



NEW
MOJAVE DESERT
TORTOISE
STUDY



Conserve
Southwest
Utah

Photos by Brady Iverson

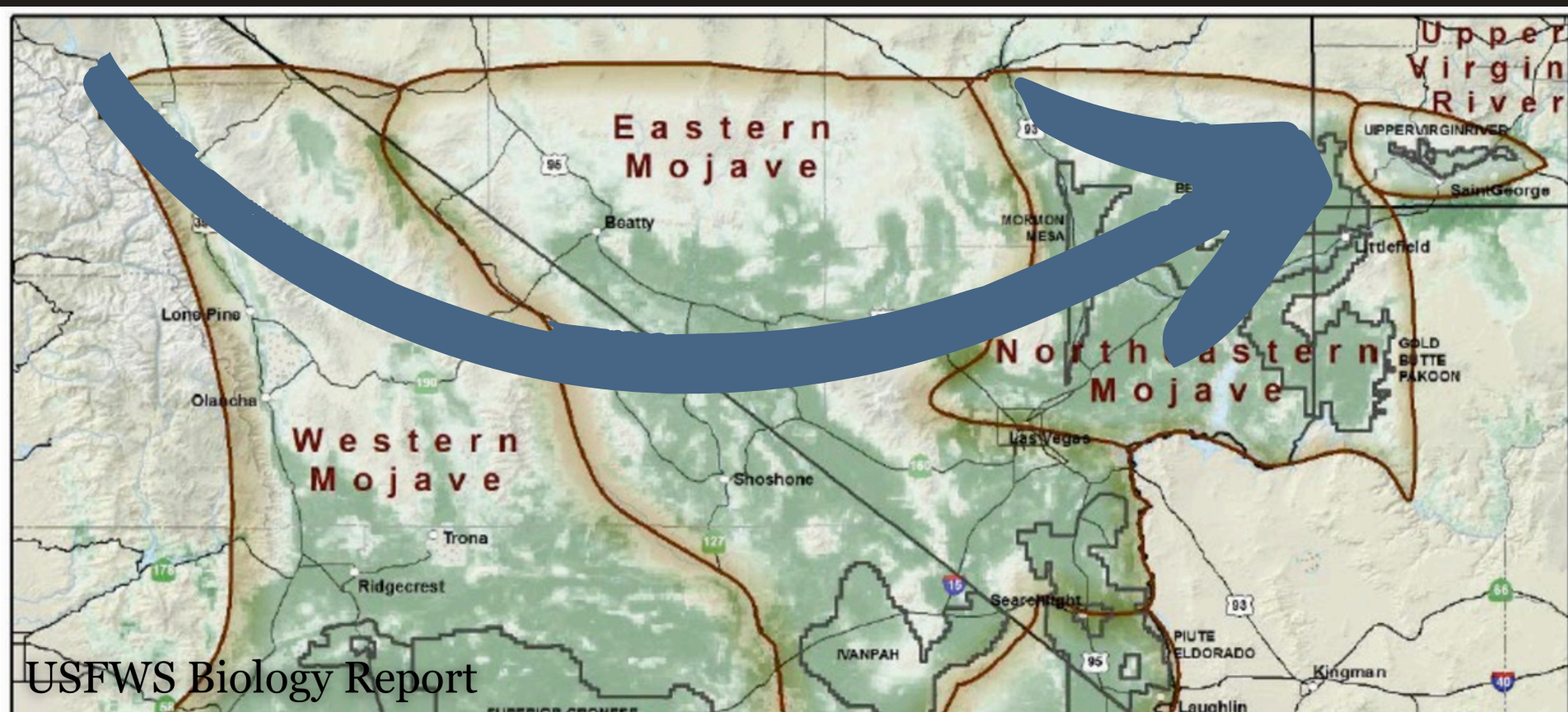
OVERVIEW

Dr. Michael W. Tuma recently published a new study entitled: **“Mojave Desert Tortoises in the Red Cliffs NCA and Upper Virgin River Recovery Unit: Population Trends, Threats to Persistence, and Conservation Significance”**

The study found that Mojave Desert tortoise populations in the Red Cliffs National Conservation Area are among the healthiest in their range. However, recent wildfires, along with other threats such as invasive plants, roads, OHV recreation, urbanization, and climate change, pose significant risks to these populations. Careful management and restoration efforts are essential to maintain these populations and support their dispersal to other areas.

LOCATION

- The Upper Virgin River Recovery Unit (UVRRU) includes designated Critical Habitat for the Mojave Desert tortoise in Washington County, Utah, and Mohave County, Arizona.
- It is the northeastern corner of the tortoise's range that spans westward into California.
- The UVRRU is one of five recovery units, all of which are deemed essential for the long-term viability of the Mojave Desert Tortoise.
- The Red Cliffs National Conservation Area and Red Cliffs Desert Reserve, which largely overlap one another, are both located within the UVRRU. The Red Cliffs Desert Reserve overlaps 45,311 acres of BLM-administered lands, 6,426 acres of State Trust Institutional Lands, 6,106 acres managed by the Utah Department of Natural Resources, and 2,981 acres of privately owned inholdings



WHAT IS
THE UPPER
VIRGIN
RIVER
RECOVERY
UNIT
(UVRRU)?

MONITORING & POPULATION TRENDS

Photo by Abbey Cottle

- Desert Tortoise population trends have been monitored since 1999 using distance sampling surveys conducted by the USFWS and Utah Department of Natural Resources.
- These surveys have determined that Mojave Desert tortoise populations in the UVRRU and especially the Red Cliffs Reserve are among the most robust throughout the range of the species.

Table 1. Adult tortoise density (tortoises/km²) estimates within tortoise conservation areas (TCAs) between 1999 and 2023.

TCA	1999 (a)	2000 (a)	2001 (a,b)	2002 (b)	2003 (a,b)	2004 (a)	2005 (a)	2007 (a)	2008 (a)	2009 (a)	2010 (a)	2011 (a)	2012 (a)	2013 (a)	2014 (a)	2015 (c,d)	2016 (c)	2017 (d,e)	2018 (f)	2019 (d,g)	2020 (h)	2021 (i)	2023 (d)
AG						11.4	13.4	6.5	4.5	7.5	13.8		6.0	7.3	8.4	10.3	8.5	9.4	7.6	7.0	7.1	3.9	
CK			10.1	7.7	4.0	4.9	6.0	4.3	4.2		3.7	3.9	3.9					4.3		1.8	4.6	2.6	
CM			7.2		6.3	6.7	10.3	3.9	4.8	9.4	4.2	4.0	0.8				1.7		2.9		4.0		
FE			15.7	3.7		8.2	13.5	6.2	6.6	8.3	6.9	6.8	0.9				5.5		6.0	2.8		5.3	
JT				3.3	2.7	1.9	2.7	3.0	2.3	2.3	2.8	3.5	3.4				2.6	3.6		3.1	3.9		
PT			6.5	4.0	3.8	2.2	9.9	1.9	3.3	4.3	3.4	3.3	3.7				2.1	2.3		1.7	2.9		
PV						2.9	3.7	4.1	4.1	3.6	3.8	6.6	1.9				4.0	5.9				3.9	
EV						2.6	5.0	4.1	1.8	3.8	1.0	2.8	0.9				2.7	5.6		2.3			
IV			2.8	5.4		4.4	4.4	5.6	5.1	4.1	1.0	4.5	2.8			1.9			3.7	2.6		3.0	
BD			5.6				0.9	1.1	1.1	3.2	3.3	3.3	5.4	2.6			5.6	1.3		2.0			
CS			2.2	3.5	5.5	1.3	3.3	1.4	1.2	2.0	3.6	4.0	2.9				4.2		5.1	3.2			
GB			1.2		1.8	0.6	0.2	1.1		2.2	1.7	1.6	2.3	1.7				1.9	2.3			2.4	
MM			1.8		3.8	2.4	4.9	3.0	1.9	7.3	5.5	6.3	4.3				2.1		3.6			5.2	
RC	34.3	25.7	24.4		14.0		22.5	22.1		15.5		19.3		18.3		15.4		20.6		18.5		20.7	
FK			5.5	4.7	3.4	8.4	5.3	3.0	0.5	3.3	2.4	3.5	2.2		4.7	4.5		4.1		2.7	1.7		
OR			10.1	13.1	4.1	7.3	7.7	7.1	5.0	7.2	7.5	3.2	4.6		3.5			3.9	3.4	2.5		2.5	
SC			4.3	8.1	7.8	6.3	6.3	5.9	1.9	4.6	2.6	3.4	4.3		2.5	2.6	3.6	1.7		1.9			

Data sources

- a) Allison and McLuckie (2018)
- b) USFWS (2009)
- c) USFWS (2016)
- d) UDNR (2024)
- e) USFWS (2018)
- f) USFWS (2019)
- g) USFWS (2020)
- h) USFWS (2022a)
- i) USFWS (2022b)

Colorado Desert Recovery Unit

- AG = Chocolate Mountain Air Gunnery Range
- CK = Chuckwalla
- CM = Chemehuevi
- FE = Fenner
- JT = Joshua Tree National Park
- PT = Pinto Mountains

Eastern Mojave Recovery Unit

- PV = Piute Valley
- EV = Eldorado Valley
- IV = Ivanpah Valley

Northeastern Mojave Recovery Unit

- BD = Beaver Dam Slope
- CS = Coyote Springs Valley
- GB = Gold Butte-Pakoon
- MM = Mormon Mesa

Upper Virgin River Recovery Unit

- RC = Red Cliffs Desert Reserve

Western Mojave Recovery Unit

- FK = Fremont-Kramer
- OR = Ord-Rodman
- SC = Superior-Cronese

- The population of Mojave Desert tortoises in UVRRU & Red Cliffs Reserve per square kilometer (km²) is the most dense across the entire range – underscoring the importance of this population.
- However, the number of tortoises per kilometer in the Reserve declined approximately 40% between 1999 and 2023.
- An annual decline of -3.2% in the UVRRU & Red Cliffs Reserve was detected between 2004 and 2014 – particularly evident between 2007 and 2013.
- Survey data from 2015 through 2023 appear to indicate a slight recovery, but not to a level that matches density observed pre-2007.
- Range-wide, there were an estimated 336,393 adult tortoises in 2004 and 212,343 in 2014, representing a decline of 124,050 (-37%) over this 10-year period.
- **Within Red Cliffs Reserve, the estimated abundance of adult tortoises declined from an estimated 3,482 in 1999 to an estimated 2,425 in 2023, an estimated loss of 1,057 (-30%).**

CURRENT STATUS OF MOJAVE DESERT TORTOISE POPULATIONS IN THE UVRRU AND RED CLIFFS RESERVE

PV		2.9	3.7	4.1	4.1	3.6	3.8	6.6	1.9		4.0	5.9		3.9		
EV		2.6	5.0	4.1	1.8	3.8	1.0	2.8	0.9		2.7	5.6	2.3			
IV	2.8	5.4	4.4	4.4	5.6	5.1	4.1	1.0	4.5	2.8	1.9		3.7	2.6	3.0	
BD	5.6			0.9	1.1	1.1	3.2	3.3	3.3	5.4	2.6		5.6	1.3	2.0	
CS	2.2	3.5	5.5	1.3	3.3	1.4	1.2	2.0	3.6	4.0	2.9		4.2	5.1	3.2	
GB	1.2		1.8	0.6	0.2	1.1		2.2	1.7	1.6	2.3	1.7		1.9	2.3	2.4
MM	1.8		3.8	2.4	4.9	3.0	1.9	7.3	5.5	6.3	4.3		2.1	3.6	5.2	
RC	34.3	25.7	24.4	14.0	22.5	22.1	15.5	19.3	18.3	15.4	20.6	18.5	20.7			
FK	5.5	4.7	3.4	8.4	5.3	3.0	0.5	3.3	2.4	3.5	2.2	4.7	4.5	4.1	2.7	1.7
OR	10.1	13.1	4.1	7.3	7.7	7.1	5.0	7.2	7.5	3.2	4.6	3.5	3.9	3.4	2.5	2.5
SC	4.3	8.1	7.8	6.3	6.3	5.9	1.9	4.6	2.6	3.4	4.3	2.5	2.6	3.6	1.7	1.9

Data sources

a) Allison and McLuckie (2018)	Colorado Desert Recovery Unit	Eastern Mojave Recovery Unit	Northeastern Mojave Recovery Unit	Western Mojave Recovery Unit
b) USFWS (2009)	AG = Chocolate Mountain Air	PV = Piute Valley	BD = Beaver Dam Slope	FK = Fremont-Kramer
c) USFWS (2016)	Gunnery Range	CS = Coyote Springs Valley	OR = Ord-Rodman	SC = Superior-Cronese
d) UDNR (2024)	CK = Chuckwalla	GB = Gold Butte-Pakoon	MM = Mormon Mesa	
e) USFWS (2018)	CM = Chemehuevi	EV = Eldorado Valley	RC = Red Cliffs Desert Reserve	
f) USFWS (2019)	FE = Fenner	IV = Ivanpah Valley		
g) USFWS (2020)				
h) USFWS (2022a)	JT = Joshua Tree National Park			
i) USFWS (2022b)	PT = Pinto Mountains			

SIGNIFICANCE

The Red Cliffs Desert Reserve and the UVRRU tortoise populations and habitats are essential for the long-term survival of the Mojave desert tortoise for several reasons:

High Population Density:

The Red Cliffs Reserve has some of the highest densities of tortoises, making it a key source for spreading tortoises and their genes to nearby areas. This helps maintain healthy populations across the region and range.

Leading-Edge Population:

As climate change makes some southern and western habitats unsuitable, the UVRRU population will be vital for the species' northward expansion into new, suitable areas. These tortoises are well-adapted to the northeastern edge of their range and will be crucial for spreading into nearby unoccupied habitats.

Genetic Diversity:

The genetic diversity in this tortoise population is essential for adapting to new and changing environmental conditions. This diversity helps ensure the long-term survival of the species by providing the genetic tools needed to cope with changes.

Keystone Species:

The Mojave Desert tortoise is a keystone species, meaning it has a higher influence over the ecosystem than other species. For example, species like the Gila monster, collared peccaries, roadrunners, and burrowing owls use their burrows and benefit from having them around. Protecting tortoises, therefore, supports broader biodiversity and ecosystem stability.

- **Wildfires:** Wildfires pose a significant threat to tortoise populations. The frequency and intensity of wildfires is increasing in the Red Cliffs regions. Fires are much more likely to start near roads and in areas with urban influences than in undisturbed natural areas. Fire kills tortoises directly and destroys the vegetation that they need to survive.
- **Invasive Plants:** Invasive plant species, like brome grasses and cheatgrass, provide fuel for fires. The burned areas, in turn, favor the spread of these invasive species. This positive feedback cycle accelerates the decline of habitat by reducing the availability of native food plants and cover for tortoises.

Photo by Larry Cazier

THREATS TO THE TORTOISE

- **Roads and Urbanization:** Roads block tortoise movements leading to smaller and more isolated patches of tortoises. Roads destroy habitats directly but also degrade them indirectly by enabling people to access places way more easily. With people come more fires, invasive species, garbage (which in turn brings ravens and coyotes that predate on tortoises). Roads also pose a direct threat to tortoises from vehicle strikes. Additionally, roads facilitate human access to tortoise habitats, increasing the risk of poaching and other harmful human activities.
- **Climate Change and Drought:** Climate change exacerbates drought conditions, leading to dehydration and starvation of tortoises, and more fire.

IN CONCLUSION

The UVRRU and Red Cliffs Reserve are critical areas, but they are small and fragmented. The tortoises need large, unfragmented patches of high-quality habitat for genetic diversity and resilience to unpredictable events like fires and droughts.

1. Stop further fragmentation of habitat.

- No more roads!
- We need to ensure critical areas like Zone 3 in the Red Cliffs Reserve remain protected from development, such as the proposed Northern Corridor Highway.

2. Restore degraded habitat areas:

- Remove invasive plants and plant genetically-adapted native plants
- Remove unneeded roads, tracks, and other infrastructure.

3. Protect more habitat

- Provide connectivity to adjacent populations of the tortoise and potential new habitats (resulting from climate change).



Photos by Brady Iverson

RESOURCES

Michael Tuma's Full Report: https://conserveswu.org/240618_Tuma_MDT_UVRRU_Conservation_Significance/

USFWS Biology Report: [https://www.fws.gov/sites/default/files/documents/Biological%20Report%20for%20the%20Upper%20Virgin%20River%20Recovery%20Unit_Januar y%202012%202021%20%282%29.pdf](https://www.fws.gov/sites/default/files/documents/Biological%20Report%20for%20the%20Upper%20Virgin%20River%20Recovery%20Unit_January%202012%202021%20%282%29.pdf)

Information about the proposed Northern Corridor Highway: <https://conserveswu.org/northern-corridor-highway/>





PROTECT THE MOJAVE DESERT TORTOISE

GO TO WWW.PROTECTREDCLIFFS.COM