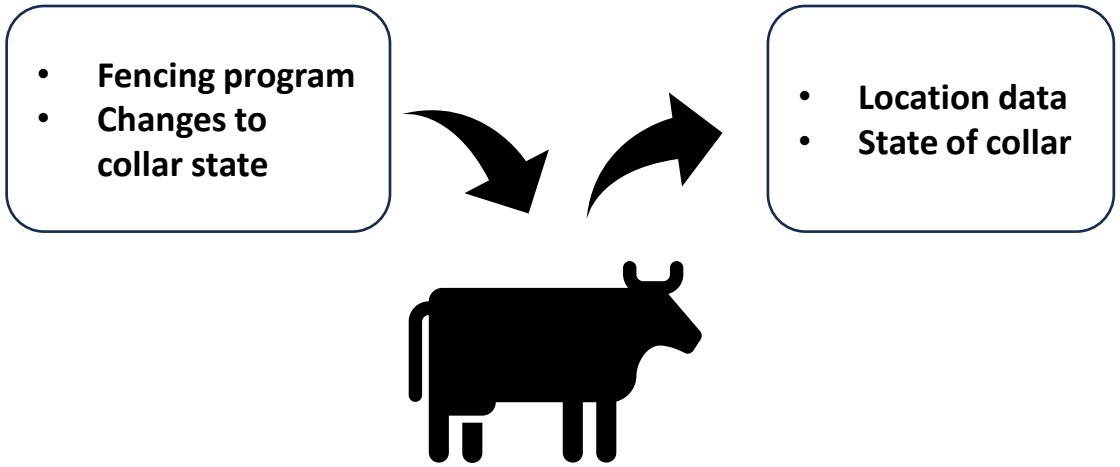
Understanding GPS, Coverage, and Why Base Station Optimization is Important

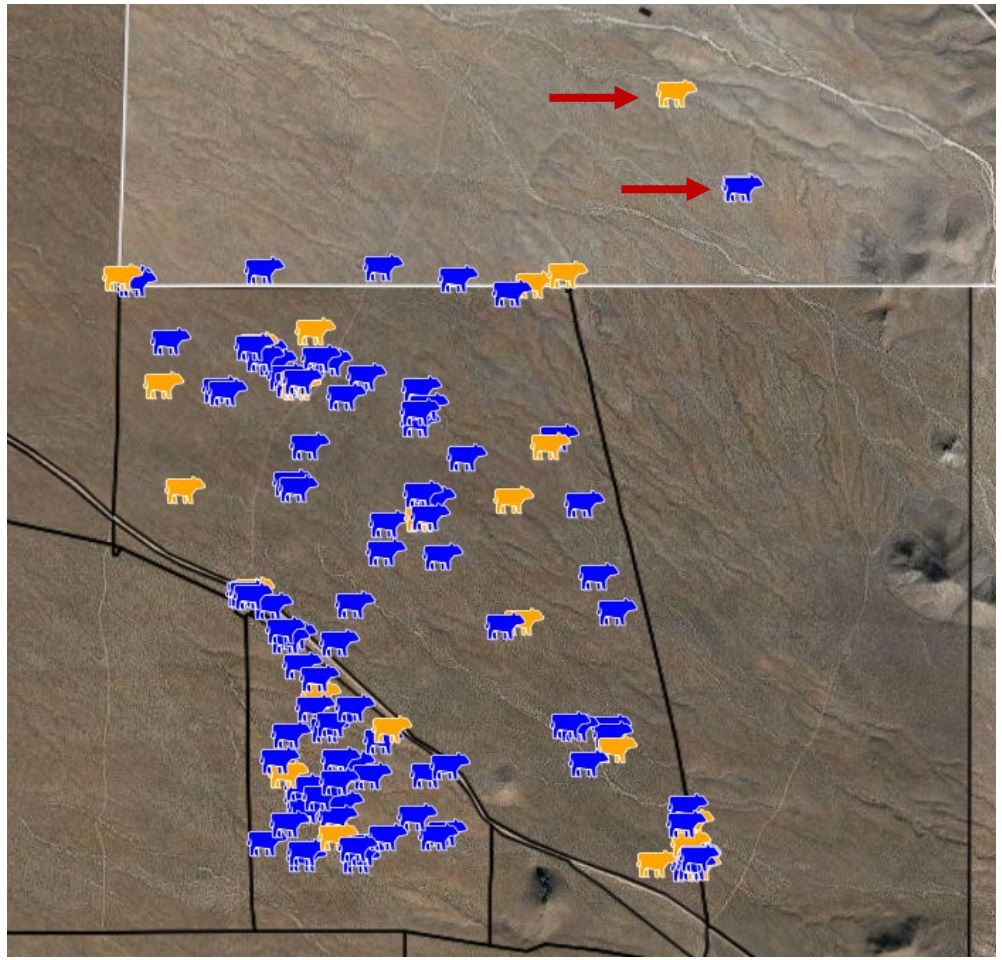
Interfacing with collars and coverage

Collars receive and relay information via a lora radio signal

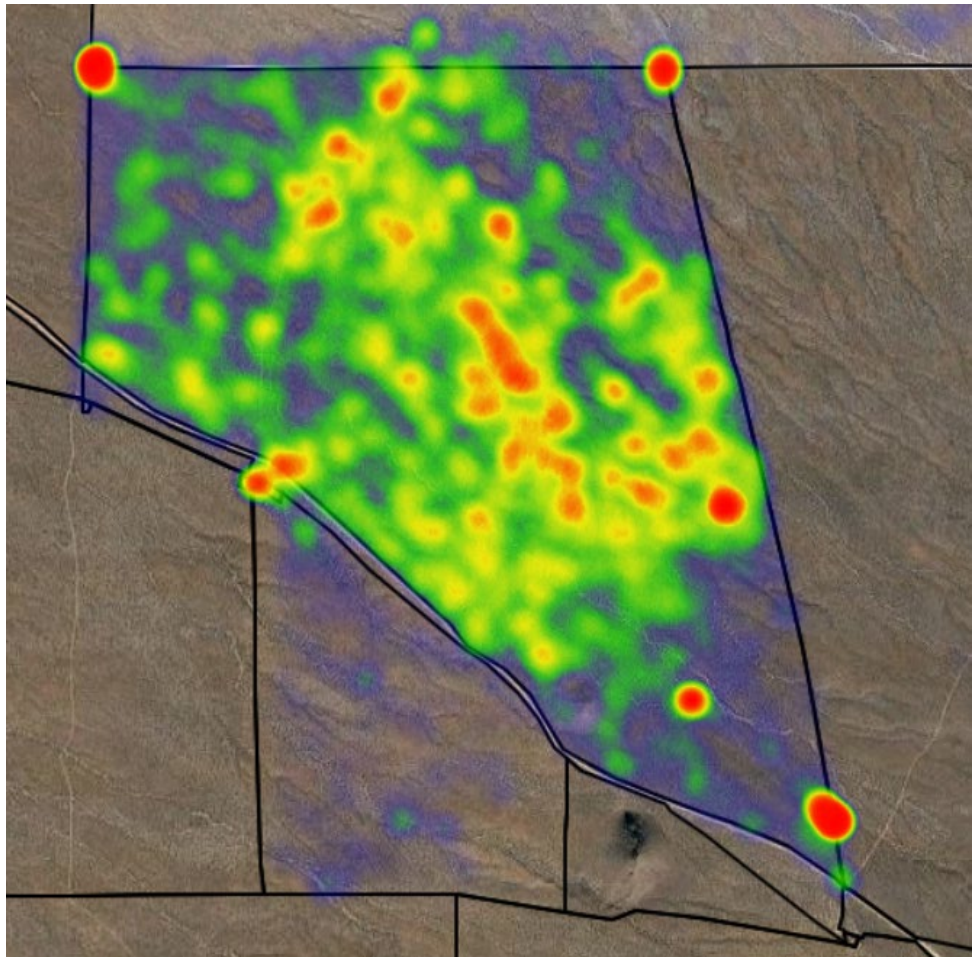
- Information such as location can be relayed to an online user interface such as HerdManager



Cattle locations

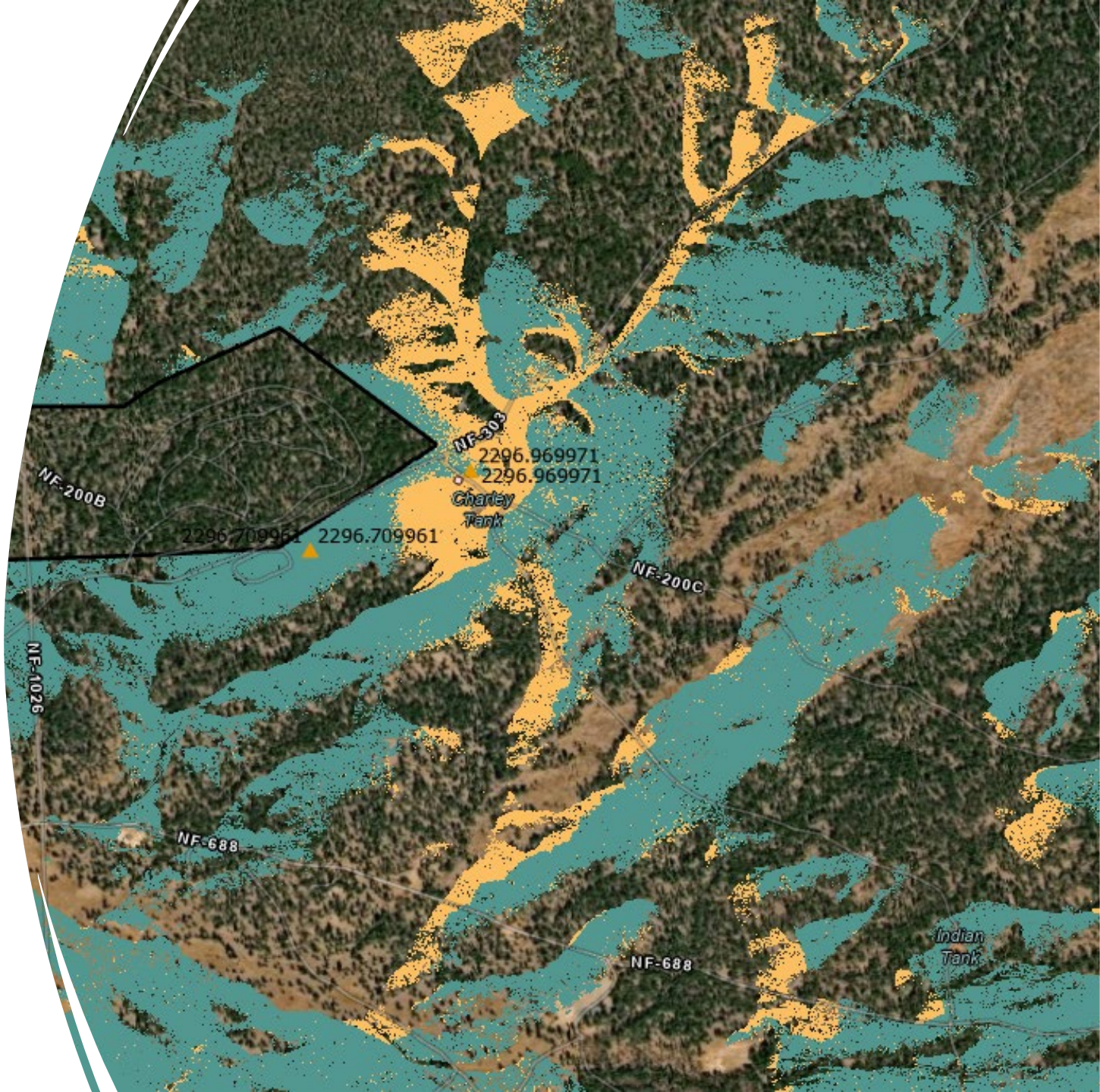


Heat maps of activity



Potential problems with this data and how its interpreted

- Lora allows us to manage areas with no cell service
- Coverage from lora is influenced by topography creating dead zones
- The data we receive, and its interpretation can be influenced by the coverage of the lora signal



Let’s check this out in real time

Misinterpretation stems poor lora coverage

This can affect interpretation in a few ways

1. Heatmaps of activity misleads where cattle truly occur
2. Animals' actual location are less reliable
3. Locating dropped collars are less informed

How do we handle this?

The best way to handle coverage issues is with optimal placement of the base station

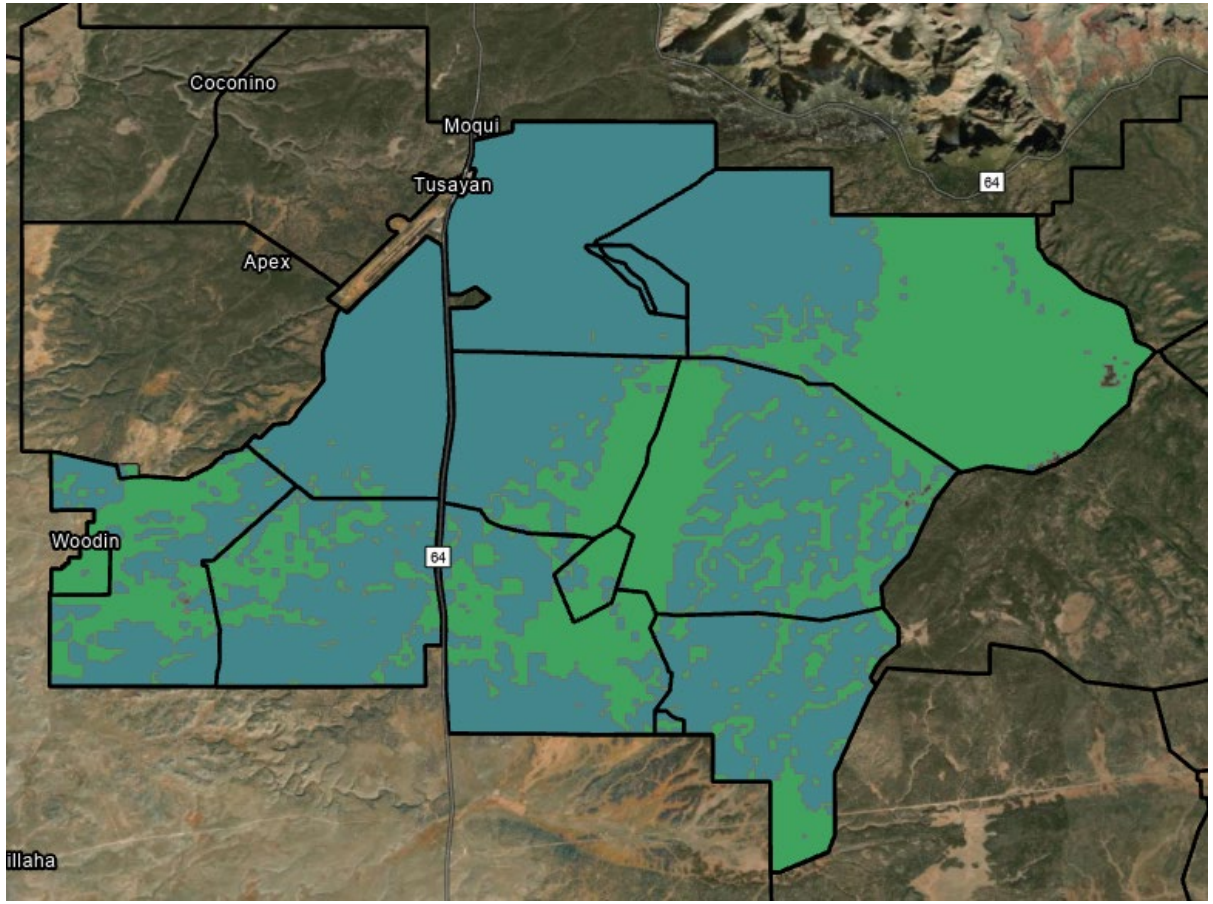
1. Optimal placement requires the user to **identify** a location that **maximizes** coverage for the desired area
2. Maximizing coverage provides the reassurance that animals last known locations are accurate and where dead zones may exist to either exclude or recognize that

Tackling this endeavor

1. Vence offers some support regarding base station placement
2. Limited to stationary placement

What you need to accomplish use this tool

- Federal Communication Commission (FCC) Mobile LTE Coverage Map
- This cellular coverage for Version and AT&T for Anita Allotment



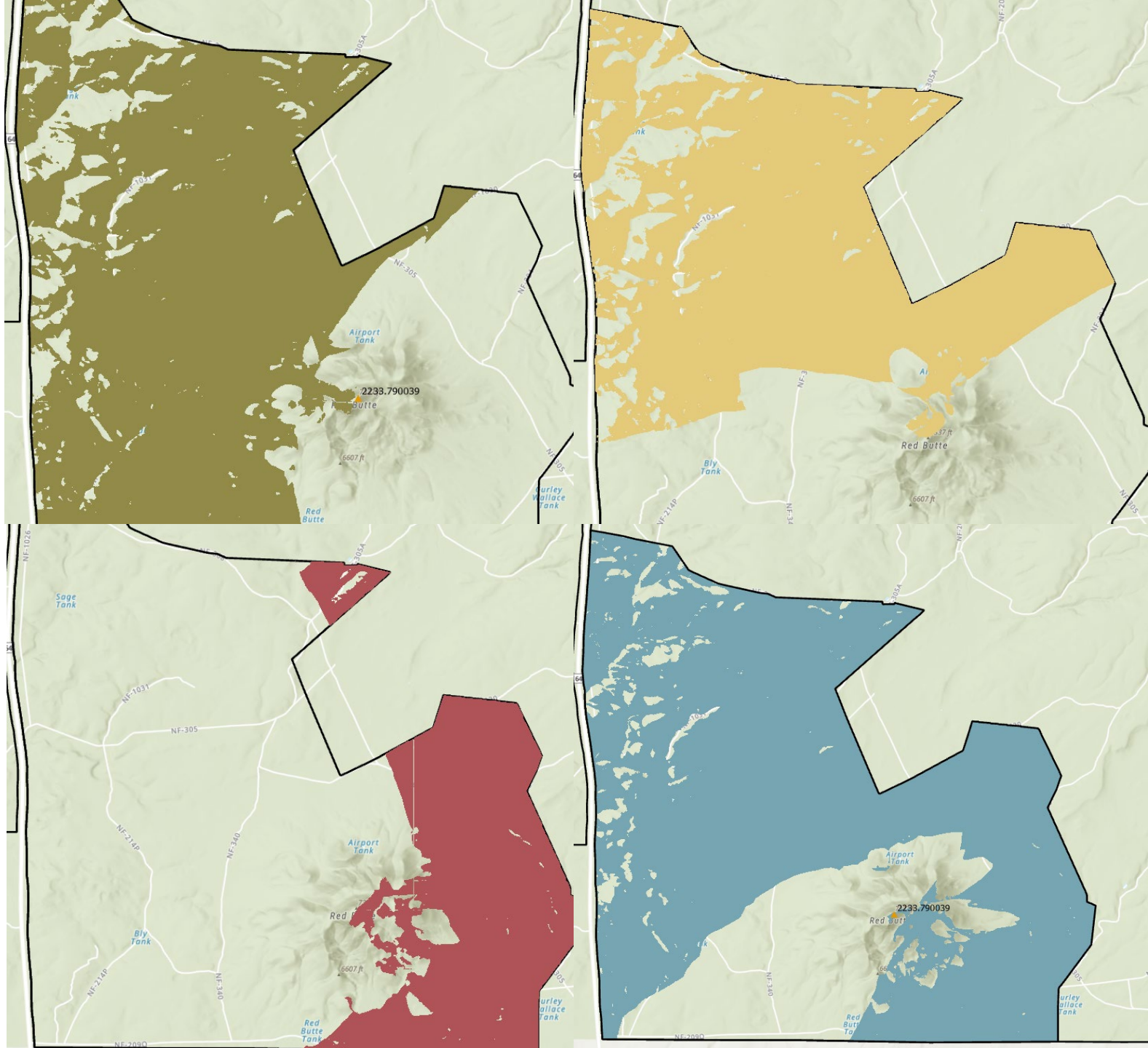
Digital Elevation Model (DEM)

opentopography.org

- 10m^2 accessible to the public for all Forest Service land
- Provides placement options and relates those locations to surrounding topography

Products from the optimization tool

- Area-wise, this tool optimally places the base station in a location that covers the majority of a pasture
- As an added bonus we know where dead zones are
- This leads to the next step
  - Placing base stations that cover for placement shortcomings



The University of Arizona

Virtual Fence Program

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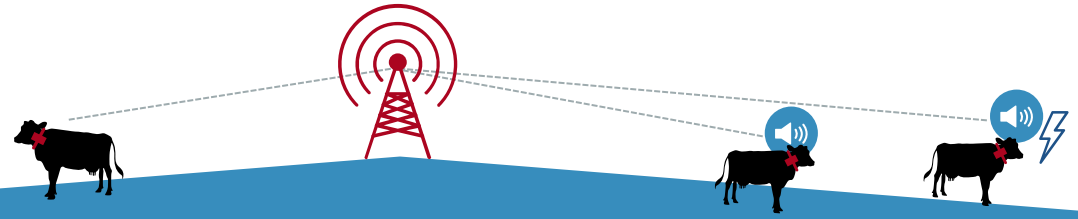

rangelandsgateway.org/virtual-fence