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In reply refer to:
AESO/SE
02EAAZ00-2021-F-0174

January 12, 2021

Memorandum

To: Regional Director, U.S. Fish and Wildlife Service, Interior Regions 5 and 7

From: Field Supervisor

Subject: Biological Opinion for Amended Washington County Habitat Conservation Plan

Thank you for your request for formal consultation with the U.S. Fish and Wildlife Service's (FWS) Arizona Ecological Services Office (AESO) pursuant to Section 7 of the Endangered Species Act of 1973 (16 U.S.C. § 1531-1544), as amended (Act). We received your request on October 20, 2020. At issue are effects that may result from the proposed issuance of an Incidental Take Permit (ITP) to Washington County, Utah, and approval and implementation of the Amended Washington County Habitat Conservation Plan (Amended HCP). The proposed action may affect the Mojave desert tortoise (*Gopherus agassizii,* desert tortoise) and its critical habitat, the Holmgren milkvetch (*Astragalus holmgreniorum*) and its critical habitat, the Shivwits milk-vetch (*Astragalus ampullarioides*) and its critical habitat, the dwarf bear-poppy (*Arctomecon humilis*), the Siler pincushion cactus (*Pediocactus* (= *Echinocactus* = *Utahia*) *sileri*), the Gierisch mallow (*Sphaeralcea gierischii*) and its critical habitat, and the Fickeisen plains cactus (*Pediocactus peeblesianus fickeiseniae*) and its critical habitat.

The FWS's Utah Ecological Services Office (UESO) reviewed the species considered in the Amended HCP (Table 3, p. 17 in Washington County 2020) and the County's conclusions that the proposed action would not likely result in adverse effects to the threatened Mexican spotted owl (*Strix occidentalis lucida*), the endangered southwestern willow flycatcher (*Empidonax traillii extimus*), the threatened western yellow-billed cuckoo (*Coccyzus americanus*), the non-essential experimental population of California condors (*Gymnogyps californianus*), the endangered Virgin chub (*Gila seminuda*) and its critical habitat, and the endangered woundfin (*Plagopterus argentissimus*) and its critical habitat. In Appendix A, we provide our concurrences to the UESO's "may affect – not likely to adversely affect" determinations for Mexican spotted owl, southwestern willow flycatcher, western yellow-billed cuckoo, Virgin chub and its critical

habitat, and woundfin and critical habitat, and agree that the proposed action will not jeopardize the non-essential experimental population of California condors (*Gymnogyps californianus*).

The UESO determined that the proposed Action would have "no effect" on the threatened Jones cycladenia (*Cycladenia humilis var. jonesii*), the threatened Ute ladies' tresses (*Spiranthes diluvialis*), and the endangered Yuma Ridgeway's rail (*Rallus obsoletus* [=*longirostris*] *yumanensis*); because the species are not reasonably certain to occur in the areas where Covered Activities will occur. "No effect" determinations do not require review from FWS; therefore, we will not address these species further in this memorandum.

Background

In 1995, Washington County prepared an HCP for the conservation of Mojave desert tortoises (hereafter referred to as desert tortoises) in the Upper Virgin River Recovery Unit (UVRRU) (USFWS 1994a). In 1996, FWS issued an ITP for the 1995 Washington County HCP. This ITP thereby allowed development to occur in desert tortoise habitat on non-Federal lands in Washington County. One of the primary goals of the HCP conservation program was to establish the Red Cliffs Desert Reserve (Reserve) to protect a significant block of desert tortoise habitat in Washington County. When the FWS issued the ITP, Washington County and the HCP Partners (including the Bureau of Land Management [BLM]) established the initially 61,022-acres Reserve. In 2009, most of the BLM-administered lands within the Reserve were designated as the Red Cliffs National Conservation Area (NCA). The FWS's ITP issued to Washington County expired in 2016. Prior to its expiration, Washington County applied to renew the ITP and amend their HCP (Amended HCP; Washington County 2020). Washington County amended the HCP to continue implementation of conservation measures from the 1995 HCP and to address new information regarding the status of desert tortoises in Washington County.

The Utah Department of Transportation has applied for a right-of-way (ROW) across the Reserve and NCA for the proposed Northern Corridor Highway Project (hereafter NCH Project) in another biological opinion (BO). The proposed NCH Project would affect the Reserve that was set aside as some of the mitigation for desert tortoises in the 1995 HCP and the Amended HCP. To address some of the Reserve effects, if a ROW crossing the Red Cliffs NCA is granted for the NCH Project, the Amended HCP includes a Northern Corridor Highway (NCH) changed circumstance that addresses effects of the highway to the HCP conservation program. A significant part of the NCH changed circumstance in the Amended HCP is to establish, administer, and manage the Reserve expanded by 6,813 acres through the designation of a new Reserve Zone 6 (hereafter referred to as Zone 6). This area would therefore be managed as part of the Reserve for the conservation of desert tortoises.

The FWS is assessing the effects of the NCH Project in a separate BO in coordination with the BLM. Because the actions evaluated for the NCH Project BO and the actions evaluated in this Amended HCP BO are connected to each other, the UESO recognized there could be confusion regarding those actions associated with the NCH Project and those actions associated with Washington County's Amended HCP. Because of the connections between the Amended HCP and NCH Project, the FWS's UESO categorized the actions proposed by Washington County to be evaluated in this Amended HCP BO. Actions proposed by UDOT, BLM, the State of Utah

School and Institutional Trust Lands Administration (SITLA), and the Utah Department of Natural Resources (UDNR) related to the NCH Project are evaluated in the NCH Project BO. In particular, the FWS recognizes the inclusion of Zone 6 with the NCH Project can be confusing to readers of this BO. BLM and SITLA have committed to the establishment of Zone 6 on their lands to offset adverse effects from the NCH Project as part of the changed circumstances for the Amended HCP. This means the establishment of Zone 6 is directly contingent on the approval of the NCH Project through the existing Reserve Zone 3 and becomes part of the proposed action as defined in 50 CFR 402.02, whereas the proposed actions of the County with respect to the NCH Project and Zone 6 are responses to a changed circumstance of the Amended HCP and considered in the analysis for the ITP in this BO.

Similarly, there may be confusion on how the FWS evaluated the NCH Project and its effects to the Reserve as mitigation for the Amended HCP in this BO. Because we are evaluating both Projects under Section 7 of the Act contemporaneously, it was difficult to determine where to account for the effects of the NCH Project to the Reserve, as the NCH Project is not part of the Proposed Action. Because the NCH Project is not part of the Proposed Action, we did not consider it appropriate to evaluate the effects of the NCH Project to the Reserve as part of the Effects of the Action evaluated in this BO. The other section of the BO where it may be appropriate to describe those effects is as part of the Environmental Baseline. However, our definition of Environmental Baseline (50 CFR 402.02) does not include consideration of Federal actions occurring contemporaneously but does allow for Federal actions that have already undergone Section 7 consultation. Since the FWS is evaluating both Projects as Federal projects at the same time and we can cross-reference effects analyses from the NCH Project BO into this BO, the FWS determined it was most appropriate to describe the effects of the NCH Project as part of the Environmental Baseline in this Amended HCP BO. This allows us to consider the beneficial effects from the County's actions associated with the NCH changed circumstances and the effects of the NCH Project in our Jeopardy analysis.

We based this on the best available scientific and commercial data including information provided in the *Habitat Conservation Plan for Washington County, Utah—Restated and Amended October 2020* (Amended HCP) (Washington County 2020), telephone conversations, meetings, field investigations, and other sources of information. Literature cited in this BO is not a complete bibliography of all literature available on the species of concern or on other subjects considered. A complete record of this consultation is on file in the FWS's UESO.

Consultation History

- January 30, 2015: UESO received the County's application and HCP renewal request.

- March 24, 2015: UESO sent the County a letter in response to the HCP renewal request informing them they were initiating the review process.

- January 2016: A contractor provided the UESO and the County with a summary and update of the HCP renewal project. Per UESO's request, this document included information that the HCP be updated with new tortoise biological information and other listed species that were not previously considered.

- June 2016: UESO received a letter from the BLM to discuss Omnibus Public Land Management Act of 2009 (OPLMA; Public Law 111-11) and transportation needs.

- October 31, 2017: UESO received a document from Washington County outlining proposed steps for the HCP Renewal.

- November 2017 to February 2018: UESO continued HCP discussions with Washington County.

- March 9, 2018: UESO received a modified version of the HCP Renewal steps from Washington County.

- April 4, 2018: UESO sent comments to and had an in-person discussion with Washington County on the HCP Renewal Steps document.

- April 27, 2018: UESO received the HCP Amendment Framework Document from Washington County.

- May 14, 2018: UESO met with Washington County and the State of Utah to discuss the HCP Amendment Framework Document.

- May to July 2018: UESO continued discussions with Washington County regarding the HCP Amendment Framework Document.

- June 2018 to June 2019: UESO received a Draft Habitat and Fire Management Plan from Washington County and they provided numerous reviews and comments on several subsequent drafts through the HCP technical committee and advisory committee.

- July 17, 2018: UESO sent final comments to Washington County on the HCP Amendment Framework Document.

- August 2018 to January 2019: UESO drafted the Amended HCP Renewal Package Items for Discussion.

- February 1, 2019: UESO sent Washington County the Amended HCP Renewal Package Items for Discussion, containing our recommendation.

- May 17, 2019: UESO received the draft Amended HCP Chapters 1, 2, and 4 from Washington County.

- June 12, 2019: UESO sent Washington County our comments on the draft Amended HCP Chapters 1, 2, and 4.

- June 14, 2019: UESO received the draft Amended HCP Chapters 6 and 7 from Washington County.

- July 29, 2019: UESO sent Washington County our comments on the draft HCP Chapters 6 and 7.

- November 12, 2019: UESO held a workshop with Washington County, Utah Division of Wildlife Resources (UDWR), and others to evaluate the status of desert tortoises in the UVRRU.

- November 26, 2019: UESO provided a summary of the desert tortoise workshop to the Habitat Conservation Advisory Committee (HCAC) at the November HCAC meeting to address HCP comments and revisions to the workshop summary.

- December 5, 2019: BLM and the FWS published the Notice of Intent to prepare an Environmental Impact Statement (EIS) for the Project.

- December 17, 2019: UESO met with the State of Utah Lands and SITLA for an initial discussion on plant and habitat protections for the Holmgren milkvetch Central Valley population to include in the Amended HCP.

- December 17, 2019: UESO held a public scoping meeting for the Project EIS at the Dixie Convention Center in St. George, Utah.

- March to April 2020: UESO coordinated with the UDNR on plant conservation measures that included surveys, seed collection, plant salvage, and funding.

- March 31, 2020: UESO provided the County with status information and recommended conservation measures for listed plants to incorporate into the Amended HCP.

- April 7, 2020: UESO received the draft Amended HCP from the County for review.

- April 20, 2020: UESO received the draft Implementation Agreement from the County for review.

- April 28, 2020: UESO met with SITLA, the Utah Public Lands Policy Coordination Office (PLPCO), Washington County, and SITLA's private sector partners to continue discussions on plant and habitat protections for the Holmgren milkvetch Central Valley population.

- April 29, 2020: UESO participated in a comment resolution work session on the draft EIS with the Cooperating Agencies.

- April to May 2020: UESO worked with SITLA and their private sector partners to develop conservation measures for the Holmgren milkvetch Central Valley population.

- May 13, 2020: UESO participated in another comment resolution work session on the Amended HCP and draft EIS.

- June 12, 2020: UESO published the draft EIS Notice of Availability and draft Amended HCP in the Federal Register.

- July 15, 2020: UESO informed partners of the occurrence of the Fickeisen plains cactus within the Amended HCP permit area and provided information about the status of the species, potential habitat, and distribution.

- July to October 2020: Washington County prepared the final HCP, addressed public comments, and sent the Amended HCP for HCAC and commission reviews.

- September 2020: UESO worked with SITLA to develop conservation measures for the dwarf bear-poppy in proposed zone 6.

- October 20, 2020: The Washington County Commission finalized the Amended HCP.

- December 7, 2020: AESO provided the draft BO to UESO Washington County for review (50 CFR § 402.02).

- December 11, 2020: AESO received comments from UESO and Washington County on the Draft BO and AESO incorporated those edits.

- December 15, 2020: AESO provided UESO and Washington County with a second draft BO to review.

- January 6, 2021: AESO received final comments from UESO and Washington County on the draft BO and AESO incorporated and/or addressed these comments.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

Regulations implementing the Act (50 CFR 402) define "action" as "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies of the United States or upon the high seas."

The Federal action we are evaluating is the FWS's issuance of a section 10(a)(1)(B) Incidental Take Permit (ITP) to Washington County, Utah (the County) for the incidental take of the desert tortoise associated with land use and development activities over a 25-year term. As part of the requirements for obtaining the ITP, the County has prepared the *Habitat Conservation Plan for Washington County, Utah—Restated and Amended October 2020 Amended Habitat Conservation Plan* (Amended HCP) (Washington County 2020) in coordination with the FWS. Approval of the Amended HCP is a component of our Federal action.

Background

In 1995, Washington County prepared a Habitat Conservation Plan (1995 HCP) that provided for the conservation of the desert tortoise in the UVRRU (Washington County 1995). In 1996, the FWS issued an Incidental Take Permit (ITP) (ITP #TE036719) for the HCP. This ITP covered the effects of development in desert tortoise habitat on non-Federal lands in Washington County. One of the primary goals of the HCP conservation program was the establishment of the Red Cliffs Desert Reserve (Reserve) to protect a significant block of desert tortoise habitat in Washington County. Washington County and the HCP Partners (including BLM) began establishing the Reserve following FWS's issuance of the ITP. In 2009, Congress designated most of the BLM lands within the Reserve as the Red Cliffs NCA. The FWS's ITP for the 1995 HCP expired in 2016. Prior to its expiration, Washington County applied to renew the ITP and amend their HCP (Amended HCP; Washington County 2020). Washington County is amending the 1995 HCP to seek continued authorization for incidental take of the desert tortoise from the covered activities, to continue implementation of conservation measures from the 1995 HCP, and to address new information regarding the status of desert tortoises in Washington County.

The ITP associated with the 1995 HCP authorized the incidental take of an estimated 1,169 desert tortoises across 12,264 acres of estimated occupied habitat and on all other non-federal lands in the Permit Area. The County estimates that activities covered under the 1995 HCP resulted in removal of 270 adult desert tortoises and 170 sub-adult desert tortoises from project sites. These represent 38 percent of the desert tortoises associated with this take authorization (HCAC 2020). Using habitat mapping from the 1995 HCP, activities associated with the 1995 HCP resulted in the loss of approximately 5,700 acres of occupied habitat delineated in the 1995 HCP, 46% of the total 12,264 acres of occupied habitat referenced in the take authorization. Loss of habitat is a surrogate for take of desert tortoises in the ITP due to the difficulty in both estimating the number of desert tortoises in the Action Area and detecting tortoises taken as part of the 1995 HCP.

The 1995 HCP included conservation measures to avoid, minimize, and mitigate adverse effects to the desert tortoise resulting from the covered activities. An administrative provision tracked funding or completion of certain conservation measures that offset the effects corresponding to the amount of the incidental take authorized by the ITP. In 2010, the FWS conducted a comprehensive review of the 1995 HCP, including the progress toward completing avoidance, minimization, and mitigation requirements. For the actions within the County's responsibility and control, the County met or exceeded the financial obligations of the 1995 HCP required to offset the effects of the authorized incidental take, spending over $6 million in excess of its original $9 million commitment (Capone 2016).

The 1995 HCP established the Reserve as its primary conservation measure (Figure 1). As part of the UESO's review of the 1995 HCP, they evaluated the Reserve under the reserve design criteria identified in the 1994 Recovery Plan (USFWS 1994a). In that evaluation (USFWS 1995), UESO determined the Reserve, as designed, was consistent with the recommendations of the 1994 Recovery Plan to support recovery of the species. The Reserve currently consists of five management zones, described in Section 6.3.1.1.2 of the Amended HCP.

Acquisition and long-term management of the Reserve was primarily a responsibility of the BLM, with certain lands acquired and managed by UDNR. The County's contributions to Reserve acquisition and management defined in the 1995 HCP were limited in scope and duration. The County anticipated that portions of the Reserve not already under BLM or UDNR management would be acquired quickly through a large exchange, and the Reserve would be designated a NCA within 5 years of ITP issuance. The County committed to assist UDNR and the BLM with the preparation of long-term management plans and provided five years of financial support to the BLM for this purpose (see Table 6.3 in the 1995 HCP). The 1995 Reserve boundary of 61,022 acres contributed substantially to the formation of the UVRRU Desert Wildlife Management Area recommended in the 1994 and 2011 desert tortoise Recovery Plans (USFWS 1994a, 2011; see Chapter 6.1.2 in the Amended HCP). Between 1995 and 2019, the originally proposed Reserve boundary changed with some boundary additions and subtractions. In total, these previously approved Reserve boundary changes resulted in a net increase in the total size of the Reserve of approximately 987 acres to total 62,009 acres. Congress designated the Federal lands in the Reserve (70 percent of the Reserve lands) the Red Cliffs National NCA through the Omnibus Public Land Management Act of 2009 (OPLMA) (Public Law 111-11). As of February 2020, approximately 665 acres of private land and 6,426 acres of land owned by the SITLA (7,091 acres total) remain for acquisition.

The 1996 ITP expired in 2016, and the County notified the FWS of its intent to seek renewal of the ITP on January 30, 2015. On March 25, 2015, the FWS sent the County a letter extending the term of the ITP while it reviewed the County's application. The County is currently operating under a temporary letter of extension, pursuant to 50 CFR 13.22, while FWS evaluates its application. Following discussions of the application, the County amended the HCP to address the following significant amendment needs to the 1995 HCP: incorporation of updated desert tortoise habitat modelling and minor changes in Reserve boundaries; explicitly addressing incidental take from allowed uses of the Reserve; and, eight changed circumstances that may affect the desert tortoise or the HCP. The County submitted the final Amended HCP on October 20, 2020, to extend over a 25-year period.

Covered Activities

Covered Activities are those activities described in Chapter 2 of the Amended HCP, which FWS hereby incorporates by reference, for which the ITP would apply. They are a broad set of land development and land use activities that will occur outside the Reserve and a narrow set of land development and land use activities that will occur on up to 200 acres inside the Reserve[1] at unspecified locations. Due to the programmatic nature of the HCP, the FWS cannot predict exactly when Covered Activities will occur over the 25-year term. A variety of non-Federal entities will implement the Covered Activities. All Covered Activities are:

- non-Federal (*i.e.*, no Federal nexus, such as Federal funding or authorization);
- occur on non-Federal and non-Tribal lands;
- conducted within the HCP Permit Area;
- otherwise lawful and conducted in accordance with all applicable local, state, and Federal laws, regulations, ordinances, and permissions;
- subject to the direct control of the County, a non-Federal HCP Partner, or a Municipal Partner through regulatory control such as zoning, or permitting, or other legal authority (see below regarding mechanisms for establishing direct control);
- those that the County analyzed in the Amended HCP; and,
- reasonably certain to cause incidental take of the desert tortoise.

Section 2.1 of the Amended HCP describes the Covered Activities that may occur outside the Reserve and lists examples. The list is not exhaustive; other ground-disturbing activities outside of the Reserve meeting the criteria for a Covered Activity and having effects substantially similar to those analyzed in this Amended HCP could also be Covered Activities. The County lists the following examples of Covered Activities outside the Reserve:

- livestock grazing,
- new utility easements,
- maintenance of existing utility easements,
- land clearing (in preparation for development activities),
- building construction,
- recreation events,
- vehicle use,
- agricultural land treatments,
- mining,
- drilling for resources,
- firefighting,
- clearing for landfill or production purposes, and
- renewable energy development.

1 Throughout this BO, activities proposed for inside the Reserve will occur within the areas comprising the Reserve at the time of those activities. Thus, the Reserve contains Zones 1 – 5 before or without the NCH changed circumstance and Zones 1 – 6 if the NCH changed circumstance occurs.

The Reserve is an avoidance area for new disturbances, other than for certain allowed uses consistent with the Amended HCP, such as small-scale projects on a limited amount of area. Section 2.2 of the Amended HCP describes types of Covered Activities that may occur inside the Reserve:

- recreation uses and related facilities,
- utilities,
- access roads,
- water development,
- flood control,
- general resource management, and
- additional zone-specific allowed uses:
    - Reserve Zone 1: low-density residential development
    - Reserve Zone 2: existing state and local government uses including, but not limited to, existing public recreational access and use of related facilities and various infrastructure facilities (*e.g.*, detention basins, wells, utility access roads).
    - Reserve Zone 3: existing state and local government including, but not limited to, the continued operation, use, and maintenance of facilities associated with the City of St. George law enforcement training range, the debris basin behind City Creek dam, Pioneer Park, and other various infrastructure facilities (*e.g.*, detention basins, wells, utility access roads).

Activities covered in the 1995 HCP, but not included in the Amended HCP as Covered Activities, include desert tortoise translocation and monitoring, hiking, pets under control of the owner, irrigation, herbicide and pesticide use, harvest of vegetation, and collection of biological or mineral specimens. The Amended HCP does not cover these activities because they are not under direct control of the County or are not reasonably certain to result in take. We briefly discuss the effects of these activities in the "Cumulative Effects" section of this BO.

We consider any take associated with handling desert tortoises during clearance surveys prior to covered activities part of the proposed action evaluated by this BO. A Section 6 Agreement with UDWR covers translocating desert tortoises into the recipient site or temporary holding facility (USFWS 2015). When desert tortoises are transferred to UDWR jurisdiction, which includes the tortoise holding facility, they are no longer the responsibility of the County, and UDWR's Section 6 Agreement covers any take associated with tortoise holding or translocation.

The Amended HCP describes the mechanisms to ensure that the County, as the ITP permittee, has direct control over the actions of the entities implementing Covered Activities. The County has established agreements with HCP Partners[2] and Municipal Partners[3] to assist with the implementation of the 1995 HCP and continue to assist with the Amended HCP. The Amended HCP creates a new provision that allows the County to execute Participation Agreements to establish direct control over Covered Activities that are not already subject to the regulatory

[2] Agencies that partner and collaborate with Washington County as signatories to the Implementation Agreement to implement the Washington County HCP.
[3] Local governments and agencies that participate in the Washington County HCP through Inter-local Agreements with Washington County, providing funding and other support for implementation of the Washington County HCP.

jurisdiction of the County, a non-Federal HCP Partner, or a Municipal Partner. An executed Participation Agreement will function as a Certificate of Inclusion, allowing project proponents to opt-in to the incidental take coverage provided by the ITP with a commitment, enforceable by the County and the FWS, to abide by the applicable provisions of the Amended HCP and the applicable terms and conditions of the ITP.

Changed Circumstances

Changed circumstances are defined in the No Surprises rule as "changes in circumstances affecting a species or geographic area covered by [an HCP] that can reasonably be anticipated by [plan] developers and the Services [FWS] and that can be planned for (*e.g.*, the listing of new species, or a fire or other natural catastrophic event in areas prone to such events)." (50 CFR 17.3). The changed circumstances and planned responses are part of the HCP's operating conservation program. No Surprises guarantees that the FWS cannot require additional actions or funds be expended; for this reason, it is important that the Amended HCP identify all reasonably foreseeable changed circumstances that may occur during the permit term and feasible responses to them.

The Amended HCP describes eight foreseeable changed circumstances and the County's plan to address them. Four of the changed circumstances are: 1) development of private lands in the Reserve (through a separate HCP), 2) the event of a municipality or some municipalities choosing not to participate in the HCP, 3) delisting the desert tortoise or a 4(d) Rule exempting certain types of take, and 4) new listed species or changes in critical habitat. These four changed circumstances would require other regulatory analysis and they are beyond the scope of this BO; therefore, we will not discuss them further in this document. Below, we list and briefly summarize the four changed circumstances with responses that are relevant to this BO:

- **NCH crossing the Reserve** – The County and its HCP Partners committed to perform certain actions in response to certain Federal approvals for the NCH Project. The NCH Project BO (USFWS 2021a) considers HCP Partner commitments associated with this changed circumstance. County commitments made in response to this changed circumstance would be an effect of the action considered in this BO, and include a reduction in the amount of take requested in the HCP, land acquisitions within Reserve Zone 6, funding and implementation of certain management actions within Reserve Zone 6, additional funding for administration of the Amended HCP and for adaptive management and monitoring activities across the entire Reserve, and funding for the addition of tortoise passages across Cottonwood Road within Reserve Zone 3.

- **Wildfire in the Reserve** – In response to wildfire on non-acquired portions of the Reserve, the County committed to engage in restoration planning for burned areas and to dedicate funds budgeted for implementing conservation actions associated with Reserve habitat and fire management to actions implementing restoration actions.

- **Exceptional drought** – In response to any portion of the Reserve entering the D4– Exceptional Drought phase[4], the County will meet and confer with the FWS and UDWR to determine what, if any, modifications to the conservation program may be prudent. Specifically, the County, FWS, and UDWR will determine whether to conduct or suspend translocation of cleared individual tortoises; whether to continue any current suspensions; and whether they should make any changes to increase holding times or find alternate disposition for translocated desert tortoises.

- **Disease outbreak in the Reserve** – Desert tortoises in the UVRRU may experience increased upper respiratory tract disease occurrence or an outbreak of a new disease. In response to this Changed Circumstance, the County will consult with the FWS and UDWR about the necessity of suspending desert tortoise translocations of cleared individuals into the Reserve. The County, UDWR, and the FWS will meet and confer to discuss alternative translocation options and possible treatment for affected tortoises, subject to financial constraints and practicability.

Conservation Measures

HCPs include measures designed to ensure conservation of covered species and to contribute to the recovery of covered species. In Chapter 6 of the Amended HCP, the County describes their conservation program designed to conserve the UVRRU population of the desert tortoise in its native habitat in perpetuity. The County describes recovery actions and conservation measures in detail in Chapter 6, which we hereby incorporate by reference in this document. We summarize these conservation measures, by species, below.

Desert Tortoise

In the Amended HCP, the County includes several conservation measures from the 1995 HCP and some additional conservation measures. The County and UESO designed these measures to create a conservation program for conserving the UVRRU population of desert tortoise in its native habitat in perpetuity (see chapter 6 of the Amended HCP) and to achieve the biological goals and objectives of the Amended HCP. The following includes a summary of these conservation measures:

- **Red Cliffs Desert Reserve –** The Amended HCP formalizes the boundary changes of the 2019 Reserve, Zones 1 – 5, that now encompasses 62,009 acres. The Reserve boundary defines the target acquisition area for the consolidation of most remaining private and SITLA-owned lands into BLM or UDNR ownership or management. As of February 2020, approximately 665 acres of private land (of the original 2,981 acres of private land) and 6,426 acres of SITLA-owned land (of the original 7,091 acres of SITLA-owned land) remain within the Reserve Zones 1 – 5. Consistent with the 1995 HCP, the County and the HCP Partners commit to acquire Reserve lands through BLM land exchanges and purchases from willing sellers using Federal assistance programs, as appropriate, and

4 D4 – Exceptional Drought is the most severe drought classification used by the U.S. Drought Monitor and indicates that an area is experiencing severe and widespread water shortages that result in water emergencies and crop losses (NDMC 2019).

other available funds. For the duration of the ITP Term, the County commits to managing the SITLA lands under an implementation agreement signed by both parties as part of the Reserve until the BLM or UDNR acquires such lands. The Amended HCP establishes conservation easements as an acceptable tool for achieving Reserve acquisitions. Such easements would preferably be in perpetuity or until acquisition, but, subject to FWS approval, term conservation easements may be acceptable in circumstances where perpetual easements are not practicable as an interim measure or as legally applicable until acquisition or management in perpetuity is achieved (Washington County 2020, p. 82). The County and HCP Partners would use and manage Reserve lands acquired through a conservation easement in accordance with the Amended HCP.

The County and the HCP Partners commit to coordinate through the deliberations of the HCAC to identify and advance potential acquisition opportunities until Reserve acquisitions are complete. The County will direct the HCAC to create a standing subcommittee (*i.e.*, the Land Acquisition Subcommittee) tasked with following up on the progress of Reserve land acquisitions, engaging with private landowners and SITLA representatives on new potential opportunities, and creating collaborative partnerships for facilitating acquisition transactions. The County will also commit financial resources toward offsetting costs associated with real estate transactions involving Reserve land acquisitions (*i.e.*, appraisals, surveys, title searches, recording fees, and the like).

- **Fencing –** To date, the County and HCP Partners have facilitated installation of more than 85 miles of fencing within and around the Reserve. The County has committed to monitor the Reserve fencing and maintain or facilitate maintenance through the appropriate owner. There is no additional fencing currently planned in Reserve Zones 1 to 5 but, through adaptive management, the HCP Partners may consider adding fencing to achieve the biological goals and objectives of the Amended HCP.

- **Law enforcement** – The BLM and the UDWR will continue to provide law enforcement within lands acquired for the Reserve. The County will continue to allocate existing resources from the Washington County Sheriff's Office to provide law enforcement on unacquired lands within the Reserve boundary owned by SITLA or the Municipal Partners.

- **Community education and outreach** – The County will continue to maintain the robust program for community education and outreach created as part of the 1995 HCP.

- **Take restriction inside the Reserve** – The County would restrict the amount of take permitted under the ITP inside the Reserve to 200 acres. The NCH Project is not a Covered Activity of the Amended HCP and that this allowance would not be used to authorize take associated with the NCH Project.

- **Development protocols for Covered Activities within the Reserve** – The HCP Administrator, the Technical Committee (TC), and the HCAC review non-Federal projects proposed on non-Federal lands in the Reserve without a Federal nexus prior to approval. A project proponent's adherence to protocols listed in Appendix A of the Amended HCP factor into the approval of the project. Applicable protocols may include

desert tortoise clearance (*i.e.*, removal) and translocation from affected areas, temporary or permanent fencing, use of biological monitors, application of seasonal restrictions, minimization of disturbance footprints, and training for construction personnel.

- **Offset of permanent habitat loss inside the Reserve –** The County will take action after consideration of recommendations of the HCAC to offset habitat loss from Covered Activities in the Reserve through 1) the acquisition and permanent protection of desert tortoise habitat outside of the Reserve at impact-to-protection ratios consistent with guidance in Desert Tortoise Management Oversight Group (Desert Tortoise Compensation Team 1991), 2) case-by-case consideration for conservation credit generated by actions that enhance connectivity of desert tortoise across the Plan Area (Figure 1, entirety of Washington County), restore degraded desert tortoise, prevent wildfire within the Reserve, control invasive species within the Reserve, or contribute to desert tortoise head-starting or population augmentation efforts within the Plan Area; or 3) conservation credit acquired from in-lieu fee programs or third-party conservation banks, if such program becomes available in the future.

- **Development protocols for Covered Activities outside the Reserve** – The HCP Administrator reviews proposed projects outside the Reserve that may occur in desert tortoise habitat. The County requires compliance with the applicable provisions of the Development Protocols, such as desert tortoise clearance surveys (see conservation measure below), barrier fencing, tortoise education, or a biological monitor.

- **Desert tortoise clearance** – The HCP Administrator will require desert tortoise clearance surveys for Covered Activities in the Reserve, the 1995 HCP incidental take areas (i.e., 12,264 acres), and in areas outside the Reserve where the HCP Administrator determines presence is likely. Qualified personnel will implement clearance according to protocols described in Appendix A of the Amended HCP. The County will work with the UDWR to conduct desert tortoise surveys outside the Reserve and, within five years of issuance of the ITP, will use that data to amend the areas outside the Reserve where desert tortoise clearance surveys are required.

- **Assistance with desert tortoise translocation** – The 1995 HCP established a successful program to translocate desert tortoises removed from certain areas of Covered Activities. The program will continue under the lead of UDWR with support from BLM, and the FWS. The County commits to allocating funding and providing support to UDWR in translocation efforts. Within two years of the ITP issuance, the County, in coordination with UDWR, will initiate an adaptive management planning process with the HCAC to prepare a Translocation Management Plan.

- **Recreation management** – The Reserve Public Use Plan (PUP) provides the primary guidance for managing public recreation in the Reserve on non-Federal lands (see Appendix B of the Amended HCP). The PUP, approved by Washington County in 2000, is the result of a collaborative process, prepared in coordination with the HCP Partners and the public. The County commits to support the implementation of the PUP on non-Federal lands within the Reserve through its recreation management, law enforcement, and community education and outreach actions.

- **Reserve habitat and fire management** - The County adopted the Red Cliffs Desert Reserve Habitat and Fire Management Guidelines for addressing wildfire events and post-fire habitat restoration in the Reserve (see Appendix D of the Amended HCP). The BLM and UDNR have primary responsibility for habitat restoration within the Reserve. The County will set aside funding to support planning, monitoring, and responses for habitat and fire management within the Reserve boundary.

    - **Fire management and habitat restoration –** *The County will only implement these conservation measures in response to the changed circumstance of the NCH.* The County will increase its funding for fire management and habitat restoration in the Reserve by approximately $10,000 per year for a total of $15,000 unless more funding is warranted in response to the wildfire changed circumstance.

- **Reserve Zone 3 habitat improvements** – *The County will only implement these conservation measures in response to the changed circumstance of the NCH.* The County will implement the following conservation measures to improve the habitat within Reserve Zone 3, the zone affected by the NCH Project alignment:

    - **Desert Tortoise Passage –** The County will provide $150,000 in funding and technical assistance to construct and evaluate designs for passage structures under Cottonwood Springs Road within Reserve Zone 3 to restore the potential for desert tortoise movement across this preexisting barrier.

- **Reserve Zone 6 support** – *The County will only implement these conservation measures in response to the changed circumstance of the NCH.* The NCH Project includes a conservation measure to establish Reserve Zone 6. Zone 6 contains approximately 3,341 acres of non-Federal lands (3,225 acres SITLA land, 71 acres of UDOT, and 45 acres of privately-owned land) and 3,471 acres of BLM land. Zone 6 would add 6,813 acres to total 68,822 acres in the Reserve. The County will manage the 3,225 acres of SITLA lands in Zone 6 until they are acquired by the BLM or other HCP Partners, and will assist BLM in managing BLM lands in Zone 6, as part of the Reserve with the associated benefits of focused management for desert tortoises and subject to the take restriction of 200 acres inside the Reserve. The County will implement the following conservation measures to support Reserve Zone 6:

    - **Land acquisition –**The County will fund the acquisition of approximately 450 acres of SITLA-owned lands within Zone 6 prior to the start of construction of the proposed NCH Project. The actual acquisition acreage would depend on the final size of the ROW approved for the proposed NCH Project as defined in the BO for that project.

    - **Fencing** – The County will install fencing along the eastern parts of the proposed Zone 6 boundary and along the Navajo Drive corridor to prevent motorized access outside the Navajo Drive ROW and to prevent vehicle collisions.

- **Development Protocols** – The County and the HCP Partners will impose the Development Protocols (Washington County 2020) on Covered Activities within Zone 6.

- **Grazing permits acquisition and retirement** – The County will support BLM to coordinate with the holders of active grazing permits applicable to Zone 6 and negotiate the acquisition of such grazing permits from willing sellers.

- **Recreation Management** – The County and the HCP Partners will reduce the total mileage of designated recreation access routes within all of Zone 6 to approximately 65 miles of primarily nonmotorized trails; a reduction of approximately one half of the total mileage of existing trails. Washington County and the HCP Partners will amend the Public Use Plan to create a final trail plan to implement the targeted level of trail reduction within Zone 6. The County will act within its discretion to complete these Public Use Plan amendments within the first five years after the NCH Project ROW permit issuance. Washington County will fund recreation management activities within Zone 6, such as the installation of signs, trail maintenance or enhancement, parking improvements, and similar actions.

- **Community education and outreach** – The County will provide additional funding for education and outreach efforts that may include videos, advertising, handouts, community engagement, contractor training, and volunteer coordination.

- **Law enforcement** – The County will provide additional funding for Washington County Sheriff Deputy patrols within Zone 6.

- **Administration –**The County will provide funding for up to three full-time HCP support staff to include an Outreach Coordinator, Field Technician, and Administrative Assistant. The funding for this support staff increases the County's capacity to support HCP conservation actions and serves to provide additional support in furtherance and to achieve the conservation outcomes of the Amended HCP.

- **Monitoring and Adaptive Management** – The County and the HCP Partners will expand the existing biological monitoring program from the 1995 HCP to include Zone 6. To support this expansion, the County will provide additional funding for baseline Reserve population monitoring and special topic monitoring for use by UDWR or another qualified contractor.

- **Wildfire restoration –** *The County will only implement this conservation measure in response to the changed circumstance of wildfire in the Reserve.* Within 90 days of a wildfire in the Reserve, the County and the HCP Partners will prepare an initial restoration plan for the affected Reserve lands. The County will dedicate funds budgeted for implementing conservation actions associated with Red Cliffs Desert Reserve Habitat

and Fire Management Guidelines to support actions prescribed in the initial restoration plan for at least the following three years. In the event of multiple fires over several years and, if the County expends budgeted monies, they will work with the HCP partners to identify other funding opportunities to continue to support these activities.

- **Conservation plan modifications –** *The County will only implement this conservation measure in response to the changed circumstance of exceptional drought.* Within 30 days of notification, the County will meet and confer with the FWS and the UDNR to determine what, if any, modifications to the conservation program may be prudent.

- **Translocation suspension –** *The County only will implement this conservation measure in response to the changed circumstance of desert tortoise disease or exceptional drought.* The County will consult with the FWS and UDWR about suspending desert tortoise translocations into the Reserve and discuss alternative options.

- **Treatment of disease –** *The County will only implement this conservation measure in response to the changed circumstance of desert tortoise disease.* The County, UDWR, and the FWS will discuss possible treatment for affected tortoises, subject to financial constraints and practicability.

Holmgren milk vetch and its critical habitat

The following conservation measures for the Holmgren milkvetch and its critical habitat are included in the Amended HCP.

- **Central Valley conservation area(s) establishment –** SITLA will coordinate with FWS and relevant private-sector partners to identify acreage to support a viable population of Holmgren milkvetch in the Central Valley Critical Habitat Unit (CHU) 1c in southern Washington County. The proposed conservation area will be set aside with the goal to protect the viable population in perpetuity. The acreage identified will be further limited to critical habitat, and the acreage may be in one location or split into more than one conservation area. SITLA will use its lease authority to prohibit development within the conservation area(s) until a conservation entity acquires and protects it in perpetuity.

- **Central Valley conservation area(s) management plan –** Within five years of reaching agreement with the FWS on the location of the Central Valley conservation area(s), SITLA and its private-sector partners will work with the HCP Administrator and the HCAC to prepare a management plan for the Central Valley conservation area with the goal of maintaining or enhancing the current population of Holmgren milkvetch. The management plan will address the establishment, monitoring, and long-term management of the conservation area(s) and may provide for recreational uses of the conservation area(s) that are compatible with the conservation of the species. The County will use resources available for adaptive management planning (*i.e.*, HCP Administrator and HCP Biologist labor) to assist SITLA and its private-sector partners with the preparation of this plan. SITLA and its private-sector partners will seek separate approval from FWS for the management plan.

- **Central Valley conservation area(s) management –** SITLA and its private-sector partners will manage the Central Valley conservation area(s) in accordance with the management plan, subject to available funding, until a conservation entity acquires and protects the lands in perpetuity for the conservation of the Holmgren milkvetch. Upon acquisition by a conservation entity, responsibility for implementation of the management plan (including any funding commitments) will transfer to the conservation entity. The County and the FWS will assist SITLA and its private-sector partners with identifying and securing funding to implement the management plan and establish permanent protections for the Central Valley conservation area(s).

- **Holmgren milkvetch surveys –** UDNR will coordinate with the County, through the HCP Administrator, to plan for and perform surveys for the Holmgren milkvetch in areas of suitable or occupied habitat for this species. The County and UDNR will seek, when practicable, to implement such surveys concurrent with desert tortoise clearance surveys prior to Covered Activities. UDNR will report the findings of any such surveys to the County and the FWS. This commitment is subject to available funding, state-wide priorities, and HCP Partner support.

Other Plant Species

In the event that the NCH changed circumstance is triggered, the County will commit to support the implementation of additional conservation measures for Holmgren milkvetch and its critical habitat, Shivwits milk-vetch and its critical habitat, dwarf bear-poppy, Siler pincushion cactus, Gierisch mallow and its critical habitat, and Fickeisen plains cactus, resulting from the proposed Action.

- **Survey, seed collection, and plant salvage** – Within five years of triggering the proposed NCH changed circumstance (*i.e.*, when the BLM approves the ROW for the NCH), the County and the HCP Partners will develop a survey, seed collection, and plant salvage plan for listed plant species to apply to the Amended HCP Take Area. The County and/or HCP Partners will coordinate with landowners to seek access for UDNR to perform seed collection or salvage activities for listed plant species concurrent with desert tortoise clearance surveys or other surveys associated with Covered Activities. The County and/or HCP Partners will seek supplemental funding or volunteer support, as available, to implement the survey, seed collection, and plant salvage plan.

- **Plant protection in Reserve Zone 6 –** Upon triggering the proposed NCH changed circumstance, the County and HCP Partners will implement adaptive management planning to protect listed plants in Reserve Zone 6 through deliberations with the HCAC, TC, and other experts. To the extent practicable, Covered Activities in Reserve Zone 6 will include protective measures for plants similar to those required on adjacent federally managed lands.

Action Area

The Action Area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR §402.02). In delineating the

Action Area, we evaluated the farthest-reaching physical, chemical, and biotic effects of the action on the environment.

The Action Area for this project is the "Plan Area" as defined in the Amended HCP, the entirety of Washington County, Utah (Figure 1). The County is in the southwest corner of Utah, bordering Nevada to the west Arizona to the south. St. George, the largest city in Washington County, is centrally located in the County. The Beaver Dam Mountains lie along the western portion of the County. Detailed description of landownership of the Plan Area is in chapter 2 of the Amended HCP and section 2.4 of the Final EIS, herein incorporated by reference.

We also define two areas within the Action Area relevant to our evaluation: the Permit Area and the Amended HCP Take Area. The Permit Area is the UVRRU in Washington County. The Beaver Dam Mountains and habitat westward are part of the desert tortoise Northeast Mojave Recovery Unit (NEMRU) (FWS 1994 and 2011) and not included in the Permit Area. While conservation and recovery activities will potentially occur throughout the Plan Area, Covered Activities will only occur within the Permit Area. Furthermore, these Covered Activities will only occur in the portions within the Permit Area where the County has requested incidental take coverage from potential habitat loss. Herein, we use the term "Amended HCP Take Area" [5] to refer to these areas (Figure 2). Based on the County's description of Covered Activities, the Amended HCP Take Area is non-federal and non-Tribal land in areas where incidental take of the desert tortoise is reasonably certain to occur (see "Covered Activities" section). The County has evaluated habitat suitability for the desert tortoise and identified "MDT Habitat," [6] the areas where they consider take of the desert tortoise reasonably certain to occur.

Authorized incidental take from Covered Activities could occur in the entire Amended HCP Take Area outside of the Reserve. Up to 200 acres of the authorized incidental take may be applied to Covered Activities inside the Reserve. At this time, the FWS cannot determine the precise location of these 200 acres of the Amended HCP Take Area within the Reserve. Additionally, management activities could occur anywhere on non-federal MDT Habitat within the Reserve; these activities would not result in loss of habitat. Conservation measures can occur throughout the entire Plan Area. Take covered under the ITP will only occur in the Amended HCP Take Area.

STATUS OF THE SPECIES AND CRITICAL HABITAT

The information in this section summarizes the range-wide status of each species considered in this BO. Further information on the status of these species, including a comprehensive status of the species, is on the FWS's Environmental Conservation Online System (ECOS), and in other references cited in each summary below.

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[5] The Permit Area we use in this BO differs from the Permit Area the County uses in the Amended HCP. The County uses the UVRRU delineated in USFWS (2011), and we use the UVRRU delineated in USFWS (2020a), which does not change the Revised Recovery Plan, but is consistent with the intent that recovery units cover the extent of the range of the species in each area. The Permit Area we use includes the entire Amended HCP Take Area defined by the County.

[6] MDT Habitat in the Amended HCP is different from the potentially suitable desert tortoise habitat defined in the 1995 HCP due to updated surveys and habitat modeling. See discussion in "Status of the Desert Tortoise in the Action Area" section.

Desert Tortoise

The FWS listed the desert tortoise populations north and west of the Colorado River in Arizona and Utah (excluding the Beaver Dam Slope population) as endangered under an emergency rule on August 4, 1989 (54 FR 42270). Subsequently, the entire Mojave population of the desert tortoise west of the Colorado River in California and Nevada, and north of the river in Arizona and Utah, including the Beaver Dam Slope, was listed as a threatened species on April 2, 1990 (55 FR 12178). The FWS designated critical habitat for desert tortoise on February 8, 1994 (59 FR 5820). The FWS signed the Desert Tortoise (Mojave Population) Recovery Plan (Recovery Plan) (USFWS 1994a) on June 28, 1994. The FWS finalized the Revised Recovery Plan for the Mojave Population of the Desert Tortoise (Revised Recovery Plan) (USFWS 2011a) on May 6, 2011. The Revised Recovery Plan identifies activities needed to support six strategic elements: 1) develop, support, and build partnerships; 2) protect existing populations and habitat; 3) augment depleted populations; 4) monitor progress toward recovery; 5) conduct applied research and modeling; and 6) implement a formal adaptive management program. A comprehensive status of the species is located in the administrative record for this Project.

Desert Tortoise Biology

The desert tortoise is an arid land reptile associated with desert scrub vegetation, primarily creosote bush (*Larrea tridentata*) flats, washes, and hillside slopes or bajadas. A robust herbaceous component to the shrubs and cacti of the creosote bush vegetation type is an important component of suitable habitat. Within these vegetation types, desert tortoises can potentially survive and reproduce where their basic habitat requirements are met: a sufficient amount and quality of forage species; shelter sites for protection from predators and environmental extremes; suitable substrates for burrowing, nesting, and over-wintering; various plants for shelter; and adequate area for movement, dispersal, and gene flow. The Revised Recovery Plan (USFWS 2011a) contains a complete description of the range, biology, and ecology of the desert tortoise.

Tortoises are long-lived and grow slowly, requiring 13 to 20 years to reach sexual maturity, and have low reproductive rates during a long period of reproductive potential (Turner *et al.* 1984; Bury 1987; Germano 1994). Growth rates are greater in wet years with higher annual plant production (*e.g.*, an average of 12.3 millimeters [0.5 inches] in an El Niño year compared to 1.8 millimeters [0.07 inches] in a drought year in Rock Valley, Nevada; Medica *et al.* 1975). The number of eggs (1-10) as well as the number of clutches (0-3; set of eggs laid at a single time) that a female desert tortoise can produce in a season is dependent on a variety of factors including environment, habitat, availability of forage and drinking water, and physiological condition (Turner *et al.* 1986, 1987; Henen 1997; Mueller *et al.* 1998; McLuckie and Fridell 2002). Success rate of clutches has proven difficult to measure, but predation appears to play an important role in clutch failure (Germano 1994). Bjurlin and Bissonette (2001) found that nest predation was highly variable.

The FWS considers desert tortoises most active in Utah from approximately March 15 through October 15; however, depending upon weather conditions, they can be active outside of these dates as well (USFWS 2021a). Desert tortoises are most active during the spring and early summer when annual plants are most commonly available for forage (USFWS 2011a).

Additional activity occurs during warmer fall months and occasionally after summer rainstorms. While rare, desert tortoises can occur above ground in the winter, including when snow is present. Desert tortoises spend the remainder of the year in burrows, escaping the extreme conditions of the desert (USFWS 2011a). The FWS determined three ranges of dates based on anticipated levels of desert tortoise activity and ambient temperatures in Utah (USFWS 2021a):

- More active season: February 15 to November 30;
- Most active season: March 15 to May 15, and August 20 to October 20; and,
- Less active season: December 1 to February 14.

Desert tortoise home range sizes vary with respect to location and year. Over its lifetime, each desert tortoise may require more than 1.5 square miles of habitat and make forays of more than seven miles at a time (Berry 1986).

Desert Tortoise Population Trends

Desert tortoise researchers began using line distance sampling (USFWS 2015a) to monitor populations across the range of the desert tortoise in 2001 and have continued to use this method consistently since 2004. Between 2004 and 2014, desert tortoise populations declined significantly in four of the five recovery units (USFWS 2015b; Allison and McLuckie 2018). The Northeast Mojave Recovery Unit (NEMRU) is the only recovery unit that has shown an upward trend for desert tortoise populations; however, population numbers are still low and below viable population levels (USFWS 2015b).

Factors Affecting the Desert Tortoise

Development

Large amounts of development have occurred throughout the species' range resulting in habitat loss. Certain developments (*e.g.*, buildings, parking lots) render habitat unsuitable for desert tortoises. Other developments and land uses (*e.g.*, agricultural, solar farms) alter the habitat and could degrade the quality of the habitat for desert tortoises.

Temporary disturbances associated with access roads and utility rights-of-way (ROWs) can have lasting effects on desert tortoise foraging resources. This can occur through direct damage to vegetation and damage to soils. Even light use can affect desert biota by making plants even more vulnerable to droughts (Bury *et al.* 1977). Damage to fragile organic and inorganic soil crusts can disrupt their functions of preventing erosion; increasing rainfall infiltration and slowing evaporation (DeFalco *et al.* 2001); regulating soil temperatures; and providing and retaining nitrogen and other nutrients (Belnap 1996; Reynolds *et al.* 2001). Vehicles or equipment movement can compact soil, decreasing infiltration rates and resulting in erosion (Davidson and Fox 1974). Soil compaction inhibits seed germination and subsequent regeneration of plant cover (Wilshire and Nakata 1976). Even minimal vehicle use can significantly reduce the establishment and growth of desert annuals in succeeding years (Adams *et al.* 1982a, 1982b). Reduction of vegetation from these causes reduces the availability of foraging and sheltering habitat for desert tortoises (Esque *et al.* 2014).

Habitat fragmentation resulting from linear structures (*e.g.*, residential fencing, roads) and areas of habitat loss can inhibit desert tortoise movements (Boarman *et al.* 1997; Edwards *et al.* 2004; Brooks and Lair 2005). Isolated or semi-isolated populations are at higher risk of localized extirpation from stochastic events. Isolation reduces the potential for genetic exchange (Dutcher *et al.* 2020) and makes populations vulnerable to inbreeding depression (Boarman *et al.* 1997; Boarman and Sazaki 2006). Inbreeding depression can reduce recruitment and fitness in the related *G. Polyphemus* (Yuan *et al.* 2019) and may result in similar effects to the desert tortoise.

In addition to habitat loss, degradation, and fragmentation, development also exposes desert tortoises to noise and vibration. Infrastructure construction produces temporary noise and vibration. Permanent noise and vibration may continue with some development, such as roads.

Vehicle Traffic

Vehicles kill substantial numbers of desert tortoises on paved roads (Boarman 2002, USFWS 2011a). In the central Mojave Desert (west of the UVRRU), at least one adult desert tortoise per 2.0 miles of road has been documented as killed each year along heavily traveled, unfenced roads (Boarman and Sazaki 1996). In addition, the FWS likely underestimates the number of juvenile desert tortoises killed on roads due to the difficulty in locating them because of their small size (Boarman and Sazaki 1996). Managers use fencing to reduce highway fatality or injury of desert tortoises; however, fencing needs to be constantly maintained and may also increase the effects of habitat fragmentation to desert tortoise populations (Boarman and Sazaki 1996, Boarman 2002, Nafus *et al.* 2013).

Climate Change

Desert tortoises may be particularly sensitive to changes in temperatures, because they cannot self-regulate their body temperatures (ectothermic) (Barrows 2011; Huey and Berrigan 2001). Increased temperatures could mean less time available for desert tortoises to forage above ground. It is unknown if this species could adapt rapidly enough to seasonal temperatures changes to shift its hibernation period or forage during cooler parts of the day or night.

During droughts, desert tortoises forage over larger areas, increasing the likelihood of injury or fatality through encounters with humans and predators (Boarman 2002). Increased flooding can trap desert tortoises in burrows (Lovich *et al.* 2011; USFWS 2011a; Berry and Murphy 2019) and may also increase the probability of individuals utilizing washes being washed into culvert debris piles adjacent to roads (Lovich *et al*. 2011). Additionally, flood events often breach desert tortoise-proof fences, resulting in more potential for vehicular collisions and increased maintenance of fence lines (USFWS 2011a).

Climate changes may affect nest and hatchling survival (Wallis *et al*. 1999) by affecting precipitation, soil moisture, and food resource availability (Rostal *et al*. 1994; USFWS 2011a; Lovich *et al*. 2012; Gibbons 2013; Peterson 1996). Drought can result in reduced clutch frequency, while increased rainfall may increase clutch frequency (Lovich *et al*. 1999; Lovich *et al*. 2015). Temperature also affects rate of egg development and incubation timing (Rostal *et al*. 1994, Lewis-Winokur and Winokur 1995). Although desert tortoise clutch timing seems to be correlated to inter-annual temperature variation, this species can lay two to three clutches a year,

which may ameliorate some of these concerns (Lovich *et al*. 2012). Females may nest earlier or later to adjust for slight annual differences in temperature and may select nest sites that are somewhat shaded or deeper in their burrows (Refsnider and Janzen 2012; Ennen *et al*. 2012). Desert tortoise sex is determined during incubation based on ambient and soil temperatures (Rostal *et al*. 1994; USFWS 2011a; Telemeco *et al.* 2013). Increased temperatures result in production of more females. The survival of reptile species with temperature-dependent sex determination through cycles of warming and cooling over the last 100,000 years suggests that changes in climate were such that species were capable of shifting the time of nesting, choice of nest sites, the range occupied, or even temperature at which the sexes were produced (Booth 2006). However, rapid changes in climate may challenge the ability of the desert tortoise to make such shifts (USFWS 2011a; Lovich *et al.* 2012; Lovich *et al.* 2017). It is unclear if these normal adaptations in egg-laying behavior will be substantial enough to meet changing conditions (behavioral adaptation rate; Telemeco *et al*. 2013). Even with earlier and deeper nesting, warmer temperatures during incubation may still result in skewed sex determination or egg mortality (Spotila *et al.* 1994; Telemeco *et al.* 2013).

Wildfire

Wildfires can kill or injure desert tortoises through direct burning, dehydration, and smoke inhalation (McLuckie *et al.* 2007, Esque *et al*. 2003) and affect them after the fire through loss of forage, change in hydrology, and damage to soil and burrows (Esque *et al*. 2003). Increased wildfire frequency is likely within the range of the species, facilitated by several factors including climate change, prevalence of invasive species, and increased human presence.

In habitat free of non-native grasses, wildfire has a long return interval and rarely carries over a large area. Native desert plants are ill-adapted to wildfire and respond poorly to fires. In areas invaded by non-native grasses, the density of fine fuels increases with consequential changes in fire behavior and the fire regime. These changes increase the likelihood and intensity of wildfire, reduce the fire return interval, and alter the vegetation community structure post-fire, and may result in long-term adverse effects to desert tortoises and their habitat.

Invasive Species

Proliferation of invasive plants is increasing in the Mojave and Sonoran deserts, largely because of human disturbance, and research indicates it is a significant threat to desert tortoise habitat (Brooks 2009). Invasive species occur in disturbed areas and in areas of high human use (*e.g*., trails, roads). Trails and roads facilitate non-native plant introduction by serving as vectors for seeds to enter undeveloped or disturbed areas. When non-native plant species become established, native perennial and annual plant species may decrease, diminish, or die out (D'Antonio and Vitousek 1992). Non-native grasses that invade desert tortoise habitat may not be as nutritious as the native forbs that typically comprise the desert tortoise diet (Hazard *et al.* 2010; D'Antonio and Vitousek 1992; Oftedal 2002; Drake *et al.* 2016; Oftedal *et al.* 2002).

Non-native invasive grasses can promote more intense and regular fire (a fire cycle) as part of their life-history (Zouhar *et al.* 2008). Red brome (*Bromus rubens*) and cheatgrass (*Bromus tectorum*) display characteristic traits that include rapid and dense growth in early season that allow them to outcompete native vegetation. Late season abrupt drying of above-ground growth

then follows this growth period. When ignited, these dry, dense grass fuels result in extreme fire heat and intensity which create charred disturbance areas. Following wildfires, non-native vegetation is likely to increase in density (BLM 2015; Brooks 1999; Brooks and Esque 2002), facilitated by their early-season, fast-growing nature. This life history is in contrast to the slow-growing, sparse plants typical of the Mojave desert vegetation community. The further dominance of invasive, non-native species causes further habitat degradation and risk of wildfire (Boarman 2002). The result is a change in the fire regime that excludes native vegetation over time and can lead to a monoculture of non-native grasses and loss of native vegetation diversity.

Grazing

Livestock grazing affects desert tortoises foraging resources by reducing native plants, spreading non-native vegetation, and disturbing soil (Fleischner 1994; Lovich and Bainbridge 1999; Reisner *et al.* 2013). Livestock tend to graze preferentially on native vegetation, allowing non-native plants to gain a larger hold (USFWS 2011a). Studies in desert tortoise habitat have shown that grazing has a negative correlation with the presence of tortoise sign (Berry *et al.* 2014; Keith *et al.* 2008). Recovery of fragile or slow-growing vegetation may take years following grazing removal, and the proliferation of low-forage-quality invasive species in the interim may continue to limit the productivity of an area for desert tortoises. In addition to habitat degradation, livestock may also trample desert tortoise individuals and collapse burrows (Lovich and Bainbridge 1999; Nussear *et al.* 2012).

Recreational Use

Human presence, particularly recreational activities, is a primary factor in desert tortoise declines (Berry and Murphy 2019). Human presence can cause desert tortoises to avoid areas; increase incidents of human handling, collection, poaching, and encounters with dogs; increase fatalities from road traffic and Off-highway Vehicles (OHVs); and attract predators (USFWS 1994a; Averill-Murray 2002; Berry *et al*. 2008; Hughson and Darby 2013). Recreational activities can degrade desert tortoise habitat by removing and damaging native vegetation, compacting soil, and spreading invasive species (see discussion on plant and soil disturbance in "Development" section above) (USFWS 1994a; Berry *et al*. 2008).

Predation

Several native species of mammals, reptiles, and birds prey upon desert tortoises, particularly hatchlings and juveniles. The common raven (*Corvus corax*) is the most visible predator of small desert tortoises (Boarman 1993; Knight and Kawashima 1993), and coyotes (*Canis latrans*) can kill adult and juvenile desert tortoises (USFWS 2011a). In the desert southwest, common raven populations have increased over the past 25 years (greater than 1000 percent), probably in response to increased human populations, associated food and water subsidies, and anthropogenic changes to the landscape (Boarman and Berry 1995; Boarman *et al.* 1995; Boarman *et al.* 2006). Linear features such as roads and utility corridors and other urban sites such as landfills and sewage ponds have been shown to attract common ravens, red-tailed hawks (*Buteo jamaicensis*), and turkey vultures (*Cathartes aura*) (Knight and Kawashima 1993; Boarman *et al.* 1995; Knight *et al.* 1999). The use of anthropogenic nesting substrates facilitates increased predation of juvenile tortoises, especially within about 0.4 kilometer (0.25 mile) of the

raven nest (Boarman 2002; Kristan and Boarman 2003). Raven numbers decrease with distance from urban sites in the west Mojave, placing desert tortoises that occur in the urban-desert interface at higher risk of predation (Kristan and Boarman 2003).

Collection

Data and anecdotal observations indicate that collection for personal or commercial purposes was significant in the past (USFWS 1994a). While illegal collection of desert tortoises could possibly affect local populations, there is no quantitative estimate of the magnitude of this threat to the species overall (Berry *et al.* 1996; Boarman 2002).

Disease

In part, population declines resulting from upper respiratory tract disease (URTD) prompted the initial emergency listing of the desert tortoise. URTD appears to be a complex disease interacting with other stressors to affect desert tortoises (Brown *et al.* 2001; Tracy *et al.* 2004). URTD causes lesions in the nasal cavity, excessive nasal discharge, swollen eyelids, and sunken eyes. In its advanced stage, it can lead to lethargy and potentially death. Environmental stresses, malnutrition, and immune deficiencies can aggravate URTD (Jacobson *et al.* 1991). The disease has higher prevalence in relatively dense desert tortoise populations, because mycoplasmal infections are dependent upon higher densities of the host (Tracy *et al*. 2004).

Other diseases that can harm desert tortoises, such as the herpes virus, *Pasteruella testudinis* (cutaneous dyskeratosis [shell disease]), and shell necrosis, are found in desert tortoise populations across the species' range (Dickinson *et al.* 2001; Martel *et al.* 2009; USFWS 2011a; Berry and Murphy 2019). The FWS knows less about these diseases; however, it has been postulated that increased environmental toxins such as heavy metals, mercury, arsenic, and chlorinated hydrocarbons associated with roads can cause certain diseases (*e.g*., cutaneous dyskeratosis and shell necrosis) (Jacobson *et al.* 1994; Chaffee and Berry 2006).

While disease is a natural phenomenon in wildlife populations, humans and their activities may introduce, spread, or increase susceptibility to harmful pathogens and microbes (*e.g*., Boarman, 2002; Martel *et al*. 2009). Humans can facilitate disease spread through unauthorized release or escape of pet desert tortoises to the wild (Johnson *et al.* 2006, Martel *et al.* 2009). Human activities can potentially compromise immunological health of wild desert tortoises through various stressors (*e.g*., elevated corticosterone from harassment or malnutrition from increased non-native invasive plants related to human-caused ground disturbances [Boarman 2002]).

Desert Tortoise Recovery Plan

The 1994 Recovery Plan divided the range of the desert tortoise into six recovery units. In 2003, the FWS convened the Desert Tortoise Recovery Plan Assessment Committee (DTRPAC) to assess that Recovery Plan. The DTRPAC Report (Tracy *et al.* 2004) produced a number of findings and recommendations that served as the basis for revision of the 1994 Recovery Plan. In particular, this report recognized that threats to the desert tortoise have cumulative, synergistic, and interactive effects, and that desert tortoise recovery depends on managing multiple threats. Threats have increased since the FWS finalized the 1994 Recovery Plan, and the DTRPAC

Report noted that many recovery actions had not been fully implemented. The DTRPAC Report also recognized that desert tortoise populations may be distributed in metapopulations (groups of populations separated by space with regular movement of individuals from one population to another). Thus, it is important to protect the corridors between habitat patches and populations in addition to reducing multiple threats within management areas. The report noted that desert tortoise metapopulations require areas of suitable habitat for recovery, but these areas may be periodically vacant of desert tortoises. Hence, absence during one survey period does not indicate an area is not important to the species.

The FWS completed a Revised Recovery Plan (USWS 2011a) that identifies desert tortoise conservation areas outside of critical habitat considered essential for the conservation and recovery of the species. This Revised Recovery Plan reduces the number of recovery units from six to five, based on genetics and data supporting metapopulations (USFWS 2011a). The UVRRU remains one of the five recovery units.

Desert Tortoise Critical Habitat

The FWS designated critical habitat for the desert tortoise on February 8, 1994, encompassing over 2,428,114 hectares (6,000,000 acres) in portions of the Mojave and Colorado deserts (59 FR 5820). The twelve designated CHUs include primarily Federal lands in southwestern Utah, northwestern Arizona, southern Nevada, and southern California (USFWS 1994b).

When the FWS designated critical habitat, we identified the physical and biological features (PBFs) that are essential for the conservation of the species and that may require special management considerations or protection. PBFs describe those habitat features required for the physiological, behavioral, and ecological needs of the species. The PBFs for the desert tortoise are:

- Sufficient space to support viable populations within each of the recovery units and to provide for movement, dispersal, and gene flow;
- Sufficient quantity and quality of forage species and the proper soil conditions to provide for the growth of such species;
- Suitable substrates for burrowing, nesting, and overwintering; burrows, caliche (hard layer of subsoil typically containing calcium carbonate) caves, and other shelter sites;
- Sufficient vegetation for shelter from temperature extremes and predators; and,
- Habitat protected from disturbance and human-caused fatality.

Holmgren Milkvetch

The FWS listed Holmgren milkvetch as endangered in 2001 (66 FR 49560, September 28, 2001). In 2006, the FWS completed a final recovery plan for Holmgren milkvetch (USFWS 2006). Threats the species include urban development, recreation, livestock grazing, non-native plants, and mineral development (USFWS 2006). Recovery efforts include successful pilot population introduction and augmentation efforts on BLM and TNC lands (Meyer and Rominger 2020; Van Buren *et al.* 2020).

Holmgren milkvetch is a member of the pea family (Fabaceae). Plants are stemless, mostly prostrate, herbaceous perennials that produce leaves and small purple flowers in the spring and die back to its roots after the flowering season (Rominger *et al.* 2019a). Plants are short-lived with low survivorship; the average lifespan is 1.3 years, and few plants live past two growing seasons (Van Buren *et al.* 2020). Holmgren milkvetch relies on its seed production and its seedbank for stable population trends (Searle 2011; Van Buren *et al.* 2020). Solitary bees are the primary pollinators and important for maximum seed production (Tepedino 2005; Pavlik and Barlow 2017). Seeds are primarily wind-dispersed (Houghton *et al.* 2020).

The species is endemic to the Mojave Desert in Washington County, Utah and Mohave County, Arizona. It occurs in or near tributary drainages to the Santa Clara and Virgin Rivers and has an elevation range of 2,480 to 2,999 feet (USFWS 2006). The species is associated with geological layers of the Moenkopi and Chinle formations and shares the same general habitat with desert tortoise (USFWS 2006, 2011b). Associated native plant species include perennial shrubs such as chaffbush (*Amphipappus fremontii*), white bursage (*Ambrosia dumosa*), Torrey Mormon tea (*Ephedra torreyana*), range ratany (*Krameria parvifolia*), Anderson wolfberry (*Lycium andersonii*), matchbrush (*Gutierrezia sarothrae*), and the perennial grasses Indian ricegrass (*Oryzopsis hymenoides*) and big galleta (*Hilaria rigida*) (Van Buren and Harper 2004a; Meyer *et al.* 2019a).

Holmgren milkvetch occurs in seven populations on Federal (BLM), State, and private lands. The seventh population (Green Valley) is on private lands along a utility corridor, outside of critical habitat (McCormick and Wheeler 2018). The Nature Conservancy (TNC) maintains a plant preserve for the species to protect a portion of the State Line population on private lands. A land exchange in progress will transfer approximately 166 acres of critical habitat containing approximately 1,000 plants from State to Federal ownership in the State Line population in 2021 as part of the Utah Test and Training Range (UTTR) legislation (Public Law 114-328) (Roe 2020).

The FWS estimates 7,100 adult plants range wide, with 42 percent in the Central Valley population, 56 percent in the State Line population, and two percent in the five remaining populations. The current estimate of 7,100 individuals (adult plants) is lower than the 2001 and 2006 estimates due to declining population trends on BLM lands within the State Line, Purgatory Flat, South Hills, and Stucki Springs populations (Van Buren *et al.* 2016). Plants in the large State Line population are no longer responding to favorable spring moisture conditions on BLM lands. The most recent evaluation indicates significantly reduced seedling occurrence and seed production (reproductive output) in habitat disturbed by livestock grazing, recreation, and non-native plant encroachment (Van Buren *et al.* 2016; Searle and Meyer 2020). In the smallest three Holmgren milkvetch populations (South Hills, Stucki Springs, and Purgatory Flat), the population sizes have declined, and surveys have detected few to no plants in recent years. Population augmentation efforts are occurring on BLM lands to improve population size and trends (Meyer and Rominger 2020). In the large Central Valley population on State lands, reproductive output significantly dropped in the northern portion of the population, apparently associated with soil and habitat disturbance (Shultz and Meyer 2015).

Holmgren Milkvetch Critical Habitat

In 2006, the FWS designated approximately 6,289 acres of critical habitat in Washington County, Utah and Mohave County, Arizona (71 FR 77972). This coincided with the six known populations at the time (State Line, Central Valley, Stucki Springs, South Hills, Purgatory Flat, and Gardner Well). The physical and biological features (PBFs) essential for the conservation of the species are appropriate geological layers or soils; topographic features (mesas, ridge remnants, alluvial fans, and fan terraces, their summits and backslopes, and gently rolling to steep swales) and the drainage areas; and the presence of insect visitors or pollinators. For a more detailed description of Holmgren milkvetch's critical habitat, see the final critical habitat rule (71 FR 77972).

Shivwits Milkvetch

The FWS listed Shivwits milkvetch as endangered in 2001 (66 FR 49560). Shivwits milkvetch is a member of the pea family (Fabaceae). In 2006, the FWS completed a final recovery plan for Shivwits milkvetch (USFWS 2006). Threats to the species include urban development, recreation, livestock grazing, non-native plants, and mineral development (USFWS 2006). Recovery efforts include the Zion National Park's development of successful propagation protocols and the use of off-site (ex-situ) seeds for population augmentation (Dilley 2019; Schrage and Dilley 2020).

Shivwits milkvetch is a perennial forb ranges in height from 8 to 26 inches. It has cream to yellow colored flowers in a raceme (flowering stem) and pinnately compound leaves (Welsh *et al.* 2003). Flowering occurs between April and late May. Each Shivwits milkvetch plant can bear up to 45 flowers per flower stalk (Welsh *et al.* 2003; 66 FR 49560), and plants frequently have several stalks. Plants survive up to nine years and go dormant and undetectable in dry years (Van Buren and Harper 2004b). Solitary bees are the primary pollinators and important for maximum seed production (Tepedino 2005).

The species is endemic to Washington County, Utah and occurs at elevations between 3,018 and 4,363 feet on isolated pockets of purple-hued, soft clay soils of the Chinle Formation (USFWS 2006). Associated plant species are primarily non-native plants such as cheatgrass, red brome, storksbill (*Erodium cicutarium*), and Bells of Ireland (*Moluccella laevis*) (Van Buren and Harper 2003b, 2004b). Native plant species historically associated with Shivwits milkvetch include trees and perennial shrubs such as pinyon pine (*Pinus edulis*), broom snakeweed (*Gutierrezia* spp), blackbrush (*Colegyne ramosissima*), fourwing saltbrush (*Atriplex canescens*) and galleta grass (*Hilaria rigida*) (Van Buren and Harper 2004b).

Shivwits milkvetch occurs in six populations on Federal (BLM, National Park Service [NPS]), Tribal (Paiute [Shivwits Band] Indian Reservation), State, and private lands. The FWS estimates 4,000 to 5,000 adult plants range wide. The Zion population on NPS lands contains 83 percent of the total known individuals, and the five remaining smaller populations contain 17 percent of the total. The range-wide estimate is slightly lower than reported in 2006 (5,185 plants). The Zion population has been monitored since 2006 with an average plant count of 3,738 individuals and exhibits an overall stable population trend with strong periods of growth following drought periods when the species goes dormant (Schrage 2020). The Pahcoon Springs, Harrisburg Bench,

and Cottonwood populations appear to be in decline, apparently from rabbit herbivory and, possibly, inbreeding depression (Meyer *et al.* 2019a; Rominger *et al.* 2019b). The FWS does not have trend information for the other three populations (Silver Reef, Coral Canyon, and Shivwits).

Shivwits Milkvetch Critical Habitat

The FWS designated approximately 2,181 acres of critical habitat in Washington County, Utah (71 FR 77972). This coincided with five of the six known populations (Zion, Silver Reef, Harrisburg Bench and Cottonwood, Coral Canyon, and Pahcoon Spring Wash); we did not designate critical habitat on the Paiute (Shivwits Band) Indian Reservation for the Shivwits population. The PBFs essential for the conservation of the species are appropriate geological layers or soils; topographic features (alluvial fans, and fan terraces, and gently rolling to steep swales with little to moderate slope (3 to 24 percent); and the presence of insect visitors or pollinators. For a more detailed description of Shivwits milkvetch's critical habitat, please see the final critical habitat rule (71 FR 77972).

Dwarf Bear-Poppy

The FWS listed dwarf bear-poppy as endangered, without critical habitat, in 1979 (44 FR 64250). In 1985, we completed the recovery plan for dwarf bear-poppy (USFWS 1985). The most recent 5-year review that we completed in 2016 identified the following threats: land development (including utility projects, residential and industry development, and development of permanent and paved roads), recreational activities, and a loss of specialist pollinators and pollinator diversity. We also determined that poorly managed livestock grazing and non-native plants are also threats to the species (USFWS 2016).

Dwarf bear-poppy is a member of the poppy family (Papaveraceae) and is a perennial forb with leaves in a rosette at ground level (subscapose) that may reach up to 10 inches in diameter. Leaves are deeply cut like a paw into three to four sections with a hair or bristle at each tip and covered with long hairs and waxy film giving them a distinctive blue-grey color (USFWS 1985; Nelson and Welsh 1993). Flowering occurs between April and late May. Plants produce up to 400 flowers at their peak size, although 20-30 flowers per plant are more common (Nelson and Welsh 1993). The average lifespan is 2.6 years, but if seedlings survive their first year, the average lifespan ranges from 4.6 to 8 years (Nelson 1989; Harper and Van Buren 2004).

The species utilizes a pulse-reserve life history strategy; it relies on its seedbank for persistence, producing a large number of seeds that remain dormant but viable in the soil for many years (Nelson 1989a, 1989b; Harper and Van Buren 2004). Seedling recruitment is episodic and occurs en masse (all together as a group) when rainfall is sufficient during the late spring (Simpson 2014; Meyer *et al.* 2015). During intervening years between recruitment events, a large fraction of the population remains dormant as a seedbank (Harper and Van Buren 2004). Bees, including many native bees and the non-native common honeybee (*Apis mellifera*) pollinate the species and are important for maximum seed production (Tepedino *et al.* 2014).

The species is endemic to Washington County, Utah and occurs at elevations between 2,700 to 3,300 feet. It occurs on gypsiferous soils, most commonly of the Shnabkaib member of the Moenkopi formation and less commonly of Middle Red and Upper Red members of the

Moenkopi, the Kayenta formation, and the Harrisburg member of the Kaibab formation (USFWS 1985, Nelson and Welsh 1993, Rominger 2020). Most of the living cover in the habitat is biocrusts (biological soil crusts) (Nelson 1989a; Nelson and Harper 1991; Simpson 2014). Associated native plants include shadscale (*Atriplex confertifolia*), Torrey's Mormon tea, nodding buckwheat (*Eriogonum cernum*), desert trumpet (*Eriogonum inflatum*), desert pepperweed (*Lepidium fremontii*) and burrobush (*Ambrosia salsola*). Non-native plants include red brome, cheatgrass (*Bromus tectorum*), barb-wire Russian thistle (*Salsola paulsenii*), African mustard (*Malcomia africana*), and halogeton (*Halogeton glomeratus*) (Harper and Van Buren 2004; Simpson 2014).

Dwarf bear-poppy occurs in nine populations (Red Bluff, Webb Hill, White Dome, Beehive Dome, North Warner Ridge, Shinob Kibe, Val Springs, Warner Valley Springs, and Purgatory Flat). We estimate 11,600 adult plants range-wide; the estimate is an across several years. Approximately half of the plants occur on Federal lands, and the remaining on State and private lands. TNC maintains plant preserves on private lands to protect plants and habitat at two populations (White Dome, Shinob Kibe), which support approximately 34 percent of the total known plants. The proposed Reserve Zone 6 on State lands supports approximately 10 percent of the total known plants. The FWS is currently using drone imagery to census the population with the largest habitat area (Red Bluffs).

Siler Pincushion Cactus

The FWS listed Siler pincushion cactus as endangered in 1979, without critical habitat (44 FR 61786), and we downlisted the plant to threatened in 1993 (58 FR 68476). We completed a recovery plan for Siler pincushion cactus (USFWS 1986) and recently updated the recovery criteria (USFWS 2019a). We identified loss of plants and habitat associated with development and mining activities as the primary threats (USFWS 2019a).

Siler pincushion cactus is a perennial plant in the cactus family (Cactaceae). Plants are globe-shaped and occasionally have clustered stems, reaching four inches tall and three to four inches in diameter. Circular areoles (cluster of spines) contain three to seven brownish-black central spines reaching one inch in length. Central spines are straight and turn pale gray or white with age. Areoles also contain 11 to 16 whitish radial spines, slightly smaller than the central spines. Flowers are yellowish in color with purple veins, less than one inch long. Fruits are dry, greenish-yellow in color, 0.6 inches long, and contain gray to black seeds. The plant flowers April through mid-May in Arizona, and March through April in Utah. This species is a long-lived perennial, but we do not know the average or maximum life span. The primary pollinators are solitary, ground nesting bees in the *Agapostemon* and *Dialictis* genera (Janeba 2009).

The species occurs on gypsum and salt-rich soils found in Washington and Kane Counties in Utah, and Coconino and Mohave Counties in Arizona (USFWS 1986; Welsh *et al.* 2003), specifically on low red or gray gypsiferous soils derived from the Moenkopi Formation, and occasionally on soils of the Chinle and Kaibab Formations. It occurs at elevations ranging from 2,800 to 5,400 feet (USFWS 1986; Welsh *et al.* 2003). Associated plant species are fourwing saltbrush, big sagebrush (*Artemisia tridentata*), Bigelow sagebrush (*Artemisia bigelovii*), rabbitbrush (*Chrysothamnus* spp.), purple sage (*Salvia dorrii*), crisp-leaf wild buckwheat (*Eriogonum corymbosum*), Fredonia buckwheat (*Eriogonum mortonianum*), Atwood's

buckwheat (*Eriogonum thompsoniae* var. *atwoodii*), and broom snakeweed (*Gutierrezia sarothrae*) (USFWS 1986).

The FWS estimates 8,000 to 10,000 plants range-wide, comprising 25 populations. Two populations occur in Utah, and 23 populations occur in Arizona (USFWS 2019a). Within the species' range, the majority of suitable habitat (approximately 90 percent) occurs on lands managed by the BLM and the Kaibab-Paiute Indian Tribe, with some habitat on State and private lands (USFWS 2008a; 2018). The two populations in Utah occur on BLM, State, and private lands and contain approximately 10 percent of the total number of plants.

Gierisch Mallow

The FWS listed Gierisch mallow as endangered in 2013 (78 FR 49149). Gierisch mallow is a perennial herb in the mallow family that produces few to many stems from a woody stem (caudex). Stems are 17 to 41 inches tall and are often dark red or purple. Leaves are bright green, smooth (glabrous) with three to five lobes. The flowering stems (inflorescences) are compound, with more than one flower per node. Flowers have orange petals 0.6 to 0.98 inches long (Atwood and Welsh 2002). Gierisch mallow is distinguished from Rusby's globemallow (*Sphaeralcea rusbyi*) by the smooth foliage, few or no star-shaped (stellate) hairs restricted to the leaf margins, larger flowers, and restricted range and habitat. We have little life history information, because it is a recently described species. The woody-base of some individual plants indicates they are at least moderately long-lived (over three years in age). The species uses a seedbank to persist, but we do not know the longevity or viability of the seedbank. Gierisch mallow likely depends on specialist pollinators in the *Diadasia* genus (globe mallow bee) to produce seeds (Tepedino 2010).

The species is restricted to gypsum outcrops of the Harrisburg Member of the Kaibab Formation in Mohave County, Arizona and Washington County, Utah (Atwood and Welsh 2002). It ranges in elevations from 2,477 to 3,766 feet. Plants occur in the Mojave mid-elevation mixed desert scrub land cover type, a transition zone above the creosote (*Larrea tridentata*) – white bursage (*Ambrosia dumosa*) desert scrub, and below the lower montane woodlands in the eastern and central Mojave Desert (NatureServe 2011).

We estimate 16,000 to 26,000 plants in three populations (78 FR 49149, Wooldridge 2020). The 18 populations identified in the listing rule were recently grouped into three populations based on NatureServe criteria (NatureServe 2004). Utah contains approximately 31 percent of the total plants; plants occur on Federal lands along the Utah-Arizona border west of Interstate 15 (78 FR 49149).

Threats to Gierisch mallow include habitat destruction or modification from gypsum mining operations, recreational activities, and wildfires associated with the spread of non-native plants (78 FR 49149). Gierisch mallow does not have a final recovery plan. Post-mining restoration efforts have successfully replanted Gierisch mallow on disturbed sites (Pavlik *et al.* 2018).

Gierisch Mallow Critical Habitat

The FWS designated approximately 12,822 acres of critical habitat in Mohave County, Arizona and Washington County, Utah (78 FR 49165). The PBFs essential for the conservation of the

species are appropriate geological layers or soils; associated plant community; biological soil crusts; the presence of insect visitors or pollinators; and areas free of disturbance and low densities of non-native plants. For a more detailed description of Gierisch mallow's critical habitat, please see the final critical habitat rule (78 FR 49165).

Fickeisen Plains Cactus

The FWS listed the Fickeisen plains cactus as endangered in 2013 (78 FR 18938). Threats and stressors include trampling by livestock and feral horses; off-road vehicle use and other recreation; mining; construction; illegal collection; non-native plants; rodent, rabbit, and insect herbivory; drought; and climate change that exacerbates the effects of small population size (Talkington 2019; Lambeth 2014, 2016, 2017). We have not completed a final recovery plan for Fickeisen plains cactus.

Fickeisen plains cactus is a small, unbranched to occasionally branched, globose cactus. Stems of mature plants are 1.0 to 2.6 inches tall and up to 2.2 inches in diameter, although most adult individuals are the size of a quarter. Tubercles that form a spiral pattern around the plant cover the stems. Each tubercle has 6 to 7 radial spines that are spongy, with a long, strongly curved central spine 0.59 to 0.70 inches long (Arizona Rare Plant Guide Committee 2001; Heil and Porter 2001; AGFD 2011).

Fickeisen plains cactus is cold adapted with contractile roots that enable the plant to retract into the soil during the winter (cold) and summer (dry) seasons, as well as other periods of drought conditions. In general, plants emerge in early spring and begin to flower in mid-April. The flowering period is short and lasts one to two weeks (Phillips *et al.* 1982; Travis 1987). By June, plants shrink back into the soil, losing at least one-half their height above ground. Some individuals may re-emerge in the autumn following monsoonal rains. Plants generally remain retracted underground during the winter months. Plants can remain retracted underground up to five years. Locating individuals can be difficult, even when surveyors know their exact location (78 FR 18938).

We have limited information on reproduction, but fruit set appears to be quite low (Aslan 2017). Larger plants appear to have higher reproductive output than smaller plants. The primary pollinators of the plant are likely halictid bees from the genera *Lasioglossum*, *Halictus*, and *Agapostemon* (Milne 1987; Aslan 2017; USFWS 2020). Seed dispersal may be limited to short distances by wind and water (Milne 1987).

The species is endemic to the Colorado Plateau in Coconino and Mohave Counties, Arizona, and Washington County, Utah and restricted to exposed layers of limestone of the Harrisburg Member of the Kaibab Formation, as well as the Toroweap, Coconino Sandstone, and Moenkopi Formations (Travis 1987; 81 FR 55265). Most populations occur on the margins of canyon rims, flat terraces, limestone benches, or on the toe of well-drained hills. Plants occur on flat to gently sloping terrain (slopes of 0 to 5 percent, up to 20 percent) at elevations between 4,200 to 5,950 feet (Arizona Rare Plant Guide Committee 2001; AGFD 2011; Hazelton 2011; USFS 2013). The species occurs in the Plains and Great Basin grasslands, and the Great Basin desert scrub vegetation communities. Biocrusts on the Kaibab National Forest may provide nutrients and favorable microsites to support the species (Belnap 2006).

We estimate 2,200 plants range wide in 40 populations, 39 in Arizona and one in Utah. Populations range in size from one to over 1,000 plants (Robertson 2020). Populations in Arizona are located on Federal lands (BLM and USFS); Tribal lands of the Navajo Nation and Hualapai Nation; State, and private lands (Arizona Rare Plant Committee 2001; Goodwin 2008; Roth 2008). The one population in Utah occurs on Federal lands (BLM) (Utah Native Plant Society 2020).

Fickeisen Plains Cactus Critical Habitat

The FWS designated approximately 17,456 acres of critical habitat in Coconino and Mohave Counties, Arizona (81 FR 55265). The PBFs essential for the conservation of the species are appropriate geological layers or soils; associated plant community; and native vegetation that provide pollinator habitat. For a more detailed description of the Fickeisen plains cactus' critical habitat, please see the final critical habitat rule (81 FR 55265).

Previous Related Consultations

Given the wide range of the desert tortoise, several Federal actions affect the desert tortoise every year. In 2020 to date, the FWS has consulted with Federal agencies on at least 18 projects affecting the desert tortoise. The 1995 HCP and a similar HCP in Clark County, Nevada cover a variety of activities across two counties for a relatively long duration of time. Other relatively large projects include the Lake Powell Pipeline in Utah and Arizona and multiple solar projects west of the UVRRU. The ECOS desert tortoise species profile lists formal consultations affecting the desert tortoise. Because of their overlapping habitat, many of the consultations from Washington County, Utah and surrounding areas also included some the plant species evaluated in this BO. These are available by searching for the species on the species search page on ECOS.

Environmental Baseline of the Desert Tortoise

Regulations implementing the Act (50 CFR 402.02) define the environmental baseline as the condition of the listed species or its designated critical habitat in the Action Area, without the consequences to the listed species or designated critical habitat caused by the proposed Action. The environmental baseline includes the past and present effects of all Federal, State, or private actions and other human activities in the Action Area. It also includes the anticipated effects of all proposed Federal projects in the action that have already undergone formal or early Section 7 consultation, and the effect of State or private actions, which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline.

The FWS is evaluating the actions associated with the NCH Project concurrent with the Amended HCP. In this BO, we address the effects of the actions evaluated in the NCH Project BO as part of the environmental baseline. We use the preferred alternative (Alternative 3) identified in the EIS (BLM and USFWS 2020a).

Status of the Desert Tortoise within the Action Area

The Action Area is primarily associated with the UVRRU, but also includes a small portion of the NEMRU, west of the Beaver Dam Mountains (USFWS 2011a). The Permit Area is associated only with the UVRRU. Because all the Covered Activities and potential adverse effects will occur in the Permit Area, we focus our discussion on the status of desert tortoises in the UVRRU. The BLM manages approximately 589,000 acres of suitable or occupied habitat outside the Reserve where actions are subject to evaluation under Section 7(a)(2) consultation. The Shivwits Band of the Paiute Reservation lands may include suitable and/or occupied desert tortoise habitat that we do not consider in this analysis, except as part of the overall UVRRU.

Desert Tortoise Habitat in the Action Area

The Action Area contains most of the UVRRU and a relatively small portion of the NEMRU, in the western portion of the Action Area. The UVRRU, on the extreme northeast edge of the species' range, is unique in habitat characteristics and temperature range. The UVRRU contains desert tortoise habitat east of the Beaver Dam Mountains, with habitat in Washington County, Utah (USFWS 1994a; USFWS 2011a) and Mohave County, Arizona (USFWS 2021a). The County could implement conservation actions anywhere in the Action Area. Adverse effects to the species from Covered Activities will occur in the Permit Area, specifically in the HCP Take Area. We focus this discussion of the "Status of the Desert Tortoise within the Action Area" and our following "Effects of the Action on the Desert Tortoise" in the Permit Area and the HCP Take Area, because this area is most relevant to our analysis.

The FWS Utah ES Field Office recently evaluated habitat in the UVRRU and identified desert tortoise suitable habitat by selecting habitat that Nussear *et al*. (2009) modeled as having a 50% or greater suitability for the species, removing impervious surfaces and other developed landcover, and excluding areas higher than 4,500 ft (USFWS 2021a). We refer to this area as "Modeled Desert Tortoise Habitat." This evaluation expanded the UVRRU from its original delineation (USFWS 2011a) to include contiguous suitable habitat in Mohave County, Arizona (USFWS 2021a). For the purposes of our analysis we have included these additional areas in Mojave County, Arizona as part of the analysis area for the UVRRU. The UVRRU now comprises 325,898 acres and includes some areas in Arizona (USFWS 2021a). Based on this, the Action Area (Plan Area) contains 357,366 acres of Modeled Desert Tortoise Habitat, 239,008 acres in the UVRRU (the Permit Area) and the remainder in the NEMRU.

The County used slightly different methodology to delineate the area where they consider the desert tortoise reasonably certain to occur. They set the elevation threshold at 4,000 feet and consider the desert tortoise not reasonably certain to occur above that elevation (Washington County 2020, see section 3.2.3.2.2 of the Amended HCP). We are referring to the area where the County considers the desert tortoise reasonably certain to occur as "MDT Habitat," consistent with the terminology in the Amended HCP. We acknowledge that desert tortoises are occasionally found outside the areas the County identified as MDT Habitat, but other authorizations address take associated with conservation measures of the Amended HCP that support the recovery and translocation of desert tortoises from areas of non-habitat (*e.g.*, UDWR Section 6 Authorities). The County advises proponents of activities outside the Amended HCP Take Area (*e.g.*, areas above 4,000 feet in elevation) to document their methods and findings of

desert tortoise absence or to coordinate with the FWS if desert tortoises are reasonably certain to occur in the affected area.

Number of Desert Tortoises in the Action Area

We used the best available data to estimate the number of desert tortoises in the Permit Area and in the Amended HCP Take Area, the portions within the Action Area most relevant to our analysis. Because we do not do not know if the desert tortoise currently occupies areas in the UVRRU outside of the Permit Area, our estimates of the number of individuals in the UVRRU applies only to the Permit Area.

Dessert tortoises are difficult to survey, due to their fossorial behavior. We used density estimates from 2017 line sampling surveys to apply to areas within the Permit Area (more detail on the methodology and confidence intervals [CIs] is in USFWS [2021a]). The wide CIs associated with the density estimates indicates a high level of uncertainty associated with these estimates. The application of the density estimates to appropriate areas also has challenges. Desert tortoises do not occur uniformly throughout the UVRRU, and surveys have not been conducted throughout the UVRRU or even throughout all Reserve zones. Thus, we made assumptions when applying density estimates across an entire area and when applying them to unsurveyed areas. These assumptions introduce additional uncertainty to our tortoise density estimates.

We estimate approximately 4,306 adult desert tortoises in the entire UVRRU (95 percent CI: 2,443 to 8,888) (USFWS 2021a), representing two percent of the range-wide population (212,343 adult desert tortoises) (Allison and McLuckie 2018). Individuals are primarily concentrated in the Reserve Zones 1 – 5 and proposed Zone 6, which we estimate to support 42 to 75 percent of the UVRRU population (USFWS 2021a). Currently we estimate that Reserve Zones 1 – 5 support approximately 2,341 adult tortoises (95 percent CI: 1,684 to 3,294), which includes desert tortoises translocated to Zone 4 (USFWS 2021a). Proposed Zone 6 has not been surveyed completely. Based on the survey data available, we estimate 361 adult desert tortoises occur in proposed Zone 6 (USFWS 2021a). These estimates total to 2,702 adult desert tortoises in Reserve Zones 1–6.

In the 2017 line sampling surveys, McLuckie *et al.* (2018) estimated 50.8 adult desert tortoises per mi^2 (19.6 per km^2) in Reserve Zones 2, 3, and 5, and 34.8 per mi^2 (13.4 per km^2) in Reserve Zone 4. Reserve Zone 1 was not surveyed in 2017. Rognan *et al*. (2017) estimated 58.3 adult desert tortoises per mi^2 (22.5 per km^2) in a 2,950-acre area of proposed Reserve Zone 6 and an 18-acre area adjacent to proposed Reserve Zone 6. Because we cannot predict exactly where the 200 acres of the Amended HCP Take Area within the Reserve will be, we applied the density estimate throughout most of the surveyed areas of the Reserve, 50.8 adult desert tortoises per mi^2, to the entire 200 acres of the Amended HCP Take Area within the Reserve. We applied the 58.3 adult desert tortoises per mi^2 to the 18-acre area adjacent to proposed Reserve Zone 6 that Rognan *et al.* (2017) surveyed. For all other areas outside the Reserve, we worked in close coordination with the Desert Tortoise Recovery Office to apply the average density from surveys in the Beaver Dam Slope stratum of the NEMRU, the closest 2017 line distance sampling available, 3.4 adult desert tortoises per mi^2 (USFWS 2018). Though this decision was based on the best available data, it introduces a high level of uncertainty in the density estimates for the

HCP Take area outside the Reserve (62,812 of the 63,030 acres in the total HCP Take Area).

Using this methodology, we estimate that 366 adult desert tortoises have home ranges that overlap with the Amended HCP Take Area with the NCH changed circumstance. If the NCH changed circumstance does not happen, Reserve Zone 6 will not be established, and 622 adult desert tortoises with home ranges that overlap with the Amended HCP Take Area could be incidentally taken from Covered Activities.

We use calculations in the FWS Survey Protocol to estimate desert tortoise juveniles and hatchlings (Turner *et al.* 1984, 1986, 1987; USFWS 2019b). We expect 13.2 percent of the desert tortoises in a population to be adults (> 180 mm carapace length), 69.1 percent (5.2 times as many as adults) to be juveniles (< 180 mm carapace length), and 17.7 percent (1.3 times as many as adults) to be hatchlings. Using these occurrence estimates, we estimate 1,830 juvenile and 458 hatchling desert tortoises occur in the Amended HCP Take Area with the NCH changed circumstance (Table 3). We also calculated estimates of juvenile (3,234) and hatching (809) desert tortoises without the NCH changed circumstance (Table 4). Accurately estimating the number of desert tortoise eggs in any given site is extremely difficult, because the eggs incubate buried beneath the soil surface. Therefore, we recognize that some undefinable number of desert tortoise eggs is present year-round.

As discussed above, we acknowledge that these estimates come with a high degree of uncertainty. We expect that this approach to some extent balances potential overestimates in some areas of the Amended HCP Take Area with potential underestimates in other areas.

Desert Tortoise Population Trends in the Action Area

Line survey sampling from 2004 to 2014 indicated a 24.3% decline in adult desert tortoises in the UVRRU and a 36.9% decline rangewide (Allison and McLuckie 2018). The NEMRU was the only recovery unit estimated to have experienced an increase in the number of adult desert tortoises (270.3%) during that timeframe. Allison and McLuckie (2018) estimate a 3.2 percent annual decline of adult desert tortoises in the UVRRU from 1999 to 2013. Data indicate that the decline was driven by stochastic events that led to episodic loss of individuals, such as wildfire events exacerbated by the establishment and dominance of invasive grass species in recent decades (McLuckie *et al*. 2020). McLuckie *et al.* (2020) determined that the number of adult desert tortoises stabilized after the fatalities from the 2006 wildfires. The effects of wildfires in 2020 on adult abundance are still being assessed.

Wildfires and other stochastic events (*e.g.*, drought) have resulted in the loss of desert tortoises. Allison and McLuckie (2018) found a decreasing trend in tortoise abundance (number of adult tortoises) following the 2006 wildfires. Kellam (2020) documented tortoise fatalities from wildfire in 2020, but the effect of the 2020 fires on current adult tortoise abundance is unknown. It could take years or generations (a generation for desert tortoises is estimated to be approximately 25 years [USFWS 2011a]), to detect actual changes in desert tortoise population trends. Desert tortoises are slow to mature (12-20 years for an individual to reach sexual maturity), therefore, it can take decades to detect the effects of stochastic events such as wildfire, on tortoise recruitment. The high desert tortoise densities in the Reserve, the highest density area in the UVRRU, may enable the population to recover from the loss of adults resulting from

wildfire and drought in recent decades, especially if ongoing and future conservation activities improve habitat conditions to benefit desert tortoise survival, reproduction, and recruitment. However, it is clear that wildfires have resulted in loss of desert tortoises and that, over time, there has been a decline in adult desert tortoise numbers.

Population viability analysis estimated a minimum viable density of adult desert tortoises in a population as 10 tortoises per mi^2 (USFWS 1994a). Desert tortoise conservation areas that support less than these targets should be intensively managed to achieve a population growth rate near 1. When populations are well above minimum viable density (*e.g.*, 30 or more desert tortoises per mi^2) and positive average growth rate can be maintained (*i.e.*, via intensive management), small reserves with high-quality, secure habitat for 10,000 to 20,000 adult desert tortoises should be sufficient for species viability. Since establishment in 1996, the Reserve has exceeded the described desert tortoise density targets (number of adult desert tortoises per mi^2) identified in the Population Viability Analysis at 10 adults per mi^2 (USFWS 1994a). The highest reported averaged abundance of adult desert tortoises in Reserve Zones 2, 3, and 5 was 3,392 (95% CI: 2,521 to 4,563) in the year 2000 (UDWR 2018). The Reserve population is approximately 44 percent lower than the minimum abundance (number of animals) target of 10,000 adult desert tortoises set for the UVRRU by the recovery office in 1994.

Additional individuals comprising the UVRRU population occur outside the Reserve, albeit at lower densities. The densities in the Reserve are considered some of the highest throughout the species' range. This contrast of high densities and low overall abundance is the result of relatively small (compared to the species range) areas of high quality, high-density habitat in a recovery unit that is small compared to other recovery units. The small size of the UVRRU and lower overall abundance does not mean the UVRRU cannot sustain a viable population. Instead, we emphasize the importance of management to sustain a viable population over time and connectivity to the range of the species to increase genetic and demographic exchange (USFWS 2021a). Habitat degradation due to wildfires and invasive plant species likely contribute to the depressed and variable population abundance in some areas of the UVRRU and represent management opportunities.

Factors Affecting the Desert Tortoise in the Action Area

The following section describes ongoing threats and conservation activities occurring in the Action Area, with a specific focus on the HCP Permit Area. We have defined desert tortoise distribution across the UVRRU into 11 subpopulations, referred to as analytical units (AUs). We based these AUs on topographical, anthropogenic, and ecological factors (USFWS 2021a). Much of what we know about threats to the desert tortoise comes from the desert tortoises in the three AUs that comprise Reserve Zones 1 – 5, where the most surveys have occurred. Given our limited knowledge about occupancy outside the Reserve, the factors that went into defining separate AUs included areas with known desert tortoise clusters, surrounding suitable habitat, and barriers to connectivity with other AUs. We do not describe these AUs in detail in this BO, but generally refer to them to aid our discussion where it is important to emphasize the uneven distribution of desert tortoises and variability of habitat conditions in the UVRRU.

Development

Urban development continues in the Action Area, particularly in the Permit Area. Increasing human population drives increased urban development. Perlich *et al.* (2017) projects the population of Washington County to increase at the highest rate of all counties in Utah, 229 percent from 2015 to 2065.

Resource extraction is another a source of potential habitat loss throughout the Action Area. Portions of the BLM-administered lands within proposed Reserve Zone 6 are closed to fluid mineral development (approximately 122 acres), while the remaining acres are currently open with varying levels of restrictions. The BLM-administered lands within proposed Reserve Zone 6 are also categorized as "open" or "open with restrictions" to locatable minerals. Approximately 1,150 acres are closed to mineral materials development, while the rest are open (BLM 1999). Some areas outside the Reserve are also open to resource extraction.

Linear features fragment the desert tortoise population in the Action Area. Barriers to connectivity throughout the UVRRU include roads, fences, developed areas, rivers, mountain ranges, agricultural areas, or any intervening stretches of land unsuitable for desert tortoise and large enough to deter desert tortoise dispersal between AUs (USFWS 2021a). Low intra- and inter-AU movement affects resiliency by reducing rescue effects (repopulating an area after a population decline) and by reducing the level of genetic heterozygosity. In the Reserve, multiple roads, mostly fenced, fragment the habitat, inhibiting movement. The NCH Project changed circumstance would include construction of a new fenced highway that would fragment the highest density cluster of desert tortoises in Reserve Zone 3 (USFWS 2021b, 2021c). Constructed desert tortoise passages (culverts) under some of the roads provide connection, but the effectiveness of these passages has not been fully evaluated. Desert tortoises have been observed to move through drainage culverts contained by desert tortoise fencing, which can potentially facilitate genetic connectivity (USFWS 2021a; Dutcher *et al.* 2020). Culvert studies conducted in southern Nevada provided observations of tortoises completely crossing through both corrugated metal pipes (CMPs) along U.S. 93 and concrete box culverts along U.S. 95 (USFWS 2020a). Tortoises were observed successfully crossing through several concrete box culverts with open medians and traveling under 4-lane roads up to a 225-ft. total distance at the U.S. 95 study site. In the Reserve, Red Hills Parkway has five desert tortoise culverts, and monitoring documented two individuals using one culvert as a movement corridor over three years of monitoring (McLuckie 2019). Additionally, two individuals were documented using a culvert on Tuacahn Road in Zone 2. The NCH Project alignment includes construction of desert tortoise passage structures to improve passage under the highway and improvement of existing passage structures (culverts) under State Route (SR) 18, if needed. In response to the NCH changed circumstance, the County would provide funding and support for desert tortoise passage structures to be constructed under Cottonwood Springs Road, which currently fragments the eastern and western portions of Reserve Zone 3.

In the Action Area outside of the Reserve, roads, urbanization, and natural features impede movement between some areas. Low connectivity within the UVRRU affects the unit's resiliency by reducing rescue effects (repopulating an area after a population decline) and by reducing the level of genetic heterozygosity (USFWS 2021a). However, connectivity is currently good between the proposed Zone 6 and the surrounding habitat to the west on BLM managed

lands and to a limited extent through Shivwits tribal lands. While residential developments border the Zone 6 SITLA lands on the northeast, east, and southeast, connectivity can extend outside of Zone 6. This connectivity may be important for supporting movement corridors between the UVRRU unit and the NEMRU, thereby connecting UVRRU with the species' range to the west.

Vehicular Traffic

Between 1987 and 2019, observations of 146 injured or dead desert tortoises occurred along roads or trails within the Reserve or surrounding areas in the Action Area (UDWR 2019a). Since the accounts consist of anecdotal observations, the actual number of fatalities may be underestimated. Most paved roads in or directly adjacent to the Reserve have desert tortoise fencing to reduce vehicular collisions (*e.g.,* I-15, SR 18, Red Hills Parkway, Tuacahn Road, and Cottonwood Springs Road). In proposed Reserve Zone 6, most roadways are OHV trails and lack any desert tortoise exclusion fencing. Outside and not directly adjacent to the Reserve, no roads are currently fenced in the Action Area.

Climate Change

In the past 25 years, Washington County has seen average annual temperatures above the mean of 16°C (61°F), and precipitation has generally been lower than the annual mean of 30 centimeters (12 inches) (NOAA 2020; Rangwala 2020). Historically, the hottest summer day had a temperature of 40.5°C (105°F), and the number of higher temperature summer days are anticipated to continue to increase, while precipitation is predicted to fluctuate within ten percent above or below the mean. Within the Reserve, a severe drought in 2002 resulted in no perennial or annual plant growth that year. Surveyors observed abnormal desert tortoise behavior, including failure to hibernate, and there was an increase in URTD and emaciated tortoises (UDWR 2018). The following year, surveys identified 2.7 times the normal amount of shell remains, presumably a result of increased mortality from the drought. In 2003, the estimated population had dropped to 42.7 individuals per mi^2 (16.5 per km^2) from the 73.3 individuals per mi^2 (28.3 per km^2) recorded in 2001 (UDWR 2018). We anticipate the frequency of severe drought, similar to conditions seen in 2002, to occur from every other year up to every 15 to 30 years (Rangwala 2020).

Wildfire

Wildfires are common within the UVRRU and have burned significant portions of the area; over 25,000 acres burned in in 2006, and significant fires occurred again in 2012. Wildfires between 1993 and 2012, burned 65 percent of Reserve Zone 3 (BLM 2020). An estimated 15 percent of adult desert tortoises within Reserve Zone 3 and 37.5 percent within the entire Reserve died during the 2005 fires (McLuckie *et al.* 2007; McLuckie *et al.* 2016). In 2020, wildfires burned approximately 8,545 acres (29%) of modeled desert tortoise habitat in Reserve Zone 3. The FWS is still assessing the fire effects on the desert tortoise population there.

Since 1976 there have been 207 fires within the Permit Area, covering 266,196 acres; 56,672 acres burned multiple times. There were no fires within proposed Zone 6. Twenty-two fires burned 15,913 acres within the Reserve since 1976, with over 3,808 acres burning multiple times

(24 percent of all burned acres). During the summer of 2005, lightning caused multiple large fires within the Reserve, burning approximately 10,244 acres of desert tortoise critical habitat and 1,267 acres of additional desert tortoise habitat within the Reserve (USFWS 2008b, 2018; UDWR 2018). An estimated 15 percent of adult desert tortoises within Reserve Zone 3 died because of wildfires that year (UDWR 2007). UDWR attributed tortoise fatalities to fire (direct death) and forage loss (starvation) (UDWR 2016).

Although wildfires have been a major factor in desert tortoise habitat for decades, they appear to have had a greater affect in the UVRRU in 2020. As of November 16, 2020, twelve wildfires had burned 18,880 acres within the Permit Area. Wildfires have burned approximately 64 percent of the Permit Area multiple times from 1976 – 2000. The combined wildfires in the Reserve affected approximately 39 percent of modeled desert tortoise habitat acres in Zone 3, which contains the highest density of desert tortoises in the Reserve. The FWS has not yet evaluated the effects of these wildfires on the desert tortoise population. The County, the BLM, and the UDWR propose habitat restoration in the Reserve and on designated critical habitat as a short-term adaptive management response to the 2020 wildfires. This effort includes seeking funds for over $3 million and a longer-term commitment to target successful restoration of at least 2,600 acres of habitat in the Red Cliffs Desert Reserve Zone 3 (BLM 2020). These restoration commitments by the HCP Partners to the Zone 3 population are important in sustaining the habitat in the Reserve for the desert tortoise.

The proliferation of invasive annual grasses is fueling an annual burn-reburn wildfire cycle in the Red Cliffs Reserve (BLM 2016). The change to this fire regime demonstrates the cause-and-effect relationship between above-average fall and winter precipitation that triggers increased production of invasive annual brome grasses, and uncharacteristically large natural or human-caused wildfires during the summer months (BLM 2015). Humans caused approximately half of the wildfires in the Reserve since 1976 (12 of 22), and all four of the wildfires in 2020. Based on the frequency of wildfires in the past, it is highly probable that the Reserve will continue to experience frequent wildfires.

Wildfire suppression activities are part of the adaptive management for the Reserve. Wildfire suppression also occurs outside the Reserve for human safety and to protect property and infrastructure. In 2016, multiple agencies implemented a project to restore native vegetation to areas of the Reserve that burned in 2005. UDWR aims to continue this project through June 2021 and continues to care for and assess survival rates of outplantings at the Red Cliffs restoration site (McLuckie 2020).

Invasive Species

Non-native invasive *Bromus* spp. and other non-native invasive plants (e.g., *Brassica tournefortii*) have increased exponentially throughout the Action Area due to significant winter, spring, and summer precipitation in 2019. Within the Reserve, exotic annual grasses and forbs reach almost every area, with some areas approaching 90 percent cover of non-native grasses (BLM 2016; USGS 2019). As stated above, when non-native, invasive grasses and plants establish in tortoise habitat, native perennial and annual plant species may decrease, diminish, or die out (D'Antonio and Vitousek 1992). Non-native grasses that invade desert tortoise habitat may not be as nutritious as the native forbs that typically comprise the desert tortoise diet

(Hazard *et al.* 2010; D'Antonio and Vitousek 1992; Oftedal 2002; Drake *et al.* 2016; Oftedal *et al.* 2002). Non-native vegetation is likely to increase in density (BLM 2015; Brooks 1999; Brooks and Esque 2002), causing further habitat degradation and risk of wildfire (Boarman 2002).

Grazing

Livestock grazing allotments occur on BLM-administered public lands located in the Action Area. These allotments use a season of use-grazing rotation system, which minimizes, though does not eliminate, effects to the desert tortoise. Livestock grazing affects desert tortoises foraging resources by reducing native plants, spreading nonnative vegetation, and disturbing soil (Fleischner 1994; Lovich and Bainbridge 1999; Reisner *et al.* 2013). Livestock tend to graze preferentially on native vegetation, allowing nonnative plants to gain a larger hold (USFWS 2011a). Livestock may also trample desert tortoise individuals and collapse burrows (Lovich and Bainbridge 1999; Nussear *et al.* 2012). The BLM is responsible for determining the appropriate levels of grazing and implementing management strategies on all allotments to protect public land resource values and maintain rangeland health (43 CFR Part 4100). The County eliminated livestock grazing in Reserve Zones 1 – 5. Within proposed Zone 6, approximately 1,462 of the 3,225 acres of SITLA lands and almost all (3,446 of 3,471 acres) BLM lands are currently under active grazing leases (SITLA 2020a, 2020b).

Recreational Use

Recreationists use the Action Area extensively for various activities, including OHV use, hiking, mountain biking, climbing, hiking, hunting, and camping. The Red Cliffs NCA/Reserve is a popular recreation destination in the area. Between October 1, 2018, and September 30, 2019, approximately 190,000 people visited the Red Cliffs NCA (BLM 2019). An extensive trail system provides more than 130 miles for hiking, biking, camping, equestrian riding, and other non-motorized recreational activities (BLM 2019). In addition, many miles of non-designated social trails exist. The HCP Partners use staff and volunteers to conduct trail maintenance, cleanup, and restoration projects as needed (Rognan 2019).

Proposed Zone 6 is also a popular recreation destination with an estimated 82,775 visitors each year on the BLM lands. The area contains 74 miles of designated trails and hosts several mountain biking events. Considerable trail braiding has occurred and the creation of an additional estimated 42 miles of social trails. The almost 3,400 acres of SITLA lands support extensive OHV use (USFWS 2021a).

Predation

Raven predation of desert tortoises has occurred for many years in the Action Area and in the Reserve; however, surveyors have only gathered baseline data in the Reserve annually since 2015 (Washington County 2019). Surveys are conducted at all known raven nesting areas and along transmission lines on Federal and non-Federal lands within and adjacent to the Reserve. Surveys have identified raven predation on juvenile and hatchling desert tortoises, including two individuals in 2015 (Washington County 2015), eight in 2017 (Washington County 2017), four

in 2018 (Washington County 2018), and fourteen in 2019 (Washington County 2019). As of 2019, all active raven nests were located on cliffs or cottonwood trees (*Populus* spp.). We note that juvenile desert tortoise carcasses are difficult to find; therefore, predation of desert tortoises is likely higher than documented (Schijf and Rogan 2019).

Surveys have detected only remnants of old raven nests on transmission line towers in the Reserve, because the power companies often remove the nests. In 2018, observers located desert tortoise carcasses beneath utility poles that are adjacent to Zone 5 (Washington County 2018). Surveys also observed a raven picking up a desert tortoise in Zone 2 in 2019 (Washington County 2019). Surveys conducted in 2019 found raven nests at 17 sites, including 11 inside the Reserve, and a raven dropped a desert tortoise on Cottonwood Springs Road within Zone 3 (Washington County 2019). Most raven nests surveys located within the Reserve are in Zone 3 (Washington County 2019). Ravens follow human habitation. Raven numbers appear to be increasing in the Reserve, likely because of human development and growth in Washington County. The effect of higher raven numbers on desert tortoise is unknown, and survey and monitoring of raven nests and raven behavior in the Reserve will continue (Washington County 2018).

Pets are allowed off leash in most of the Action Area outside the Reserve, including proposed Zone 6. Pets are required to be on a leash within the Reserve, with the exception of hunting dogs with a licensed hunter during official hunting seasons. Various reports over the last 10 years indicate predation of desert tortoises by domestic dogs. Officials observed approximately six desert tortoise shells near the Black Rock-climbing area in Snow Canyon State Park, and they speculated that dogs scavenged or depredated desert tortoises (UDWR 2019b).

Collection

Illegal collection of desert tortoises by collectors and pet owners may play a role in the population decline in the Reserve (McLuckie *et al*. 2020). A 2019 field report by UDWR indicated 38 incidents of suspected or confirmed illegal take of desert tortoises from the Reserve and surrounding areas (UDWR 2019b).

Disease

Disease is present in the Action Area, but its prevalence is not known outside the Reserve. Within the Reserve, observers noted shell disease in relatively high-density desert tortoise areas, including areas around Cottonwood Wash, Middleton Wash and the Red Hills Parkway (UDWR 2018). URTD occurs throughout the Reserve, and the presence of tortoises with URTD clinical signs has increased since 2013 (UDWR 2018). Desert tortoises translocated long distances (*e.g*., greater than 300 meters [984 feet]) and into Zone 4 of the Reserve require a health screening prior to release to reduce the potential for disease transmittal.

The Reserve and Other Conservation Activities

The 1995 HCP established a multi-agency, collaborative conservation program consistent with the recovery recommendations of the 1994 Recovery Plan (USFWS 1994a). The County and the HCP Partners, in partnership with the FWS, have made substantial progress toward fully implementing the goals and objectives of the 1995 HCP, and, in several instances, have exceeded

their respective obligations under the 1995 HCP (see Chapter 6.2 of the Amended HCP, Table 15). The County, in conjunction with those entities performing activities under the 1995 HCP, implemented a variety of conservation measures inside and outside of the Reserve. They established and managed the Reserve for the benefit of the desert tortoise (*e.g.*, removing grazing, installing fencing, eliminating several motorized routes); performed and supported monitoring and research activities, provided education to the public; implemented protocols for performing certain types of land use activities inside and outside of the Reserve (*i.e.*, subdivision development, utility development, road development, recreation); and, experimentally collected and translocated desert tortoises from areas subject to land development and other human activities to under-occupied portions of the Reserve. These conservation activities would continue under the Amended HCP. The Washington County HCP coordinates actions by other HCP Partners (primarily the BLM and UDNR) and works to further the recovery of the desert tortoise in the UVRRU.

The Reserve is the primary conservation measure under the 1995 HCP to mitigate the loss of desert tortoise habitat from Covered Activities. Prior to the issuance of the 1995 ITP, the UESO evaluated the design of the Reserve and concluded that it was sufficient to offset the effect of the take to the desert tortoise. The HCP Partners have acquired the majority of the designated acres for conservation purposes; approximately 7,091 acres remain for acquisition. The County monitors and manages these 7,091 acres within Reserve Zones 1 – 5.

The County and HCP Partners continue to maintain the Reserve established under the original 1995 HCP. However, the NCH Project potentially changes the Reserve's conservation value to the desert tortoise. The NCH Project alignment would reduce the amount of MDT Habitat in the Reserve by 276 acres, and fragment and degrade an additional 2,335 acres of habitat. The County would add the 6,813-acre off-site Zone 6 to the Reserve in response to the NCH changed condition. In this BO, we evaluate the Reserve using biological values, those values necessary to sustain desert tortoises in sufficient numbers in protected habitat and to support recovery. These are similar to the Reserve design standards identified in the 1994 Recovery Plan (USFWS 1994a) but also encompass additional values relating to the condition of the species and the habitat in the area. The biological values consider the small size of the UVRRU and that the Reserve protects the largest known population of desert tortoises within the UVRRU. Our application of the biological values is consistent with the design standards in the 1994 Recovery Plan (USFWS 1994a). The NCH Project BO (section 5.3) (USFWS 2021b) provides a detailed description of the biological values and their relation to the design criteria from the 1994 Recovery Plan. We provide a summary below:

- **Animals** – A Reserve with animals of all life stages (eggs, hatchlings, juveniles, and adults) in a ratio sufficient to maintain a stable population, population growth, or rebound from population decline.

- **Size and Area** – A Reserve of sufficient size and adequate distribution within a species' native range or recovery unit to allow for demographic and genetic viability and recovery of the species amidst possible habitat loss or degradation.

- **Intactness** – A Reserve that retains connectedness within the species' native range to allow for ecological function of the species across the landscape, and among populations

to allow demographic and genetic flow that supports population dynamics and a natural evolutionary trajectory.

- **Connectivity** – A Reserve that has sufficient connectivity of sufficient habitat blocks such that there is unimpeded demographic movement such as dispersal, seasonal shifts, or migration to allow animals to move and disperse to meet life-history needs.

- **Habitat Condition** – A Reserve that retains habitat with physical and biological features necessary for breeding, feeding, and sheltering to support all life stages.

In this BO, we consider the NCH Project part of the environmental baseline. The NCH Project BO (USFWS 2021b) evaluates the biological values of the Reserve with the conservation measures associated with the NCH Project. Based on the analysis in the NCH Project BO (see section 5), we expect that, with the NCH Project, the Reserve will maintain the biological values necessary for the long-term viability of the desert tortoise in the UVRRU and support the potential for recovery of the species. This conclusion is contingent on the conservation measures associated with the NCH Project that would enhance the biological values of the Reserve. We expect Zone 3 conservation measures, specifically habitat restoration and addition of desert tortoise passage under roads, to improve habitat quality and dispersal needs, and, ultimately, improve desert tortoise population dynamics. The addition of Zone 6 will contribute to desert tortoise subpopulation redundancy in UVRRU by protecting most of the largest known subpopulation currently outside the Reserve. If the NCH Project does not occur, the Reserve, and its biological values, will remain as established under the 1995 HCP.

Status of Desert Tortoise Critical Habitat in the Action Area

The entirety of one desert tortoise CHU is in the Permit Area, the Upper Virgin River (UVR) CHU. Of the 53,366 acres in the UVR CHU, 88 percent (46,856 acres) are in the Reserve (Table 5). Proposed Zone 6 does not contain critical habitat.

The Reserve gives the UVR CHU a level of protection, however, there is still potential for habitat loss, degradation, and fragmentation within the Reserve, especially on unacquired private and SITLA-owned lands. The UDNR manages lands in the UVR CHU, including Snow Canyon State Park, in part to conserve the desert tortoise. In 2009, Congress designated the 39,564 acres of BLM-managed lands in the Reserve an NCA for protection and management of wildlife and natural resources, including desert tortoise.

A small number of utility developments and other small developments have permanently altered or temporarily disturbed critical habitat in the Reserve. Non-native plant species have increasing invaded critical habitat in the Reserve in recent years. The 1995 HCP adaptive management program and the Red Cliffs NCA RMP are implementing activities to restore the physical and biological features that invasive grasses and others sources of habitat degradation have affected.

The NCH Project would cause the permanent loss of 276 acres of critical habitat and degradation of an additional 2,347 acres. The loss and habitat fragmentation would permanently impede tortoise movement between 1,340 acres of habitat to the south and the rest of the Reserve. This will degrade the PBF that describes the need for sufficient space, specifically decreasing the

potential for movement, dispersal, and gene and potentially negatively affecting population viability. To minimize these effects, the NCH Project and the response to the NCH changed circumstance included in the Amended HCP includes tortoise passages in the design of the highway to minimize the fragmentation and the addition of tortoise passages on the existing Cottonwood Springs Road and improved passages on the existing SR 18 to increase the potential for habitat connectivity.

Status of Holmgren Milkvetch in the Action Area

The Amended HCP Take Area contains an estimated 3,300 Holmgren milkvetch plants in two populations (Central Valley and Green Valley), representing 46 percent of the range-wide estimate (Table 6). The approximately 1,000 plants in the State Line population are not included in the Amended HCP Take Area, because these lands will be transferred to Federal ownership in 2021 (see Holmgren milkvetch subsection of the "Status of the Species" section) (Roe 2020). Plants occurring on lands transferred to Federal ownership will then be afforded protections under the Act that they did not have on non-Federal land.

The Central Valley population is the second largest Holmgren milkvetch population. It is located on State lands and contains 42 percent of the total known population). The City of St. George General Plan in 2009 and amendment in 2016 (City of St. George 2009, 2016) indicate that the majority of plants and habitat in this population will be lost to residential and industrial development.

The Green Valley population is small, containing four percent of the total range-wide estimate. It occurs in an existing utility corridor and an area designated as open space by Washington County directly adjacent to proposed Zone 6 (St. George City General Plan 2009, 2016). Past utility development activities resulted in some habitat alteration, but fencing excludes public access from approximately half of the population. Within the fenced area, land use is light and appears to be restricted to maintenance activities associated with existing utilities. Recreation, primarily from mountain bikes and OHVs, affects plants and habitat outside of the fenced area. Future disturbance within the utility corridor may occur because of maintenance activities or the installation of new utilities.

HCP staff and other conservation partners have collected approximately 100,000 seeds on non-Federal lands in the Central Valley population and 45,000 greenhouse produced seeds (Meyer *et al.* 2019b). More seed collection efforts are planned at this population prior to development.

Washington County contains a considerable amount of undeveloped, potential habitat for Holmgren milkvetch. Based on a habitat model developed by the U.S. Geological Survey (USGS), the Amended HCP Take Area contains 9,345 acres of undeveloped, potential habitat, and Federal lands contain 10,001 acres. We consider these areas potential habitat and recommend qualified botanists evaluate their suitability. The model likely over-represents Holmgren milkvetch suitable habitat, and UESO and partners plan to refine the model using fine-scale vegetation information from drone imagery (Meyer *et al.* 2019b).

Status of Holmgren Milkvetch Critical Habitat in the Action Area

When the FWS designated critical habitat in 2006, it included 1,956 acres of non-federal lands in Washington County. Development has resulted in the loss of approximately 744 acres in Central Valley (Subunit 1c), Purgatory Flat (Unit 3), and State Line (Subunit 1). Approximately 1,212 acres of undeveloped critical habitat remain on non-Federal lands. The Amended HCP Take Area currently contains approximately 1,029 acres of critical habitat (Central Valley Subunit 1c and Purgatory Flat), representing 16 percent of total critical habitat for the species (71 FR 77982). The 166 acres of critical habitat in the State Line (Subunit 1) are not located in the Amended HCP Take Area, because these lands will be transferred to Federal ownership in 2021 (see Holmgren milkvetch subsection of the "Status of the Species" section) (Roe 2020).

UDOT currently protects 17 acres of critical habitat in the Central Valley Subunit. The Purgatory Flat CHU contains 13 acres of undeveloped critical habitat in the Amended HCP Take Area. However, there are no plants in the Amended HCP Take Area in this unit (Table 6). The Washington City master plan (Washington City 2017) indicates that all the Amended HCP Take Area in this unit would be lost to residential and industrial development. Holmgren milkvetch plants occur on Federal lands (BLM) in this CHU, and the population is fenced to exclude public access and use. Washington County maintains a Recreation and Public Purposes (R&PP) lease of these lands with the BLM to provide a buffer area for an existing gun range. The BLM may potentially transfer the R&PP leased lands to Washington County in the future if the habitat is afforded protections and management equivalent to those provided under Federal ownership (Trujillo 2020). Such a land exchange would require the BLM to consult with the FWS, if the action would result in adverse effects to the species. A land exchange, part of the Utah Test and Training Range (UTTR) legislation, will transfer approximately 166 acres of critical habitat in the State Line population from State to Federal ownership in 2021 (Public Law 114-328) (Roe 2020).

Status of Shivwits Milkvetch in the Action Area

The Amended HCP Take Area does not include any known Shivwits milkvetch plants. Washington County contains a considerable amount of undeveloped, potential habitat for Shivwits milkvetch. Based on a habitat model developed by the USGS, the Amended HCP Take Area contains 4,763 acres of undeveloped, potential habitat, and Federal lands contain 32,000 acres. We consider these areas potential habitat and recommend qualified botanists evaluate their suitability.

Status of Shivwits Milkvetch Critical Habitat in the Action Area

When FWS designated critical habitat in 2006, it included 161 acres of non-Federal lands in Washington County (71 FR 77985). Development on non-Federal lands has resulted in the loss of 41 acres in two units (Coral Canyon [Unit 3], Harrisburg Bench and Cottonwood [Unit 4a], and Silver Reef [Unit 4b]). One hundred and twenty (120) acres of undeveloped critical habitat remain on non-Federal lands. The Amended HCP Take Area contains approximately 92 acres of critical habitat (Coral Canyon, Harrisburg Bench and Cottonwood, and Silver Reef), representing four percent of total critical habitat for the species (Table 7; 71 FR 77985).

Status of Dwarf Bear-poppy in the Action Area

The Amended HCP Take Area contains estimated 815 dwarf bear-poppy plants in six populations (White Dome, Beehive Dome, Warner Valley Springs, Red Bluffs, Webb Hill, and Purgatory Flat), seven percent of the current range-wide estimate (Table 8). One population (Purgatory Flat) occurs entirely within the Amended HCP Take Area and contains approximately 40 plants. Washington City zoned habitat in the Purgatory Flat population for commercial and residential development (Washington City 2017). Habitat of the other five populations in the Amended HCP Take Area (White Dome, Beehive Dome, Warner Valley Springs, Red Bluffs, and Webb Hill,) are zoned for commercial and residential development (White Dome and Webb Hill) or open space transitional (Beehive Dome, Warner Valley Springs, and Red Bluffs). HCP staff and other conservation partners have collected approximately 102,680 seeds on non-Federal land in the White Dome population and have planned more seed collection at this population prior to development (Meyer 2018; DeNittis 2020). The populations zoned for open space transitional may allow for compatible development projects (Washington County Development Code 1997; AECOM 2010; City of St. George 2016). A portion of these five populations are located on BLM or TNC lands.

Washington County contains a considerable amount of undeveloped, potential habitat for dwarf bear-poppy. Based on a suitable soils layer from the Utah Geological Survey (UGS) and a habitat model from Northern Arizona University (Bowker 2016), the Amended HCP Take Area contains 13,239 acres of undeveloped, potential habitat, and Federal lands contain 125,210 acres. We consider these areas potential habitat and recommend qualified botanists evaluate their suitability.

Status of Siler Pincushion Cactus in the Action Area

The Amended HCP Take Area contains an estimated 170 Siler pincushion cactus plants in one population (White Dome), representing two percent of the range-wide estimate. The plants occur on SITLA lands planned for development and are located next to the TNC White Dome Preserve (AECOM 2010). Most of the White Dome population occurs on private lands managed by TNC as part of the White Dome Preserve to protect Siler pincushion cactus and dwarf bear-poppy. HCP staff and other conservation partners are currently salvaging plants from the Amended HCP Take Area and relocating them to TNC lands prior to development (York 2020).

Washington County contains a considerable amount of undeveloped, potential habitat for Siler pincushion cactus. Based on a suitable soils layer from the UGS, the Amended HCP Take Area contains 14,519 acres of undeveloped, potential habitat, and Federal lands contain 195,406 acres. We recommend qualified botanists evaluate their suitability for Siler pincushion cactus.

Status of Gierisch Mallow in the Action Area

The Amended HCP Take Area does not contain known Gierisch mallow plants. Washington County contains a considerable amount of undeveloped, potential habitat for Gierisch mallow. Based on a suitable soils layer from the UGS, the Amended HCP Take Area contains 2,572 acres of undeveloped potential habitat, and Federal lands contain 18,176 acres. We consider these areas potential habitat and recommend qualified botanists evaluate their suitability.

Status of Gierisch Mallow Critical Habitat in the Action Area

When the FWS designated critical habitat in 2013, 167 acres occurred on non-Federal lands in Washington County (78 FR 49165). All 167 acres of critical habitat are located in the Amended HCP Take Area, representing one percent of the total critical habitat. The County zoned the 167 acres as open space transitional (OCS), which may allow for compatible development projects (Washington County Development Code 1997). Development has not occurred on these lands (Table 9).

Status of Fickeisen Plains Cactus in the Action Area

The Amended HCP Take Area does not contain known Fickeisen plains cactus locations.

Washington County contains a considerable amount of undeveloped, potential habitat for Fickeisen plains cactus Based on a suitable soils layer from the UGS, the Amended HCP Take Area contains 5,660 acres of undeveloped, potential habitat, and Federal lands contain 22,841 acres. We consider these areas potential habitat and recommend qualified botanists evaluate their suitability.

Status of Fickeisen Plains Cactus Critical Habitat in the Action Area

The Amended HCP Take Area does not contain Fickeisen plains cactus critical habitat.

EFFECTS OF THE ACTION

In accordance with 50 CFR 402.02, effects of the action are all consequences to listed species or critical habitat that are caused by the proposed Action, including the consequences of all other activities that are caused by the proposed Action. A consequence is caused by the proposed Action if it would not occur but for the proposed Action and it is reasonably certain to occur. Effects of the Action may occur later in time and may include consequences occurring outside the immediate area involved in the Action (see §402.17).

Effects of the Action on the Desert Tortoise

This section includes an analysis of effects from the issuance of an ITP based on the Amended HCP on desert tortoise. Specific effects related to actions of the HCP are discussed in detail, but we recognize the benefit of the Amended HCP and ITP issuance for the long-term conservation of desert tortoise in Washington County. The benefit to long-term conservation of desert tortoises is gained through Washington County's implementation of the Amended HCP and its over-arching goal to establish and manage the Reserve in perpetuity for the conservation of desert tortoise and long-term recovery potential in the UVRRU, which would not otherwise be achieved. The Findings and Recommendations include a detailed analysis of the Reserve benefit to the desert tortoise. In this section, we provide analysis of specific effects of actions, including covered activities, as described in the Amended HCP.

We evaluate the effects of the Action assuming that NCH changed circumstance does occur. We

base the number of individuals exposed to the stressors on the number of acres in the Amended HCP Take Area (Table 1) and the estimated number of individuals in the Amended HCP Take Area (Table 3). If the NCH changed circumstance does not occur, we expect the effects on the species to be similar in nature. However, if the NCH changed circumstance does not occur, the County and HCP partners would not expand the Reserve by adding Zone 6. Covered Activities could then occur on all the non-Federal MDT habitat within proposed Zone 6 and would not be restricted by the 200-acre limit within the Reserve. Thus, the effects would occur in a larger Amended HCP Take Area and would apply to nearly double the number of individuals (Tables 2 and 4).

Handling

Clearance surveys are minimization measures that would remove desert tortoises from areas before Covered Activities occur. The County will continue to coordinate with HCP partners to identify areas that require clearance surveys. The County will work with UDWR to subsequently translocate cleared individuals to areas that support recovery. This will reduce the number of individuals exposed to other effects during and after development projects in the Amended HCP Take Area. However, the handling and translocation will also affect desert tortoises. UDWR's Section 6 Agreement with FWS covers the effects of translocation of cleared individuals; therefore, the Amended HCP will only cover effects during the clearance of the individuals. Desert tortoises may experience stress during handling that could interfere with normal behavioral patterns, including breeding, feeding, and sheltering, and ultimately result in harm.

The County and HCP Partners initiated the clearance and translocation program under the 1995 HCP, and they have collected data to monitor the program and inform adaptive management. From 1996 to 2020, the County processed (*i.e.*, handled and evaluated) 831 desert tortoises, and translocated 530 of those into Reserve Zone 4 from 1999 to 2009 (HCAC 2020; McLuckie *et al.* 2019). The UDWR releases individuals, unless they are sick or injured or had been kept in captivity for a long period. Many of those sick or injured individuals are entered into the State's Adoption Program. Of the desert tortoises processed under the 1995 HCP, 54 percent (435 desert tortoises) were cleared for activities covered under the 1995 HCP (the others were associated with other activities and covered under a separate 10(a)(1)(a) permit or Section 6 permit). On average, 24 desert tortoises were cleared each year for activities covered under the 1995 HCP, 11 adults (45.8 percent) and 13 sub-adults (54.2 percent) (HCAC 2020). The past 25 years of desert tortoise clearance under the 1995 HCP and other known translocation studies have documented few adult desert tortoise deaths or injuries. Rognan (2020) documented only one desert tortoise fatality in the previous 24 years potentially attributed to translocation (specifically from anesthesia at the veterinary clinic) and one to three cases when stress of translocation may have caused or exacerbated disease that led to death (Rognan 2020). Overall, monitoring of individuals translocated into Zone 4 from 1999 to 2018 documented relatively high desert tortoise growth rates, consistent annual reproduction, and high site fidelity of translocated individuals (McLuckie *et al.* 2019).

The County will implement the following conservation measure to minimize the effects of handling:

- Qualified personnel will implement clearance according to protocols described in

Appendix A of the Amended HCP.
- Adaptively manage translocation, in coordination with UDWR and the FWS, to ensure the translocation program continues to support recovery goals.
- Initiate an adaptive management planning process, in coordination with UDWR, within two years of the Renewed/Amended ITP to prepare a Translocation Management Plan that identifies other locations within the Plan Area that might be suitable for strategic tortoise population augmentation.

Clearance surveys will not find all of the desert tortoises in the affected area, because of the species' cryptic nature. Therefore, an unknown number of desert tortoises will remain in the Amended HCP Take Area and be exposed to other stressors from Covered Activities (see discussion of these stressors below). We expect the surveys will detect most of the 352 adults in the Amended HCP Take Area, because of their large size. Juveniles are smaller and much more difficult to detect. Because of their lower detection rates, we expect the clearance surveys to remove a few of the 1,830 juvenile desert tortoises, none of the 458 hatchlings, and none of the undeterminable number of eggs in the Amended HCP Take Area.

Of the individual tortoises that are cleared, we anticipate that a few will experience some decrease in fitness and/or reproduction because of the stress from handling, and a few may die. Based on the past success of the program, we expect the effects from handling to be insignificant to most affected individuals.

Crushing/Entombment

Desert tortoises are vulnerable to crushing and/or entombment in their burrows or dens because of heavy equipment and excavation and grading at development sites (Boarman and Sazaki 1996), off-road recreational vehicle use, vehicle access during management activities, and livestock trampling (Lovich and Bainbridge 1999; Nussear *et al.* 2012). Exposure of desert tortoises to this stressor may occur at any time of the year when Covered Activities occur. Crushing and entombment will injure and, likely, kill individuals. The County documented desert tortoise injuries and deaths from activities covered under the 1995 HCP and the circumstances causing the injury or death. Based on their records, the FWS estimates that covered activities may have killed or injured three to seven desert tortoises (Rognan 2020).

The County will implement the following conservation measures to reduce the occurrence of crushing and entombment:

- Prohibit motorized recreation from unauthorized routes within the Reserve.
- Continue to maintain existing fencing around the Reserve.
- Require project proponents to implement clearance surveys during construction of projects in the Reserve and other areas where desert tortoises are most likely to occur.
- Coordinate with the holders of active grazing permits to reduce livestock grazing in Reserve Zone 6.

We expect crushing and entombment to kill or injure only a subset of the desert tortoises in the Amended HCP Take Area. Clearance surveys will remove some of the individuals prior to Covered Activities; however, detection is not perfect, and the County only requires clearance

surveys in the Reserve, the 1995 HCP incidental take areas (*i.e.*, 12,264 acres), and in other areas where the HCP Administrator determines presence is likely. Individuals remaining in the Amended HCP Take Area may be exposed to these stressors (see discussion in "Handling" section above for estimates of individuals removed during clearance surveys). These stressors will affect not all the individuals remaining in the Amended HCP Take Area; exposure to the stressors will not occur across the entire Amended HCP Take Area, and some desert tortoises may move out of the Amended HCP Take Area to other areas within their home range. Because the clearance surveys will remove most of the 352 adult desert tortoises in the Amended HCP Take Area, we expect only a few will remain and be killed or injured from crushing and/or entombment. Based on injuries and deaths from activities under the 1995 HCP, we estimate Covered Activities will crush and/or entomb approximately 10 adults. Covered Activities will additionally crush and/or entomb some of the 1,830 juveniles, and some of the 458 hatchlings, and some undeterminable number of eggs in the Amended HCP Take Area.

Entrapment

Open trenches, other excavations, or open pipes present during the construction phase of certain Covered Activities may entrap desert tortoises. Desert tortoises that cannot escape these features will die. The County will implement the following conservation measures to reduce the occurrence of entrapment:

- Require project proponents to implement clearance surveys during construction of projects in the Reserve and other areas where desert tortoises are most likely to occur.
- Require project proponents to fence and/or monitor trenches, pits, and other during construction of projects in the Reserve.

Because of the implementation of the conservation measures, and the temporary nature of the potential exposure, we anticipate entrapment of very few individuals.

Habitat Loss, Degradation, and Fragmentation

Habitat loss renders habitat unable to support desert tortoises and decreases the total amount of suitable habitat available for the species. Some Covered Activities (*e.g.*, permanent developments) will result in permanent habitat loss, while others (*e.g.*, utility corridors) may result in temporary habitat loss or habitat degradation. Habitat degradation will also likely occur outside of the Amended HCP Take Area, particularly along the edges of development and grazing allotments in the Amended HCP Take Area and in areas that experience recreational use. These areas will likely experience disruption to native plant communities from increased human activity, including recreational activities (*e.g.*, hiking, bicycling, and off-road vehicles), through direct damage to plants, damage to soil crusts, soil compaction and introduction of non-native plants (see discussion of these effects in the "Development" subsection of the "Factors Affecting the Desert Tortoise" section). Human presence increases in developed areas, potentially increasing exposure of surrounding habitat to human-cause wildfires. Habitat loss and degradation from Covered Activities will additionally affect desert tortoises by fragmenting available habitat.

Desert tortoises exposed to these stressors may respond by traveling longer distances to meet

their breeding, feeding and sheltering needs or by making repeated attempts to access previously available habitat. This could result in increased energy expenditures that, in turn, could reduce an individual's fitness or reproduction. Habitat fragmentation could restrict genetic exchange within the UVRRU, reduce its genetic diversity, and, ultimately, the population's ability to adapt to changing conditions (see discussion in "Development" subsection of "Factors Affecting the Desert Tortoise").

The County will implement the following conservation measures to minimize the effects of habitat loss, degradation, and fragmentation:

- The continued protection and management of the Reserve.
- Require project proponents to implement clearance surveys prior to and during construction of projects in the Reserve and other areas outside the Reserve where desert tortoises are most likely to occur.
- Limit habitat loss from Covered Activities within the Reserve to 200 acres.
- Continue to prohibit motorized recreation from unauthorized routes within the Reserve.
- Manage public recreation in the Reserve on non-Federal lands according to the PUP.
- Reduce the total mileage of designated recreation access routes within Reserve Zone 6 by approximately two-thirds.
- Continue to manage Covered Activities within the Reserve and subsequently restore Amended HCP Take Areas in the Reserve consistent with the Utility Development Protocols.
- Include measures to control non-native plant species in the Red Cliffs Desert Reserve Habitat and Fire Management Guidelines for addressing wildfire events and post-fire habitat restoration in the Reserve (see Appendix D of the Amended HCP).
- Increase public awareness of desert tortoises and conservation issues.
- Support law enforcement to regulate human activity that may affect desert tortoise habitat in the Reserve (*e.g.*, human-cause wildfires and travel off designated trails).
- Continue translocation into Zone 4 and other areas, as appropriate.

Because FWS cannot predict the amount of habitat loss versus degradation in the Amended HCP Take Area or how much will be permanent versus temporary, for the evaluation in this BO, we consider the entire Amended HCP Take Area permanent habitat loss and will no longer support desert tortoises. This habitat will be lost incrementally at indeterminable times during the 25-year duration of the ITP. We also estimate that the effects of habitat degradation will extend 1,667 feet (the radius of an adult male desert tortoise home range [200 acres; USFWS 2011a]) from the edge of the Amended HCP Take Areas. We expect the habitat loss to further fragment desert tortoise habitat in the Permit Area.

We expect individual desert tortoises with home ranges that overlap with the Amended HCP Take Area and the 1,667-foot buffer to be exposed to habitat loss, degradation, and fragmentation. The effects of exposure from these stressors could range from insignificant to significant, depending on the extent of the habitat degradation and the quantity and quality of habitat within an individual's home range. We estimate that the desert tortoises that experience effects to this stressor will be the same as those with home ranges that overlap in the Amended HCP Take Area and that remain in and adjacent to the Amended HCP Take Area after the

Covered Activity occurs (*i.e*., those that are not translocated prior to Covered Activities or those killed in association with Covered Activities).

Noise, Vibration, and Human Presence

Various Covered Activities will produce noise and vibrations, including construction activities, road traffic, management activities, and off-road vehicle recreation. The noise and vibrations associated with vehicle use in the desert can disturb desert tortoises and alter normal behavior patterns (Tuma *et al.* 2016; Berry and Murphy 2019). Such interference with normal behavioral patterns, including breeding, feeding, and sheltering could potentially affect fitness or reproduction of individuals. One study noted that a desert tortoise stopped moving for almost two hours when frightened by noise or vibrations but observed few physiological effects from short-term exposures to jet aircraft noise and sonic booms (Bowles *et al.* 1999). Human presence in desert tortoise habitat will be greater in and around developed areas, and on recreational trails. The County will implement the following conservation measures to minimize the effects of noise, vibration, and human presence:

- Continue to prohibit motorized recreation from unauthorized routes in the Reserve.
- Manage public recreation in the Reserve according to the Reserve PUP.
- Reduce the total mileage of designated recreation access routes within Reserve Zone 6 by approximately two-thirds.
- Increase public awareness of desert tortoises and conservation issues through the outreach and education program.

We estimate that the effects of noise, dust, and human presence from development activities will extend approximately 1,667 feet (the radius of an adult male desert tortoise home range [USFWS 2011a]) from the edge of the Amended HCP Take Area and from the edges of trails. We expect all individuals with home ranges that overlap into this area and that remain in that area during and after Covered Activities to be exposed to this stressor. The effects to desert tortoises from exposure to this stressor will vary depending on the intensity and duration of the noise, vibration, and/or human presences and the location of the source within an individual's home range. Noise, vibration, and human presence from roads and other development already occur in parts of the Amended HCP Take Area, and desert tortoises near those sources may have become somewhat habituated to them. Desert tortoises may respond to new noise, vibration, and human presence from Covered Activities by altering their behavior patterns; however, we expect these behavioral changes to be relatively minor and temporary and have only insignificant effects to individuals.

Increased Predation

We expect desert tortoises with home ranges adjacent to Amended HCP Take Area to have greater exposure to predation, especially those near types of development that attract predators (*e.g*., utility lines, garbage dumps). We expect some desert tortoises, especially juveniles, with home ranges that overlap the Amended HCP Take Area and adjacent to the Amended HCP Take Area after the Covered Activity occurs (*i.e.*, those that are not translocated or killed in association with the Covered Activity) to be depredated due to increased predators near Amended HCP Take Areas. It is difficult to predict how many desert tortoises will be lost to predation because of the proposed Action and what extent the effects will have on recruitment or

other tortoise population dynamics within the Action Area.

The Reserve

The County and HCP Partners will continue to maintain the Reserve established in the 1995 HCP, as described in chapter 6.3.2 of the Amended HCP, with the changes resulting from the NCH changed circumstance. The County will implement the following conservation measures with the NCH changed circumstance (listed here and described in the "Conservation Measures" section of the "Proposed Action") to enhance the biological values of the Reserve such that it continues to support the conservation and recovery of the desert tortoise:

- Reserve Zone 3 habitat improvements
    - Desert Tortoise Passages
    - Habitat restoration
- Reserve Zone 6 support
    - Land acquisition
    - Fencing
    - Development Protocols
    - Grazing permit acquisition and retirement
    - Recreation Management
    - Community education and outreach
    - Law enforcement
    - Administration
    - Monitoring and Adaptive Management

The County has also committed to provide financial support for management actions in the Reserve, such as fire preventative measures such as weed management and fire breaks along existing Reserve roads and utility corridors. The County will increase its funding for fire management and habitat restoration in the Reserve by approximately $10,000 per year for a total of $15,000 unless response to the wildfire changed circumstance warrants more funding.

We considered the biological values of the Reserve, with the changes resulting from the NCH Project and the County's conservation measures listed above, to evaluate the Reserve's contribution to the conservation and recovery of the desert tortoise in the UVRRU and range wide. Quantitative analyses tend to be problematic for this species. The desert tortoise is a long-lived species (50 or more years in the wild) with low juvenile survival, and recruitment to reproductive age may take 13 to 20 years (USFWS 1994a). Individual desert tortoises move slowly, yet can travel long distances. Because of these attributes, it is difficult to extrapolate quantitative impacts or benefits of various actions on population dynamics (*e.g.*, recruitment and dispersal). Overall, this hinders our ability to quantitatively determine the cause of recent declining abundance of desert tortoise in the UVRRU. Thus, UESO used a qualitative analysis to evaluate the Reserve. The NCH Project BO (USFWS 2021b) provides additional detailed discussion of the Reserve biological values with the changed circumstance, and we herein incorporate the discussion in that document. Below, we briefly discuss the biological values of the Reserve without the NCH changed circumstance and summarize the discussion in the NCH Project BO of the biological values with the NCH changed circumstance:

- **Animals** – Since the 1995 HCP, Reserve Zones 1 – 5 has been able to maintain tortoise demographic and genetic viability. Each Reserve Zone includes all desert tortoise life stages, reproduction, and recruitment. The Reserve protects five of the six known highest-density sub-populations in the UVRRU (*e.g.*, 100 or more adult desert tortoises) (USFWS 2021a). The NCH Project includes desert tortoise passages under the new highway alignment, allowing desert tortoises to maintain demographic and genetic viability. In addition, the conservation measures adding passages across Cottonwood Springs Road and passage improvements along SR-18 will improve movement within Zone 3 and between Zones 2 and 3, allowing for improved dispersal and genetic exchange in the Reserve. The inclusion of Zone 6 would add protection to another sub-population of desert tortoises with a relatively high density.

- **Size and Area** – The current size of the Reserve Zones 1 – 5 is approximately 62,009 acres, an increase in 987 acres from the original 1995 Reserve boundaries, with approximately 40,000 acres of computer modeled desert tortoise habitat. Assuming priority habitat fragmentation barriers within the Reserve are addressed, Reserve Zones 1 – 5 are collectively considered to be of sufficient size and population to support desert tortoise demographic and genetic population viability in the UVRRU. BLM management currently provides some protection to desert tortoises in the area of proposed Zone 6. The NCH changed circumstance would provide a higher level of protection to approximately 6,813 acres of modeled desert tortoise habitat, substantially improving the biological value of Reserve size.

- **Intactness** – Reserve Zones 1 – 5 are adjacent blocks of habitat, and desert tortoise passages will partially address barriers to movement. The utility development protocols protect the intactness of the Reserve by minimizing habitat loss and degradation, offsetting permanent effects, and restoring temporary loss and degradation. The NCH changed circumstance would not affect the proximity of the existing zones. The inclusion of tortoise passages would improve intactness by increasing connectivity within Zone 3 and between Zones 2 and 3. The addition of Zone 6 would add another habitat block, albeit of greater distance from Zones 1 – 5 but with potential movement corridors enhancing intactness with habitat to the west. Connectivity between Zone 6 and lands to the west provide a level of intactness to the Reserve that is critical to the UVRRU.

- **Connectivity** – Connectivity within Reserve AUs supports demographic and genetic viability of the Reserve. However, individual AUs may not be large enough to independently support a sustainable population; maintaining and improving connectivity between AUs would support this value. There are several roads reducing connectivity between and within Zones 1 – 5. The NCH changed circumstance would construct a highway alignment that would increase fragmentation in the two AUs that comprise Zone 3, in the highest desert tortoise density area in Zone 3. Conservation measures proposed with the NCH would minimize the habitat fragmentation from the new highway by constructing desert tortoise passages under it. In response to the changed circumstance, the County would improve existing connectivity by constructing tortoise passages under Cottonwood Springs Road and potentially SR-18. Adding Zone 6 to the Reserve protects connectivity potential with the adjacent NEMRU. Connectivity is good between Zone 6 and adjacent lands to the northwest, west, and southwest (primarily BLM and Shivwits

tribal lands).

- **Habitat Condition** – UESO evaluated the five AUs in Reserve Zones 1 – 5 as moderate condition, primarily due to size constraints, existing barriers, and invasive plant species (USFWS 2021a). The County will continue to implement development protocols, recreation management, and habitat and fire management to maintain and improve the habitat condition in Reserve Zones 1 – 5. Effects from the NCH changed circumstance would further degrade the condition of the affected AUs. The County will implement conservation measures with the NCH changed circumstance to improve the habitat in Zone 3 degraded in the 2020 wildfires. The County would also add Reserve Zone 6 in response to the NCH changed circumstance. UESO also evaluated the condition of the AU that contains proposed Zone 6 as moderate, and they identified human access as the primary source of habitat degradation. When added to the Reserve, Habitat in Zone 6 will benefit from the development protocols, recreation management, and habitat and fire management the County implements in the Reserve. The County will implement additional conservation to improve the habitat condition in proposed Zone 6, notably grazing permit acquisition and retirement and recreation management.

UESO determined that the HCP conservation strategy, with the Reserve Zones 1 – 5 as the primary focus, remains sufficient for offsetting the estimated take from Covered Activities in the permit area over the next 25 years. This conservation strategy includes the Reserve establishment, management, and support for land acquisition, conservation benefits of the past 25 years, and the avoidance and minimization measures for covered activities inside and outside the Reserve.

Additionally, we conclude that the Reserve, with the addition of Zone 6 and the conservation measures to improve connectivity and habitat condition within the Reserve, both in response to the NCH changed circumstance, will continue to support the conservation of the desert tortoise in the UVRRU despite the adverse effects associated with the NCH Project.

Other Conservation Activities

The County has committed to other conservation measures to minimize the effects to and promote the recovery of the desert tortoise. We discuss conservation measures designed to specifically minimize the effects of stressors caused by the proposed Action in the above subsections of the "Effects of the Action on the Desert Tortoise" in conjunction with those stressors.

The County's efforts towards community outreach and education has fostered an awareness, appreciation, and stewardship of the species within the community. This has alleviated some of the stressors on the species resulting from human co-occurrence in desert tortoise habitat (*e.g.,* illegal possession, harassment) and prompted citizen science and volunteer efforts that benefit species conservation and recovery. Additionally, the County Sheriff office's enforces disincentives to illegal activities that would harm desert tortoises (*e.g.,* illegal procession).

Effects of the Action on Desert Tortoise Critical Habitat

The Proposed Action could potentially affect all of the five PBFs in the UVR CHU identified as essential for the conservation of the species and that may require special management considerations or protection. Covered Activities will potentially affect desert tortoise critical habitat by exposure to the same stressors as individual desert tortoises.

Habitat Loss, Degradation, and Fragmentation

We discuss the specifics of habitat loss, degradation, and fragmentation in more detail above under the subheading for the stressor in the "Effects of the Action on the Desert Tortoise" section. These stressors will specifically affect the following PBFs:

- Sufficient space to support viable populations within each of the five recovery units and to provide for movement, dispersal, and gene flow;
- Sufficient quantity and quality of forage species and the proper soil conditions to provide for the growth of such species;
- Suitable substrates for burrowing, nesting, and overwintering; burrows, caliche (hard layer of subsoil typically containing calcium carbonate) caves, and other shelter sites; and,
- Sufficient vegetation for shelter from temperature extremes and predators.

The County will implement conservation measures to minimize the effects of habitat loss, degradation, and fragmentation. We list these under the subheading for these stressors in the "Effects of the Action on the Desert Tortoise" section.

Because the FWS cannot predict the amount of habitat loss versus degradation in the Amended HCP Take Area due to Covered Activities or how much will be permanent versus temporary, for the evaluation in this BO, we consider the entire 633 acres of undeveloped designated critical habitat outside the Reserve and 200 acres inside the Reserve permanent habitat loss.

Noise, Vibration, and Human Presence

We discuss the specifics of noise, vibration, and human presence in more detail above, under the subheading for the stressor in the "Effects of the Action on the Desert Tortoise" section. These stressors will specifically affect the following PBF.

- Habitat protected from disturbance and human-caused fatality.

The County will implement conservation measures to minimize the effects of noise, vibration, and human presence. We list these under the subheading for these stressors in the "Effects of the Action on the Desert Tortoise" section.

Conservation Activities

The County's establishment of the Reserve with the 1995 HCP and continued management of the Reserve protects 91 percent (46,005 of 50,545 acres) of the undeveloped critical habitat therein

continues to support the PBFs required for the physiological, behavioral, and ecological needs of the species (see the "Conservation Activities" subsection under the "Effects of the Action on the Desert Tortoise' Section).

Effects of the Action on Plant Species and Plant Critical Habitat

In this section, we first summarize potential effects that are common to all six federally listed plant species from Covered Activities. In subsequent subsections, we evaluate the effects to each plant species and each critical habitat.

Crushing

Covered Activities may crush plants, specifically by vehicles accessing development sites, construction equipment at development sites, people using habitat for recreation, and grazing livestock. Crushing will damage plants, and energy used to repair the damage would reduce the energy available for processes such as photosynthesis and flower production. These damaged plants could experience reduced fitness and/or reproduction and may die.

Implementation of the following conservation measures will reduce the occurrence of crushing listed plant species:

- SITLA will establish a conservation area for Holmgren milkvetch that will be managed for the species in-perpetuity.
- UDNR will conduct surveys for Holmgren milkvetch in areas of suitable or occupied habitat for this species concurrent with desert tortoise clearance surveys, when practicable.
- The County and its HCP Partners will develop a survey, seed collection, and plant salvage plan for listed plant species within the Amended HCP Take Area. *This will only occur in response to the NCH changed circumstance.*
- The County and HCP Partners will implement adaptive management planning to protect listed plants in Reserve Zone 6. *This will only occur in response to the NCH changed circumstance.*

Habitat loss and degradation

This stressor renders habitat unable to support plants, decreases its ability to support plants, and/or reduces habitat connectivity. Some Covered Activities (*e.g.*, permanent developments) will result in permanent habitat loss through habitat conversion; other Covered Activities may only degrade habitat. For example, recreational activities (mountain biking, hiking, target shooting, OHV use, camping, horseback riding) may degrade habitat by compacting soil and increasing erosion, destroying biocrusts, and facilitating encroachment of non-native plants (Floyd *et al.* 2003; Roth 2012). Livestock grazing can degrade habitat by altering species composition of plant communities, including decreasing the density and biomass of individual species, reducing species richness, and changing community organization; disrupting ecosystem functions, including nutrient cycling and ecological succession; and altering ecosystem structure, including changing vegetation, facilitating establishment of non-native plants, increasing soil erosion, and reducing water availability (Dadkhah and Gifford 1980; Waser and Price 1981;

Robinson and Bolen 1989; Fleischner 1994; Holechek *et al.*1998; DiTomaso 2000; Loftin *et al.* 2000). Gypsum specialists may be especially sensitive to habitat fragmentation resulting from grazing (Pueyo *et al.* 2008). Soil compaction and erosion may render the habitat unsuitable for listed plants and affect future recruitment and establishment in heavily affected locations.

Implementation of the following conservation measures will reduce the effects of habitat loss and degradation:

- SITLA will establish a conservation area for Holmgren milkvetch that will be managed for the species in-perpetuity.
- UDNR will conduct surveys for Holmgren milkvetch in areas of suitable or occupied habitat for this species concurrent with desert tortoise clearance surveys, when practicable.
- The County and its HCP Partners will develop a survey, seed collection, and plant salvage plan for listed plant species within the Amended HCP Take Area. *This will only occur in response to the NCH changed circumstance.*
- The County and HCP Partners will implement adaptive management planning to protect listed plants in Reserve Zone 6. *This will only occur in response to the NCH changed circumstance.*

Habitat Fragmentation

The same activities that result in habitat loss and degradation can also affect plant species by fragmenting their habitat. Reduced habitat connectivity can negatively affect plant populations through reduced gene flow within and between populations, and reduced pollinator visitation and plant fitness (Gilpin and Soule 1986; Aizen and Feinsinger 1994; Mustajarvi *et al.* 2001; Aizen *et al.* 2002; Honnay *et al.* 2005). Fragmented plant populations may be less attractive to insect pollinators and support lower pollinator diversity (Aizen *et al.* 2002; Goverde *et al.* 2002; Lennartsson 2002; Kolb 2008). These effects have the potential to exert a cascading effect in smaller and more isolated plant populations (*i.e.*, increased pollen limitation, reduced reproductive success) that combine to reduce genetic diversity, population size, and increase their extinction risk (Jennersten 1988; Ellstrand and Elam 1993; Debinski and Holt 2000; Memmott *et al.* 2004).

Implementation of the following conservation measures will reduce the effects of habitat fragmentation:

- SITLA will establish a conservation area for Holmgren milkvetch that will be managed for the species in-perpetuity.
- UDNR will conduct surveys for Holmgren milkvetch in areas of suitable or occupied habitat for this species concurrent with desert tortoise clearance surveys, when practicable.
- The County and its HCP Partners will develop a survey, seed collection, and plant salvage plan for listed plant species within the Amended HCP Take Area. *This will only occur in response to the NCH changed circumstance.*

- The County and HCP Partners will implement adaptive management planning to protect listed plants in Reserve Zone 6. *This will only occur in response to the NCH changed circumstance.*

Dust

Land clearing and development on unpaved surfaces are sources of fugitive dust that can result in sublethal effects to plant growth and reproduction as a result of blocked stomata, altered photosynthetic rates, increased leaf temperature, and clogged flower surfaces (stigmas and pollen) (Padgett *et al.* 2007; Sharifi *et al.* 1997, Ferguson *et al.* 1999; Wijayratne *et al.* 2009; Lewis and Schupp 2014; Lewis 2016; Waser *et al.* 2016). Fugitive dust deposition is generally highest closest to the source and attenuates with distance (Everett 1980; Walker and Everett 1987; Environmental Protection Agency (EPA) 1995; Cowherd *et al.* 2006; Talley *et al.* 2006; Padgett *et al.* 2008). Negative effects to plant growth and reproduction may occur up to 300 feet from dust sources (EPA 1995; Veranth *et al.* 2003; Etyemezian *et al.* 2004; Padgett *et al.* 2007, Wijayratne *et al.* 2009; Lewis 2016; Waser *et al.* 2016).

Competition from Non-native Species

The establishment and spread of non-native plants is one of the fastest growing threats for many rare plant species. Examples of negative effects to native plants by non-native plants involve numerous taxa, locations, and ecosystems (Melgoza *et al.* 1990; Aguirre and Johnson 1991; D'Antonio and Vitousek 1992; Brooks 2000; DiTomaso 2000; Mooney and Cleland 2001; *Levine et al.* 2003; Traveset and Richardson 2006). Development activities may contribute to non-native plant invasions via surface disturbance, introduced road fill, vehicle transport of non-native plants, and road maintenance activities (Hobbs 1989; Rejmánek 1989; Hobbs and Huenneke 1992; Evans *et al.* 2001; Gelbard and Belnap 2003). Recreational activities facilitate establishment of non-native species by spreading seeds. Operation of existing transportation corridors may facilitate non-native plant invasion because of soil nitrogen enrichment from vehicle exhaust (Brooks 2003).

Non-native plants have the potential to negatively affect seedling recruitment, plant abundance, and population trends through competitive exclusion, niche displacement, and changes in insect predation. Plant populations with high canopy coverage of annual non-native plants may be at risk of an altered wildfire regime (Brooks 1999; Link *et al.* 2006). In habitat free of non-native grasses, wildfire has a long return interval and rarely carries over a large area. Native desert plants are ill-adapted to wildfire and respond poorly to fires. In areas invaded by non-native grasses, the density of fine fuels increases with consequential changes in fire behavior and the fire regime. These changes increase the likelihood and intensity of wildfire, reduce the fire return interval, and alter the vegetation community structure post-fire, and may result in both immediate and long-term effects to habitat.

Non-native plants may encroach into surrounding habitats over time depending on the resiliency of these habitats to invasion (Gelbard and Belnap 2003, Chambers *et al.* 2007, Chambers *et al.* 2013). Because of historical and ongoing land disturbance, cheatgrass has increased in abundance over the past 20 years in listed plant habitats of Washington County, Utah (Van Buren *et al.* 2016). Other non-native plants found in listed plant habitats include the following:

red brome, storksbill, African mustard, and cheatgrass (Van Buren and Harper 2004a, 2004b; Searle and Yates 2010; Meyer *et al.* 2019a; Rominger *et al.* 2019b). Cheatgrass and red brome have the potential to spread up to 500 feet from disturbance areas over time (Bradley and Mustard 2006).

Holmgren milkvetch

We expect the conservation measure implemented by SITLA and other HCP Partners to establish and manage a conservation area for the species will maintain a viable Central Valley population of Holmgren milkvetch in perpetuity. To accomplish this, UESO are coordinating with SITLA and working with species experts to develop a conservation area design that protects an area of sufficient population size to sustain genetic and demographic variation and maintain a viable population of Holmgren milkvetch in Central Valley. UESO anticipates finalizing the conservation area design in 2021 and establishing the conservation area thereafter, prior to development of those areas.

The UESO expects to lose all the individuals in the Amended HCP Take Area outside of the conservation area because of habitat loss and degradation from Covered Activities. The UESO estimates this loss as 1,000 to 1,500 Holmgren milkvetch plants in the Central Valley and Green Valley populations, representing 14 to 21 percent of the total known population. The establishment of the conservation area would preserve approximately 1,800 to 2,300 plants, representing 25 to 32 percent of the total known population. There may be additional areas unknown to us within the Amended HCP Take Area that also contain Holmgren milkvetch plants, although we cannot predict how many currently unknown plants may be located. If previously unidentified Holmgren milkvetch plants occur in the Amended HCP Take Area, we anticipate that habitat loss and degradation from Covered Activities would destroy these plants. HCP partners could use salvaged seeds to introduce or augment populations on protected lands. There are approximately 10,001 acres of potential Holmgren milkvetch habitat on Federal lands in Washington County that HCP partners could potentially use to establish new populations.

Holmgren Milkvetch Critical Habitat

The UESO expects to lose approximately 746 to 846 acres of critical habitat (Central Valley Subunit 1c and Purgatory Flat), representing 12 to 13 percent of total critical habitat for the species, as a result of habitat loss and degradation from Covered Activities. We expect the conservation measure implemented by SITLA and other HCP Partners to establish and manage a conservation area for the species to protect a portion of critical habitat in perpetuity. The establishment of the conservation area would preserve approximately 200 to 300 acres, representing three to four percent of the total designated critical habitat. The Holmgren milkvetch recovery team and species experts will provide a thorough review of potential conservation area designs. The review will consider the best available information about the species, including the Holmgren milkvetch population viability analysis (Van Buren *et al.* 2020); plant survey data for the Central Valley population (2003, 2020); seed collection and pollinator information for the Central Valley population (Schultz and Meyer 2015, Pavlik and Barlow 2017); and the PBFs. We will work with SITLA and the private sector partners to review and select a final conservation area that will promote recovery of Holmgren milkvetch.

Shivwits Milkvetch

Covered Activities will not affect currently known populations of Shivwits milkvetch, because they do not occur in the Amended HCP Take Area. The Amended HCP Take Area may contain previously unknown locations of Shivwits milkvetch plants, though we cannot predict how many currently unknown plants may be located. If new plants of Shivwits milkvetch occur in the Amended HCP Take Area, we anticipate that habitat loss and degradation from Covered Activities would destroy these plants. HCP partners could use salvaged seeds and plants to introduce or augment populations on protected lands. There are approximately 32,000 acres of potential Shivwits milkvetch habitat on Federal lands in Washington County that HCP partners could potentially use to establish new populations.

Shivwits Milkvetch Critical Habitat

The UESO expects to lose Shivwits milkvetch critical habitat in two units (Coral Canyon [Unit 3], Harrisburg Bench and Cottonwood [Unit 4a], and Silver Reef [Unit 4b]) because of habitat loss and degradation from Covered Activities. This loss equals 92 acres of Shivwits milkvetch critical habitat, representing four percent of total critical habitat for the species (71 FR 77985).

Dwarf Bear-poppy

The UESO expects to lose 815 dwarf bear-poppy plants in six populations (White Dome, Beehive Dome, Warner Valley Springs, Red Bluffs, Webb Hill, and Purgatory Flat), representing 7 percent of the total known population, as a result of habitat loss and degradation from Covered Activities. They expect the extirpation (complete loss) of one population (Purgatory Flat), comprising approximately 40 plants and the loss of. We expect to lose 775 plants in the other five populations (White Dome, Beehive Dome, Warner Valley Springs, Red Bluffs, and Webb Hill). This would not cause the extirpation of those populations, because a portion of each of these populations is located on BLM or TNC lands.

The Amended HCP Take Area may also contain previously unknown Dwarf bear-poppy plants, though we cannot predict how many. If previously unidentified dwarf bear-poppy plants occur in the Amended HCP Take Area, we anticipate that habitat loss and degradation from Covered Activities would destroy these plants. HCP partners could use salvaged seeds to introduce or augment populations on protected lands. There are approximately 125,210 acres of potential Dwarf bear-poppy habitat on Federal lands in Washington County where unknown populations may occur or that HCP partners could potentially use to establish new populations.

Siler Pincushion Cactus

The UESO expects to lose 170 Siler pincushion cactus plants in one population (White Dome), representing two percent of the total known population, because of habitat loss and degradation from Covered Activities. The Amended HCP Take Area may also contain previously unknown Siler pincushion cactus plants, though we cannot predict how many. If previously unidentified Siler pincushion cacti occur in the Amended HCP Take Area, we anticipate that habitat loss and degradation from Covered Activities would destroy these plants. HCP partners could use salvaged plants seeds to introduce or augment populations on protected lands.

Gierisch Mallow

The FWS does not know of any Gierisch mallow plants within the Amended HCP Take Area. The Amended HCP Take Area may contain Gierisch mallow plants, though we cannot predict how many. If previously unidentified Gierisch mallow plants occur in the Amended HCP Take Area, we anticipate that habitat loss and degradation from Covered Activities would destroy these plants, but HCP partners could use salvaged plants and seeds to introduce or augment populations on protected lands. There are approximately 18,176 acres of potential Gierisch mallow habitat on Federal lands in Washington County where unknown populations may occur or that HCP Partners could potentially use to establish new populations.

Gierisch Mallow Critical Habitat

We expect the loss of 167 acres of Gierisch mallow critical habitat, representing one percent of the total critical habitat, because of habitat loss and degradation from Covered Activities.

Fickeisen Plains Cactus

The FWS does not know of any Fickeisen plains cactus plants within the Amended HCP Take Area. The Amended HCP Take Area may contain Fickeisen plains cactus plants, though we cannot predict how many. If previously unidentified Fickeisen plains cactus are located in the Amended HCP Take Area, we anticipate that habitat loss and degradation from Covered Activities would destroy these plants. HCP partners could use salvaged plants and seeds to introduce or augment populations on protected lands. There are approximately 22,841 acres of potential Fickeisen plains cactus habitat on that HCP Partners could potentially use to establish new populations.

Fickeisen Plains Cactus Critical Habitat

Fickeisen plains cactus critical habitat does not occur in the Amended HCP Take Area, therefore Covered Activities will not affect it.

CUMULATIVE EFFECTS

Cumulative effects are those effects of future State or private activities, not involving federal activities, that are reasonably certain to occur within the Action Area considered in this BO (50 CFR 402.02).

While the Amended HCP covers an extensive list of Covered Activities, activities that are not covered may also occur on non-Federal/non-Tribal lands within the action area. For example, landowners in the Reserve may decide to develop their land rather than sell to the BLM or UDNR. This action would require a separate ITP if take of the desert tortoise was reasonably certain to occur. The Act does not prohibit incidental take of listed plant species on non-Federal lands, therefore, we would only evaluate effects to listed plant species from projects with a Federal nexus.

The Amended HCP does not cover certain activities that may occur in the Action Area. Take is not reasonably certain to occur from activities such as collection of biological or mineral

specimens; hiking, sightseeing, camping, and equestrian activities; irrigation for agriculture, landscaping, horticulture, and domestic purposes; harvest of vegetation, native or introduced. Other activities may potentially result in take, but they are not under direct control of the County, such as collection of individuals; depredation from pets; use of herbicides and pesticides; and desert tortoise translocation and monitoring unrelated to Covered Activities (*i.e.*, translocating cleared desert tortoises, processing escaped pet desert tortoises). For activities that have the potential to result in take, our effects analysis of Covered Activities encompasses all the desert tortoises we expect to occur in the Amended HCP Take Area. Therefore, any take of desert tortoises from these non-covered activities is already assessed in our analysis of Covered Activities.

The Proposed Action could result in an increase in certain unlawful activities related to increased development; such as unauthorized collection of desert tortoises, unauthorized collection of listed plant species from Federal land, and habitat degradation from prohibited recreational activities; that may result in take of the desert tortoise or adverse effects to listed plant species. Because effects from these activities are illegal the Amended HCP would not cover them.

We evaluated the effects of increased human presence within a 1,667-foot surrounding the Amended HCP Take Area. The increasing human population in the Action Area will also result in increased recreational use of surrounding areas, inside and outside the Reserve. Increased human presence, noise, and harassment can all disturb wildlife, particularly ground dwelling species with slow mobility such as the desert tortoise. Unmanaged OHV use can result in the degradation of habitat through damage to vegetation and soils (Luckenbach 1975; Vollmer *et al.* 1976; Ouren and Coffin 2013). Habitat degradation due to increased recreational use, coupled with the habitat loss and degradation caused by Covered Activities, could reduce the overall quality of the habitat in the Action Area for desert tortoises and listed plant species.

Increased development will increase the number of roads and the traffic volume on roads in the Action Area, which is likely to result in increased occurrence of vehicles crushing desert tortoises. However, this is not a planned, controlled or legal activity that can be covered in the HCP. Most road construction and expansions under the Amended HCP will be associated with private development projects and will occur in areas where habitat is lost to Covered Activities and, thus, desert tortoises are less likely to persist. Vehicle traffic to access facilities and recreational areas will be considerable slower than highway traffic, reducing the chances of collision with a desert tortoise. Furthermore, the application of the Development Protocols that remove desert tortoises from areas subject to development and the installation and continued maintenance of tortoise fencing as part of implementing the Amended HCP is likely to reduce opportunities for desert tortoises to be on roads and exposed to vehicles. For these reasons, we expect the number of desert tortoises crushed on roads constructed under the Amended HCP to be lower than that on larger roads and highways. Large road and highway projects in the Permit Area (*e.g.*, the NCH Project) are likely to have Federal nexus through funding or permitting and, thus, we would address those effects under a separate Section 7 consultation.

We evaluated the effects of clearance surveys to the desert tortoise above in the “Effects of the Action to the Desert Tortoise” section. We consider any take associated with handling desert tortoises during clearance surveys prior to covered activities as part of the proposed action. When desert tortoises are transferred to UDWR’s jurisdiction, which includes the tortoise

holding facility, they are no longer the responsibility of the County, and UDWR's Section 6 Agreement covers any take associated with holding or translocation. Nevertheless, the HCP includes continued support for adaptive management and a level of monitoring of the translocation populations in coordination with the State to ensure adaptive and effective management of this minimization measure. We do not anticipate any differences in mortality rates among translocated, resident, and control desert tortoises, though future translocation efforts may include moving desert tortoises to restored areas to evaluate the potential for restoration as part of recovery objectives. To ensure that the effects of translocation are consistent with our analysis, the UDWR will establish criteria for success and adaptively manage translocation in coordination with the County and FWS to ensure the translocation program continues to support recovery goals. The UDWR is conducting a survival analysis that compares translocated survival rates to wild survival rates in the Reserve. The results of this analysis may be incorporated into the Translocation Plan that will be developed within two years of permit issuance.

While recognizing the potential for future unknown projects in the Action Area, we are unaware of any non-Federal projects reasonably certain to occur in the Action Area that we have the level of detail necessary to identify and analyze specific effects.

JEOPARDY AND ADVERSE MODIFICATION ANALYSIS

Section 7(a)(2) of the Act requires that federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat.

Jeopardy Analysis Framework

Our jeopardy analysis relies on the following:

"Jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 C.F.R. § 402.02). The following analysis relies on four components:

(1) Status of the Species, which evaluates the range-wide condition of the listed species addressed, the factors responsible for that condition, and the species' survival and recovery needs;
(2) Environmental Baseline, which evaluates the condition of the species in the Action Area, the factors responsible for that condition, and the relationship of the Action Area to the survival and recovery of the species;
(3) Effects of the Action (including those from conservation measures), which determines the direct and indirect effects of the proposed federal Action and the effects of any interrelated or interdependent activities on the species; and,
(4) Cumulative Effects, which evaluates the effects of future, non-federal activities in the Action Area on the species.

The jeopardy analysis in this BO emphasizes the range-wide survival and recovery needs of the listed species and the role of the Action Area in providing for those needs. We evaluate the significance of the proposed Federal action within this context, taken together with cumulative effects, for making the jeopardy determination.

Destruction/Adverse Modification Analysis Framework

The final rule revising the regulatory definition of "destruction or adverse modification of critical habitat" became effective on March 14, 2016 (81 FR 7214) and subsequently modified on October 28, 2019 (84 FR 44976). The revised definition states: "Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features."

Similar to our jeopardy analysis, our adverse modification analysis of critical habitat relies on the following four components:

(1) the Status of critical habitat, which evaluates the range-wide condition of designated critical habitat in terms of PBFs, the factors responsible for that condition, and the intended recovery function of the critical habitat overall;
(2) the Environmental Baseline, which evaluates the condition of the critical habitat in the Action Area, the factors responsible for that condition, and the recovery role of the critical habitat in the Action Area;
(3) the Effects of the Action, which determine the direct and indirect effects of the proposed federal action and the effects of any interrelated or interdependent activities on the PBFs and how they will influence the recovery role of affected CHUs; and,
(4) Cumulative Effects, which evaluate the effects of future, non-federal activities in the Action Area on the PBFs and how they will influence the recovery role of affected CHUs.

CONCLUSION

After reviewing the current status of species and the critical habitat, the environmental baselines for the Action Area, the effects of the proposed Washington County HCP and cumulative effects, it is our biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the desert tortoise, Holmgren milkvetch, Shivwits milkvetch, dwarf bear-poppy, Siler pincushion cactus, Gierisch mallow, and Fickeisen plains cactus or result in the adverse modification of critical habitat for desert tortoise, Holmgren milkvetch, Shivwits milkvetch, Gierisch mallow, or Fickeisen plains cactus. We base these conclusions on the following:

Desert Tortoise

- The proposed Action with the NCH changed circumstance would adversely affect approximately 352 adult desert tortoises, which represents approximately 8 percent of desert tortoises in the UVRRU (4,306) and 0.2 percent of the rangewide adult population (212,343). Most of these individual desert tortoises will not be lost from the population,

but will be cleared from the Amended HCP Take Area and subsequently translocated by UDWR into suitable habitat. Personnel conducting clearance surveys will be trained on how to handle and transport, individuals to minimize the stress to the tortoises and, therefore, minimize adverse effects associated with moving them. Overall, the Amended HCP Take Areas with the NCH changed circumstance are not considered high importance to the UVRRU recovery based on our best available information on density, current barriers, and development (USFWS 2021a). Based on proportion of affected individuals relative to the total number in the UVRRU and rangewide and the past success of the translocation program, we do not expect the proposed Action with the NCH changed circumstance to appreciably reduce the number of adult desert tortoises such that the survival and recovery of the desert tortoise in the UVRRU is reduced. Therefore, the UVRRU will still contribute to rangewide desert tortoise recovery goals.

- Through implementation of the Conservation Program, the County intends to conserve the UVRRU population of desert tortoise in its native habitat in perpetuity. The County has demonstrated its commitment to the Conservation Program established the 1995 HCP. In addition to fulfilling their original $9 million commitments, the County spent over $6 million in excess (Capone 2016). The Amended HCP would continue implementing conservation measures under this Conservation Program (*e.g.*, clearance surveys) for an additional 25-year period to continue to support the conservation and recovery of the desert tortoise.

- The Reserve, a conservation measure established under the 1995 HCP, will continue to contribute to the conservation and recovery of the desert tortoise by preserving the areas containing the highest densities of the species in the UVVRU. The NCH changed condition would result in some habitat loss and fragmentation of the Reserve. Adding Zone 6 to offset those effects would preserve an area of the highest density of desert tortoises currently known outside the Reserve and protects potential connectivity between the UVRRU and the NEMRU. In addition, most of the desert tortoises in the UVRRU would be protected in the Reserve and the proposed Zone 6 (USFWS 2021a). The County commits to implementing additional conservation measures in the Reserve (*e.g.*, restoration of habitat degraded by wildfires and recreational use, installation of additional desert tortoise passages) in response to the NCH changed condition to offset its effects of habitat degradation, fragmentation, and loss in the Reserve. Based on our evaluation of the biological values of the Reserve (see "Conservation Actions" subsection of "Effects of the Action on the Desert Tortoise" section), the Reserve will continue to promote the conservation and recovery of the desert tortoise by protecting habitat to support its behaviors (*e.g.*, foraging) and life cycle (*e.g.,* reproduction, recruitment, dispersal).

- The County is restricting Covered Activities within the Reserve to 200 acres to limit habitat loss and fragmentation in the Reserve, which contains the highest known densities of desert tortoises in the UVRRU. This represents less than one percent of the total modeled desert tortoise habitat in the Reserve. Many of the Covered Activities (*e.g.*, utility rights of way) in the Reserve will result in short-term habitat degradation and modification, not permanent habitat loss. Furthermore, most activities in the Reserve subject to the review and approval of the County include habitat restoration and offsetting

habitat loss as a condition of approval. Protecting the desert tortoises and their habitat in the Reserve, the core of the UVRRU, will contribute to the persistence of the species in the UVRRU and rangewide.

We conclude, based on the reasons listed above, specifically the relative amount of the take, the nature of the take, and the conservation benefits the Reserve and the proposed Zone 6 provide, that the species can sustain the take estimated from the proposed Action without resulting in jeopardy to the desert tortoise.

Desert Tortoise Critical Habitat

- The total loss of critical habitat from the proposed Action represents less than one percent of the critical habitat range wide and approximately 1.3 percent of the critical habitat in the UVR CHU. Thus, the estimated loss is relatively low compared to the total amount of critical habitat range wide and in the UVR CHU and will not appreciably reduce the conservation and recovery potential of the CHU or the entire critical habitat.

- The County will implement conservation measures to improve the condition of the habitat inside the Reserve. Therefore, the remaining critical habitat in the Reserve will increase in value and contribute to the continued conservation and recovery of the desert tortoise.

We conclude, based on the reasons listed above, specifically the relatively small amount of critical habitat loss and the habitat improvements to the critical habitat in the Reserve, that the proposed project would not appreciably diminish the value of UVR CHU or the entire critical habitat for the conservation of the desert tortoise.

Holmgren Milkvetch

- We estimate the proposed Action will result in the loss of approximately 1,000 to 1,500 plants Holmgren milkvetch plants in the Central Valley and Green Valley populations, representing 14 to 21 percent of the range-wide estimate (7,100 plants). The Central Valley population is currently the only population that appears to have a stable population trend. The County and HCP Partners have committed to protecting a viable population of Holmgren milkvetch in the Central Valley Subunit 1c to support the recovery of the species. They will provide in-perpetuity habitat protections for one or more conservation areas and will develop and implement a management plan to maintain plants and habitat, and address stressors such as recreation, fugitive dust, and non-native plants in the conservation areas. The inclusion of monitoring will guide management activities. FWS and other conservation partners have and will continue to salvage seeds from the Amended HCP Take Area to use to augment the Central Valley population or other populations. Pilot augmentation efforts have demonstrated initial success. We expect the County's and HCP Partners' commitments to protect and manage this population will enable it to continue to persist and contribute to the recovery of the Holmgren milkvetch.

- The largest population of the Holmgren milkvetch, State Line, is on BLM land and the Proposed Action will not affect it. Though this population declined in recent years, the BLM

is augmenting the population to improve the population size and trend (Meyer and Rominger 2020). The BLM's ongoing conservation effort with this population increases the likelihood that this population will continue to persist and contribute to the recovery of the Holmgren milkvetch.

- Covered Activities will not affect plants in the State Line population and the other three populations of Holmgren milkvetch, comprising approximately 5,600 to 6,100 plants (79 to 86 percent of the total known population). The remaining relatively large number of plants would continue to provide species resiliency and the multiple populations would continue to provide species redundancy.

- The plants within the HCP Take Area are on private land and, as such, they are not afforded protection under the Act. Issuing the ITP requires the FWS to evaluate the effects to the Holmgren milkvetch. In the absence of the proposed Action, these lands would likely be developed without a federal action and, thus, the project proponent would not be required to evaluate the effects to the species. Therefore, the conservation measures for the Holmgren milkvetch in the proposed Action would not likely be implemented in absence of the proposed Action.

We conclude, based on the reasons listed above, specifically the proportion of loss relative to the range-wide estimate, the protection of the conservation area to provide a viable population, the management of that conservation area for persistence of the population, and the redundancy offered by the remaining four populations, that the species can sustain the loss estimated from the proposed Action without resulting in jeopardy to the Holmgren milkvetch.

Holmgren Milkvetch Critical Habitat

- We estimate the proposed Action will result in the loss of 746 to 846 acres of critical habitat, which is 12 to 13 percent of the total designated critical habitat. Approximately 4,673 to 4,773 acres of Holmgren milkvetch critical habitat, 74 to 76 percent of the total designated critical habitat, will remain in the six CHUs (the remaining 11 to 14 percent of the total designated critical habitat has been already been destroyed). The County and HCP Partners have committed to protecting approximately 200 to 300 acres of critical habitat in the Central Valley CHU 1c to support the recovery of the species. The 200 to 300 acres of critical habitat will be included in one or more conservation areas and will contain the physical and biological features to conserve Holmgren milkvetch. The acreage will be protected in perpetuity and will be managed to maintain plants and habitat. We expect the County's and HCP Partners' commitments to protect and manage this critical habitat will enable it to continue to function and contribute to the recovery of the Holmgren milkvetch.

- Covered Activities will not occur in four of the six CHUs. Thus, Covered Activities will not affect the ability of the remaining Holmgren milkvetch critical habitat to contribute to the conservation and recovery of the species.

We conclude, based on the reason listed above, specifically the relatively small amount of area lost, that the proposed project would not appreciably diminish the value of the critical habitat for

the conservation of the Holmgren milkvetch.

Shivwits Milkvetch

- No Shivwits milkvetch plants occur in the Amended HCP Take Area. Thus, Covered Activities will not adversely affect known Shivwits milkvetch populations.

We conclude, based on the lack of effects to known individual plants that the proposed Action will not result in jeopardy to the Shivwits milkvetch.

Shivwits Milkvetch Critical Habitat

- Approximately 2,020 acres of Shivwits milkvetch critical habitat, 93 percent of the total designated critical habitat, will remain in the six CHUs. Covered Activities will not occur in four of the six CHUs. Thus, Covered Activities will not affect the ability of the remaining Shivwits milkvetch critical habitat to contribute to the conservation and recovery of the species.

We conclude, based on the reason listed above, specifically the relatively small amount of area lost, that the proposed project would not appreciably diminish the value of the critical habitat for the conservation of the Shivwits milkvetch.

Dwarf Bear-poppy

- Eight of the nine known dwarf bear-poppy populations and approximately 93 percent of the total number of known individuals will remain under the proposed Action. Thus, the number of plants lost represents a relatively small proportion of the range-wide estimate. The remaining plants and populations will continue to provide resiliency and redundancy to support species persistence.

- Approximately 84 percent of the known dwarf bear-poppy plants occur on land protected by TNC or on BLM land that, as Federal land, is afforded protections under the Act. Additionally, if the NCH Project occurs, the addition of Zone 6 to the Reserve will provide additional protections for this species.

We conclude, based on the proportion of loss relative to the range-wide estimate and the protections afforded to the majority of plants rangewide that the species can sustain the loss estimated from the proposed Action without resulting in jeopardy to the Dwarf bear-poppy.

Siler Pincushion Cactus

- All 25 known Siler pincushion cactus populations and approximately 98 percent of the total number of known individuals will remain. Thus, the number of plants lost represents a relatively small proportion of the range-wide estimate, and the remaining populations will maintain species redundancy.

We conclude, based on the proportion of loss relative to the range-wide estimate and because the loss would not reduce the number of populations, that the species can sustain the loss estimated from the proposed Action without resulting in jeopardy to the Siler pincushion cactus.

Gierisch Mallow

- No Gierisch mallow plants occur in the Amended HCP Take Area. Thus, Covered Activities will not adversely affect known Gierisch mallow populations.

We conclude, based on the lack of effects to known individual plants that the proposed Action will not result in jeopardy to the Gierisch mallow.

Gierisch Mallow Critical Habitat

- Ninety-nine percent of the total designated critical habitat for Gierisch mallow will remain in the two CHUs. Covered Activities will not occur in one of the two CHUs. Thus, the loss will only occur in one unit and represents a relatively small portion of the total critical habitat.

We conclude, based on the reasons listed above, specifically the relatively small amount of area lost, that the proposed project would not appreciably diminish the value of the critical habitat for the conservation of the Gierisch mallow.

Fickeisen plains cactus

No Fickeisen plains cactus plants occur in the Amended HCP Take Area. Therefore, Covered Activities will not adversely affect known Fickeisen plains cactus populations.

We conclude, based on the lack of effects to known individual plants that the proposed Action will not result in jeopardy to the Fickeisen plains cactus.

Fickeisen Plains Cactus Critical Habitat

- Covered Activities will not affect any Fickeisen plains cactus critical habitat.

We conclude, based on the lack of effects to Fickeisen plains cactus critical habitat, that the proposed project would not appreciably diminish the value of the critical habitat for the conservation of the Fickeisen plains cactus.

We based the conclusions of this biological opinion on full implementation of the Amended HCP, including conservation measures, summarized in the "Description of the Proposed Action" section of this document.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined (50 CFR § 17.3) to include significant

habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. “Harass” is defined (50 CFR § 17.3) as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. “Incidental take” is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of Section 7(b)(4) and Section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The Amended HCP and its associated documents identify affects to the desert tortoise likely to result from the proposed taking and the measures that are necessary and appropriate to minimize those effects. All conservation measures described in the proposed Amended HCP, together with the terms and conditions described in the section 10(a)(1)(B) permit issued with respect to the proposed Amended HCP, are hereby incorporated by reference as reasonable and prudent measures and terms and conditions within this Incidental Take Statement pursuant to 50 CFR 402.14(j). Such terms and conditions are non-discretionary, and the County must undertake them for the exemptions under section 10(a)(1)(B) and Section 7(o)(2) of the Act to apply. If the County fails to adhere to these terms and conditions, the protective coverage of the section 10(a)(1)(B) permit and Section 7(o)(2) may lapse. We describe the amount or extent of incidental take we anticipate under the Amended HCP, associated reporting requirements, and provisions for disposition of dead or injured animals in the Amended HCP and/or its accompanying section 10(a)(1)(B) permit.

“Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, the Act provides limited protection of listed plants from take to the extent that it prohibits the removal and reduction to possession of federally listed endangered plants from areas under Federal jurisdiction, or for any act that would remove, cut, dig up, or damage or destroy any such species on any other area in knowing violation of any regulation of any State or in the course of any violation of a State criminal trespass law.”

AMOUNT OR EXTENT OF TAKE

In the “Status of the Desert Tortoise in the Action Area” and the “Effects of the Action” sections, we estimated the number of desert tortoises we anticipate are in the Amended HCP Take Area and are likely to be taken in the form of capture and collect through clearance surveys or, if undetected, could be injured or killed (*i.e.*, harmed) from Covered Activities. This information is important to determine whether the numbers of tortoises affected by the Proposed Action are not likely to jeopardize the continued existence of the desert tortoise. We discussed the methodology we used in those estimates and acknowledged the high levels of uncertainty associated with them. We based these estimates on the best available data.

We expect the proposed Action will affect all the desert tortoises with home ranges that overlap with the HCP Take Area, estimated to include 352 adults, 1,830 juveniles, 458 hatchlings, and an undeterminable number of eggs. We expect clearance surveys to find and remove most of the 352 adults from the Amended HCP Take Area prior to Covered Activities. We estimate that most

of the 1,830 juveniles, most of the 458 hatchlings, and all of the undeterminable number of eggs will remain in the HCP Take Area after the clearance surveys. These remaining individuals will be exposed to stressors from Covered Activities; some will be harmed (i.e., killed or injured) by crushing, entombment, or entrapment. Habitat loss, degradation, and fragmentation will affect desert tortoises that remain in and around the Amended HCP Take Area after Covered Activities, harming some by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.

The County will track and report the number of individuals cleared from the Amended HCP Take Area in association with Covered Activities. Based on our estimate of the number of individuals in the Amended HCP Take Area, we do not expect them to clear more than 336 adults outside the Reserve or more than 16 adults inside the Reserve. However, a variety of circumstances may alter these estimates, such as improvements in survey or detection methodologies or changes in tortoise abundance or density due to factors outside of the control of the County. The County will also track and report the number of individuals found killed or injured from Covered Activities. Because they are not likely to find all the dead and injured desert tortoises within the Amended HCP Take Area, that number will be a subset of the actual number killed or injured. They are more likely to detect adults than sub-adults. Based on the number of individuals the County reported killed or injured from Covered Activities under the 1995 HCP (3-7 individuals), we do not expect detection of more than 10 adults killed or injured by Covered Activities under the Amended HCP. Again, a variety of circumstances may alter the assumptions from which we derived this number. We do not estimate the number of individuals that may be lost from Covered Activities (*e.g.*, invasive weed control) inside the Reserve and outside the 200 acres in the Amended HCP Take Area, as we cannot predict where or to what extent those activities may occur.

Though we estimated the amount of take as number of individuals and the County will track the number of individuals cleared, killed, or injured from Covered Activities, we determined it is more appropriate to use a habitat surrogate to track the amount of take. Tracking take as number of individuals to determine when take is exceeded would not be practical because of the difficulty in finding dead or injured individuals and the uncertainties associated with our estimated number of individuals. As defined in 50 CFR 402.14 (g)(7)(i)(1)(i), we can use a habitat surrogate for tracking take if we (1) can describe the causal link between the surrogate and take of the listed species, (2) can explain why it is not practical to express the amount or extent of anticipated take or to monitor take-related effects in terms of individuals of the listed species, and (3) set a clear standard for determining when the level of anticipated take has been exceeded. We discuss our rationale below:

(1) In the “Status of the Desert Tortoise in the Action Area” section, we discussed the methodology we used to establish a causal link between the surrogate (habitat) and the take of desert tortoises. Specifically, we estimated the number of desert tortoises in the Amended HCP Take Area using a density estimate appropriate for a given area, based on the best available data, multiplied by the area affected within the Amended HCP Take Area (see Tables 3 and 4). There is a high level of uncertainty associated with the estimates because the density estimates we use have wide confidence intervals, distribution of desert tortoises is not even across areas, and not all areas have been surveyed. Though the level of uncertainty is high for our estimate in any specific area, we

expect that density overestimates in some areas will balance out underestimates in other areas across the relatively large Amended HCP Take Area. Thus, the total number of individuals we estimate for the take is a reasonable estimate for our jeopardy analysis but not appropriate for estimating the take in each specific areas in which a Covered Activity would occur. If new information reveals that our estimates are not adequate (*e.g.,* we find a previously unknown high-density concentration of desert tortoises in the HCP Take Area), we would reevaluate our analysis in this BO and, if necessary, recommend reinitiating consultation.

(2) We have estimated the amount of take as numbers of individuals for our jeopardy analysis. Though there is a high level of uncertainty associated with this, we expect that overestimates in some areas will balance out underestimates to produce a reasonable estimate across the entire Amended HCP Take Area. However, we are not confident that we can accurately apply these estimates to smaller areas within the Amended HCP Take Area as Covered Activities occur. Additionally, desert tortoise numbers and distribution within areas are constantly changing with hatchings, deaths, immigration, and emigration.

It is not practical for the County to accurately track the amount of take in number of individuals, because the low detection rates of desert tortoises would likely underestimate the take. Desert tortoises are difficult to detect, because they spend a considerable proportion of time underground in burrows or in vegetation, sometimes deep enough that they are not visible to personnel conducting transects. This proportion of the population varies from year to year, probably in ways that bear no relationship to variation in true abundance (USFWS 2015). The optimum time for detecting desert tortoises is an 8-week period in the spring (USFWS 2015), which would not correspond with the construction schedules for all Covered Activities. Hatchlings and eggs are even more difficult to detect than adults because of their small size and the location of eggs underground. There is no means of equating one dead or impaired desert tortoise (assuming we find it) to a number of dead or impaired tortoises not observed. For all these reasons, we cannot rely on surveys to track the amount of take in numbers of individuals. If new methods or techniques are developed to measure take in numbers of individuals, we would work with the County to appropriately incorporate them into their implementation of the Amended HCP.

(3) We have set a clear standard, based on of the number of acres on which Covered Activities occur, for determining when the level of anticipated take has been exceeded. With the NCH changed circumstance, the Proposed Action would result in the loss of up to 62,960[7] acres, of which up to 200 acres may occur inside the Reserve. As discussed above, this BO defines this area as the Amended HCP Take Area, which is the area within the Plan Area that the County has determined take of the desert tortoise is reasonably certain to occur from Covered Activities. The proposed Action is the Plan Area. If new information identifies additional areas in the Plan Area occupied by desert tortoises, reinitiation would be triggered if the Covered Activities are likely to exceed

7 In this BO, we estimated the number of animals subject to take based on the shape files provided by Washington County, which is approximately 63,030 acres (USFWS 2021a). For the purposes of consistency with the Amended HCP, we use Washington County's requested take of desert tortoises associated with 62,960 acres (*i.e.*, the habitat surrogate).

62,960 acres. The County would exceed the take covered under their ITP if Covered Activities occur on more than 62,960 acres.

EFFECT OF THE TAKE

In this BO, we determine that this level of anticipated take is not likely to result in jeopardy to the desert tortoise for the reasons stated in the Conclusions section.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

We incorporate the County's conservation measures (see the "Conservation Measures" subsection of the "Proposed Action" section), including avoidance and minimization measures, status surveys, biological and compliance monitoring, and reporting measures, as reasonable and prudent measures and terms and conditions to address the incidental take of the desert tortoise. Activities executed by the County that require handling of desert tortoises as part of the minimization measures must be conducted by individuals included on the List of Authorized Individuals for the HCP or under the direct, on-site supervision of an experienced, permitted biologist (or tortoise veterinarian re: drawing blood).

We did not identify additional reasonable and prudent measures for the FWS during the consultation on our issuance of the permit.

Disposition of Dead or Injured Listed Species

Upon locating a dead, injured, or sick listed species, you must provide initial notification to the FWS's Law Enforcement Office, 2900 4th Avenue North, Suite 301, Billings, Montana, 59101, (303-729-2285) and the UESO (801-975-3330) within three working days of its finding. You must make written notification within five calendar days and include the date, time, and location of the animal, a photograph if possible, and any other pertinent information. Send the notification to the Law Enforcement Office with a copy to the UESO. Take care in handling sick or injured animals to ensure effective treatment and in handling dead specimens to preserve the biological material in the best possible state.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed Action on listed species or critical habitat, to help implement recovery plans, or to develop information. We recommend that the FWS implement the following:

- Prioritize desert tortoise conservation actions in the following order:

    1) Support acquisition of the remaining Reserve in-holdings from willing sellers.

2) Support funding opportunities for improving habitat conditions in the Reserve through habitat management (i.e., invasive plant species management and habitat restoration).

3) Support research and funding opportunities for improving intactness and connectivity throughout the UVRRU, starting with the Reserve and working west by installing and maintaining effective desert tortoise passageways and corridors and monitoring condition and desert tortoise use (USFWS 2021a). This also includes ground-truthing, protecting, and restoring connectivity between AUs and recovery units.

4) Support acquisition of the Zone 6 non-Federal lands from willing sellers.

5) Support improvement of habitat conditions in Zone 6 through fencing, closing of trails, and habitat restoration.

6) Support translocation planning and population augmentation efforts to translocate desert tortoises to new areas that support recovery unit goals (*i.e.*, habitat corridors or to test habitat restoration effectiveness).

- UESO will work with the County and HCP Partners to develop criteria for success through the Adaptive Management program for conservation actions implemented under the Amended HCP. These criteria will describe how actions are tracked and measured to achieve milestones. Working toward these success criteria will help achieve community and biological goals until the implementation milestones of the Amended HCP are realized. Criteria will consider the biological values inherent to the Reserve. These include animals, size, intactness, connectivity, and condition of habitat (Amended HCP Appendix G).

- Emphasize that any development of roads or other human development, such as the Western Corridor, should maintain habitat and connectivity between Zone 6 and other parts of the UVRRU and NEMRU.

- Encourage municipalities to manage activities in or adjacent to desert tortoise habitat so that they do not contribute to the proliferation of predators within desert tortoise habitat (minimizing waste, reducing perching and nesting opportunities for ravens, etc.).

- Coordinate and collaborate with other local, State, and Federal agencies, Tribes, as well as private groups to sponsor or assist with public education regarding desert tortoise conservation to enhance public support for conservation activities. Target groups for education and outreach may include OHV groups, hunting groups, home owner associations, scout troops, public schools, libraries, and other audiences and venues associated with regional land use or educational programming.

- Coordinate with local, State, and Federal agencies as well as private groups to support recovery programs, initiatives or actions that include federally listed species, including

desert tortoise, plants and other species. Seek recovery funding for County and State leadership to identify and implement management strategies for recovery actions that complement other programs (e.g. Amended HCP and VR Recovery Program) and that supports species recovery and the potential for delisting.

REINITIATION NOTICE

This concludes formal consultation for our issuance of an ITP for the Washington County Amended HCP. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take exceeds the ITP, any operations causing such take must cease pending reinitiation.

In keeping with our trust responsibilities to American Indian Tribes, UESO will coordinate with the Bureau of Indian Affairs in the implementation of this consultation and, by copy of this BO, are notifying the Shivwits Band of Paiutes Tribe of its completion. The UESO also coordinated the review of this project with the UDNR.

We appreciate your efforts to identify and minimize effects to listed species from this project. Please refer to the consultation number, 02EAAZ00-2020-F-0174 in future correspondence concerning this project. Should you require further assistance or if you have any questions please contact Jessica Miller (Jessica_Miller@fws.gov) or Shaula Hedwall (Shaula_Hedwall@fws.gov).

Approved:

Jeffrey A. Humphrey, Field Supervisor — Date: 1/12/20

cc (electronic):
Supervisor, Utah Ecological Services Field Office, Salt Lake City, UT
Director, Western Regional Office, Bureau of Indian Affairs, Phoenix, AZ
Chairperson, Shivwits Band of Paiutes, Ivins, UT
Commissioners, Washington County Commission, St. George, UT
Administrator, Washington County HCP Program, St. George, UT
Director, Utah School and Institutional Trust Lands Administration, Salt Lake City, UT
Director, Utah Department of Natural Resources, Salt Lake City, UT
State Director, Bureau of Land Management, Salt Lake City, UT
Mayor, Ivins City, UT

FIGURES AND TABLES

Figure 1. Plan Area for the Washington County Amended HCP.

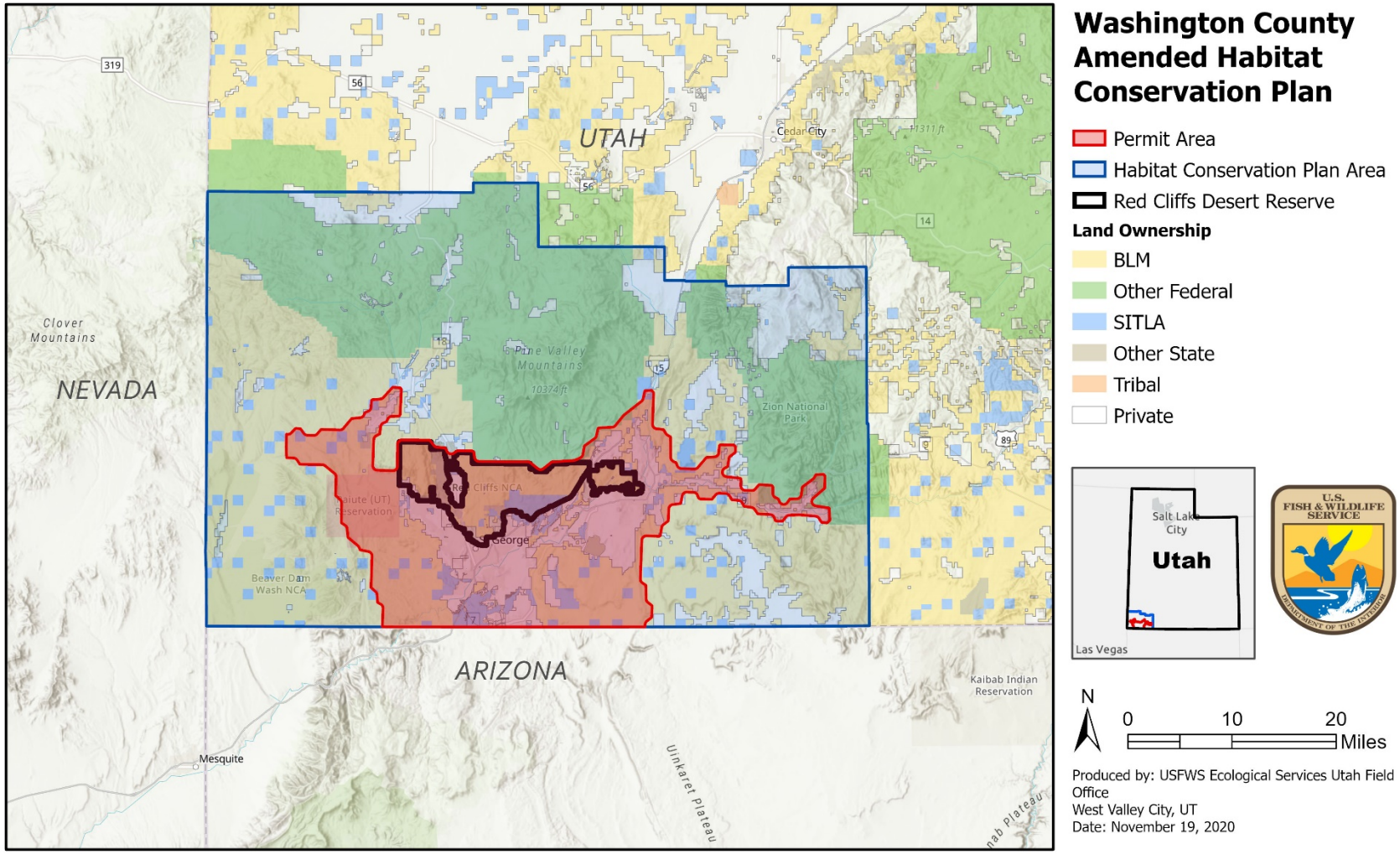

Figure 2. Amended HCP Take Area for the Washington County Amended HCP.

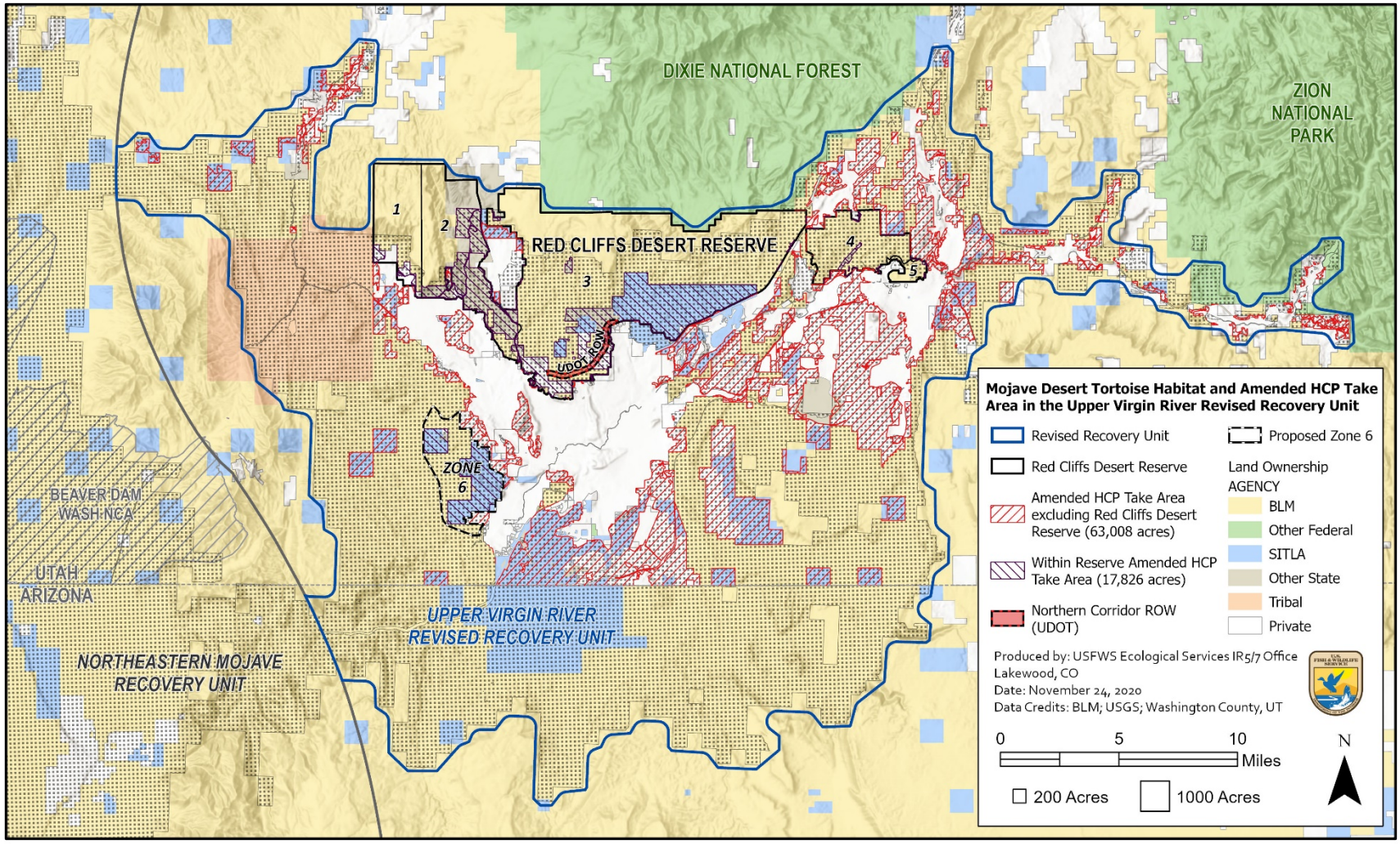

Table 1. Area within portions of the Action Area, acres (mi^2), with the changed circumstance of the Northern Corridor.

	Total, acres (mi^2)	**Modeled Desert Tortoise Habitat, acres (mi^2)**	**MDT Habitat* on non-Federal/non-Tribal lands, acres (mi^2)**	**Amended HCP Take Area (acres)**
UVRRU	466,427 (728.8)	325,898 (509.2)		
Plan Area	1,556,250 (2,431.6)	357,366 (558.4)		
Permit Area	366,894 (573.3)	239,008 (373.5)	80,353 (125.5)	63,160
Northern Corridor permanent footprint	276 (0.4)	276 (0.4)	0 (0)	
Reserve Zone 6	6,813	6,747 (10.5)	3,341 (5.2)	
Total Reserve (Zones 1-6)	68,822 (107.5)	48,048 (75.1)	17,393 (27.2)	200
Permit Area, outside Reserve	298,058 (465.7)	190,960 (298.4)	62,760 (98.4)	62,760

*This is habitat the County considers reasonably likely to contain desert tortoises.

Table 2. Area within portions of the Action Area, acres (mi^2), without the changed circumstance of the Northern Corridor.

	Total, acres (mi^2)	**Modeled Desert Tortoise Habitat^, acres (mi^2)**	**MDT Habitat* on non-Federal/non-Tribal lands, acres (mi^2)**	**Amended HCP Take Area (acres)**
UVRRU	466,427 (728.8)	325,898 (509.2)		
Plan Area	1,556,250 (2,431.6)	357,366 (558.4)		
Permit Area	366,894 (573.3)	239,008 (373.5)	80,353 (125.5)	66,501
Reserve (Zones 1 – 5)	62,009 (96.9)	41,301 (64.5)	14,052 (22)	200
Permit Area, outside Reserve	304,885 (476.4)	197,707 (308.9)	66,301 (103.6)	66,301

^ This is suitable desert tortoise habitat modeled in USFWS (2020).
*This is habitat the County considers reasonably likely to contain desert tortoises.

Table 3. Number of individual desert tortoises (with 95 percent confidence intervals [CIs]) estimated in the Amended HCP Take Area with the NCH changed circumstance.

	Amended HCP Take Area, acres (mi^2)	**Adult desert tortoise Density/mi^2 (95 percent CI)**	**# of adult desert tortoises (95 percent CI)**	**# of juvenile desert tortoises (95 percent CI)**	**# of hatchling desert tortoises (95 percent CI)**
Reserve Zones 1-6	200 (0.31)	50.8 (38.9-66.3)	16 (12–21)	83 (62 – 109)	21 (16–27)
Surveyed area adjacent to proposed Reserve Zone 6	18 (0.03)	58.3 (33.9-99.5)	2 (1-3)	10 (5–6)	3 (1–4)
Total Permit Area, excluding Reserve Zones 1-6 and adjacent surveyed area	62,812* (98.14)	3.4 (1.0-10.9)	334 (98–1,070)	1,737 (510–5,564)	434 (144–1,391)
Total	63,030 (98.5)		352 (111–1,094)	1,830 (577–5,689)	458 (144–1,422)

*We estimated the number of animals subject to take based on the acreage in the GIS shape files provided by Washington County (approximately 63,030 acres) (USFWS 2021c). For the purposes of consistency with the Amended HCP, we use Washington County's requested take of desert tortoises associated with 62,960 acres (*i.e.*, the habitat surrogate) in this document and our permit.

Table 4. Number individual desert tortoise (with 95 percent confidence intervals [CIs]) estimated in the Amended HCP Take Area without the NCH changed circumstance.

	Amended HCP Take Area, acres (mi^2)	**Adult desert tortoise Density / mi2 (95 percent CI)**	**# of adult desert tortoises (95 percent CI)**	**# of juvenile desert tortoises (95 percent CI)**	**# of hatchling desert tortoises (95 percent CI)**
Reserve Zones 1 – 5	200 (0.31)	50.8 (38.9 - 66.3)	16 (12 – 21)	83 (62 – 109)	21 (16 – 27)
Surveyed area in and adjacent to proposed Zone 6	2,968 (4.64)	58.3 (33.9- 99.5)	270 (157 – 461)	1,404 (816 – 2,397)	351 (204 – 599)
Total Permit Area, excluding surveyed area in and adjacent to proposed Zone 6	63,155 (98.68)	3.4 (1.0 - 10.9)	336 (99 – 1,074)	1,747 (515 – 5,595)	437 (129 – 1,399)
Total			622 (268 – 1,558)	3,234 (1,393 – 8,101)	809 (349 – 2,025)

Table 5. Area of desert Tortoise critical habitat within portions of the Action Area.

	Total, acres	**Desert Tortoise Critical habitat, acres**	**Undeveloped Desert Tortoise Critical habitat, acres**	**Undeveloped Critical Habitat in the Amended HCP Take Area, acres (mi^2)**
UVRRU	466,427	53,366	50,545	
Plan Area	1,556,250	129,269	126,355	
Permit Area	366,894	53,366	50,545	833
Northern Corridor permanent footprint	276	276	274	
Reserve Zone 6	6,813	0	0	
Total Reserve (Zones 1-6)	68,822	46,856	46,205	200
Permit Area, outside Reserve	298,058	6,510	4,340	633

Table 6. Holmgren milkvetch populations and critical habitat in the Amended HCP Take Area, Washington County, Utah.

Population	Landowner	Critical Habitat Acreage (acres)	Estimated Number of Plants	Comments
Central Valley	SITLA	1,033	3,000	UDOT currently protects 17 acres. SITLA and conservation partners will protect additional acres as a conservation measure.
Green Valley	Private	None	300	Plants and habitat in this population are located in a utility corridor, occupying approximately 50 acres.
Purgatory Flat	Washington County, Private	13	0	No plants are located on non-Federal lands.

Table 7. Shivwits milkvetch critical habitat in the Amended HCP Take Area, Washington County, Utah.

Critical Habitat Unit	Landowner	Critical Habitat Acreage (acres)	Comments
Coral Canyon	SITLA, Private	53	No plants occur in the Amended HCP Take Area.
Harrisburg Bench and Cottonwood	Private	3	No plants occur in the Amended HCP Take Area.
Silver Reef	Private	36	No plants occur in the Amended HCP Take Area.

Table 8. Dwarf bear-poppy populations in the Amended HCP Take Area, Washington County, Utah.

Population	Landowner	Estimated Number of Plants	Comments
White Dome	SITLA, Private	250	Rough estimate of plants due to lack of survey data.
Beehive Dome	SITLA	75	Rough estimate of plants from 2020 site visit.
Warner Valley Springs	SITLA	150	Utah Natural Heritage Program (UNHP) database.
Red Bluffs	SITLA	150	Estimate provided for State lands outside of proposed zone 6. UNHP database.
Webb Hill	SITLA	150	UNHP database.
Purgatory Flat	Private	40	UNHP database.
Estimated Plant Total		**815**	**Approximately 7 percent of the range-wide estimate**

Table 9. Gierisch mallow critical habitat in the Amended HCP Take Area, Washington County, Utah.

Critical Habitat Unit	Landowner	Critical Habitat Acreage (acres)	Comments
Starvation Point	SITLA	167 acres designated	167 acres of undeveloped critical habitat occurs on SITLA lands in the Amended HCP Take Area. No plants occur in the Amended HCP Take Area.

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APPENDIX A – CONCURRENCES AND CONFERENCE REPORT FOR NONESSENTIAL EXPERIMENTAL 10 (J) POPULATIONS

This appendix contains the AESO concurrences for the threatened Mexican spotted owl (*Strix occidentalis lucida*), the endangered southwestern willow flycatcher (*Empidonax traillii extimus*), the threatened western yellow-billed cuckoo (*Coccyzus americanus*), the endangered Virgin chub (*Gila seminuda)* and its critical habitat*,* and the endangered woundfin (*Plagopterus argentissimus*) and its critical habitat. In addition, this appendix also contains the AESO "not likely to jeopardize" concurrence for the experimental, nonessential population of California condor (*Gymnogyps californianus*).

CONCURRENCES

Mexican spotted owl

The UESO determined the Project "may affect, but is not likely to adversely affect" the threatened Mexican spotted owl. We concur with that determination for the following reasons:

- There is no occupied Mexican spotted owl habitat within the Action Area or within 0.5 mile of the Action Area; therefore, there will be no disturbance to breeding owls from the action.

- No suitable habitat for Mexican spotted owl is located within the Action Area, so these activities would not result in effects to recovery or protected habitat.

Southwestern willow flycatcher and yellow-billed cuckoo

The UESO determined the Project "may affect, but is not likely to adversely affect" the endangered southwestern willow flycatcher or the threatened western yellow-billed cuckoo. We concur with those determinations for the following reasons:

- The densely vegetated riparian habitat where these birds breed and forage does not commonly overlap with habitat used by the desert tortoise; therefore, the proposed Action is not likely to result in disturbance to breeding and migrating flycatchers or cuckoos.

- The County and municipalities restrict land development activities within floodplains and riparian areas within the where flycatcher and cuckoo habitat may occur. These zoning restrictions protect riparian habitat for the flycatcher and cuckoo habitat as well as the species; therefore, we expect the proposed action to result insignificant and discountable effects to habitat for these species.

Virgin Chub and Woundfin

The UESO determined the Project "may affect, but is not likely to adversely affect" the endangered Virgin chub and the endangered woundfin or their designated critical habitats. We concur with those determinations for following reasons:

- The Amended HCP Take Area does not include aquatic habitat that these species occupy. The County and municipalities substantially restrict land development activities within the floodplain of the Virgin River that contains habitat for the species. These restrictions minimize the potential for effects to these fishes from habitat degradation (*e.g.*, runoff from erosion). For these reasons we expect any effects to these fishes to be insignificant.

- Critical habitat for these fish includes floodplain adjacent to the Virgin River. The County and municipalities substantially restrict land development activities within the floodplain. These restrictions minimize the potential for development in these areas that could degrade the physical and biological factors; water, physical habitat, and biological environment; of the critical habitat. For these reasons we expect any effects to critical habitats for these fishes to be insignificant.

JEOPARDY DETERMINATION FOR NONESSENTIAL EXPERIMENTAL 10 (J) POPULATIONS

California condor

- Because of the California condor's status as a nonessential experimental population, we treat these condors as though they are proposed for listing for Section 7 consultation purposes. By definition, a nonessential experimental population is not essential to the continued existence of the species. Thus, no proposed action effecting a designated population could lead to a jeopardy determination for the entire species.