



July 18, 2022

Re: Comments on FEIS's Lack of a Serious Analysis of Impacts to Public Health

Dear Josh Tulkin and the Sierra Club Maryland Chapter:

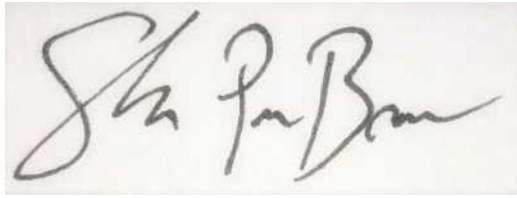
I have reviewed the FEIS Final Environmental Impact Statement and Final Section (4) Evaluation June 2022 Appendix M: Natural Resources Technical Report in order to assess whether the FEIS adequately evaluated the rare, threatened, and endangered species on Plummers Island, from my perspective as a wildlife management professional (certified as a Certified Wildlife Biologist ® and holding a PhD) with nine years of experience that includes surveying bat species for several state agencies, non-profits, and universities. See attached CV. In my professional opinion, the FEIS fails to provide documentation that endangered and threatened bat species were properly surveyed and omitted documentation of them from earlier years. Below are specific points I would like to highlight:

1. Final EIS Report Appendix M: Natural Resources Technical Report mentions on pages 115 – 118 that acoustic study methodology and final results would be provided in Appendix P called I-495 & I-270 Managed Lane Study Threatened and Endangered Bat Habitat Assessment and Acoustic Survey Report. However, this report is missing in Appendix P. While this report was missing in Appendix P, I was able to review a small portion of results from this Appendix P from a separate website, though dated May 2020 rather than June 2020. The Virginia Tech survey team's 2016-2017 survey map listed as Figure 2 in May 2020 Natural Resources Technical Report Appendix P: Bridge Survey Report for the Northern Long-Eared Bat and Indiana Bat shows *Myotis septentrionalis* (MYSE) and *Myotis sodalis* (MYSO) documentation along with all survey sites. The map in Figure 2 also indicates that MYSO were detected less than 1 mile from the potential American Legion Bridge site. Methods for surveys are missing in this Appendix so it is unclear whether other surveys were done around Plummers Island or not, if bat species identification included manual vetting or just automated program identification from acoustic files which can be very flawed. Additionally, If MYSO were reported in a figure used in Appendix P from a study done in 2016-2017, I don't understand why the final EIS states that no T&E species were documented in this area.

2. Final EIS Report Appendix M: Natural Resources Technical Report also mentions on pages 115 – 118 that bridge and guano survey results are provided in Appendix P. While this report was missing in Appendix P, I was able to find this Appendix P from a separate website, though dated May 2020 rather than June 2020. Coastal Resources Inc. performed multiple bridge guano surveys. However, without sending guano off for DNA analysis, one cannot determine presence or absence of specific bat species. Also, not all T&E bat species are well known as bridge roosters. In our region, bat species well known to roost under bridges are common species so this survey method would not have been the most reliant to confirm presence or absence of T&E bat species.
3. Coastal Resources Inc.'s mentioned bat surveys were performed two nights per site. Bats change summer roosts every 1.1 - 7 days, depending on the species. So surveys should be performed on multiple nights and in multiple seasons (not simply two nights per site) to better address presence or absence. Specific details about locations, nights, detector equipment/height, and climate conditions were not provided in the Natural Resources Technical Report at Appendix P to be able to confirm they were done in accordance with U.S. Fish and Wildlife Service guidelines.
4. Plummers Island supports many different habitat types that could potentially be used by many currently listed T&E species (MYSE & MYSO) plus future T&E species under consideration (*Myotis lucifugus* & *Perimyotis subflavus*). All of these species (except MYSO) were reported on Plummers Island in addition to another state T&E species (*Myotis leibii*) and the remaining species listed by Maryland DNR as Species of Greatest Conservation Need. Each unique habitat type should be surveyed for bat species presence/absence. Please see attached publications from Manville 1968, Bailey 1923, Nelson 1913 for confirmation of multiple T&E bat species on Plummers Island.
5. Mist netting did not appear to have been performed on Plummers Island nor was extensive acoustic surveying of all habitat types on the Island. With part of Plummers Island recently added to this I-495/I-270 construction project, I highly recommend having mist netting and acoustic monitoring performed this summer and early fall. Based on the final EIS report's Natural Resources Technical Report Appendix M and the May 2020 Appendix P: Bridge survey report for the Northern long-eared bat and Indiana bat (omitting the acoustic report and methodology) I do not find support that T&E species are absent from Plummers Island. In my professional opinion, further surveying is needed.

Thank you for allowing me to submit this letter as part of your Chapter's review of the FEIS document. Please let me know if you have any questions or wish to discuss this further. My email address is shannpb@umd.edu and direct line is 301-405-1193.

Best regards,

A handwritten signature in black ink on a light-colored background. The signature is written in a cursive style and reads "Shannon P. Browne".

Shannon P. Browne, PhD, Certified Wildlife Biologist ®

Senior Lecturer & Advisor, University of Maryland, Environmental Science & Technology

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW BAT FROM THE EASTERN UNITED STATES.

BY E. W. NELSON.

The discovery of an undescribed species of bat from the Potomac River a few miles above Washington and from Vermont well illustrates our lack of knowledge concerning this group of mammals. It was first brought to my attention when Mr. George L. Kirk of Rutland, Vermont, sent me for identification two specimens collected April 10, 1913, in a cave near Brandon, Vermont, where he found a considerable colony of bats which had hibernated there during the preceding winter. One of these two specimens proved to be *Myotis lucifugus* and the other appears to represent the species here described. The collection of the U. S. National Museum, including that of the Biological Survey, was then examined and two other specimens representing the same species were discovered among the series of *Myotis lucifugus*, with which they had been confused. It appears to be uncommon since only these two could be found among the considerable number of specimens of the last named species from various parts of the Eastern United States in these collections.

***Myotis winnemana* sp. nov.**

LEAST BROWN BAT.

Type from Plummers Island, Maryland (in Potomac River 10 miles above Washington): No. 150,275, adult ♂, U. S. National Museum, Biological Survey Collection; collected August 31, 1907, by Dr. A. K. Fisher.

Distribution.—Known only from type locality and Brandon, Vermont.

Description.—In general color closely resembles *M. lucifugus* but may be at once distinguished by its much shorter forearm and blackish muzzle. Color of upper parts dark rufous chestnut-brown with a tinge of golden; underparts dull grayish brown; muzzle and sides of head blackish as in

M. californicus; ears and feet similar in shape but distinctly shorter than in *M. lucifugus* and about as in *M. californicus ciliolabrum*.

Measurements of type (in flesh).—Total length, 82 mm.; tail, 39; hind foot, 8; forearm, 30.5; extent of wings, 225.

Skull.—Distinctly smaller and more flattened than in *M. lucifugus* and more closely resembling that of *M. californicus*, but even more flattened than in that species.

Skull measurements.—Basal length from nasal notch to occipital foramen, 10.4; width of brain case, 6.8.

Remarks.—The specimen from Brandon, Vermont, is a female and slightly more richly colored and larger than the male (type); this size difference between the sexes being commonly the case in this genus. It also differs from both the Maryland specimens in having a distinctly more flattened brain case and longer and proportionately heavier rostrum. Should other specimens from Vermont or the surrounding area agree with the Brandon example in the formation of the skull it may be necessary to distinguish it as a subspecies.

This interesting small species is most closely related to the *californicus* section of the genus but appears to have been overlooked up to the present time largely through its general color resemblance to *M. lucifugus*. It may be at once distinguished from that species by its forearm, which is about 4-8 mm. shorter. The skulls of this species are a trifle larger than those of typical *californicus*, from middle California, with top of brain case a little more flattened. They agree most closely in size and skull outline with examples of *M. californicus ciliolabrum* from South Dakota, and from Graybull, Wyoming, but have more flattened skulls and smaller teeth.

Rec'd Feb. 6, 1968

**SPECIAL PUBLICATION
OF THE
WASHINGTON BIOLOGISTS' FIELD CLUB**

**NATURAL HISTORY OF
PLUMMERS ISLAND, MARYLAND¹**

XX. ANNOTATED LIST OF THE VERTEBRATES

BY RICHARD H. MANVILLE
U. S. Fish and Wildlife Service

CONTENTS

Introduction	1	Birds	17
Acknowledgments	7	Breeding Bird Census ..	35
Fishes	7	Mammals	36
Amphibians	12	Hypothetical List	42
Reptiles	14	Literature Cited	42

The area near the nation's capital, rich in historical lore, has long attracted the interests of naturalists and has been mentioned frequently in biological literature. Captain John Smith noted (*vide* Arber, 1884: 60) that "Ther be in this cuntry Lions, Beares, woulues, foxes, muske catts, Hares, fleinge squirells, and other squirells." As early as 1608, Captain Smith recorded (*ibid.*: 417-418) that on "the 16 of June we fell with the river Patowomek. . . . Having gone so high as we could with the bote [*i.e.*, to Little Falls] we met diuers Saluages in Canowes, well loaden with the flesh of Beares, Deere, and other beasts." On the return voyage, he mentioned "a few Bevers, Otters, Beares, Martins and Minks we found." These and other early accounts of the area have been assembled by McAtee (1918).

Early in 1900 the Washington Biologists' Field Club was

¹The preceding number in this series was published in Proc. Biol. Soc. Wash., 79: 117-126, 1966. This number is published by the Washington Biologists' Field Club to promote its primary objective of research on the fauna and flora of Plummers Island and adjacent areas.

TABLE 1 CONTINUED

Species	Flood plain	Upland	Open	Swamp
	forest, 28 acres	forest, 13 acres	field, 7 acres	forest, 2 acres
Blue-gray gnatcatcher, <i>Poliotilta caerulea</i>	2			
Starling, <i>Sturnus vulgaris</i>	3	1		
Yellow-throated vireo, <i>Vireo flavifrons</i>	2	5		
Red-eyed vireo, <i>Vireo olivaceus</i>	5	10		
Parula warbler, <i>Parula americana</i>	4	2		
Prairie warbler, <i>Dendroica discolor</i>			4	
Ovenbird, <i>Seiurus aurocapillus</i>		1		1
Kentucky warbler, <i>Oporornis formosus</i>	7	3		
Yellowthroat, <i>Geothlypis trichas</i>	2		2	1
Yellow-breasted chat, <i>Icteria virens</i>			2	
Redstart, <i>Setophaga ruticilla</i>	4			1
Common grackle, <i>Quiscalus quiscula</i>	1	3		
Scarlet tanager, <i>Piranga olivacea</i>	1			
Cardinal, <i>Richmondena cardinalis</i>	6	3		
Indigo bunting, <i>Passerina cyanea</i>	2		1	
Goldfinch, <i>Spinus tristis</i>	1		1	
Towhee, <i>Pipilo erythrophthalmus</i>			1	
Field sparrow, <i>Spizella pusilla</i>			1	6
Song sparrow, <i>Melospiza melodia</i>	2			
41 species	77	35	19	3

MAMMALS

The treatment follows that of Gerrit S. Miller, Jr., and Remington Kellogg, *List of North American Recent mammals*, Bull. 205, U. S. National Museum, 1955.

DIDELPHIMORPHAE—opossums

Didelphis marsupialis virginiana Kerr, Virginia Opossum.—A common prowler on the island, as evidenced by its distinctive tracks. One was seen by P. L. Ricker at Cactus Rock on 15 June 1934. Gardner (1950) records one specimen (USNM 180539) taken on Plummers Island by H. S. Barber, 10 November 1912.

SORICIDAE—shrews

Sorex cinereus fontinalis Hollister, Maryland Shrew.—Records from Cabin John are mentioned by Goldman and Jackson (1939) and by Gardner (1950). On 28 August 1927, a dead specimen (USNM 252545) was found by Rock Run on the north side of the C. and O. Canal (Weinore, 1928).

†*Sorex longirostris* Bachman, Bachman's Shrew.—Listed by Goldman and Jackson (1939) as to be expected on the strength of a Falls Church, Va., record.

†*Microsorex hoyi winnemana* Preble, Pigmy Shrew.—The first pigmy shrew taken south of Ohio and New York was a specimen (USNM 186320) collected on the Virginia shore of the Potomac, near Stubblefield Falls, on 25 April 1903. Preble (1910) described it as a new species, and Jackson (1925) later reduced it to subspecific rank. This rare shrew is the smallest American mammal known.

Blarina brevicauda kirtlandi Bale & Moulthrop, Short-tailed Shrew.—Several have been trapped in the cabin by A. K. Fisher, F. M. Uhler, and H. L. Yereck. Gardner (1950) mentions Plummers Island records. One was seen at the west end of the island on 23 July 1960 (R. H. Manville).

†*Cryptotis parva parva* (Say), Least Shrew.—Goldman and Jackson (1939) include this species in a hypothetical list on the basis of records from Laurel, Md., and Falls Church, Va.

TALPIDAE—moles

Scalopus aquaticus aquaticus (Linnaeus), Eastern Mole.—Plummers Island records are mentioned by Goldman and Jackson (1939) and by Gardner (1950). Runways are frequent on the mainland and on the island, particularly the lower eastern end. One found dead on the Rock of Gibraltar, 30 May 1967 (R. H. Manville).

Condylura cristata cristata (Linnaeus), Star-nosed Mole.—A less common mole than the preceding, this species has been recorded from Cabin John and from the island (Bailey, 1923; Gardner, 1950). On 13 June 1962, one (USNM 324924) was found dead below Cactus Rock by P. J. Spangler.

VESPERTILIONIDAE—plain-nosed bats

Myotis lucifugus lucifugus (Le Conte), Little Brown Bat.—An adult male and female and two young were collected on Plummers Island by W. H. Osgood on 1 August 1897 (Bailey, 1923). Others have been taken in the cabin by A. K. Fisher, June 1904, and by H. S. Barber, 12 September 1911.

Myotis keenii septentrionalis (Townsend), Keen Bat.—Several have been captured in the cabin by H. S. Barber, A. K. Fisher, W. R. Maxon, W. L. McAtee, and W. H. Osgood at various times from 1902 to 1910 (Goldman and Jackson, 1939).

Myotis subulatus lebbii (Audubon & Bachman), Least Brown Bat.—Our smallest local bat is known from two specimens collected in the cabin by A. K. Fisher on 24 and 31 August 1907. One of these (USNM 150275) served as the holotype of *M. winnemana* (Nelson, 1913), at that time known otherwise only from Vermont. This name was synonymized with *M. s. lebbii* by Miller and Allen (1928: 171).

Lastomyia noctigaga (Le Conte), Silver-haired Bat.—One (USNM 147924) was taken in the cabin on Plummers Island by A. K. Fisher on 6 October 1906. A second (USNM 201569) was collected by M. W. Lyon, Jr., at Great Falls, Md., on 23 April 1916.

Pipistrellus subflavus (F. Covier), Eastern Pipistrel.—One was taken in the cabin by A. K. Fisher on 23 March 1907 (Goldman and Jackson, 1939). Two subspecies, *subflavus* and *obscurus*, have each been recorded at the island (Bailey, 1923; Gardner, 1950); the latter was probably a migrant, taken while flying over the river on 9 September 1905.

Eptesicus fuscus fuscus (Beauvois), Big Brown Bat.—This large bat is commonly seen flying at dusk. One was killed in the cabin by A. K. Fisher on 5 August 1905; one was taken in a mouse trap on the window sill by H. S. Barber on 21 January 1907; one was photographed on the island by N. Kent on 16 April 1909; others were trapped in the cabin by A. L. Nelson and F. M. Uhler on 15 January 1939 (Bailey, 1923; Goldman and Jackson, 1939).

Lasturus borealis borealis (Miller), Red Bat.—At least five were captured in the cabin on Plummers Island from 1903 to 1909 by H. S. Barber, W. R. Maxon, and W. L. McAtee (Goldman and Jackson, 1939). A juvenile (USNM 204976), just able to fly, was collected on Plummers Island by H. S. Barber on 15 July 1914 (Bailey, 1923).

Myotis cinereus cinereus (Beauvois), Hoary Bat.—The nearest record (Bailey, 1923) is of one taken at Chain Bridge on 26 May 1904. This bat is a late and rapid flyer, and not easily secured, but it probably visits the island during migration (Goldman and Jackson, 1939).

Nyctoeius humeralis humeralis (Rafinesque), Evening Bat.—One female was captured in the cabin on Plummers Island by H. S. Barber on 7 September 1910, and several were taken at Falls Church, Va., by J. H. Riley (Bailey, 1923).

LEPORDAE—hares and rabbits

Sylvilagus floridanus mollurus (Thomas), Eastern Cottontail.—Listed as common on the island (Goldman and Jackson, 1939). On 7 April 1918 there were five young in a nest near the cabin (R. C. Shannon); on 17 April 1935 there were five young in a nest near the fireplace (F. C. Lincoln); seen on the island 30 May 1967 (R. H. Manville).

SCURRIDAЕ—squirrels

Marmota monax monax (Linnaeus), Woodchuck or Groundhog.—Recorded on Plummers Island by Bailey (1923) and Goldman and Jackson (1939). Burrows have been noted in crevices at Cactus Rock, the Rock of Gibraltar, and the base of the cliff near the cabin. On 22 July 1906 an adult was seen swimming from the island to the Virginia shore; and on 17 May 1907 four young were noted at Cactus Rock (W. L. McAtee). Others have been noted on the island by H. S. Barber (1906), G. B. Vogt (9 June 1960), and R. H. Manville (3 October 1964).

Tamias striatus fisheri A. H. Howell, Eastern Chipmunk.—Seen on the island on 22 June 1902 (W. Palmer) and 13 October 1902 (W. R. Maxon), and noted at the cabin on 8 December 1912 (H. S. Barber). There appear to be no records in recent years.

Sciurus carolinensis carolinensis Gmelin, Gray Squirrel.—On 1 December 1900, W. P. Hay noted, "Nine squirrels today in 5 hours." There were two young on the island on 8 May 1908 (W. L. McAtee). On 23 July 1960, six were seen near the cabin (R. H. Manville).

Sciurus niger vulpinus Gmelin, Fox Squirrel.—This large tree squirrel was a "former resident, but now rare and erratic" on the island (Goldman and Jackson, 1939). Bailey (1923) recorded, "In 1905 I saw one on the Virginia side of the Potomac just above Plummer Island; on October 22, 1916, Francis Harper saw one just above Great Falls on the Maryland side."

Tamiasciurus hudsonicus loguax (Bangs), Red Squirrel.—Former resident, and may still occur (Goldman and Jackson, 1939). On 6 September 1908, H. S. Barber captured a specimen (USNM 157317) swimming from Plummers Island toward the Virginia shore. On 22 February 1914, one living near the cabin was caught and eaten by a Cooper's hawk (A. K. Fisher). The last record is of one seen near Cactus Rock on 11 November 1953 (M. K. Brady).

Glaucomys volans volans (Linnaeus), Southern Flying Squirrel.—Will Wyatt collected one (USNM 140242) opposite the island on 9 September 1905, and another (USNM 167904) near the island on 13 February 1910. One was trapped in the cabin by F. M. Uhler on 15 February 1937 (Goldman and Jackson, 1939). In 1906, A. K. Fisher hung out 17 gounds on trees on the island, and five of them were occupied by flying squirrels; T. H. Kenney observed a family in a gound on the river path on 20 April 1907; on 17 May 1908, an old female was nursing young in one of these gounds near the cabin. Just above Plummers Island, E. A. Preble and Francis Harper found a family of young in a bark nest on 12 April 1917 (Bailey, 1923). The latest record was on 21 April 1963 (P. J. Spangler).

CASTORIDAE—beavers

Castor canadensis Kuhl, Beaver.—On 10 October 1966, L. W. Swift noted "beaver cutting on poplar [*Populus virginiana*], lower end of island." Soon thereafter, at the annual fall outing on 29 October, further cutting on other large trees near the river was observed by many members. A beaver was reported in the channel at the west end of the island on 2 April 1967 (M. E. Hale). Fresh cuttings were noted at the east end of the island on 29 July 1967 (H. W. Setzer).

CURCETIDAE—native rats and mice

Peromyscus leucopus noveboracensis (Fischer), White-footed Mouse.—Common resident. Specimens have been taken, in and about the cabin,

HYPOTHEICAL LIST

- Passertheribulus henslowii* (Audubon), Henslow's Sparrow.—A. Wetmore has observed flocks in the fields about the Taylor Model Basin on the mainland west of Plummers Island.
- Amophila gesthals* (Lichtenstein), Bachman's Sparrow.—Casual-singing male recorded at Cabin John by A. Wetmore (Stewart and Robbins, 1958: 358).
- Rethrodontomys humilis* (Audubon & Bachman), Eastern Harvest Mouse.—Specimens were taken at Falls Church, Fort Myer, and Alexandria, Va., by V. Bailey, L. di Z. Mearns, and J. H. Riley; a number of skulls were found in barn owl pellets at the Smithsonian tower by A. K. Fisher and A. Wetmore (Bailey, 1923: 118).
- Synaptomys cooperi* Baird, Southern Bog Lemming.—Bailey (1923: 118) recorded remains taken by A. K. Fisher from long-eared owl pellets at Munson Hill, Fairfax County, Va., and from the stomach of a red-tailed hawk at Sandy Spring, Montgomery County, Md.; specimens were collected in 1896-7 at a sphagnum bog in Hyattsville, Prince Georges County, Md., by V. Bailey, A. H. Howell, and W. H. Osgood.

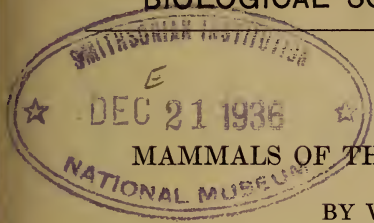
LITERATURE CITED

- ALDRICH, JOHN W., AND ALLEN J. DUVALL. 1943. Breeding bird population of the Potomac River flood plain and adjoining uplands. Pp. 5-7 in MS report, Bureau of Sport Fisheries and Wildlife. ANNER, EDWARD, editor. 1884. Capt. John Smith . . . Works, 1608-1631. cxxxvi + 976 pp. Birmingham.
- BALLET, VERNON. 1923. Mammals of the District of Columbia. Proc. Biol. Soc. Wash., 36: 103-138.
- BEAN, BARTON A., AND ALFRED C. WEED. 1911. Recent additions to the fish fauna of the District of Columbia. Proc. Biol. Soc. Wash., 24: 171-174.
- BOND, GORMAN M. 1966. Notes on the taxonomy of the birds of Maryland and the District of Columbia. Proc. Biol. Soc. Wash., 79: 165-169.
- BRADY, MAURICE K. 1924. Muhlensberg's turtle near Washington. Copeia, No. 135: 92.
- _____. 1937. Natural history of Plummers Island, Maryland. VI, Reptiles and amphibians. Proc. Biol. Soc. Wash., 50: 137-139.
- CLARK, AUSTIN H. 1930. Records of the wood tortoise (*Clemmys insculpta*) in the vicinity of the District of Columbia. Proc. Biol. Soc. Wash., 43: 13-15.
- COOKE, MAY TEACHER. 1929. Birds of the Washington, D. C., region. Proc. Biol. Soc. Wash., 42: 1-80.
- FISHER, A. K. 1935. Natural history of Plummers Island, Maryland. IV, Birds. Proc. Biol. Soc. Wash., 48: 159-167.
- GARDNER, MARSHALL C. 1950. A list of Maryland mammals, I. Marsupials and insectivores; II, bats. Proc. Biol. Soc. Wash., 63: 65-68, 111-114.
- GORMAN, E. A., AND H. H. T. JACKSON. 1939. Natural history of Plummers Island, Maryland. IX, Mammals. Proc. Biol. Soc. Wash., 52: 131-134.
- HAY, W. P. 1902. A list of the batrachians and reptiles of the District of Columbia and vicinity. Proc. Biol. Soc. Wash., 15: 121-145.
- HENSHAW, H. W. 1907. An extension of the range of the wood tortoise. Proc. Biol. Soc. Wash., 20: 65.
- JACKSON, HARTLEY H. T. 1925. Two new pigmy shrews of the genus *Microsorex*. Proc. Biol. Soc. Wash., 38: 125-126.
- MCCATTEE, W. L. 1918. A sketch of the natural history of the District of Columbia. Biol. Soc. Wash., Bull. 1: 1-142.
- _____. 1944. Timber rattlesnake in the District of Columbia region. Proc. Biol. Soc. Wash., 57: 33.
- _____, E. A. PREELE, AND ALEXANDER WETMORE. 1917. Winter birds about Washington, D. C., 1916-1917. Wilson Bull., 29: 183-187.
- _____, AND A. C. WEED. 1915. First list of the fishes of the vicinity of Plummers Island, Maryland. Proc. Biol. Soc. Wash., 28: 1-14.
- MCCAVLEY, ROBERT H., JR. 1945. The reptiles of Maryland and the District of Columbia. xv + 194 pp. Privately published, Hagerstown.
- MULLER, GARRETT S., JR., AND GROVER M. ALLEN. 1928. The American bats of the genera *Myotis* and *Piponyx*. U. S. Nat. Mus., Bull. 144: vii + 218.
- NERSON, E. W. 1913. A new bat from the eastern United States. Proc. Biol. Soc. Wash., 26: 183-184.
- OSGOOD, WILLIAM H. 1907. "*Hemimiphila laurencei*" near the District of Columbia. Auk, 24: 342-343.
- PREELE, EDWARD A. 1910. A new *Microsorex* from the vicinity of Washington, D. C. Proc. Biol. Soc. Wash., 23: 101-102.
- SMITH, HUGH M., AND BARTON A. BEAN. 1899. List of fishes known to inhabit the waters of the District of Columbia and vicinity. U. S. Fisheries Commission, Bull. 18: 179-187.
- _____, AND WILLIAM PALMER. 1888. Additions to the avifauna of Washington, D. C., and vicinity. Auk, 5: 147-148.
- STEWART, ROBERT E., AND CHANDLER S. ROBBINS. 1958. Birds of Maryland and the District of Columbia. North American Fauna, 62: 1-401.
- SWALES, B. H. 1920. Records of several rare birds from near Washington, D. C. Proc. Biol. Soc. Wash., 33: 181-182.

- WANDER, DAVID B. 1916. A chorographical and statistical description of the District of Columbia. vi + 212 pp. F. S. Government Printing Office, Washington, D. C.
- WESTMORE, ALEXANDER. 1920. Observations on the life history of the box turtle, *Copella*, No. 77: 3-5.
- _____. 1923. The evening grosbeak near Washington, D. C. *Condor*, 40: 130.
- _____. 1923. The wood rat in Maryland. *Jour. Mar. Biol. Ass. U.S.*, 13: 1-10.
- _____. 1928. A record for *Sorex fonthallii*. *Jour. Mar. Biol. Ass. U.S.*, 18: 1-2.
- _____, AND FREDERICK C. LINCOLN. 1928. Records of the Maryland Auk, 45: 225-228.

7.0673

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON



MAMMALS OF THE DISTRICT OF COLUMBIA.

BY VERNON BAILEY.

INTRODUCTION.

The first formal list of the mammals of the District of Columbia,¹ comprising 38 species, was published in 1896. Since then nine additional species have been taken within the area, many interesting notes have accumulated, a number of technical names have been changed, and the old list has become quite inadequate for the present growing interest in outdoor life. The long-felt need of brief untechnical descriptions of species to aid in the identification of the obscure or rare forms is now supplied. It is to be hoped that a closer study of our local fauna will add other species to the list and that fuller notes on habits will render a future revision still more satisfactory than the present.

AREA INCLUDED.

As in the previous list a circular area with a radius of 20 miles from the Capitol as a center is adopted. This seems to represent the original animal life of the District of Columbia better than does the area within the present restricted boundary lines of the District, much of which is now occupied by the city proper. All but a very few of the notes however refer to the inner half of this radius and most of them to the original 10 mile square formerly included within the District. The present area reaches well beyond the farthest corners of the Geological Survey quadrangle and includes many swamps, marshes, glens, cliffs, and forested areas, now not fully explored, that promise worthy discoveries. Not half and probably not a quarter of it has been carefully examined or trapped over for mammals.

¹List of Mammals of the District of Columbia, by Vernon Bailey. Proc. Biol. Soc. Washington, Vol. X, pp. 93-101, May 28, 1896.

HISTORICAL.

The early natural history of the District of Columbia, including records of mammals for the region about Washington has been well presented by W. L. McAtee, in Bulletin I., of the Biological Society in 1918, but there is still a rich field in old journals and manuscripts and in obscure publications which will eventually throw much light on the actual conditions of the animal fauna in its primitive state.

Of the mammals known formerly to occur in or near the District of Columbia, but no longer found here, may be noted the buffalo, elk, white-tailed deer, beaver, panther, wolf, marten, black bear, and the bottle-nosed dolphin, or porpoise.

The porpoise was last seen in the river near Georgetown in 1884, and was then common in the lower part of the Potomac, but has now become scarce.¹ Being more or less migratory in habits its reappearance is not improbable.

ACKNOWLEDGMENTS.

My own notes have been freely supplemented by those of other members of the Biological Survey and the Biological Society. So far as possible credit is given with each note, but for the preservation of specimens and the records that go with them it is obviously impossible to give full credit in all cases. Even a list of those who have actually contributed to the net results would include most of the local naturalists from Baird down to the present time, and include, besides mammalogists, a large number of ornithologists, entomologists, herpetologists, conchologists, botanists, and others with only the keen outdoor interest of the world in which we live.

For more than the ordinary contributions of specimens and notes, however, I wish to express my indebtedness to Dr. C. Hart Merriam, Dr. E. W. Nelson, Dr. A. K. Fisher, Dr. T. S. Palmer, Dr. Wilfred H. Osgood, Mr. Morris M. Green, Mr. Edward A. Preble, Mr. A. H. Howell, Mr. N. Hollister, Major E. A. Goldman, Mr. Gerrit S. Miller, Jr., Dr. Charles W. Richmond, and Mr. J. H. Riley.

FAUNAL POSITION.

The District of Columbia lies wholly within the Carolinian division of the Upper Austral Zone, but in a comparatively

¹The Pastime, Vol. 3, No. 2, p. 16, Aug., 1884.

narrow belt between the Austroriparian, which comes the up coast as far as Norfolk; and the Alleghanian, which follows down the mountains only a short distance to the westward. As a natural result of proximity a few Alleghanian species drift down the streams and find footholds on the cold slopes of high banks and cliffs, and in cold gulches, or in cold swamps and sphagnum bogs, where very local conditions afford more or less congenial environment. *Microsorex* from near the hemlock slopes on the west side of the Potomac above Plummer Island, and *Synaptomys* from the sphagnum swamps near Hyattsville are good examples. The red squirrel is here on the edge of its zone, which is mainly Alleghanian. The red-backed mouse (*Evotomys*) may yet be found on some of the cold slopes of the river bluffs.

On the other hand the Austroriparian rice rat (*Oryzomys palustris*) reaches up from the south with the live oaks almost to the edge of the District (to near Colonial Beach, Virginia) and will probably be added to the District list when the Patuxent marshes are explored. There is one specimen of the southern shrew (*Sorex longirostris*) recorded for the District, and the Carolina shrew *Blarina brevicauda carolinensis* comes close to the southern border. The golden mouse (*Peromyscus nuttallii*) was recorded for the District in 1861 by Haley in Philp's "Washington Described," but as no specimens are known to have been taken nearer than the Dismal Swamp, Virginia, this Austroriparian species is not included in the present list. A number of specimens of the Rafinesque bat (*Nycticeius humeralis*), which is mainly an Austroriparian species, are merely the free wanderers of a winged species near the edge of its real zone.

Class MAMMALIA: Warm-blooded animals that nurse their young.

Order MARSUPIALIA: Pouched animals.

Family DIDELPHIIDAE: Opossums, etc.

OPOSSUM, VIRGINIA OPOSSUM.

***Didelphis virginiana virginiana* Kerr,**

In size the opossum about equals the ordinary house cat. It has naked ears, long nearly naked, prehensile tail, and soft gray fur. The female has an external abdominal pouch, in which the young are carried and nursed for about 76 days after birth before they first emerge. The period of gestation is about 16 days, and the young when born are very rudimentary, about the size of small navy beans, weighing about a fifth of a gram each. An adult male measures in total length 780, tail 298, hind foot 70 mm.;

winter or early spring. In life the delicate fleshy, fingerlike filaments radiating from the end of the nose are in constant motion apparently in the effort to touch, feel, and recognize objects with which they come in contact in their subterranean life, so taking the place of the functionless rudiments of eyes in the search for earthworms and insect food.

Family SORICIDAE: Shrews.

SHORT-TAILED SHREW.

Blarina brevicauda brevicauda (Say).

These are the largest of our shrews, with heavy bodies, short legs, short tails, pointed noses, minute eyes, concealed ears, and velvety fur. Their color is plumbeous or sooty black, with a metallic luster when the fur is smoothed down. The teeth as in other shrews are tipped with dark brown. A Washington specimen measures, total length 112, tail 23, hind foot 15 mm.; in inches 4.4, .9, .6. This is smaller than the typical form farther west and north, but not quite small enough for *Blarina brevicauda carolinensis* farther south. A specimen from the Rappahannock River near Warsaw, Virginia, can, however, be referred to *carolinensis*.

The short-tailed shrews are among the commonest small mammals of the district, being found in the woods and fields, and in brushy or weedy places up to the very edges of the city, and even on vacant lots where there is sufficient cover of old grass, weeds, boards, or suitable protection from the light of day and overhead enemies. Like other shrews their eyes are very small and probably of less use to them than the pointed, flexible nose in finding the insects and other small animal life on which they feed.

They burrow mainly near the surface, in rich mellow soil, make roadways over the surface of the ground under cover of old vegetation, or follow the roadways and tunnels of the meadow mice and pine mice. At the lower end of the Zoological Park in 1893, in a Schuyler mouse trap, I caught one of these shrews by the neck and a meadow mouse by the hips. The trap was set across a runway and evidently the shrew was pursuing or had hold of the back part of the mouse when they ran through my trap and were both caught.

They are very fond of meat and eat any mice or small animals or even their own kind when found in traps and are of great value in keeping down the abundance of small rodents, as well as insects, bugs, worms and snails.¹ While savage little brutes in their own small world they are practically harmless and very useful animals in their relations to human economy.

LEAST SHORT-TAILED SHREW.

Blarina parva (Say).

These are the smallest of our short-tailed shrews, but with heavier bodies than the small species of *Sorex*. Their feet are small, tails short, noses

¹See Merriam, C. Hart, Mammals of the Adirondack Region, pp. 164-173, 1884; and Shull, A. Franklin, Habits of the Short-tailed Shrews, Amer. Naturalist, Vol. XLI, pp. 449-522, 1907.

pointed, eyes minute, ears hidden, and fur soft and velvety. Their upperparts are sepia brown, the lowerparts ashy gray. An adult male from Brightwood, D. C., measures in total length 78, tail 18, hind foot 10 mm.; in inches 3.1, .7, .4.

Although widely distributed from New Jersey to Nebraska, Texas, and Georgia, these little shrews seem always scarce or so obscure in habits as to be rarely found except by owls. In 2,262 pellets of barn owls from the Smithsonian tower, Dr. Fisher took 61 of their skulls, and in pellets from long-eared owls from Munson Hill, Virginia, there were 23 of their skulls among 176 of other small mammals.¹

In 1890 Prof. W. B. Barrows, then a member of the Biological Survey, picked up one of these little shrews in Brookland and brought it to the office. In 1896 I caught one near Brightwood in an old grassy field where the Military Road enters Rock Creek Park, and the same year J. H. Riley caught one in an old stump in a field at Falls Church. In 1913, 1914, and 1915, A. H. Howell collected four specimens near his place at Woodridge, a suburb in the northeastern quarter of Washington. A number of specimens have been taken by George Marshall at Laurel, Maryland.

Little is known of the habits of these shrews, except that specimens are occasionally taken in traps set in field mice runways or in tiny runways under old grass that seem to be made by the shrews themselves for their convenience in getting about over the surface of the ground and catching their insect food.

BACHMAN SHREW; CAROLINA SHREW; SOUTHERN SHREW.

Sorex longirostris Bachman.

This is the only eastern *Sorex*, except *fisheri* from the Dismal Swamp, that has the third unicuspid tooth smaller than the fourth. Its size is very small, the ears rather conspicuous, the nose not longer than in other shrews. The color of the upperparts is chestnut brown, of the underparts ashy gray. Measurements of a series of specimens from North Carolina show a total length of 86, tail 32, hind foot 10.7 mm.; in inches 3.4, 1.3, .45.

Hollister reports a specimen of this rare little southern shrew in the National Museum, collected by C. Girard, labeled Washington, D. C., and entered in the museum catalogue April 19, 1855, as No. 637. There seems to be no clue to the exact locality where it was collected or to the exact date of collection, but Bachman's type of the species described in 1837 was taken in the swamps of the Santee River, South Carolina, and others have been taken on dry uplands. The only other specimen from the vicinity of Washington was collected by C. K. Rorebeck, at Falls Church, Virginia, January 3, 1897, and is now in the National Museum collection. One taken by Dr. M. W. Lyon at Chesapeake Beach, Maryland, July 3, 1908, is the next nearest to Washington. Other specimens have been taken in Georgia, South Carolina, North Carolina, Alabama, Indiana, and Illinois.²

¹Hawks and Owls, Bull. 3, p. 141, 1893.

²Hollister, N., Proc. U. S. Nat. Mus., vol. 40, p. 379, 1911.

MARYLAND SHREW.

Sorex fontinalis Hollister.

This tiny shrew is one of the smallest known species of its genus and probably next to the smallest known mammal of North America. It is very slender and delicate with long sharp nose, minute eyes and relatively long tail. Its color is sepia brown above, brownish gray below. Measurements, total length 90, tail 31, hind foot 10 mm.;¹ in inches 3.51, 1.4, .4.

In February, 1896, I caught three of these little shrews in mouse traps set under logs, and in runways through the sphagnum moss in a cold swamp near Hyattsville, in the same locality and situations with the lemming mouse (*Synaptomys*), and later two other specimens were taken there by Dr. Fisher.

On November 6, 1898, Gerrit S. Miller, Jr. caught one in a cold spring swamp near Beltsville, Maryland, and the three from Laurel, Maryland, were caught by George and E. B. Marshall. The one from Sandy Springs was found dead in a path so no idea of habits or habitat were obtained.

In 1920 only 13 specimens of *Sorex fontinalis* were known. These were all collected near the District of Columbia, in Maryland, at localities as follows: Beltsville, 2; Hyattsville, 5; Hollywood, 1; Laurel, 4; Sandy Springs, 1. The fact that none have been taken in the great amount of trapping on the uplands indicates a mainly swamp habitat for the species. Nothing is known of their habits except the little gained through specimens caught. They live under cover of moss, logs, and marsh vegetation, through and under which they make tiny burrows and roadways. Some of those caught were in meadow mouse or lemming mouse runways. They take meat bait and, like other shrews, probably live mainly on insects and other forms of small animal life found on or under the surface of the ground.

LEAST SHREW.

Microsorex winnemana Preble.

In size, as its name indicates, this is the smallest of all the shrews and therefore the smallest known mammal in North America, being very slender and delicate, with its tail about three times as long as its hind foot. In color the upperparts are grayish brown, the lowerparts ashy gray. Measurements of type: total length, 78, tail 28, hind foot 9 mm.; in inches 3.08, 1.1, .35.

This rare species was discovered and described by Edward A. Preble of the Biological Survey, who says, "On April 25, 1903, while searching for salamanders * * * on the Virginia shore of the Potomac above Plummer Island [near Stubblefield Rapids] I dislodged from the decayed interior of a large fallen log a tiny shrew. The rarity of any species of long-tailed shrew in the vicinity of Washington caused me to take special pains in preserving the specimen. Later, when I examined it carefully, I was surprised to find that it belonged to the genus *Microsorex*, hitherto unknown

¹For detailed characters see original description by N. Hollister, Proc. U. S. Nat. Mus., vol. 40, p. 378, 1911.

to occur south of Ohio and New York. It was apparent that the specimen represented an undescribed form, but its characterization was deferred in the hope that other specimens would be detected. This did not occur until January 24 of the present year [1910] when William Fink of Berwyn, Maryland, found a second specimen in the decayed heart of a dead chestnut tree which he cut from a dry hillside at some distance from water." The detailed description then follows¹ and under *Remarks* he adds "*Microsorex winnemana* is the smallest species of shrew (and therefore the smallest mammal) thus far discovered in America. The specific name *winnemana* (beautiful island) is in allusion to Plummer Island, the home of the Washington Biologists' Field Club, near which the type specimen was taken."

Here is a field to inspire any energetic young naturalist, a remarkable species with only two specimens known, and a fair clue given to habits and habitat. Who will be the next to bring in specimens, dead or alive, and add something to our meager fund of knowledge of the wild life about us?

Order CHIROPTERA: Bats.

Family VESPERTILIONIDAE: Northern Bats.

HOARY BAT.

Nycteris cinerea (Beauvois).

The hoary bat has 32 teeth, is the largest of our eastern bats, with ears short and rounded, the top of the feet and tail membranes well furred, and the fur full and soft. Its color is yellowish brown frosted with white, its throat and wing linings buffy. Average adults measure in total length 135, tail 58, hind foot, 11 mm.; in inches 5.2, 2.26, .45. Spread of wings 15 to 16 inches.

A specimen taken October 2, 1892, at Laurel, Maryland, one taken October 20, 1897, and another May 26, 1904, at Chain Bridge, seem to be the only records for the vicinity of the District of Columbia; but other records from Baltimore, Maryland, New Jersey, South Carolina, and Pennsylvania, bring its range on all sides of the District. It is a wide-ranging migratory species, and evidently covers the whole area. With a boreal breeding range across the continent, and a migratory range in winter from Canada to at least the southern border of the United States, it may be looked for at Washington in the fall and spring migrations. Its size readily distinguishes it on the wing from the smaller bats, but it is a late and rapid flyer and not easily secured for specimens. Dr. Fisher tells me that this is the only bat known to the District fauna that has not been taken in the cabin at Plummer Island.

RED BAT.

Nycteris borealis borealis (Müller).

The red bat has 32 teeth, is medium sized, with short, rounded ears, mainly naked inside and on rims, and with the top of tail membranes and

¹Proc. Biol. Soc. Washington, vol. 23, p. 101, 1910.

feet well furred. Its color is bright rusty or pinkish yellow, with a slight frosting of white-tipped hairs over back and breast. In total length it measures 117, tail 52, hind foot 10, spread of wings 330 mm.; in inches 4.5, 2.1, .4, 13.

This is one of the commonest bats to be seen flying about in the evenings, either in the open places in the woods, or about the houses in the city. It often comes out so early in the evening that its bright colors are easily recognizable as it flies softly about in search of flying insects. Apparently it is in part resident here, although a migratory species in at least the northern part of its range. Specimens collected about Washington bear dates of April, May, June, July, August, September, October, and November. At Arlington on March 1, 1919, I saw several flying about on a warm evening soon after sundown, while it was so light that their unmistakable colors could be recognized. The evening was warm and still, but the nights had been frosty for a week past, and very cold only two weeks before. Wetmore saw half a dozen of these bats flying about before dusk at the border of the woods near Lorton, Virginia, on November 17, 1917, and collected one of them. Prof. Cooke saw one near his "Wickiup" at Viresco on the Virginia side of the Potomac at midday January 1, 1913. It lit on the ground near him and its bright red fox color was very striking. A warm and springlike day had probably brought the bat out of its hibernating quarters.

An old female collected near Falls Church, Virginia, by Riley, June 3, 1905, contained 3 large embryos nearly ready for birth. A female shot by A. H. Hardisty near the northwest corner of Rock Creek Park, May 11, 1918, contained 3 embryos.

In a paper on the number¹ of young of this bat Dr. Marcus Ward Lyon, Jr., records an adult female nursing four young brought into the National Museum alive by Mr. C. J. Lawson of Washington, D. C., on June 18, 1902. Photographs of the family were secured and shown in a plate, a young one at each of the adult's nipples, where they held on with great tenacity, each having in its mouth a good deal of its mother's hair in which its hooked milk teeth firmly caught. The young were less than a third grown, but their combined weight, alive, was 12.7 grams, while that of the mother was but 11 grams.

In the Merriam collection is a female taken June 22, 1889, with two young clinging to her. On July 11, 1908, a half grown red bat was picked up on Seventeenth Street near the Corcoran Art Gallery, where it had probably fallen while learning to fly. Another young apparently just able to fly was collected at Plummer Island July 15, and another near Washington, July 24. Two to four young are the usual numbers. Little is known of the breeding habits or whether the young always cling to the mother until old enough to fly or whether they hang up part of the time in the leafy tips of branches, heads downward, where their parents spend the daylight hours.

As with other bats their food consists of a great variety of flying insects caught on the wing.

¹Lyon, Dr. Marcus Ward, Jr., Observations on the Number of Young of the Lasiurine Bats. Proc. U. S. Nat. Mus., vol. 26, p. 425, 1903.

SILVER-HAIRED BAT.

Lasionycteris noctivagans (LeConte).

These bats have 36 teeth; are medium in size, with wide, naked, somewhat quadrate ears; upper surface of tail membrane hairy near the base; fur long and soft. Color black or dusky brown with silvery tips to the hairs over back and belly; ears, feet, and membranes black or blackish. Measurements, total length 116, tail 47, hind foot 10, expanse 298 mm.; in inches 4.5, 1.85, .4, 11.7.

This is a wide ranging boreal species over the northern and mountainous parts of the continent, and a few specimens have been taken about Washington during their migrations southward. On November 12, 1885, Dr. Fisher shot one between Arlington and Rosslyn, Virginia, and in the National Museum collection are skins labeled Washington, D. C., January, 1893, and another Smiths Island, Virginia, September 3, 1893. Dr. Fisher collected another at Plummer Island, October 6, 1906, and Hardisty one near Georgetown October 17, 1918. On November 12, 1905, Preble saw five or six bats on an open hillside in the woods north of Piney Branch and west of Eighteenth Street, some of which were recognized as almost certainly of this species. All of these dates indicate migratory records.

In northern New York Dr. Merriam records the silver-haired as the most abundant breeding species of bat, and says the two young are born about the first of July.¹ At Ossining, New York, where the species is abundant, Doctor Fisher took 28 out of the siding of a house in June, which would indicate a breeding record.

LARGE BROWN BAT.

Eptesicus fuscus fuscus (Beauvois).

Total number of teeth 32; size rather large; ears of medium length, pointed, and wholly naked; wing and tail membranes mainly naked; fur glossy. Color bright hazel or hair brown, paler on belly; ears and membranes dark brown or blackish. Measurements, total length 112, tail 42, hind foot 11, expanse 300 mm.; in inches 4.4, 1.6, .45, 11.8. Weight of adult male 15.2 grams, of female 14.2 grams.

These large brown bats are common residents about Washington and may be recognized on the wing by their size and brown color. They fly at evening about our front doors and along the streets and alleys, as well as in open spaces in the woods, with a strong, rapid, but very erratic flight as they pursue their winged prey. They are resident throughout the year, breeding in summer and hibernating in nooks and corners of the houses in winter either in the same dark recesses where they spend the daylight hours or in special cavities selected for warmth and protection. They often enter open doors and windows and fly about the rooms, catching insects and lighting on the ceilings or walls. Open and vacant buildings are favorite hunting grounds for them. They live also in hollow trees, and in caves and clefts among the rocks, and have been found hibernating in rolled-up

¹Merriam, C. Hart, *Mammals of the Adirondack Region*, p. 190, 1884.

awnings. In the cabin on Plummer Island Dr. Fisher caught one in a mouse trap set on the window sill, January 21, 1907. Almost every winter during the coldest weather of January specimens are brought in from apartment houses or private residences where found flying about the rooms, awakened from their hibernation by the heat. These are always found to be excessively fat, but with empty stomachs, showing that they have been for a long time dormant.

The earliest seen flying outside were reported by Dr. T. S. Palmer on March 22, 1911, on Biltmore Street. They were large, brown bats and probably of this species. The evening was warm, and maples, elms, and poplars were in blossom, but there were no leaves on the trees, and few summer birds had arrived. On March 26, 1919, they were seen flying about my front door at 1834 Kalorama Road, while it was light enough to recognize the species. The forsythia, Japanese quince, and hyacinths were then in full bloom. These bats remain active in autumn up to October.

Usually in the West but one young is raised in a season, but there are records of two. On July 31, 1919, I found a pair dead in front of Stoneleigh Court on Connecticut Avenue, where they had evidently been knocked down and killed, or caught in the building and thrown out. The female contained two minute embryos the size of No. 8 shot, that would have been born in May or June of the next year. Another was taken August 7 in the same condition. Riley obtained a young with eyes not yet open on June 14, 1899, from a colony in an old church in Falls Church, Virginia.

From their habit of hunting about houses they are presumably one of the most useful species of bats as insect destroyers.

EVENING BAT; RAFINESQUE BAT.

Nycticeius humeralis (Rafinesque).

Total number of teeth 30, only one upper incisor and one upper premolar on each side. Size small, ears small, pointed, and with short tragus, tip of tail free of membrane. Color dark brown with very black ears and membranes. An adult specimen measures in total length 95, tail 35, hind foot 9 mm.; in inches 3.7, 1.4, .35. Weight of adult female, 9.5 grams.

This is an abundant southern bat, occurring but rarely as far north as Washington. Two specimens taken near Washington by Wm. H. Rhees, May 22, 1882, are in the National Museum collection. A female was taken at Linden, Maryland, August 11, 1896, and one taken at Oxon Hill, June 2, 1903. A female in the Biological Survey collection, U. S. National Museum, was taken at Plummer Island, September 7, 1910, by H. S. Barber. At Falls Church, Virginia, J. H. Riley reports specimens taken July 28, 1898, July 9, 1902, July 28, 1906, and July 29, 1914. A female taken by A. H. Hardisty, July 9, 1918, in Prince George County, Maryland, near the District Line, apparently had young, as the single pair of subaxillary mammae showed signs of being used.

On May 17, 1919, one of my Boy Scouts brought me a bat of this species that he had found in a crack near the top of a telephone pole at the north end of Connecticut Avenue Bridge. This also was a female and later

when it died in captivity was made into a specimen and turned in to the Biological Survey collection.

On May 20, 1920, Alex. Wetmore brought me a specimen taken in his house the previous evening at 1819 Hamline Street, Northeast. It was a female containing two small embryos.

While specimens have been taken as far north as Riverton, Virginia, and Carlisle, Pennsylvania, the main range of the species is in the lower Austral Zone west to Texas. With all the collecting done about Washington the number of specimens is so small that the only conclusion is that we are beyond the edge of its main range.

GEORGIAN BAT.

Pipistrellus subflavus (F. Cuvier).

Total number of teeth 34; size small; ears small, pointed, nearly naked; tragus short and wide; fur short and woolly; color pale russet or yellowish brown above, lighter and brighter below; ears and membranes light brown. Measurements, total length 84, tail 37, hind foot 8 mm.; in inches 3.2, 1.45, .32.

This is generally the most abundant small bat in and around Washington. Specimens have been taken during every month and at frequent intervals from April 29 to October 17. They may be seen every warm summer evening, flitting softly between the trees in the parks, or along the streets with irregular zigzag flight as they catch their food of flying insects. Often their pale colors can be recognized when they first appear in the early dusk of evening, their small size distinguishing them from the brighter-yellow red bat. During the day they sleep in some dark retreats in buildings, or in hollow trees, or under bark.

In the Merriam collection, now in the U. S. National Museum, are 16 specimens taken by Dr. Richmond May 14, 1887, under the roof of a barn near the Soldiers Home. They were part of a colony suspended in a cluster in somewhat the form of a hornets' nest from the roof in one corner of the building. Those taken were captured after the colony was dislodged. On May 3, 1896, Dr. F. V. Coville found one hanging in a bunch of elm leaves low over the water at High Island and gave it to me for a specimen. On August 18, 1904, J. H. Riley caught one in the bird gallery in the Smithsonian building. On April 29, 1914, Dr. T. S. Palmer brought me one that he had caught in his house on Biltmore Street, where it may have entered through a window, or come out of some hibernating retreat.

A specimen taken by A. H. Hardisty near Brookland on June 1, 1918, contained two embryos and had the usual arrangement of mammae, one on each side of the breast, more nearly subaxillary than pectoral. Another taken by Preble near Washington, June 3, 1899, contained two embryos, and in the Merriam collection in the U. S. National Museum is a female taken July 3, 1888, that was nursing young.

DUSKY GEORGIAN BAT.

Pipistrellus subflavus obscurus Miller.

In size and proportions about the same as *subflavus* but color duller and

darker, less yellowish and with dark tips of hairs on back more conspicuous.

This dark colored northern form described by Gerrit S. Miller, Jr., from Lake George, New York, is probably not a resident of the District. Two specimens taken as they were flying over the river near Plummer Island, September 9, 1905, are typical in color. They may have migrated from their northern habitat, or merely wandered out of their regular range after the breeding season was over.

LITTLE BROWN BAT.

Myotis lucifugus lucifugus (LeConte).

Total number of teeth 38, 2 upper incisors, and 3 upper premolars to each side. Size small; ears short, not reaching tip of nose, narrow and pointed with slender tragus; membranes mainly naked; fur smooth and glossy. Color, dull hazel brown above, buffy below, ears and membranes dusky brown. Measurements, total length 86, tail 37, hind foot 9, forearm 38.8, expanse of wings 260 mm.; in inches 3.4, 1.45, .35, 1.5, 10.2.

This is the common little brown bat of Washington and vicinity, and many specimens have been taken in May, June, July, and August. In 1888 and 1889, Morris M. Green and Dr. C. W. Richmond collected large numbers of them in the crevices between the timbers of the Old Long Bridge across the Potomac. Of these 10 adults and 15 young taken June 16, and a nursing female taken July 3, are in the Merriam collection, now a part of the U. S. National Museum collection. An old male and female and two half-grown young were collected at Plummer Island, August 1, 1897, by Dr. W. H. Osgood, and two males were collected August 24 and 31, by Dr. A. K. Fisher.

While common breeding summer bats, their winter habits and their places of hibernation are little known. In 1920, the first small bats seen, apparently of this species, were flying about in the woods on the evening of March 19, but some of the Boy Scouts reported small bats seen a week earlier.

At Falls Church, Virginia, J. H. Riley shot two females, each containing one large embryo, one on June 26, 1906, and the other on June 21, 1907.

SAY BAT.

Myotis subulatus subulatus (Say).

Total number of teeth 38; size small; ears long and narrow, reaching beyond tip of nose; fur soft and glossy. Color bright hazel brown above, buffy brown below; ears and membranes light brownish. Measurements, total length 95, tail 41, foot 9, forearm 35, expanse 247 mm.; in inches 3.7, 1.6, .35, 1.4, 9.7.

The Say bat closely resembles the little brown bat, but specimens are readily distinguished by longer ears, which laid forward reach well beyond the tip of the nose. It seems not to be very common, but occasionally one is taken near Washington. In the National Museum collection is a specimen taken by P. L. Jouy, at Alexandria, Virginia, in August, 1875. Gerrit S. Miller, Jr., took two at Forest Glen on May 10 and 26, 1896. Another

was taken in the Smithsonian grounds by John J. Veit, September 23, 1919. In the Biological Survey collection are five taken at Plummer Island, March 27 and 31, May 28, August 17, and September 14, from 1902-1910, by Fisher, Osgood, McAtee, Maxon, and Barber.

LEAST BROWN BAT.

Myotis winnemana Nelson.

From *Myotis lucifugus*, which it resembles, this tiny bat may be distinguished by its smaller size, smaller ears, and shorter forearm and blackish face. The color is bright chestnut-brown above, grayish brown below, muzzle and sides of head dusky, ears and membranes black. Measurements of type specimen, total length 82, tail 39, hind foot 8, forearm 30.5, expanse of wings 225 mm.; in inches 3.2, 1.5, .3, 1.2, 8.8.

This smallest of our eastern bats was described in 1913, by Dr. E. W. Nelson, from three specimens taken on Plummer Island in the Potomac River, 10 miles above Washington. The type and one topotype are adult males collected by Dr. A. K. Fisher, August 24 and 31, 1907, as they flew about in the cabin after dark. The only other specimen then known was a female taken from a hibernating colony of bats in a cave at Rutland, Vermont, by George L. Kirk, on April 10, 1913. Apparently it is a rare species or more would have been taken. Dr. Nelson considered it our eastern representative of the *M. californicus* group.

CURRICULUM VITAE

Notarization. I have read the following and certify that this *curriculum vitae* is a current and accurate statement of my professional record.

Signature  Date July 18, 2022

I. PERSONAL INFORMATION

I.A. UID, Last Name, First Name, Middle Name, Contact Information

UID: 112564827
Browne, Shannon Pederson
Department of Environmental Science and Technology (ENST)
College of Agriculture and Natural Resources (AGNR)
University of Maryland College Park (UMCP)
8127 Regents Drive
1459 Animal Science/Agricultural Engineering Building
College Park, Maryland 20742
Tel: 301-405-1193 F
Fax: 301-314-9023
E-mail: shannpb@umd.edu
Web Page:
<https://agnr.umd.edu/about/directory/shannon-pederson-browne>

I.B. Academic Appointment at UMD

Nov 2015-Present	Lecturer & Advisor ENST, AGNR, UMD
------------------	---------------------------------------

I.D. Other Employment

2015 - current	Lecturer Maryland Master Naturalist Program Audubon Naturalist Society, Chevy Chase, MD other locations
2013 - 2019	Bat Acoustics Research Assistant University of Maryland Center for Environmental Science Frostburg, MD
2014	Lecturer Northeast Section of The Wildlife Society Castleton State College Castleton, VT
2013-2015	Graduate Research Assistant II Environmental Science & Policy Department University of Maryland College Park, MD
2013	Graduate Research Assistant II

Department of Cell Biology & Molecular Genetics
University of Maryland
College Park, MD

2007 – 2013
Program Manager, Subunits & Certification
The Wildlife Society
Bethesda, MD

I.E. Educational Background

Ph.D. 2021
University of Maryland
Environmental Science & Technology
College Park, MD

M.N.R. 2004
Virginia Polytechnic Institute & State University
Natural Resources
National Capital Region, Falls Church, VA

B.S. 1999
Texas A&M University
Animal Science
College Station, TX

I.F. Continuing Education

- N.W.C.O.A. - Bat Standards Certification Training; Virtual; June 5, 2022
- Food, Agriculture and Natural Resources Disciplines: Emotional Support Animals Training; Virtual; May 26, 2022
- University of Maryland; TerrapinSTRONG Training; Virtual; April 13, 2022
- University of Maryland; BioRAFT; Hazardous Waste Generator; March 9, 2022; Virtual; training
- University of Maryland; Defend Your Shell Security Awareness Training; Virtual; February 14, 2022
- University of Maryland; Laboratory Fire Safety; Virtual; February 2, 2022
- Scouts BSA (formerly Boy Scouts of America) Youth Protection Training; Virtual; February 6, 2022
- Northeast Bat Working Group; Northeast Bat Working Group Annual Conference; Virtual; January 12-14; conference
- National Council for Behavioral Health; Mental Health First Aid USA; Virtual; July 23, 2021; workshop
- Cornell Lab of Ornithology Bird Academy; Feeder Birds: Identification and Behavior; Virtual; March 21, 2021; workshop
- Northeast Bat Working Group; Northeast Bat Working Group Annual Conference; Virtual; March 10-11, 2021; conference
- The Wildlife Society; The Wildlife Society Annual Conference; Virtual; September 28 – October 2, 2020; conference & workshops
- University of Maryland; Security Awareness Training; Virtual; November 18, 2020; workshop
- University of Maryland Police Department; Clery Act for Campus Security Authorities 2020-2021; Virtual; September 2020; workshop
- University of Maryland; BioRAFT; Hazardous Waste Generator; Virtual; August 26, 2020; training

- University of Maryland; TLTC; Creative ways to make your online class highly interactive and experiential; Virtual; August 21, 2020; workshop
- University of Maryland; TLTC; Alternative summative assessments for your online course; Virtual; August 13, 2020; workshop
- University of Maryland; TLTC; ELMS Canvas-Basics; Virtual; March 19, 2020; workshop
- University of Maryland; TLTC; Course design retreat; College Park, MD; August 9, 2019; workshop
- University of Maryland Police Department; Clery Act for Campus Security Authorities 2019-2020; September 2019; Virtual; workshop
- International Urban Wildlife Working Group; International Urban Wildlife Working Group Annual Conference; Portland, OR; June 2-5, 2019; conference.
- Cornell Lab of Ornithology Bird Academy; eBird Essentials; Virtual; February 3, 2019; workshop
- Northeast Bat Working Group; Northeast Bat Working Group Annual Conference; January 16-18, 2019; conference
- University of Maryland Occupation Safety and Health; Ladder Safety Training; College Park, MD; March 2019; workshop
- University of Maryland; BioRAFT; Hazardous Waste Generator; October 26, 2018; Virtual; training
- University of Maryland; BioRAFT; Laboratory Exposure Controls Training October 26, 2018; Virtual; training
- North American Joint Bat Working Group; 28th Annual Colloquium on the Conservation of Mammals in the Southeastern U.S.; Roanoke, VA; March 26-29, 2018; conference
- North American Society for Bat Research; North American Society for Bat Research Annual Conference; Knoxville, TN; October 18-22, 2017; conference
- The Wildlife Society; The Wildlife Society Annual Conference; Raleigh, NC; October 15-19, 2016; conference & workshops
- Northeast Bat Working Group; Northeast Bat Working Group Annual Conference; Baltimore, MD; January 11-13, 2016; conference
- The Wildlife Society; The Wildlife Society Annual Conference; Pittsburg, PA; October 25-30, 2014; conference & workshops
- North American Society for Bat Research; North American Society for Bat Research Annual Conference; Albany, NY; October 22-24, 2014; conference.
- Bat Conservation and Management: Acoustic Training of Eastern U.S. Bats; Shepherdstown, WV; August 2014; workshop
- Bat Conservation and Management; Field Training Course in Bat Ecology and Management; Paradise, AZ; May 13-23, 2014; workshop
- Northeast Bat Working Group; Northeast Bat Working Group Annual Conference; Clinton, NJ; January 8-10, 2014; conference
- ESRI; Learning Environments: GIS Tools for Critical Thinking; Virtual; June 21-28, 2013; workshop
- The Wildlife Society; The Wildlife Society Annual Conference; Portland, OR; Oct 13-18, 2012; conference & workshops
- The Wildlife Society; The Wildlife Society Annual Conference; Waikoloa, HI; Nov 5-10, 2011; conference & workshops
- The Wildlife Society's Wildlife Damage Management Working Group; Urban Coyote Damage Management Workshop; Nebraska City, NE; April 21, 2011; workshop
- The Wildlife Society; The Wildlife Society Annual Conference; Snowbird, UT; Oct 2-6, 2010; conference & workshops

- The Wildlife Society; The Wildlife Society Annual Conference; Monterey, CA; Sept 20-24, 2009; conference & workshops
- The Wildlife Society; The Wildlife Society Annual Conference; Miami, FL; Nov 8-12, 2008; conference & workshops
- The Wildlife Society; The Wildlife Society Annual Conference; Tucson, AZ; Sept 22-26, 2007; conference & workshops

I.G. Professional Certifications, Licenses, and Memberships

- National Wildlife Control Operators Association Bat Standards Certification, 2022-current
- National Wildlife Control Operators Association, 2022-current
- Special Purpose Possession Permit #MBPER0009294, USFWS, 2021-current
- Certified Wildlife Biologist ® 2020-current
- Scientific Collection Permit #57324, MDDNR, 2019-current
- Associate Wildlife Biologist ® 2009-2019
- North American Society for Bat Research, Member, 2017 – current
- Northeast Bat Working Group Member, 2015 - current
- Project WILD Instructor Certificate, 2011
- The Wildlife Society Maryland-Delaware Chapter, Member, 2003-current
- The Wildlife Society Wildlife Damage Management Working Group, Member, 2003-current
- The Wildlife Society Urban Wildlife Management Working Group, Member, 2003-current
- The Wildlife Society, member, 2003-current

II. RESEARCH, SCHOLARLY, CREATIVE AND/OR PROFESSIONAL ACTIVITIES

II.C.1. Refereed Journal Articles

Browne, S.P., and J.M. Mullinax. 2020. The Pandemic Paradigm: How can we teach wildlife courses with quality – and compassion – during the pandemic? *The Wildlife Professional* 14: 42-47.

II.D.1. Refereed Conference Proceedings

Credille, K.M., C.J. Lupton, R.A. Kennis, R.L. Maier, J. Dziezyc, S. Castle, G.A. Reinhart, G.M. Davenport, and R.W. Dunstan. 2000. The Role of Nutrition on the Canine Hair Follicle: A Preliminary Report. Pages 37-54 In Reinhart, G.A. and D.P. Carey, eds. *Recent Advances in Canine and Feline Nutrition*, Iams Nutrition Symposium Proceedings. Orange Frazer Press, Wilmington, Ohio.

II.E. Conferences, Workshops, and Talks

II.E.1. Keynotes

Pederson, S. 2010. History of Women in Natural Resources. Maryland Department of Natural Resources, Annapolis, MD.

II.E.3. Refereed Presentations

Browne, S. P., and J. M. Mullinax. 2022. Updated ecology of cave bats. Northeast Bat Working Group Annual Meeting, Virtual and Manchester, NH.

Rohrbaugh, L., and S. P. Browne. District of Columbia's Bat Update. 2022. Northeast Bat Working Group Annual Meeting, Virtual and Manchester, NH.

Pederson, S. 2019. Evaluating relationships between bats and urban landscapes. International Urban Wildlife Conference, Portland, OR.

Pederson, S. 2019. Evaluating Relationships between Bats and Landscape Characteristics. Northeast Bat Working Group Annual Meeting, State College, PA.

Pederson, S. 2019. Maryland's Bat Update (on behalf of Dana Limpert, MDDNR). Northeast Bat Working Group Annual Meeting, State College, PA.

Pederson, S. 2019. District of Columbia's Bat Update (on behalf of Lindsay Rohrbaugh, DDOE). Northeast Bat Working Group Annual Meeting, State College, PA.

II.E.6. Refereed Posters

Pederson, S. 2018. City bats. North American Joint Bat Working Group Meeting & 28th Annual Colloquium on the Conservation of Mammals in the Southeastern U.S., Roanoke, VA.

Pederson, S. 2017. Bats and the City. North American Society for Bat Research Annual Conference, Knoxville, TN.

Pederson, S. 2016. Urbanization's impact on bats in White Nose Syndrome-positive region. The Wildlife Society Annual Conference, Raleigh, NC.

Pederson, S. 2016. Urbanization's impact on bats in White Nose Syndrome-positive region. MEES Colloquium. College Park, MD.

Pederson, S. 2016. Can cities save bats? University of Maryland Bioscience Day, College Park, MD.

Pederson, S. 2014. Bats Inside the Beltway? University of Maryland Bioscience Day, College Park, MD.

Pederson, S. 2014. Restoring an Urban Meadow: Is it Worth the Time? North American Society for Bat Research Annual Conference, Albany, NY.

Pederson, S. 2013. Recommendations Based on Urban/Suburban Coyote Human Dimensions Surveys: A Metadata Analysis. Maryland-Delaware Chapter of The Wildlife Society Spring Meeting, New Germany State Park, MD.

Pederson, S. 2013. Recommendations Based on Urban/Suburban Coyote Human Dimensions Surveys. Northeast Association of Fish and Wildlife Agencies Annual Conference, Albany, NY.

Pederson, S. and L. N. Carbyn. 2013. TWS Certification – Is it Worth it? Joint Meeting of the Alberta Chapter and Canadian Section of The Wildlife Society, Canmore, Alberta, Canada.

Pederson, S. 2005. Preparing Northern Virginia Residents for Urban Coyotes. The Wildlife Society Virginia Chapter Annual Winter Meeting, Sterling, VA.

Pederson, S. 2004. Preparing Residents in the Greater Washington Metropolitan Area for Urban Coyotes. Virginia Tech Graduate Education Week, Falls Church, VA.

II.E.7. Refereed Panels

Pederson, S. 2021. Navigating Conservation during a global pandemic (panel discussion). Presented to Michigan Chapter of The Wildlife Society Annual Conference, Virtual.

II.E.8. Non-Refereed Presentations

Browne, S.P. 2022. Ecology of Maryland's Cave Bats. Maryland Extension Woodland Wildlife Wednesday, Virtual.

Pederson, S. 2021. Just plain batty: New discoveries in the ecology of hibernating Maryland bats. Presented to Audubon Naturalist Society, Virtual.

Pederson, S. 2020. Backyard Wildlife Survey. Presented to Audubon Naturalist Society, Virtual.

Pederson, S. 2018. Searching for Bats! Presented to Harford County Public Library, Public Library, Norrisville, MD.

Pederson, S. 2018. Bats: Busting the myths about bats. Presented to Chesapeake Bay Environmental Center, Grasonville, MD.

Pederson, S. 2018. Using science to study animals. Presented to all 8th grade science classes, Longfellow Middle School, McLean, VA.

Pederson, S. 2018. Welcome campers to bat ecology. Presented to summer campers at Audubon Naturalist Society, Chevy Chase, MD.

Pederson, S. 2016. Mammal Identification. Presented to 4-H Congress, College Park, MD.

Pederson, S. 2016. Bat ecology 101. Presented to Harford County Public Library, Bel Air, MD.

Pederson, S. 2015. Explorations in Bat Research. Presented to Natural History Society of Maryland, Baltimore, MD.

Pederson, S. 2012. Conservation Affairs and Subunit Leadership Workshop. Presented to The Wildlife Society's 19th Annual Conference, Portland, OR.

Pederson, S. 2011. Learning to Live with Coyotes. Presented to Grosvenor Place Homeowner's Association, Bethesda, MD.

Pederson, S. 2011. Preventing Urban Coyote-Human Conflict. Presented to Reston Association, Reston, VA.

Pederson, S. 2008. Co-existing with Urban Coyotes in the East. Presented to Reston Association, Reston, VA.

Pederson, S. 2008. Living With the Trickster: Coyotes in the East. Presented to Audubon Naturalist Society, Leesburg, VA.

Pederson, S. 2005. Preparing Northern Virginia Residents for Urban Coyotes. Presented to The Wildlife Society Virginia Chapter Annual Winter Meeting, Sterling, VA.

Pederson, S. 2005. Urban Coyotes: Going Wild in the City. Presented to Virginia Polytechnic Institute and State University Graduate Research Seminar, National Capital Region, Falls Church, VA.

II.F.5. Refereed Extension Publications

Pederson, S., D. Trauger, and J. Parkhurst. 2007. Learning to Live with Coyotes in Metropolitan Areas. Virginia Cooperative Extension Publication 420-050, Blacksburg, VA.

II.L. Gifts, and Funded Research not administered by ORA

II.L.1. Gifts (*solicited and in-kind funds*)

2017 UMD Sustainability Fund, \$5,000, Co-PI to develop Carbon Management Course

2016 UMD Sustainability Mini Grant, \$1,980 grant recipient

2014 Cosmos Club Scholar, \$4,000 grant recipient

II.Q. Research Fellowships, Prizes and Awards

- 2022 AGNR Graduate Student of the Year Award in ENST
- 2022 AGNR Overall Student of the Year Award
- 2019 Goldhaber Award \$400
- 2017 North American Society for Bat Research Best Poster Award
- 2017 Phi Kappa Phi Honor Society inductee
- 2016 Debbie Morrin-Nordlund Travel Grant Fellow, \$600 Award
- 2016 Sustainability Teaching Fellow (formerly Chesapeake Fellowship), \$500 Award
- 3rd place, 2014 UMD Bioscience Day Poster Competition, Environmental Science Category
- 1st place, 2005 Virginia Tech Graduate Education Week Student Poster Competition
- 2nd place, The Wildlife Society Virginia Chapter Student 2005 Poster Competition
- Dean's Honor Roll, Recipient
- Distinguished Student Award, Recipient
- Academic Achievement Award, Recipient

III. TEACHING, MENTORING AND ADVISING

III.A. Courses Taught

ENST 214 Introduction to Fish and Wildlife Sciences (3 credits)

Spring 2022

Enrollment: 33

ENST 462 Field Techniques in Wildlife Management (3 credits)

Spring 2022

Enrollment: 18

ENST499 Special Topics (1 or 3 credits)

Spring 2022

Enrollment: 7

ENST499Y: Special Topics: University Teaching (3 credits)

Spring 2022

Enrollment: 1

ENST472 Capstone (3 credits)

Fall 2021

Enrollment: 2

ENST499 Special Topics (3 credits)

Fall 2021
Enrollment: 1

ENST 214 Introduction to Fish and Wildlife Sciences (3 credits)
Spring 2021
Enrollment: 44

ENST 462 Field Techniques in Wildlife Management (3 credits)
Spring 2021
Enrollment: 10

ENST 456 Spatial Analysis & Ecological Sampling (3 credits)
Spring 2021
Enrollment: 5

ENST 456 Spatial Analysis & Ecological Sampling (3 credits)
Fall 2020
Enrollment: 12

ENST 499W: Special Topics: Endangered Species Management (3 credits)
Fall 2020
Enrollment: 1

ENST 214 Introduction to Fish and Wildlife Sciences (3 credits)
Spring 2020
Enrollment: 40

ENST 462 Field Techniques in Wildlife Management (3 credits)
Spring 2020
Enrollment: 16

ENST472 Capstone II (3 credits)
Spring 2020
Enrollment: 1

ENST 489 Research Experience (3 credits)
Fall 2019
Enrollment: 2

ENSP 386 Internship Experience (3 credits)
Fall 2019
Enrollment: 2

ENST 214 Introduction to Fish & Wildlife Sciences (3 credits)
Spring 2019
Enrollment: 46

ENST 462 Field Techniques in Wildlife Management (3 credits)
Spring 2019
Enrollment: 14

ENST499Y: Special Topics: University Teaching (3 credits)
Spring 2019
Enrollment: 2

ENSP 386 Internship Experience (3 credits)
Spring 2019
Enrollment: 1

ENST 499 Special Topics (3 credits)
Spring 2019
Enrollment: 4

ENST 489 Research Experience (3 credits)
Fall 2018
Enrollment: 1

ENST 214 Introduction to Fish & Wildlife Sciences (3 credits)
Spring 2018
Enrollment: 56

ENST 462 Field Techniques in Wildlife Management (3 credits)
Spring 2018
Enrollment: 9

ENST499Y: Special Topics: University Teaching (3 credits)
Spring 2018
Enrollment: 2

ENSP 386 Internship Experience (3 credits)
Spring 2019
Enrollment: 1

ENST 489 Research Experience (3 credits)
Spring 2018
Enrollment: 3

ENST 499 Special Topics (3 credits)
Spring 2018
Enrollment: 2

ENST 461 Urban Wildlife Management (3 credits)
Fall 2017
Enrollment: 20

ENST 489 Research Experience (3 credits)
Fall 2017
Enrollment: 7

ENSP 386 Internship Experience (3 credits)

Fall 2017
Enrollment: 1

ENST 499 Special Topics (3 credits)
Fall 2017
Enrollment: 1

ENST499Y: Special Topics: University Teaching (3 credits)
Fall 2017
Enrollment: 1

ENST 489 Research Experience (3 credits)
Summer Session I 2017
Enrollment: 1

ENST 499T Special Topics in ENST: Spatial Analysis & Ecological Sampling (3 credits)
Spring 2017
Enrollment: 15

ENST472 Capstone II (3 credits)
Spring 2017
Enrollment: 5

ENST 489 Research Experience (3 credits)
Spring 2017
Enrollment: 4

ENST 499 Special Topics (3 credits)
Spring 2017
Enrollment: 3

ENST 461 Urban Wildlife Management (3 credits)
Fall 2016
Enrollment: 29

UNIV100 The Student in the University (1 credit)
Fall 2016
Enrollment: 8

ENST 489 Research Experience (3 credits)
Fall 2016
Enrollment: 6

ENST 499 Special Topics (3 credits)
Fall 2016
Enrollment: 2

ENST 489 Research Experience (3 credits)
Summer Session I 2016
Enrollment: 2

ENST 489 Research Experience (3 credits)
Spring 2016
Enrollment: 2

ENST 499 Special Topics (3 credits)
Spring 2016
Enrollment: 1

III.B.6 Course or Curriculum Development

ENST Curriculum Change for all 4 ENST undergraduate concentrations

ENST 456 (3 credits) Spatial Analysis & Ecological Sampling
ENST 499 (3 credits) Special Topics: Cave bat behavior
ENST 499 (1 credit) Special Topics: Wildlife trafficking
ENST 499W (3 credits) Special Topics: Endangered Species Management
ENST 499P (3 credits) Carbon Management
ENST 499T (3 credits) Spatial Analysis & Ecological Sampling
ENST 489 (3 credits) Field Experience: Urban Wildlife Study
ENST 499 (3 credits) Special Topics: Urban ecology design
ENST 499 (3 credits) Special Topics: Bat activity analysis
ENST 499 (3 credits) Special Topics: Wildlife population estimation
ENST 499 (3 credits) Special Topics: Wildlife camera trapping

III.D. Mentorship

III.D.1. Junior Faculty

2020 – present	Primary supervisor to three full-time PTK faculty members
2020 – present	Secondary supervisor to three full-time PTK faculty members and one part-time PTK faculty member
2016 – 2020	Primary supervisor to one full-time PTK faculty member and six part-time PTK faculty members

III.E Advising: Other than Directed Research

III.E.1. Undergraduate

Primary advisor to ~80 undergraduate students in 2021
Secondary advisor to 231 students in 2021
Primary advisor to ~75 undergraduate students in 2020
Secondary advisor to 230 students in 2020
Primary advisor to 53 undergraduate students in 2019
Secondary advisor to 244 students in 2019
Primary advisor to 90 undergraduate students in 2018
Secondary advisor to 282 students in 2018
Primary advisor to 83 undergraduate students in 2017
Secondary advisor to 276 students in 2017
Primary advisor to 127 undergraduate students in 2016
Secondary advisor to 290 students in 2016
Primary advisor to 50 undergraduate students in 2015

III.I. Teaching Awards

2016 Non-tenure track Lecturer of the Year Award, ENST

IV. SERVICE AND OUTREACH

IV.A.3. Reviewing Activities for Journals and Presses

Bessent, A. 2022. Bats in the Anthropocene. Academia Letters. Open Access – Distributed under CC by 4.0.

IV.B. Committees, Professional & Campus Service

IV.B.1. Campus Service Department

2022	Faculty Search Committee for Quantitative Ecologist
2020	ENST Leadership Council, Member
2020	ENST Retreat Planning Committee, Member
2019 – present	ENST Strategic Planning Committee, Member
2018 – present	PTK Committee, Member
2018 – 2019	Chair, PTK Committee
2018 – 2020	Faculty Search Committee for PTK
2015 – 2016	Faculty Search Committee for Wildlife Ecologist
2015 – present	ASABE and Green Family Scholarship, supervisor
2015 – present	ENST Undergraduate Committee PCC member
2015 – present	ENST Diversity & Mentor Committee member
2015 – 2018	ENST Faculty & Staff Excellence Awards Committee member

IV.B.2. Campus Service College

2022	Faculty Search Committee for AGNR Assistant Dean
2019 – current	College of AGNR Ag Discovery Program guest speaker (2019 & 2022)
2017 - 2018	College of AGNR Focus Group Member
2015 – present	College of AGNR Academic Programs Committee

IV.B.3. Campus Service University

2022 – present	Frederick Douglass Scholarship Committee Member
2017 – present	Lights Out UMD bird-building collision research supervisor
2016 – 2017	UMD Scholarship in Practice Board (ENST representative)
2015 – present	Departmental Evaluator for UMD Transfer Credit Services Office
2015 – present	RESTORE (University club) Faculty Advisor
2013 – present	UMD Student Chapter of The Wildlife Society Graduate Student Liaison (aka co-Advisor)

IV.B.8. Leadership Roles in Meetings and Conferences

- Co-host; International Urban Wildlife Management Conference; Washington, DC; June, 2023 (anticipated)
- Co-host; Northeast Bat Working Group Annual Meeting; Virtual & Manchester, NH; January 12-14, 2022
- Co-host; Northeast Bat Working Group Annual Meeting; State College, PA; January 16-18, 2019
- Co-host; Northeast Bat Working Group Annual Meeting; Baltimore, MD; January 13-15, 2016

IV.C.3. Corporate or Other Board Memberships

2015 – 2021 Northeast Bat Working Group Treasurer

IV.E. Media Contributions

- [UMD Terp Magazine – Safe Flight: UMD Faculty and Students Encourage Bird-Friendly Buildings \(Spring 2022 Anticipated\)](#)
- [UMD Diamondback newspaper interview – Death by design: Windows in UMD’s buildings are killing birds](#)
- [Guggenheim consortium interview - Sharing our cities with bats](#)
- [WTOP interview – Why bats are being spied on in a local meadow](#)
- [WTOP interview – The non-scary facts about bats](#)
- [Audubon Naturalist Society newsletter interview - The Bat Brigade at Woodend](#)
- [UMD Diamondback newspaper interview – UMD research team studies how bats react to urban development](#)
- [Bethesda magazine interview - Suburban Jungle](#)
- [WAMU interview - Coyotes Are Here To Stay In D.C. Region](#)

IV.F. Community and Other Service

- Scouts BSA (formerly Boy Scouts of America) Pack 1127 Assistant Den Leader
- MCPS Northwest High School wildlife science course development consultant
- Our Small World Preschool guest speaker
- UMD Bat Festival coordinator and speaker for College Park residents
- ANS Woodend Nature Sanctuary Summer Camp, speaker for campers about bat ecology
- PGCPs Greenbelt Middle School class guest speaker
- Hidden Oaks Nature Center Bat Fest guest speaker
- Cardinal Shehan School assembly guest speaker
- FCPS McLean High School Career Day guest speaker
- FCPS Kent Gardens Elementary School assembly guest speaker
- FCPS Westgate Elementary School class guest speaker

IV.G. Service Awards and Honors

2020 Outstanding Academic Advisor, AGNR Dean’s Student Advisory Council