Raven Monitoring and Management in California, Nevada, and Utah

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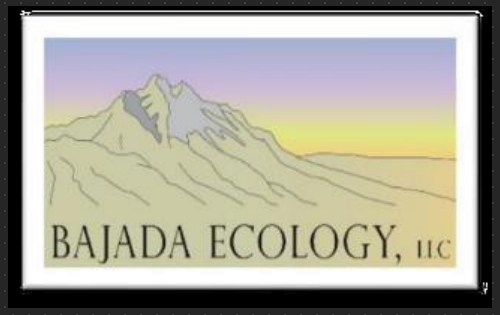
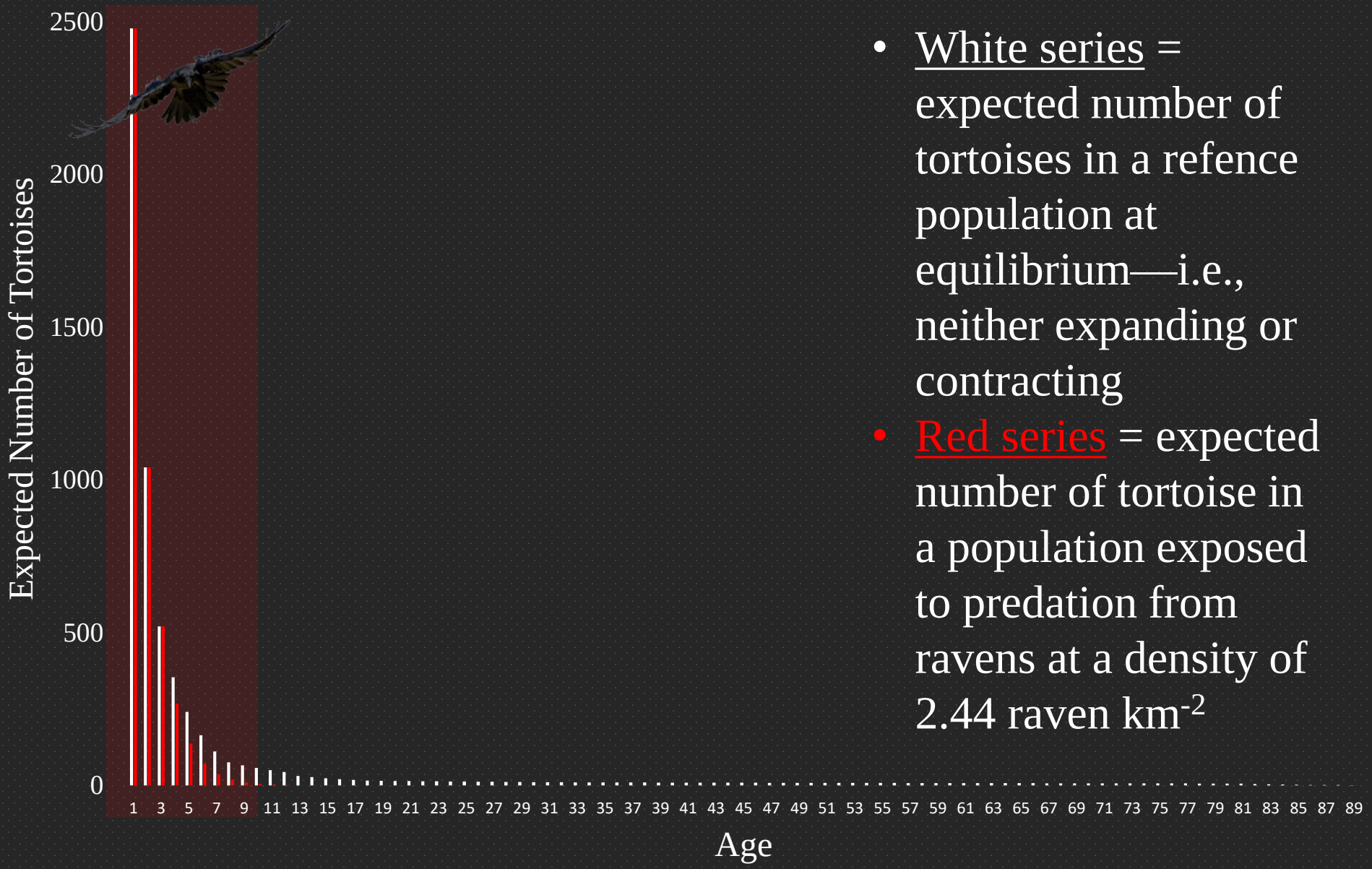
Outline

- Introduction
- Acknowledgements
- 2020 to 2024 Raven Trends and Management in California
- 2022 and 2024 Raven Density Estimates and Management Approach in Southwestern Utah
- 2022 to 2024 Raven Density Estimates and Next Steps in Nevada
- Indirect Effects Fees
- Conclusion

Acknowledgments

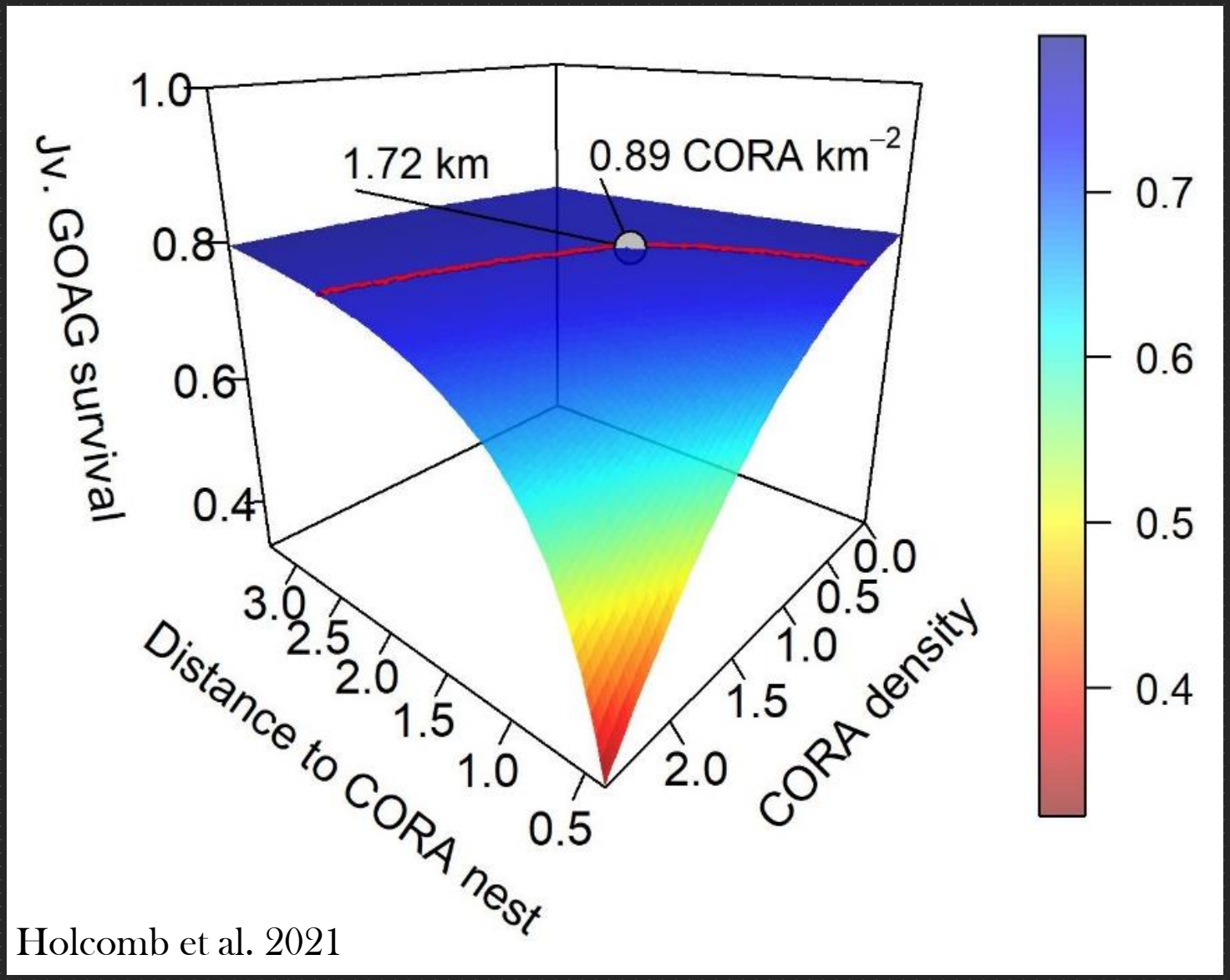


Expected Number of Mojave Desert Tortoises



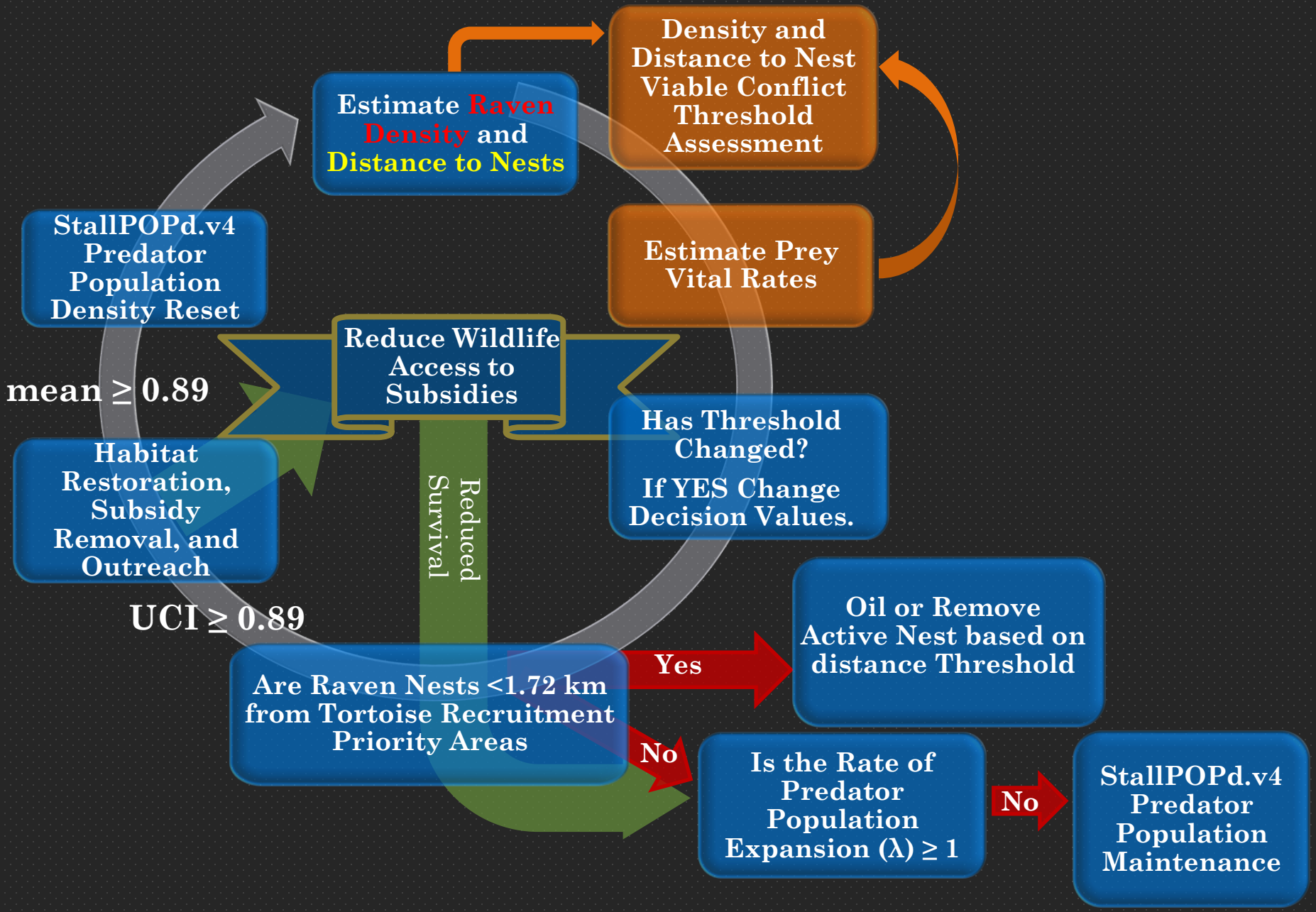
- White series = expected number of tortoises in a refence population at equilibrium—i.e., neither expanding or contracting
- Red series = expected number of tortoise in a population exposed to predation from ravens at a density of 2.44 raven km^{-2}

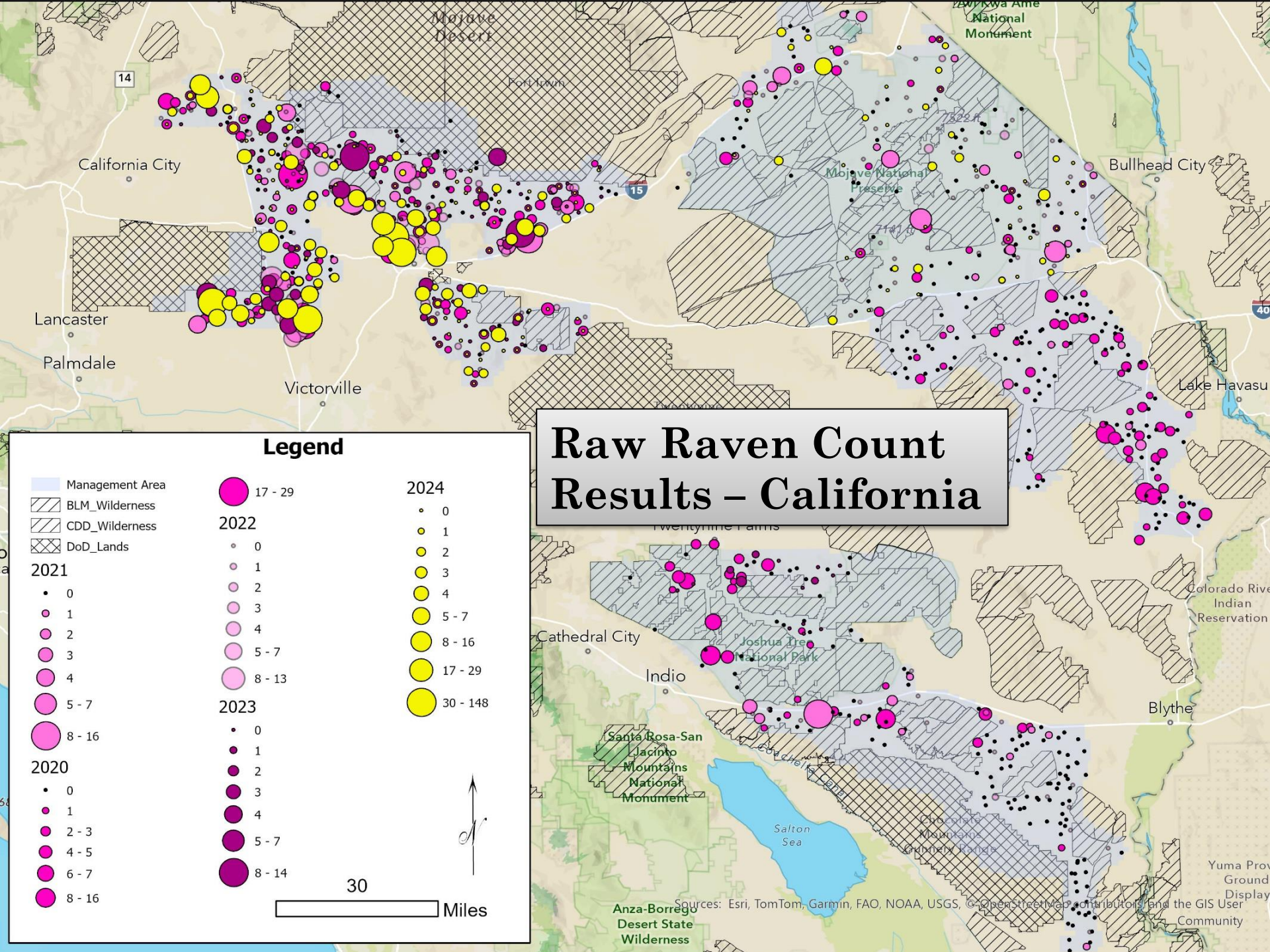
Mojave Desert Tortoise – Common Raven Viable Conflict Threshold



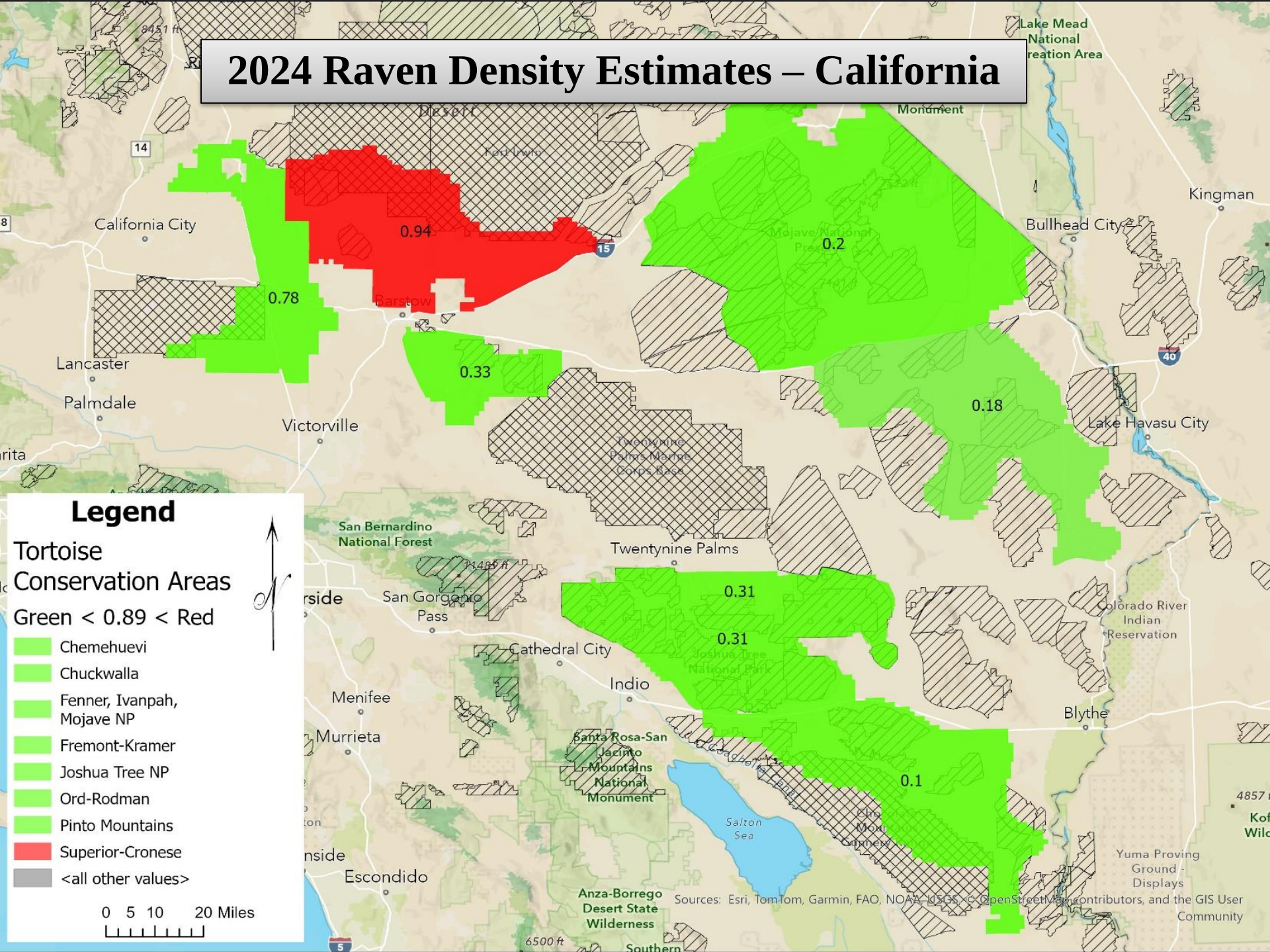
Holcomb et al. 2021

Adaptive Management Cycle

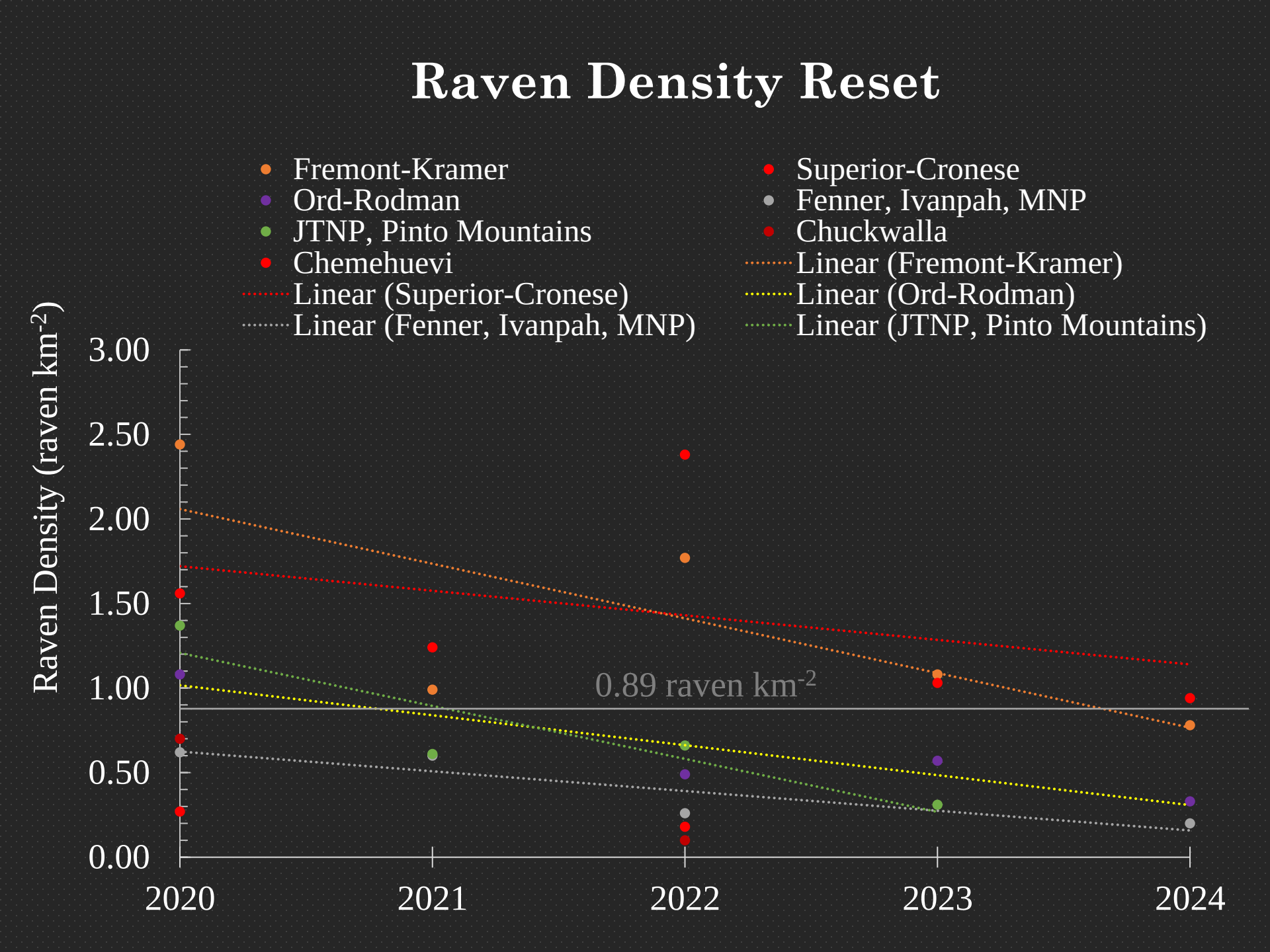



Raw Raven Count Results – California
Legend
Management Area
BLM_Wilderness
CDD_Wilderness
DoD_Lands
2021
0
1
2
3
4
5 - 7
8 - 16
2020
0
1
2 - 3
4 - 5
6 - 7
8 - 16
17 - 29
2022
0
1
2
3
4
5 - 7
8 - 13
2023
0
1
2
3
4
5 - 7
8 - 14
2024
0
1
2
3
4
5 - 7
8 - 16
17 - 29
30 - 148
30
Miles
Mojave Desert
California City
Lancaster
Palmdale
Victorville
Bullhead City
Lake Havasu
Mojave National Preserve
Joshua Tree National Park
Cathedral City
Indio
Blythe
Salton Sea
Santa Rosa-San Jacinto Mountains National Monument
Anza-Borrego Desert State Wilderness
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

2024 Raven Density Estimates – California



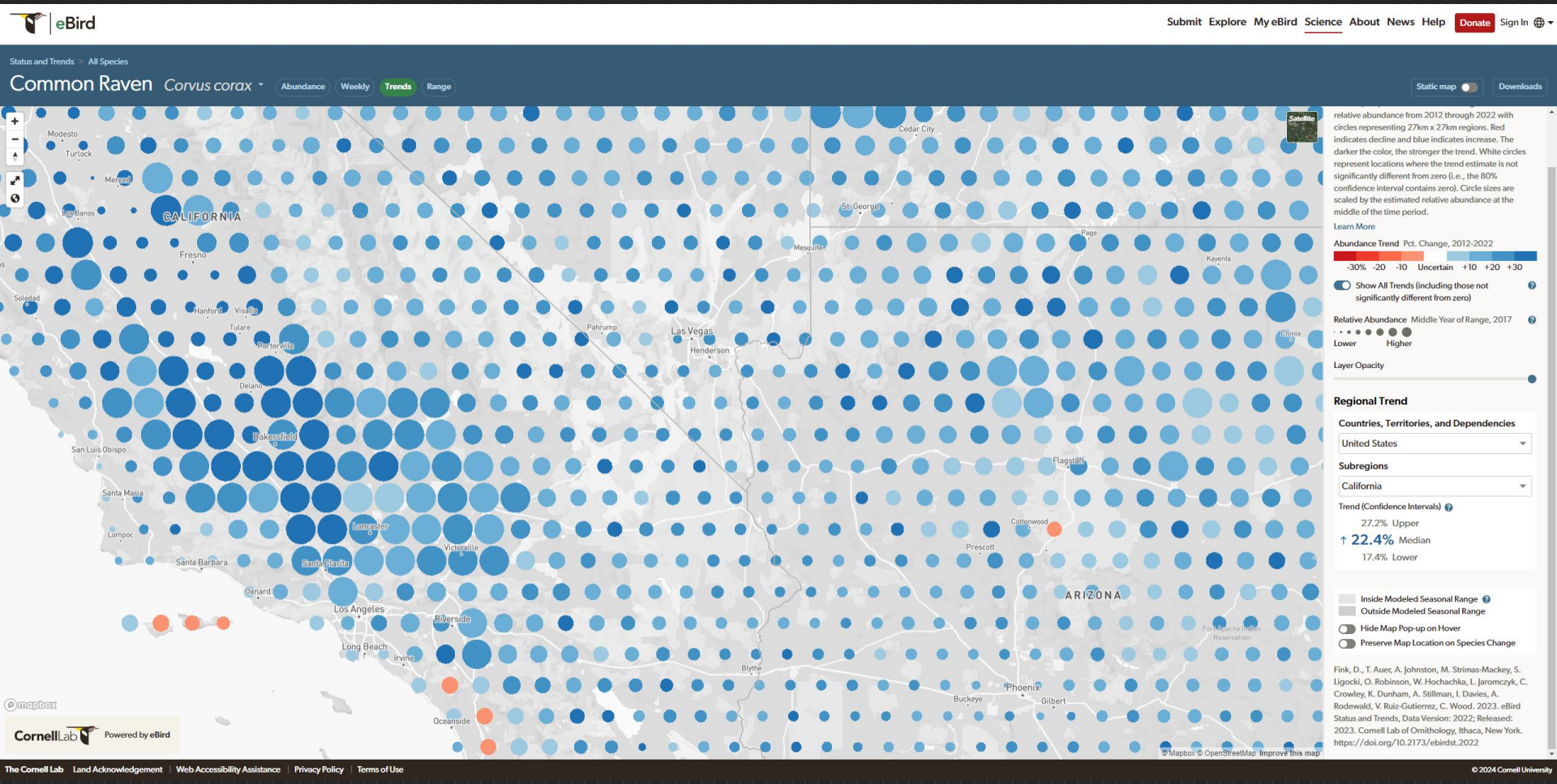
Raven Density Reset



Raven Density Reset

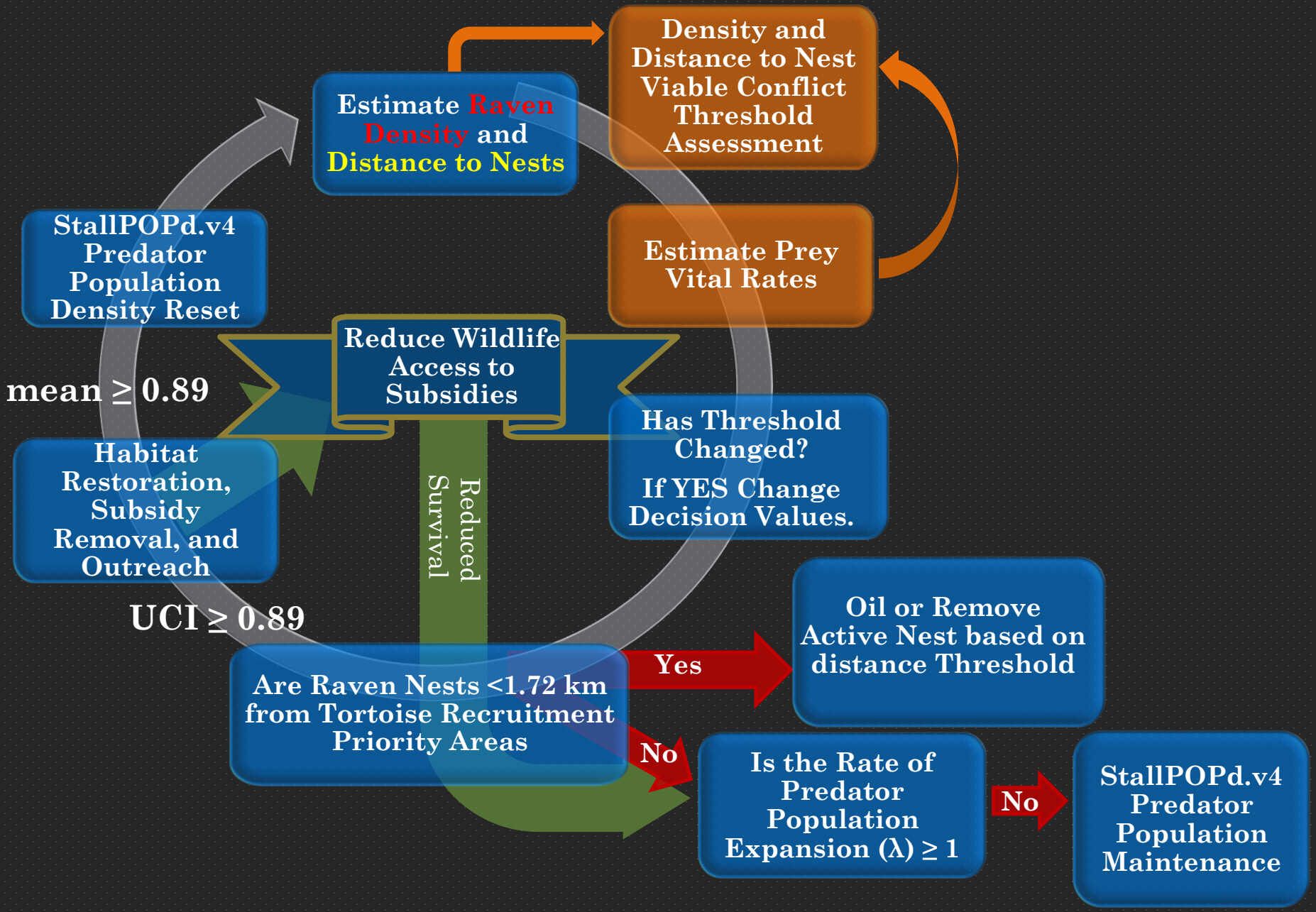
CORA Monitoring & Management Strata	2024 (or most recent) Mean Density (raven km^{-2})	2020 - 2024 [or most recent] Density Difference	2020 - 2024 [or most recent] Percent Change	Slope	R^2
Fremont-Kramer	0.78	-1.66	-68%	-0.323	0.5571
Ord-Rodman	0.33	-0.75	-69%	-0.177	0.8686
Superior-Cronese	0.94	-0.62	-40%	-0.145	0.1551
Fenner, Ivanpah, MNP	0.20	-0.42	-68%	-0.117	0.8122
JTNP, Pinto Mountains	0.31	-1.06	-77%	-0.310	0.8054
Chemehuevi	0.18	-0.09	-33%	NA	NA
Chuckwalla	0.10	-0.60	-86%	NA	NA
Average	0.41	-0.74	-63%	-0.2143	0.6397

Raven Density Trends 2012-2022

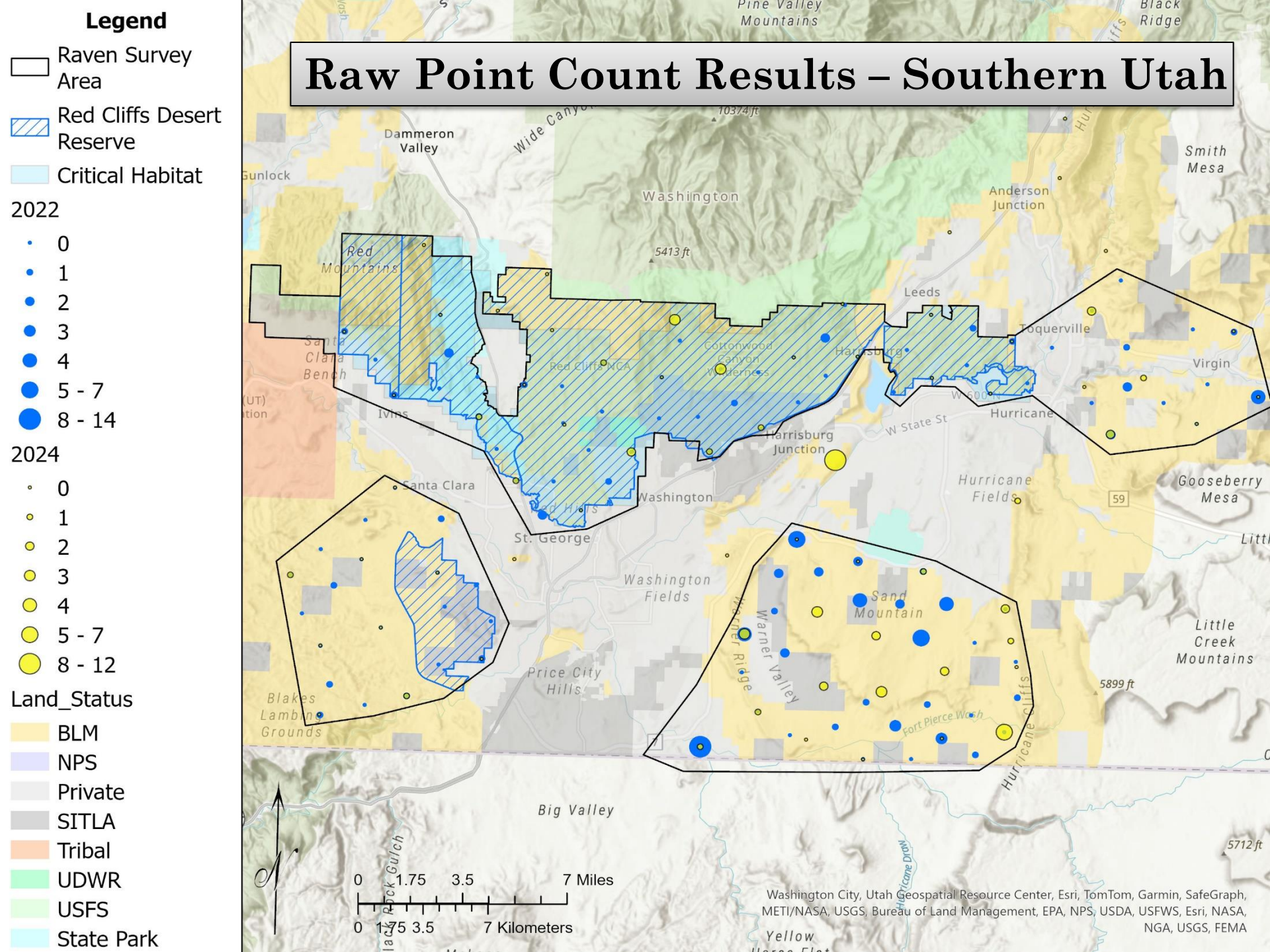


https://science.ebird.org/en/status-and-trends/species/comrav/trends-map?showAllTrends=true&regionCode=USA-CA

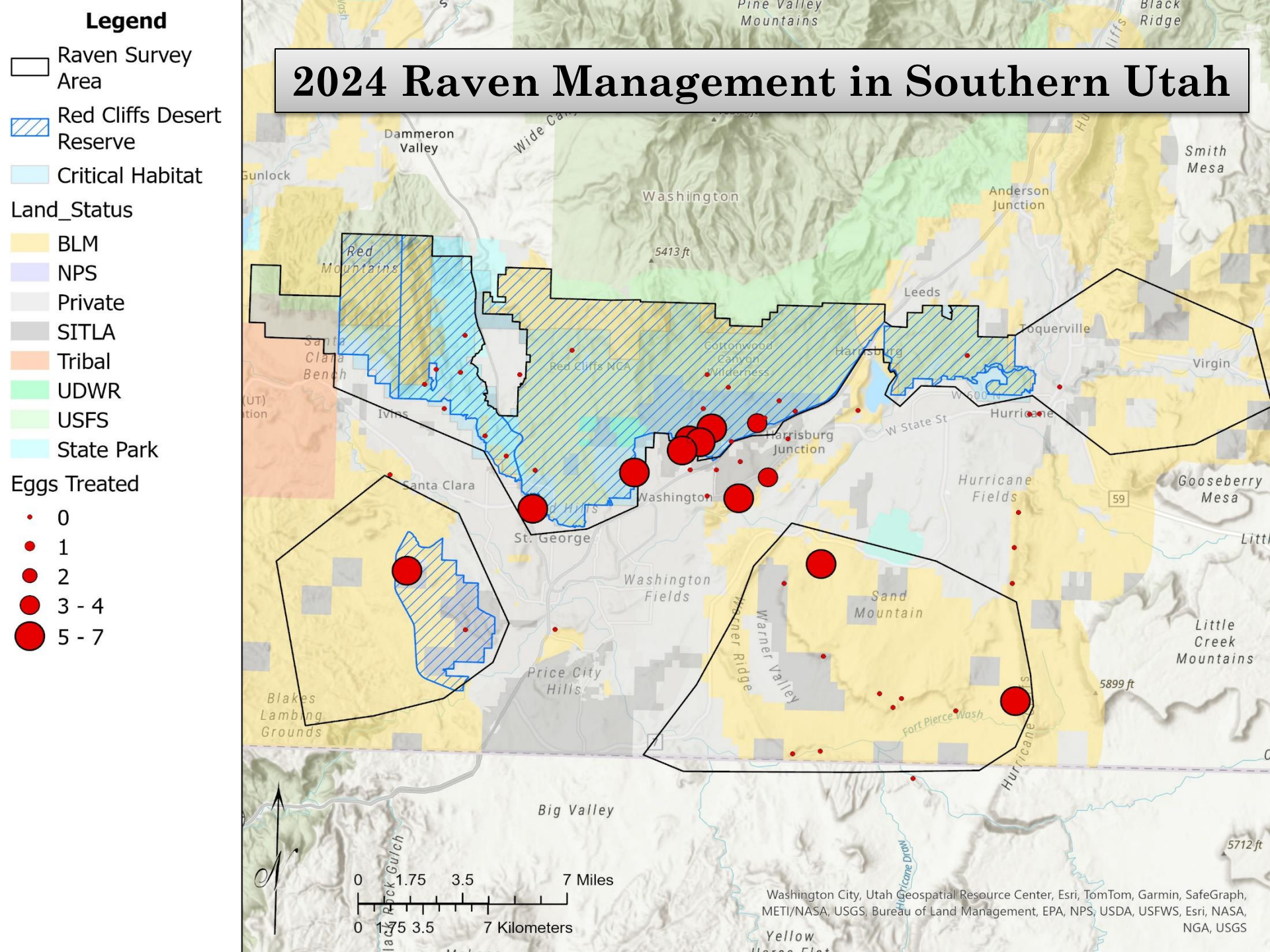
Adaptive Management Cycle



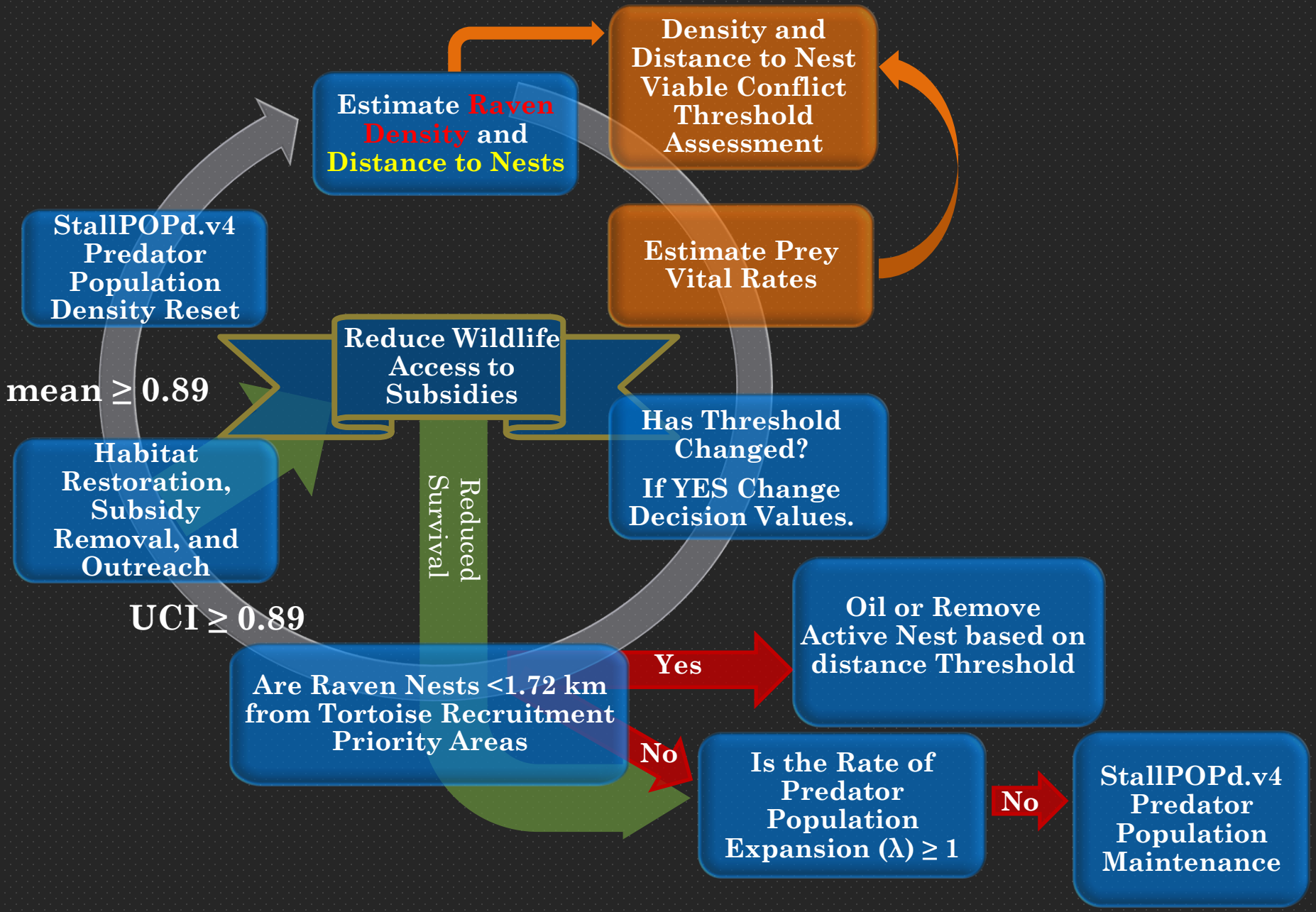
Raw Point Count Results – Southern Utah

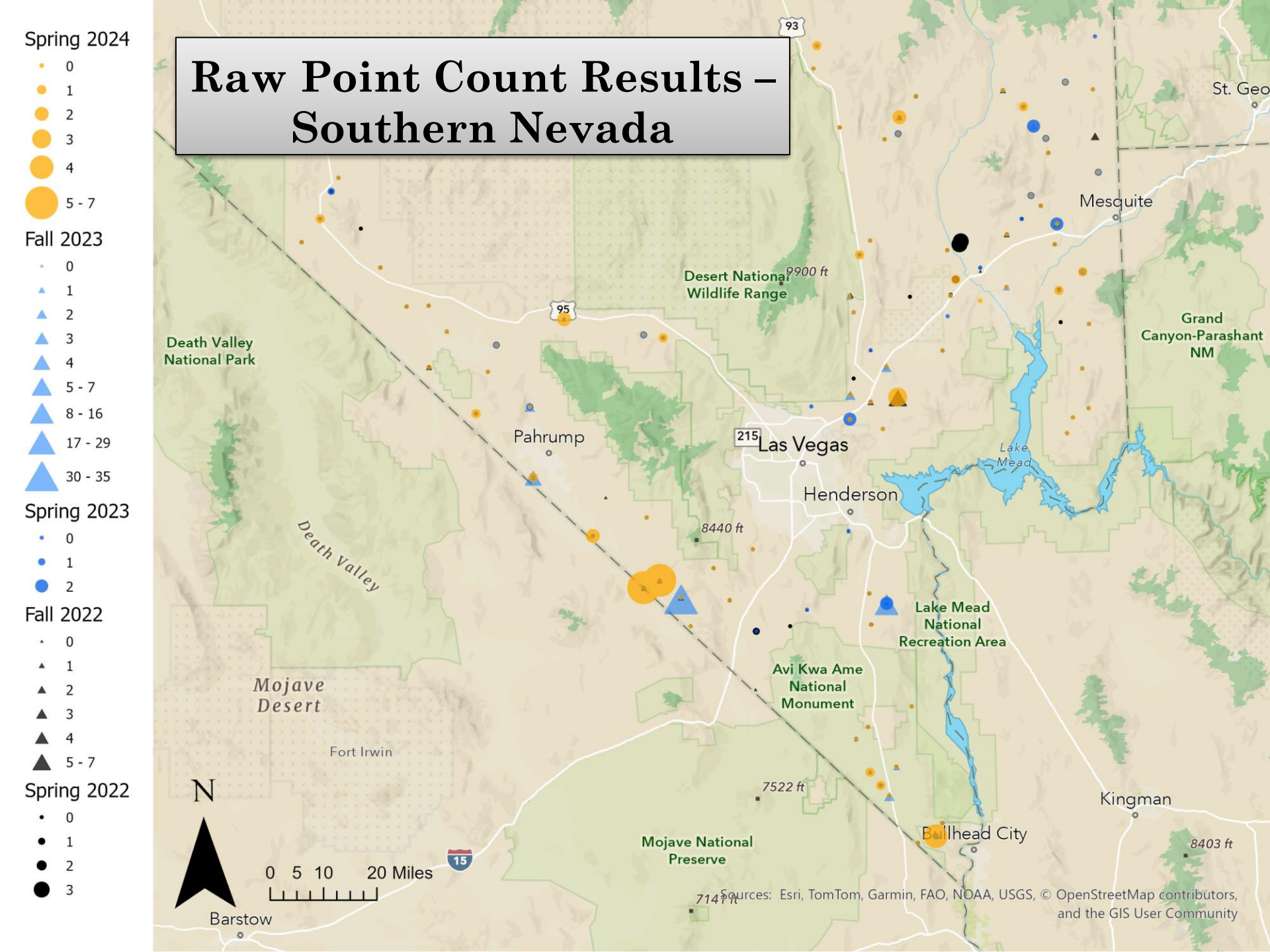


2024 Raven Management in Southern Utah



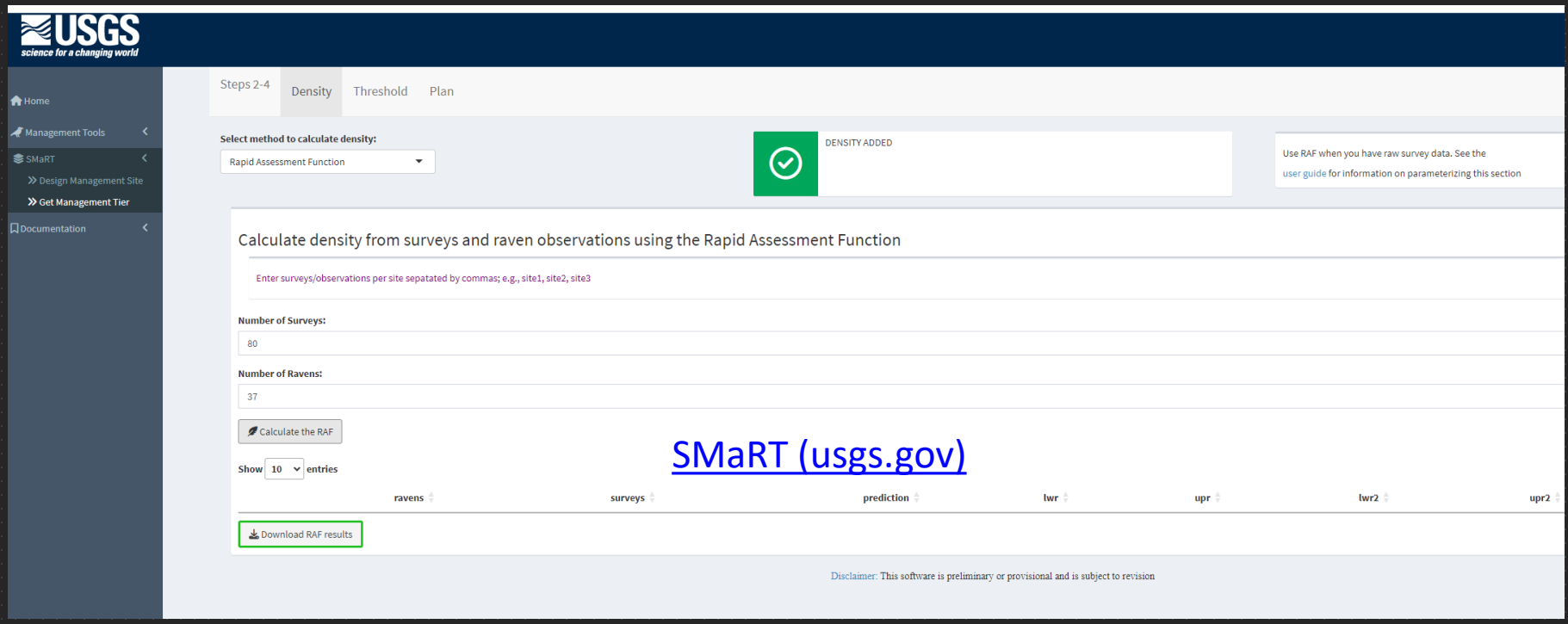
Adaptive Management Cycle



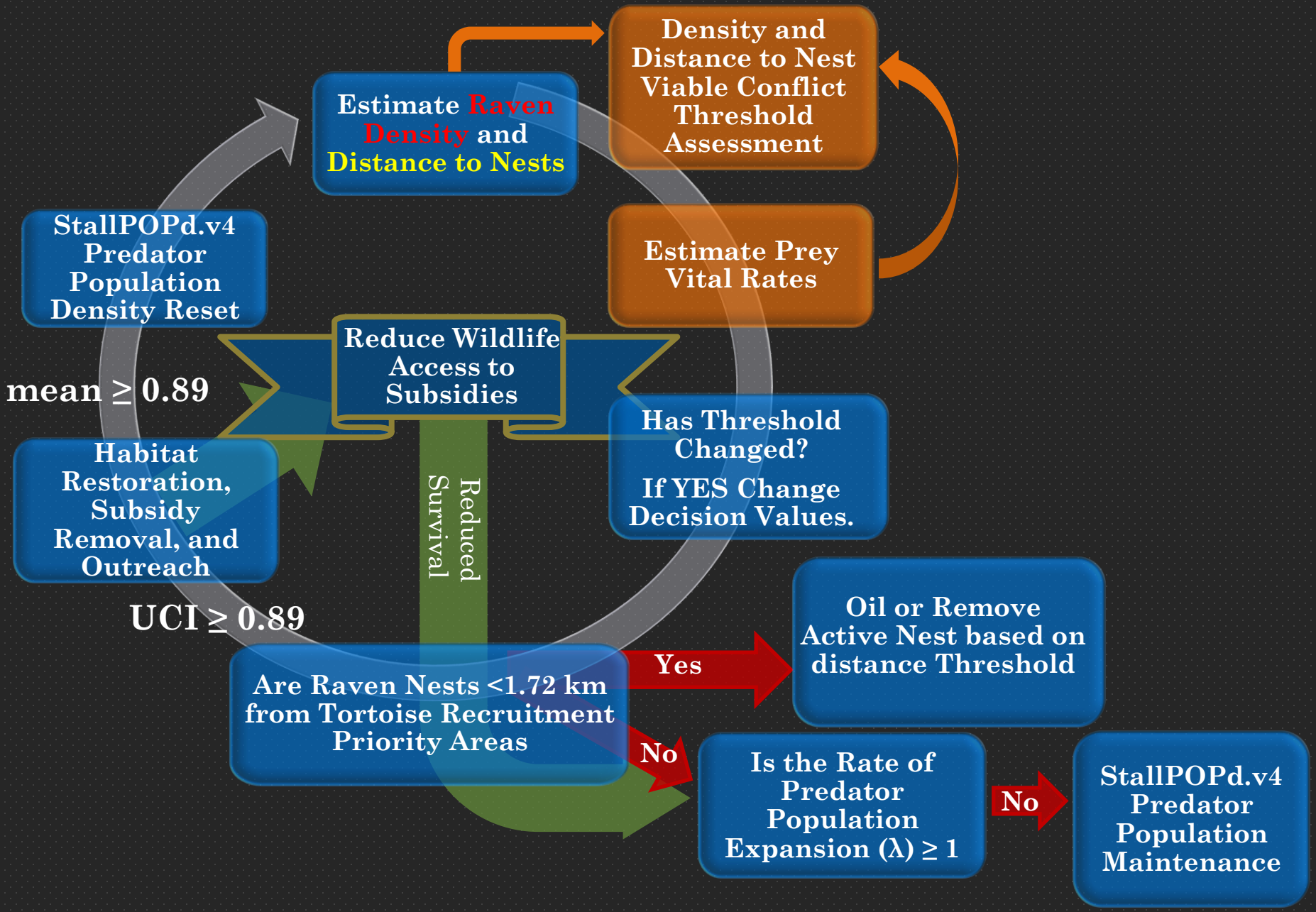

Raw Point Count Results – Southern Nevada
Spring 2024
0
1
2
3
4
5 - 7
Fall 2023
0
1
2
3
4
5 - 7
8 - 16
17 - 29
30 - 35
Spring 2023
0
1
2
Fall 2022
0
1
2
3
4
5 - 7
Spring 2022
0
1
2
3
93
95
215
15
Death Valley National Park
Desert National Wildlife Range
9900 ft
Pahrump
Las Vegas
Henderson
Mesquite
St. Geo
Grand Canyon-Parashant NM
Lake Mead
8440 ft
Death Valley
Lake Mead National Recreation Area
Avi Kwa Ame National Monument
Mojave Desert
Fort Irwin
7522 ft
Kingman
Bullhead City
8403 ft
Mojave National Preserve
7141 ft
Barstow
N
0 5 10 20 Miles
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

Next steps in Southern Nevada

Season Year	Ravens	Surveys	Prediction	Lower 95th	Upper 95th	error
Springs 2024	37	80	0.39	0.2	0.8	-0.03
Fall 2023	66	80	0.67	0.23	1.32	0.11
Spring 2023	19	88	0.2	0.1	0.5	-0.11
Fall 2022	20	69	0.26	0.13	0.6	-0.1
Spring 2022	5	56	0.09	0.04	0.37	-0.2
Combined	147	373	0.34	0.13	0.67	0.04



Adaptive Management Cycle



Raven Fee

RENEWABLE ENERGY ACTION TEAM
DEPOSIT DOCUMENT

Detailed instructions for properly completing this document begin on page 7. REAT agencies are responsible for completing this form and submitting it to NFWF when a project proponent will be depositing funds with NFWF, but the deposits identified in the document will be made by the project proponent. Once the deposit document is completed the applicable REAT agency should submit a copy to NFWF and the project proponent. The project proponent should include a copy with the deposit.

Project Name: Palen Solar Project

Project Phase: *(if applicable)* Pre-Construction

Project Location: *(i.e. County, Township, Range, Section, Base and Meridian)*
Riverside County
San Bernardino Base and Meridian
T5S, R17E, portions of Sections 19, 20, 21, 27, 28, 29, 31, 32, 33, and 34.
T5S, R16E, portions of Section 24, 25, 26, 27, and 28.
T6S, R17E, portions of Sections 2, 3, 4, 5, and 6.

Land Ownership of Project Site: *(if publicly owned, identify the applicable government entity)*
Bureau of Land Management (BLM)

Project Proponent: EDF Renewables (Maverick Solar, LLC)

Permittee/Grantee: *(and, if applicable, the parent company)*

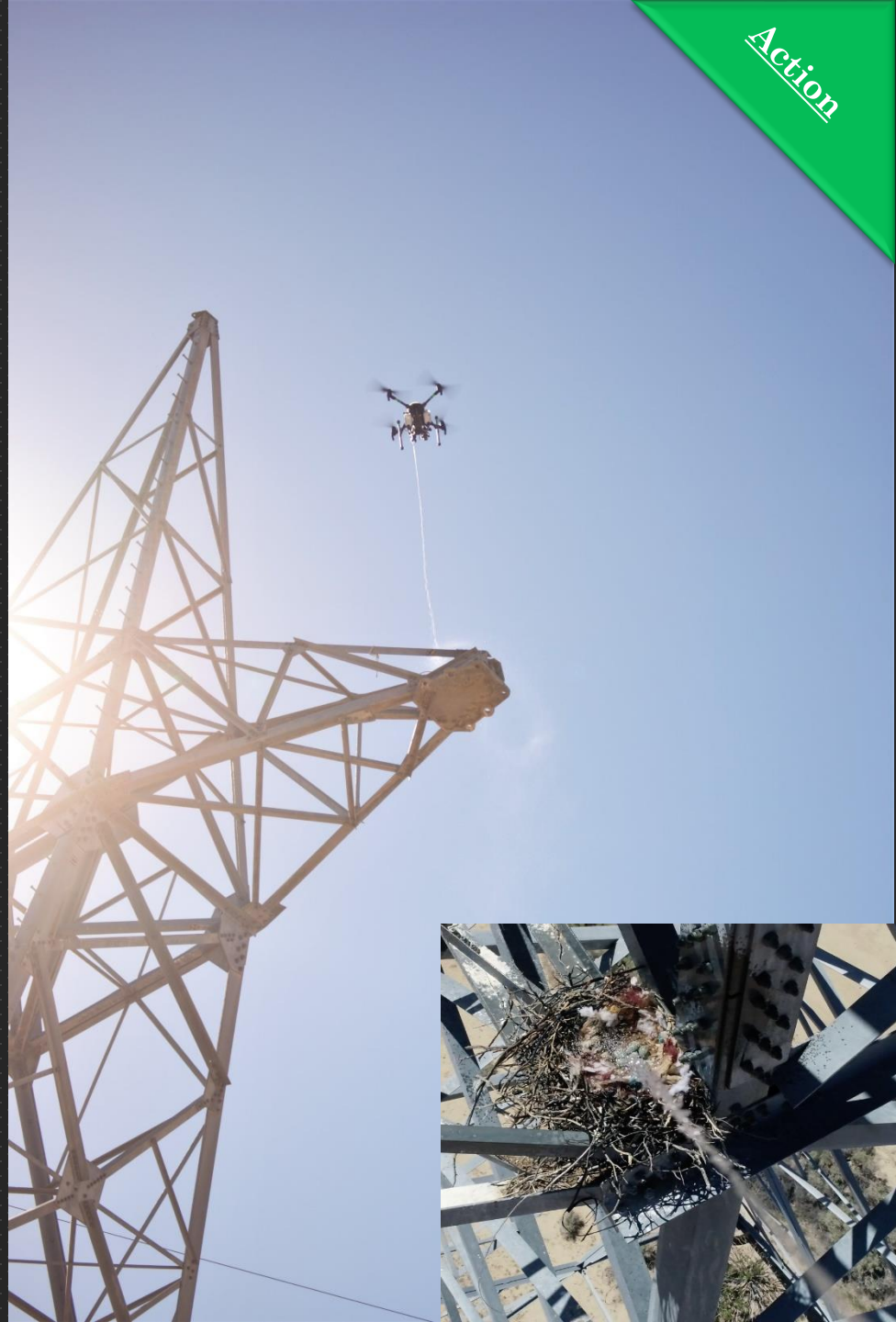
Permitting Agency (check if applicable) and Decision Documents:
(identify by name, date, and permit #)

[X] **Bureau of Land Management**
- [X] Decision Document Attached
  Project Identification or Tracking #: **CACA-48810 Record of Decision 10/18**

[X] **California Department of Fish and Wildlife**
- [X] Decision Document Attached
  Project Identification or Tracking #: **ITP 2081-2017-052-06 12/18**
- [ ] SB 34 Funds

[ ] **California Energy Commission**
- [ ] Decision Document Attached
  Project Identification or Tracking #:

[X] **U.S. Fish and Wildlife Service**
- [X] Decision Document Attached
  Project Identification or Tracking #: **Biological Opinion FWS-ERIV-18B0083-18F0403 5/18**



Conclusion

- Raven egg oiling is effective but expensive and needed in perpetuity
- Indirect effect fees are necessary to implement raven treatments at landscape scales
- One size does not fit all when it comes to raven management
- Areas near subsidies are slowest to respond to treatments – particularly near dumps and agriculture