



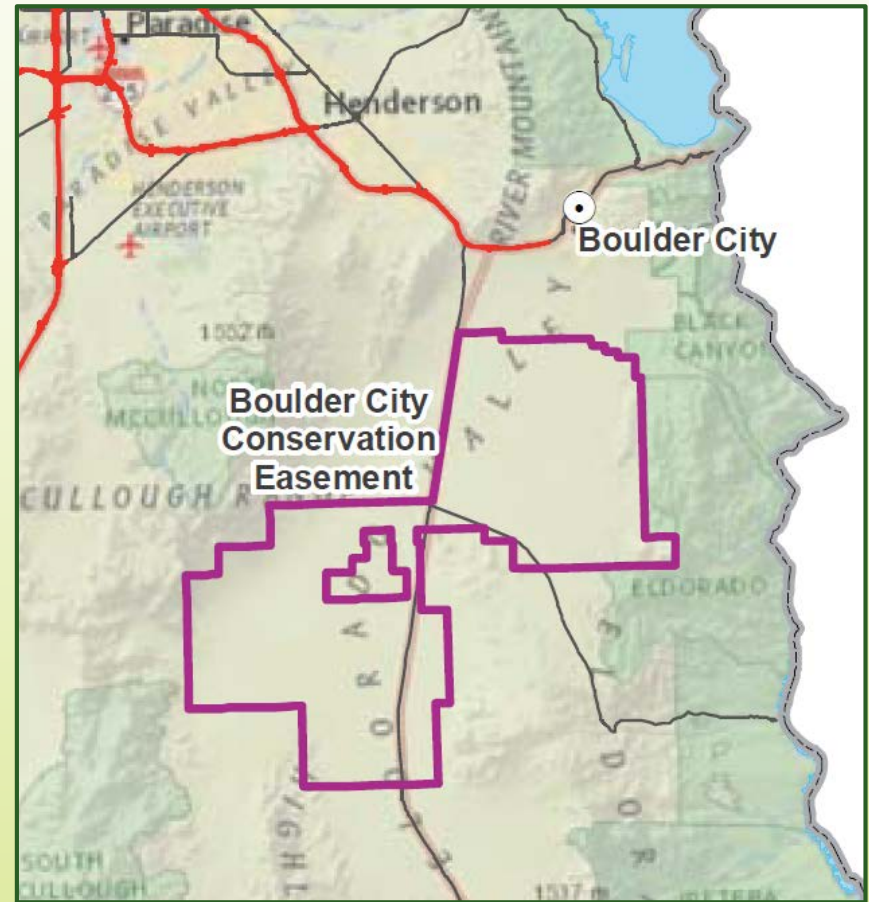
SMALL MAMMALS OF THE BOULDER CITY CONSERVATION EASEMENT 2017-BEC-1730M

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Background and Need

Boulder City Conservation Easement

- Located southwest of Boulder City in Eldorado Valley
- Approximately 86,540 acres
- >90% Mojave Desert scrub association
- Readily accessible to the public
- Limited use area
- Solar energy zone imbedded
- Transmission, substations, switch yard, roads bisecting area



From the 2015 Boulder City Conservation Easement Management Plan

Background and Need

Clark County acquired the Boulder City Conservation Easement in 1995 as a permit condition

Purpose

“...ensure that the property is retained in a natural condition, and to prevent any uses that will impair the conservation, protection, restoration and enhancement of the natural resource values, especially those values associated with habitat for the desert tortoise and other indigenous flora and fauna.”



Background and Need

The Small Mammal Community – Important Roles

- Most important group in deserts in terms of numbers
- Food web - Nutrient cycle
- Soil aeration, turnover, mixing
- Burrows provide shelter for other species
- Seed distribution
- Can be an indicator of ecosystem health

Effective Conservation/Management Needs Information

- Who you have
 - Species, Community
- How many
 - Density, Relative Abundance
- Where
 - Distribution, Habitat affinity
- Goals and Objectives
 - Characterization
 - Monitoring – General status, Stressor-specific



History

2018 Small Mammal Study Initiated the Process

- Transect locations randomly-selected
- 22 transects; 15 single-trap stations
- Successfully captured 22 individuals
- Trapped 4 species; Captured 1 on camera

Long-tailed pocket mouse

Chaetodipus formosus

Desert kangaroo rat

Dipodomys deserti

Bushy-tailed woodrat

Neotoma lepida

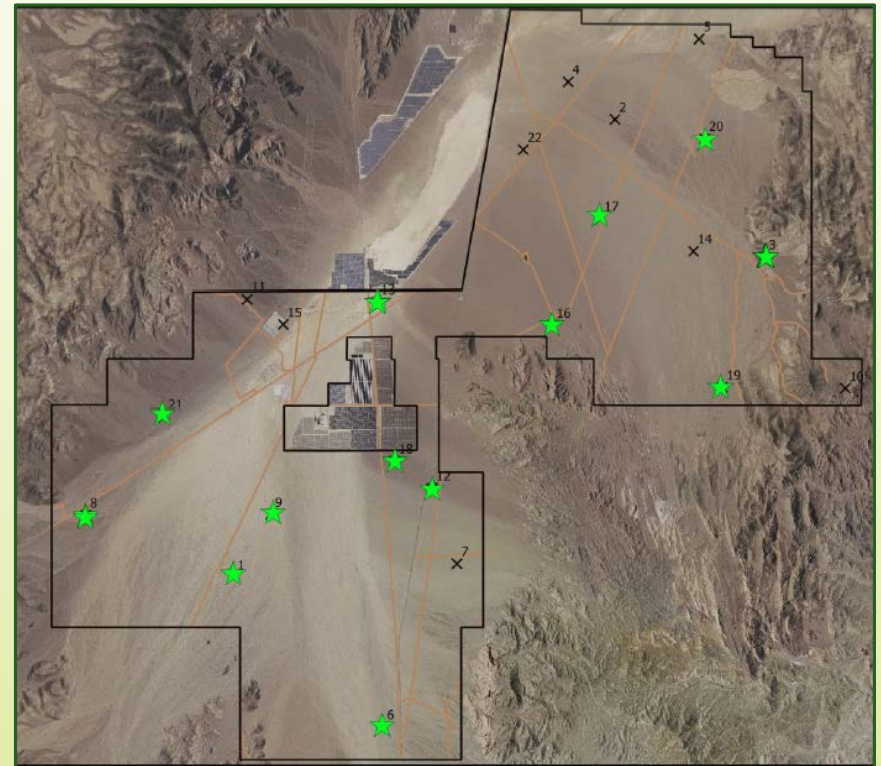
Cactus mouse

Peromyscus erimicus

Round-tailed ground squirrel

Spermophilus tereticaudus

- Captured other mammals on camera



2019 Study Goal, Objectives, Approach

Goal

Augment and Verify the 2018 Study Results

Objectives

Generate a species list of small mammals in the BCCE

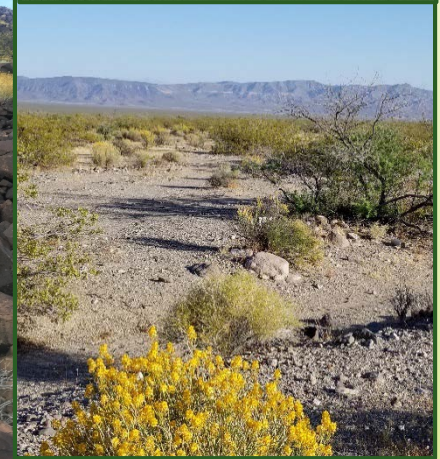
Find *Evaluation Species* if they are present

Approach

Develop List of Target Species

Identify Target Habitats/Locations

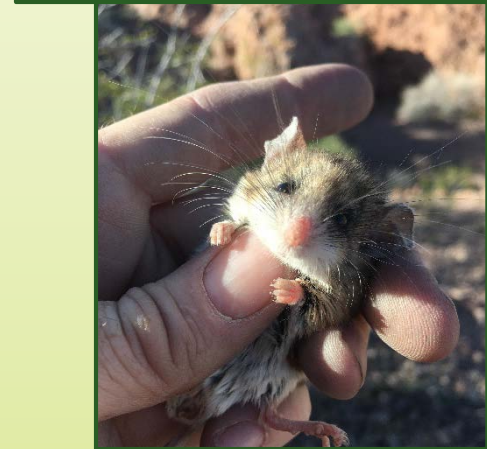
Use readily-accepted, repeatable trapping protocols



Targeted Species

Based on

- Review of Museum Records of previously captured species in the BCCE, Eldorado Valley, adjacent areas
- Findings of 2018 Study
- DCP Documents (Species Accounts, Project Reports, BCCE Management Plans)
- Review of key literature (Hall, and others)
- Professional judgement of our lead mammalogist



Categories of species

- Likely to be Present
- Potentially Present
- Not Likely to be Present

Targeted Species List

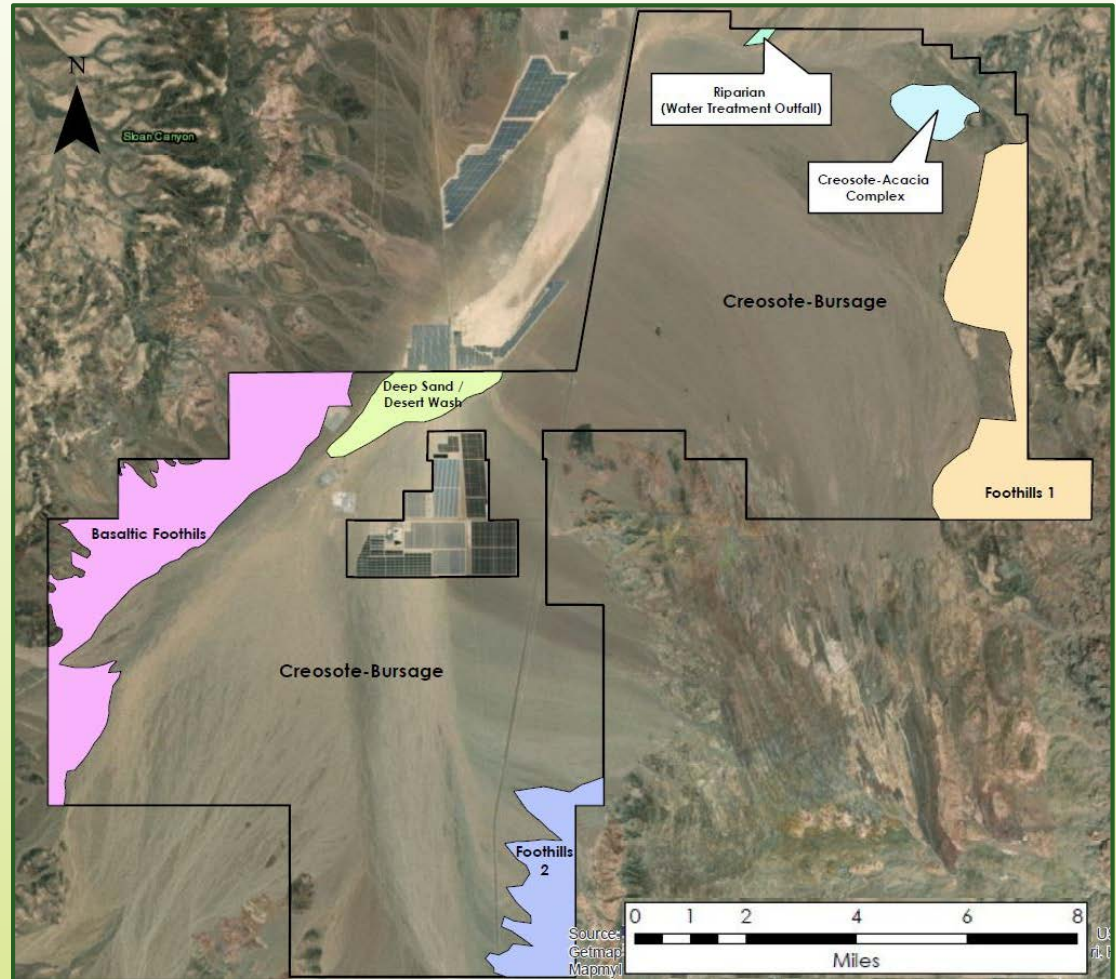
Scientific Name	Common Name
Known or Likely to Occur in BCCE	
<i>Ammospermophilus leucurus</i>	White-tailed antelope ground squirrel
<i>Chaetodipus formosus</i>	Long-tailed pocket mouse
<i>Chaetodipus penicillatus</i> ^a	Desert pocket mouse
<i>Dipodomys merriami</i>	Merriam's kangaroo rat
<i>Neotoma lepida</i>	Desert woodrat
<i>Perognathus longimembris</i>	Little pocket mouse
<i>Peromyscus eremicus</i>	Cactus mouse
<i>Peromyscus maniculatus</i>	Deer mouse
<i>Xerospermophilus tereticaudus</i> ^b	Round-tailed ground squirrel
Potentially but not likely to be present; low abundance if present	
<i>Dipodomys deserti</i> ^a	Desert kangaroo rat
<i>Onychomys torridus</i>	Southern grasshopper mouse
<i>Peromyscus crinitus</i>	Canyon mouse
<i>Reithrodontomys megalotis</i>	Western harvest mouse
<i>Thomomys bottae</i>	Botta's pocket gopher
Unlikely to be present - habitat requirements or geographic range	
<i>Dipodomys panamintinus</i>	Panamint kangaroo rat
<i>Mus musculus</i>	House mouse
<i>Peromyscus boylii</i>	Brush mouse
<i>Peromyscus truei</i>	Pinyon mouse
<i>Rattus rattus / Rattus norvegicus</i>	Roof rat/Norway rat
^a Included based on summary of small mammals present in the BCCE in previous BCCE Management Plans	
^b Included based on results of the 2018 survey	

Targeted Habitats/Locations

2019 targeted isolated/unique habitats

Reviewed

- Mapped soils, vegetation, topography
- Imagery (satellite, aerial photography)
- Previous Study trapping locations



Targeted Habitats/Locations

2019 targeted isolated/unique habitats

Observed/Adjusted

- Observed habitats in the field
- Adjusted/revised targeted locations
- Identified new locations



Methods

Trapping Protocol

- Multiple transects per location/habitat (3-6)
- Transects included target and adjacent habitat
- Trapped 2-3 nights/week to distribute trapping effort throughout the spring
- Trapped a location successive nights, but abandoned with high trap success
- Traps set each evening
- Transect location recorded by GPS
- Set 10-30 trap stations per transect
- 2 Sherman collapsible livetraps per station
- Baited with a rolled oats/peanut butter mix



Methods

Trapping Protocol (continued)

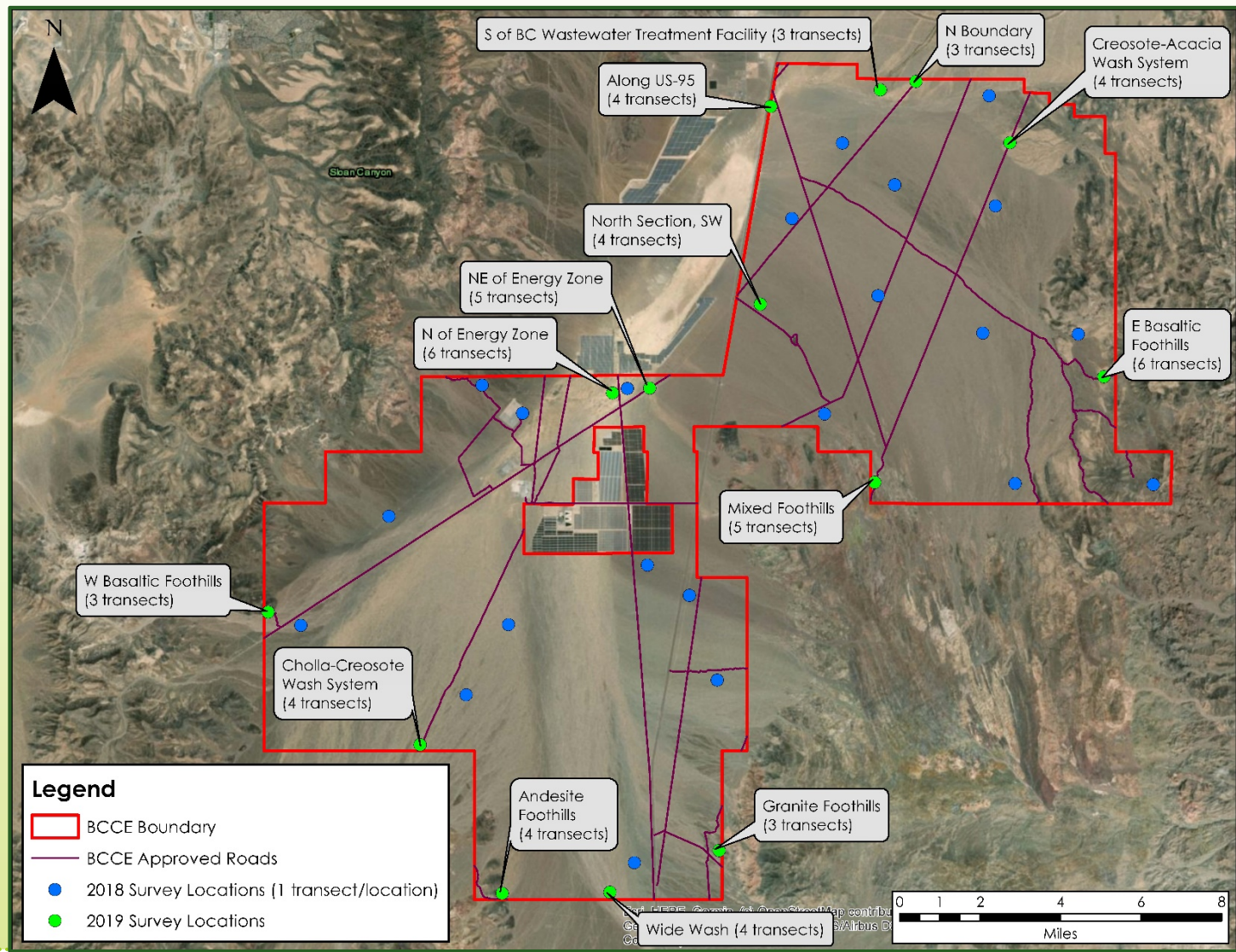
- Traps checked each morning
- Documented temperature
- Recorded trap as Open, Closed, Successful
- Animals evaluated for Species, Sex, Condition
- Collected 1-2 museum specimens per species

Data Management

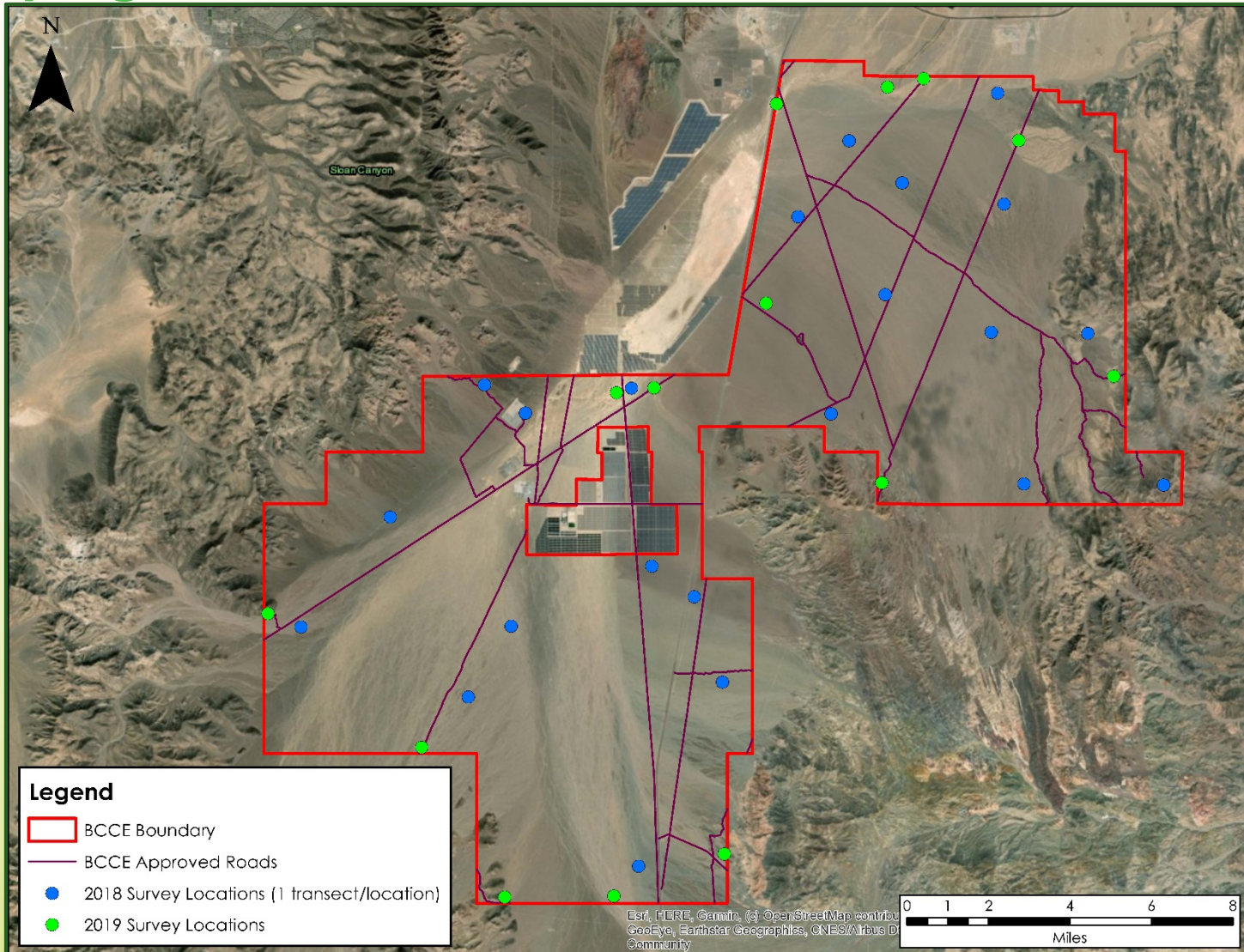
- Data recorded on forms
- Entered into GeoDatabase, QC reviewed



Trapping Locations



Trapping Locations



Results

- Trapped March 27 through May 30, 2019
- 16 trapping events (nights)
- 14 trapping locations
- 58 transects
- 2,240 trap nights
- Captured 152 individuals
- Captured 9 species
- No mortalities



Results

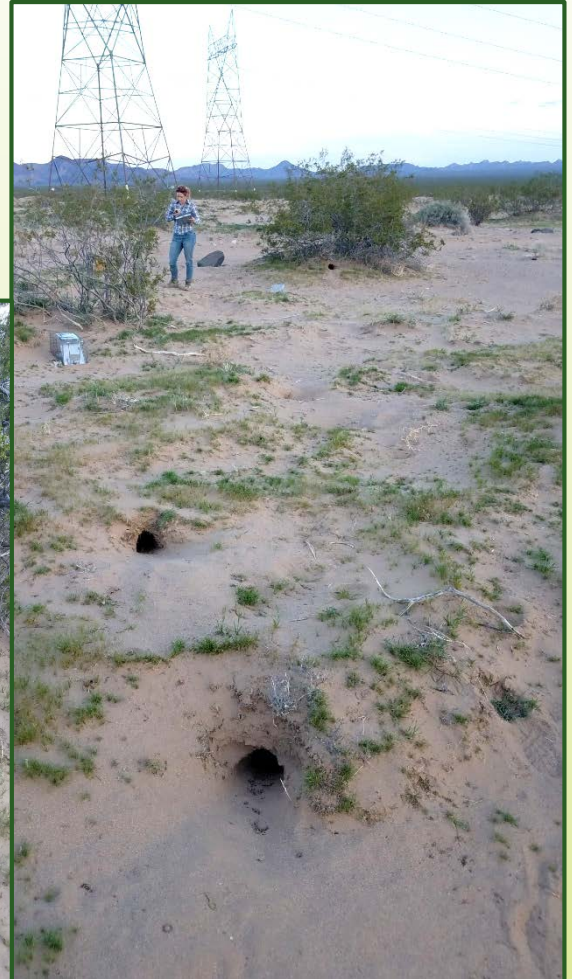
Scientific Name	Common Name	Number
Known or Likely to Occur in BCCE		
<i>Ammospermophilus leucurus</i>	White-tailed antelope ground squirrel	3
<i>Chaetodipus formosus</i>	Long-tailed pocket mouse	30
<i>Chaetodipus penicillatus</i>	Desert pocket mouse	
<i>Dipodomys merriami</i>	Merriam's kangaroo rat	47
<i>Neotoma lepida</i>	Desert woodrat	8
<i>Perognathus longimembris</i>	Little pocket mouse	26
<i>Peromyscus eremicus</i>	Cactus mouse	18
<i>Peromyscus maniculatus</i>	Deer mouse	
<i>Xerospermophilus tereticaudus</i> ^b	Round tailed ground squirrel	
Potentially but not likely to be present; low abundance if present		
<i>Dipodomys deserti</i>	Desert kangaroo rat	2
<i>Onychomys torridus</i>	Southern grasshopper mouse	1
<i>Peromyscus crinitus</i>	Canyon mouse	17
<i>Reithrodontomys megalotis</i>	Western harvest mouse	
<i>Thomomys bottae</i>	Botta's pocket gopher	
Unlikely to be present - habitat requirements or geographic range		
<i>Dipodomys panamintinus</i>	Panamint kangaroo rat	
<i>Mus musculus</i>	House mouse	
<i>Peromyscus boylii</i>	Brush mouse	
<i>Peromyscus truei</i>	Pinyon mouse	
<i>Rattus rattus</i> / <i>Rattus norvegicus</i>	Roof rat/Norway rat	



Evaluation Species

Desert Kangaroo Rat (*Dipodomys deserti*)

- Not proposed for coverage in the permit modification
- Were captured on the northern edge of the BCCE
- Habitat is not abundant in that area but extends north
- May be present elsewhere in Eldorado Valley



Evaluation Species

Desert Pocket Mouse (*Chaetodipus penicillatus*)

- Proposed for coverage in the upcoming permit modification
- BCCE Management Plans
 - 2009 stated pocket mice are abundant in the BCCE
 - Later documents state desert pocket mice are abundant
- Habitat Suitability Index and associated map show low-moderate suitability
- In Nevada, the species is associated with relatively dense shrubs in flat sandy wash bottoms contiguous with the Colorado River and tributaries
- Dry lake edges are salt desert scrub and may be somewhat suitable (except for water), but not well represented within the BCCE

Recommendations for Future Efforts

Community Ecology/Monitoring Plans

- Ecology studies are beneficial if tied to conservation objectives
- Develop specific monitoring questions/goals
- Develop targeted plans to address those questions/goals

Desert Pocket Mouse

- Are they in Eldorado Valley outside the BCCE?
- What is their distribution in southern Nevada?
- What is limiting their distribution?
- Are they at risk from....?

Desert Kangaroo Rat

- Are they elsewhere in the BCCE? In Eldorado Valley?

Panamint Kangaroo Rat (*Dipodomys panamintinus*)

- What is the actual distribution of the species in the County?

Thank You



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