

KANSAS DEPARTMENT OF WILDLIFE AND PARKS
Petition for Species Review (submission deadline: October 5, 2023)
Endangered/Threatened/Species-in-Need-of-Conservation Status

Kansas recognizes rare or declining species by state listing to categories of Endangered*, Threatened**, or Species-in-Need-of-Conservation (SINC)*** (K.A.R. 115-15-1 and 2). Every 5 years these lists are reviewed as required by statute (K.S.A. 32-960). A Threatened and Endangered Species Task Committee oversees the process and makes listing recommendations to the Secretary of Kansas Department of Wildlife and Parks (KDWP) based on best available science. Any changes to these lists must be approved by the KDWP Commission.

A review regarding a listing, delisting, uplisting or downlisting of Kansas wildlife regarding the above categories is initiated via a petitioning process. To submit a petition for review, please fully complete the requested information attached below. Petitioners are strongly encouraged to provide all substantive biological information with cited references to aid in the review. A completed petition is no guarantee that the listing request will occur. The scientific information in the petition determines whether or not the requested listing change will merit a full review.

At the request of the KDWP Secretary, the Threatened and Endangered Species Task Committee will evaluate all completed petitions and determine if there is sufficient information to justify a full review of the petitioned status change. If the species is accepted for further review, there will be public information meetings conducted in regard to the proposed listing change.

All petitioning documents pertaining to the species under full review will be made available to the public at the KDWP website (<https://ksoutdoors.com/Services/Threatened-and-Endangered-Wildlife/2018-Five-Year-Review>). If a listing change is recommended, a notice of the proposed action will be sent to federal and state agencies and local and tribal governments that may be affected by the petitioned species, and to all individuals and organizations that have requested notification. KDWP will issue news releases concerning the proposed species listing change. In addition, individual petitions and substantiating data will be distributed to and evaluated by: 1) academia, 2) wildlife agency personnel, 3) other professionals, 4) other resource agencies (state and federal) and 5) nonprofessionals who have known expertise/experience with the petitioned species. This entire process, from petition to final vote by the commission, has taken as long as 18 months.

Questions concerning the petitioning and review process should be directed to Jordan Hofmeier, Assistant Director of Ecological Services, KDWP, 512 SE 25th Ave, Pratt, KS 67124 (Jordan.Hofmeier@ks.gov).

Completed “Petition for Species Review” pdf forms should be sent to kdwpt.ess@ks.gov or paper copies to KDWP, Attn: Ecological Services, 512 SE 25th Ave., Pratt, KS 67124-8174.

* Endangered Species: any species of wildlife whose continued existence as a viable component of the state’s wild fauna is determined to be in jeopardy (KSA 32-958c).

**Threatened Species: any species of wildlife which appears likely, within the foreseeable future, to become an endangered species (KSA 32-958f).

***Species-in-Need-of-Conservation: (SINC) any species which are highly specialized, whose habitat is very limited in Kansas, or shows a population decline that warrants data collection concerning its status in Kansas. Conservation efforts focused on this species can prevent future listing as threatened or endangered. This listing is not defined in the Kansas Statutes.

Species Common Name: Broad-headed Skink

Species Scientific Name: *Plestiodon laticeps*

Currently listed as:

Endangered Threatened Species-In-Need-of-Conservation (SINC) not listed

Petitioned to:

Endangered Threatened SINC not listed

Note to petitioner: Feel free to expand the blanks below to add sufficient information. When completed, please convert Word document to a pdf prior to submitting.

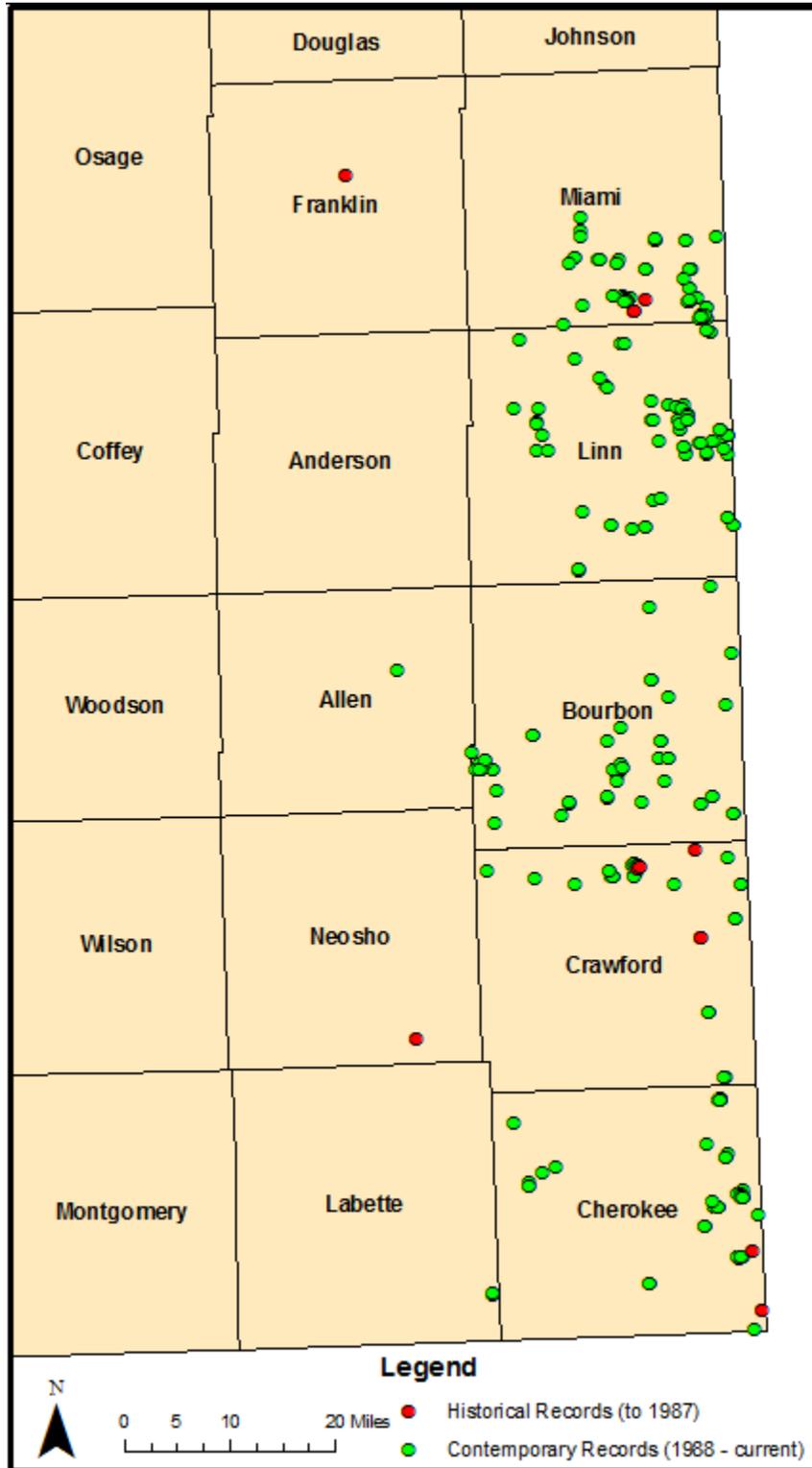
1) List the survey/research information that has occurred since the last 5-year review (2018) that has prompted your petition to change the listing category of this species.

Surveys completed by KDWP from 2015-2018 focused on the conservation status, range, and habitat use of the Broad-headed Skink. Prior to 2015, there were 55 records from 31 unique localities documented in Kansas. From 2015-2019, KDWP documented 374 occurrences. Additionally, Scientific Collection Permit reports from 2015-2022 documented 13 records, Kansas Herpetofaunal Atlas (KHA) documented 13 records, and the Global Biodiversity Information Facility (GBIF) reported 6 individuals through iNaturalist Research Grade observations from 2022-2023, totaling 406 records from 2015 to current. The information provided by KDWP surveys and records from additional sources have characterized the species habitat and provided a better understanding of the species distribution.

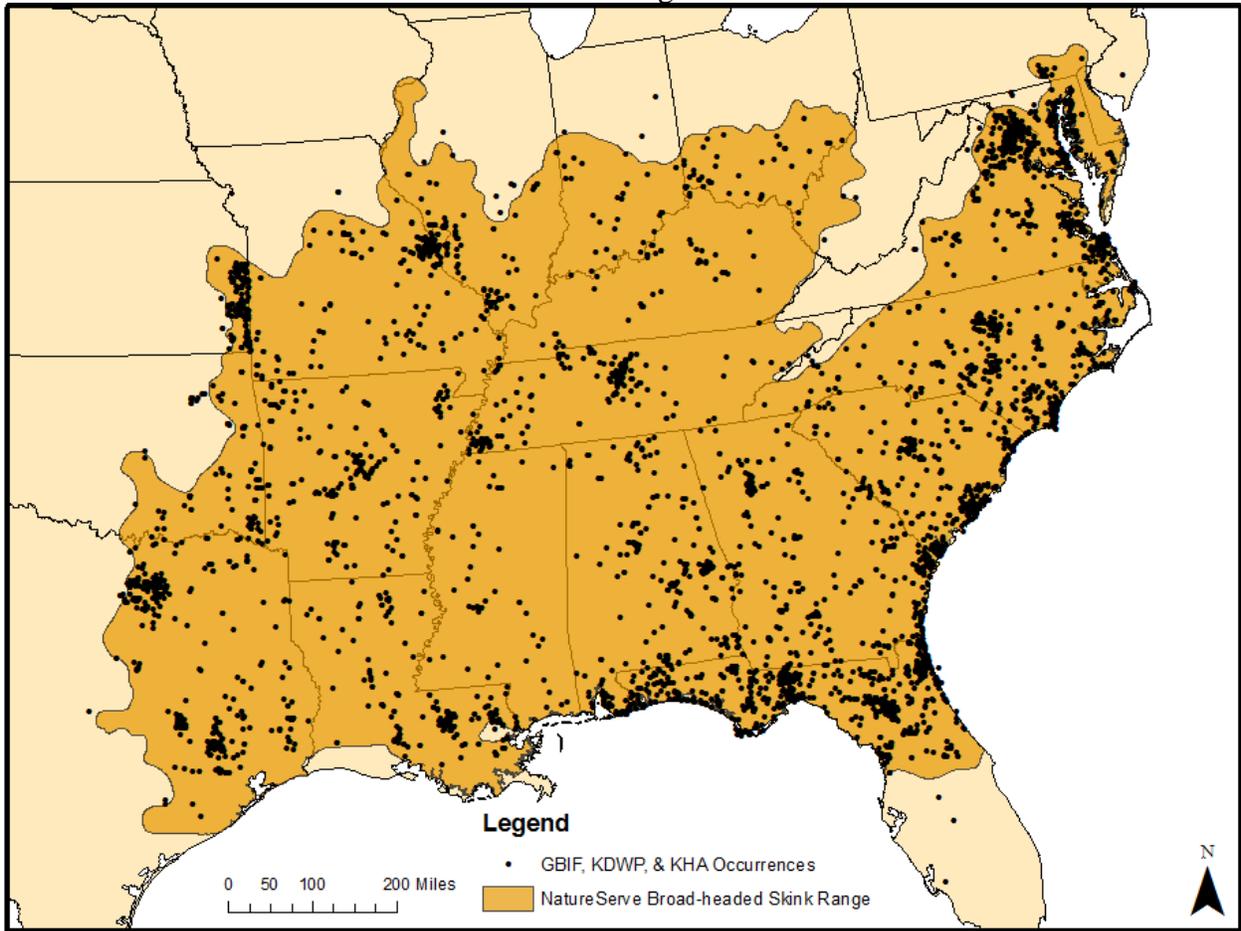
Additionally, it was previously thought that oak-hickory woodlands were the preferred habitat of the Broad-headed Skink. KDWP efforts provided support that woodland structure, not composition, may be more important. Using landcover datasets, Broad-headed Skinks captured during KDWP surveys were documented in oak-hickory complexes as well as others not typically thought of as suitable habitat for the species.

2) a. Provide a map of the species' current distribution in Kansas and range wide.

Kansas Broad-headed Skink Records



Broad-headed Skink Range and Occurrences



b. Is the Kansas population considered connected with the population in an adjoining state?
Yes No Don't know

c. If no, what is the distance to the nearest out-of-state population? _____

d. Is the Kansas population genetically distinct from the core population in other states?
Yes No Don't know

Cite references:

GBIF.org. Accessed 5 July 2023 GBIF Occurrence Download <https://doi.org/10.15468/dl.t7jvph>.

KDWP. 2023. 2013-2022 Collection Permit Database. KDWP Ecological Services Division.
Pratt, KS.

NatureServe and IUCN 2007. *Plestiodon laticeps*. The IUCN Red List of Threatened Species.
Version 2022-2.

Taggart, T.W. 2023. Kansas Herpetofaunal Atlas.

<http://webapps.fhsu.edu/ksherp/account.aspx?o=32&t=56>.

3) How and to what magnitude has the species' distribution changed within Kansas during the past 35 years?

It is unclear if records collected in the last 35 years (contemporary records) have documented an increase in the Broad-headed Skinks range in Kansas or are a result of expanded survey effort. Only 15 historical records, prior to 1988, were documented in the state. Recent efforts to better understand the species range in Kansas likely documented the Broad-headed Skink in areas it historically occupied, but the range was poorly understood because of a lack of concerted effort (Kansas Broad-headed Skink Records map). One specimen was documented in Franklin County in 1911 and one in Neosho County at Neosho State Fishing Lake in 1978. Recent efforts in those counties were not able to document the species. In the last 35 years, county records for the Broad-headed Skink were documented in Bourbon (2005), Labette (2018), and Allen (2023) counties. Labette and Allen counties are only represented by one individual in each and likely represent the western extent of the species range in the state.

Records existing on federally or state managed properties prior to 1988 include Crawford State Park, Miami State Fishing Lake, and Neosho State Fishing Lake. Contemporary records (1988 to current) on federal and state managed properties include Bourbon State Fishing Lake, Buche Wildlife Area, Crawford State Park, Harmon Wildlife Area, Hollister Wildlife Area, La Cygne Wildlife Area, Marias des Cygnes National Wildlife Refuge, Marias des Cygnes Wildlife Area, Miami State Fishing Lake, Middle Creek State Fishing Lake, Mined Lands Wildlife Area West Mineral Units, and Spring River Wildlife Area.

Globally?

No studies documenting an increase or decrease in the species range were found. The Delaware Department of Natural Resources and Environmental Control's State Wildlife Action Plan list the species as possibly extirpated.

Cite references:

Delaware Department of Natural Resources and Environmental Control. 2015. 2015-2025 Delaware Wildlife Action Plan. Dover, Delaware, USA.

GBIF.org. Accessed 5 July 2023 GBIF Occurrence Download <https://doi.org/10.15468/dl.t7jvph>
Hullinger, A., Cordes, Z., Riedle, J.D., and Stark, W. 2020. Habitat Assessment of the Broad-headed Skink (*Plestiodon laticeps*) and the Associated Squamate Community in Eastern Kansas. Transactions of the Kansas Academy of Science. 123:137-150.

KDWP. 2018. Skink Survey Database. KDWP Ecological Services Division. Pratt, KS.

KDWP. 2023. 2013-2022 Collection Permit Database. KDWP Ecological Services Division. Pratt, KS.

Taggart, T.W. 2023. Kansas Herpetofaunal Atlas.

<http://webapps.fhsu.edu/ksherp/account.aspx?o=32&t=56>

4) Describe the species' population (not distribution) trend within Kansas during the past 35 years.

The population ecology of the Broad-headed Skink in Kansas is unknown. Surveys by KDWP completed in 2016 and 2017 used drift fences and visual encounter surveys at 258 sites in grasslands, young woodlands, and mature forests on state and federally owned properties in eastern Kansas. Each site was surveyed for three nights using drift fences and one visual encounter survey within a 30-meter radius of the center of the drift fence. Eighty-seven Broad-

headed Skinks were detected at 61 of the 258 sites (naïve occupancy = 0.24). When grassland sites as well as sites from Neosho State Fishing Lake and Neosho Wildlife Area are removed because of a lack of detections, this equates to 61 detections at 193 sites (naïve occupancy = 0.32). During these surveys, Broad-headed Skinks were the most documented reptile. Additionally, 67 individuals were recorded outside of the survey sites.

During the 2018 KDWP Broad-headed Skink survey, 162 woodland sites on private, state, and federal lands were surveyed using visual encounters. Each site measured 50x50 meters (1/4 hectare) and was surveyed four times. Broad-headed Skinks were the most documented reptile, recording 136 individuals. The species was detected at 56 of the 162 sites (naïve occupancy = 0.35). Occupancy analysis estimated occupancy probability at 0.48. Fifty-seven additional individuals were recorded outside of the survey sites.

The table below displays recent Broad-headed Skink records on federal and state managed properties within their probable range. Years where KDWP survey crews targeted Broad-headed Skinks on the property are high-lighted. KDWP employees were able to document the species consistently with targeted efforts. Consecutive documentations on those properties occurred when surveys were repeated. Only Neosho State Fishing Lake and Neosho Wildlife Area had repeat non-detections. Five total surveys were completed between Biller Wildlife Area (1), Chestnut (2), and Mined Lands Wildlife Area Pittsburg Units (2) where the Broad-headed Skink was not found. Unhighlighted records from 2019 to 2023 were provided by Scientific Collection Reports, KHA, or reported by GBIF through iNaturalist Research Grade documentations.

Recent Broad-headed Skink Records on State and Federal Lands											
Protected Area	Year First Detected	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
Biller WA											
Bourbon County SFL	2012			9	2						11
Buche WA	2018				8	5	9	1			23
Chestnut WA											
Crawford SP	1960	2	1	15	1	3					22
Harmon WA	2018				2						2
Hollister WA	2005		1	11	1					1	14
La Cygne WA	1994	2	19	6	3						30
Marais des Cygnes NWR	1994	4	9	4	1						18
Marais des Cygnes WA	2003		17	23	6	6					52
Miami SFL	1951		5	13	1	3					22
Middle Creek WA	2018				2						2
Mined Lands WA WMU	2017			5					1		6
Mined Lands WA PU											
Neosho SFL	1978										
Neosho WA											
Spring River WA	2015	1		7	2	6	5				21
Total		9	52	93	29	23	14	1	1	1	223

2015 was the pilot year for the project. This likely explains the low capture numbers and lack of Broad-headed Skinks at Hollister Wildlife Area, Marias des Cygnes National Wildlife Refuge and Miami State Fishing Lake. In 2016, surveys were focused on La Cygne Wildlife Area, Marias des Cygnes National Wildlife Refuge, and Marias des Cygnes Wildlife Area. Other locations where Broad-headed Skinks were found were opportunistic surveys. The surveys in 2017 were fairly even in effort. These details are provided in Hullinger et al. (2020). During 2018, much of the effort was on private land and most of the protected areas were opportunistically surveyed or surveyed at one or two sites, explaining the low numbers. KDWP surveys in 2019 were brief visual encounter surveys.

Globally?

No population studies were found related to the Broad-headed Skink. NatureServe's Long-term trend for the species is a decline less than 30% to an increase of 25% and the Short-term Trend is Relatively Stable, less than 10% change. Delaware, Ohio, Pennsylvania, and West Virginia list the Broad-headed Skink as a Species of Greatest Conservation Need (SGCN) within their 2015 State Wildlife Action Plans.

Delaware –SGCN. Possibly extirpated.

Ohio – SGCN. The SWAP list the Broad-headed Skink as an uncommon periphery species whose population is declining.

Pennsylvania – SGCN with a state candidate status. Estimates the short-term population trend is relatively stable, less than or equal to 10% change.

West Virginia – SGCN. No comments on the species current population trend.

Cite references:

Delaware Department of Natural Resources and Environmental Control. 2015. 2015-2025

Delaware Wildlife Action Plan. Dover, Delaware, USA.

GBIF.org. Accessed 5 July 2023 GBIF Occurrence Download <https://doi.org/10.15468/dl.t7jvph>

Hullinger, A., Cordes, Z., Riedle, J.D., and Stark, W. 2020. Habitat Assessment of the Broad-headed Skink (*Plestiodon laticeps*) and the Associated Squamate Community in Eastern Kansas. Transactions of the Kansas Academy of Science. 123:137-150.

KDWP. 2018. Skink Survey Database. KDWP Ecological Services Division. Pratt, KS.

KDWP. 2023. 2013-2022 Collection Permit Database. KDWP Ecological Services Division. Pratt, KS.

NatureServe and IUCN 2007. *Plestiodon laticeps*. The IUCN Red List of Threatened Species. Version 2022-2.

Ohio Division of Wildlife. 2015. Ohio's State Wildlife Action Plan. Columbus, Ohio, USA.

PGC-PFBC (Pennsylvania Game Commission and Pennsylvania Fish & Boat Commission). 2015. Pennsylvania Wildlife Action Plan, 2015-2025. C. Haffner and D. Day, editors. Pennsylvania Game Commission and Pennsylvania Fish & Boat Commission, Harrisburg, Pennsylvania.

Taggart, T.W. 2023. Kansas Herpetofaunal Atlas.

<http://webapps.fhsu.edu/ksherp/account.aspx?o=32&t=56>.

West Virginia Division of Natural Resources. 2015. 2015 West Virginia State Wildlife Action Plan. South Charleston, West Virginia.

5) a. What is the Global Rank of this species from NatureServe? (<http://natureserve.org/>)
 G5 – Secure
https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.100658/Plestiodon_laticeps

b. What is species status and trend on ICUN Red List? (<http://www.iucnredlist.org/>)
 Least Concern
<https://www.iucnredlist.org/species/64231/12756745>

c. What proportion of the species’ global population is currently found within Kansas?
 Proportion of the population is unknown but based on the Conant and Collins 1998 map used by NatureServe and IUCN (orange shading in Broad-headed Skink Range and Occurrences map), the Kansas Broad-headed Skink range represents 0.6% of the species range.

6) What is the species’ current residency status within Kansas (vagrant, migrant, wintering, or year-round)?
 Year-round

7) Describe the species’ current breeding status within Kansas.
 Broad-headed Skinks reach reproductive maturity at age-2. Only four nests have been documented in the state with clutch size ranging from 8 to 19. Two nests were communal. These observations occurred from early to mid-July. Kansas nests have been documented under railroad ties and under the bark of decaying logs, but Broad-headed Skinks are known to use stumps, rotting lumber, and tree cavities elsewhere in their range. In Kansas, hatchlings begin to be observed in mid to late July.

Although nests are not often documented, KDWP did find evidence of reproduction/recruitment. Three gravid females were observed during KDWP surveys. Hatchlings were observed each year from 2015-2018, ranging from one to eight individuals per location. Two locations where hatchlings were observed in 2016 also had hatchlings observed in 2017. During the 2018 surveys, hatchlings (age-0) and sub-adults (age-1), were 60% of all captures.

Hatchling Broad-headed Skinks				
	2015	2016	2017	2018
Number of Individuals	1	8	17	31
Number of Locations	1	6	13	16

Cite references:

Briggler, J.T and Johnson T.R. 2021 The Amphibians and Reptiles of Missouri. Conservation Commission of the State of Missouri.
 Cooper W.E. and Vitt, L.J. 1994. Tree and Substrate Selection in the Semi-arboreal Scincid Lizard, *Eumeces laticeps*. Herpetological Journal. 4:20-23.
 Hullinger, A., Cordes, Z., Riedle, J.D., and Stark, W. 2018. *Plestiodon laticeps* (Broad-headed Skink) Reproduction. Herpetological Review.
 KDWP. 2018. Skink Survey Database. KDWP Ecological Services Division. Pratt, KS.
 Miller, L.L. and Collins, J.T. 1993. History, Distribution and Habitat Requirements for Three Species of Threatened Reptiles in Eastern Kansas. Report to the KDWP.

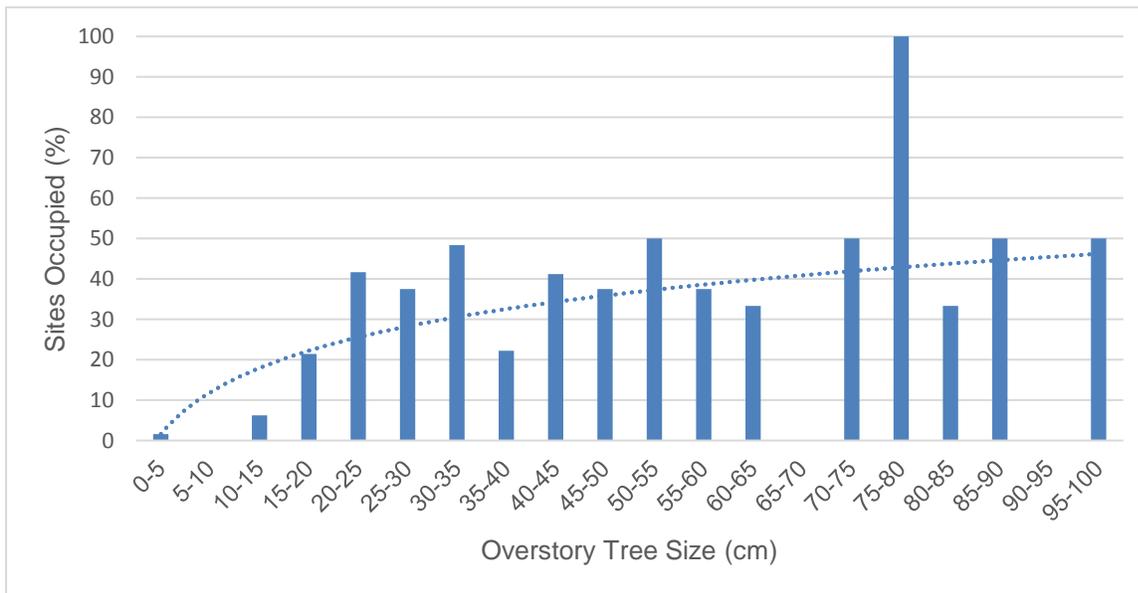
Mitchell, J.C. 1994. The Reptiles of Virginia. Virginia Department of Game and Inland Fisheries.

8) Describe the species’ habitat requirements:

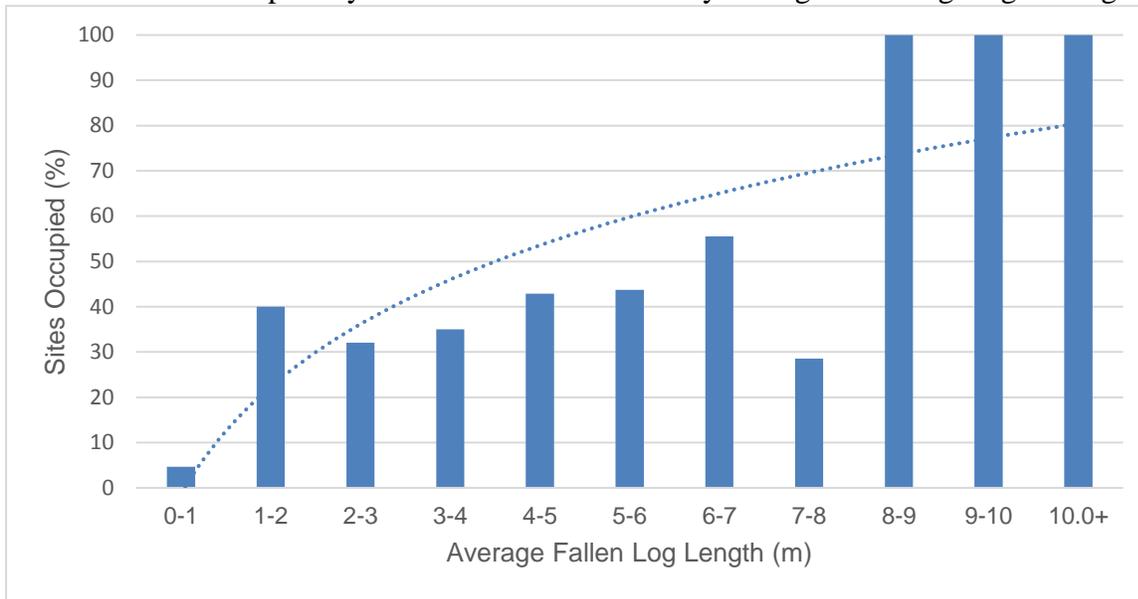
Broad-headed Skinks are a semi-arboreal lizard that inhabit mature pine and hardwood forests. Cooper (1993) found Broad-headed Skinks tend to occupy large oak trees and trees with holes as they provide greater complexity. Tree sizes occupied by the 35 individuals in this study ranged from 41-182 cm diameter at breast height (dbh). Hullinger et al. (2020) found in Kansas, the species prefers mature forests with large fallen logs. This study provided evidence that average overstory tree size had an increasingly positive effect on Broad-headed Skink presence at a dbh of 20-25 cm and an average fallen log length of 2 m or more was positively associated with skink presence (figures below).

Large trees, snags, and/or fallen logs serve as overnight refuge and protection from predators as well as areas to bask, forage, nest, and hibernate. Observations from Cooper and Vitt (1994) found 65% of their observations were on vertical surfaces and 35% on the ground. Of 175 Broad-headed Skink observations from the KDWP 2018 surveys, 111 (63%) were on/in/under fallen logs, 30 (17%) on/in snags, 23 (13%) on/in live trees, 7 (4%) on the ground, and 4 (2%) on/under rocks, highlighting the use of dead trees.

Percent of sites occupied by the Broad-headed Skink by average overstory tree size categories.



Percent of sites occupied by the Broad-headed Skink by average fallen log length categories.



KDWP surveys documented individuals in oak-hickory woodlands typically associated with Broad-headed Skinks, but we found use of other landcover types as well including Eastern Floodplain Forest and Ruderal Deciduous Forests. The table below summarizes the 2018 KDWP captures at standardized survey sites in Bourbon, Cherokee, Crawford, Miami, and Linn counties using the Ecological Mapping Systems of Kansas and Nebraska. This excludes surveys in Anderson, Franklin, Labette, and Neosho counties and does not include opportunistic records. We did not document Broad-headed Skinks in Ozark Woodland and Forest landcover, but several have been documented by KHA in this habitat type.

Landcover Type	Total Sites in Landcover Type	Percent of Sites Skink Detected	Number of Individuals
Eastern Floodplain Forest (South)	66	0.32	75
Mixed Oak-Hickory Woodland and Forest	9	0.44	6
Ozark Woodland and Forest	4	0.00	
Ruderal Deciduous Woodland	71	0.42	54
	150		135

The table below provides a description for each landcover type Broad-headed Skinks were documented in by KDWP from 2015-2019.

2015-2019 KDWP Broad-headed Skink, Ecological Mapping Systems of Kansas and Nebraska	
Landcover Type	Species Associates
Cross Timbers Woodland	Post Oak, Blackjack Oak, American Elm, Dwarf Chinquapin, Dwarf Hackberry
Eastern Floodplain Forest (South)	Hackberry, Slippery Elm, Black Walnut, Red Oak, Pecan
Mixed Oak-Hickory Woodland and Forest	Bur Oak, Chinquapin Oak, White Oak, Red Oak, Sugar Maple, Basswood, Shagbark Hickory, Ash spp., American Elm, Black Walnut, Hackberry
Ozark Woodland and Forest	White Oak, Black Oak, Shagbark Hickory, Bitternut Hickory, Ash spp., Hackberry, Slippery Elm, American Elm, Black Walnut
Ruderal Deciduous Woodland	Hackberry, Black Walnut, Honey Locust, Osage Orange, Ash spp.
Urban Trees and Shrubs	Planted and native trees and shrubs

Hullinger (2018), using the Kansas GAP Landcover Map and KDWP data collected from 2015-2017, documented Broad-headed Skinks in Maple-Basswood Forest, Mixed Oak Floodplain Forest, Oak-Hickory Forest, Pecan Floodplain, and Post Oak-Blackjack Oak Forest. 2018 surveys documented Broad-headed Skinks within those landcovers as well as Ash - Elm - Hackberry Floodplain Forest, Cottonwood Floodplain Forest, Deciduous Forest - Mined Land, and Mixed Oak Ravine Woodland.

Cite references:

Cooper, W.E. 1993. Tree Selection by the Broad-headed Skink, *Eumeces laticeps*: Size, Holes, and Cover. *Amphibia-Reptilia*. 14:285-294.

Cooper W.E. and Vitt, L.J. 1994. Tree and Substrate Selection in the Semi-arboreal Scincid Lizard, *Eumeces laticeps*. *Herpetological Journal*. 4:20-23.

Diamond, D.D., L.F. Elliott, G. Steinauer, K. Kindscher, P. Hanberry, D. True, and M. Sunde. 2021. Ecological Systems of Kansas and Nebraska: Final Report. Submitted to Kansas Department of Wildlife, Parks and Tourism, and Nebraska Game and Parks Commission.

Egbert, S.L., Peterson, D.L., Stewart, A.M., Lauver, C.L., Blodgett, C.F., Price, K.P., Martinko, E.A. 2021. The Kansas GAP Landcover Map Final Reports. Kansas Biological Survey Report #98. University of Kansas.

Hullinger, A. 2018. Critical Habitat Assessment and Recovery Plan for the Kansas State Threatened Broad-headed Skink. Thesis. Fort Hays State University.

Hullinger, A., Cordes, Z., Riedle, J.D., and Stark, W. 2020. Habitat Assessment of the Broad-headed Skink (*Plestiodon laticeps*) and the Associated Squamate Community in Eastern Kansas. *Transactions of the Kansas Academy of Science*. 123:137-150.

KDWP. 2018. Skink Survey Database. KDWP Ecological Services Division. Pratt, KS.

Mitchell, J.C. 1994. The Reptiles of Virginia. Virginia Department of Game and Inland Fisheries.

9) Discuss the species' degree of specialization with regard to habitat, food, or other life history factors.

Broad-headed Skinks are active during the day from April to September. In other parts of their range, during the winter months, they have been observed hibernating underground and in tree stumps. During the active period, cavities in trees and fallen logs are used as shelter at night. They then emerge during the day to back and forage. The Broad-headed Skink diet includes

invertebrates such as insects, arachnids, snails, and isopods, but they may also prey on small vertebrates including snakes, lizards and their eggs, and mice. They forage on the ground or in trees using both chemosensory and visual cues to detect prey.

During the breeding season, large adult males guard their territory and the females within them. Males will aggressively defend the female from smaller males. The Broad-headed Skink exhibits size-assortative pairing. Both males and females prefer to mate with larger individuals, presumably because larger females produce larger clutches and larger males have higher genetic quality. Females lay a single clutch of eggs each year and will construct a nest in rotted areas of trees, logs, or under sluffing bark. The female will guard the nest until the young have hatched.

Cite references:

- Cooper, W.E. 1987. Aggregation in the Broad-headed Skink (*Eumeces laticeps*). American Society of Ichthyologists and Herpetologists. 1987(3):807-810.
- Cooper, W.E. and Vitt, L.J. 1985. The Relationship between Reproduction and Lipid Cycling in the Skink, *Eumeces laticeps*, with Comments on Brooding Ecology. Herpetologica. 41(4):419-432.
- Cooper, W.E. and Vitt, L.J. 1997. Maximizing male reproductive success in the broad-headed skink (*Eumeces laticeps*): preliminary evidence for mate guarding, size-assortative pairing, and opportunistic extra-pair mating. Amphibia-Reptilia. 18(1):59-73
- Goin, B.G. and Goin, C.J. 1951. Notes on the Natural History of the Lizard, *Eumeces laticeps*, in Northern Florida. Quarterly Journal of the Florida Academy of Sciences. 14(1):29-33.
- Vitt, L.J. and Cooper, W.E. 1986. Foraging and Diet of a Diurnal Predator (*Eumeces laticeps*) Feeding on Hidden Prey. Journal of Herpetology. 20:408-415

10) Discuss the species' sensitivity to environmental contaminants and disease, if any, including known potential problems:

Minimal, I could not find papers documenting potential threats from contaminants or disease.

11) To what degree is this species currently vulnerable to consumptive and/or commercial use in Kansas, and what relationship does that use have on its total population?

Minimal, I could not find evidence of them being sold in the pet trade.

12) What are the current and imminent threats to the species in Kansas? Please list in priority order with the highest-ranked threat first.

1. Habitat conversion from development (watershed impoundments, roads, commercial and residential development) decreases the habitat available to the species and reduces habitat connectivity. Agricultural practices such as habitat conversion or grazing in forested areas may decrease habitat quality and quantity.

2. Natural system modifications such as encroachment of invasive species and fire suppression changes forest species composition and forest structure. Fire suppression may result in an increase in non-native species such as Honeysuckle (*Lonicera spp.*). Honeysuckle species can degrade forest quality by competing with native forest species and having allelopathic effects on native plant germination. Changes to the forest structure and quality will likely negatively affect woodland species. Additionally, these effects may alter micro-habitats available to Broad-

headed Skinks by shading logs, forest floors, and trees that may serve as basking, foraging, and refuge areas.

Cite references:

- Atchison, R., Daniels, R., Martinson, E., and Stadtlander, M. 2020. Kansas Forestry Action Plan. Kansas State University, 164 pp.
- Hartman, K.M. and McCarthy, B.C. 2008. Changes in Forest Struct and Species Composition Following Invasion by a Non-Indigenous Shrub, Amur Honeysuckle (*Lonicera maackii*). Journal of the Torrey Botanical Society. 135-2: 245-569.
- McNeish, R.E. and McEwan, R.W. 2016. A Review on the Invasion Ecology of Amur Honeysuckle (*Lonicera maackii*, Caprifoliaceae) a Case Study of Ecological Impacts as Multiple Scales. Journal of the Torrey Botanical Society. 143-4: 245-569.
- Rohweder, M.R. 2022. Kansas Wildlife Action Plan. Ecological Services Section, Kansas Department of Wildlife and Park in cooperation with the Kansas Biological Survey. 3rd Edition. 183 pp.

13) a. What is the recovery potential of this species?

Excellent _____ Good Fair _____ Poor _____ Unlikely _____

Explain:

Broad-headed Skinks were observed at 12 of the 17 (71%) state and federal lands surveyed by KDWP within the species probable range. Eight of the 12 properties where the species was detected were surveyed by KDWP for consecutive years and resulted in repeat findings. The other four were not sampled by KDWP more than once, but two of these have additional reports from KHA, GBIF iNaturalist Records, or Scientific Collection Reports. Within their DCH, Broad-headed Skinks were documented at nine of 10 (90%) state and federal lands surveyed.

Crawford State Park, La Cygne Wildlife Area, Marias des Cygnes National Wildlife Refuge, and Miami State Fishing Lake have Broad-headed Skink records dating greater than 20 years old (ranging from 1951-1994) at the start of the KDWP surveys in 2015. Broad-headed Skinks were consistently documented on these properties by KDWP.

Two conservation easements within the species range have recent documentations as well. The 14 total protected areas (easements and government managed lands) are located within six of the seven counties with recent records (Bourbon n=2, Cherokee n=3, Crawford n=1, Labette n=1, Linn n=4, Miami n=3). Mature woodlands should continue to be preserved in these protected areas.

Much of the species range in Kansas is privately owned. Thus, use of private forests is important. In 2018, 145 of the 162 survey sites were on private property in the skinks probable range. The additional 17 sites were on public land or beyond the species known/current range (Anderson, Franklin, northern Labette, and Neosho counties), but were investigated as they provided potential habitat. Broad-headed Skinks were documented on 54 of the 145 sites, (naïve occupancy = 0.37) with a total of 164 individuals being documented on private land during standardized and opportunistic surveys.

b. List any conservation actions that are currently addressing the needs of this species.
KNESCA

The Broad-headed Skink was listed as state-Threatened in 1987 under the Kansas Nongame and Endangered Species Conservation Act. Designated Critical Habitat (DCH) includes, 1) All stands of mature oak woodland in Bourbon, Crawford, Linn, and Miami counties, 2) Stands of suitable timber anywhere within the skink's probable range. Actions that qualify for an Ecological Review are reviewed by KDWP Ecological Services Division to evaluate potential impacts to DCH. Projects impacting DCH may require an Action Permit to avoid, minimize, or mitigate impacts.

State Wildlife Action Plan (SWAP)

Because of the species Threatened status, the Broad-headed Skink is listed a Tier 1 SGCN in the Kansas SWAP. Species listed as SGCN qualify for the funding under the USFWS State Wildlife Grant program to address conservation needs such as monitoring, research, and habitat management. Ecological Focus Areas (EFA) within the SWAP prioritize habitats and landscapes where conservation actions can be applied for maximum benefit. Terrestrial EFAs within the species range include the Eastern Forest and Ozark Plateau.

Habitat Improvement Programs

KDWP's Habitat First Program and the NRCS Environmental Quality Incentives Program can provide financial assistance to landowners to address natural resource concerns such as invasive plant species management, forest stand improvement, and tree establishment. Technical assistance may also be provided by KDWP and NRCS.

- c. List any pending conservation actions that might improve the status of this species.

Recovery Plan

KDWP Ecological Services Division is currently developing a Recovery Plan for the Broad-headed Skink. Recovery Plans identify strategies and research priorities to better understand the species ecology in Kansas as well as identify management actions that may enhance species populations and threats to the species.

14) Summarize your reasons for requesting a review of this species:

Little was known of the habitat requirements and range of the Broad-headed Skink when originally listed in 1987. At that time, there were 15 records within the state and these were infrequent, fragmented, and provided little information on the species. From 1988 to current, 446 Broad-headed Skinks have been documented in Kansas. Of these, 374 were recorded by KDWP between 2015 to 2019. Recent survey efforts have helped fill in those data gaps and we have a better understanding of the range, quantitative habitat requirements, and woodlands the species will use.

A lack of historical records in the state could be a combination of effort, the species wary and semi-arboreal nature, confusion with the Common Five-lined Skink (*P. fasciatus*), and that different sampling techniques are more successful in finding them. Searching under rocks yields little success but walking slow and scanning the tops of fallen logs, looking up trees or snags, and searching under decayed tree bark, is much more successful.

During surveys, KDWP was able to consistently document Broad-headed Skinks on private and public lands. There has also been an increase in the number of protected lands where the species has been detected. When listed as state-Threatened, the Broad-headed Skink was only known from three state-owned properties. When viewing contemporary records, the species has

been documented on 12 federal and state-owned lands. Five of which were not documented until KDWP surveys began. Eight of these 12 properties have records from four or more years between 2015 and 2023.

The Broad-headed Skink was the most documented reptile during the 2016-2017 and 2018 surveys. Though the species has not been recorded in Franklin and Neosho counties since their first documentation, the Broad-headed Skink has been well documented in Bourbon, Crawford, Cherokee, Linn, and Miami counties with additional records in Allen and Labette.

15) Describe your expertise/experience with the species you are petitioning.

While working for the KDWP, I led field surveys for Broad-headed Skinks in eastern Kansas from 2015-2018. The surveys focused on the species habitat associations and range.

Note on citations: It is not necessary to provide extensive literature citations, however, any pertinent data is helpful in determining species status. Feel free to attach any information you may have pertaining to the status or biology of this species that will help in its review.

If there is insufficient space for your reply to any of the informational requests, attach extra sheets. Be sure to reference your attached material to the appropriate numbered questions.

The currently-listed Kansas species can be found at:

<http://ksoutdoors.com/Services/Threatened-and-Endangered-Wildlife/Kansas-Threatened-and-Endangered-Species-Statewide> (threatened and endangered list)

<http://ksoutdoors.com/Services/Threatened-and-Endangered-Wildlife> (SINC list)

Petitioner(s):

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Send fully completed petition to (deadline is October 5, 2023): kdwpt.ess@ks.gov or

Kansas Department of Wildlife and Parks

Attn: Ecological Services

512 SE 25th Ave

Pratt, KS 67124-8174