

Euphydryas anicia chuskae (Chuskae Anicia Checkerspot)



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Taxonomy

- **Class:** INSECTA
- **Order:** LEPIDOPTERA
- **Family:** NYMPHALIDAE
- **Genus:** Euphydryas
- **Scientific Name:** *Euphydryas anicia chuskae* (Ferris and R. Holland, 1980)
- **Common Name:** Chuskae Anicia Checkerspot
- **Synonyms:** *Occidryas anicia* ssp. *chuskae* Ferris and R. Holland, 1980
- **Taxonomic Name Source:** Ferris, C. D. and R. W. Holland. 1980. Two new subspecies of *Occidryas anicia* (Doubleday) from New Mexico. *Bulletin of the Allyn Museum*. 57:1-9.

Agency Status

- **NMDGF:**
- **Federal Status:**
- **BLM Sensitive:**
- **USFS:**
- **IUCN Red List:** [Not Evaluated](#)
- **Nature Serve Global:** [I2](#)
- **NHNM State:** S1
- **NM Endemic:** NO

Description

Anicia Checkerspot is checkered all over with bands of red, white and black spots. Many different geographic races have been described based on local variations. Subspecies *Euphydryas anicia chuskae* (Ferris and R. Holland 1980) has a yellowish cast underneath and flies in the Chuska Mountains (counties: SJ, MK) from June 22 to August 15. It flies at higher sites than *Euphydryas anicia hermosa*, with which it is generally sympatric in the Chuska Mountains.

Description courtesy of Steven J. Cary, [Butterflies of New Mexico](#), 2024

Habitat and Ecology

This taxa is found at high altitudes between 7300 feet and 9000 feet (2225 to 2745 meters) in elevation in the Chuska mountains although usually it is found above 7500 feet (2286 meters) (Ferris and Holland 1980, Holland 1984, Cary and Toliver 2024). This species is found in high elevation alpine meadows and tundra as well as occurring along the edges

of and in Gambel Oak-Ponderosa Pine woodlands (Ferris and Holland 1980, BLM 2003). A 2008 report by the Bureau of Reclamation states that this species inhabits moist areas along streams and marshes (Bureau of Reclamation 2008). This species has one flight in the original description; this flight is described as being very short and peaking in the last week of June with extreme flight dates ranging from June 22nd to July 8th (Ferris and Holland 1980). However, butterflies of New Mexico reports a record as late as August 15th extending the extreme flight dates for this species by more than a month (Cary and Toliver 2024). During flight this species is very attracted to Orange Sneezeweed (*Helenium hoopesii*) and can frequently be seen nectaring on it in mass (Ferris and Holland 1980). Much of the life history for this species is unknown and more research is needed however, the larval host plant for this species while unknown is presumed to be Rocky Mountain Penstemon (*Penstemon strictus*) (Ferris and Holland 1980).

Geographic Range:

The Chuska Anicia Checkerspot is endemic to the Chuska Mountains in northwestern New Mexico and northeastern Arizona (Ferris and Holland 1980, Cary and Toliver 2024). The Chuska Mountains lie entirely within the Navajo Nation Reservation (Holland 1984). Nearby areas, such as Defiance Plateau, Beautiful Mountain, and Buffalo Gap and the areas northwest of Buffalo Gap, have been searched for this subspecies but none have been found (Ferris and Holland 1980). This taxa lives in just three counties, those being San Juan, and McKinley in New Mexico and Apache in Arizona (BLM 2003, Cary and Toliver 2024). Another *Euphydryas anicia* subspecies, *Euphydryas anicia hermosa* also occurs in the Chuska Mountains. However, it is thought that *E. a. chuskae* flies at higher elevations, which separates the two subspecies (Cary and Toliver 2024).

Conservation Considerations:

This taxa underwent a NatureServe conservation assessment in 1998 and came out as being critically imperiled in Arizona, and globally imperiled with extinction (NatureServe 2024). This taxa is also listed as a species of concern in McKinley county New Mexico by the United States Fish and Wildlife Service (BLM 2003, USFWS 2024). This taxa is also a Bureau of Land Management sensitive species (BLM 2003). However, despite all the concern no specific management is currently being done for this taxa. Especially seeing the recent endangered species status of *E.a. chuskae*'s closest relative *E.a. cloudcrofti* steps should be taken to try to determine the size and health of this taxa before it ends up in a similar position to *E.a. cloudcrofti*. Additional research is also needed on the life history and habitat of this subspecies to try to ensure long term survival of the taxa. Additional, effort should be taken to try to conserve the reservoir populations for this taxa as if those go extinct the taxa will soon follow it as losing these populations can result in a domino effect with other populations who relied on the reservoir quickly going extinct (Ehrlich and Murphy 1987). In order to save this taxa from extinction protection of this taxas habitat is likely needed as well as a return to a healthy fire regime if this taxa is going to be vulnerable for a long time to come.

Threats:

The threats for this species have not been adequately researched and more work is needed on this front. However, climate change is almost certainly the major threat to this subspecies *E.a chuskae*'s closest relative *E.a. cloudcrofti* has recently been driven to near extinction a concerning situation as it shares an almost identical habitat to this subspecies in the Sacramento mountains and has a very similar known life history. *E.a. cloudcrofti* has recently been designated as a federal endangered subspecies due to the sharp declines its experiencing (Ferris and Holland 1980, USFWS 2023). The threats that have driven *E.a. cloudcrofti* are also present with *E.a. chuskae* and almost certainly having a similar effect. Firstly, climate change is driving these narrow mountain endemics and their host plants to higher elevations and at some point as this continues they will eventually have nowhere else to go (Gottfried *et al.* 2012, USFWS 2023). Having hundreds of miles of inhospitable desert separating these taxa from the next further north sky islands makes them unable to move themselves further north to escape the effects of this climate warming

(USFWS 2023). Additionally, major droughts in the southwestern United States have killed off host plants, decreased nectar quality, and available moisture that these species need to survive (Forister *et al.* 2010, Phillips *et al.* 2018). These droughts are expected to continue to get worse in the American southwest and as such pose a major threat to this taxon's long term survival (Cook *et al.* 2009, Forister *et al.* 2010, Cook *et al.* 2015, Williams *et al.* 2022, Forister *et al.* 2023). This is especially true as there is some evidence that areas of high moisture such as streams or marshes are extremely important to this subspecies (Bureau of Reclamation 2008). This taxon is also threatened by fire suppression which can erase the meadow habitats that this taxon relies on (USFWS 2004). Extreme temperatures from climate change and the fact that this taxon only has a single known host plant also put this taxon at significant risk for phenological mismatch which has been documented as driving other checkerspot species metapopulations to extinction (Singer and Parmesan 2010, Patterson *et al.* 2019). This taxon also only has a single brood a year which makes this taxon much less adaptable to threats and puts it at increased risk of extinction (Forister *et al.* 2023).

Additionally, another major issue that has had a drastic effect on *E.a. cloudcrofti* is grazing from horses (USFWS 2023). In the Chuskas free ranging sheep and goats have devastated much of the local vegetation in the area and this taxon's host penstemon is likely seeing declines similar to those in the Sacramento mountains due to grazing (USFWS 2023). Holland (1984) also reports ongoing poorly regulated lumber operations in the subspecies habitat which occur over wide areas and use minimal erosion control measures or understory protection (Holland 1984). This could severely impact the quality of habitat available for this taxon and this taxon already exists in such a small range that any loss of habitat especially with climate change driving it to higher elevations could be extremely detrimental. Due to the threat from climate change and drought this species is thought to be experiencing slow continuous declines driving the taxon to extinction however, one very severe drought, fire, or extreme weather event could likely drive this taxon to extinction as a result one location has been determined for this taxon. This is especially likely as *Euphydryx anicia* and its subspecies also exist in a metapopulation dynamic where patches regularly go extinct and rely on recolonization from sub-populations in neighboring patches (USFWS 2004). This metapopulation dynamic makes checkerspots extremely difficult to conserve and puts them at a significantly increased risk of extinction (Ehrlich and Murphy, 1987, Saccheri *et al.* 1998). This balance between extinction and recolonization is key in a metapopulation however, with climate change and fire suppression this balance is getting much more difficult to maintain and when populations go extinct like usual they are no longer being recolonized leading to declines in these species (USFWS 2004). This makes the taxon especially vulnerable as it is likely relying on very few reservoir populations to try to recolonize these patches and if fires, fire suppression, or drought eliminates these reservoir populations then the surrounding populations are not viable on their own. Extinction of these subpopulations or threats such as climate change and fire suppression which reduce habitat for this taxon can also isolate parts of the metapopulation in which case they quickly fall into cycles of inbreeding depression drastically increasing their chances of extinction (Saccheri *et al.* 1998, Nieminen *et al.* 2001).

Population:

The population size and trend are not known for this species. Determination of the population size of this taxon and monitoring of population trends is necessary to ensure the population is stable. Especially as there is evidence of decline with this taxon and many other southwestern *E. anicia* subspecies. This taxon is also a resident to the American west where many widespread, relatively common species of butterfly are in decline (Forister *et al.* 2021).

References:

- [ITIS. 2021. Integrated Taxonomic Information System \(ITIS\). https://www.itis.gov/](https://www.itis.gov/)
- Ehrlich, P.R. and Murphy, D.D.. 1987. Conservation lessons from long-term studies of checkerspot butterflies. *Conservation Biology* 1: (122-131).
- [Cook, B.I., Ault, T.R. and Smerdon, J.E.. 2015. Unprecedented 21st century drought risk in the American Southwest and Central Plains.. *Science Advances* 1. https://doi.org/10.1126/sciadv.1400082](https://doi.org/10.1126/sciadv.1400082)
- [Bureau of Reclamation. 2008. Draft Environmental Assessment Captain Tom Dam Safety of Dams Rehabilitation Project . *Reclamation Managing Water in the West* , Phoenix AZ .](#)

- <https://corpora.tika.apache.org/base/docs/govdocs1/029/029774.pdf>
- Bureau of Land Management (BLM). 2003. Farmington Proposed Resource Management Plan and Final Environmental Impact Statement . U.S. Department of the Interior, Farmington New Mexico . https://eplanning.blm.gov/public_projects/lup/64524/20001905/250002264/FDO - FFO - 2003 - Farmington Proposed RMP Vol 1.pdf
 - Holland, R.. 1984. Butterflies of Two Northwest New Mexico Mountains . *Journal of the Lepidopterists' Society* 38: (220-234). [https://images.peabody.yale.edu/lepsoc/jls/1980s/1984/1984-38\(3\)220-Holland.pdf](https://images.peabody.yale.edu/lepsoc/jls/1980s/1984/1984-38(3)220-Holland.pdf)
 - Cary, S.J. and Toliver, M.E. . 2024. Butterflies of New Mexico.. Pajarito Environmental Education Center (PEEC). <https://peechnature.org/butterflies-of-new-mexico/>
 - sRedList. 2023. sRedList Platform - a tool to support Red List assessments (Version 1.1). LifeWatch ERIC. <https://doi.org/10.48372/DSKB-JE13>
 - Cook, E.R., Seager, R., Heim, R.R., Vose, R.S., Herweijer, C. and Woodhouse, C.. 2009. Megadroughts in North America: Placing IPCC projections of hydroclimatic change in a long-term paleoclimate context.. *Journal of Quaternary Science* 25: (48-61). <https://doi.org/10.1002/jqs.1303>
 - Nieminen, M., Singer, M.C., Fortelius, W., Schlops, K. and Hanski, I.. 2001. Confirmation that inbreeding depression increases extinction risk in butterfly populations. *The American Naturalist* 157: (237-244).
 - Saccheri, I., Kuussaari, M., Kankare, M., Vikman, P., Fortelius, W. and Hanski, I. . 1998. Inbreeding and extinction in a butterfly metapopulation. *Nature* 392: (491-494).
 - Forister, M.L., Halsch, C.A., Nice, C.C., Fordyce, J.A., Dilts, T.E., Oliver, J.C., Prudic, K.L., Shapiro, A.M., Wilson, J.K. and Glassberg, J. . 2021. Fewer butterflies seen by community scientists across the warming and drying landscapes of the American West. *Science* 371: (1042-1045).
 - Williams, A.P., Cook, B.I. and Smerdon, J.E. . 2022. Rapid intensification of the emerging southwestern North American megadrought in 2020–2021. *Nature Climate Change* 12: (232-234).
 - Singer, M.C. and Parmesan, C.. 2010. Phenological asynchrony between herbivorous insects and their hosts: signal of climate change or pre-existing adaptive strategy?. *Philosophical Transactions of the Royal Society B Biological Sciences* 365: (3161-3176).
 - Ferris, C.D. and Holland, R.W.. 1980. Two subspecies of *Occidryas anicia* (Doubleday) from New Mexico. *Bulletin of the Allyn Museum* 57: (45300).
 - U.S. Fish and Wildlife Service (USFWS), Otero County, The Village of Cloudcroft, and U.S. Forest Service. 2004. Conservation Plan for the Sacramento Mountains Checkerspot Butterfly (*Euphydryas anicia cloudcrofti*). Albuquerque, NM : (80).
 - Forister, M.L., McCall, A.C., Sanders, N.J., Fordyce, J.A., Thorne, J.H., O'Brien, J., Waetjen, D.P. and Shapiro, A.M.. 2010. Compounded effects of climate change and habitat alteration shift patterns of butterfly diversity. *Proceedings of the National Academy of Sciences* 107: (2088-2092).
 - Gottfried, M., Pauli, H., Futschik, A., et al. 2012. Continent-wide response of mountain vegetation to climate change. *Nature Climate Change* 2: (111-115).
 - U.S. Fish and Wildlife Service (USFWS) . 2023. Endangered and Threatened Wildlife and Plants; Endangered Species Status for Sacramento Mountains Checkerspot Butterfly. *Federal Register* 88: (6177-6191).

More Information

