

Species of Conservation Concern Process

Tonto National Forest plan revision process supplemental information for the species of conservation concern, October 17, 2023

This paper was written to give background on how & when the potential Species of Conservation Concern (SCC) list was created as part of the Tonto National Forest – Forest Plan revision process. Further, information on specific species is provided to answer questions or concerns raised during the Forest Plan Objection process. This document is NOT intended to be an exhaustive history of the SCC process, recognizing some institutional knowledge of the SCC process was lost as authors of the foundation documents retired or otherwise left the Tonto National Forest and Regional Office. A timeline of activities is presented first, followed by methods used to create the SCC list.

General SCC Timeline

- **2012.** New planning rule released to guide Forest Plan revisions. Chapter 10 of the directives (FSH 1909.12, 12.52) addresses at-risk species and identification of SCC species. Forest Service Handbook 1909.12 – Land Management Planning
- **2016-2017.** Tonto Planning staff, AZGFD staff and long list of partners & collaborators research & wrote an assessment of ecological conditions as part of Forest plan revision process. One AZGFD biologist is imbedded at the Tonto SO as the initial at-risk species assessment is created. Team confers often and reviews SCC requirements tied to Forest Plan revision process. They begin research on species to include in first draft SCC list. First draft SCC list is based on the Tonto 2013 RFSS list, data in the 2012 AZ State Wildlife Action Plan (SWAP), local expert knowledge, NatureServe species information and data from Arizona Heritage Data Management database version 2016.
- **March 2017.** The NEPA document “Final Assessment Report of Ecological Conditions, Trends, and Risks to Sustainability Volume I” is completed. In Chapter 7 At-Risk Species: Identifying and Assessing At-risk Species in the Plan Area, the document identifies species that are federally recognized as threatened, endangered, proposed, and candidate species as well as potential “species of conservation concern.” This chapter builds on the reference and current conditions for the other resources assessed in this volume. It also relies heavily on the description of vegetation types in Chapter 3 (ecological response units) on the Tonto National Forest and the associated risk assessment performed. Finally, a very rough list of potential SCC species is provided as Table 111.
- **August 2017.** Following final analysis of potential at-risk species, Tonto staff release their first SCC list (59 species) to the Regional Forester for review. This list reflects comments received on the assessment and updates to best available scientific information.
- **September 2017.** Regional Forester, per advice of Regional Office Staffs for Wildlife/Fish/Rare Plants (WFRP) and Ecosystem Analysis and Planning (EAP) issue letter to Tonto NF that the initial list of SCC has been reviewed and that refinement of the list shall proceed during the planning process.
- **October 2019.** Regional Forester is sent Tonto’s revised (Second) SCC list. The revised list of 51 species was compiled by TNF staff based on comment & input from the public, partners and stakeholders.
- **November 13, 2019.** Regional Forester, per advice of Regional Office Staffs for Wildlife/Fish/Rare Plants (WFRP) and Ecosystem Analysis and Planning (EAP) issue letter to

Tonto NF that the revised SCC has been reviewed, wherein add seven (7), remove fifteen (15) species, overall adjusting list from 59 to 51 SCC species.

- **November 2020.** Third (3rd) version of the potential species of conservation concern list for the Tonto National Forest created. In response to the Draft Tonto National Forest Land Management Plan and Draft Environmental Impact Statement, staff received substantial input on proposed SCC from our state, corporate, and non-profit partners, as well as from interested members of the public and internal staff. Revisions to the list of SCC incorporate the best available scientific information as contributed by these organizations and individuals. Reasons for these changes include newly documented concerns for species persistence, recent changes in ecological conditions on the forest, updated evaluations of risks to species, and new information regarding species distribution. During this time the forest added 6 species to and removed 5 species from the previously concurred upon list, for a net change from 51 species to 52 recommended SCC. The updated list of potential species includes 30 plants, 10 invertebrates, 1 fish, 1 amphibian, 2 reptiles, 4 birds, and 4 mammals (=all bats).
- **June 1, 2021.** Letter from Tonto NF to Regional Forester: Recommended Species of Conservation Concern for Regional Forester Review and Concurrence (letter requesting concurrence on the 3rd iteration of the SCC list).
- **January 31, 2022.** Regional Forester provided Tonto NF letter of concurrence for changes to the final potential SCC list. The Tonto recommended adding five species and removing four species to the previously concurred upon list based on newly available scientific information. These changes adjusted the total number of potential SCC from 51 to 52.
- **March 2023.** Regional Forester received an Objection Response for the Species of Conservation List Associated with the Tonto National Forest Plan Revision from Jaqueline Emanuel, the Reviewing Officer for the Chief.

General SCC Process

The methodology, rationale, and overall process for selecting the list of potential SCC species was presented in Chapter 7 At-risk Species: Identifying and Assessing At-risk Species in the Plan Area, in the March 2017 Final Assessment Report of Ecological Conditions, Trends, and Risks to Sustainability Volume I (here after the “2017 Assessment”). Of the 167 identified at-risk species that were identified as occurring on the Tonto National Forest there were 5 mammals, 77 birds, 6 amphibians and reptiles, 11 invertebrates, 5 fish, and 63 plants. These species were carried forward for further for consideration and analysis.

Overall methods and guidance used for identifying at-risk species was provided by the Land Management Planning Handbook, Chapter 10 – The Assessments (Forest Service Handbook 1909.12). There are two main categories of at-risk species:

- federally recognized threatened, endangered, proposed, and candidate species; and
- potential species of conservation concern.

Identification of at-risk species on the Tonto National Forest was accomplished in cooperation with numerous Federal, State, and Tribal agencies along with various academic and nongovernmental organizations using the best available scientific information.

The **167 original** candidates were evaluated using the following steps, as detailed in the 2017 Assessment document. This evaluation was conducted to refine and potentially parse down the preliminary SCC list to only species that meet all the criteria:

- **Step 1:** Identify species that are native to, and known to occur, in the plan area.

Of the more than 2,187 animal, plants, and fungi species found in Arizona (NatureServe 2016). For species with documented habitat on the Tonto, those that met one or more of the following criteria were considered potential species of conservation concern: Species with a status rank of G or T 1, 2, or G3 and S 1 or 2 on NatureServe ranking system.

- **Step 2:** Identify species that are at risk of persisting over the long term in the plan area.

The second step of the species of conservation concern analysis process determined which species can be removed from the potential species of conservation concern list because it is secure and its continued long-term persistence in the plan area is not at risk. Step 2 criteria were: (1) species populations and the ecological conditions they depend upon are not known to be affected by threats; (2) species have stable or upward trends in population or habitat; (3) species do not have restricted ranges; (4) species do not have low population numbers or restricted ecological conditions; (5) species occurrence in the planning area is considered “transient”; or (6) there is insufficient information to evaluate whether or not the species is at risk for persistence within the plan area.

Based on knowledge of the species’ abundance, distribution, lack of threats to persistence, trends in habitat, or responses to management, 109 of the initial 167 species identified as potential species of conservation concern are secure and their continued long-term persistence in the plan area is not at risk or there is insufficient information to deem them at risk. As such, these species were then no longer considered for further analysis as potential species of conservation concern.

- **Step 3:** Associate the federally listed and potential species of conservation concern with current ecological conditions and key ecosystem characteristics described within ecological response units for terrestrial species or within watersheds for aquatic species on each of the Tonto National Forest local zones.
- **Step 4:** Perform a risk analysis on federally listed and potential species of conservation concern with their associated habitats.

A table containing potential SCC species is included in the 2017 Assessment document, and that 2017 list **did not contain** the Richinbar Talussnail or Roosevelt Talussnail . In 2023, a search for records or reports that considered these two Talussnails in the development of the original list.

For reasons that cannot be determined, A mayfly (*Fallceon eatoni*) was not included in the 2017 Assessment Report, but was included in the first SCC list approval by the RO (2017?). This species was inadvertently omitted, but should have been evaluated due the requirement to consider species with a G1 NatureServe ranking.

Following the publication of the 2017 Assessment Report, the potential SCC list was modified (see timelines above) to address concerns and account for information provided by specialists, partners, and the public. Tonto staff added or removed species based on distribution and whether we could substantiate a risk to persistence.

Most of the SCC list modifications were in response to AZGFD subject matter experts and input from their highly experienced field staff. Input from AZGFD staff during the planning process and objection periods was extremely valuable in terms of which species should be recommended as SCC and others that that should not.

From 2017-2021 AZGFD biologists provided data for several talussnail observations and rationale for inclusion or removal of certain bats from the list. Also, during the 2019-2021 timeframe, AZGFD was

actively updating their State Wildlife Action Plan, which was renamed “AZ Wildlife Conservation Strategy” (AWCS). Most applicable to the Tonto SCC list was the AZGFD updating their Species of Greatest Conservation Need (SGCN) lists. At the beginning of the SCC process, several Tonto species did not have a SGCN value, but by 2019-2020 they were assigned values by AZGFD. The new SGCN value triggered the consideration of some species to be included in the final 2021 SCC list.

In November 2020 the SCC list changes were documented and rationale explained in a standalone document transmitted to the RO for review (USDA 2020).

Objection Instruction Response

Response to Freeport McMoran 2023 Objection: the review in response to the objection by Freeport McMoran found that the record did not clearly include background on adjustments made to the SCC list. Additional information related to the Sierra Ancha talussnail, A mayfly, Ancna mountain snail, fringed myotis, Pale Townsend’s big-eared bat, Richinbar talussnail, and Roosevelt talussnail is included below.

Sierra Ancha talussnail

Contrary to the Objection review statement, this species was not removed from further analysis in the Assessment report This talussnail was added due to better AZGFD information on occurrence, and the G1 ranking which requires the forest to consider threats caused by stressors on and off the plan area. Additionally, during Tonto plan development, the revised AZGFD SGCN value changed from Tier 3 to Tier 2 (= greater need for conservation). Additional information about the change in status and inclusion of Sierra Ancha talussnail as a potential SCC was provided in the supporting documentation to the Regional Forester to recommend concurrence and is included below.

Previously, this snail has been known from a single observation occurring on Reynolds Creek (three miles above Pleasant Valley Road, Reynolds Falls Asbestos Mine Gila County; Arizona, Alt. ca. 6,000 ft.; 13 adults, A. M. Strong, May 1929) (Berry 1948). While considered possibly extirpated in the NatureServe database (NatureServe 2017), recent surveys by AGFD and U.S. Forest Service appear to have detected an additional specimen, though genetic tests are pending (Arizona Game and Fish, unpublished data). Generally, all Sonorella and Oreohelix are visually identical; species are usually identified based on internal anatomical features (Stevens and Ledbetter 2014).

Members of Sonorella are well adapted to living in dry areas with only sporadic rainfall. These snails are primarily found in talus rock, sometimes up to several feet below the surface. They seal to the stone surface with a layer of mucus in order to avoid extreme temperatures and avoid desiccation (Arizona Game and Fish Department 2008b; Stevens and Ledbetter 2014). Due to these habitat preferences and behavior they are rarely encountered and their life histories are poorly understood (Stevens and Ledbetter 2014).

Land snails generally do not move very much, but they do venture short distances to locate food and reproduce, generally during periods of rain (Stevens and Ledbetter 2014). They are likely omnivorous, feeding on decaying and sometimes live vegetation, as well as algae, biofilm, and fungi. Very little is known about their behavior underground (Stevens and Ledbetter 2014)

The current condition of talus slopes and rock has not been assessed; however, because talussnails are so closely tied to talus-slope rocks, alterations to this habitat may be a potential threat. Such alterations could include: construction, roads, logging, brush control, surface pollution, mining, etc. (Stevens and Ledbetter 2014).

The only known location for this species is associated with ponderosa pine-evergreen oak. This ERU is highly departed from historic conditions, largely as a result of fire exclusion, with infilling of canopy gaps, increased tree density, and reductions in understory. These changes put this ERU at particular risk of uncharacteristic, high-severity fire. The 100-year projection is somewhat better, however, with a moderate departure forecast.

If other populations of this species exists, they may be subject to reproductive isolation. Generally this is true of most Sonorella species as they tend to be highly endemic.

Due to the lack of information regarding this species, its highly endemic nature, and the current NatureServe ranking, we have included it in our potential SCC list per the requirements of the 2012 planning rule.

A Mayfly

For reasons that cannot be determined, A mayfly (*Fallecon eatoni*) was not included in the 2017 Assessment Report, but was on the first SCC list (circa 2019) approval by the RO; the reason was primarily that staff had not correctly followed the requirement to include species with a G1 NatureServe ranking. Additional information about A mayfly as a potential SCC was provided in the supporting documentation to the Regional Forester to recommend concurrence and is included below.

*While originally collected over 100 years in northern Sonora, *Fallecon eatoni* was only rediscovered again in 2005 from Salt River Canyon, Gila Co., Arizona (McCafferty 2006), with an additional observation recorded in the San Bernardino Mountains, Cottonwood Canyon, California (Meyer and McCafferty 2008).*

*No species-specific information is available regarding the necessary ecological conditions for *Fallecon eatoni*. Generally, all mayflies are entirely aquatic in the immature larval stage. The larvae molt numerous times, generally over a short period of time. This is followed by a unique life stage called the subimago in which individuals are winged but sexually immature. These perch along shoreline vegetation between 4 minutes and 48 hours. The adults may only live hours to a few days (NatureServe 2017). Dispersal of mayflies is limited by the short lifespan of gravid females and drainage systems (NatureServe 2017).*

Mayflies are regularly used as an indicator in monitoring water quality and health of aquatic systems. They are a vital part of the food web, making resources in algae and aquatic plants available to higher consumers (Purdue University Department of Entomology 1995.).

*Restricted distribution and possibly low numbers are cited as reasons for concern for this species (McCafferty 2006), however, this suggestion may be somewhat dubious as population trend and distribution for this mayfly are generally unknown and surveys have not been conducted. Generally, mayflies in some areas of North America may be at risk due to existing or impending habitat degradation. Four North American mayflies (*Ephemera compar*, *Isonychia diversa*, *Pentagenia robusta*, *Siphonurus luridipennis*) have been considered extinct in recent years. (Purdue University Department of Entomology 1995.). While no specific threats are known for *Fallecon eatoni*, the aquatic and riparian habitats within the Lower and Upper Salt River zone are considered highly departed. Non-native, invasive species are widespread and common, and watershed flows and channels have been dramatically altered over time. These desert riparian ecosystems are considered at high risk in the future due to projected drought conditions and increasing water demand from the adjacent metropolitan area. Heavy recreation along some parts of the Salt River may also have an impact on rare aquatic species.*

Due to the possibility of small populations, overall risks to aquatic and riparian systems, and a NatureServe ranking of G1G2, we have included this mayfly in our list of potential SCC.

Ancha Mountainsnail

Contrary to the Objection Review, this species was not removed from further analysis in the Assessment report. This talussnail was included due to better AZGFD information on occurrence, and the G1 ranking which requires the forest to consider threats caused by stressors on and off the plan area. Also, during the Tonto Plan development, the AZGFD SGCN value changed from Tier 3 to Tier 2 (greater need for conservation). Additional information about Ancha mountain snail as a potential SCC was provided in the supporting documentation to the Regional Forester to recommend concurrence and is included below.

*This mountain snail is only known from a single collection by Walton and Gregg on Oct. 10, 1949 about three miles north of Reynolds Creek, Sierra Ancha, Gila County, Arizona at an altitude of about 7,200 ft (Gregg 1953). The specimens were found in limestone rockslides on the northeast slopes and appear to be sympatric with *Sonorella anchana* and *Sonorella strongiana* which were also found in the same area.*

*No species-specific information is available regarding the ecological conditions needed for *O. anchana*; however, other members or *Oreohelix* also appear to prefer limestone outcrops in damper areas of a forest. They will often occur near water, but not in it as too much moisture may lead to fatal fungal infection (Arizona Game and Fish Department 2003c). These snail generally estivate most of the year, only becoming active between March-April and October-November. They are generally found closer to the surface than *Sonorella* species, and are thought to have higher heat and drought tolerance (Arizona Game and Fish Department 2003c).*

*Other *Oreohelix* in Arizona are known to feed on fungi and rotting plants, and are associated with species that include *Rhus* sp. (sumac), *Salix* sp. (willow), *Cercocarpus* sp. (mountain mahogany), gossypol, *Rosa* sp. (rose), and various forbs (Arizona Game and Fish Department 2003c).*

*The known locality for this species suggests that it would be associated with Ponderosa Pine-Evergreen Oak and Mixed Conifer ERUs on the forest. These systems are moderately to highly departed at present, largely due to the increased potential for high-intensity fire. Such fire may pose a threat to snails by altering moisture regimes and needed vegetation. It has also been suggested that grazing may pose a challenge for some *Oreohelix* as they cannot move across heavily grazed areas (Arizona Game and Fish Department 2003c). The restricted distribution of *O. anchana* increases risk of population reduction or extinction due to chance events.*

Fringed myotis

This bat was not part of the 2017 Assessment. Bats were added in part due to public comment and confirmation with the Arizona Game and Fish Department. During the Tonto Plan development, the AZGFD SGCN value changed from unassigned in 2012 to Tier 2 (greater need for conservation). Additional information about fringed myotis as a potential SCC was provided in the supporting documentation to the Regional Forester to recommend concurrence and is included below.

Fringed myotis occur in middle elevations, in deserts, grasslands, and woodlands. They use a wide range of roosting habitats, including rock crevices, caves, mines, large snags, under exfoliating bark, and buildings (Arizona Game and Fish Department 2011). These bats feed primarily on arthropods (especially moths, beetles, and spiders) capture in air but also gleaned from plants (NatureServe 2020). While relatively little is known regarding migration, fringed myotis move to lower elevations in winter and may even be periodically active in cool

temperatures (Arizona Game and Fish Department 2011).

Population modeling has suggested that fringed myotis maybe particularly susceptible to climate change effects in the southwestern U.S. (Arizona and New Mexico) as the region is projected to become drier and surface water more scarce (Hayes and Adams 2017). Human disturbance of roost sites is also considered a threat to the species, especially at maternity colonies. Disturbance could include recreational caving, mine exploration, abandoned mine closure, vandalism, timber harvest (loss of snags and roost sites), and destruction of buildings and bridges used for roosting (NatureServe 2020).

This bat species is known to be affected by white-nose syndrome, and the fungus that causes the disease may have been detected on bats found in Arizona at Grand Canyon National Park ([NPS New Release: Bat Fungus Potentially Detected at Grand Canyon](#)). While population level effects are as yet unknown, more information on abundance and trend is needed.

While we have relatively little data on the local issues affecting fringed myotis, recent concerns expressed by local experts suggest the above concerns for this bat species are likely substantial (personal communication, Angie McIntire, Arizona Game and Fish Department Bat Biologist; and Aaron Sidder, Bat Conservation International). As such we are recommending fringed myotis as a potential SCC and have incorporated plan components to address needed ecological conditions in the revised forest plan.

Pale Townsend's big-eared bat

This species was added to the 3rd iteration of the SCC in part due to public comment and confirmation with the Arizona Game and Fish Department of the species importance. During the Tonto Plan development, the AZGFD SGCN value changed from Tier 3 in 2012 to Tier 1 (greatest need for conservation). Additional information about Pale Townsend's big-eared bat as a potential SCC was provided in the supporting documentation to the Regional Forester to recommend concurrence and is included below. *All Arizona populations of Townsends big-eared bats are considered from the subspecies C. t. pallescens, one of two species in the genus Corynorhinus found in North America. This bat is a cave and abandoned mine obligate (Arizona Game and Fish Department 2003b) and is one of the mostly commonly encountered species in surveys of abandoned mines in Arizona, though rarely in large numbers (personal communication, Aaron Sidder, Bat Conservation International).*

Roosting habitat in summer includes caves, mines, and occasionally old buildings found in desert scrublands to woodlands and coniferous forests. Winter hibernacula occurs in cold caves, lava tubes, and mines primarily in uplands and mountains (Arizona Game and Fish Department 2003b). Unlike a number of bats, this species prefers to hang from open ceilings at roost sites, generally avoiding the use of cracks and crevices (Arizona Game and Fish Department 2003b).

It is thought that populations of C. t. pallescens are declining in the western part of its range as substantial declines have been documents in several western states (Gruver and D.A. 2006; NatureServe 2020). Threats to the species focus on disturbance and/or destruction of roost sites. Such disturbance may come from recreational caving, mine reclamation or closures, renewed mining activity, removal/exclusion from buildings, or vandalism (Arizona Game and Fish Department 2003b; Diamond and Diamond 2014; NatureServe 2020; O'Shea and Vaughan 1999).

While white-nose syndrome has not yet been detected in C. t. pallescens, the cool season hibernacula used by the species in winter may be compatible with conditions needed for the

growth of the cold-loving Pseudogymnoascus destructans, the fungus that causes the white-nose syndrome (personal communication, Aaron Sidder, Bat Conservation International).

While it is difficult to assess the status of C. t. pallescens populations on the Tonto National Forest based on existing data, local species experts have voiced specific concerns that are supported by the literature available (personal communication, Angie McIntire, Arizona Game and Fish Department Bat Biologist; and Aaron Sidder, Bat Conservation International). The human population in Arizona has increased dramatically in recent years as have impacts from forest visitors. Mining, which has long and active history on the forest, as well as closures of abandoned mines closures are likely to be a continued issue for Townsend's big-eared bats. As such, we recommend C. t. pallescens as a potential SCC and have sought to include plan components that address corresponding ecological conditions.

Richinbar talussnail

Neither this species nor the Roosevelt talussnail were on the preliminary candidate 2017 SCC list. This talussnail was added to the 2nd iteration of the SCC list (2019) in part due to public comment and confirmation with the Arizona Game and Fish Department of the species importance and considering it was now ranked as a G2 species. A detailed description of the species and conservation need was provided in the 2020 report "Recommended Species of Conservation Concern for the Tonto National Forest". During the Tonto Plan development, the AZGFD SGCN value changed from Tier 3 in 2012 to Tier 2 (great need for conservation). Additional information about Ancha mountain snail as a potential SCC was provided in the supporting documentation to the Regional Forester to recommend concurrence and is included below.

(See combined write-up under Roosevelt talussnail)

Roosevelt talussnail

This talussnail was added to the 2nd iteration of the SCC list (2019) in part due to public comment and confirmation with the Arizona Game and Fish Department of the species importance and considering it was now ranked as a G2 species. During the Tonto Plan development, the AZGFD SGCN value changed from unknown in 2012 to Tier 2 (great need for conservation).

Like most species of southwest talussnails, the status of both the Richinbar and Roosevelt talussnails are largely unknown. Sonorella are rarely encountered, usually occupying interstitial crevices in loose, rocky debris slope habitats, emerging during or after precipitation events. Little is known about the life histories of individual species, with the exception of some short-term observations of captive specimens (Sorensen et al. 2018). The Richinbar talussnail is listed as a tier 1C (unknown status) in the Arizona State Wildlife Action Plan (Arizona Game and Fish Department 2012), while the Roosevelt talussnail was omitted, but likely because it was previously listed under a generic genus. Under the plan criteria it would likely also be included as tier 1C—unknown status (Sorensen et al. 2018). However, both snail's NatureServe global ranking of G2 mandates consideration as we do not have sufficient data to suggest that they are secure on the forest.

Potential conservation concerns are generic to all land snail populations in the planning area, and may include: wildfires and prescribed burns, road and trail construction, and mining. Sonorella species are vulnerable to any disturbance that would remove talus or rocky habitat and increase interstitial sedimentation, and (for forest-dwelling species) any activities that open forest canopy, alter stream hydrogeomorphology, or otherwise change local moisture conditions may impact those populations (USDA Forest Service 1999). There is still uncertainty on what impacts climate change and prolonged drought in the American Southwest will have on native land snail

populations (Sorensen et al. 2018).

References:

- Arizona Game and Fish Department. 2003b. *Corynorhinus townsendii pallescens*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 6 pp.
- Arizona Game and Fish Department. 2003c. *Oreohelix yavapai cummingsi*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 1-4 pp.
- Arizona Game and Fish Department. 2008b. *Sonorella micromphala*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 1-4 pp.
- Arizona Game and Fish Department. 2011. *Myotis thysanodes*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 6 pp.
- Arizona Game and Fish Department. 2012. Arizona's State Wildlife Action Plan: 2012-2022. Arizona Game and Fish Department, Phoenix, Arizona.
- Berry, S.S. 1948. Snails of the Sierra Ancha, Arizona. *The American Midland Naturalist*. 39(1): 151-159. DOI: 10.2307/2421436.
- Diamond, G.F.; Diamond, J.M. 2014. Bats and Mines: Evaluating Townsend's Big-eared Bat (*Corynorhinus townsendii*) Maternity Colony Behavioral Response to Gating. *Western North American Naturalist*. 74(4): 416-426. DOI: 10.3398/064.074.0407.
- Gregg, W.O. 1953. Two new land snails from Arizona. *Bulletin So. Calif. Academy of Sciences*.
- Gruver, J.C.; D.A., K. 2006. Townsend's Big-eared Bat (*Corynorhinus townsendii*): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/townsendbigerearedbat.pdf> [date of access].
- Hayes, M.A.; Adams, R.A. 2017. Simulated bat populations erode when exposed to climate change projections for western North America. *Plos One*. 12(7) DOI: 10.1371/journal.pone.0180693.
- McCafferty, W.P. 2006. Rediscovery of *Fallceon eatoni* (Kimmins) (Ephemeroptera : Baetidae) - Note. *Proceedings of the Entomological Society of Washington*. 108(1): 248-248.
- Meyer, M.D.; McCafferty, W.P. 2008. Mayflies (Ephemeroptera) of the Far Western United States. Part 3: California. *Transactions of the American Entomological Society*. 134(3-4): 337-430. DOI: 10.3157/0002-8320-134.3.337.
- NatureServe. 2017. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://explorer.natureserve.org>. (Accessed: July 11, 2017).
- NatureServe. 2020. NatureServe Explorer [web application]. NatureServe, Arlington, Virginia. Available <https://explorer.natureserve.org/>. (Accessed: November 2020).

- O'Shea, T.J.; Vaughan, T.A. 1999. Population changes in bats from central Arizona: 1972 and 1997. *Southwestern Naturalist*. 44(4): 495-500. DOI: 10.2307/3672349.
- Purdue University Department of Entomology. 1995. (W.P. McCafferty ed.) Last updated 9 July 2002. *Mayfly Central- The Mayflies of North America*. Online. Available: <http://www.entm.purdue.edu/entomology/research/mayfly/Contents.html>.
- Sorensen, J.A.; B.A. Williams; Scobie., E. 2018. *Tonto National Forest Sensitive Invertebrates Guide. Nongame and Endangered Wildlife Program Technical Report 318*. Arizona Game and Fish Department, Phoenix, Arizona.
- Stevens, L.E.; Ledbetter, J.D. 2014. *A Guidebook to the Rare Invertebrates of the Coconino National Forest, Northern Arizona*. Flagstaff: Museum of Northern Arizona.
- USDA Forest Service. 1999. *Conservation Assessment and Strategy – Wet Canyon talussnail Sonorella macrophallus (Gastropoda: Pulmonata: Helminthoglyptidae) Pinaleño Mountains, Graham County, Arizona*. Coronado National Forest, Safford Ranger District. 31 pp.
- USDA Forest Service. 2017. *Final Assessment Report of Ecological Conditions, Trends, and Risks to Sustainability Volume I : Chapter 7 At-Risk Species: Identifying and Assessing At-risk Species in the Plan Area*. Tonto National Forest. Phoenix AZ. 108 pages. March 2017
- USDA Forest Service. 2020. *Recommended Species of Conservation Concern for the Tonto National Forest*. Tonto National Forest. Phoenix AZ. 41 pages. November 2020.
- Olson, Jay. 2022. Personal communication email. Former Tonto National Forest Wildlife Biologist communication with Michelle Dela Cruz December 2022 regarding SCC species list creation & modification since 2017.