

Historical and Current Assessment of Six Covered and Three Evaluation Bird Species

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On behalf of Lead Agency:

Lake Mead National Recreation Area



1. Public Lands Institute & School of Life Sciences, UNLV
2. Resource Management, Lake Mead National Recreation Area, NPS

Project Need and Objectives

Needs

- Insufficient information for bird species in Clark County
- Provide data to assess status of targeted species

Goals

- Conduct Intensive area surveys (completed in 2009)
- Compile historical observations, and conduct surveys and assessments
- Create habitat models



Targeted Species

- Arizona Bell's Vireo
- Blue Grosbeak
- Bendire's Thrasher
- Gray Vireo
- Le Conte's Thrasher
- Phainopepla
- Summer Tanager
- SW Willow Flycatcher
- Vermillion Flycatcher



Compiled and Reviewed Historical Observations (Historical Observation Mining)

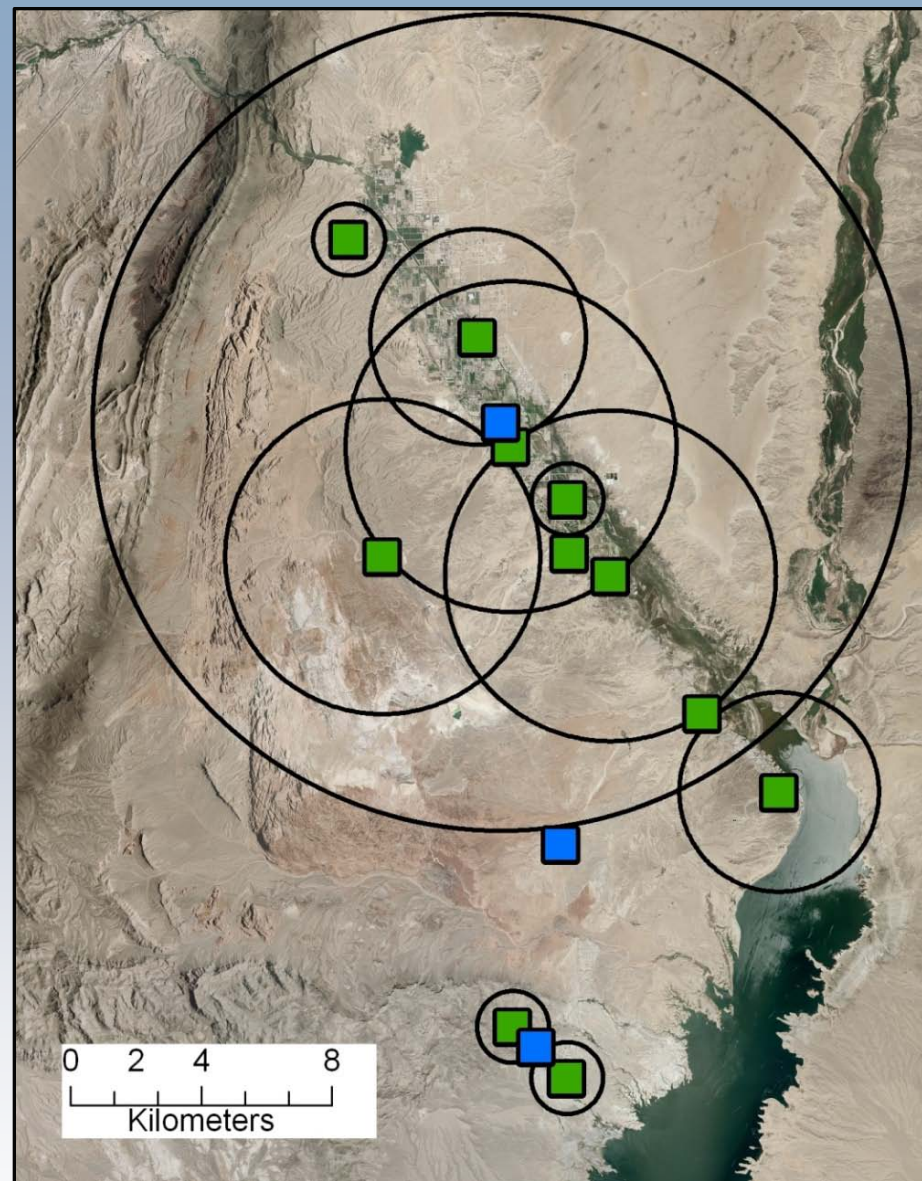
- Researched taxonomic history using ITIS
- ~ 75 different sources (museums, databases, agency records, and publications)
- Selected all data but focused our historical assessments on pre-1994 observations.
- Filtered results for eligible records, and removed duplicate observations
- Georeferenced and estimated error for each observations

214 Total Observations within Clark County for the 9 species

60 records discarded:

- Error buffer > 6km
- Observation within error margin of another observation

- Georeferenced observation surveyed
- Georeferenced observation not surveyed
- Error buffer for the georeferenced observation



Example of georeferenced observations and associated error buffer

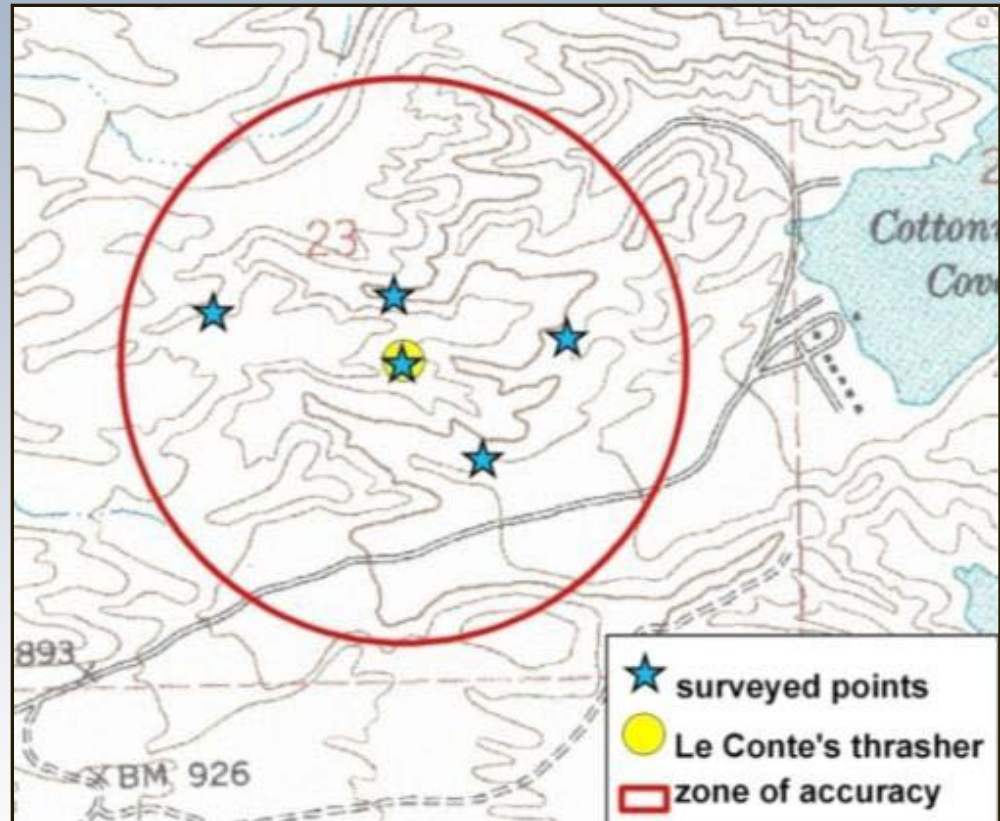
Summary of Historical (pre-1994) Observations in Clark County

- Arizona Bell's Vireo: 10
- Blue Grosbeak: 12
- Bendire's Thrasher: 6
- Gray Vireo: 14
- Le Conte's Thrasher: 26
- Phainopepla: 53
- Summer Tanager: 9
- SW Willow Flycatcher: 9
- Vermillion Flycatcher: 15
- **Total 154**



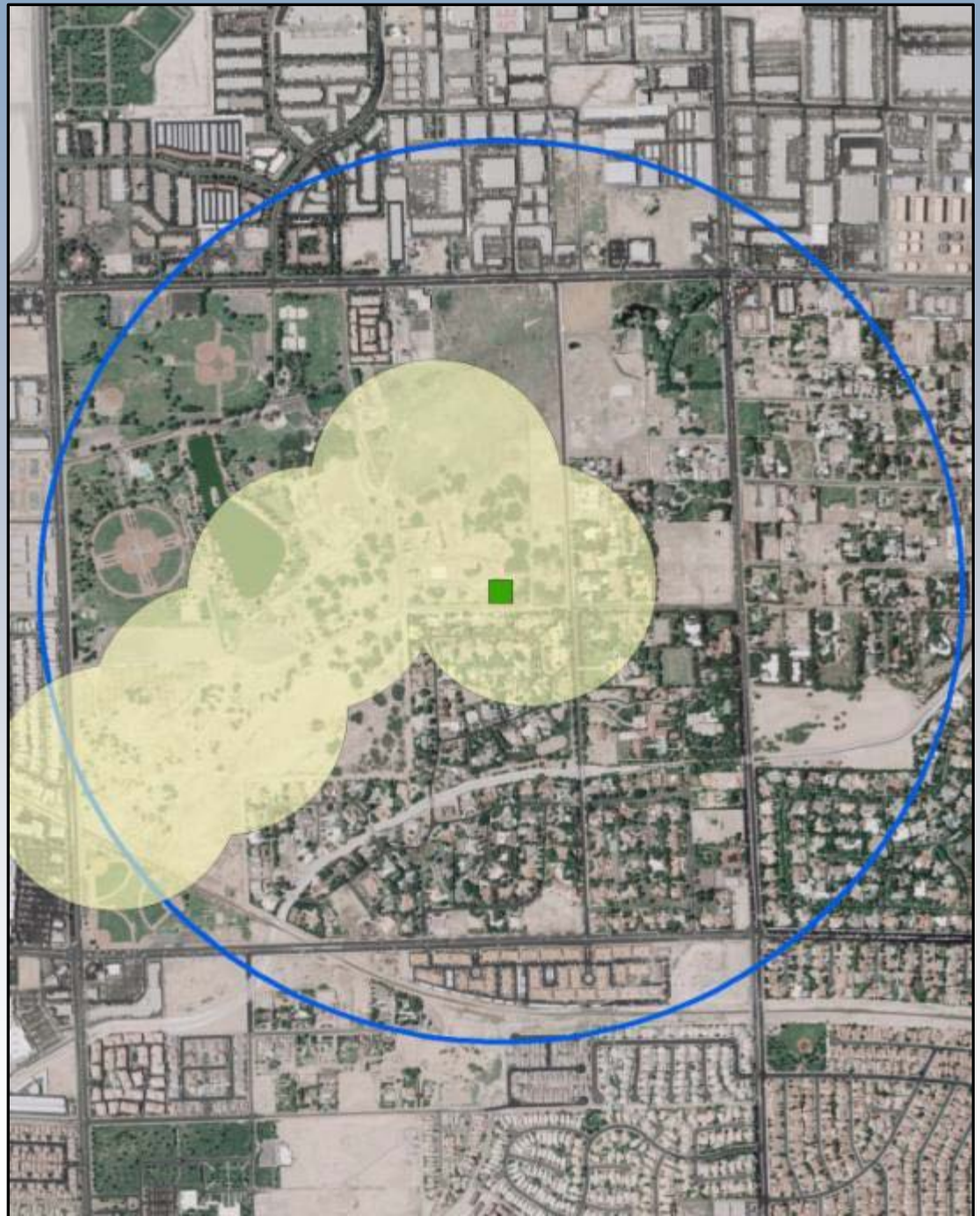
Field Survey Approach

- Surveys conducted within 1km of georeferenced historic observation
- Species specific call-broadcast every 150 to 300m at ~ 5 points within buffer
- Calls of target species played twice for 30 seconds with 1 minute break



Phainopepla

- Survey Area 1.8km
- Error Buffer 1100m
- Presence



Habitat Assessment

Habitat conditions assessed at each site

Data collected in three main categories:

- Vegetation/habitat categories & dominant plant species
- Presence of species-specific indicators (e.g. mistletoe for Phainopepla)
- Qualitative indicators of human disturbance (i.e. presence of a road, buildings)



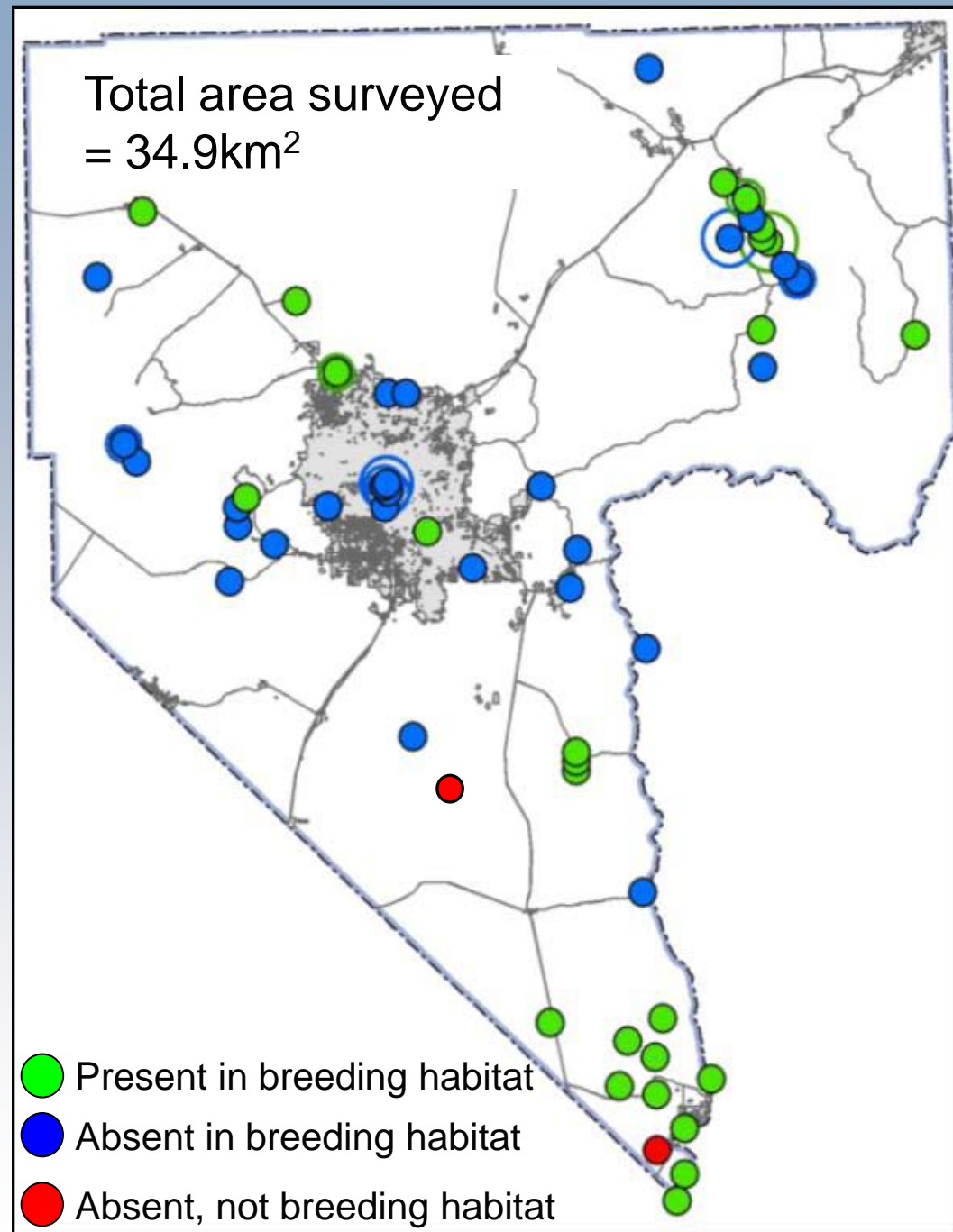
Phainopepla 53 sites

25 Present

- All had Mistletoe
- 16 disturbed or heavily disturbed
- 4 moderately disturbed
- 5 limited or no disturbance

28 Absent

- 17 disturbed or heavily disturbed
- 3 moderately disturbed
- 8 limited disturbance



Bendire's Thrasher

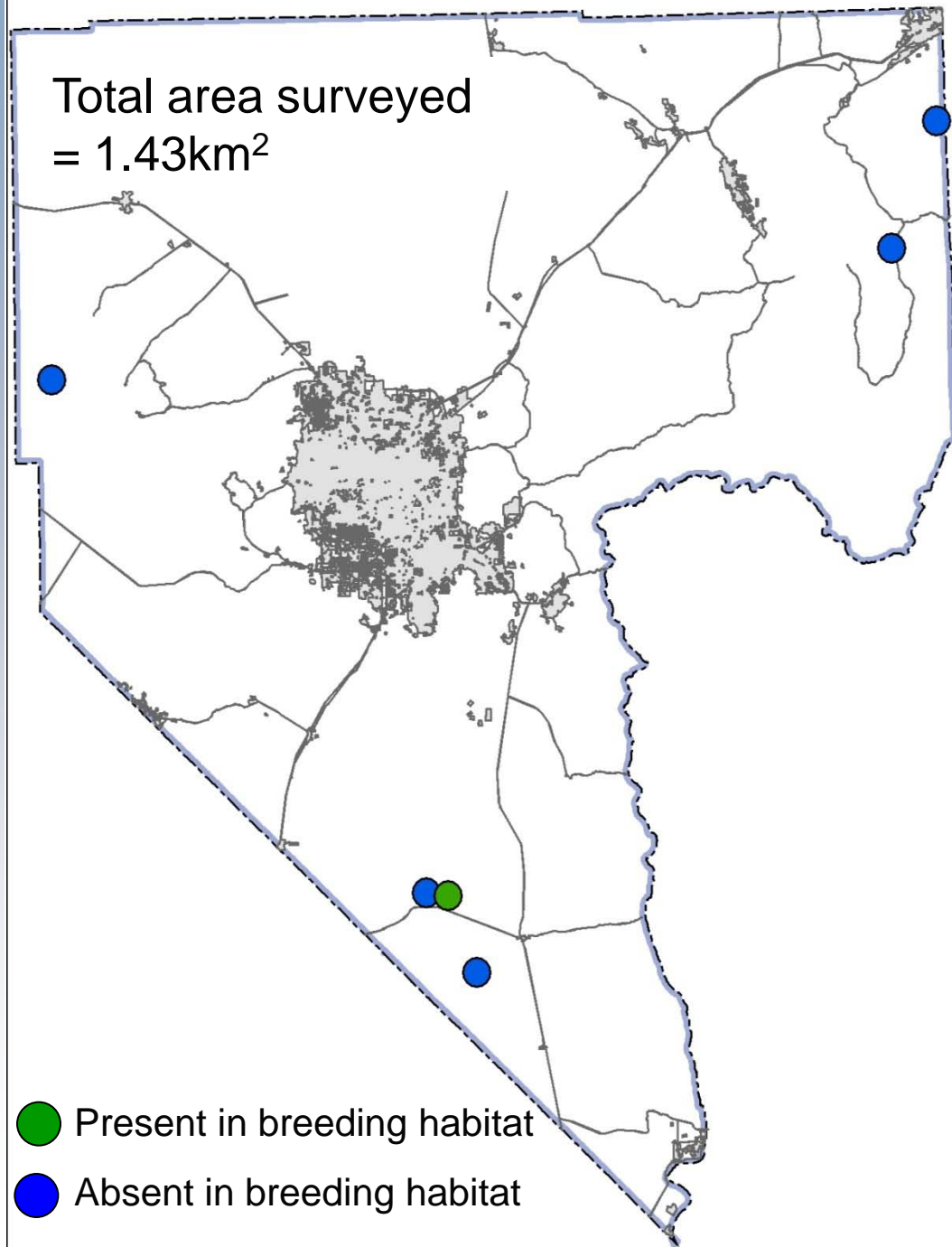
6 sites

1 Present

- Limited or no disturbance

5 Absent

- 4 limited disturbance
- 1 moderate disturbance



Gray Vireo

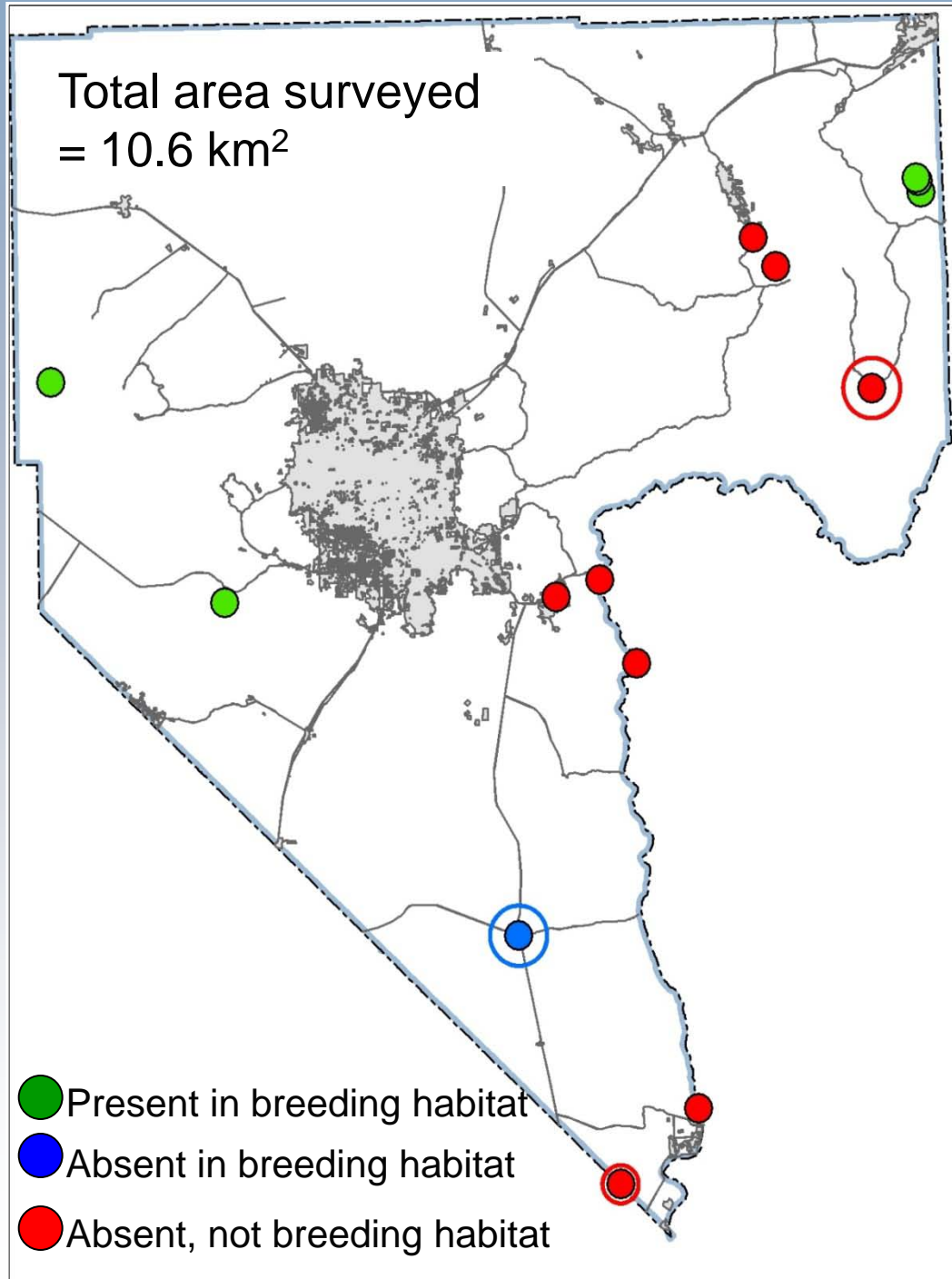
14 sites

5 Present

- 5 limited or no disturbance

9 Absent

- 7 sites areas not considered breeding habitat (eg. creosote/bursage)
- 2 highly disturbed



Blue Grosbeak

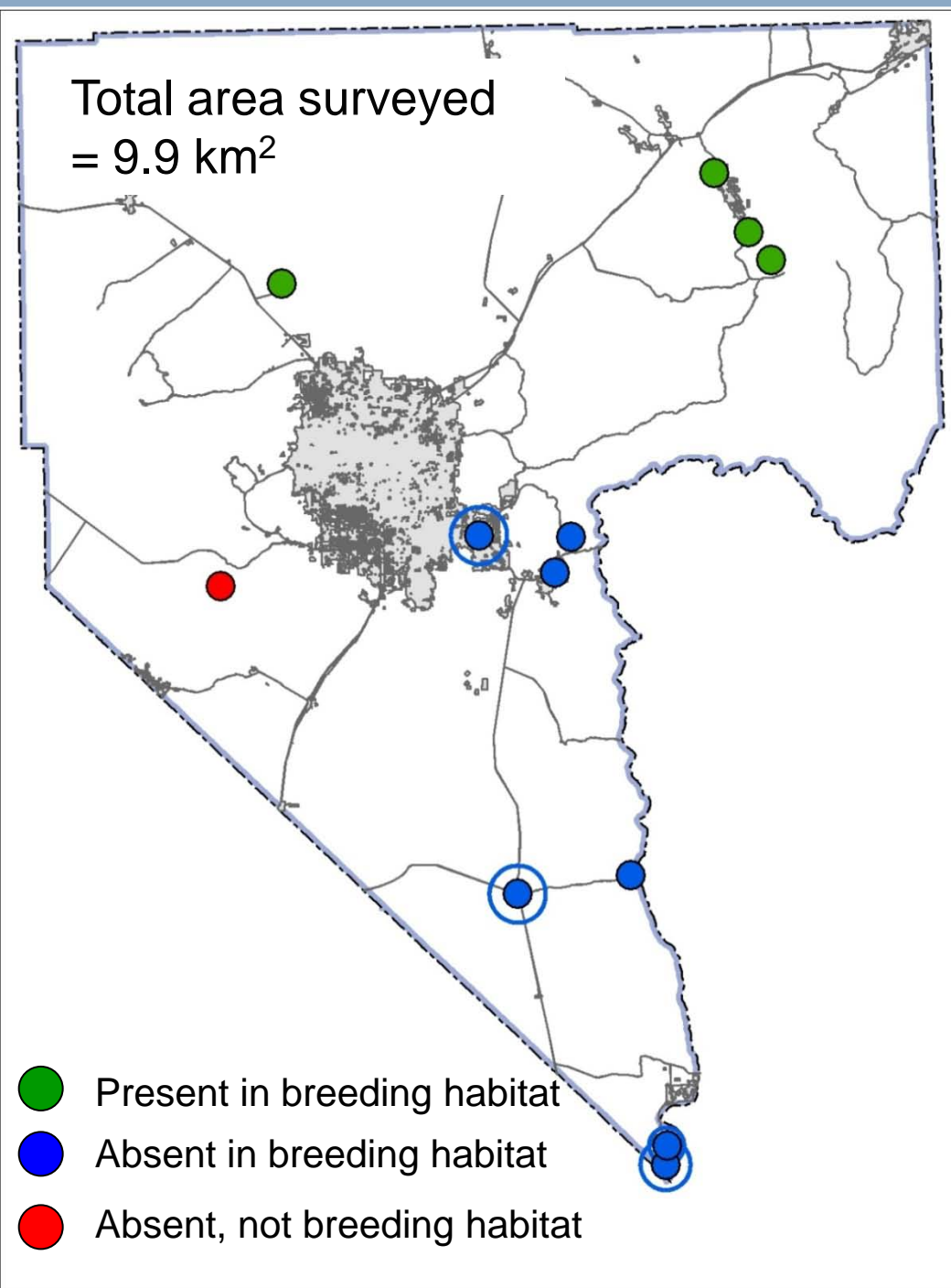
12 sites

4 Present (3 likely sites visited twice each)

- 3 disturbed
- 1 limited disturbance

8 Absent

- 7 disturbed or heavily disturbed
- 1 no or light disturbance (not breeding habitat)



Bell's Vireo

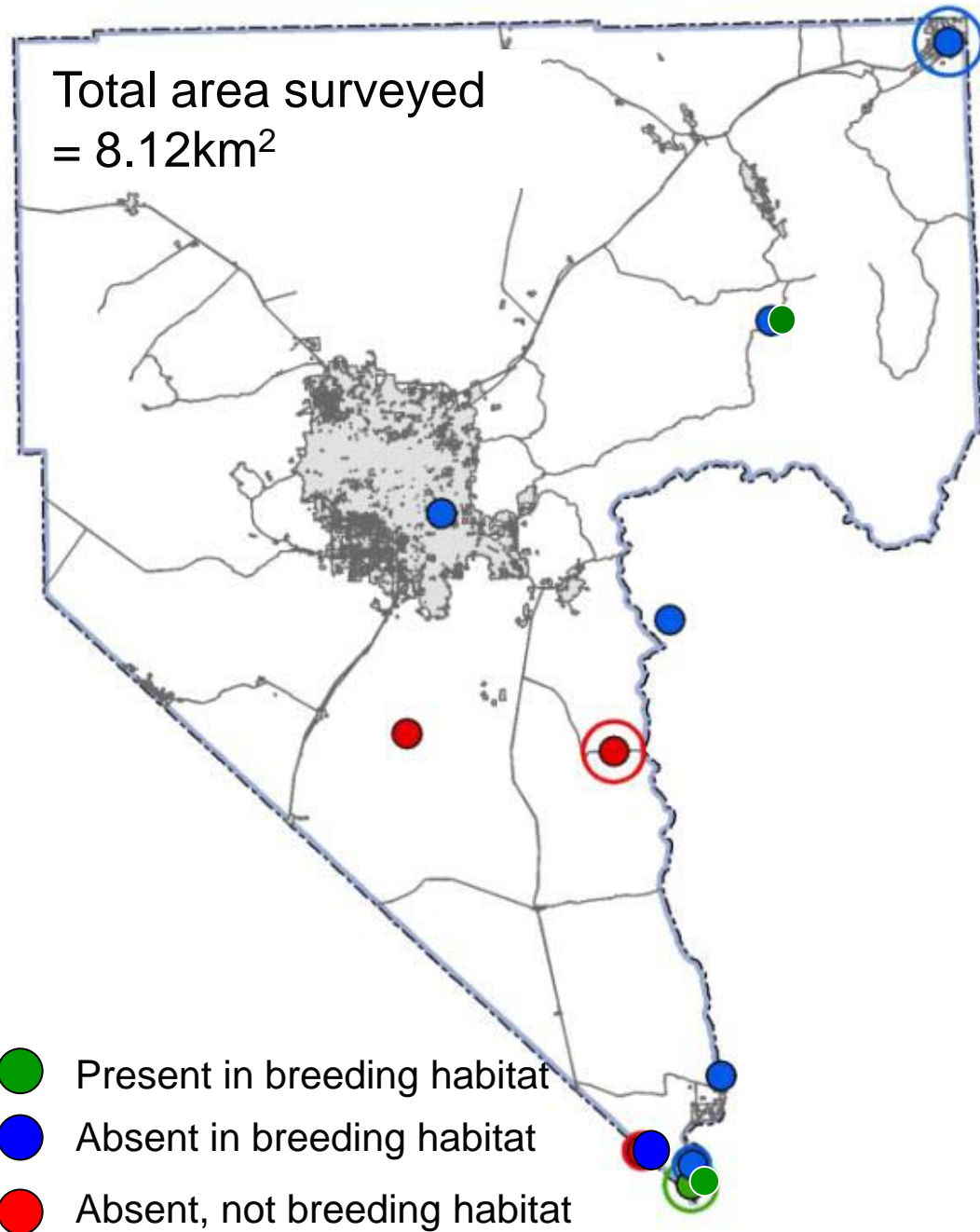
10 sites

2 Present

- 1 On golf course, heavily disturbed

6 Absent in breeding habitat

- 4 Disturbed or Heavily Disturbed
- 2 Moderately Disturbed



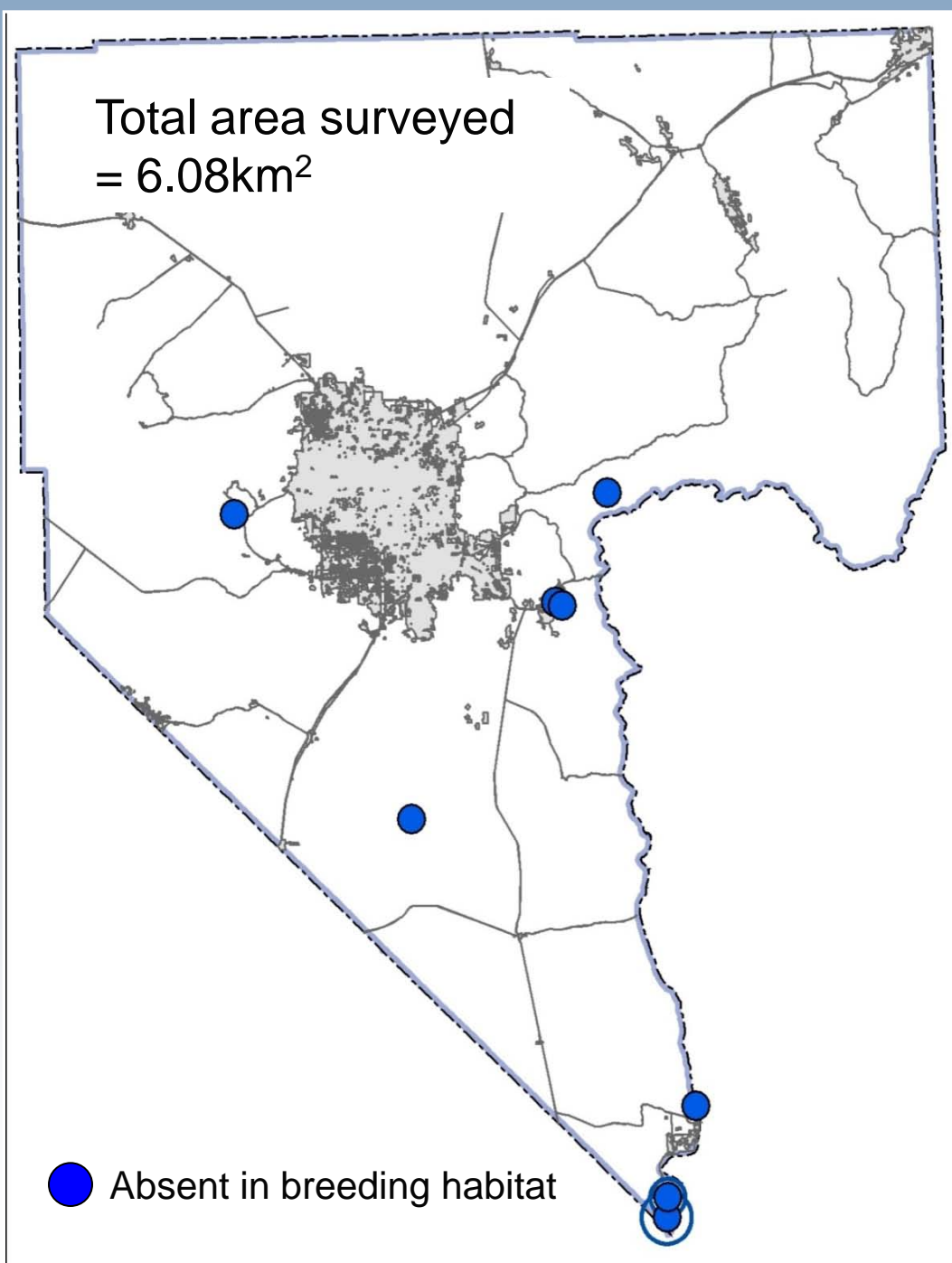
- Present in breeding habitat
- Absent in breeding habitat
- Absent, not breeding habitat

Summer Tanager

9 sites

9 Absent in breeding habitat

- 7 Disturbed or Heavily Disturbed
- 2 in limited disturbance, in marginal habitat

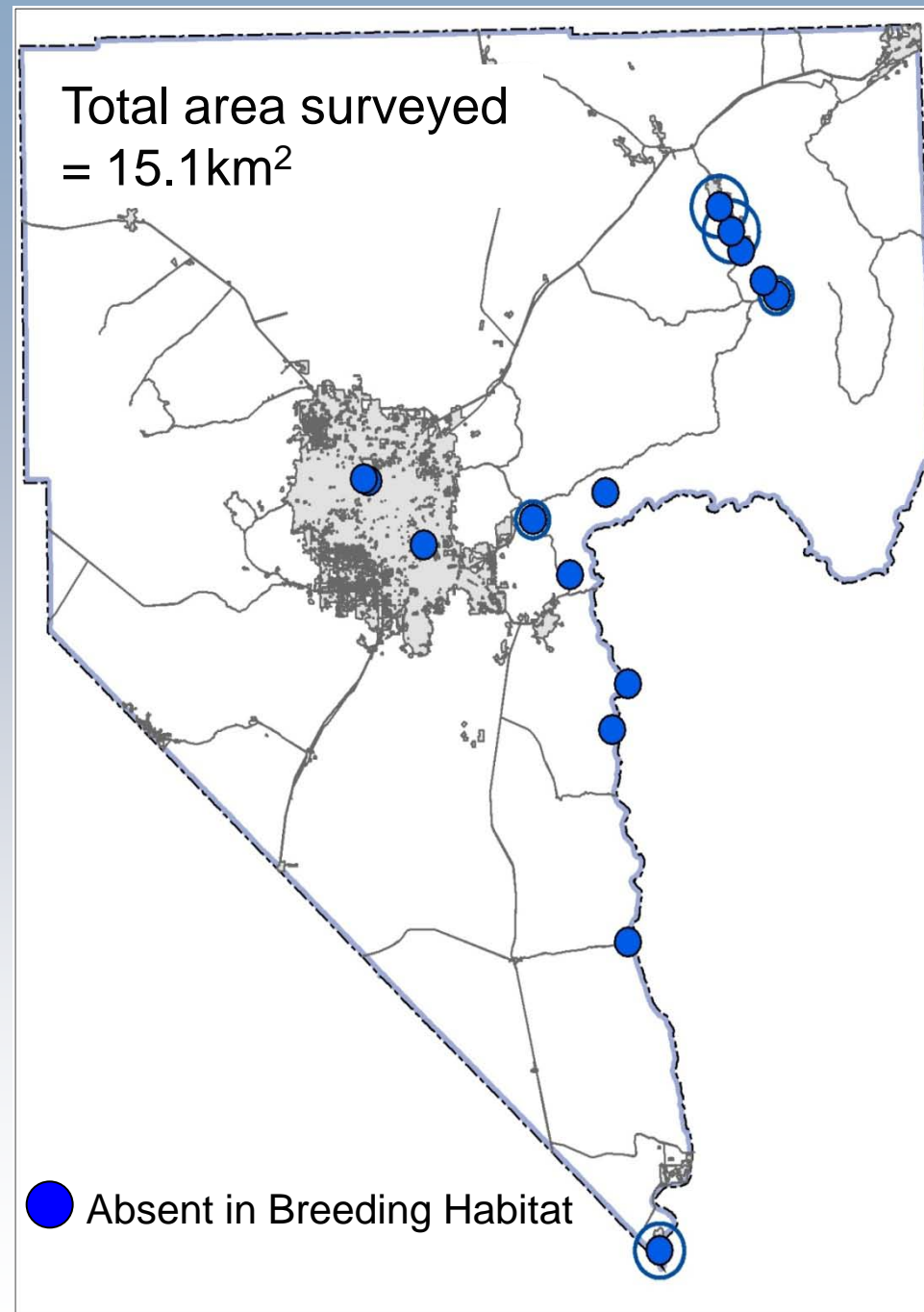


Vermilion Flycatcher

15 sites

15 Absent in breeding habitat

- 12 sites disturbed or highly disturbed
- 1 moderate disturbance
- 1 limited disturbance
- 1 no disturbance



Le Conte's Thrasher

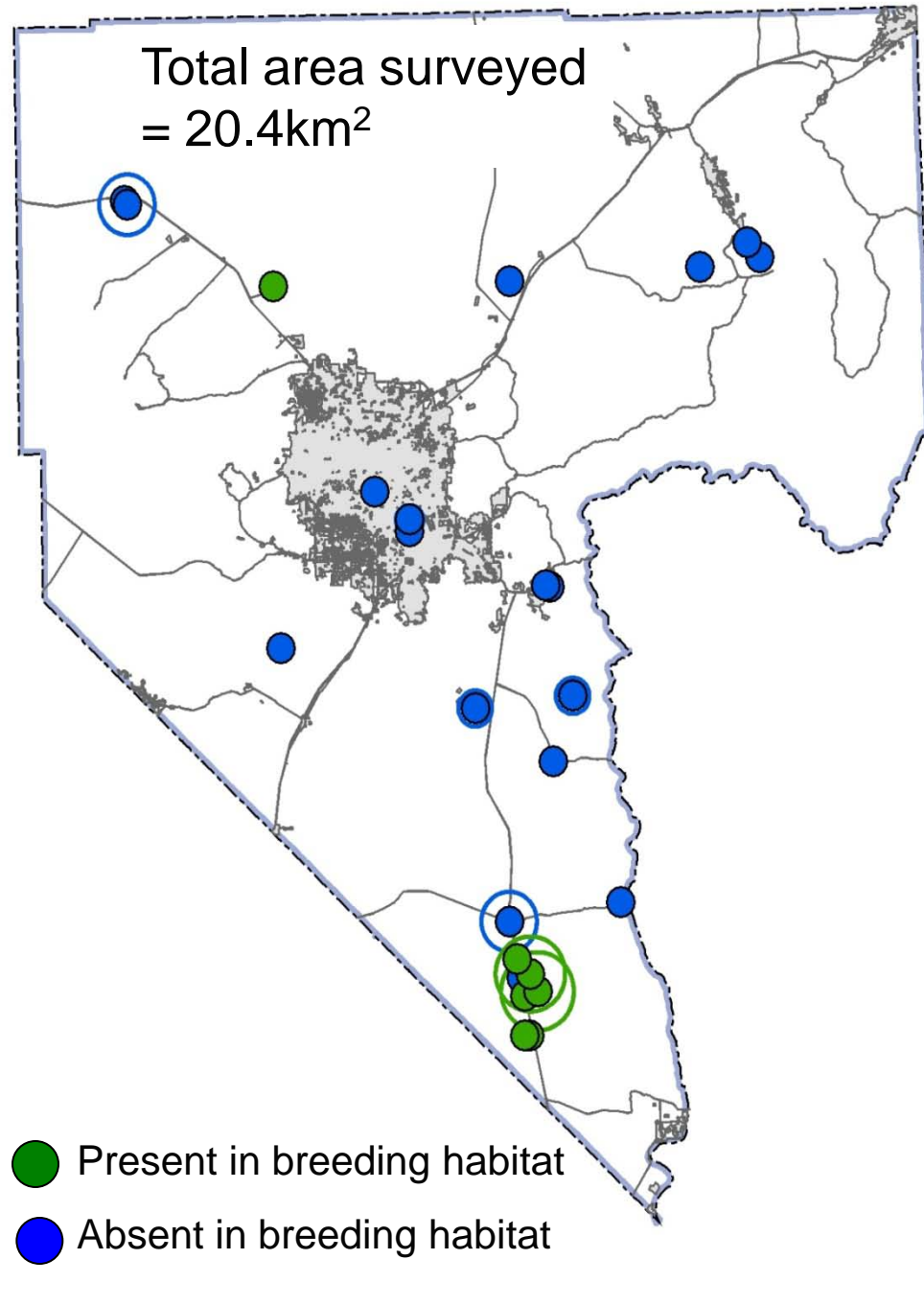
25 sites

7 Present

- 4 limited disturbance
- 3 moderate disturbance

18 Absent

- 11 disturbed or heavily disturbed
- 3 moderately disturbed
- 4 light disturbance

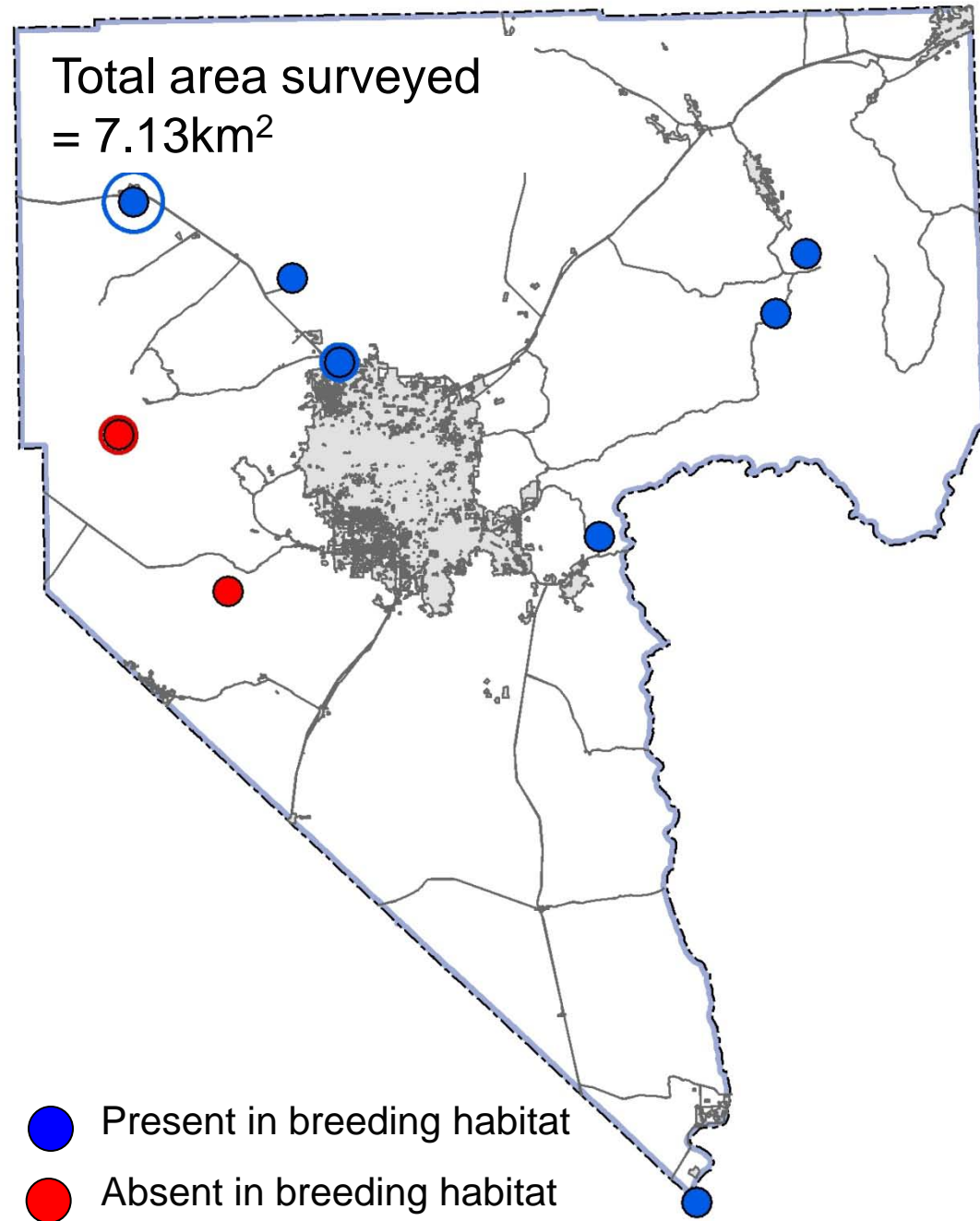


Southwestern Willow Flycatcher

9 sites

9 Absent sites (2 not
breeding habitat)

- 5 disturbed or heavily
disturbed
- 2 moderate disturbance





Conceptual and Habitat Models for Six Covered and Three Evaluation Bird Species

Outline

- Development of conceptual models for habitat modeling
- Acquisition of data layers
- Collation of observation records
- Habitat modeling process

- ✓ Bendire's Thrasher
- ✓ Bell's Vireo
- ✓ Blue Grosbeak
- ✓ Crissal Thrasher
- ✓ Gray Vireo
- ✓ LeConte's Thrasher
- ✓ Phainopepla
- ✓ Southwestern Willow Flycatcher
- ✓ Vermilion Flycatcher

Development of Conceptual models

- Draft conceptual models delivered to County
- Final conceptual models based on biologically relevant variables
 - Direct influence
 - Indirect influence

Development of Conceptual models



Gray vireo (*Vireo vicinior*)

Predictor	Biological relevance	Data source(s)	Influence
Elevation	Present within 1830- 2100 m, influenced by Pinyon-Juniper and separation (elevation) from Plumbeous and Bell's vireos	Clark County DEM	Direct
Wash (Arroyos)	Presence of important vegetation types found in high-elevation washes	LAME GIS Wash layer	Direct
Vegetation	Associated with: Pinyon-Juniper, bitterbrush (<i>Purshia</i> sp.) or cliff rose (<i>Cowania</i> sp.). Also with Scrub oak and Manzanita.	SWReGAP, LANDFIRE EVT	Direct
Temperature	Potential upper/lower limit (present in southern NV Apr-Aug) No direct association from literature	BioClim data	Indirect

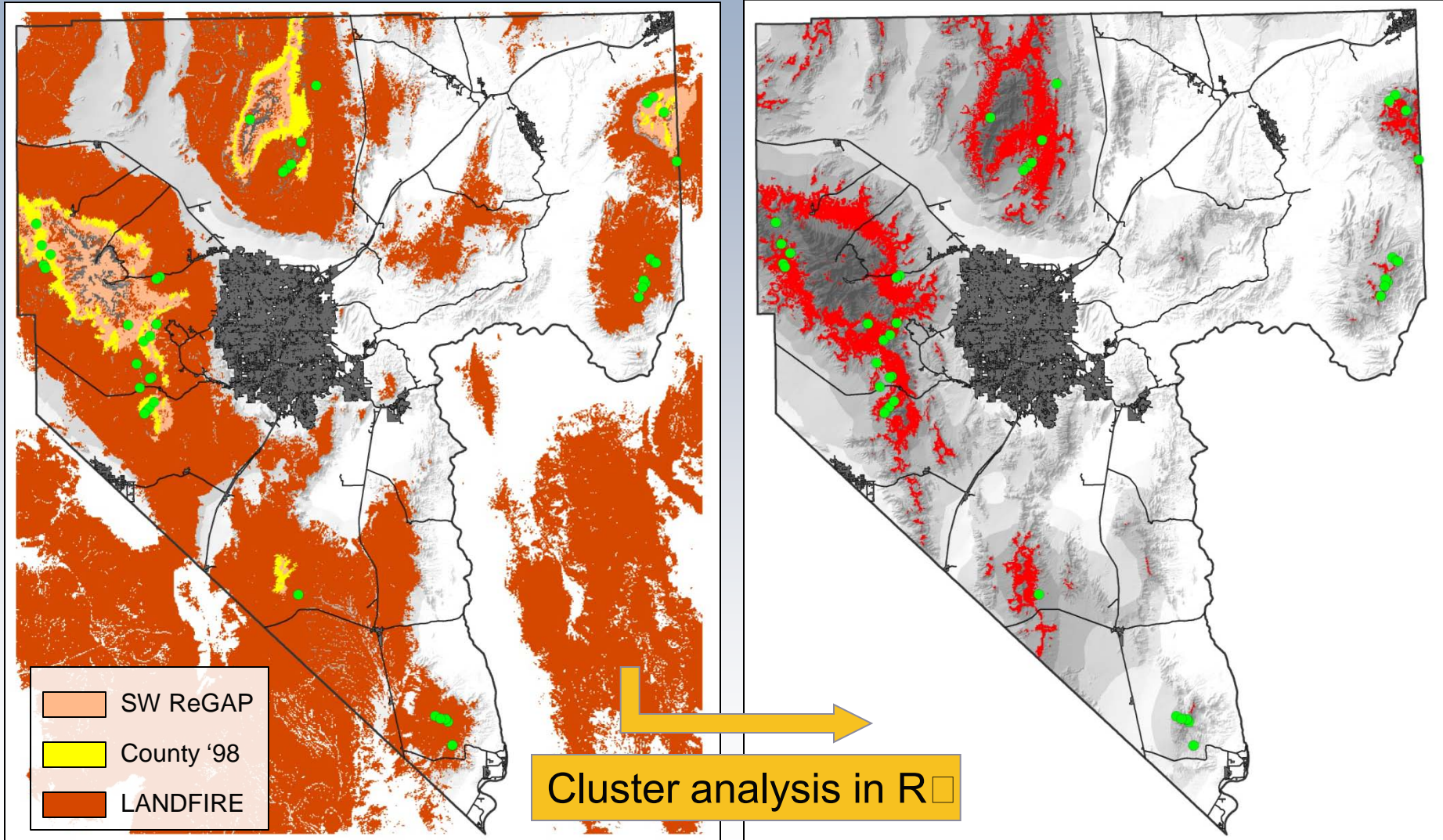
Acquisition of data layers

- Vegetation (e.g. LANDFIRE, SWReGAP, Ecosite)
- Climatic variables (e.g. BIOCLIM, SNODAS)
- Soil & Geomorphology (e.g. SSURGO, USGS & County Geomorphology datasets)
- Terrain (e.g. DEM, Slope Aspect)
- Development (e.g. County Parcel data, TIGER, BLM Designated routes)
- Landform (SWReGAP, Ph.D. dissertation)
- Hydrology (e.g. Washes, Lake Level, Minor & major streams)

Data layers evaluated for adequacy for modeling purposes, new layers generated in some instances

Acquisition of data layers

Example: Pinyon-Juniper



Collation of Occurrence records

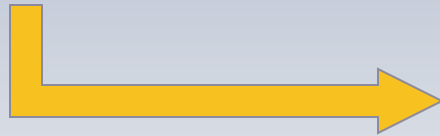
Data sources

Agency records and databases

Field observations

Research databases

Incidental observations

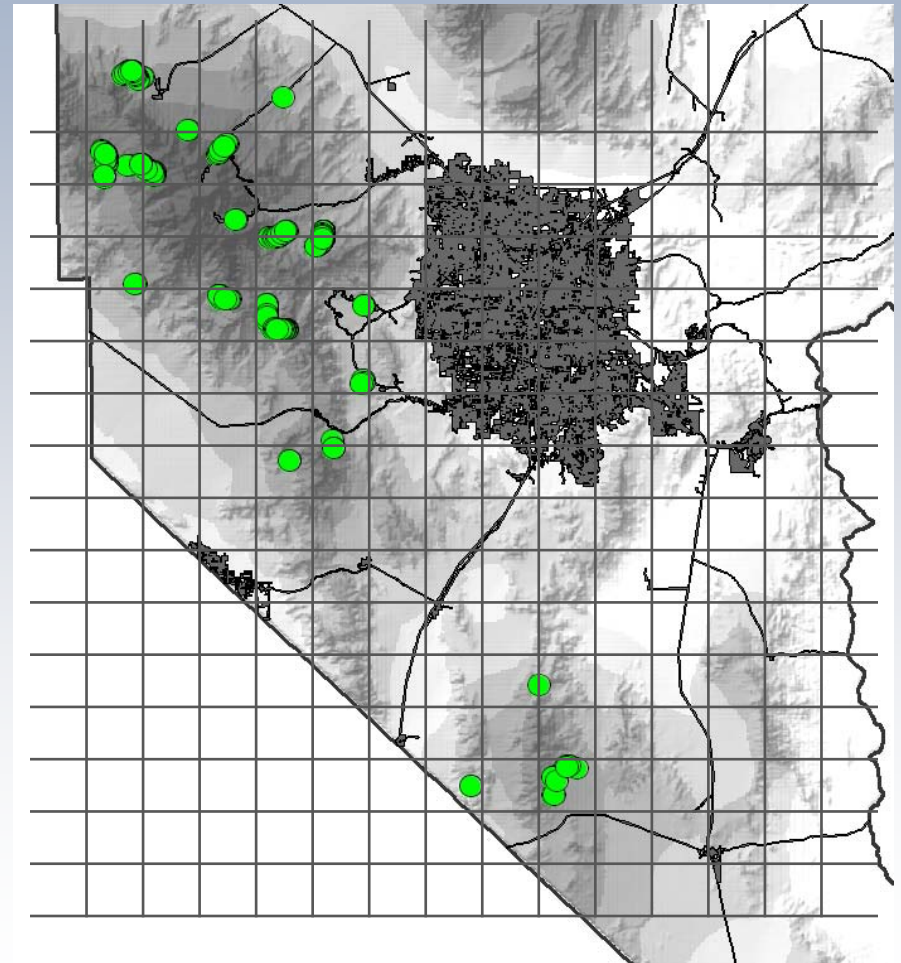


Quality assurance
(points checked against
'real world' location)

Species	Occurrences
Bendire's Thrasher	28
Bell's Vireo	118
Blue Grosbeak	129
Crissal Thrasher	248
Gray Vireo	190
LeConte's Thrasher	145
Phainopepla	317
Southwestern Willow Flycatcher	42
Vermilion Flycatcher	16

Habitat modeling process

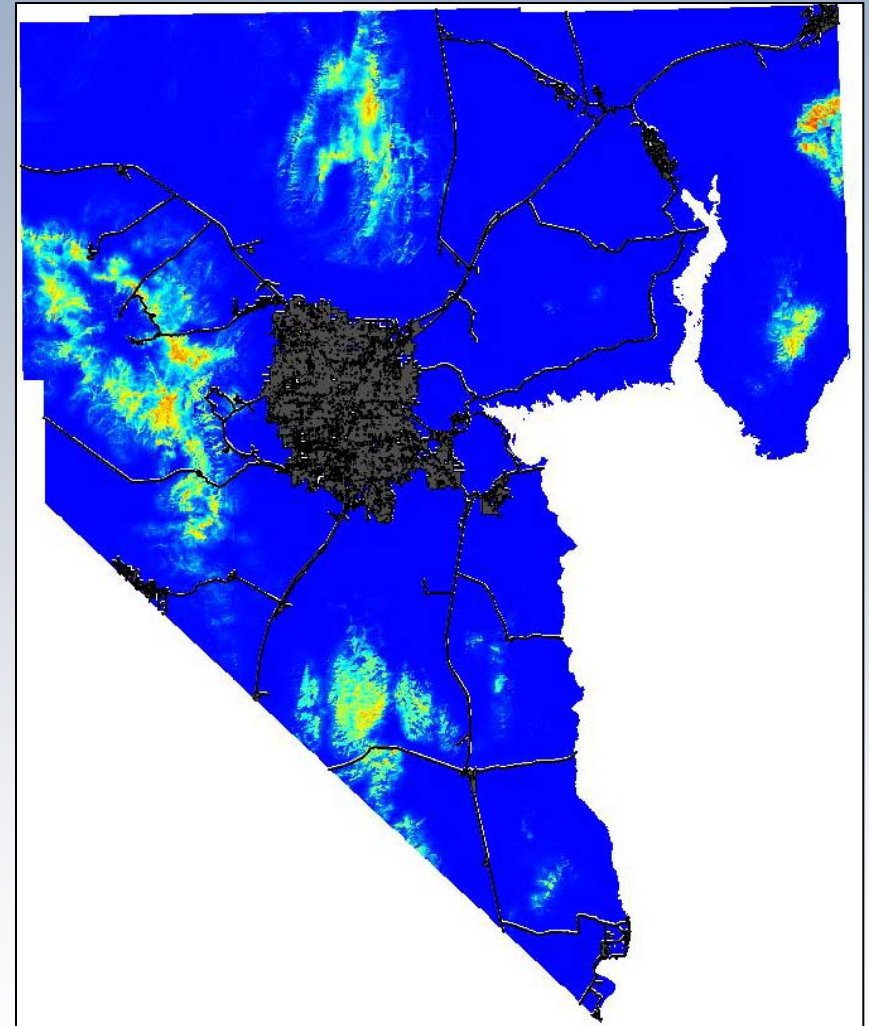
- Maxent algorithm (Phillips et al. 2004, 2006)
- Presence points weighted to reduce sampling bias
- Covariates selected based on conceptual models



Habitat modeling process

Example: Gray Vireo

Covariates	Percent contribution
NDVI	54.6
D2 Pinyon-Juniper	10.1
Precipitation	8.7
D2 Creosote-Bursage	6.1
Elevation	5.9
D2 Rocky Canyons	3.3
Blackbrush	3.3
Fire history	2.8
Topography	1.8
D2 Washes	1.2
Geomorphic Landforms	1.2
D2 Joshua Tree	1.1

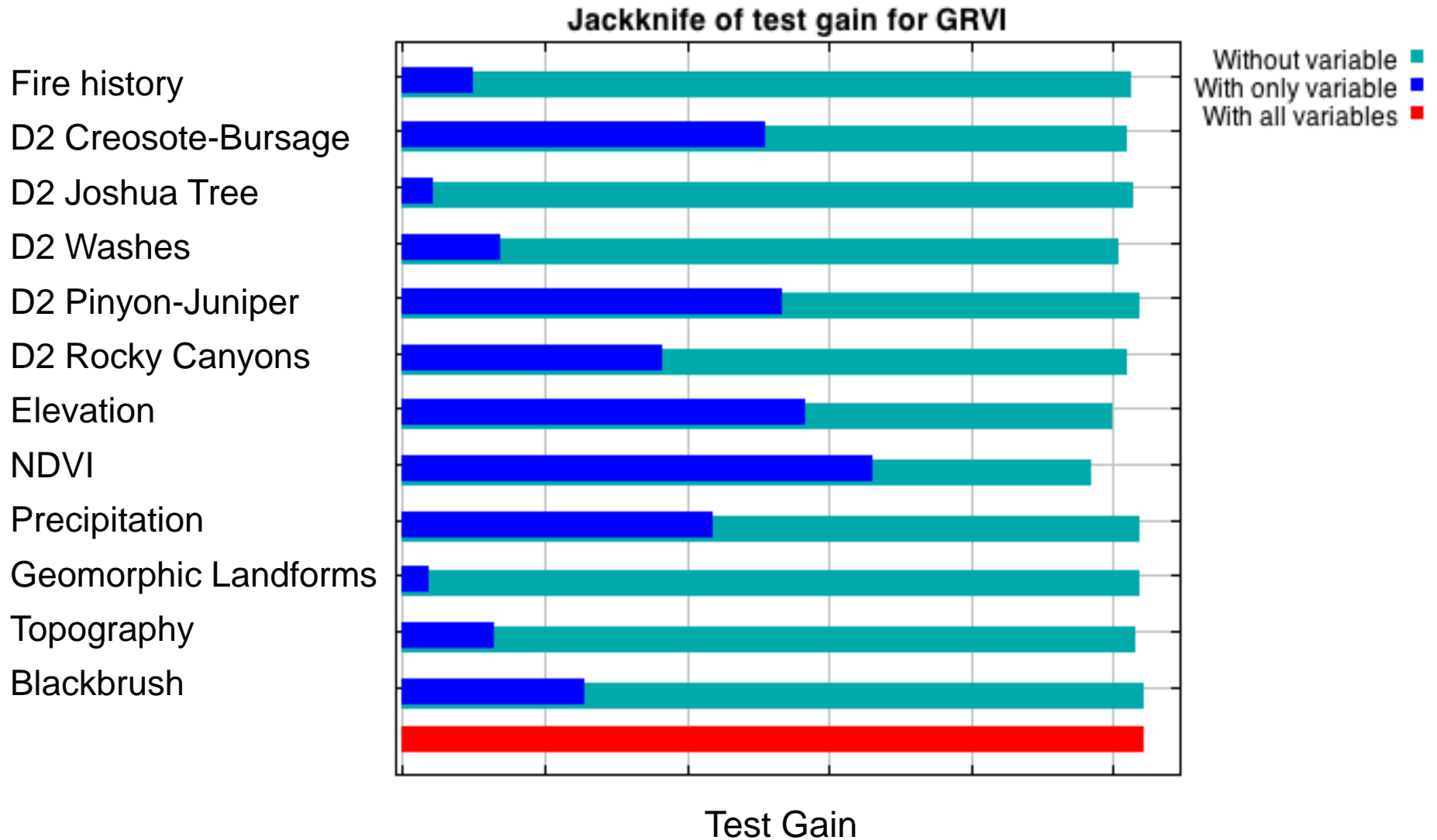


Habitat modeling process

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Blackbrush	3.3
Fire history	2.8
Topography	1.8
D2 Washes	1.2
Geomorphic Landforms	1.2
D2 Joshua Tree	1.1

- Models evaluated
 - Contribution of variables to overall model
 - Assessment of variable importance
 - Response of predicted habitat suitability to model variables
- Iterative process

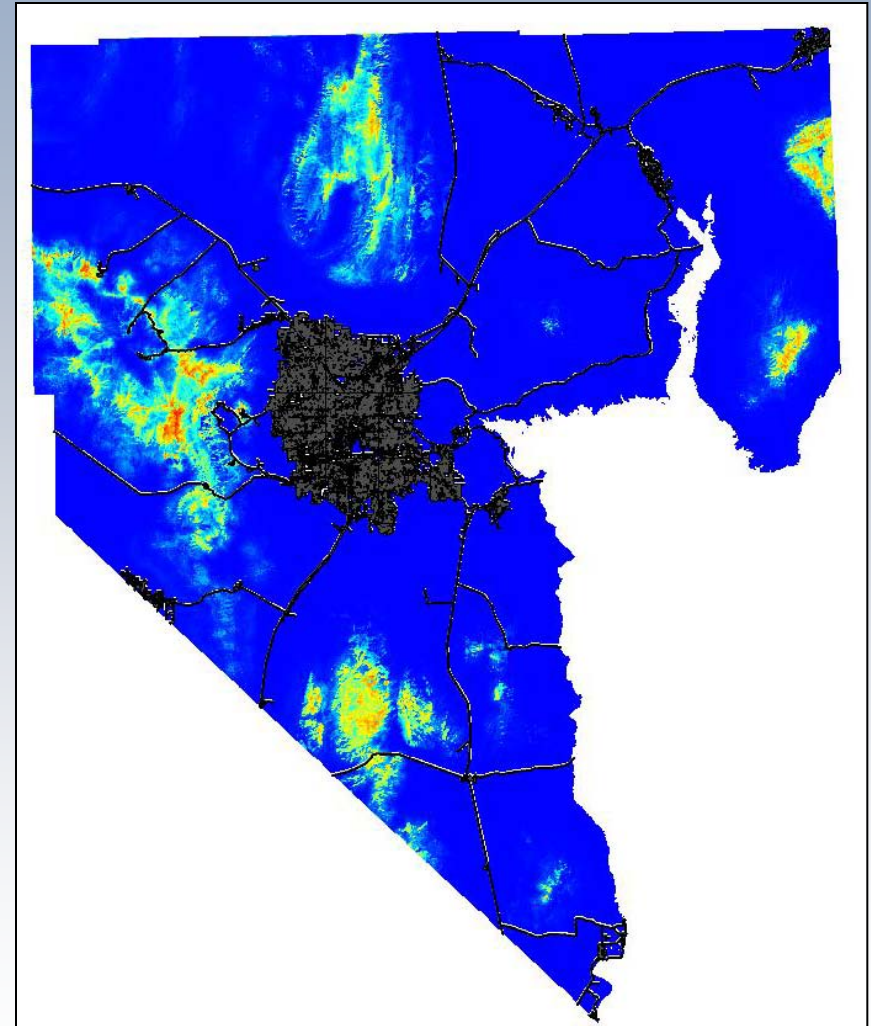
Habitat modeling process



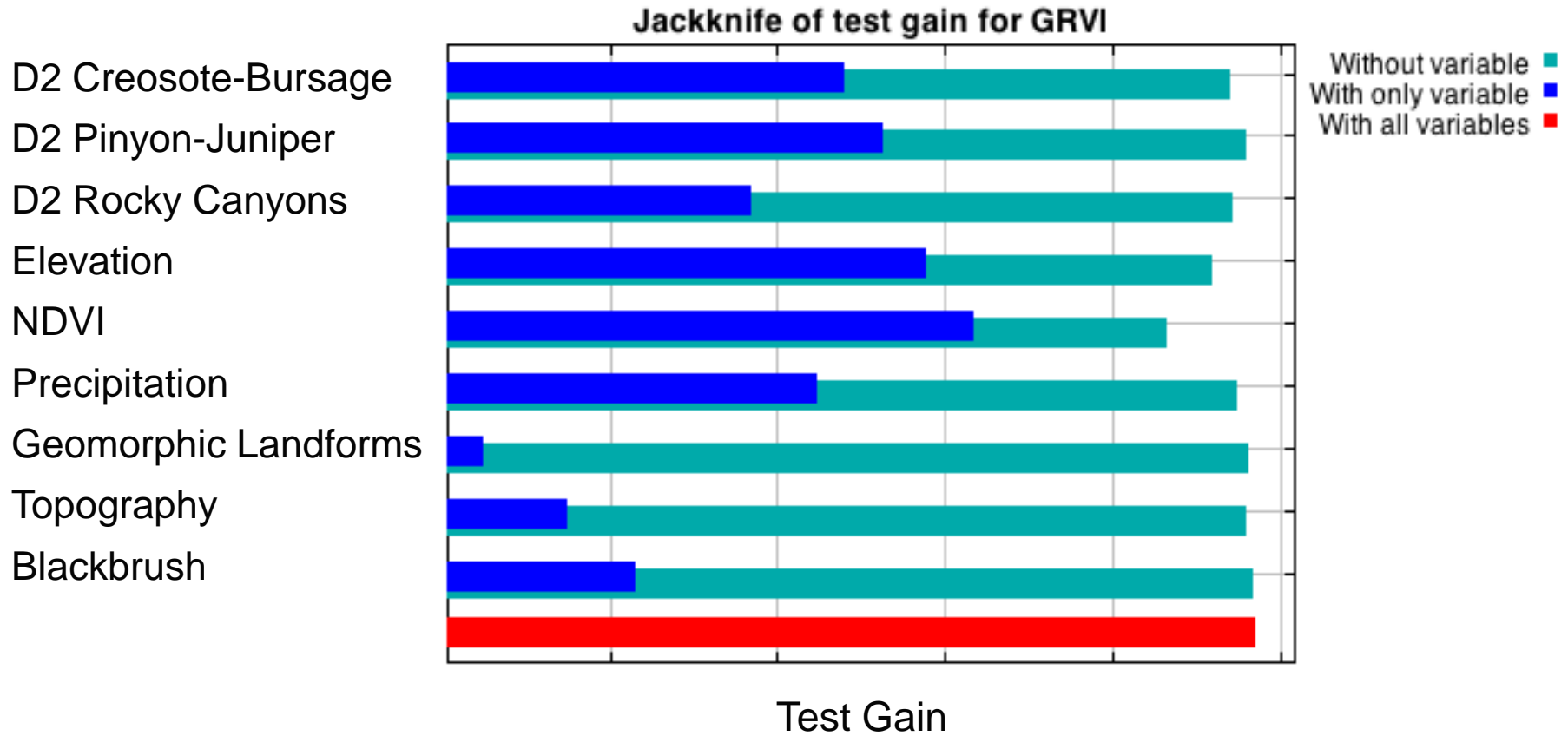
Habitat modeling process

Example: Gray Vireo

Covariates	Percent contribution
NDVI	55.9
D2 Pinyon-Juniper	12.6
D2 Creosote-Bursage	8.6
Elevation	7.5
Precipitation	6.0
D2 Rocky Canyons	3.6
Blackbrush	3.3
Topography	2.1
Geomorphic Landforms	0.4

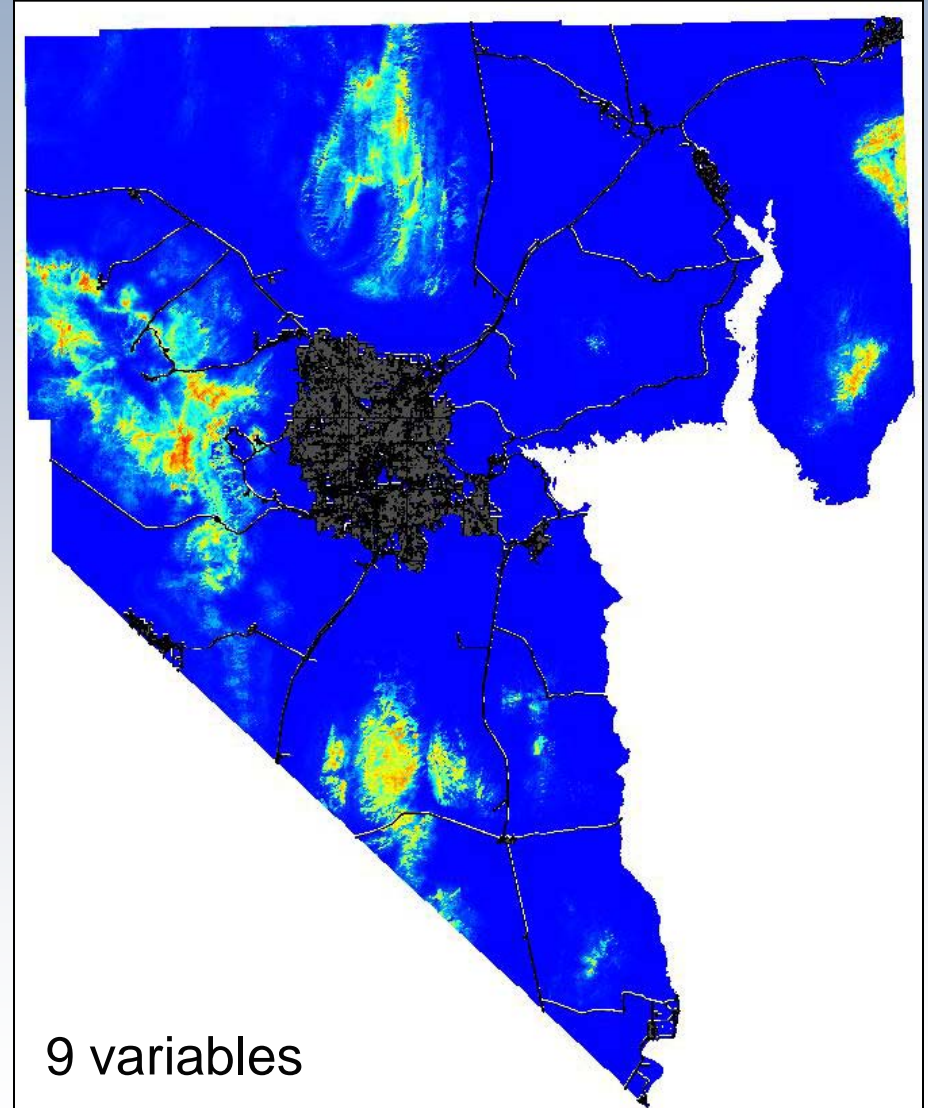
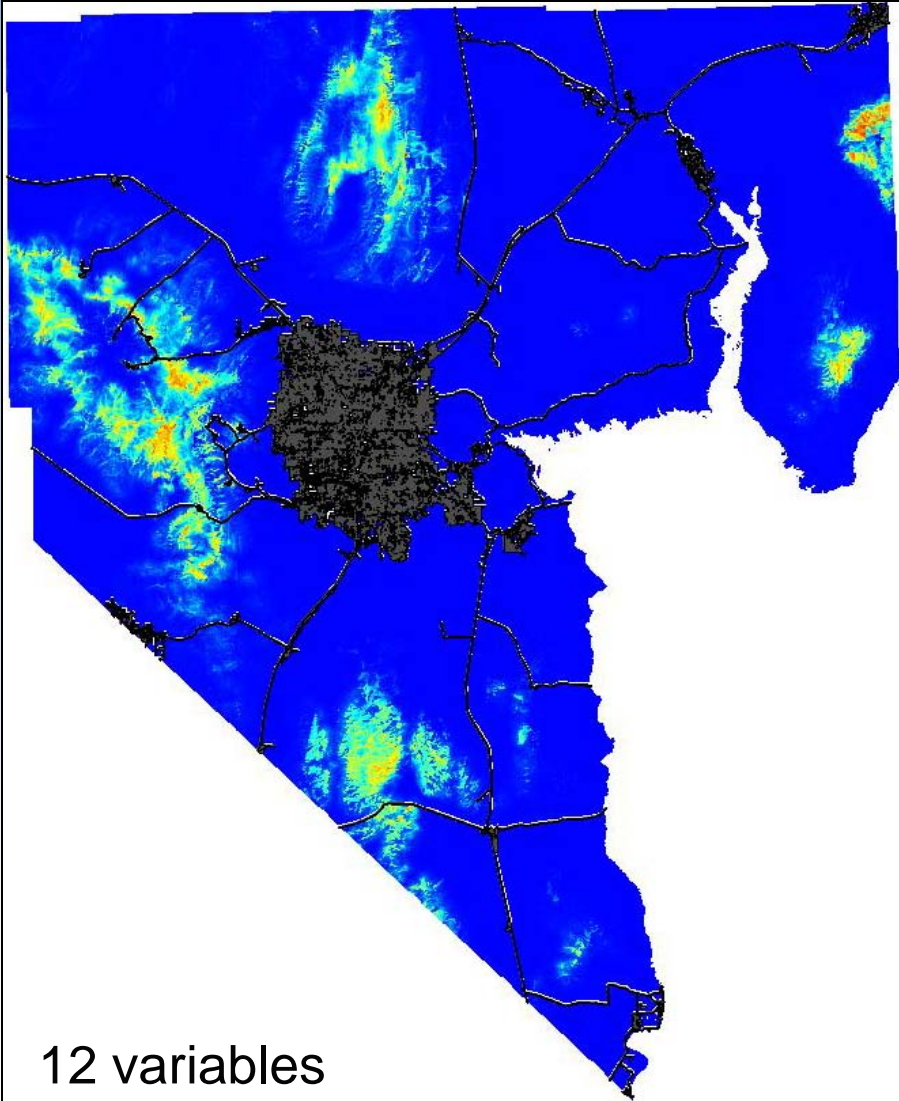


Habitat modeling process



Habitat modeling process

Example: Gray Vireo



Acknowledgments

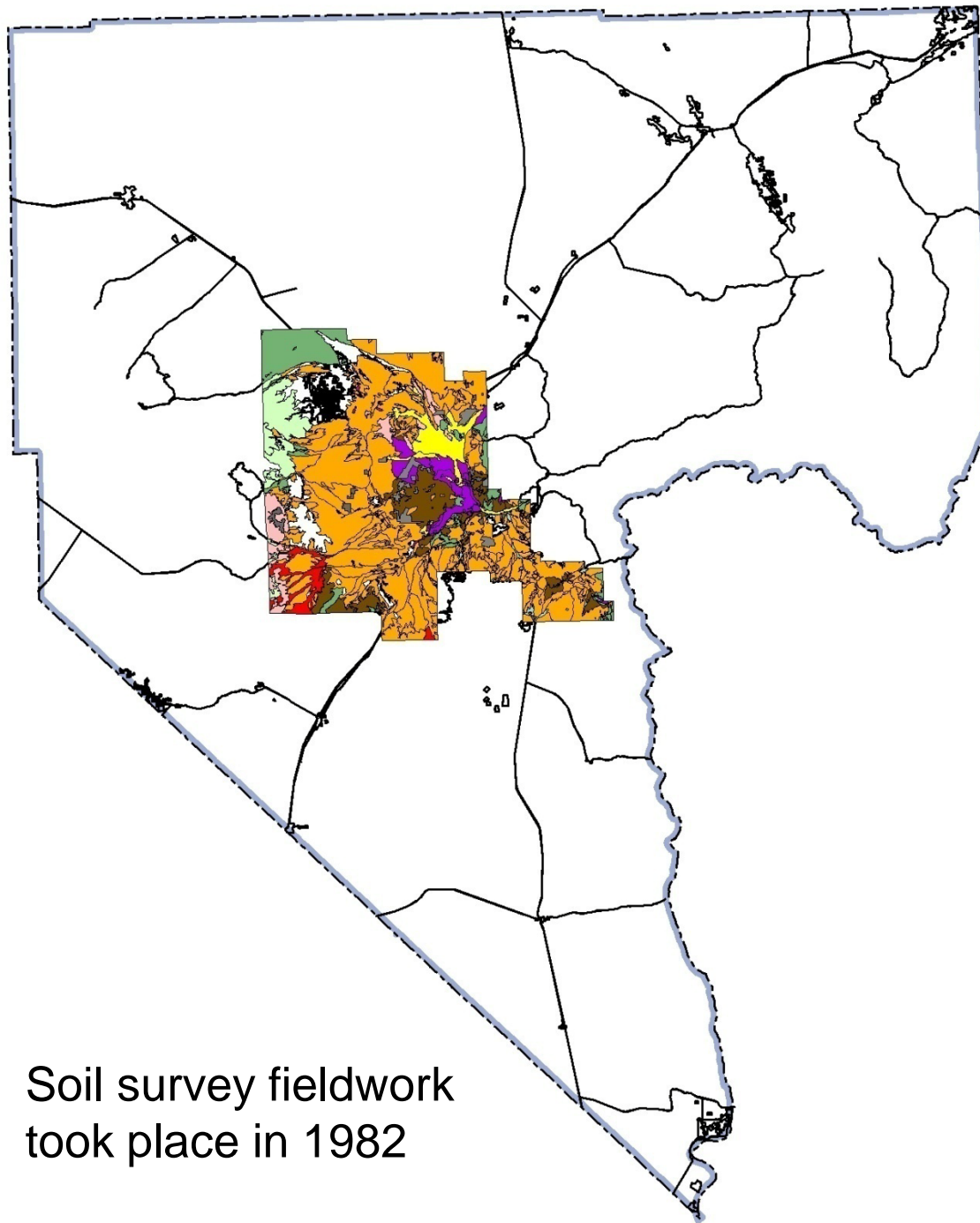
Agency Cooperators: Public Lands Institute UNLV, Great Basin Bird Observatory, USDA Natural Resources Conservation Service, Bureau of Land Management, and Clark County

Field and Technical Assistance: Joe Barnes, Erinn Birmingham, Dorothy Crowe, Ashley Fisher, Calias Fossier, Joe Hutcheson, and Mitch Urban

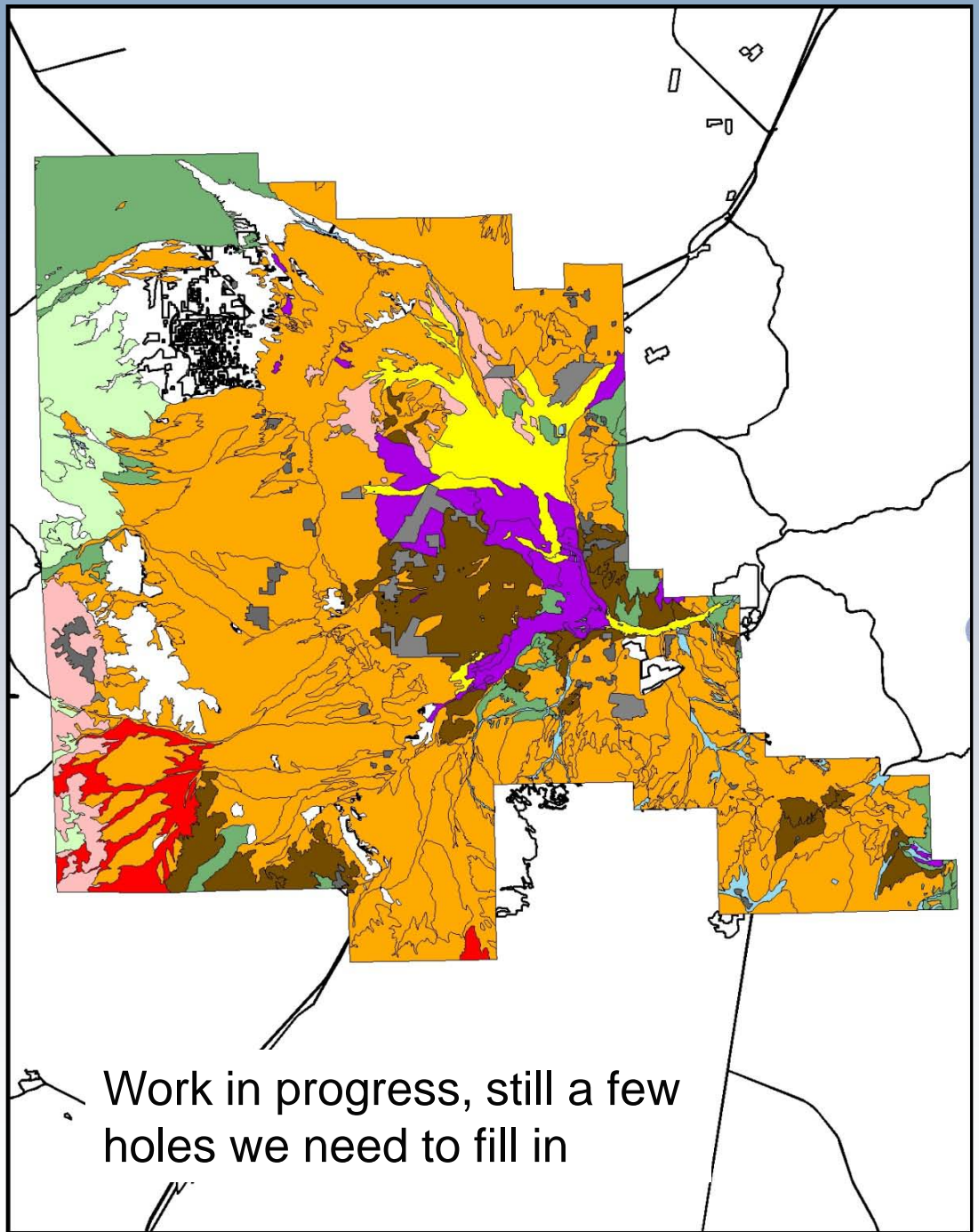
Technical Advice and Assistance: Elisabeth Ammon,, Jen Ballard, Joe Hutcheson, Rich Inman, Doug Merkler, Ken Nussear, Morgan Raskin, Mark Sappington, Cheryl Vanier



Map of Clark County
with the vegetation
of Las Vegas
classified from Soil
Survey Database



- Creosote Bur Sage
- Mojave Mixed Scrub
- Mesquite
- Salt Bush
- Shadscale
- Blackbrush
- Joshua Tree
- Urban
- Wash
- Juniper



Work in progress, still a few holes we need to fill in