**2017 BACA Monitoring Protocol**

We will map all clusters (7 pads/cluster) or individual pads, from every year and population, using ArcGIS Collector on Samsung Tablets. We have planted over 1300 cactus clusters between 2012 and 2017 (2012-2013 plantings were all planted as individual pads). We will record planting data (year, location, protection method, tag number) as well as a health index for the cluster or pad (below). We will take a health index for the first two years following planting. We will then randomly sample 10 clusters per treatment group (population x planting year), and monitor them for secondary and/or tertiary growth, area, and health. All clusters will be watered on a monthly basis throughout the summer (May-September).

Data to be collected for all clusters:

Date

Inspector

Year planted

Protection method

Tag number

Health index (1-5) -- first two years

Data to be collected for random sample clusters (seven years following planting):

Date

Inspector

Year planted

Protection method

Tag number

Health index (1-5)

# of secondary pads

# of tertiary pads

# of quaternary pads

Cluster length (cm)

Cluster width (cm)

Notes

Note: Cluster width and height will be collected to calculate ground cover area.

The overall health of BACA clusters will be rated using the following health index. All pad types (primary, secondary, tertiary, etc.) will be taken into account.

**1- Very poor.** Most if not all pads are dead and/or missing (0-20% alive).

**2- Poor.** Significant rot on all or most pads, many missing and/or dead (20-40% alive).

**3- Fair.** Roughly half alive & healthy. Rot and sun scalding on most pads (40-60% alive).

**4- Good.** Most pads alive and in healthy condition. Some rot and/or sun scalding on most pads (60-80% alive).

**5- Excellent.** Most or all pads alive & healthy. May have minimal rot, biting, and sun scalding (80-100% alive).