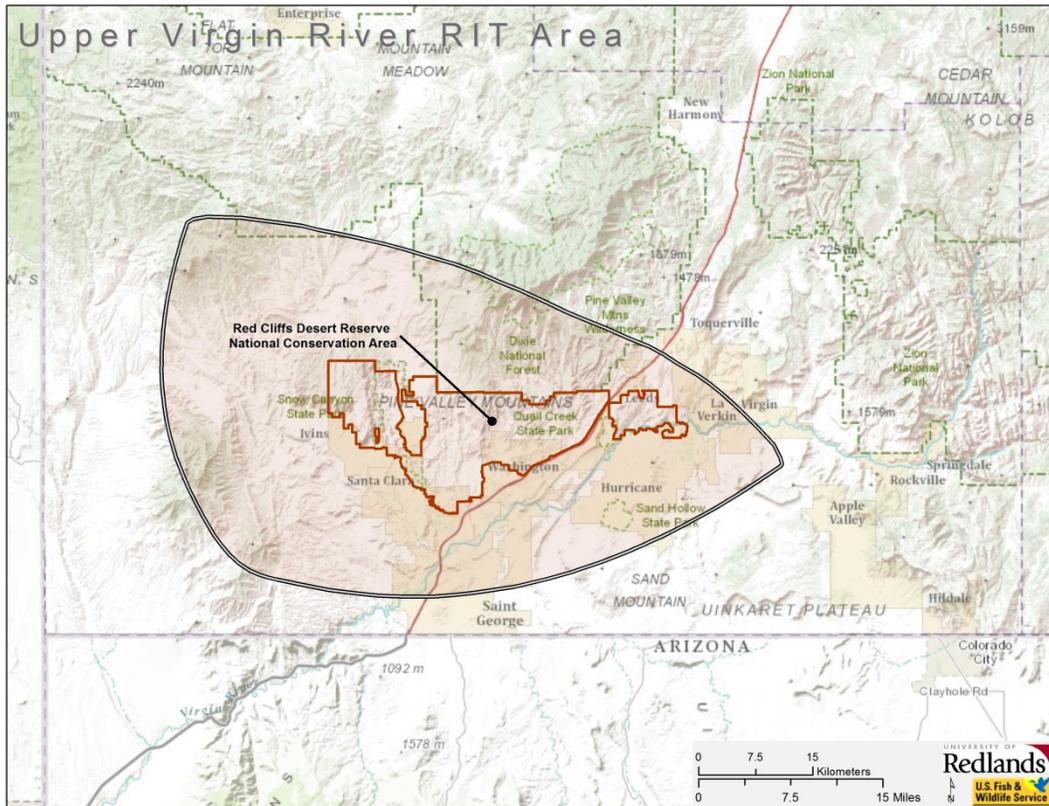


# RECOVERY ACTION PLAN

## FOR THE

### MOJAVE DESERT TORTOISE IN THE

### UPPER VIRGIN RIVER RECOVERY UNIT



April 2014  
Version 1

## WHAT IS THIS DOCUMENT?

This document is the recovery action plan developed by the Upper Virgin River Recovery Implementation Team (RIT) for their region. The foundation for desert tortoise recovery is the revised recovery plan for the Mojave desert tortoise (USFWS 2011. Revised Recovery Plan for the Mojave population of the desert tortoise, *Gopherus agassizii*. Sacramento, CA), which describes threats to the Mojave desert tortoise and recovery actions to remove these threats. Due to the numerous and diverse threats that vary spatially and temporally across the range of the tortoise, the revised recovery plan recommends an adaptive management framework for prioritizing recovery actions. The first step in this framework was to capture and rank the threats and recovery actions with development of a spatial decision support system (SDSS). The desert tortoise SDSS ranks categories or types of recovery actions that are expected to be most effective in each part of the desert for long-term recovery of the species based on models of relationships between threats, recovery actions, and tortoise populations. The next step in the adaptive management framework was for regional RITs to tier off the recovery plan and the ranked recovery action types from the SDSS by developing recovery action plans containing specific, local prescriptions for recovery actions and suggesting the first set of activities to be pursued during the initial years of the recovery process. In conjunction with prioritizing recovery actions in this document, the RITs prioritized needs for effectiveness monitoring or research. This document is the first recovery action plan for the Upper Virgin River RIT.

Disclaimer: The Desert Tortoise Management Oversight Group (MOG) approves this Recovery Action Plan (version 1) as part of an ongoing process toward recovery of the Mojave desert tortoise. This approval does not imply endorsement of specific recommendations within the plan by all members of the MOG. The recovery action plan is intended to be a living document that serves as a tool to facilitate on-the-ground implementation of recovery actions. Nothing obligates actions to be implemented by agencies or that alternative actions cannot also be implemented to address underlying threats to the tortoise. The RITs will regularly engage with the MOG to report on progress in implementing recovery actions. The next version of the recovery action plan (i.e., version 2) will include a “report card” on the progress of recovery implementation.

### LITERATURE CITATION OF THIS DOCUMENT SHOULD READ AS FOLLOWS:

U.S. Fish and Wildlife Service. 2014. Recovery action plan for the Mojave desert tortoise in the Upper Virgin River Recovery Unit. U.S. Fish and Wildlife Service, Pacific Southwest Region, Sacramento, California. Developed in coordination with the Upper Virgin River Recovery Implementation Team. 14 pp.

## TABLE OF CONTENTS

	page
<b>A. INTRODUCTION</b>	<b>1</b>
<b>B. UPPER VIRGIN RIVER RIT PARTICIPANTS</b>	<b>4</b>
<b>C. PRIORITIZED ACTIONS</b>	<b>4</b>
Red Cliffs Desert Reserve	7
Upper Virgin River RIT area (outside of the Reserve)	11
<b>D. TRACKING &amp; MONITORING PLAN</b>	<b>12</b>
Reporting recommendations for recovery action implementation and maintenance	12
Plan for supporting monitoring and research to assess action effectiveness	12
Overall recovery action plan effectiveness monitoring needs	12
Monitoring for effectiveness of specific recovery action types	13
Priority needs identified for effectiveness monitoring or research in the Upper Virgin River	13
<b>E. NEXT STEPS</b>	<b>14</b>
<hr/>	
<b>ONLINE APPENDIX: BACKGROUND &amp; SUPPORTING INFORMATION</b>	
<a href="http://www.fws.gov/nevada/desert_tortoise/dtro/uppervirgin.html">http://www.fws.gov/nevada/desert_tortoise/dtro/uppervirgin.html</a>	
Ranked threats for the RIT's tortoise conservation area & region	
Ranked recovery action types for the RIT's tortoise conservation area & region	

## A. INTRODUCTION

### Overview of Recovery Implementation Teams

The revised recovery plan (USFWS 2011) called for the establishment of regional Recovery Implementation Teams (RITs). The RITs are appointed recovery teams, per section 4(f)(2) of the Endangered Species Act (Act), are advisory to the U.S. Fish and Wildlife Service, and are exempt from the Federal Advisory Committee Act. The RITs bring together partners from land management, scientific, conservation, and land-use groups to work together with the Fish and Wildlife Service on planning, implementing, tracking, and evaluating recovery actions. Necessary to this diverse partnership, RIT members must have a commitment to working collaboratively for recovery of the desert tortoise and be knowledgeable about desert tortoise issues, including related management issues.

The primary responsibility of each RIT is to partner across local and regional jurisdictional boundaries to plan, implement, and evaluate actions related to desert tortoise recovery. Diverse teams are essential because of the many jurisdictions and stakeholders involved in implementing actions related to desert tortoises. A cooperative/coordinated effort among land managers, wildlife agencies, stakeholders, and scientists will:

- Accomplish recovery goals that would be unattainable on a local scale;
- Reduce duplication of effort and increase the efficient use of resources and expertise; and
- Increase public and federal/state/local agency support for recovery by providing consistent information on the status of desert tortoise recovery implementation throughout the species' range.

Organization of the RITs is based on recovery units and land management planning areas, configured in a manner that will also be logistically practical from a jurisdictional perspective. The specific tasks for each RIT are to:

- Develop a science-based recovery action plan for its assigned geographical area;
- Coordinate implementation of recovery actions contained in the recovery action plan;
- Provide/secure/coordinate the necessary resources for implementation of recovery actions;
- Assess effectiveness of implemented recovery actions;
- Compile results into a range-wide database and local-level decision support system;
- Report findings and status annually to appropriate regional groups and the Desert Tortoise Management Oversight Group; and
- Review recovery action plans and revise as necessary.

More information on the RITs can be found in the full "RIT Terms of Reference," available at [http://www.fws.gov/nevada/desert\\_tortoise/dtro/dtro\\_rits.html](http://www.fws.gov/nevada/desert_tortoise/dtro/dtro_rits.html)

## Development of the Recovery Action Plan

Each RIT was provided with the most up-to-date information from the desert tortoise spatial decision support system (SDSS), including rankings of recovery action types for each tortoise conservation area and the overall RIT area. Using a consensus-based framework, each RIT proposed specific actions within these ranked recovery action types and then prioritized these actions based on information within the SDSS, the RIT members' on-the-ground knowledge, and each party's individual interests. Each RIT also identified priority needs for effectiveness monitoring or research in their areas. The recovery action plan contains these priorities for the Upper Virgin River RIT. This recovery action plan is intended to be revisited and updated to reflect new information and to report progress on implementation of specific recovery actions. Public feedback on this plan will also be considered by the RITs in subsequent revisions. Similar recovery action plans have been developed for the California Mojave RIT and the North-East Mojave RIT.

The desert tortoise SDSS is a model of threats to tortoise populations, a purposeful tool for structured recovery action planning. Structured decision-making tools are not designed to represent on-the-ground "truth," but rather are designed to provide for transparent, systematic problem-solving (Starfield, AM. 1997. A pragmatic approach to modeling for wildlife management. *Journal of Wildlife Management* 61:261-270). The desert tortoise SDSS provides background information about the most important threats in particular areas and rankings of recovery actions types for the RIT's tortoise conservation areas and region. Utilizing this type of pragmatic modeling prevents managers from becoming paralyzed by shortcomings in understanding or by limited data availability, while highlighting data and information needs. It also makes it incumbent on RIT participants to use on-the-ground, site-specific knowledge provided by individual RIT members in tandem with guidance from model outputs and not rely on computer output alone.

Much of the background information captured within the SDSS that contributed to this planning process can be explored and downloaded from [http://www.fws.gov/nevada/desert\\_tortoise/dtro/uppervirgin.html](http://www.fws.gov/nevada/desert_tortoise/dtro/uppervirgin.html), including:

- Threats ranked by their estimated overall contribution to risk in each tortoise conservation area, and
- Ranked recovery action types based on their estimated overall contribution to decreasing risk to the tortoise in each tortoise conservation area.

More in-depth information is accessible in two on-line tools. The Desert Tortoise Recovery Model Explorer is a tool in the form of a website ([http://www.fws.gov/nevada/desert\\_tortoise/dtro/model.html](http://www.fws.gov/nevada/desert_tortoise/dtro/model.html)) where one can explore the model underlying the decision support system. The current version of the model is based on Appendix A of the revised recovery plan and feedback from RIT members. Specifically, one can use the Model Explorer to find information about how threats affect tortoises and how recovery actions affect particular threats. The Data Explorer is another tool in the form of a website ([http://www.fws.gov/nevada/desert\\_tortoise/dtro/data.html](http://www.fws.gov/nevada/desert_tortoise/dtro/data.html)) where one can explore each data layer (map) used in the decision support system. The spatial distribution of threats, as well as recovery actions that already have been completed in the RIT areas for which we have spatial data, can be found on the Data Explorer. These data layers have been reviewed by RIT members. Although we will never have perfect knowledge about the effects of threats on tortoises, these

tools provide a framework for organizing the best available information, improving data sources and models, and undertaking adaptive management for desert tortoise recovery.

### **How should this document be interpreted and used?**

This recovery action plan is the product of collaborative discussion among RIT participants about the highest priority on-the-ground actions to be taken over the next few years. The intent behind the plan is to identify specific actions in need of funding for implementation. The recommendations are available for consideration to be implemented by land and wildlife management agencies as budgeting and planning occur and as other opportunities arise. Proponents of projects conducted within desert tortoise habitat may find the recovery action plan useful in identifying actions to compensate for impacts to desert tortoise populations or habitat in particular areas. Implementation of recovery actions will occur within existing land-management and environmental-review processes and subject to funding availability, other competing priorities (*e.g.*, for non-tortoise related actions), and logistical constraints of the responsible implementing entity.

As mentioned previously, the RITs are composed of individuals with diverse backgrounds and interests. As a result, not all recommendations were universally supported by RIT participants. In such cases, dissenting viewpoints or clarifying opinions are reflected in the document to capture the full range of input provided during the process and to inform managers of potential issues or concerns related to implementation. In some cases dissenting opinions may stimulate ideas for alternative actions that may still address the underlying threats to desert tortoises. In addition, not all groups contained the local management expertise to provide very specific prescriptions. Therefore, various actions will involve further development by appropriate specialists in the relevant agencies. Where the recovery action plan calls for development of a separate topic-specific plan, task groups of appropriate specialists may be coordinated by the Fish and Wildlife Service or individual RIT members to draft these plans.

The emphasis given to or taken from specific activities in the recovery action plan was heavily influenced by the specific composition of each RIT and the background and on-the-ground knowledge of participants. Gaps between prescriptions based on best available science and RIT recommendations can be measured by the differences in prioritization seen between RIT priorities and SDSS rankings in the RIT's table of prioritized actions. In addition, summary tables at the beginning of the RIT's prioritizations provide a comparison between the number of actions proposed in each action type and the SDSS ranking. Another artifact of the process of developing this recovery action plan is that recommendations do not always align smoothly across RIT boundaries, thereby creating occasional inconsistencies in approaches or priorities across biologically irrelevant lines on a map. Nevertheless, the recovery action plan provides a yardstick against which progress toward recovery can be made. Updates will occur on an ongoing basis in conjunction with reports to the Desert Tortoise Management Oversight Group and other appropriate regional management groups. Progress in implementing recovery actions and future coordination within and between RITs will provide opportunities to refine recommendations based on new information, address dissenting opinions reflected in the current plan, consider input provided outside the RITs, and better integrate recommendations across boundaries.

Finally, as noted by many RIT participants, the recovery action plan is not comprehensive in that much of the recovery program relies on development of policy-level prescriptions rather than the site-specific actions captured in this document. In particular, there was concern that in light of the current reality of many development projects and rights of way being authorized within tortoise habitat, issues related to habitat loss are not directly addressed by this RIT plan. *Therefore, we note that the action of protecting intact desert tortoise habitat, including linkages between tortoise conservation areas, is emphasized in the revised recovery plan even though it is not addressed specifically in the recovery action plan.*

**A. UPPER VIRGIN RIVER RIT PARTICIPANTS**

The Upper Virgin River RIT operates as part of the Washington County Habitat Conservation Plan’s Technical Committee.

---

Land Management	Bureau of Land Management	Tim Croissant
Land Management	Snow Canyon State Park	Kristen Comella
Wildlife Management	Utah Division of Wildlife Resources	Ann McLuckie
County	Washington County	Rob Sandberg
County	Washington County	Cameron Rognan
Stakeholder	Independent	Gary McKell

---

**B. PRIORITIZED ACTIONS**

The following tables include the prioritized site-specific recovery actions recommended by the Upper Virgin River RIT for the Red Cliffs Desert Reserve, as well as for the RIT area as a whole. The RITs were asked to describe specific on-the-ground recovery actions that cooperating entities would implement if they had the funding. Details such as location or scope of the action that are not specified here may be specified in future, more detailed project proposals/concepts. RIT participants were asked to disregard issues of cost, feasibility, and politics in brainstorming recovery actions and to focus instead on biological issues related to threats to tortoises within their RIT area. Implementation will be determined by funding availability, logistics, and other agency priorities. Within this context, other actions, even if not prioritized here, may still be relevant and appropriate in meeting underlying threat-reduction objectives; this recovery action plan does not preclude innovative ideas to achieve recovery of the Mojave desert tortoise.

## Glossary of Terms used in the Tables of Prioritized Actions

**RIT Priority** is the RIT's assigned priority for each action.

**Priority 1** actions are those that the RIT deemed the highest priority for implementation. These actions have the highest expected effectiveness for contributing to tortoise recovery and/or need to be completed first to allow for other actions to be implemented. In some cases, these actions may already be underway or planned for implementation within the planning period.

**Priority 2** actions are those that are the next highest priority for implementation after priority 1 actions have been initiated.

**Priority 3** actions are those that are the lowest highest priority for implementation, but that the RIT would still like to see implemented in this approximately 5-year planning period. These actions are the lowest priority due to their anticipated effectiveness and/or potential for implementation. These actions are to be pursued only after priority 1 and 2 actions have been implemented.

**SDSS RA type rank** refers to the ranking of the recovery action type from the SDSS (October 2012), under which the specific action was proposed (*e.g.*, an SDSS RA type ranking 3 tells us that this action came from the recovery action type that was ranked 3rd for this Tortoise Conservation Area). You can find the definition of each recovery action type on the Desert Tortoise Recovery Model Explorer ([http://www.fws.gov/nevada/desert\\_tortoise/dtro/model.html](http://www.fws.gov/nevada/desert_tortoise/dtro/model.html)).

**RA code** is the short-hand code for the SDSS recovery action type under which specific actions were proposed.

**RIT identifier number** refers to the specific number that the action was given at the RIT in-person meeting. The number is the ranking of the recovery action type from the SDSS under which the specific action was proposed, followed by the order in which the action was proposed (*e.g.*, RIT identifier number 3.02 tells us that this action came from the recovery action type that was ranked 3rd for this Tortoise Conservation Area and that it was the 2nd specific action proposed by RIT members under this type.)

**Dissenting Opinions** were submitted by RIT members if they did not support a particular action that was prioritized by the rest of the RIT, or if they felt other clarifying comments were necessary. Actions which received dissenting opinions or clarifications are noted with a footnote that describes the reasoning behind the dissent.

**Summary Table of Actions Prioritized by the Upper Virgin River RIT**

Recovery Action (RA) Type from SDSS	RA code	SDSS ranking (RIT area)	# Site-specific Actions Prioritized	# Dissenting Opinions
Environmental education	EDU	1	15	
Restore habitat	HAB	2	5	
Increase law enforcement	LEO	3	6	
Install & maintain human barriers (wildland-urban interface)	WUI	4	2	
Sign & fence protected areas	SFP	5	7	1
Decrease predator access to human subsidies	SUB	6	5	
Remove grazing (close allotments)	GRZ	7	1	
Install & maintain tortoise barrier fencing	FEN	8	5	
Targeted predator control	PRD	9		
Control dogs	DOG	10	2	
Restore roads ( <i>e.g.</i> , vertical mulching)	RER	11		
Manage disease in wild populations	WDS	12	1	
Landfill management	LAN	13		
Sign designated routes	RTS	14		
Install & maintain human barriers (preserves)	PRE	15		
Designate & close roads (travel management plan)	TRV	16		
Fire management planning & implementation	FIR	17	6	2
Manage disease in captive populations	CDS	18	1	
Restore habitat (toxicants/unexploded ordinance)	TOX	19		
Withdraw mining	MNG	20	1	1
Connect habitat (culverts/underpasses)	CUL	21	2	
Speed limits	SPD	22		
Install & maintain tortoise barriers (open OHV areas)	OOA	23		
Land acquisition	ACQ	24	3	
Restore habitat (garbage clean-up)	GAR	25		
Minimize wild horse & burro impacts	WHB	26		
Other	OTH		1	

RIT Priority	SDSS RA Type rank	RA code	Area of Interest & Specific Actions
<b>Red Cliffs Desert Reserve</b>			
1	1	EDU	Continue to produce educational materials ( <i>e.g.</i> , brochures, stickers, coloring books) that increase the publics' awareness of the protected areas (Red Cliffs Desert Reserve, National Conservation Area, State Park, etc.), the diversity of native species within them, and the surrounding Mojave desert ecosystem. Include ways the public can help protect species and their habitat. (RIT identifier number: 1.01)
1	1	EDU	Continue to develop and provide Mojave species diversity educational programs and retrofit to specific audiences ( <i>e.g.</i> , public schools, ATV jamboree, service clubs, higher education institutions, Forest Service, BLM, county fair, etc.). (1.02)
1	1	EDU	Continue to provide input on K-12 grade educational desert ecology curriculum with the local school districts. (1.04)
1	1	EDU	Educate recreational users to respect the rules and regulations of the Reserve ( <i>e.g.</i> , campfires, stay on trails, pet control, leash laws) through conservation officer/law enforcement contacts, interpretive staff, trail stewards, friends groups, etc. (1.05)
1	1	EDU	Continue to develop and maintain up to date recreational brochures, information, kiosks, trail signage etc. in the Reserve. (1.07)
1	2	LEO	Increase law enforcement (federal, state, local) presence during peak recreation periods and at high use areas. Identify priority actions and patrol areas and follow through by maintaining a regular presence. (2.01)
1	2	LEO	Enforce rules through the use of warnings and citations. Ensure that all ordinances are in place, to aid in compliance. (2.02)
1	2	LEO	Monitor and patrol sensitive areas with law enforcement/conservation officers/rangers/volunteers ( <i>e.g.</i> , ATV's in Zone 4/Virgin River area). (2.04)
1	3	SFP	Install and maintain signage to keep the public on designated trails. (3.03)
1	4	HAB	Restore habitat in burned or otherwise disturbed areas; identify polygons of high potential or importance and create islands of seeded or planted habitat to enhance recovery. (4.02)
1	4	HAB	Conduct habitat restoration by controlling cheat grass and other non-native and invasive plant species. (4.05)
1	8	WUI	Continue monitoring recreation trails and use areas through the Human Impact Monitoring study. (8.01)
1	10	WDS	Continue to integrate current research into tortoise disease management protocols for the Reserve. (10.01)
1	15	FIR	Strategically place fuel breaks, such as brown stripping. (15.02)
1	15	FIR	Strategically place fuel breaks, such as herbicide applications. (15.04)

RIT Priority	SDSS RA Type rank	RA code	Area of Interest & Specific Actions
<b>Red Cliffs Desert Reserve</b>			
1 <sup>1</sup>	15	FIR	Strategically place fuel breaks, such as targeted grazing. (15.05)
1	15	FIR	Continue to work cooperatively with other Reserve partners to effectively manage tortoises and fire management issues in the Reserve. (15.06)
1	19	DOG	Continue to enforce dogs on leash ordinance and policies through the use of trail stewards, and law enforcement officers. Record dogs off leash during Human Impact Monitoring study. If dogs off leash continue to be a problem, consider banning dogs from problem trails within tortoise habitat. (19.01)
1	21	CUL	Maintain existing culverts that connect habitat within the Reserve, such as Tuacahn Rd, SR-18, Red Hills Parkway, and Cottonwood Road, so that tortoises can pass through them. (21.02)
1	23	ACQ	Acquire all remaining SITLA properties (State Institutional Lands Administration) and private properties within the boundaries of the Red Cliffs Desert Reserve. (23.01)
1	23	ACQ	Proposed projects that involve loss of habitat must compensate through acquisition of desert tortoise habitat within or adjacent to the protected area. Use MOG compensation ratios for proposed utility projects that involve permanent/temporary loss of habitat within the Reserve to maintain reserve design, habitat integrity, and reduce incursion into the Reserve. (23.02)
1	Other	OTH	Ensure no net loss of habitat within the Reserve. (28.01)
2	1	EDU	Take advantage of local resources such as submitting articles in local newspapers and magazines during peak tortoise activity periods ( <i>e.g.</i> , spring, early fall) to promote awareness and appreciation of desert tortoises and their habitat and reserve management issues. Submit a minimum of 2 articles / year. (1.03)
2	1	EDU	Continue to educate and encourage homeowner associations adjacent to the Reserve to participate in the management and protection of the Reserve. (1.06)
2	1	EDU	Pursue more BLM tortoise awareness opportunities, including at a new visitors center and outreach materials associated with the NCA designation. (1.08)
2	2	LEO	Improve reporting from law enforcement to report on activities on the Reserve / NCA. Appropriate agencies should review these reports and present them at the quarterly meetings. (2.03)

<sup>1</sup> This proposed recovery action is inconsistent with the Washington County HCP, the DT Recovery Plan, and the results of the Recovery Model Explorer. Grazing, as an effective method to reduce the potential for wildfires, is an unproven method. Proposed fuel reduction methods such as targeted grazing should be identified as a research item and conducted within the Reserve only when research results demonstrate it as a fuel reduction method that benefits tortoises and their habitat. (Utah Division of Wildlife Resources)

RIT Priority	SDSS RA Type rank	RA code	Area of Interest & Specific Actions
<b>Red Cliffs Desert Reserve</b>			
2	3	SFP	Identify, sign, and/or maintain existing roads as open or closed. (3.01)
2	3	SFP	Place physical barriers ( <i>e.g.</i> , fencing) in problem areas. (3.02)
2	3	SFP	Develop and use spatial data to show where signs currently exist, and where new ones are needed; review and update as needed. (3.04)
2 <sup>2</sup>	3	SFP	Install human-barrier fencing to retrofit stand-alone tortoise mesh with w/ 4 strand wire fence where appropriate ( <i>e.g.</i> , Red Hills Parkway) to reduce illegal human entry along roadways. (3.05)
2	3	SFP	Assess and implement seasonal closures of trails where appropriate. (3.06)
2	4	HAB	Conduct habitat restoration in washes or wetland areas by removing non-native species ( <i>e.g.</i> , exotic trees particularly salt cedar, in areas including but not limited to Grapevine Wash in Zone 4, Virgin River in Zone 4, Sand Hollow Wash in Snow Canyon State Park, City Creek). (4.01)
2	4	HAB	Restore habitat with large-scale seeding or plantings within the Reserve. (4.03)
2	4	HAB	Restore habitat on old roads and social trails. (4.04)
2	5	FEN	Maintain tortoise fence around the perimeter of the Reserve, with appropriate maintenance agreements. Conduct annual monitoring of tortoise exclusion fence and identify and fix all areas where the fencing is compromised. Maintain and update ArcMap of all fenced areas and identify type of fence. (5.02)
2	5	FEN	Identify and complete the areas that need tortoise fencing throughout the Reserve. (5.03)
2	6	SUB	Identify raven nests along power lines and remove all raven nests encountered within desert tortoise habitat. (6.01)
2	6	SUB	Minimize new above-ground power lines along right-of-ways to decrease perching site for ravens within high density tortoise areas within the Reserve. (6.04)
2	6	SUB	Identify open trash cans within recreation areas; modify where appropriate. Install scavenger proof garbage bins at recreation sites where trash is an ongoing problem (as determined by human impact monitoring study) and where there is a commitment to provide maintenance (removal of trash). (6.05)

<sup>2</sup> The Final Biological Opinion from the USFWS stated that tortoise exclusionary fencing would be installed along the entire ROW once construction was completed, which they did. DOT and St. George City developed a fencing plan as directed in the BO. That plan identified what type of fence would be installed and where. No one objected to the plan, and it was accepted. Fencing was subsequently completed as identified with either tortoise-only or people exclusionary fence. To come back at this point and require significant additional cost is not good public relations, and neither UDOT nor St. George City would agree to do it since they have complied with their agreement. (Washington County)

RIT Priority	SDSS RA Type rank	RA code	Area of Interest & Specific Actions
<b>Red Cliffs Desert Reserve</b>			
2	8	WUI	Install and maintain human barriers where appropriate in problem areas. (8.02)
2	15	FIR	Model to identify landscape-level fuel breaks by strategically identifying linear areas that would reduce the spread of large-scale fires ( <i>e.g.</i> , Cottonwood Road, Middleton Powerline Road, etc.). (15.01)
2 <sup>3</sup>	15	FIR	Strategically place fuel breaks, such as green stripping. (15.03)
2	19	DOG	Increase signing associated with keeping dogs on leash within the Reserve. (19.02)
3	1	EDU	Build a new visitors center, or education facility, in a more ideal location to support higher use and greater outreach opportunities, potentially cooperating with Virgin River Recovery Program. (1.09)
3	5	FEN	Upgrade all tortoise exclusion fencing to the specification described in the Revised Recovery Plan ( <i>e.g.</i> , 1 in by 2 in galvanized mesh w/ 4 strand wire fence). (5.01)
3	5	FEN	Continue to monitor and assess the need for tortoise fencing in Snow Canyon State Park. (5.04)
3	6	SUB	Assess the use of raptor perches by ravens; Are these perches subsidizing raven populations that are predated tortoises? If so, remove. (6.02)
3	6	SUB	Install anti-perching devices along known raven perching sites in high density tortoise areas within the Reserve. (6.03)
3 <sup>4</sup>	17	MNG	Identify all existing mining claims within the Reserve and consider purchase of mining claims within tortoise habitat ( <i>e.g.</i> , zone 4). (17.01)
3	21	CUL	Construct culverts along Cottonwood Road and other roads with tortoise barrier fencing. (21.01)
3	22	GRZ	Purchase and acquire all grazing allotments within the Red Cliffs Desert Reserve (Veyo Allotment). (22.01)

<sup>3</sup> Green stripping, as an effective method to reduce the spread of wildfires, is an unproven theory in the Mojave Desert. Proposed fuel reduction methods, such as green stripping should be identified as a research item and conducted with the Reserve only when research results demonstrate it as a method that benefits tortoises and their habitat. (Utah Division of Wildlife Resources)

<sup>4</sup> BLM has already identified the mining claims that are valid. The possibility of obtaining funding to purchase the claims, if the owners were interested is very remote due to low relative priority and lack of funding. Identified claims are in Zone 4 where the tortoises are technically considered take under the HCP permit due to being translocated tortoises. (Washington County)

RIT Priority	SDSS RA Type rank	RA code	Area of Interest & Specific Actions
<b>Upper Virgin River RIT Area: Actions to be implemented outside of the Red Cliffs Desert Reserve</b>			
1	1	EDU	Continue to produce educational materials ( <i>e.g.</i> , brochures, stickers, coloring books) that increase the public's awareness of the Upper Virgin River, the diversity of native species within them, and the surrounding Mojave desert ecosystem. Include ways the public can help protect species and their habitat. (RIT identifier number: 1.01)
1	1	EDU	Develop an educational pamphlet on desert tortoise natural history, their uniqueness to the Mojave ecosystem, as well as what to do when encountering a desert tortoise. (1.02)
1	1	EDU	Continue to conduct outreach to the public to educate and/or involve them in the protection of the habitat and its species, such as public service announcements on the radio, up-to-date websites and volunteer opportunities. (1.04)
1	1	EDU	Continue to develop and maintain up to date recreational brochures, information, kiosks, trail signage etc. (1.05)
1	3	LEO	Continue to organize quarterly law enforcement coordination meetings to increase communication and effectiveness between local, state, and federal law enforcement officers. (3.01)
1	18	CDS	Continue to institute state ( <i>e.g.</i> , regulation of Certificates of Registration) policies that strictly control the possession of captive tortoises and prevent propagation, particularly within counties adjacent to or containing wild tortoise populations. The unauthorized release or escape of pet tortoises into the wild is known to occur, and captive releases have the potential to introduce disease into wild populations of desert tortoises. (18.01)
1	24	ACQ	Acquire desert tortoise habitat. (24.01)
2	1	EDU	Continue to maintain up to date web resources ( <i>e.g.</i> , trails, campgrounds, seasonal closures, etc.). (1.03)
2	3	LEO	Increase law enforcement (federal, state, local) presence during peak recreation periods and at high use areas. Identify priority actions and patrol areas and follow through by maintaining a regular presence. (3.02)
2	5	SFP	Assess impacts of humans on habitat in recreation areas within the Upper Virgin River recovery unit. (5.01)
3	1	EDU	Pursue more BLM tortoise awareness opportunities, including at a new visitors center and outreach materials associated with the NCA designation. (1.07)
3	8	FEN	Assess the need for tortoise barrier fencing within the Upper Virgin River recovery unit outside the Reserve. (8.01)

## C. TRACKING & MONITORING PLAN

### Reporting requirements for recovery action implementation and maintenance

Implementation and maintenance reporting is vital for tracking what has been undertaken for recovery of the desert tortoise, as well as for assessing effectiveness of actions at the tortoise conservation area level. For each action undertaken, the location, type, area and/or number of activities undertaken should be reported each year. In out-years, status updates of on-going actions should be reported (*e.g.*, locations of visual inspections and repairs). RIT members will use a forthcoming Desert Tortoise Recovery Action Tracking Database to upload spatial data or draw the footprint of implemented actions.

### Plan for supporting monitoring and research to assess action effectiveness

**Overall Recovery Action Plan Effectiveness Monitoring.** The large number of potential recovery/mitigation actions in any portion of the desert reflects the reality that Mojave desert tortoises are impacted by many activities of potentially greater or lesser effect. Reasonable documentation of these multiple impacts and the effectiveness of ameliorating those impacts has been elusive for reasons related to the biology of the desert tortoise, such as the fact that tortoises are long-lived and many threats have chronic effects. Also, survivorship of adults is relatively high, and therefore a very slight predicted improvement in survivorship would require extensive and intensive monitoring. Finally, juveniles are cryptic with high mortality rates making documentation of their occurrence, let alone survival, extremely difficult. The Desert Tortoise Science Advisory Committee has advised that effectiveness of on-the-ground recovery actions for desert tortoise recovery, in general, be assessed using data from the range-wide monitoring program, emphasizing increasing ability to detect regional population trends rather than fine-scaled population responses to individual actions. Population abundance is an accepted metric of overall population response to both continuing threats and to successful recovery actions, which is why both recovery plans to date for the desert tortoise have included a recovery criterion calling for evidence of increasing population trends. In addition, a commitment to the measurement of an overall population response is a necessary prerequisite to the desert tortoise being delisted and relief from regulatory burdens of the Endangered Species Act. Because multiple recovery actions for multiple projects are expected to be implemented in the same tortoise conservation area, using distance sampling to describe changes in abundance within tortoise conservation areas is the appropriate success measure for recovery actions prioritized and implemented based on the SDSS ranking system.

Estimated annual support required for the monitoring program in the Upper Virgin River recovery unit--

Red Cliffs Desert Reserve: ~\$100,000

**Monitoring for the effectiveness of specific recovery action types.** Focused effectiveness monitoring and/or research for particular actions are still important to improve understanding of

threats or actions for which greater uncertainty or controversy exists. Extremely well-designed, implemented, and coordinated research studies will be required to accurately describe recovery action effectiveness in these cases. Research requires replication and standardization of procedures. Best research practices also require that effectiveness metrics are measurable within a reasonable timeframe. Potentially, an effectiveness monitoring/research fund (*e.g.*, managed by the National Fish and Wildlife Foundation) should be established from which experimental effectiveness monitoring efforts would be coordinated at a larger scale.

In conjunction with prioritizing recovery actions in this document, the RIT prioritized needs for effectiveness monitoring or research. The RIT developed priorities for management actions and effectiveness monitoring/research for their area that they felt warrant such an experimental approach.

**Upper Virgin River RIT**

Priority Effectiveness Monitoring and/or Research Topics	RA code	SDSS RA Type rank
Monitor effectiveness of habitat restoration methods ( <i>e.g.</i> , herbicide, black fingers of death, large-scale seeding and plantings, enhancing seed germination)	HAB	2
Monitor effectiveness of post-burn habitat restoration/rehabilitation. In previously burned areas, identify polygons of high diversity or importance ( <i>e.g.</i> , desert tortoise presence, etc.) and apply the following experimental controlled methods (followed by monitoring): 1) herbicide application followed by planting of containerized shrubs and forbs; water plants during dry periods to increase success rate of containerized Mojave shrubs and forbs; 2) herbicide application followed by seeding of new and successful native plant species cultivars; 3) application of the BFOD fungi with higher success rates of infection as standalone "herbicide" and as a replacement for herbicide used in treatments; 4) continue with other experimental efforts to increase germination/survival success rate of Mojave species including methods of seed delivery that reduce granivory; and 5) large-scale seeding.	HAB	2
Monitor effectiveness of fuel reduction/fire break projects. Evaluate: a) targeted, selective grazing for fire breaks; b) mowing ROWs for fire breaks; c) herbicide application; and d) compaction, grading or other mechanical methods; Research into finding suitable material for fire breaks; e) adapted vegetated material).	FIR	17
Monitor effectiveness of head-starting. Tortoises could be bred and raised in an educational facility that would also double to promote educational awareness of the species and conservation efforts. Tortoises could be released in areas of the Reserve with good habitat but low tortoise densities, or in areas that have recovered from fire.		
Monitor effectiveness of culverts for habitat/population connectivity. Monitor culverts to determine tortoise use and inform future designs.	CUL	21
Monitor current habitat quantity and quality annually using available spatial software ( <i>e.g.</i> , ArcMap, aerial photos) to ensure no net loss of habitat within the Reserve.		
Monitor effectiveness of actions to manage disease in wild populations.	WDS	12

Monitor effectiveness of habitat restoration methods ( <i>e.g.</i> , herbicide, black fingers of death, large-scale seeding and plantings, enhancing seed germination.	HAB	2
--	-----	---

#### **D. NEXT STEPS**

The relevant land management agencies will use their own processes to implement priority actions, research and monitoring. The necessary planning processes (*e.g.*, NEPA where appropriate) will be engaged to formalize each agency’s commitments to the adopted actions. The recovery action plans will also be available for agencies to use to identify priority mitigation actions for projects impacting desert tortoise habitat or populations within the relevant RIT area. Implementation and monitoring will be tracked using online tools and collaboration among RIT members.