Of the days where the towers were set to collect data and monarchs were released with radio transmitters, the following data was collected and appears promising for location estimation.

Three files are included: 1. Power, 2. Tower, and 3. Monarch

1. Power\_MonarchswPromisingHits\_2019

This file contains the power readings from the towers at the times when monarch butterflies were being tracked that have hits on either 3 or more towers or has a lot of information from 1 or 2 towers. These are all the ones that show any potential from 2019.

Date – date of data collection

Time – GMT of detection

Antenna – antenna on tower

Power – RSSI (relative signal strength indicator)

Tower – 2019 = T1, T2, T3, T4, T5a, T5b, T6, T7, T8, T9

T5a and T5b are the same tower – this was the center of the 9-tower grid and had 6 antennae (1-3 on each ARU)

M\_ID – monarch ID

Year – listed to ensure that when looking at a monarch it is always a unique individual

1. TowerLocations\_MonarchswPromisingHits\_2019

This file contains the tower locations and antenna angles for each day of data collection. In 2019, these locations and angles can be used for every analysis, as we left the towers standing all summer

Date – date of data collection

Site – GM = 2019 field site

Tower – 2019 = T1, T2, T3, T4, T5a, T5b, T6, T7, T8, T9

T5a and T5b are the same tower – this was the center of the 9-tower grid and had 6 antennae (1-3 on each ARU)

T\_Northing – northing UTM of tower

T\_Easting – easting UTM of tower

Antenna – antenna number; tower 5 has ARU 5a and 5b each with only towers 1, 2, and 3 connected

EstAntAz – direction the antenna is pointing. Taken by standing behind the antenna and taking a compass bearing

T\_Long – tower longitude

T\_Lat – tower latitude

1. TrueMonarchLocationTime\_MonarchswPromingHits\_2019

This file contains locations where we know the monarch was sitting during the observation period and an estimated time. The time is not necessarily accurate for what the towers may estimate

M\_ID – monarch ID

Date – date of data collection

PointID – order from the trimble of collected point

Northing – monarch northing UTM

Easting – monarch easting UTM

ApproximateTime – a time from my notes where the monarch was likely sitting still in this spot – does not indicate duration of staying there