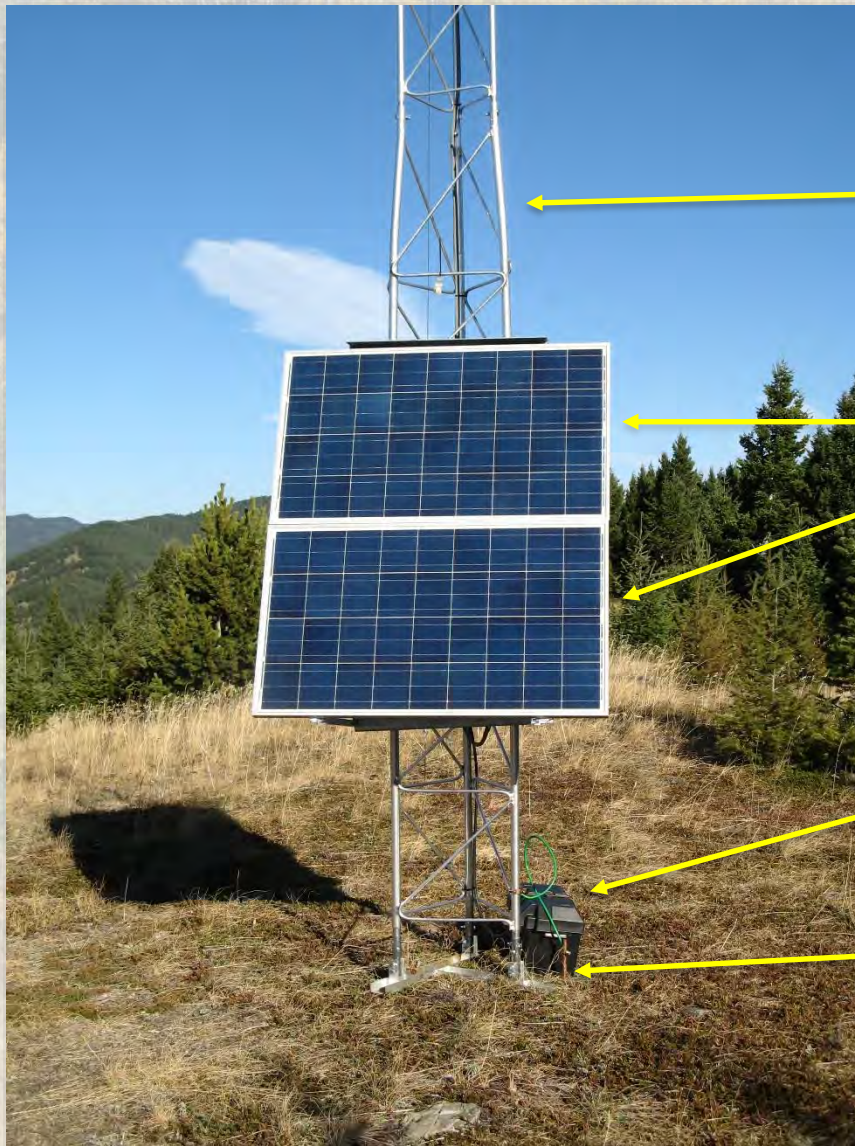




Waldron
towers

**2016
Electric Fence
Around
Towers**





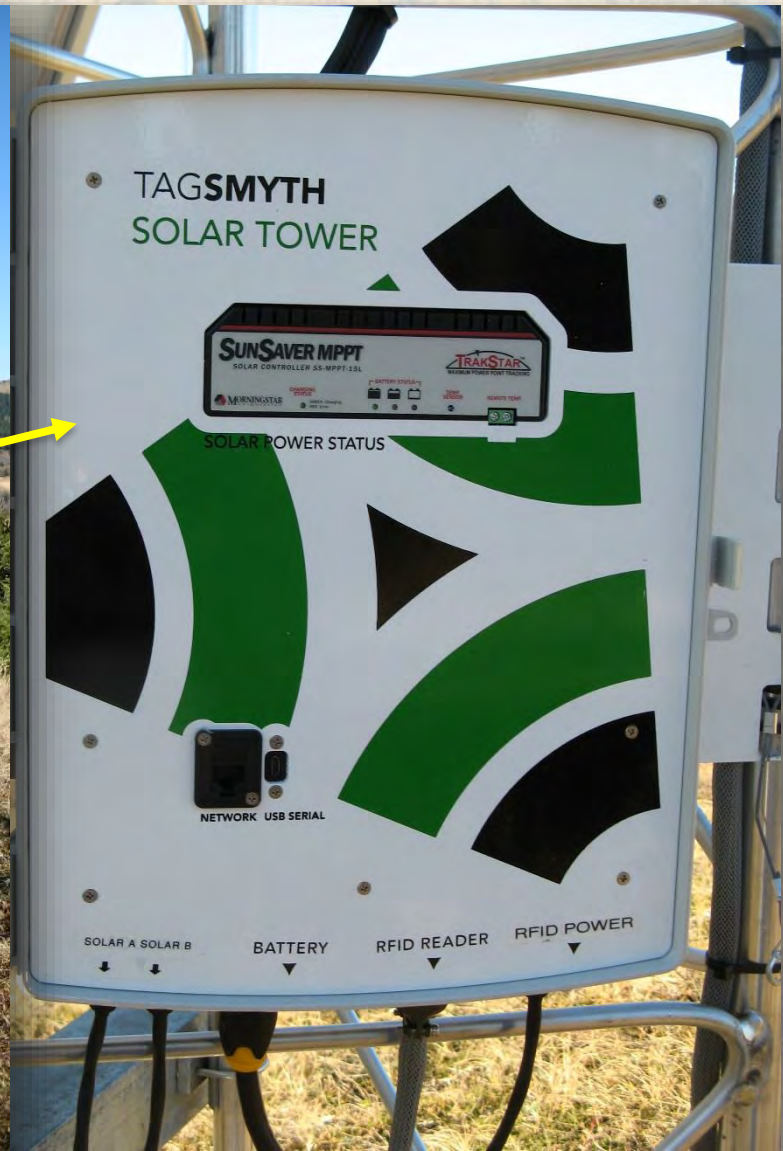
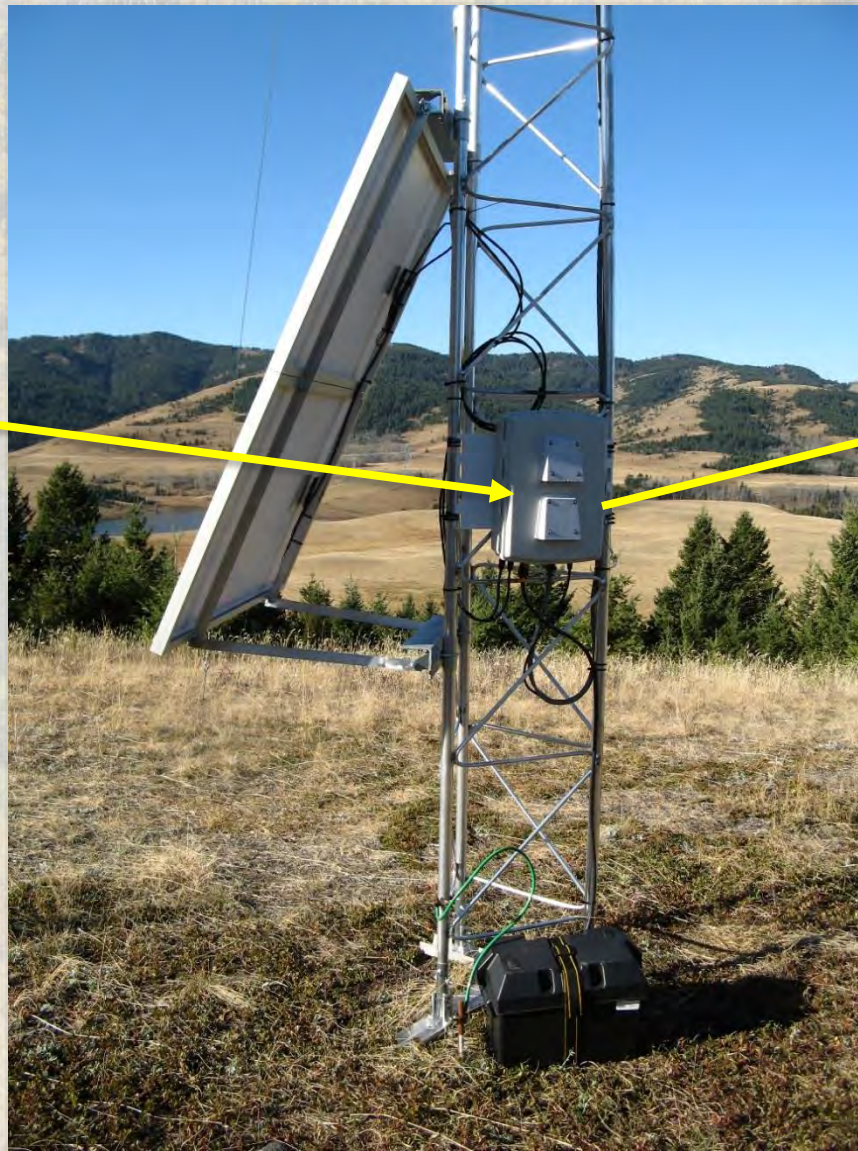
**30' Lattice
Tower**

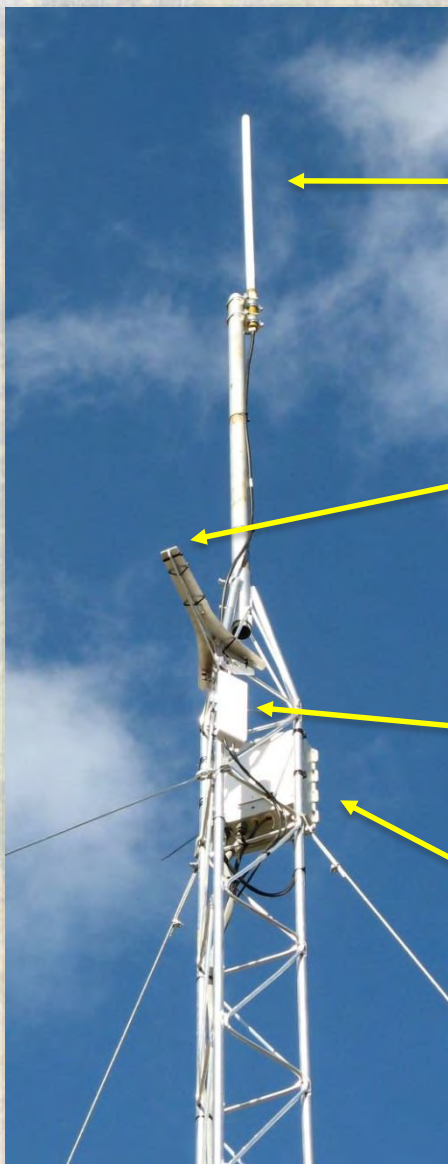
**Solar Panels
mounted
on Tower**

Battery

**8' Ground
Rod**

Tower Control Panel





**360° Omni
Antenna**

GPS Module
-Tower Location
-Timing of Read

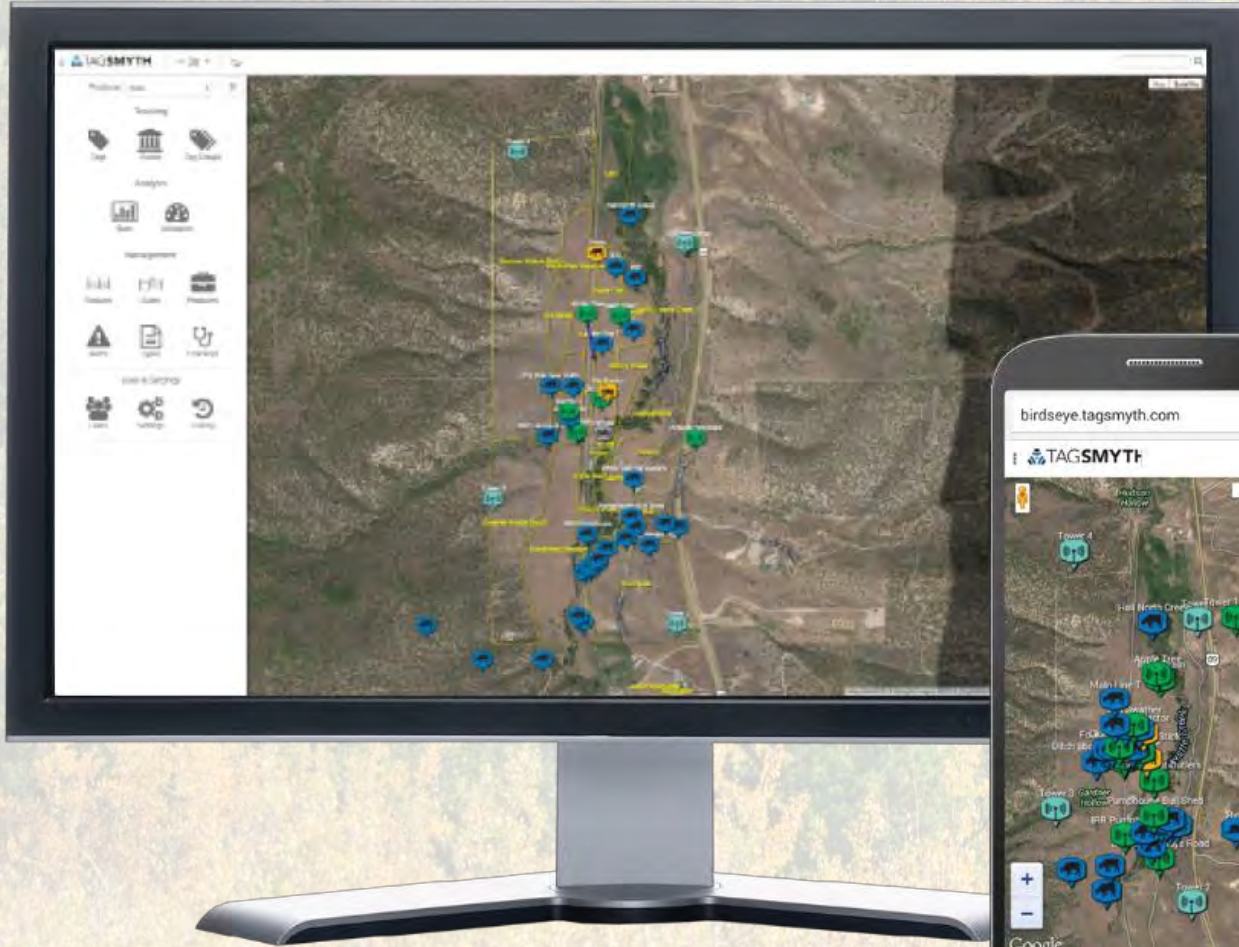
Data Radio
2.4 GHz

ARFID Receiver

Base Receiver

- Receives tag signals from ARFID receivers
- Processes tag reads and calculates animal positions
- Uploads Data to Producer website





Tracking System

Web based Interface



A landscape photograph showing rolling hills covered in golden-brown grass. In the middle ground, a small pond is visible, surrounded by more hills. The background is hazy with fog or mist. The sky is overcast. The overall scene is a rural, pastoral setting.

**Livestock at Waldron
October 2014**

Producer: Waldron



Tracking



Tags



Cows



Tag Groups

Analysis



Stats



Utilization

Management



Pastures



Gates



Producers



Alerts



Types



Checkups

User & Settings



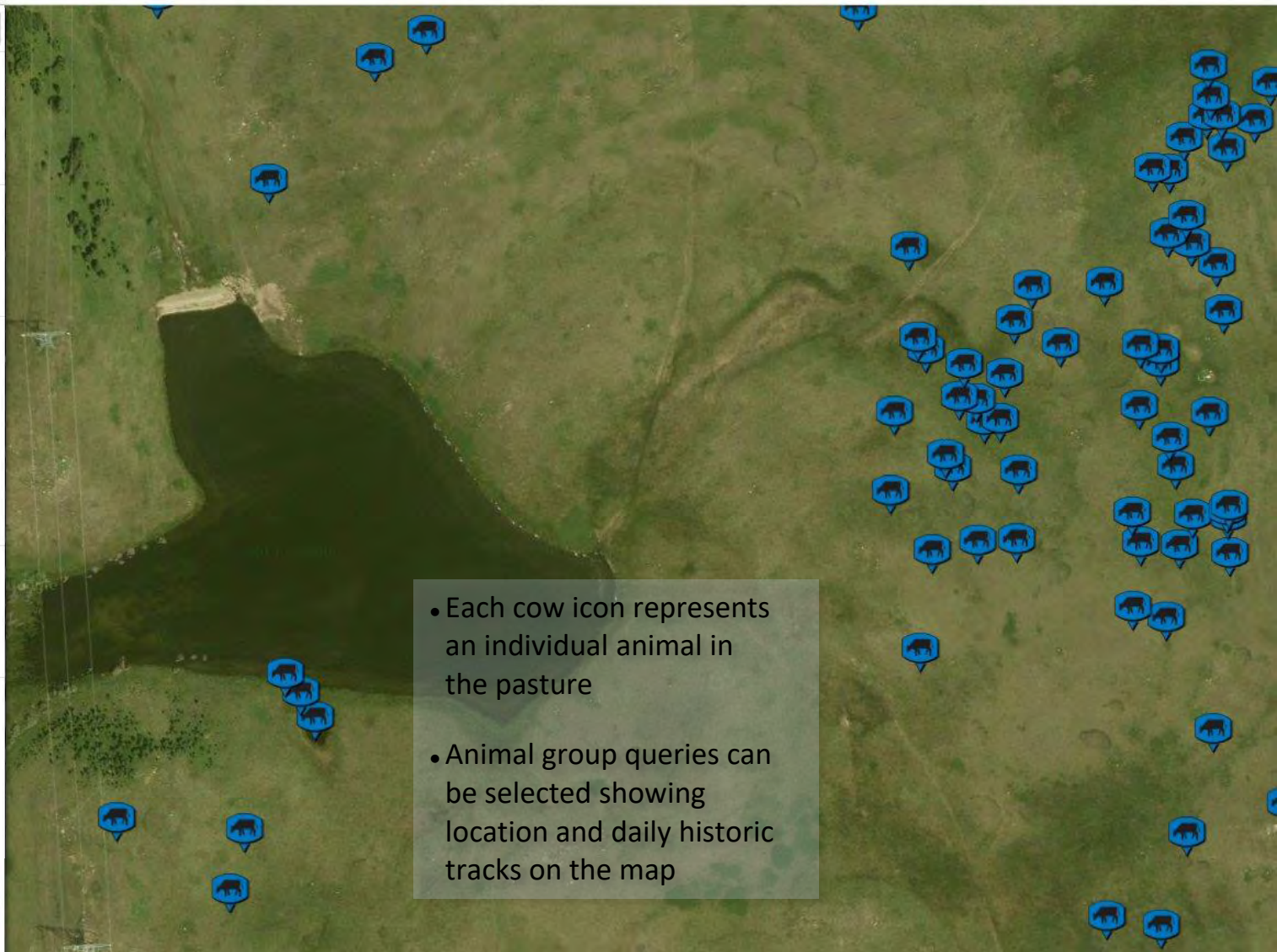
Users



Settings



History



Producer: Waldron

Tracking

- Tags
- Assets
- Tag Groups

Analysis

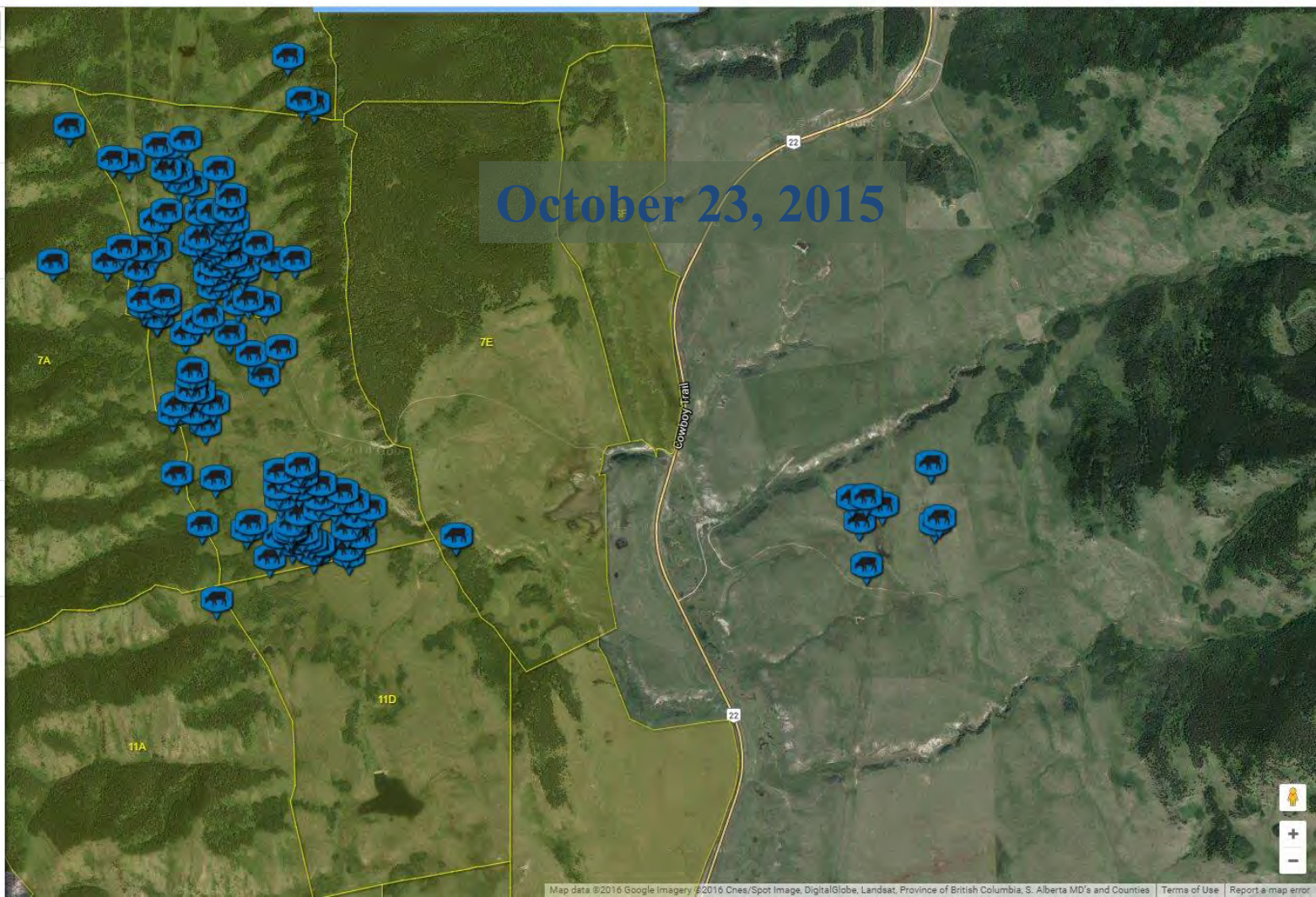
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Management

- Pastures
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- Users
- Settings
- History



Producer: Waldron

Tracking

- Tags
- Assets
- Tag Groups

Analysis

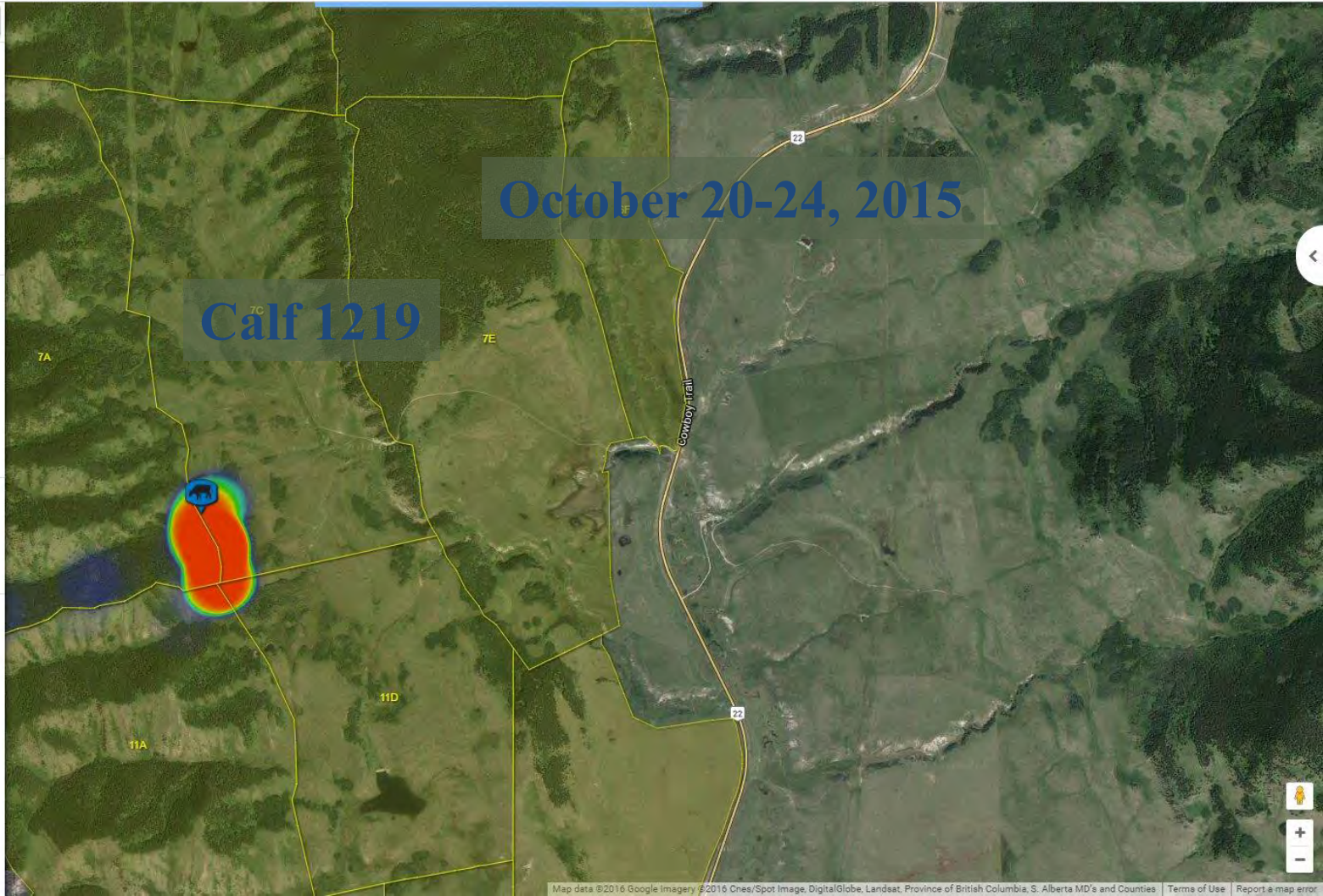
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Producer: Waldron

Tracking

- Tags
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Analysis

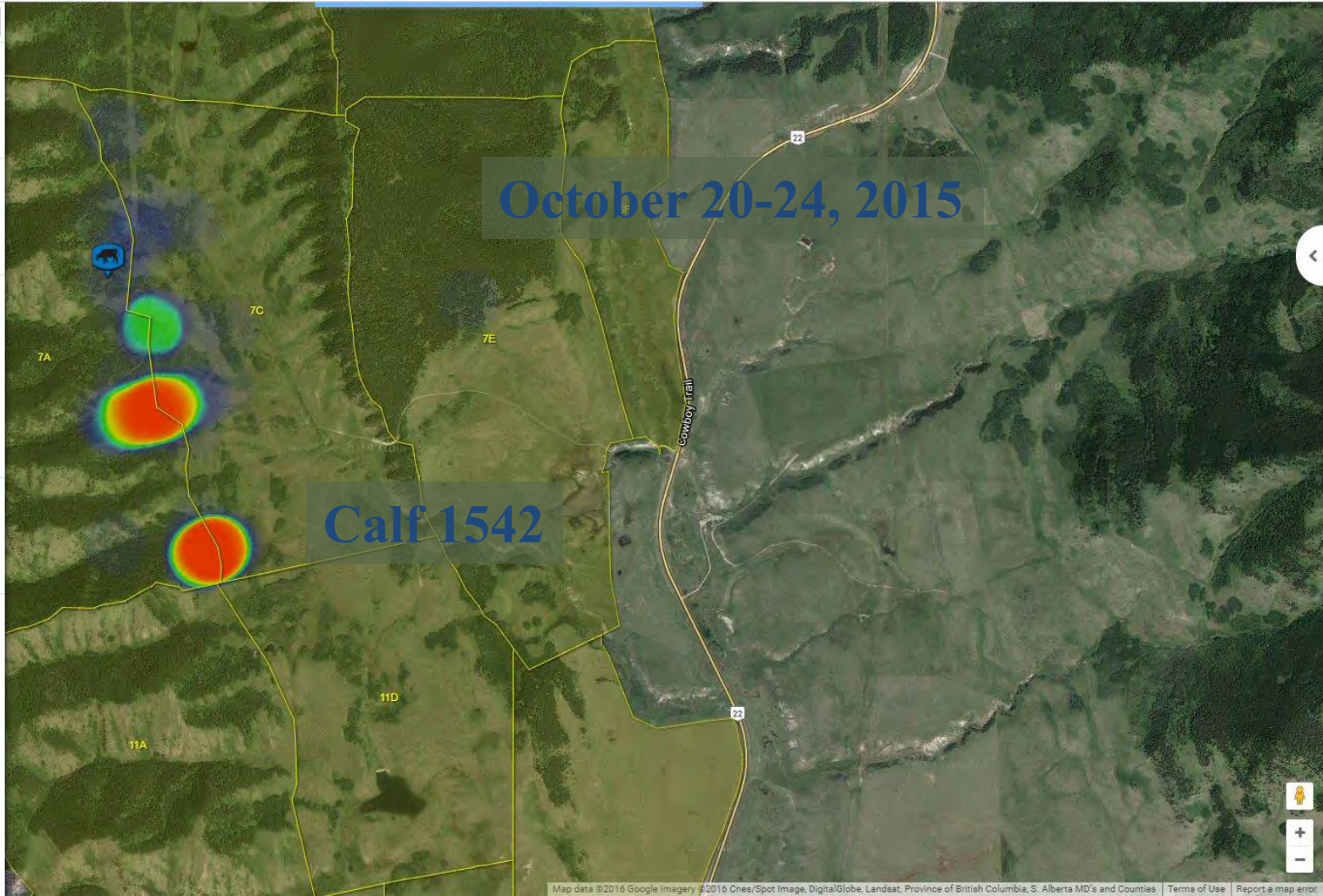
- Stats
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- Pastures
- Gates
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Producer: Waldron

Tracking

Tags Assets Tag Groups

Analysis

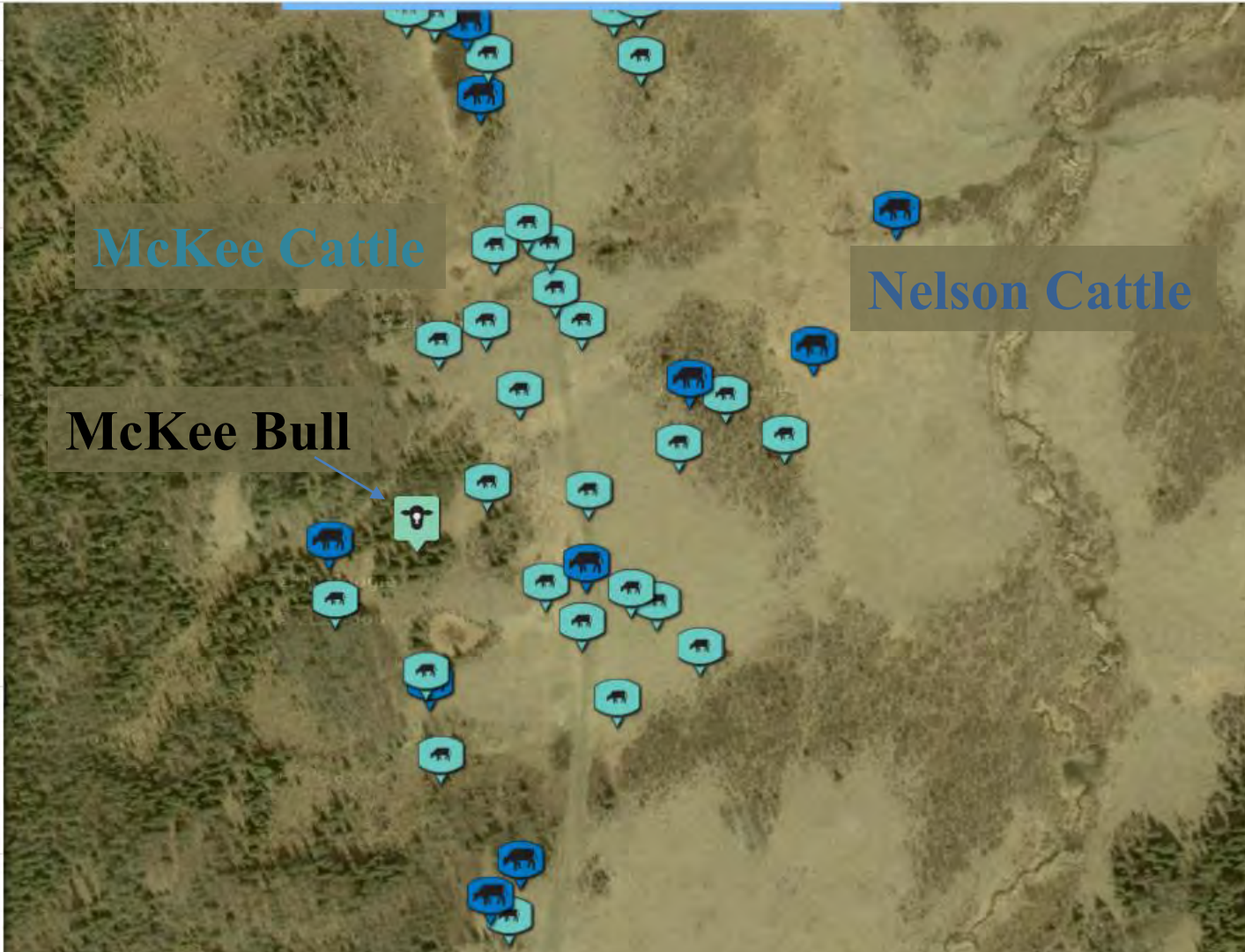
Stats Utilization

Management

Pastures Gates Producers Alerts Types Checkups

User & Settings

Users Settings History



Tracking Systems

2. RangeTRACKER

Used to
locate
animals
in remote areas



2. RangeTracker

- Directional Antenna
- 5 Mile Range
 - direct line of site
- Audio tone hi – lo indicator for signal strength
- Mini USB adapter
 - Upload Data to PC
 - Rechargeable Battery

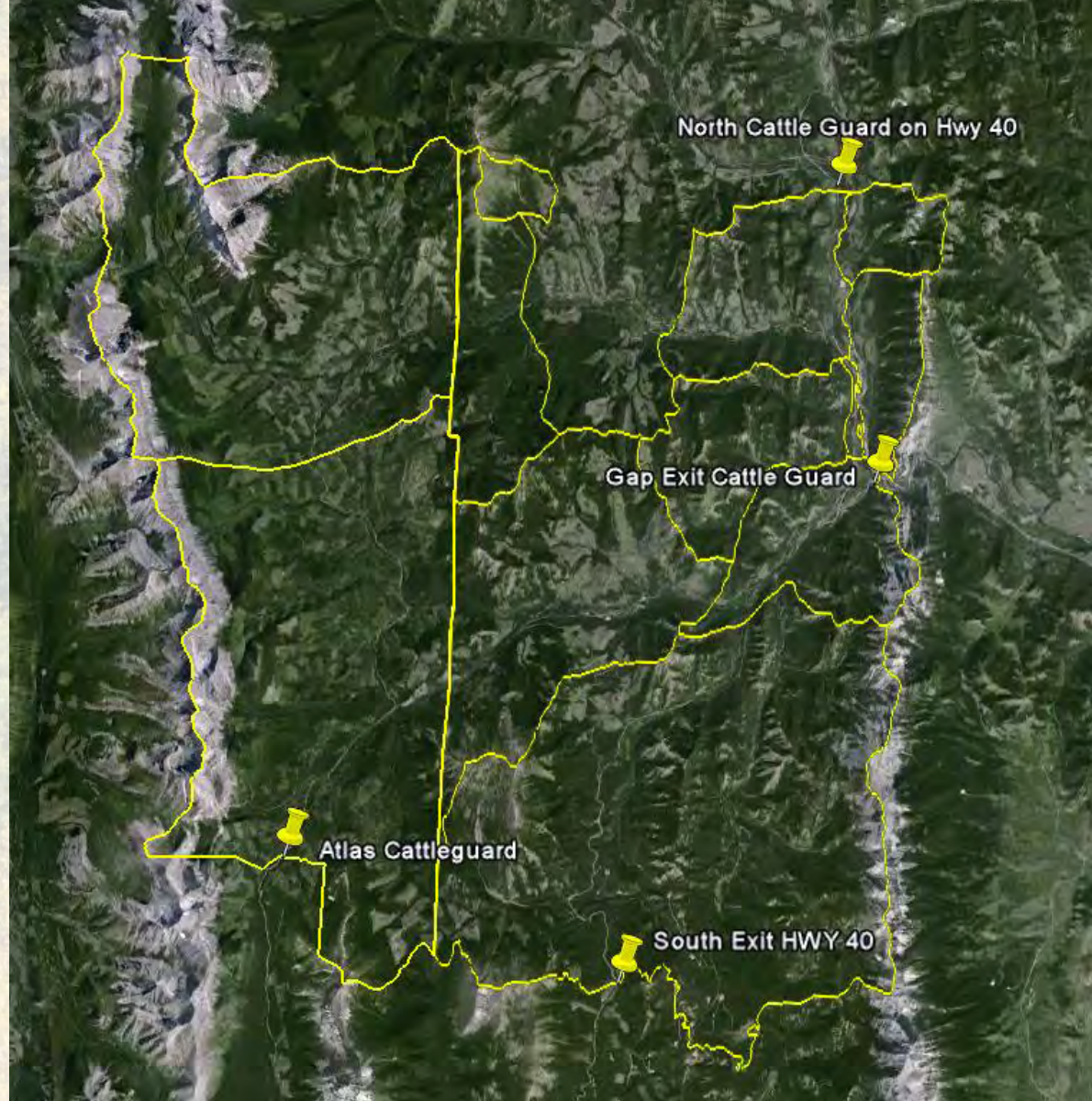


**North Fork
Grazing
Allotment**

**7 Miles
North
of
Coleman**

**12 X 14
Miles**

**Tag 1300
Animals**



Animals
Trailed into North Fork
Allotment





14 Miles across the valley looking west to BC border



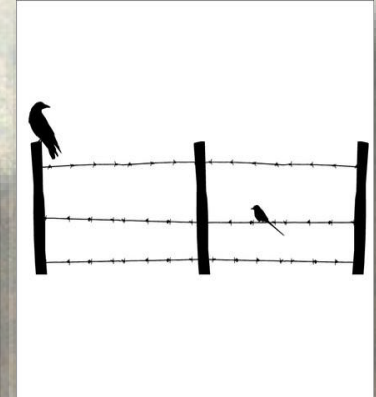
Capabilities

- **Identify the Locating of livestock**



Capabilities

- Identify the Locating of livestock
- Identify when
 - gates are left open
 - fences are down
 - animals are sick
 - there is predation
 - rustling



Future Developments

GPS ARFID tags

GPS tag readers

Improved Tag Readability

Increased Read Range

Location Accuracy

Producer Alerts



GPS ARFID Tag

- 900 MHz range
- Solar Powered
- Pings between 5-10 minutes
based on solar energy
- Position accuracy 15-30 Feet
- Weight 19.2 Grams – 2/3 oz.
- Dimensions – 2.95” X 1.57” X 0.59”
- Stores 20 positions locally and uploads on request



GPS ARFID reader

- RangeCOMPANION interface with Smart Phone
 - Read range 4.5 miles or 7.24 km
 - Dimension 4.63" X 3.35" X .59"
 - Weight – 3.33 oz
 - Micro USB is used for Recharging
 - Connectivity Bluetooth
 - Interface – Smart Phone or Tablet
 - Data stored locally on device
then uploaded to TagSmyth cloud
with a Wi-Fi connection





**Web based Interface with
PC, Smart Phone, and Tablet**

RangeLINK GPS AFRID receiver

- Stationary or Mobil Reader
- Connectivity – Wi-Fi or Bluetooth
- Receives the tag location
- uploads data to TagSmyth cloud or Smart Device
- Read range 15 miles – 24 km
- Power input 12 V @ 0.5 Amp
- 3.74" X 2.76" X 1.38"
- 3.42 oz



RangeLink
replaces 3
towers



Funding Sources

SAIT

Allflex

TagSmyth

Southfork

AF, CCIA, LIS

Traceability Growing Forward

Waldron, North Fork, Pole Haven Grazing Associations

Environment Sustainable Resources Development

Waterton Bio Sphere Ass. Carnivore Working Group

National Sciences & Engineering Research Council of Canada



Every Animal Counts with Real Time Animal Movement

Alberta Agriculture
and Forestry

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