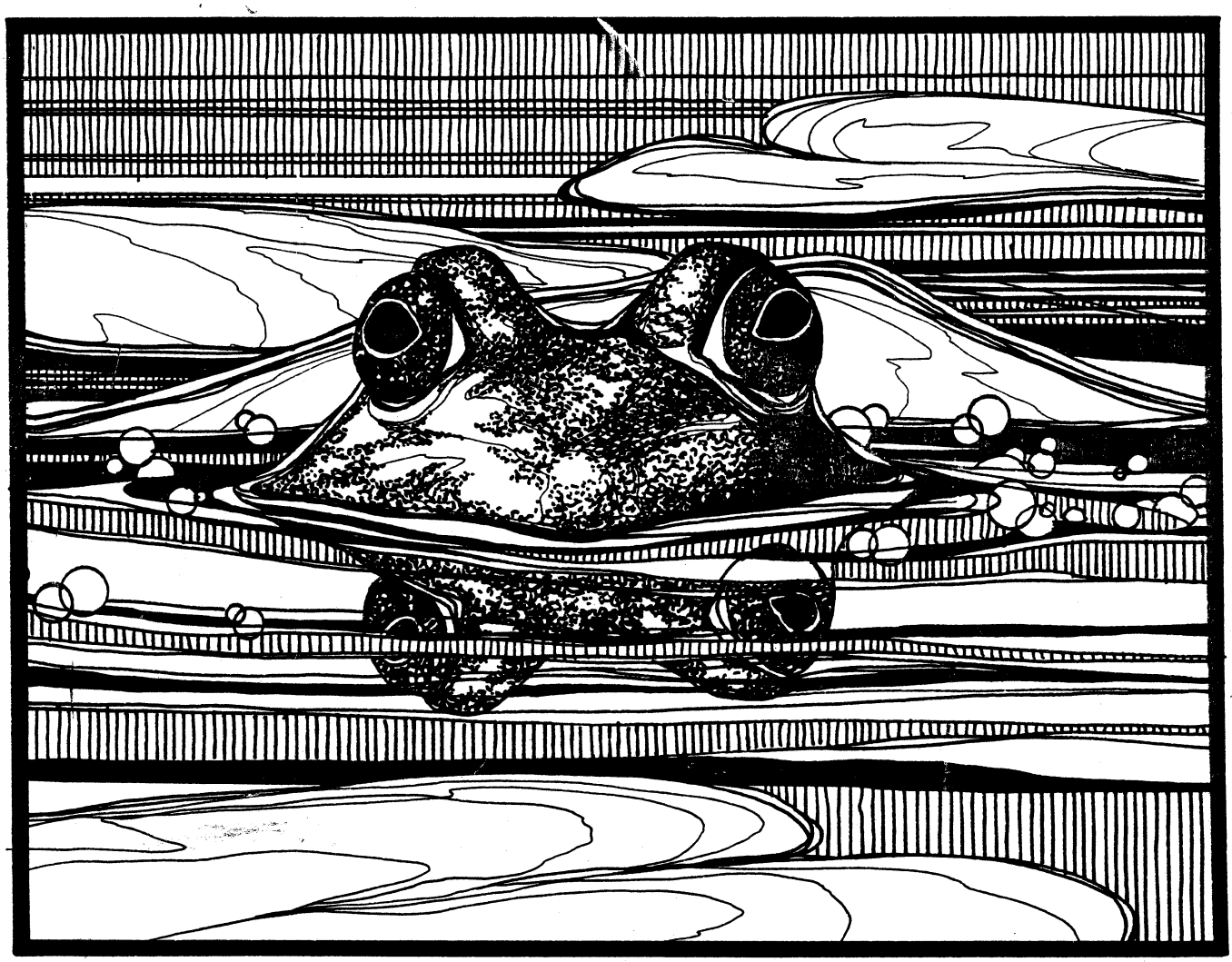
VIRGINIA'S AMPHIBIANS AND REPTILES

A DISTRIBUTIONAL SURVEY



VIRGINIA HERPETOLOGICAL SURVEY

VIRGINIA'S AMPHIBIANS AND REPTILES:
A DISTRIBUTIONAL SURVEY

FRANKLIN J. TOBEY

VIRGINIA HERPETOLOGICAL SURVEY

1985

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"There is no part of natural history more interesting or instructive than the study of the geographical distribution of animals. Places not more than fifty or a hundred miles apart often have species ... at the one, which are not found at the other.

There must be some boundary which determines the range of each species; some external peculiarity to mark the line which each does not pass."

Alfred Russel Wallace

1853

COMMON NAMES used in this booklet are the standard names that were assigned each species by the committee on herpetological common names of the American Society of Ichthyologists and Herpetologists (ASIH). These names are preferred over the many colloquial names which have always caused confusion. Also, they are the common names used in "A Field Guide to Reptiles and Amphibians of Eastern and Central North America" (Conant, 1975).

SCIENTIFIC NAMES in this booklet follow usage in the same field guide. In this way, we hope to reduce the confusion likely to arise from changes in scientific names which have yet to be widely accepted by the herpetological community or used in the current popular field guides.

A VIRGINIA INDEX to Dr. Conant's Field Guide appears as an index to the Virginia maps in this survey booklet. The Virginia index first appeared in 1976 as Virginia Herpetological Society (VaHS) Bulletin No. 80. It was designed by the survey coordinator to help Virginians identify specimens through use of the second edition of the Peterson Field Guide No. 12 published by the Houghton Mifflin Company of Boston, Massachusetts (Conant, 1975).

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Cover: Bullfrog *(Rana catesbeiana)* See map on page 63 for its distribution in VA.

Design by: Michael R. Berardesco, Berardesco Associates, Inc. Chatham, New Jersey.

THIS BOOKLET PRESENTS THE KNOWN RANGE, IN VIRGINIA, OF EACH OF THE STATE'S NEARLY ONE-HUNDRED AND FIFTY KINDS OF AMPHIBIANS AND REPTILES.

THIS IS THE FIRST COMPREHENSIVE HERPETOLOGICAL SURVEY FOR THE COMMONWEALTH OF VIRGINIA.

INTRODUCTION

Throughout the ages, amphibians and reptiles have been feared by mankind. The fear was spawned by ignorance; fear of the unknown. The association of these animals with evil is deeply ingrained in the culture we inherited from the Old World.

The discovery and exploration of the New World gave new life, literally, to the study of Nature. Strange plants and animals motivated new generations of naturalists. While 18th century natural history was brewing and maturing, the average person's view of amphibians and reptiles still was a reflection of Medieval folkore. Human disdain for creeping things was so pervasive that, until the advent of modern science, amphibians and reptiles were included under the same category as insects.

Scientific effort was doing wonders for the accretion of academic knowledge in 19th century America. Distribution of those scientific gains, however, had to await the discovery and use of better means of communication. Natural history lectures, popular in Victorian times, were limited to the social elite in urban centers. Considerable misinformation continued in popular circulation.

Zoological parks, museum exhibits, motion pictures and TV, along with the necessary leisure to enjoy them, have expanded our horizons lightyears beyond those of earlier generations. The general public has grown accustomed to turtles, lizards and snakes, salamanders, newts, frogs, treefrogs and toads. Yet, many cling to the past by having uneasy feelings about close physical proximity to the so-called lower forms of life.

Only in relatively recent times have attempts been made to redress the long neglect of such a major, however inconspicuous, component of our environment. Ignorance and superstition have not fully been cast off. Yet, we have come a long way.

In 1982 an unusually homely bug-eyed monster charmed the movie-going public. Heavy odds prevent earthlings from harboring an orphan from Outer Space. There is no need to feel culturally-deprived if the natural physical barriers are never relaxed. Quite equally "unearthly" beings have been seen on Earth and enjoyed by ostensibly sober people. All that is required is an insatiable interest in zoology.

In the 1950's the author spent several weekday lunch-hours at the National Aquarium in the basement of the U.S. Department of Commerce building.* There, a giant salamander called a "hell-bender" was on view in one of the aquaria. He was alive and replete in what may only be described as gorgeous ugliness. These rarely-seen amphibians may strike some as "ugly monsters from the depths" or "unearthly". But, in the natural sciences, too, facts are often as bizarre as science fiction. So why the need to fantasize ? The real world has an adequate supply of wrinkly, wobbly, and zany-shaped animals and plants.

In reality, amphibians and reptiles are highly beneficial to mankind. Insects and rodents annually destroy crops worth billions of dollars. Insects and rodents are high on the list of items in the diets of frogs and snakes. Turtles may nibble lettuce or cadge a few strawberries from the family garden plot. But, amphibians and reptiles do not destroy agricultural crops on a grand scale. Also, few of them are known to carry human-disease-causing organisms or any parasites that may do so.

Not many people are aware of Virginia's nearly 150 kinds of amphibians and reptiles. These animals pose no real danger to mankind, except in the relatively rare event of a bite by a poisonous snake. Not many people have that hazard in focus.

Poisonous snakebite is painful. Swelling, shock, and other distress accompany an envenomated bite. Any bite should be seen by a physician. This is where the story of the Virginia Herpetological Survey begins. A medical student's interest in the statistics of poisonous snakebite (Wood, 1954) gave this statewide survey a running start.

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* On Fourteenth Street, N.W., between Pennsylvania Avenue and Constitution Avenue, Washington, D.C. about a quarter of a mile from the National Museum of Natural History, Smithsonian Institution. Take the subway to Federal Triangle METRO Station.

John Thornton Wood, M.D., while a student in the School of Medicine at the University of Virginia at Charlottesville:
(1) Searched the existing pertinent scientific literature;
(2) Sought out actual preserved specimens of poisonous snakes in museum and college biology departments;
(3) Obtained the observation notes of local naturalists and known herpetologists; and,
(4) Checked the locations of snakebite accidents taken from admission records on file at twenty Virginia hospitals.

On the basis of this research, Dr. Wood was able to map the distribution of Virginia's four poisonous snakes: northern copperhead, the eastern cottonmouth, timber rattlesnake and the canebrake rattlesnake.

Why is it useful to know such things about this group of animals ? Wood knew that many people worry, needlessly, about being bitten by snakes, even by a variety that does not occur in their particular area of the state.

Also, he learned that many harmless snakes were killed by people because they were mistakenly thought to be poisonous. Wood knew that factual information would be helpful, not only to physicians, but to all those whose occupations or whose recreational activities took them outdoors.

Later research, by others, determined that the annual average incidence of poisonous snakebite in Virginia is less than six bites per 100,000 population. Also, fortunately, few people in the United States die from snakebite. In this state it is a relatively rare event. Death from being struck by lightning is more common. For example, death is rarely the outcome of a copperhead bite. No deaths from that cause were recorded east of the Mississippi River in the decade 1950-1960. Even so, all four of Virginia's poisonous snakes should be considered deadly so that these animals are accorded the respect they deserve.

The observed clinical effects of snakebite vary from case to case. The variety of poisonous snake and the amount of venom injected, as well as the quality of the venom, are three of the factors which depend upon the snake. On the human side of the equation, each snakebite victim brings a personal set of factors to the scene. Among these are: age, past medical history, their health, weight, serum sensitivity and any other allergies.

People who cannot distinguish between local harmless snakes and local poisonous snakes should avoid all kinds of snakes.

Caution in areas where poisonous pit-vipers are known to occur is good preventive medicine. It is easier to get into good safety habits than it is to endure the pain, discomfort, and expense of an envenomated bite. Safety precautions are only a bit more sophisticated than those used to avoid tin cans, broken glass, or rusty nails on the hiking trail.

Some commonly-held but needless anxieties were eliminated by John T. Wood's pioneering study.

The poisonous Eastern Coral Snake *(Micrurus fulvius)*, and the Eastern Diamondback Rattlesnake *(Crotalus adamanteus)*, are not native to Virginia. Central North Carolina is still accepted as the northernmost limit for breeding populations of these two snakes plus the American Alligator *(Alligator mississippiensis)*. This, despite occasional captures of a baby 'gator or a Central American Caiman juvenile in Virginia. This state has no native crocodilians (alligators, caiman, or crocodiles).

In spite of its salutary climate, Virginia does not offer a suitable haven for semi-tropical or tropical amphibians and reptiles. Among the variables which must be matched to the needs of transplanted species are: food, habitat, temperature range, barometric pressure, humidity, and geological substrate. Virginia may not possess the right mix of the survival requirements of an introduced species. Here, the word "introduced" infers an artificial transplanting of a non-native species.

Few introduced species are recorded on the maps which appear toward the rear of this booklet. The U.S. National Museum of Natural History's large preserved collection has a specimen of the Mississippi Map Turtle *(Graptemys kohni)* that was said to be captured in the Great Dismal Swamp near the City of Suffolk some years ago. Its release there may have been the prank of a playful herpetologist, or the act of distracted parents who wanted to give their child's pet a more permanent home. It is one of the few non-natives to appear on our maps. The species is native to the Central Gulf States.

Tropical species, once imported and released by well-meaning but poorly-informed people, rarely survive a typical winter, even in Virginia. If the species happens to be aquatic it may find the warm water outflow from an industrial site or power-plant. If it does, its chances of survival are considerably enhanced. Opportunity for reproduction, however, under normal circumstances would be limited if not impossible. Not many of the truly exotic species released in Virginia show signs of establishing a permanent breeding population. Hence, a real breeding population in a natural setting is a good criterion for a native or indigenous species.

Outlandish species of amphibians or reptiles turn up, usually, in urban or suburban areas. Commonly these are out-of-state varieties known to have been popular in the pet trade. The one Mississippi Map Turtle found in the swamps near Suffolk, VA., is a good example.

"Exotics," as they are called, are brought into the state by any one of several routes. Some are merely souvenirs that were purchased and brought home by local residents. The prized curio is thoughtlessly turned loose after the novelty wears off, or it manages to get out of its container. Other live specimens are shipped in by commercial collectors and are destined for the pet shops or for biological supply houses or laboratories. The animals either escape by accident or are intentionally released when they become a burden, cannot be fed, or are unmarketable.

It is possible, also, for small amphibians or small reptiles to enter the state as stowaways in burlap-covered tree roots, or in shrubs shipped from distant nurseries. There are many known and confirmed accounts of such stowaways arriving at a worksite in rough timber, heavy rock for waterway rip-rap, in fill-dirt, or other bulk shipments moved over distance by barge or railroads.

Highly adaptable species have been introduced by one of these methods and have become feral in areas that offered adequate or nearly suitable habitat. The Red-eared Turtle *(Chrysemys scripta elegans)* is an excellent example. The species is from the Gulf States and was sold in pet stores until banned a decade or so ago. Turtles, and some domestic fowl, carry *Salmonella*, a micro-organism that can produce severe diarrhea accompanied by cramps in those who fail to wash their hands before eating a meal. Some cases occurred from handling pet turtles. There are red-eared turtle colonies in ponds and old abandoned canals in urban and suburban areas of this and adjacent states as a result of releases over the 1950's.

Within-the-state (intrastate) relocation of some subspecies or species is more commonly noted among the salamanders. People who go fishing will purchase "spring lizards" in a county near their homes and take them some distance to another county. As we know, live bait can escape. Instances of this intrastate activity have been reported in the scientific literature. (Martof, 1953).

Artificial shifting of herpetiles with release in a strange habitat should be discouraged. Work with the Fence Lizard *(Sceloporus undulatus)* showed that when young Ohio lizards were transported to Texas, and young Texas lizards were taken to Ohio, both transported populations failed to reach breeding age (Tinkle, 1973).

We have been discussing a number of things relating to the distribution of amphibians and reptiles. The participants in this survey have had to cope with many of these considerations. Fortunately, we have had access to much of the literature, both scientific and popular, on Virginian herpetology. Happily, a lot more was in print than in 1954 when John T. Wood launched his studies on the distribution of poisonous snakes.

In the introduction to his paper (Wood, 1954), he observed:

> "Prior to 1940 there was only incidental mention of poisonous snakes in this state. ... These reports have not been summarized previously, and little is known of the distribution of poisonous snakes in Virginia. ..."

If there was scant information on venomous snakes, imagine the status of information on the other 140+ (*) varieties of amphibians and reptiles which are now known to have some distribution in Virginia. Several of us "pooled our ignorance" and launched the survey shortly after Dr. Wood's 1954 publications appeared. The coordinator volunteered to see it through and into print, helped by many and prodded by more. The present booklet is dedicated to all students of Virginia herpetology, past, present, and future.

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* See index pages 103-109.

THE SURVEY

Long before mankind arrived on this continent, southern and southwestern amphibians and reptiles filled in the areas to the limits of their temperature tolerances. Others, more adaptable to cooler climates, acquired territories by moving into lands surrendered by the glacier's northward retreat.

Virginia's ideal location between the cooler North and the warmer South offers the best of both to a great assortment of animals and plants. In the case of the salamanders, particularly, a few species are found only in Virginia. Their habitat may be restricted to a few mountaintops. Other kinds are found in a single drainage basin or watershed. There, the individual members of the species live out their full cycle. Amphibians and reptiles are bound to their habitats more closely than the highly mobile birds, or even the mammals.

Some varieties of salamanders, frogs and toads, turtles, lizards and snakes, are found just about anywhere in the state. Anywhere, that is, where suitable food is available and the available habitat is suitable. A few species are to be found only in those counties along the Virginia-North Carolina line where they are at the northernmost edge of their range. Other species may be observed or collected only in areas of the state adjacent to West Virginia or Maryland where these varieties are at the extreme southern limit of their normal range.

For the general (U.S.) range of any species or subspecies, see "A Field Guide to the Reptiles and Amphibians of Eastern and Central North America" by Dr. Roger Conant (1975) published by the Houghton Mifflin Company, Boston, Massachusetts.

RANGE relates to the limits of a species or a subspecies -- its distribution over a geographic area that provides all of the necessities of life: food, water, acceptable habitat, *etc.* Range has little to do with actual numbers of individuals. Obviously, it takes a greater number of individuals of a given species to occupy a larger area.

POPULATION, properly used, refers primarily to people, but the word has been used in zoology to cover the number of individuals of non-human species found in a given area. Only a few of our more dedicated naturalists have attempted a census of our amphibian and reptilian species. Census studies are badly needed. Virginia is a large state and it can absorb the efforts of many field workers. If any number of persons with sufficient interest in the task would devote time to population studies, much would be added to scientific knowledge.

It is the sole purpose of this booklet to present the known range, in Virginia, of each of the state's nearly one hundred and fifty kinds of amphibians and reptiles. This is the first time a comprehensive state survey has been completed for the Commonwealth of Virginia.

While this work is a *first* for Virginia, it is not the first time a state survey has been conducted. We benefited from earlier partial or complete surveys made for North Carolina, Tennessee, Kentucky, West Virginia, Pennsylvania, Maryland, and New Jersey. The coordinator of this survey in Virginia had a minor part in the New Jersey survey while a high school student (1934-1938) in Newark, N.J. The junior science club of the Newark Museum sponsored a survey of the state's snakes. The group wrote letters to fifty rural high schools seeking the participation of biology classes in the survey. Report forms were supplied for use by the N.J. biology teachers. As a result of that effort, a booklet combining range notes and identification aids was published by the Newark Museum Association (Trapido, 1937). The Public Service Corporation gave financial support to the project. It was deemed useful to utility company personnel and others in outdoor occupations.

New Jersey's total area is 8,000 square miles. The size of

the ambitious project posed by Virginia's 40,000 square mile area was further complicated by the varied geophysical types of terrain and, therefore, the certainty of greater animal diversity. One of the earliest survey chores was rounding up information from adjacent states which might help in fixing the number of likely Virginian species and subspecies. Among the publications examined were:

[N.J.] Fowler, H.W. (1907); Trapido, H. (1937);
[MD.] Kelly, (1936); McCauley, R.H. (1945);
Cooper, J.E. (1960); Harris, H.S.,Jr. (1975);
[W.V.] Green, N.B. (1954);
[N.C.] Brimley, C.S. (1926-1944);
[TN.] Gentry, G. (1955);
[PA.] Netting, G. and N.D. Richmond (1955);
[KY.] Barbour, R. (1971).

For the Virginia area, it was necessary to find out just which varieties of amphibians and reptiles were to be found. After that, the real question became: "Where do they occur, and where not ?"

To answer the question, in 1957, the author and William L. Witt, plus a number of associates began gathering information about specimens collected in the state from the earliest records up to the present. Dr. Wood's efforts were adapted and expanded to obtain the product represented by the series of maps which accompany this text. Nearly 5,000 localities have been posted on the maps. In many instances, a dot on the map represents more than one specimen. In some cases dozens of specimens were collected, not all at the same time. Not all of the specimens taken at one locality were placed in the same depository by their collectors.

Where does distribution data come from ? It comes, mainly, from scientific collections and records kept in college and university zoology departments and in major museums of natural history. To encourage cooperation, two-way communication was established with key staff and curators at these institutions both within and outside of Virginia.

Information was shared with zoologists anywhere who were working on the general range of amphibian or reptilian species which also inhabit Virginia. In return, valuable data was obtained and many of our findings were either confirmed or refined.

This survey's results were combed from the catalogues of major collections of preserved specimens held, at the time of our contact, in the following scientific institutions:

Academy of Natural Sciences of Philadelphia, PA.
American Museum of Natural History, New York City, N.Y.
Arizona State University, Biology Department, Tempe, AZ.
Bridgewater College, Biology Department, Bridgewater, VA.
Carnegie Museum of Natural History, Pittsburgh, PA.
Caroline County Collection, Bowling Green, VA. (now in Richmond)
Chicago Academy of Sciences, Chicago, IL.
College of William & Mary, Department of Biology, Williamsburg.
Columbian Union Biological Station, Headwaters, VA.
Concord College, Department of Biology, Athens, W.V.
Cornell University, Ecology and Systematics, Ithaca, N.Y.
Cranbrook Institute of Science, Bloomfield Hills, MI.
Duke University, Department of Zoology, Durham, N.C.
Field Museum of Natural History, Chicago, IL.
Florida State Museum, Univ. of Florida, Gainsville, FL.
Great Dismal Swamp Wildlife Refuge Collection, Suffolk, VA.
Harvard University, Museum of Comparative Zoology, Cambridge, MA.
Illinois State Natural History Survey, Champaign, IL.
Liberty High School, Bedford County Collection, Bedford, VA.
Longwood College, Department of Natural Sciences, Farmville, VA.
Lord Fairfax Community College, Dep't of Natural Resources, Middletown, VA.
Los Angeles County Museum of Natural History, Los Angeles, CA.
Lynchburg College, Biology Department, Lynchburg, VA.
Marshall University, Department of Zoology, Huntington, W.V.
Mountain Lake Biological Station, (Univ. of Va.) Pembroke, VA.
National Museum of Natural History (USNM), Washington, D.C.
National Museum of Natural Sciences, National Museum of Canada, Ottawa, Canada.
Natural History Society of Maryland, Department of Herpetology, Baltimore, MD.
Norfolk Museum of Arts and Sciences, (1957-1970) Norfolk, VA.
North Carolina State Museum of Natural History, Raleigh, N.C.
Northern Virginia Community College, Alexandria and Annandale,VA.
Northwestern Louisiana University, Nachitoches, LA.
Ohio State University, Department of Zoology, Columbus, OH.

Old Dominion University, Dep't of Biological Sciences, Norfolk.
Peninsula Nature and Science Center, Newport News, VA.
Randolph-Macon College, Biology Department, Ashland, VA.
Randolph-Macon Woman's College, Dep't of Biology, Lynchburg, VA.
Savannah Science Museum, Savannah, GA.
Shenandoah National Park, Research Collection, Luray, VA.
Southern Illinois University, Dep't of Zoology, Carbondale, IL.
Tennessee State University, Biology Department, Kingsport, TN.
Tennessee Valley Authority, Office of Natural Resources,(files) Norris, TN.
Texas Co-operative Wildlife Collection, Texas A&M University, College Station, TX.
University of Connecticut, Museum of Zoology, Storrs, CT.
University of Illinois, Museum of Natural History, Urbana, IL.
University of Kansas, Museum of Natural History, Lawrence, KS.
University of Maryland, Department of Zoology, College Park, MD.
University of Michigan Museum of Zoology, Ann Arbor, MI.
University of New Mexico Museum of Southwestern Biology, Albuquerque, N.M.
University of Richmond, Department of Biology, Richmond, VA.
University of Southern Louisiana, Dep't of Biology, Lafayette.
University of Tennessee Vertebrate Museum, Knoxville, TN.
University of Virginia, Department of Biology, Charlottesville.
Virginia Commonwealth University, Biology Department, Richmond.
Virginia Highlands Community College, Abingdon, VA.
Virginia Institute of Marine Science, Gloucester Point, VA.
Virginia Military Institute, Lexington, VA.
Virginia Polytechnic Institute & State University, Blacksburg.
Virginia Tech Extension Collection, Amelia, VA.
Washington & Lee University, Biology Department, Lexington, VA.
Wayne Community College, Fish & Wildlife Management, Goldsboro,N.C.
West Virginia Biological Survey, Marshall University, Huntington.
Wytheville Community College, Biology Department, Wytheville, VA.

Why preserve specimens? A basic purpose of museum and college or university biology department storage of preserved specimens is to obtain biological information and to organize it for systematic research and interpretation. The results of the patient field work of many people over the years can be organized to yield patterns that cannot be seen or foretold by an individual collector. Many studies are facilitated by the physical presence of preserved specimens. Among these are: comparative anatomy, details of animal reproduction, evidence of parasitism, precise identification, structural biology, and taxonomy.

Most of the institutions listed on pages 10 and 11 house preserved specimen collections including amphibians and reptiles. In some cases, the specimens have since been transferred to other larger scientific institutions with better curatorial care and maintenance. For example, the Bowling Green High School's Caroline County Collection formed the nucleus of the Virginia Commonwealth University Collection in Richmond, VA, in the early 1970's.

The museum collection serves a function close to that of a public library. The museum or zoology department may loan its specimens to qualified scientists who are making a study of a species throughout its general range. In state-supported institutions, specimens may be made available for study by valid researchers if this does not conflict with university research commitments or studies currently underway.

Between 1958 and 1983, knowledge of Virginia's herpetiles was researched, recorded, and shared through a loosely-organized network of interested persons: university and college biologists; natural science and wildlife management faculty; high school biology and science teachers; advanced biology students, wildlife refuge and game biologists; physicians, dentists, and veterinarians; all part-time students of herpetology. Full-time and part-time naturalists and park rangers aided the survey by providing information or specimens, or both. We are deeply indebted to them. This work could not have been done without their aid and encouragement.

Among the survey participants were many highly-motivated and enthusiastic adults whose primary occupations were more often in fields other than the life sciences. Herpetology provided an outlet for excess energy and spare time and gave them a feeling of accomplishment. Their contributions were many.

This survey was made with the co-operation of Virginia's many colleges and universities. The level of participation was at the option of interested faculty members or their graduate or undergraduate students.

Why multiple preserved specimens ? A series of specimens (dozens to hundreds) is taken to check many population characteristics including uniformity, genetic consistency, and relationship. On this topic Dr. W. Leslie Burger, a 1950's survey participant, said:

"Modern taxonomists deal in the identification of populations rather than of individuals. Although a person may have but one specimen it is considered a sample of a population which is improved as other specimens become available. A person, therefore, never identifies one specimen from any given area as one subspecies, and another from the same area as belonging to another subspecies. Instead, when a population includes a mixture of many individuals -- some which look like one subspecies, and some exhibiting traits of another subspecies -- the population as a whole is then labeled an intergrade population. This is a keystone of modern taxonomy."

(See Appendix I)

Over-collecting: Some localities and some species have been over-collected. A number of species and subspecies that are difficult to collect in the field today are very adequately represented in several major collections. Before removing additional specimens from their natural habitat and from the gene pool, please determine whether specimens already preserved in an accessible collection can serve your study purposes. As a future alternative to collecting and preserving additional specimens from heavily-collected localities we recommend that a few specimens be collected, photographed, and released in the spot where they were first found. If specimens must be taken for preservation, please deposit them in a well-curated nearby collection so that they will serve a wider student group.

The state's herpetofauna consists of 145 species and subspecies. Of these, 76 are amphibians and 69 are reptiles.* With more systematic field work these figures will change. Researchers may either confirm the existence of named species and subspecies, or indicate that some distinctions lack meaning and should be discarded. (See Appendix I.) Such refinements in taxonomy continue to be made and it is this process which has made the older field guides obsolete or confusing. Many of the most recent changes in nomenclature have not yet been reflected in the popular field guides. (See the statement on page iv.)

We hope that this Virginia survey effort will inspire greater field work in this extremely fascinating subject and in areas of the state which have had little or no attention.

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* See index pages 103-109.

ACKNOWLEDGMENTS

While all of us like to feel that we were the first arrivals in the field, we might be amazed at the long list of noted predecessors who pioneered in collecting both amphibians and reptiles in Virginia. Among them were:

MARK CATESBY (1679-1749) English-Colonial Naturalist.
He came to Virginia in 1712 and lived in the home of his brother-in-law, a Williamsburg physician, until 1719. Catesby became a close friend of William Byrd II of the Westover Plantation. Catesby is recognized by science in the specific name for the northern bullfrog. [See the cover illustration and map at page 63.] Since 1981, the Bulletin of the Virginia Herpetological Society has been named CATESBEIANA in his honor.

LOUIS AGASSIZ (1807-1873) Swiss-American Zoologist, Geologist.
He toured the United States giving popular lectures on natural history in the major cities of his day. Among the many specimens he placed in Harvard University's Museum of Comparative Zoology is a six-lined racerunner lizard that was collected in Richmond, VA, in 1862! Agassiz founded the Lawrence Scientific School. Many of its graduates, in turn, founded major museums or collections in other states.

SPENCER FULLERTON BAIRD (1823-1887) American Zoologist.
He attended Dickinson College in Carlisle, PA, from 1836 to 1840, and received a Master of Arts degree in 1843. From that point on, his instruction came from contact with established naturalists. Baird, one of our earliest systematic zoologists, succeeded Joseph Henry as Secretary of the Smithsonian Institution in 1878. Baird used government expeditions and a network of private collectors to build up the Smithsonian's collections. He wrote in collaboration with Charles Girard.

EDWARD DRINKER COPE (1840-1897) American Paleontologist. He was born in Philadelphia, PA, and at an early age showed a strong love for the natural sciences. In 1859 he went to Washington, D.C., and studied under Spencer F. Baird at the Smithsonian Institution. On Cope's return to Philadelphia, he worked almost daily at the Academy of Natural Sciences paying particular attention to reptiles. At 22 he was one of the country's leading authorities in this field. Among the many specimens he collected for both the U.S. National Museum (D.C.) and the Academy of Natural Sciences (Phila.) were some from Montgomery and Giles counties in Virginia. The journal of the American Society of Ichthyologists and Herpetologists (ASIH) was named COPEIA in his honor.

THEODORE LYMAN (1833-1897) Naturalist, Army Staff Officer, Fisheries Commissioner, and Member of the U.S. Congress. He was born in Waltham, MA, and was in Harvard's Class of 1855. He graduated from Professor Agassiz' Lawrence (MA.) Scientific School in 1858. Lyman, while on a collecting foray in Florida, sent specimens to Agassiz at the Museum of Comparative Zoology. In Florida, Ted Lyman met (then Captain) George G. Meade who was mapping for the Army. The young engineer was already an expert on coastal lighthouse construction and a friend of the Smithsonian's Joseph Henry. Meade recognized Lyman's abilities as an observer of nature and the environment. It could have been Meade who sent the racerunner specimen to Agassiz. Meade was near Richmond in 1862 during the Seven Days' Battle. [He had just recently been made a Brigadier and was looking for staff officers.] Ted Lyman had married in early 1863 and taken his bride to Europe for the Tour. We must surmise that Meade sent the (*) racerunner specimen to Agassiz with a note asking Lyman's whereabouts. If so, it worked! Awaiting the Lymans' return in August 1863 was a letter from General Meade inviting Ted Lyman to join his staff as aide-de-camp. Lyman was made a Lt. Colonel in the Massachusetts Militia and joined the U.S. Army in the field near Culpeper, VA. Several specimens from Meade's Headquarters are in the MCZ collection credited to Ted Lyman and are posted on our maps. Lyman was with Meade up to Appomattox C.H., shook hands with Grant and Lee, and went home. He became Commissioner of Inland Fisheries from 1866 to 1882 and served as a Member of the U.S. House of Representatives as an Independent from Massachusetts (1882-1885).*[Packages and notes went home with wounded soldiers.]

NATHANIEL SOUTHGATE SHALER (1841-1906) American Geologist and Paleontologist was born in Kentucky. His father was a military surgeon and his mother was a Virginian. In 1859 he was a student at Agassiz' Lawrence Scientific School in Massachusetts. Shaler served two years in the Union Army as a Captain of Artillery. After the war he conducted a summer school in geology at 'Camp Harvard' near or on the grounds of the present Cumberland Gap National Historical Park, VA-KY. He collected specimens at Monterey, Highland County, VA, in 1871 and deposited them in the Museum of Comparative Zoology. From 1874 to 1880 he was state geologist of Kentucky, a position which, again, permitted him to spend summers in the field. He was the author of several geology texts used into the middle 1930's.

RAYMOND LEE DITMARS (1876-1942) American Naturalist, Author. He was born in Newark, N.J. In 1898-1899 he was a reporter for the New York Times. Earlier work for the American Museum of Natural History as assistant curator of entomology attracted the attention of Dr. William T. Hornaday of the New York Zoological Park. Ditmars was asked to join the staff of the 'Bronx Zoo' in 1899 and, shortly after, was made Curator of Reptiles. In 1910, he became Curator of Mammals and Reptiles. In "The Reptile Book" (1907), he wrote about collecting on the old battlefields at Bull Run (now Manassas Battlefield National Park), at the site of a town ('Groveton') which was wiped out by the war. Among his later books were: "The Making of a Scientist" (1937), and "Field Book of North American Snakes" (1939).

EMMETT REID DUNN (1894-1956) Field Naturalist, Herpetologist, Biology Professor, and Zoogeographer. He was born in Alexandria, VA. His early interest in natural history "in general, and in snakes and salamanders in particular, was a shock to the Dunn and Reid families of Alexandria. They ... must have been relieved to find the young naturalist welcomed and encouraged by Leonhard Stejneger at the U.S. National Museum just across the Potomac." Dunn was influenced in herpetology by Stejneger, Henry S. Pratt, and Thomas Barbour (MCZ-Harvard). His earliest collecting trips were to the Blue Ridge. Since it was rich in salamanders he found a real frontier to explore.

Dunn received a B.S. from Haverford College in 1915; an M.A. in 1916 and accepted a teaching position at Smith College. During World War I he was an Ensign in the U.S. Navy. In 1919 he returned to Smith College where, by 1929, he became an Associate Professor of Biology. He edited COPEIA from 1924 to 1929. Dunn married and returned to Haverford College with his bride in 1930. In 1934 he succeeded Henry S. Pratt as Professor of Biology. He became associate curator of reptiles at the Academy of Natural Sciences of Philadelphia. Dunn was the first to describe the salamander subspecies *'Eurycea bislineata wilderae'* and *'Pseudotriton ruber nitidus'* from White Top Mountain specimens. Dunn described two other salamander species: *Plethodon wehrlei* and *Plethodon yonahlossee*. In all, he contributed over 200 papers to the scientific literature, many of them on Virginian species.

There were other pioneers whose collected specimens put dots on the faunal distribution maps in this booklet. Among them:

[Date]	[Localities]	[Counties]	[Collectors]
1853	Calmes Neck	Clarke Co.	C. B. Kennerly
1879	Gloucester Point	Gloucester	J. Ford
1882	Alexandria	Fairfax Co.	Geo. Shoemaker
1884	Natural Bridge	Rockbridge	F. W. Putnam
1886	Arlington	Arlington Co.	S. V. Patch
1891	Ashland	Hanover Co.	F. B. Sheldon
1894	Smith Island	Northampton	C. W. Richmond
1896	Dismal Swamp	(Chesapeake)	William Palmer
1897	Hot Springs	Bath County	Lt. Wirt Robinson
	Smith Island	Northampton	Dr. Paul Bartsch
1898	Alberene	Albemarle Co.	R. E. Shaw
1905	Staunton	Augusta	Dr. William Mann
1906	Stribling Spring	Augusta	Dr. Leonhard Stejneger
1910	Aria (?)	Floyd County	Fannie Wertz
1911	Chilesburg	Caroline Co.	F. P. Drowne
1917	Danville,	Pittsylvania	A. S. Packard
1918-1927	Great Dismal Swamp	(Chesapeake)	Chas. S. Brimley and S. Henshaw
1920	Sunfish Creek	Nelson Co.	K. MacIntyre
1923	Arlington	Arlington Co.	Hugh V. Clark
1924	Pamunkey River	King William	Sherman C. Bishop
1927	Onancock	Accomack Co.	M. B. Trautman
1933	Independence Hill	Prince William	C. E. Burt

We thank the many faculty scientists, curators, and curatorial staff of both major and smaller collections for sharing their data, giving advice, supplying lists of acquisitions, writing notes and observations, and otherwise assisting in this survey. Among those scientists who have been most helpful are:

John S. Applegarth, Ray E. Ashton, Walter Auffenberg, Joseph R. Bailey, Laurence E. Bayless, Charles R. Blem, R.C. Brachman, R.A. Brandon, G.R. (Jack) Brooks, Richard Bruce, W. Leslie Burger, J.E. Cadle, J.L. Chamberlain, Robert F. Clarke, Doris M. Cochran, Charles J. Cole, Joseph T. Collins, Roger Conant, J.M. Condit, John E. Cooper, William Degenhardt, James R. Dixon, Kenneth E. Dodd, Herndon G. Dowling, Robert Dubos, W.E. Duellman, Sherman S. Dutton, Carl H. Ernst, Fred B. First, Jr., Franklin F. Flint, M. J. Fouquette, James A. Fowler, Richard Franz, John B. Funderburg, F.R. Gehlbach, Glenn Gentry, R.H. Giles, Jr. Eugene V. Gourley, N. Bayard Green, Wayne Grimm, Gene Grubitz, III.

Charles O. Handley, Jr., Patricia G. Haneline, Dennis M. Harris, Herbert S. Harris,Jr., Lester E. Harris, Jr., G. J. Hennessey, Max M. Hensley, Richard Highton, Richard L. Hoffman, D.F. Hoffmeister, John R. Holsinger, Victor H. Hutchison, H. G. M. Jopson, M. W. Klemens, Thomas H. Krakauer, Lynne Kour Kunze, Cornelis Laban, C. J. McCoy, Burd S. McGinnes, Edmond V. Malnate, T. Paul Maslin, Hymen Marx, Donald A. Merkle, Joseph C. Mitchell, James J. Murray, Jr., Jack A. Musick, Max A. Nickerson, G.T. Nye.

Douglas W. Ogle, James A. Organ, William M. Palmer, J.A. Peters, F. Harvey Pough, Roger H. Rageot, Neil D. Richmond, Robert D. Ross, Gerald C. Schaefer, E. Ray Schaffner, F. W. Schueler, F.J. Schwartz, Michael Seidel, Philip C. Shelton, Robert C. Simpson, Philip W. Smith, James T. Tanner, Donald W. Tinkle, Robert Gough Tuck, Jr., Thomas M. Uzzell, Barry D. Valentine, Harold Voris, Marvin I. Wass, Arlene Webb, Kentwood D. Wells, Shirley K. Whitt, E. E. Williams, Kenneth L. Williams, Gerald K. Williamson, John Thornton Wood, Gary W. Woodyard, William S. Woolcott, John W. Wright, George R. Zug, and Richard G. Zweifel.

THE VIRGINIA HERPETOLOGICAL SOCIETY

The coordinator of this survey owes special thanks to many members and friends of the Virginia Herpetological Society.

Nearly 1,000 adult and young enthusiasts found their way into the society during its first two decades. Over those years, annual membership averaged 250 in Virginia and 90 out-of-state members. Many members turned in VaHS collecting forms and useful supplemental information. Most of the material appeared in the collecting notes in VaHS BULLETIN between 1958 and 1980.

The 1957 co-founders of the society were a good cross-section of the anticipated membership:

W. Leslie Burger, then a biology instructor at the College of William and Mary, Williamsburg, VA, was quick to recognize the value of the society's broad base in accomplishing the survey of the state's herpetofauna. He further refined the list of species expected to occur in the state (Burger 1958, 1959) and suggested many practical areas for study and investigation.

O. King Goodwin, then an instructor in the apprentice school, Newport News Shipbuilding and Drydock Company, made the first multi-county survey of both amphibians and reptiles on the York-James Peninsula using a crew of Explorer Scouts.

Roger H. (de)Rageot, then curator of natural history at the old Norfolk Museum of Arts and Sciences, originated the salvage system for placing unusual Virginia collecting records in the U.S. National Museum of Natural History collection. The many specimens include county records for Surry County where Roger served many summers as a scout camp naturalist.

Franklin J. Tobey, after ten years as a reporter and associate editor on a Washington, D.C.-based magazine, was then shifting to an organization consulting group, Wilson E. Hamilton and Associates, as director of public relations. Tobey was a resident of Oakton, Fairfax Co., VA., and explorer adviser.

William L. Witt, then a Washington and Lee High School student in Arlington, VA., deposited specimens in the Smithsonian's division of reptiles and amphibians preserved collection. He kept abreast of the already accumulated and incoming data on Virginia's herpetiles. He reconstructed the maps of poisonous snake distribution (Wood, 1954) and adopted that format for maps on the other species. It was he who, at personal expense of time and funds, built up the set of Virginia state outline maps which, updated, now serve as the survey's master file. From the Smithsonian's records he went on to other eastern seaboard collections wherever his civilian or U.S. Air Force travels took him.

John Thornton Wood, M.D., at the time of the society's origins, was a physician in family medical practice at Burkeville, VA. He had been a summer camp naturalist in northern New Jersey (1939); director of the Dayton (OH.) Public Museum of Natural History (1943-1945); education staff of the American Museum of Natural History (N.Y.C.) from 1946 to 1948; with the Virginia Fisheries Laboratory at Yorktown, VA. (1949); College of William and Mary, Williamsburg, VA.; School of Medicine, University of Virginia, Charlottesville, (1951-1954). In 1958, at the first statewide meeting in the Richmond area, John T. Wood was elected first president of the society.

At the time of the Virginia Herpetological Society's first statewide meeting there appeared a publication which saved the group's key members much time and effort. It was the 1958 edition of Roger Conant's Field Guide. Dr. Conant was then the Director of the Philadelphia Zoological Garden and had been curator of reptiles and public relations director for many years. Dr. Conant is presently adjunct professor of biology at the University of New Mexico, Albuquerque, N.M.

In late 1980, Dr. Conant voice-read all of his Virginia data from collecting trips on the DelMarVa Peninsula onto a tape cassette and presented the data to the survey coordinator for use on the accompanying maps. This was a considerable boon

and represented a substantial increase in the number of records for Accomack and Northampton counties. We are indebted to Dr. Roger Conant for his guidance and counsel.

We are grateful to all who provided collecting data. Among these were many biologists, full-time and part-time naturalists:

Arthur J. Abell, Robert N. Bader, Robert S. Bailey, James L. Baker, Louis C. Baker, John B. Bazuin,Jr., Pat Blanton, Frank S. Blasdell, John O. Bradshaw, Dale L. Brittle, A. J. Bullard, Simon Campden-Main, Stephen Carmody, Daniel Carver, Michael J. Clifford, William E. Cooper,Jr., Brian Craig, Costello M. Craig, Gerald Craig, Mark Craig, Steven Q. Croy, A. B. Davenport, W.T. Dowd,Jr., Margaret (Pat) Duncan, Glen A. Engeling, Wallace Evans, Howard Fenton,Jr., W. Ferrell, F. Raymond Fosburg, Barry Fox, Robert J. Gagnon, Bill Gagnon, Dan Gillespie, George R. Gillette, O. King Goodwin, L.B.Gregory, Bill Hadley, Don Hallinger, Charles L. Hanson, S. Blair Hedges, Robert A. Hodge, R. Wayne Hodges, Dennis Hollowell, Charlotte Howington, George H. Huffman, Ray Humphries, William Jackson, Allan Jesse, A.J. Johnson, Bruce A. Johnson, David Johnson, David S. Jones III, Robert P. Kern, and Phoebe H. Knipling.

Robert A. Lapsley, Molly Lutcavage, Woodrow L. McKenzie, John H. McLaughlin, Michael McMillan, James A. Martin, W.H. Martin III, William H. Massman, Ralph Mears, Robert E. Meintzer, Robert S. Merkel, Michael Miller, John A. Millsback, Paul F. Millsback, George S. Morrison, Ronald L. Murray, Larry Neff, Ken T. Nemuras, Walter B. Newman, R.J. O'Kennon,Jr., J.R. Orgain,Jr., Daniel Peacock, Richard Peacock, Louise Pearson, Ronald H. Pine, William Portlock, Fred Price, Scott Rae, John B. Redd, Jack A. Redmond,Jr., Jeffrey L. Richmond, W. Rothery, J. Wm. Shiner, Tim Skinner, Chuck Saunders, Scott K. Silsby, Leslie E. Southall, Ralph L. Southall, John W. Steiner, Charles C. Steirly,Jr., Charles J. Stine, Michael Sustek, Edwin B. Swan, Ernest Taylor, Peter B. Tirrell, Martin VanBuren, J.L. Webb, T. Preston Webster, Peter Wemple, Frederick Wilbur, Henry M. Wilbur, Gary M. Williamson, Jonathan H. Wilson, Robert F. Wise, and last, but certainly not least, William L. Witt and all who provided collecting data, color slides, and useful information and good advice for the society's Bulletin and this survey.

We regret that there is insufficient room to name everyone who has participated actively in the survey. Those who did are not only credited as the collectors on data slips but in the museum acquisition records. Where collectors' names are known, they appear in the collecting notes in the VaHS BULLETINS (1958-'80), or in the backup material that will remain in the permanent file which, as viewed now, will be at the University of Richmond, VA. Also, any appearances of having ignored collecting data that was volunteered is sincerely regretted. We have used all the valid data given us. The spare-time nature of the VaHS operation, however, provided an occasional opportunity to misplace data which we wish were not so. Such mishaps were pure inadvertence.

Over the twenty-two years of the coordinator's stewardship all energies were spent in reaching potentially-interested persons. We wanted to encourage participation by high school students, biology and science teachers, physicians, dentists, and other paramedical personnel, and veterinarians, game biologists, Virginia Tech extension agents, park rangers, and naturalists.

Because of the large forested areas within the state, we tried to build and maintain contacts with National Forest Service or National Park Service people, the Virginia Division of Forestry, and county foresters. The Virginia Commission on Game and Inland Fisheries staff was always helpful from J. J. Shoman to the present time. We have been aided frequently by the editor of VIRGINIA WILDLIFE, Harry L. Gillam and staff. We benefited often from advice provided by Col. John McLaughlin of the Commission's Law Enforcement Division as well as the Education Division over the years.

With the assistance of the science supervisors of the state's Board of Education, we reached many biology teachers in the secondary schools. Through Franklin Kizer and J. D. Exline and their staff, we were able to set up VaHS exhibits at some of the biennial State Science Teacher Association meetings in Fredericksburg and Williamsburg. As a welcome, but unexpected dividend we were able to reach the Youth Conservation Corps leaders at their several summer sites, thus gaining added information on the distribution of herpetiles in Virginia.

We were indebted to military personnel, active and reservist, for collecting data on military reservations in the state: At Forts A.P. Hill, Lee, Monroe, Pickett, Story, the Quantico Marine Corps Base, Camp Perry, and the Naval Weapons Depot Annex near Yorktown, VA.

Military personnel interested in herpetology put their own leisure time to good use by collecting on military bases and recording their efforts. In this select group of contributors we salute: Kansans Joseph T. and Jerry D. Collins (U.S. Army Reserve) who collected at Fort A. P. Hill in Caroline County. Glen A. Engeling (U.S. Naval Reserve) reported on collecting at Newport News, Hampton, and York County while at the Naval Weapons Depot Annex near Yorktown, VA. Major Ronald Murray U.S. Marine Corps) spent his off-duty hours collecting and recording in Prince William and Stafford Counties while at the Quantico Marine Station. And, an Idahoan, Ronald Pace (USAR) reported on specimens he captured in and around Fort Lee, VA.

Colonel Robert L. Guillaudeu, officer-in-charge of a U.S. Army Reserve Medical Unit was the society's medical adviser for many years. He and his safety committee performed diligently at VaHS meetings where venomous snakes were exhibited to reduce any chances of a genuine medical emergency occurring, before, during, or after the sessions. We owe him many thanks.

College and university faculty zoologists with an interest in herpetology were added to the VaHS mailing list as soon as the names and addresses were known. By 1970, nearly 90 percent of this key group were supporting the society and its survey. Among those whose frequent advice and guidance kept us on track over the years were: James L. Chamberlain, Carl H. Ernst, John B. Funderburg, Harry G. M. Jopson, Thomas H. Krakauer, J. J. Murray, Jr., Robert D. Ross, and Robert C. Simpson. We have yet to single out Richard L. Hoffman, but we cannot pass by his many contributions here without noting him in this context. To this eminent list we add the University of Maryland's eminent zoologist Richard Highton. He and his students have combed the state (and adjacent states) for salamanders. The maps reflect his boundless energies. Highton has added two new species to the state list, and doubtless there will be more. Many of our survey maps reflect Highton and Hoffman collecting data.

Professor Hoffman of Radford University has long been known for his contagious enthusiasm. Among his many former students who continued a lively interest in the herpetology of Virginia are these: Dale L. Brittle who built up the Caroline County collection at Bowling Green, VA.; Margaret (Pat) Duncan who, aided by Costello M. Craig and sons, maintained the Bedford County collection at Liberty High School in Bedford, VA.; and M. Katherine Klimkiewicz whose articles appeared in the fine, but

lamentably discontinued, publication "ATLANTIC NATURALIST" with its excellent editor, Ben O. Osborn. (Klimkiewicz, 1972)

Among those whose interest in herpetology took them, literally, underground are scientific speleologists James A. Fowler, John R. Holsinger, Victor H. Hutchison, and John E. Cooper and their associates. Many of their collected specimens are recorded on the maps which appear in this booklet. As a matter of fact, it was necessary to obtain a copy of the Virginia Cave Survey's "CAVES of VIRGINIA" (Douglas 1964) to locate many of the sites.

The coordinator, through exchange with other state and local herpetological societies, and with access to collecting data through other sources, located many out-of-state collectors who visited Virginia. Some made themselves known through their most thoughtful contributions of notes to the VaHS BULLETIN. Whenever we could obtain records of their finds in Virginia we posted them on the maps.

It was necessary, for self preservation, to limit correspondence with out-of-state enthusiasts who did not collect in Virginia. This was done to husband resources and energies for the Virginia task which this booklet caps. We hope that any person who was offended by our seeming provincialism will now understand our purposeful preoccupation. We thank Carolyn W. Tobey, our fine helpmate, for her patience and fortitude throughout the process.

We thank Phoebe H. Knipling and Louis C. Baker for their steadfast conservation of the Society's and Survey's financial resources over the years 1958 to 1986.

"Of what avail are forty freedoms
without a blank spot on the map?

Aldo Leopold, Conservationist
Madison, Wisconsin, 1948 in
"A SAND COUNTY ALMANAC"

ABOUT THE SURVEY MAPS

The accompanying faunal distribution maps reflect the past and recent distribution of amphibians and reptiles in Virginia.

These maps provide baseline data useful to future field workers in detecting changes in the range of species and subspecies. The maps present all Virginia data known to us. The earliest of the collecting data comes from the mid-1800's.

Many of the older records are for localities which may no longer be habitable for some of the species indicated. The habitat, especially in urban or suburban areas, may be either substantially altered or destroyed. It is quite possible that hardy or highly adaptable species may survive in altered areas.

The dots on each map indicate where at least one specimen was collected (solid dot). For rare varieties we have used some sightings or observations (o) to augment the otherwise skimpy record. A hollow dot has been placed on the localities where the species was observed by a person whose ability to identify the specimen is above question. In a few instances an "o" was used to mark a locality where a specimen was collected, identified, preserved, but the specimen has been lost or misplaced.

Some records will be indicated for areas where collecting is prohibited by law or federal regulations. For example, the Shenandoah National Park (SNP) has provided many records. Some of these pre-date the Works Progress Administration origins of the park and the building of the Skyline Drive. Other records were provided by collectors working on the staff or people who held valid permits for collecting within the park boundaries. Such permits are issued to valid scientific collectors by the agency with supervisory control over the preserve, park, or wildlife refuge. Future collectors are strongly advised to apply for, and receive, such permits before collecting.

A VALID LOCALITY RECORD for a Virginian amphibian or reptile is a preserved identifiable specimen in a scientific or a private collection. The specimen should be accompanied by sufficient written information to give an opportunity for its verification, if needed.

A COUNTY RECORD is the first specimen of the represented species ever to be collected in that county and preserved in a curated scientific collection. Not all major collections include dates on their lists of preserved specimens as provided to us.

A STATE RECORD is the first specimen of a given species or subspecies ever to be collected in Virginia and preserved in a major well-curated collection. It was not possible to determine precisely the precedence of records, so we have stated simply: "earliest dated record at hand" on the captions accompanying the Virginia Herpetological Survey maps, pages 33 to 97.

[The term "record" as used here and elsewhere in this booklet has nothing to do with the size, weight, or length of a given specimen.]

There are many localities, even entire counties, where little or no collecting has been done. The task of running down the records for 145 varieties of herpetiles was done by a small number of people. The maps reflect a great deal of field work on the part of a large number of people working over nearly one-hundred years -- four or five generations of biologists, zoologists, naturalists, and interested collectors.

In going over the lists from scientific institutions we found that not all of the specimens or their localities (as given) could be run to ground. Where identification accuracy was in doubt, or where the locality could not be found on old or new maps, the item was disqualified. The meagre record for some species was supplemented by:

(a) Captured specimens: Freshly caught specimens temporarily housed in private collections were moved into scientific collections for permanent record; or,

(b) Salvaged specimens: Specimens found dead on the road, or specimens that died in small private or summer camp nature

center collections were preserved and deposited in a major well-curated collection; or,

(c) Healthy captive specimens: Live specimens that were being well cared for by their collectors were photographed in color and the original slides duplicated to provide evidence for the species at a given locality. This is acceptable if the locality is well within the known range of the species. [Such specimens should be preserved, upon death, and deposited in major collections.] And, . . .

(d) Specimens described in the literature: "Literature records" are those specimens described by a known authority and the locality of capture is also included in the text. Such items appear in the reports, books, or other writings authored by naturalists and scientists. These may be used in lieu of preserved records if the item is not controversial.

Range Maps: Range maps show the general area over which a species may be found. The area is shown as a gray or shaded zone. Such maps appear in the better field guides. While these maps seem to say that the species can be found anywhere within the zone that is an incorrect impression. Specimens may be found only in suitable habitat.

Shaded or cross-hatching areas on maps are fine for showing interstate distribution of a species within the United States. That type of map is limited if it were to be used to show the occurrence of a species within the state, such as a county-by-county distribution. For that reason, we planned to use dots.

The dot map says, in effect, a specimen was actually taken at this spot. Our dot maps show the distribution of each species or subspecies with the dots affixed to the locality where a specimen was actually found. The occurrence may be historical or recent. If the environment has been altered significantly the species may no longer be present in any numbers, or at all.

No attempt has been made to ring the outer limits of the dots to indicate a "range boundary". We do not know whether other specimens of the species represented were ever found outside of that area, or that some may be found beyond that "limit" in future years. Until more is learned from the accretion of data, attempts at describing limits would be pure guess.

A list of Virginia counties and county-sized jurisdictions as well as former counties appears on page 32.

Five Virginia counties have now been absorbed by cities. The old county names are rarely used now. Specimens in many major collections, however, still are listed under these obsolete geographical names. To date, these are:

Elizabeth City County
Nansemond County
Norfolk County
Princess Anne County
Warwick County

To help the non-Virginian, we must note that not all counties have a county seat of government with the same name as the county. For example, Richmond County's seat of government is Warsaw, VA. The state capital, Richmond, is in Henrico County.

When recording collecting data from the vicinity of an independent city, we assigned the cities to county or county-sized jurisdictions of which they were a geographic part. (Exceptions: Hampton and Newport News.)

Independent City	Co.#	Independent City	Co.#
Alexandria	31	Lexington	82
Bedford, City of	10	Lynchburg	16
Bristol (VA)	96	Martinsville	46
Buena Vista	5	Newport News	95
Charlottesville	2	Norfolk, City of	21
Chesapeake, City of	21	Norton	98
Clifton Forge	3	Petersburg	75
Colonial Heights	22	Portsmouth	21
Covington	3	Radford	62
Danville	72	Richmond, City of	45
Emporia	42	Roanoke, City of	81
Fairfax, City of	31	Salem	81
Falls Church	31	South Boston	43
Franklin, City of	88	Staunton	8
Fredericksburg	89	Suffolk, City of	63
Galax	18	Virginia Beach	77
Hampton	29	Waynesboro	8
Harrisonburg	83	Williamsburg	49
Hopewell	75	Winchester	36

FAUNAL DISTRIBUTION MAPS

PHYSIOGRAPHIC PROVINCES

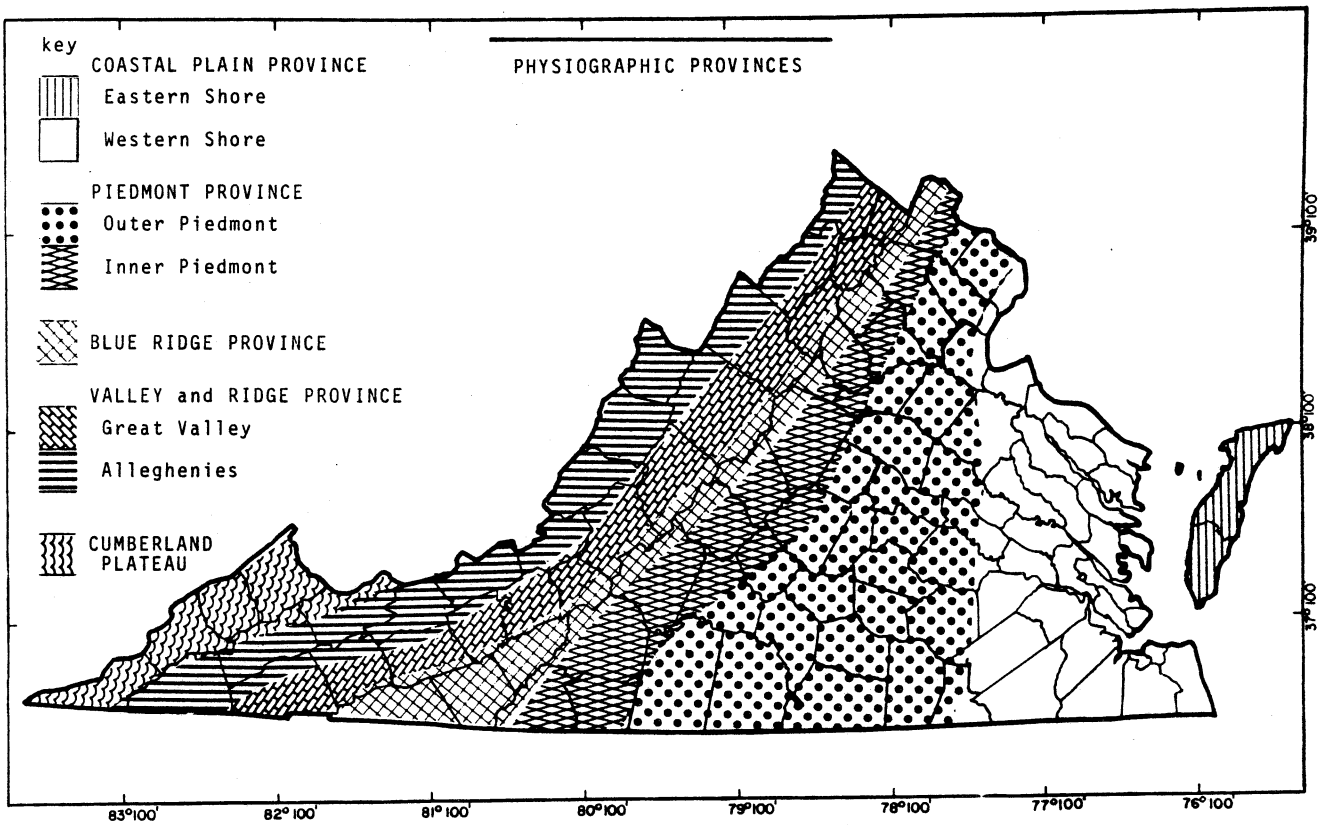
COASTAL PLAIN: Elevated seabottom, low topographic relief and extensive marshes. From Virginia's Tidewater, it extends inland to the fall line where it meets the Piedmont Province. Sedimentary sand and gravel are underlain by Precambrian rock sloping eastward to the sea. Most elevations are below 500 feet, but commonly are less than 100 feet above sea level.

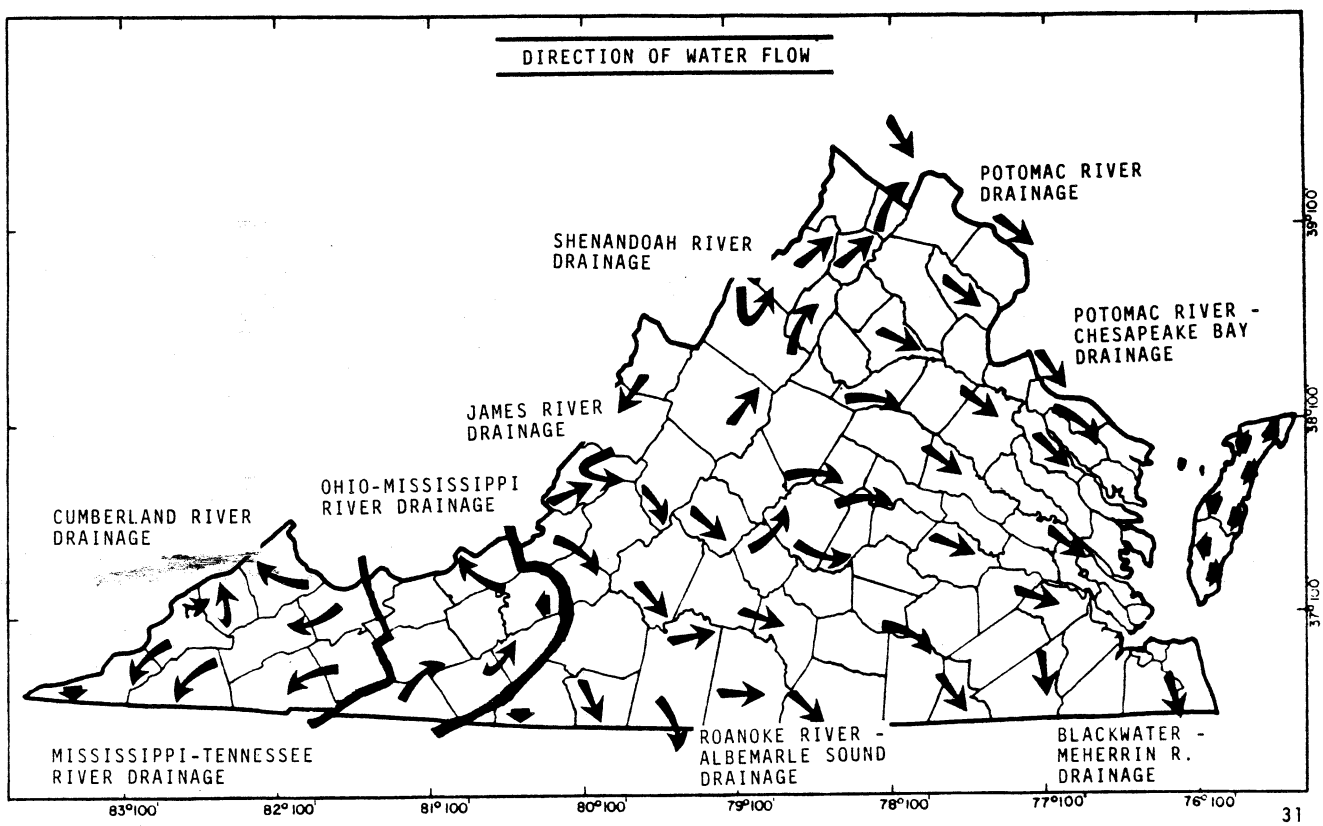
PIEDMONT PROVINCE: The uplands, literally the foothills, extend from the fall line to the highlands. It consists of metamorphic rocks: slates, soapstones (steatite), gneiss, schist, and some marble. Its western boundary abuts the upthrust Precambrian formations of the Blue Ridge. Soils of the Piedmont are mostly red or yellow podzols. Relief is typically 300 to 800 feet above sea level.

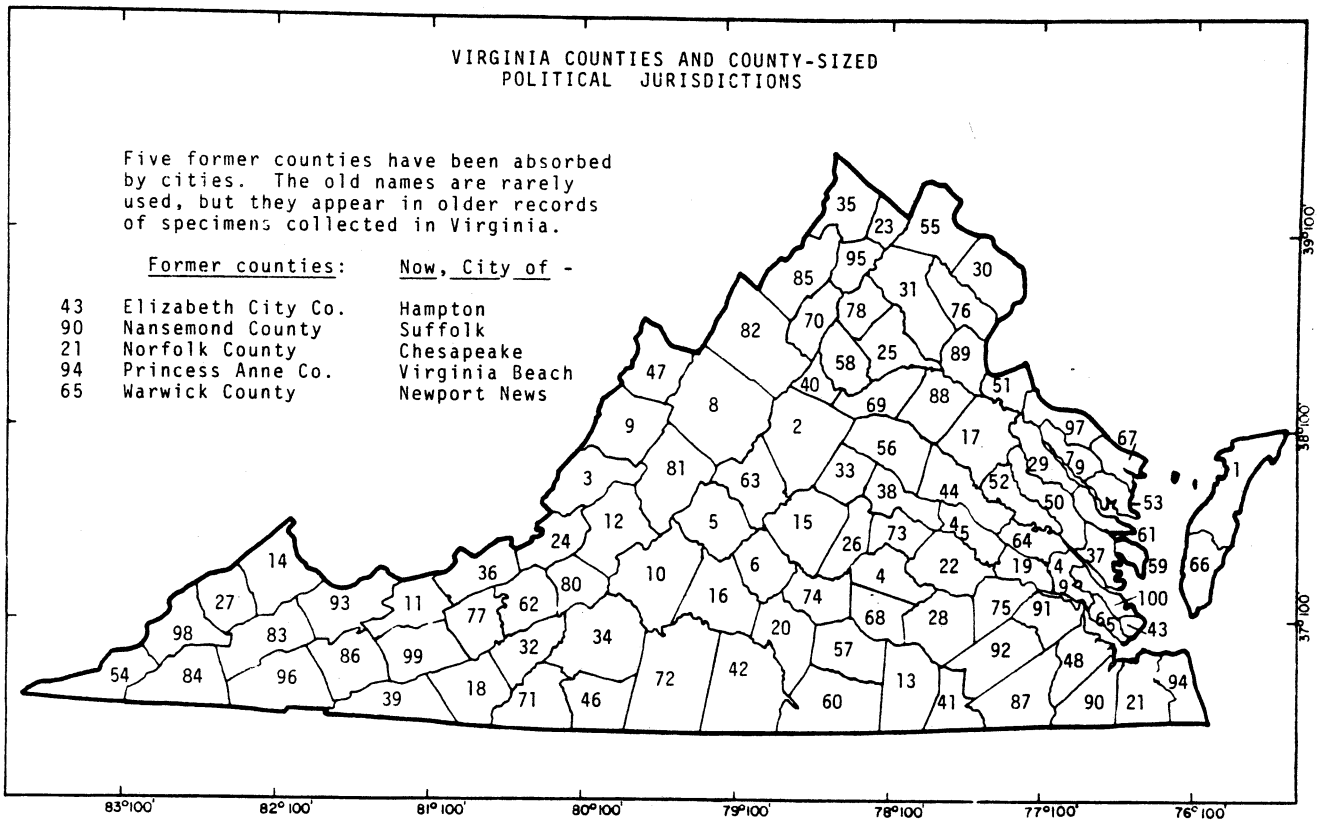
BLUE RIDGE PROVINCE: The easternmost ridge of the great Appalachian highlands which overlooks the Piedmont. Typical rocks are granite, gneiss, and metamorphosed volcanic rocks such as greenstone, uplifted higher than other parts of the Virginia highlands. On the western edge of the Blue Ridge Province the Lower Paleozoic formations of the Valley and Ridge Province are in contact with the uplifted Cambrian rock of the Blue Ridge. A fault (escarpment) provides a sharp structural boundary between the two provinces. The Blue Ridge has thin soils. Elevations are from 1,000 to 5,000 feet.

VALLEY and RIDGE PROVINCE: Folded mountains made up of parallel valleys and ridges which are of sedimentary origin including much limestone. Characterized by Karst topography as indicated by surface limestone and underground water courses which produce caves. Many millions of years ago this region was a westward-facing Coastal Plain containing many swampy areas on top of older Ordovician limestone formations. Much vegetation accumulated and was buried. Eventually, this produced the coal beds found in the southwestern part of the state. Some red and yellow podzolic soils and thin mountain soils predominate. Elevations are 1,000 to 2,000 feet.

CUMBERLAND and ALLEGHENY PLATEAU: These plateaus barely encroach upon Virginia's borders with Kentucky and West Virginia, respectively. A southwest-facing escarpment 500 feet high overlooking the Valley and Ridge Province forms the boundary between. Southwestern soils are red and yellow podzols and range into grayish-brown podzols in Highland Co.


key
COASTAL PLAIN PROVINCE
Eastern Shore
Western Shore
PIEDMONT PROVINCE
Outer Piedmont
Inner Piedmont
BLUE RIDGE PROVINCE
VALLEY and RIDGE PROVINCE
Great Valley
Alleghenies
CUMBERLAND PLATEAU
PHYSIOGRAPHIC PROVINCES
39°100'
38°100'
37°100'
83°100'
82°100'
81°100'
80°100'
79°100'
78°100'
77°100'
76°100'


DIRECTION OF WATER FLOW
POTOMAC RIVER DRAINAGE
SHENANDOAH RIVER DRAINAGE
POTOMAC RIVER - CHESAPEAKE BAY DRAINAGE
JAMES RIVER DRAINAGE
OHIO-MISSISSIPPI RIVER DRAINAGE
CUMBERLAND RIVER DRAINAGE
MISSISSIPPI-TENNESSEE RIVER DRAINAGE
ROANOKE RIVER - ALBEMARLE SOUND DRAINAGE
BLACKWATER - MEHERRIN R. DRAINAGE
39°100'
38°100'
37°100'
83°100'
82°100'
81°100'
80°100'
79°100'
78°100'
77°100'
76°100'



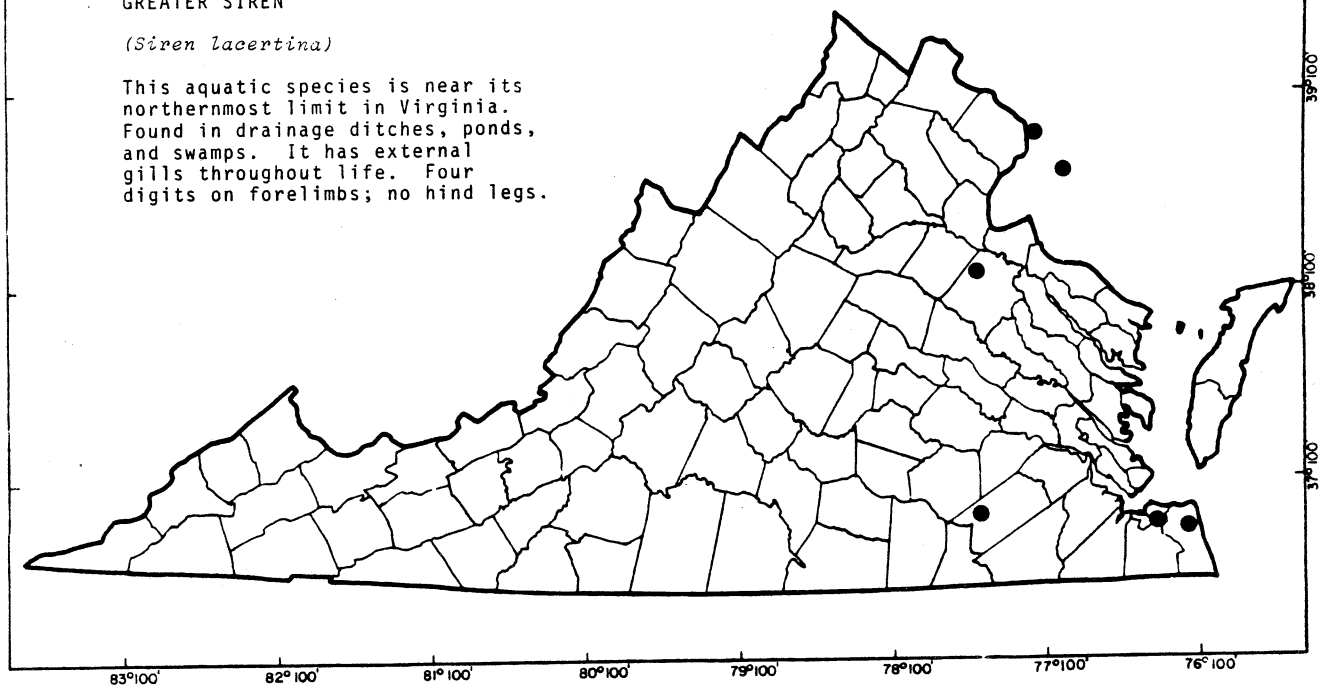
1 ACCOMACK CO.
2 ALBEMARLE CO.
3 ALLEGHANY CO.
4 AMELIA CO.
5 AMHERST CO.
6 APPOMATTOX CO.
7 ARLINGTON CO.
8 AUGUSTA CO.
9 BATH COUNTY
10 BEDFORD CO.
11 BLAND COUNTY
12 BOTETOURT CO.
13 BRUNSWICK CO.
14 BUCHANAN CO.
15 BUCKINGHAM CO.
16 CAMPBELL CO.
17 CAROLINE CO.
18 CARROLL CO.
19 CHARLES CITY CO.
20 CHARLOTTE CO.
21 CHESAPEAKE, (City of)
22 CHESTERFIELD CO.
23 CLARKE CO.
24 CRAIG COUNTY
25 CULPEPER CO.
26 CUMBERLAND CO.
27 DICKENSON CO.
28 DINWIDDIE CO.
29 ESSEX CO.
30 FAIRFAX CO.
31 FAUQUIER CO.
32 FLOYD COUNTY
33 FLUVANNA CO.
34 FRANKLIN CO.
35 FREDERICK CO.
36 GILES COUNTY
37 GLOUCESTER CO.
38 GOOCHLAND CO.
39 GRAYSON CO.
40 GREENE CO.
41 GREENSVILLE CO.
42 HALIFAX CO.
43 HAMPTON, (City of)
44 HANOVER CO.
45 HENRICO CO.
46 HENRY COUNTY
47 HIGHLAND CO.
48 ISLE of WIGHT CO.
49 JAMES CITY CO.
50 KING and QUEEN CO.
51 KING GEORGE CO.
52 KING WILLIAM CO.
53 LANCASTER CO.
54 LEE COUNTY
55 LOUDOUN CO.
56 LOUISA CO.
57 LUNENBURG CO.
58 MADISON CO.
59 MATHEWS CO.
60 MECKLENBURG CO.
61 MIDDLESEX CO.
62 MONTGOMERY CO.
63 NELSON CO.
64 NEW KENT CO.
65 NEWPORT NEWS, (City of)
66 NORTHAMPTON CO.
67 NORTHUMBERLAND CO.
68 NOTTOWAY CO.
69 ORANGE CO.
70 PAGE COUNTY
71 PATRICK CO.
72 PITTSYLVANIA CO.
73 POWHATAN CO.
74 PRINCE EDWARD CO.
75 PRINCE GEORGE CO.
76 PRINCE WILLIAM CO.
77 PULASKI CO.
78 RAPPAHANNOCK CO.
79 RICHMOND CO.
80 ROANOKE CO.
81 ROCKBRIDGE CO.
82 ROCKINGHAM CO.
83 RUSSELL CO.
84 SCOTT COUNTY
85 SHENANDOAH CO.
86 SMYTH COUNTY
87 SOUTHAMPTON CO.
88 SPOTSYLVANIA CO.
89 STAFFORD CO.
90 SUFFOLK, (City of)
91 SURRY COUNTY
92 SUSSEX CO.
93 TAZEWELL CO.
94 VIRGINIA BEACH, (City of)
95 WARREN CO.
96 WASHINGTON CO.
97 WESTMORELAND CO.
98 WISE COUNTY
99 WYTHE COUNTY
100 YORK COUNTY

FAUNAL DISTRIBUTION MAP

GREATER SIREN

(Siren lacertina)

This aquatic species is near its northernmost limit in Virginia. Found in drainage ditches, ponds, and swamps. It has external gills throughout life. Four digits on forelimbs; no hind legs.

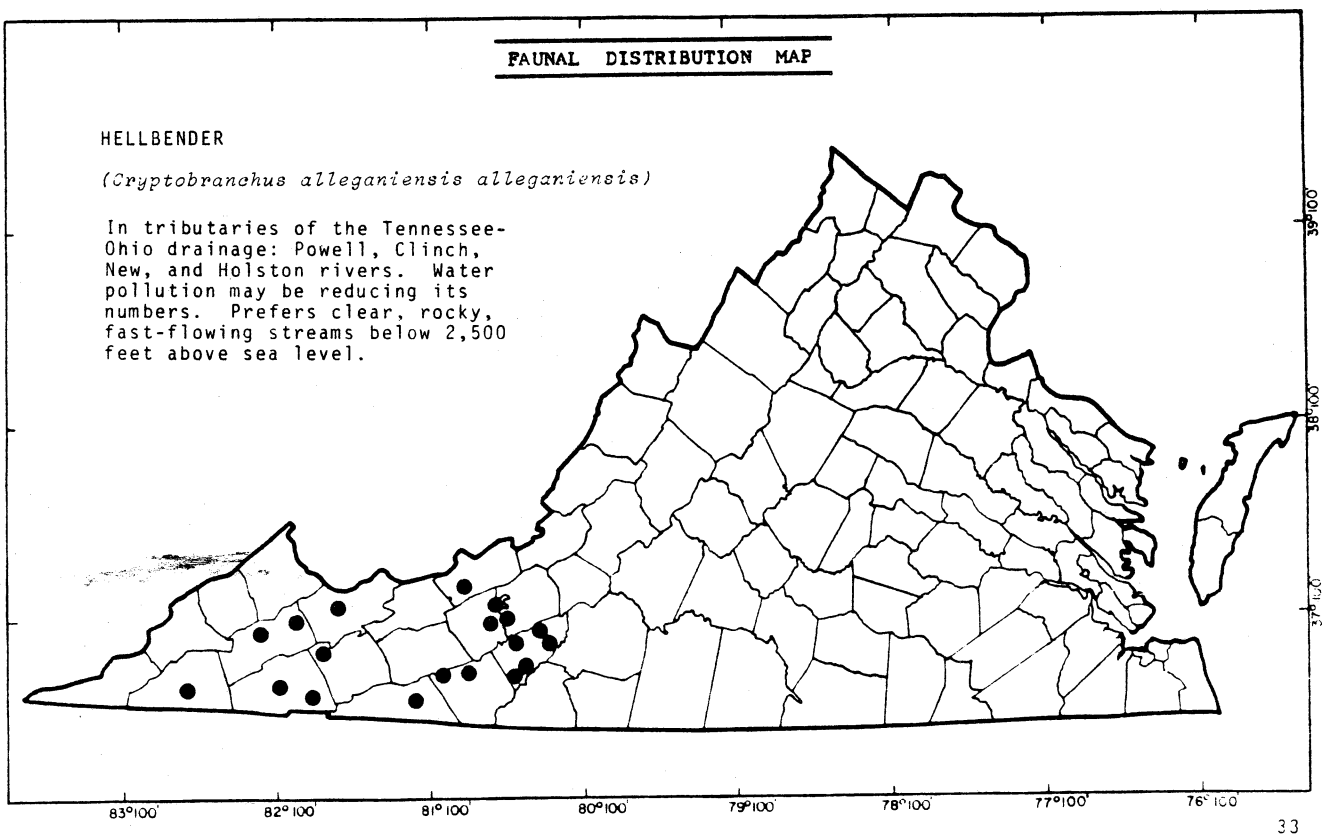


FAUNAL DISTRIBUTION MAP

HELLBENDER

(Cryptobranchus alleganiensis alleganiensis)

In tributaries of the Tennessee-Ohio drainage: Powell, Clinch, New, and Holston rivers. Water pollution may be reducing its numbers. Prefers clear, rocky, fast-flowing streams below 2,500 feet above sea level.

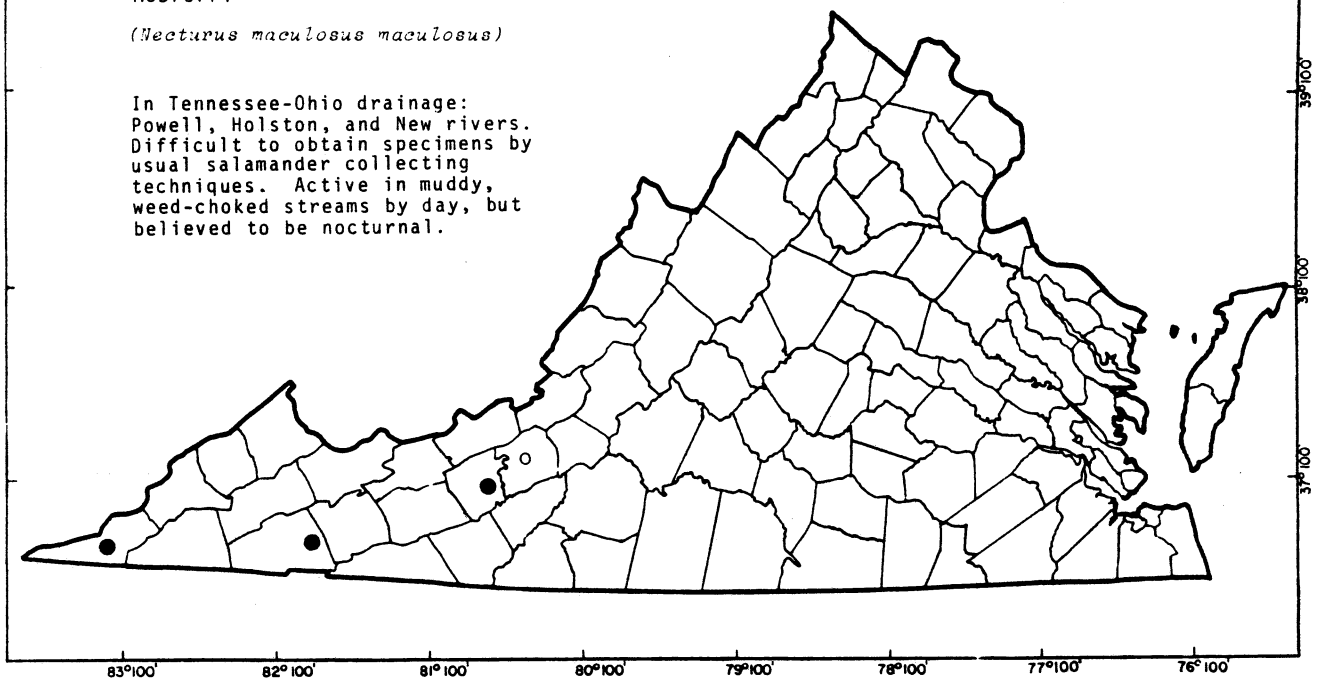


FAUNAL DISTRIBUTION MAP

MUDPUPPY

(Necturus maculosus maculosus)

In Tennessee-Ohio drainage: Powell, Holston, and New rivers. Difficult to obtain specimens by usual salamander collecting techniques. Active in muddy, weed-choked streams by day, but believed to be nocturnal.

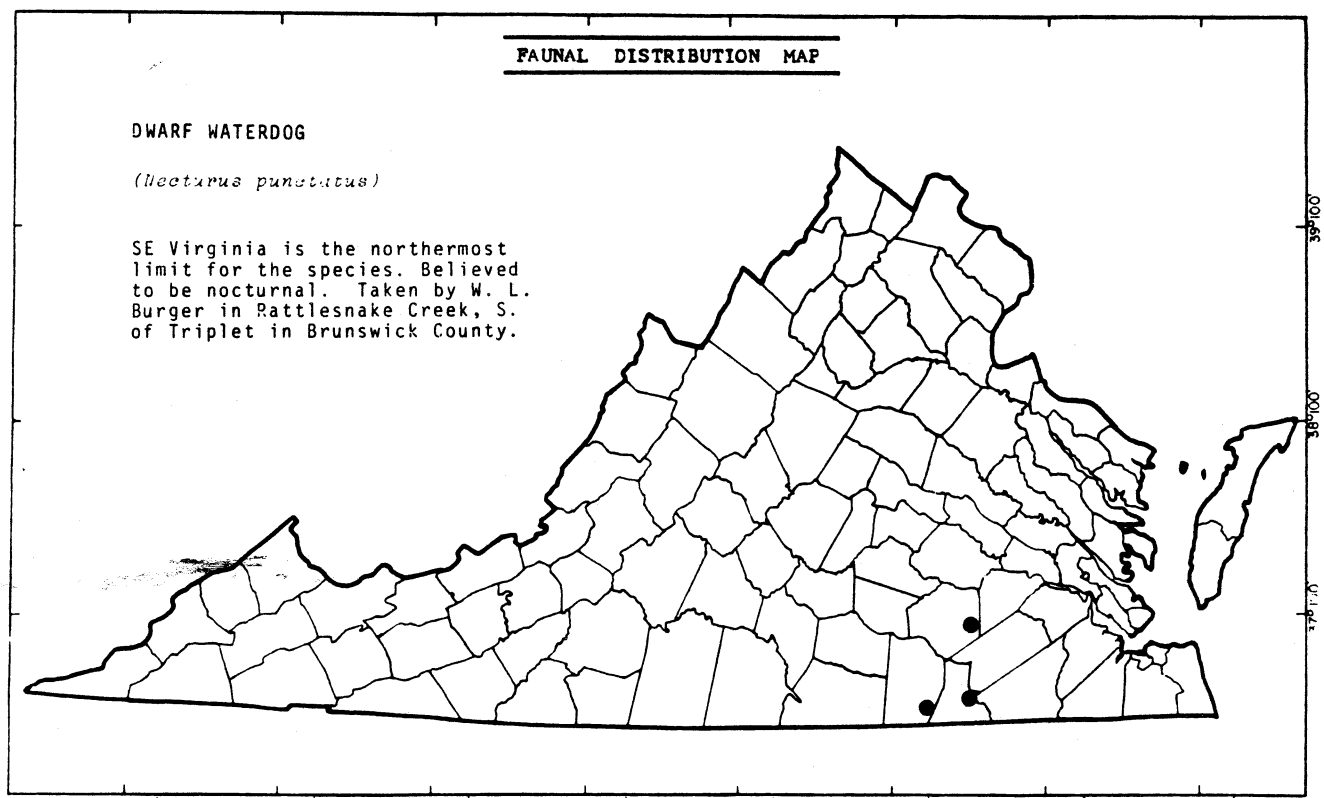


FAUNAL DISTRIBUTION MAP

DWARF WATERDOG

(Necturus punctatus)

SE Virginia is the northermost limit for the species. Believed to be nocturnal. Taken by W. L. Burger in Rattlesnake Creek, S. of Triplet in Brunswick County.

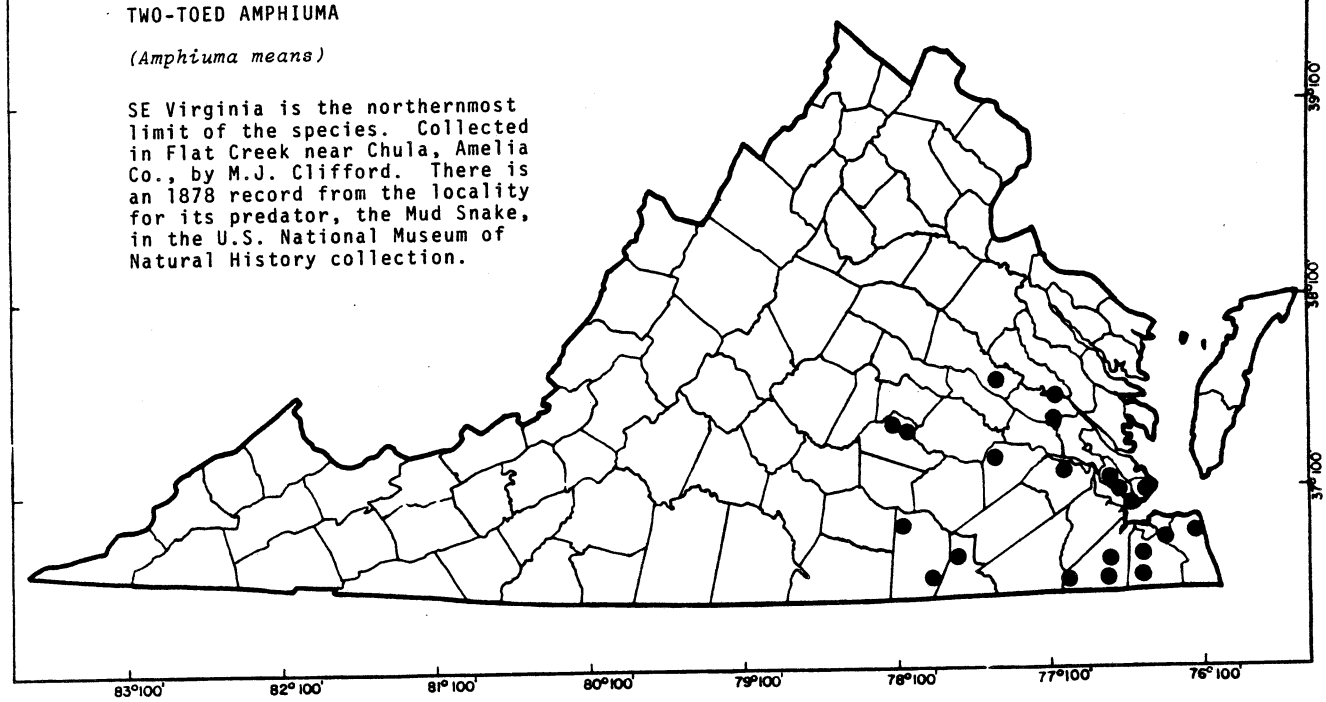


FAUNAL DISTRIBUTION MAP

TWO-TOED AMPHIUMA

(Amphiuma means)

SE Virginia is the northernmost limit of the species. Collected in Flat Creek near Chula, Amelia Co., by M.J. Clifford. There is an 1878 record from the locality for its predator, the Mud Snake, in the U.S. National Museum of Natural History collection.

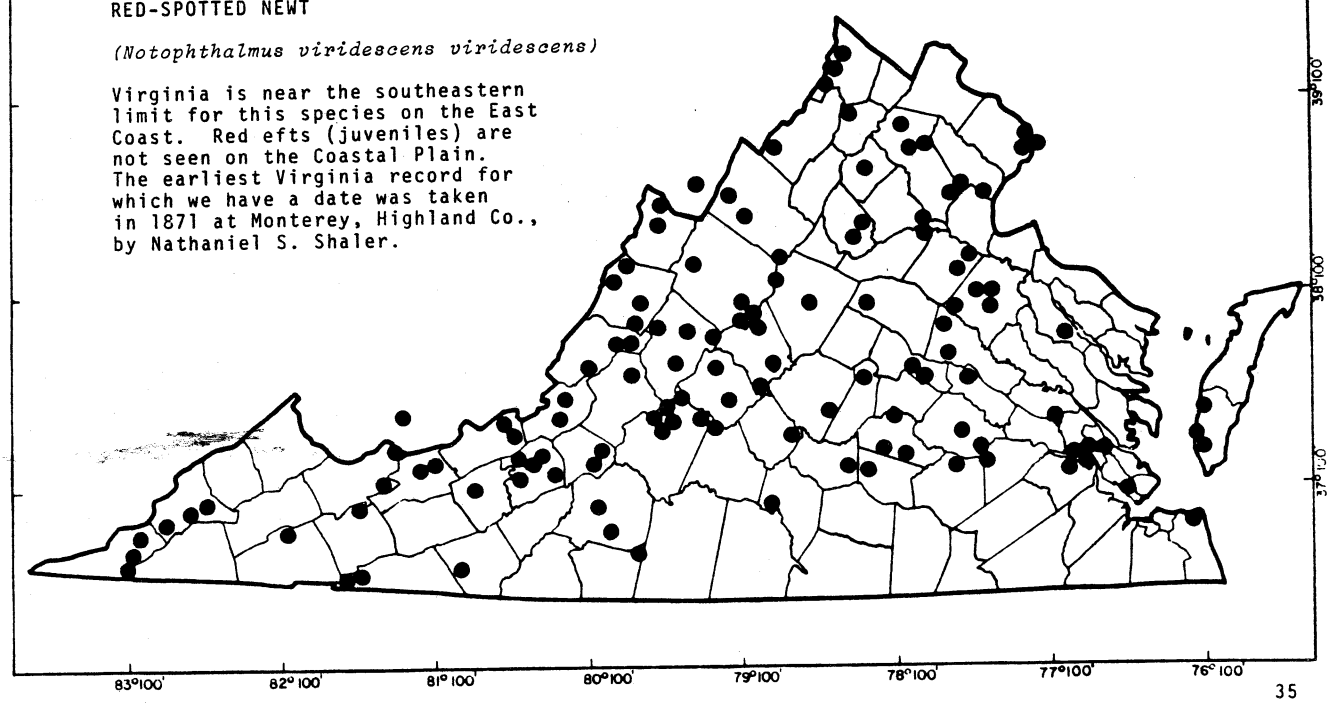


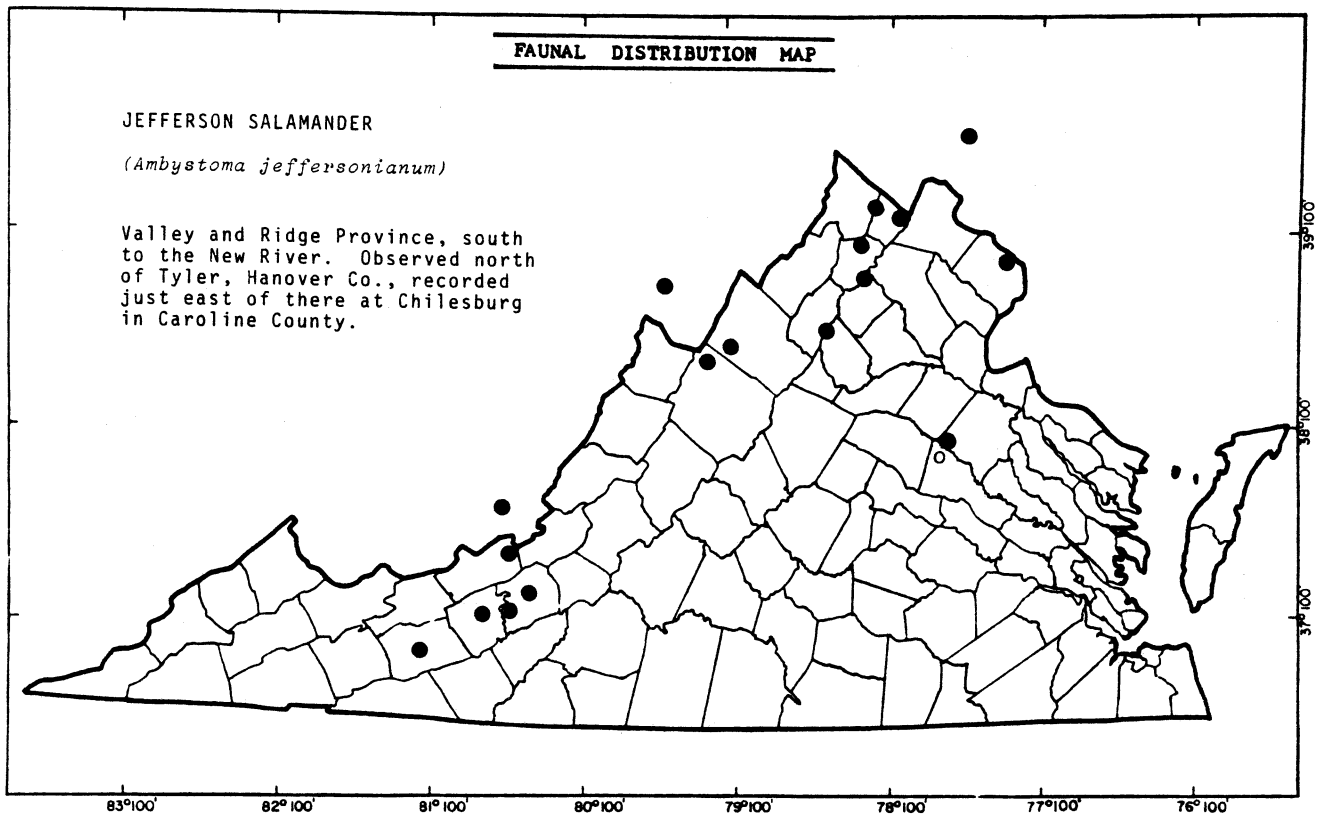
FAUNAL DISTRIBUTION MAP

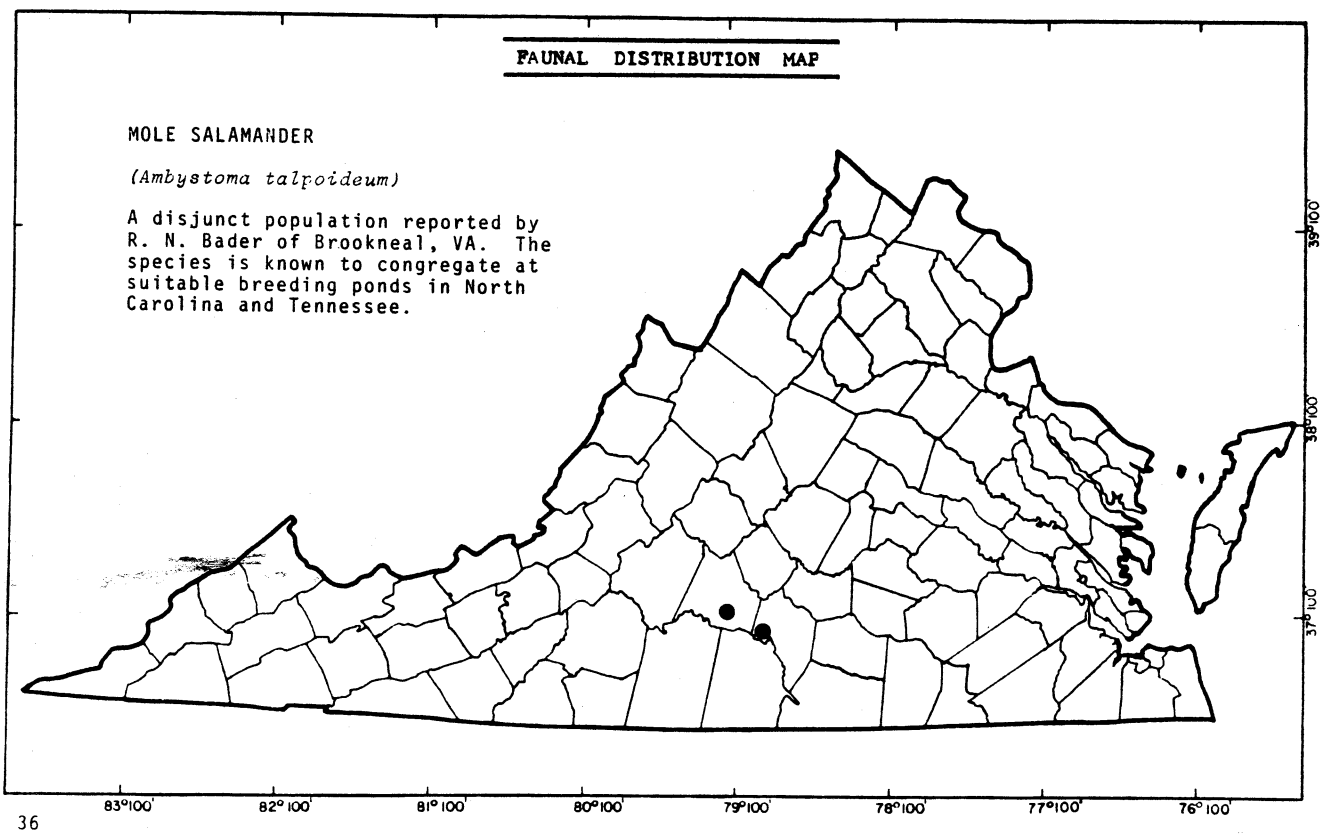
RED-SPOTTED NEWT

(Notophthalmus viridescens viridescens)

Virginia is near the southeastern limit for this species on the East Coast. Red efts (juveniles) are not seen on the Coastal Plain. The earliest Virginia record for which we have a date was taken in 1871 at Monterey, Highland Co., by Nathaniel S. Shaler.




FAUNAL DISTRIBUTION MAP
JEFFERSON SALAMANDER
(Ambystoma jeffersonianum)
Valley and Ridge Province, south to the New River. Observed north of Tyler, Hanover Co., recorded just east of there at Chilesburg in Caroline County.
39°100'
38°100'
37°100'
83°100'
82°100'
81°100'
80°100'
79°100'
78°100'
77°100'
76°100'

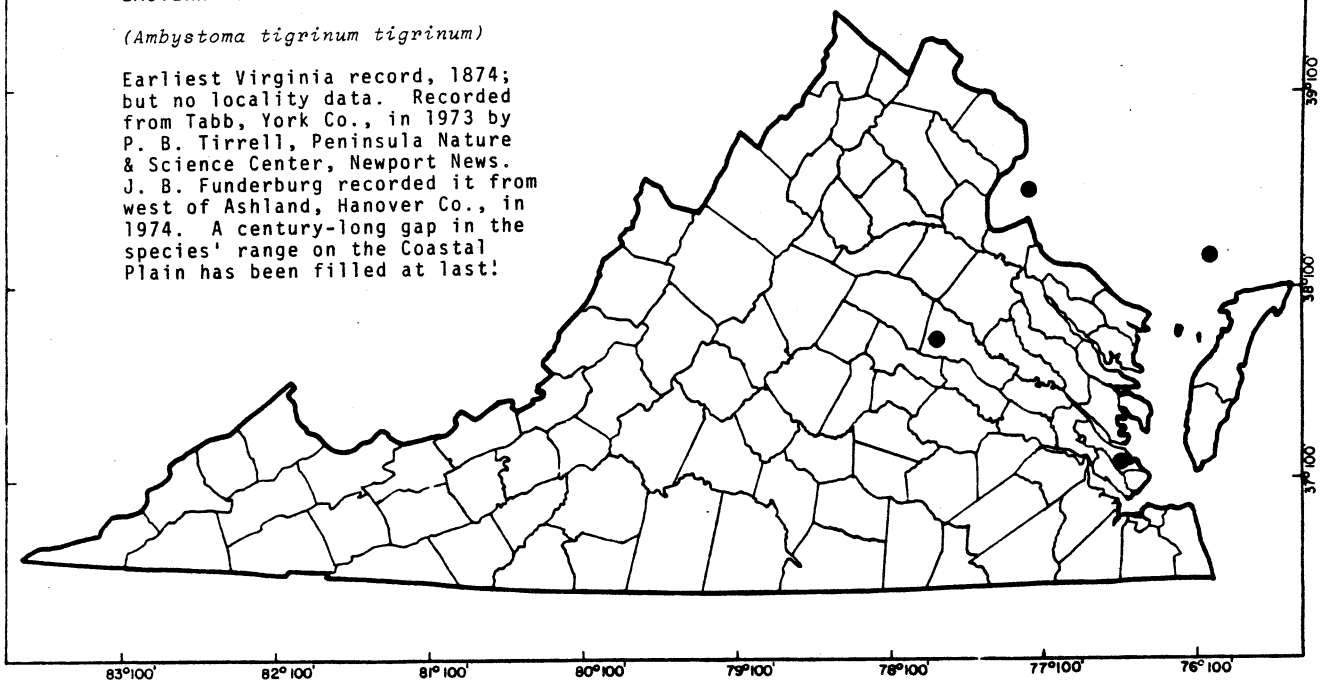

FAUNAL DISTRIBUTION MAP
MOLE SALAMANDER
(Ambystoma talpoideum)
A disjunct population reported by R. N. Bader of Brookneal, VA. The species is known to congregate at suitable breeding ponds in North Carolina and Tennessee.
39°100'
38°100'
37°100'
83°100'
82°100'
81°100'
80°100'
79°100'
78°100'
77°100'
76°100'

FAUNAL DISTRIBUTION MAP

EASTERN TIGER SALAMANDER

(Ambystoma tigrinum tigrinum)

Earliest Virginia record, 1874; but no locality data. Recorded from Tabb, York Co., in 1973 by P. B. Tirrell, Peninsula Nature & Science Center, Newport News. J. B. Funderburg recorded it from west of Ashland, Hanover Co., in 1974. A century-long gap in the species' range on the Coastal Plain has been filled at last!

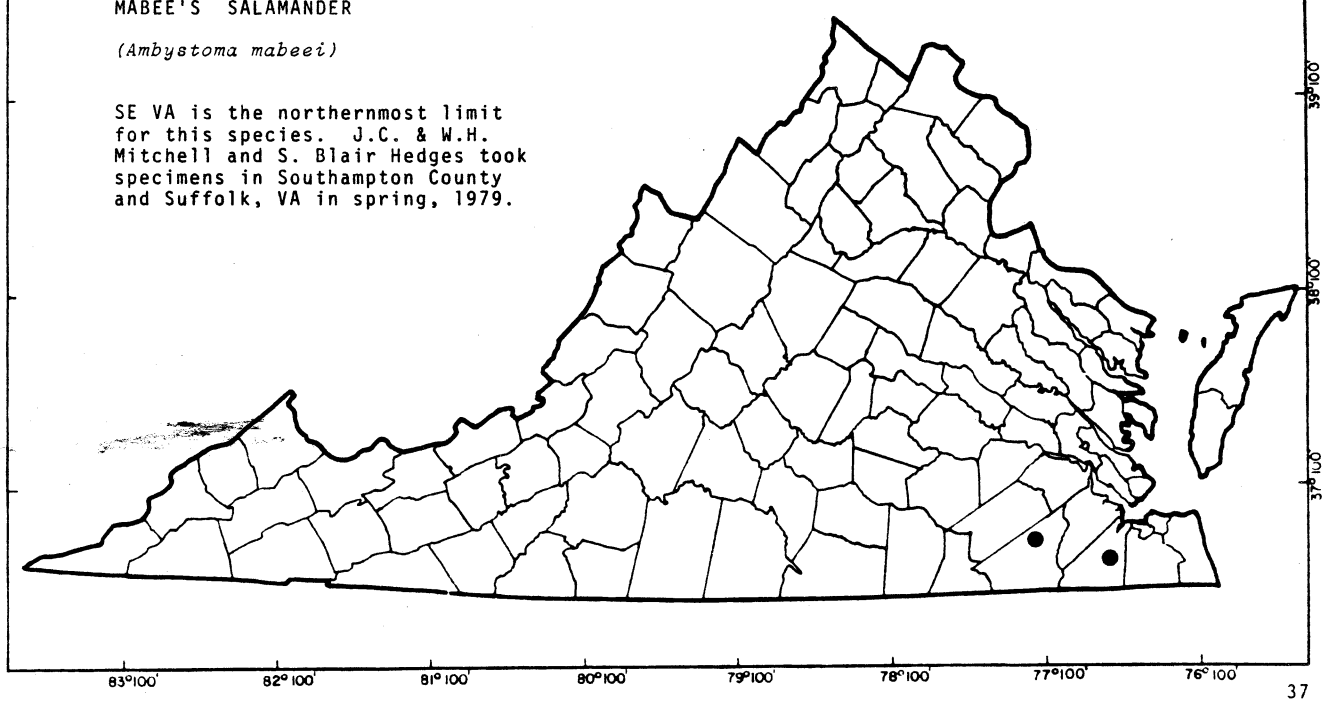


FAUNAL DISTRIBUTION MAP

MABEE'S SALAMANDER

(Ambystoma mabeei)

SE VA is the northernmost limit for this species. J.C. & W.H. Mitchell and S. Blair Hedges took specimens in Southampton County and Suffolk, VA in spring, 1979.

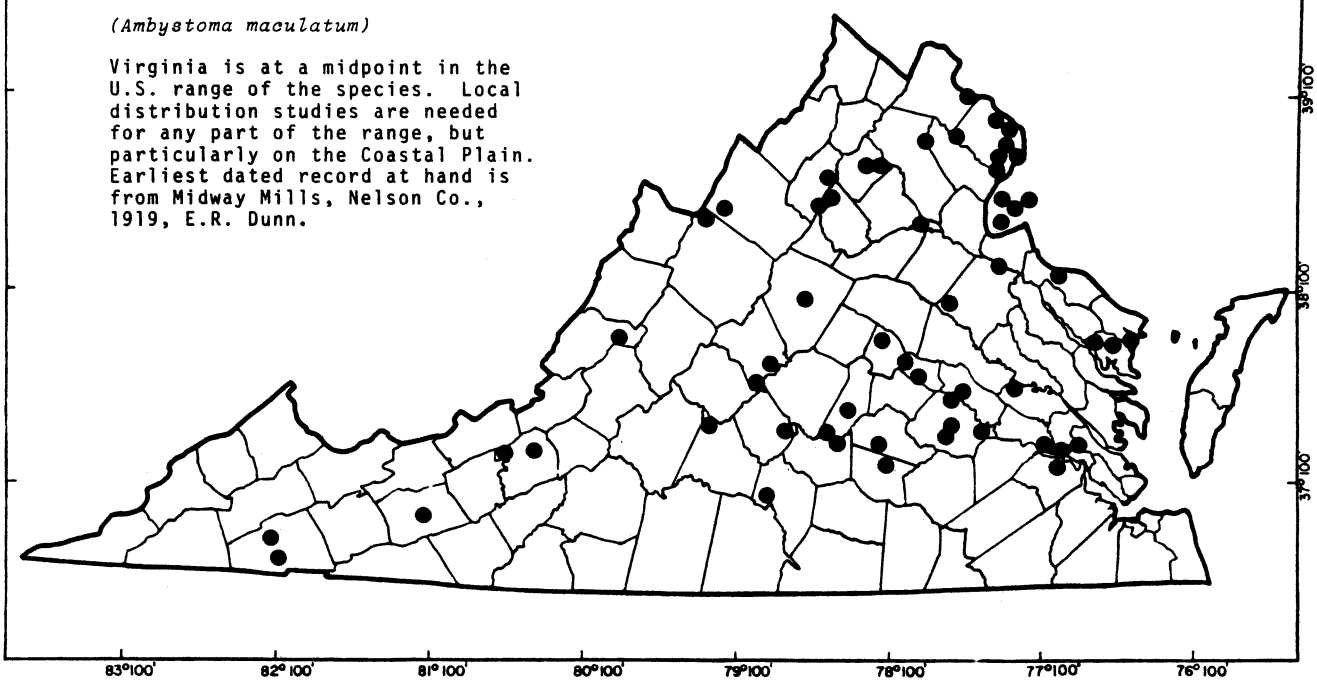


FAUNAL DISTRIBUTION MAP

SPOTTED SALAMANDER

(Ambystoma maculatum)

Virginia is at a midpoint in the U.S. range of the species. Local distribution studies are needed for any part of the range, but particularly on the Coastal Plain. Earliest dated record at hand is from Midway Mills, Nelson Co., 1919, E.R. Dunn.

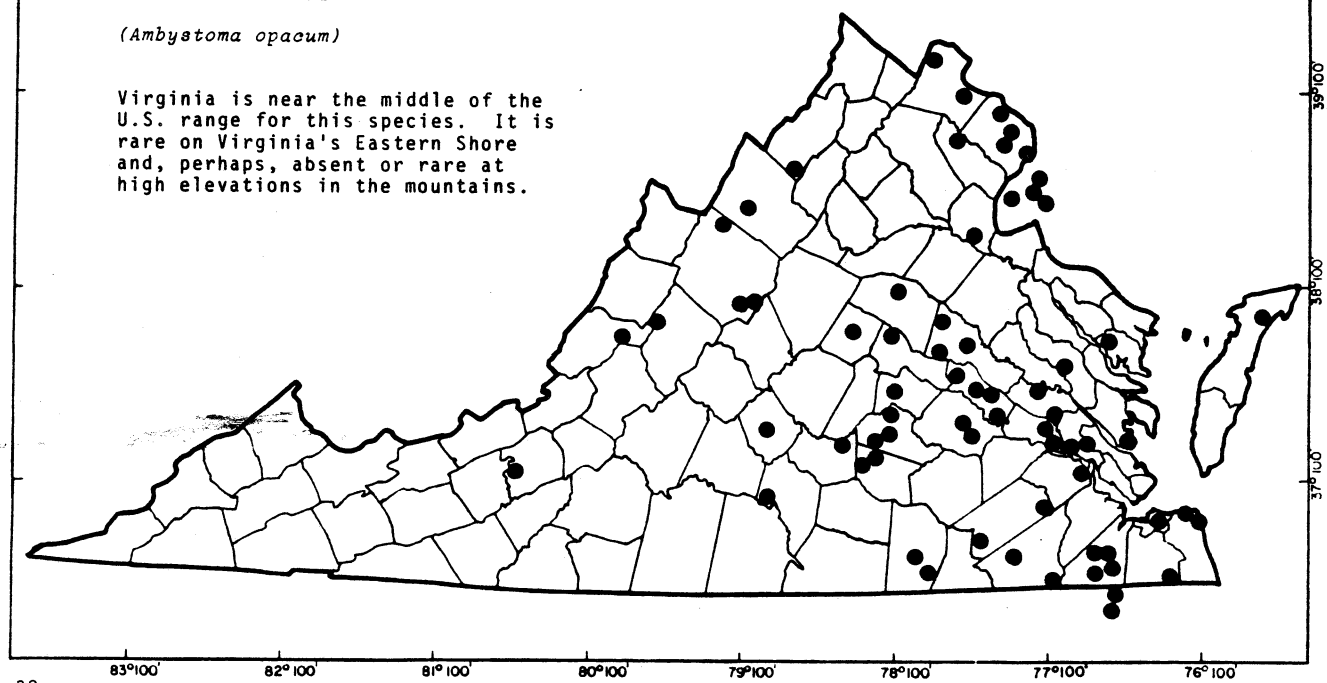


FAUNAL DISTRIBUTION MAP

MARBLED SALAMANDER

(Ambystoma opacum)

Virginia is near the middle of the U.S. range for this species. It is rare on Virginia's Eastern Shore and, perhaps, absent or rare at high elevations in the mountains.

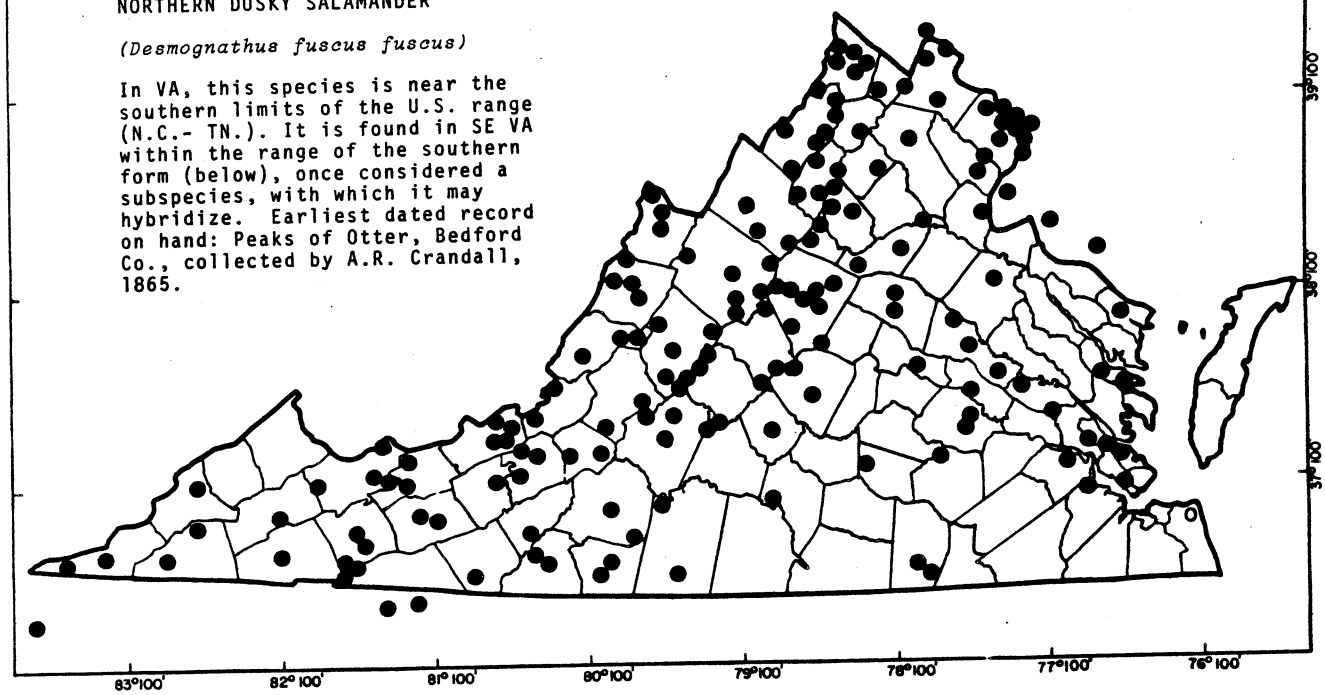


FAUNAL DISTRIBUTION MAP

NORTHERN DUSKY SALAMANDER

(Desmognathus fuscus fuscus)

In VA, this species is near the southern limits of the U.S. range (N.C.- TN.). It is found in SE VA within the range of the southern form (below), once considered a subspecies, with which it may hybridize. Earliest dated record on hand: Peaks of Otter, Bedford Co., collected by A.R. Crandall, 1865.

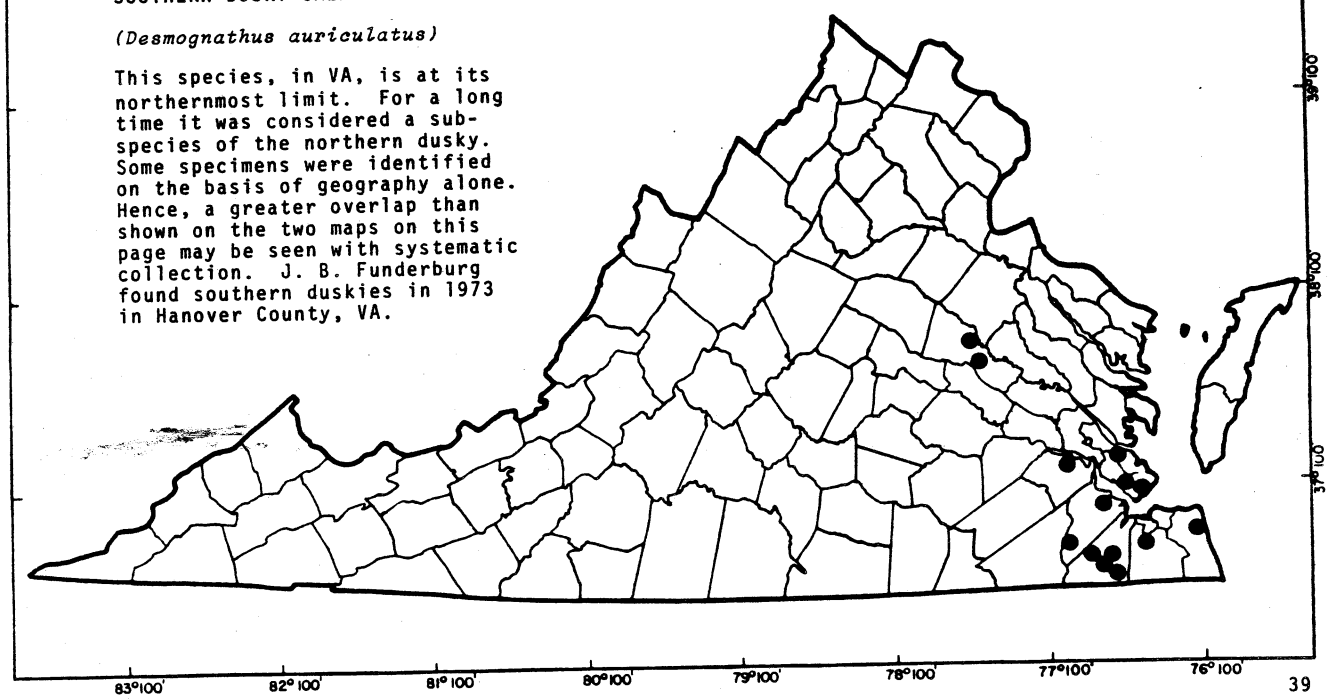


FAUNAL DISTRIBUTION MAP

SOUTHERN DUSKY SALAMANDER

(Desmognathus auriculatus)

This species, in VA, is at its northernmost limit. For a long time it was considered a subspecies of the northern dusky. Some specimens were identified on the basis of geography alone. Hence, a greater overlap than shown on the two maps on this page may be seen with systematic collection. J. B. Funderburg found southern duskies in 1973 in Hanover County, VA.

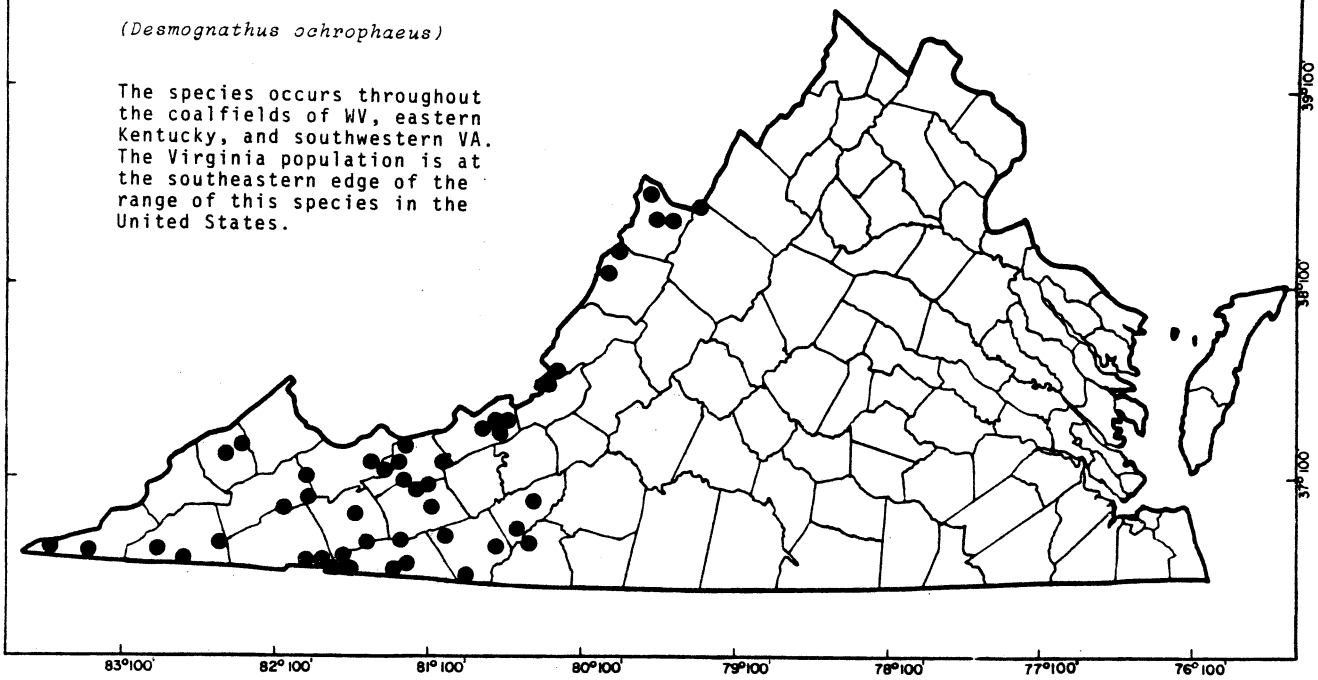


FAUNAL DISTRIBUTION MAP

MOUNTAIN DUSKY SALAMANDER

(Desmognathus ochrophaeus)

The species occurs throughout the coalfields of WV, eastern Kentucky, and southwestern VA. The Virginia population is at the southeastern edge of the range of this species in the United States.

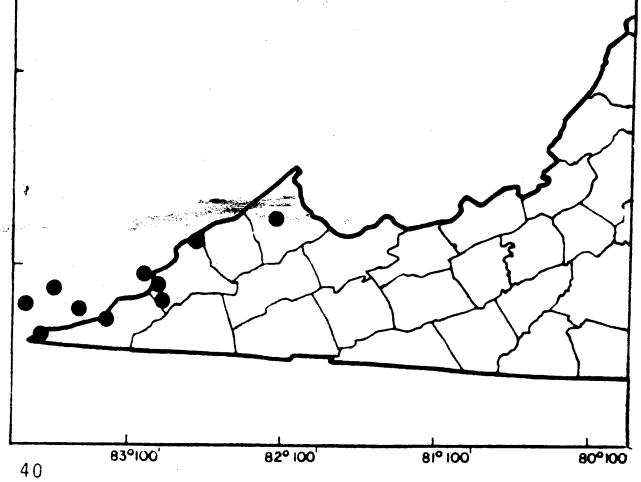


FAUNAL DISTRIBUTION MAP

BLACK MOUNTAIN DUSKY SALAMANDER

(Desmognathus welteri)

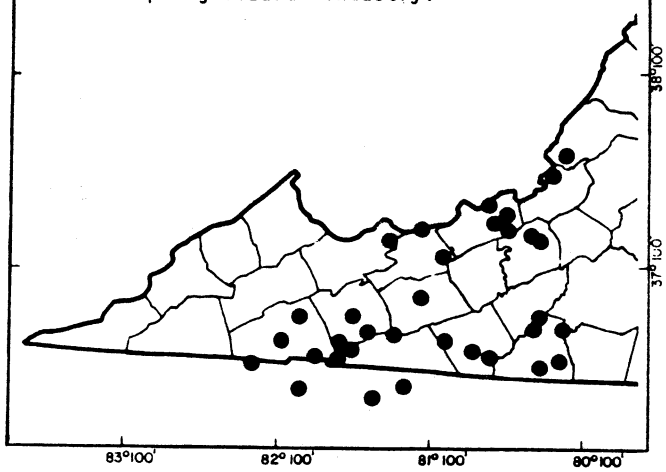
Southwestern Virginia is the eastern limit of the U.S. range of this species. The form is endemic to Appalachia (VA.- KY.) in mountainous wooded areas.



BLACK-BELLIED SALAMANDER

(Desmognathus quadramaculatus)

Endemic to Appalachia. This is a montane form frequenting streams above 1,500 feet elevation. It is found sometimes on the upper Piedmont as a result of the "spring lizard" industry.

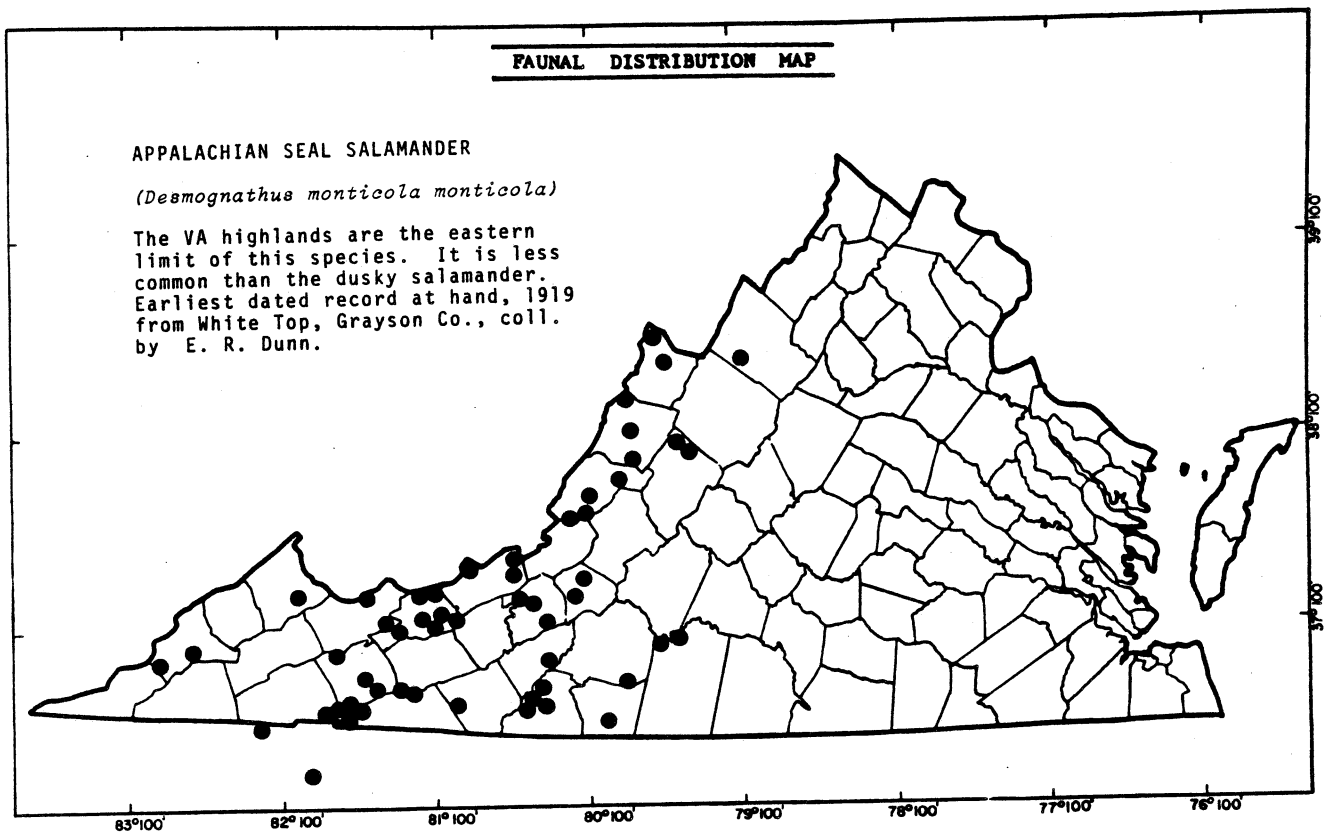


FAUNAL DISTRIBUTION MAP

APPALACHIAN SEAL SALAMANDER

(Desmognathus monticola monticola)

The VA highlands are the eastern limit of this species. It is less common than the dusky salamander. Earliest dated record at hand, 1919 from White Top, Grayson Co., coll. by E. R. Dunn.

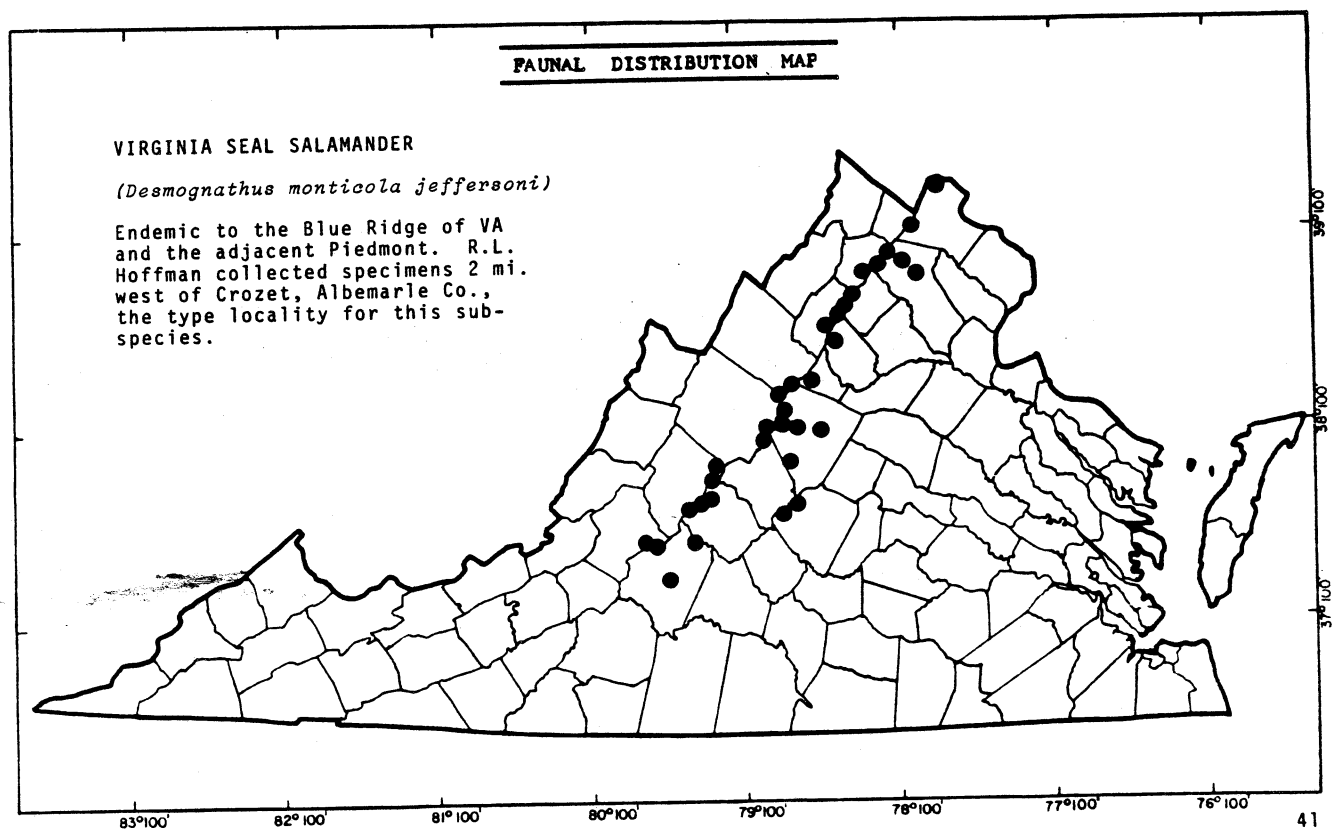


FAUNAL DISTRIBUTION MAP

VIRGINIA SEAL SALAMANDER

(Desmognathus monticola jeffersoni)

Endemic to the Blue Ridge of VA and the adjacent Piedmont. R.L. Hoffman collected specimens 2 mi. west of Crozet, Albemarle Co., the type locality for this sub-species.



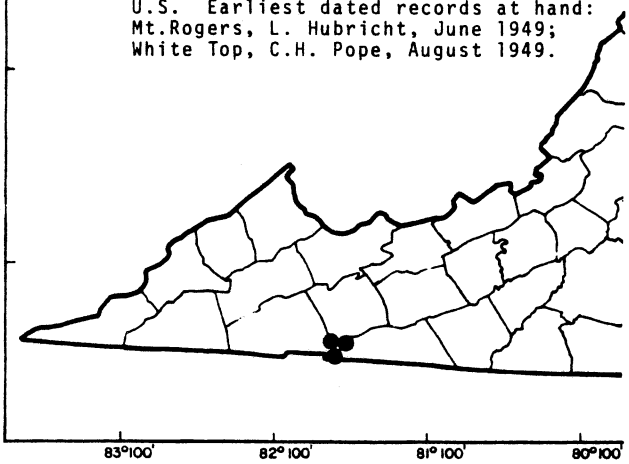
FAUNAL DISTRIBUTION MAP

PYGMY SALAMANDER

(Desmognathus wrighti)

Mount Rogers and White Top Mountain, Grayson Co., are the northernmost limit of this tiny terrestrial amphibian with no aquatic stage. It is found in the spruce-fir zone.

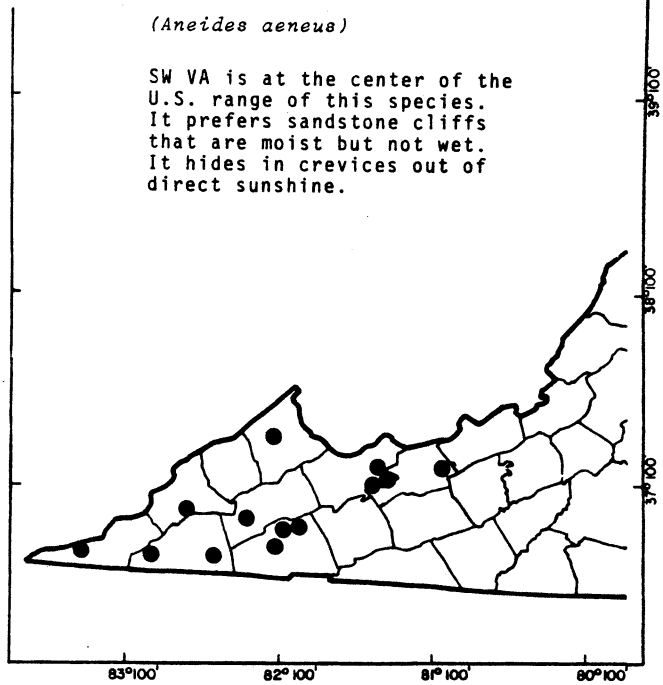
The species is well represented in major scientific collections in the U.S. Earliest dated records at hand: Mt.Rogers, L. Hubricht, June 1949; White Top, C.H. Pope, August 1949.



GREEN SALAMANDER

(Aneides aeneus)

SW VA is at the center of the U.S. range of this species. It prefers sandstone cliffs that are moist but not wet. It hides in crevices out of direct sunshine.

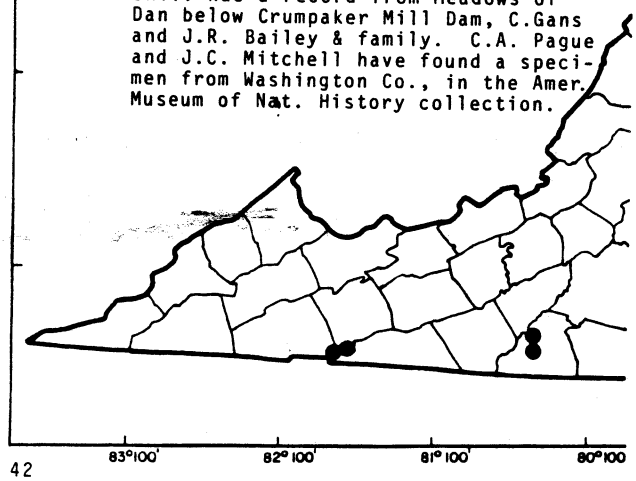


FAUNAL DISTRIBUTION MAP

SHOVEL-NOSED SALAMANDER

(Leurognathus marmoratus)

Virginia is the northernmost limit for this species. Definitely known from the north slope of White Top, Grayson Co. Apparently collected twice in Patrick Co. Dr.Roger Conant (1975) cites S.S. Sweet record; Duke Univ. has a record from Meadows of Dan below Crumpaker Mill Dam, C.Gans and J.R. Bailey & family. C.A. Pague and J.C. Mitchell have found a specimen from Washington Co., in the Amer. Museum of Nat. History collection.

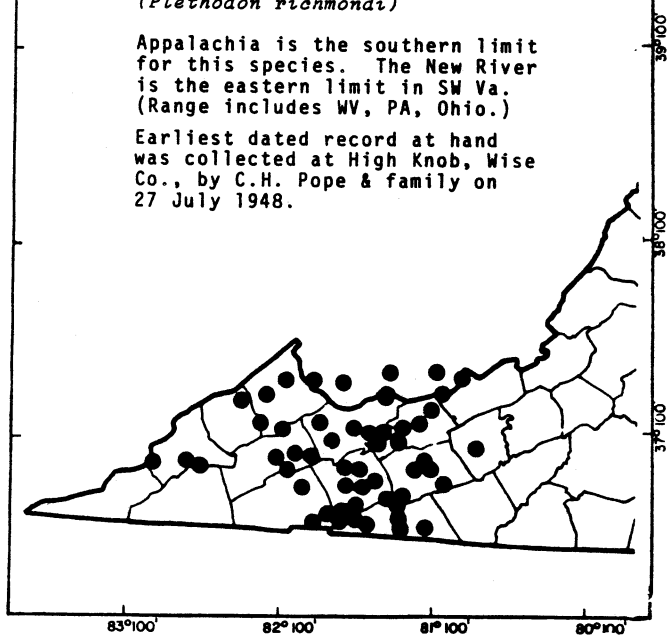


RAVINE SALAMANDER

(Plethodon richmondi)

Appalachia is the southern limit for this species. The New River is the eastern limit in SW Va. (Range includes WV, PA, Ohio.)

Earliest dated record at hand was collected at High Knob, Wise Co., by C.H. Pope & family on 27 July 1948.



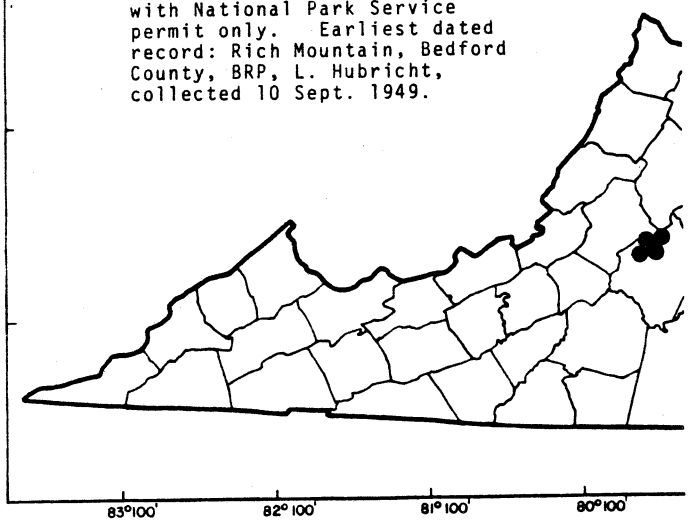
FAUNAL DISTRIBUTION MAP

PEAKS OF OTTER SALAMANDER

(Plethodon nettingi hubrichti)

Endemic to the Peaks of Otter region in central Virginia.

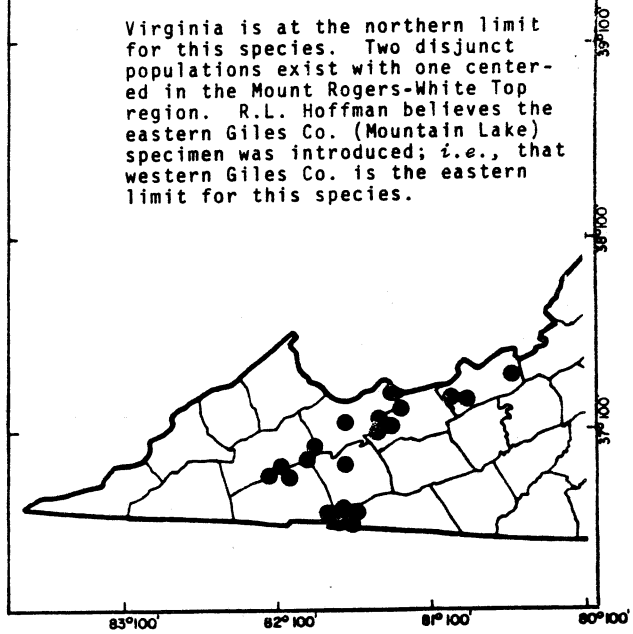
Collecting within the Blue Ridge Parkway area is done with National Park Service permit only. Earliest dated record: Rich Mountain, Bedford County, BRP, L. Hubricht, collected 10 Sept. 1949.



APPALACHIAN WOODLAND SALAMANDER

(Plethodon jordani)

Virginia is at the northern limit for this species. Two disjunct populations exist with one centered in the Mount Rogers-White Top region. R.L. Hoffman believes the eastern Giles Co. (Mountain Lake) specimen was introduced; *i.e.*, that western Giles Co. is the eastern limit for this species.

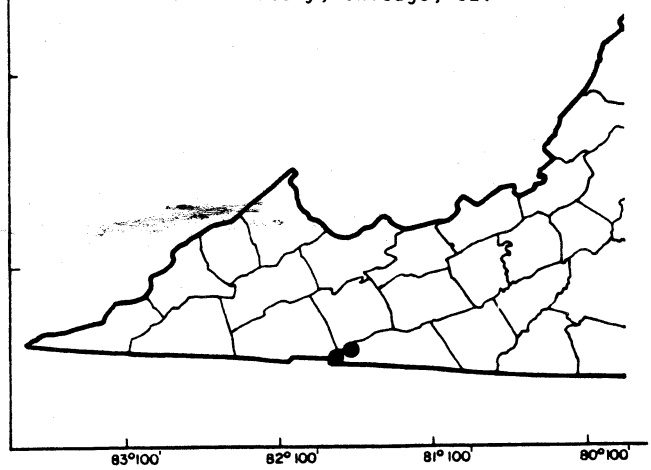


FAUNAL DISTRIBUTION MAP

SPOT-BELLIED SALAMANDER

(Plethodon welleri ventromaculatum)

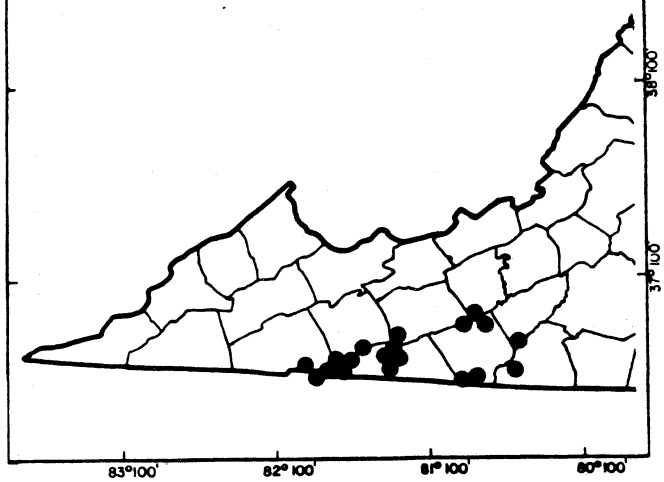
This subspecies is at its northern limit in the Mount Rogers-White Top region of SW Virginia. Prefers fir forests above 4,000 ft. elevations. Collected at Mount Rogers, Grayson Co., July 1946, by R.L. Hoffman. Type specimens in Field Museum of Natural History, Chicago, IL.

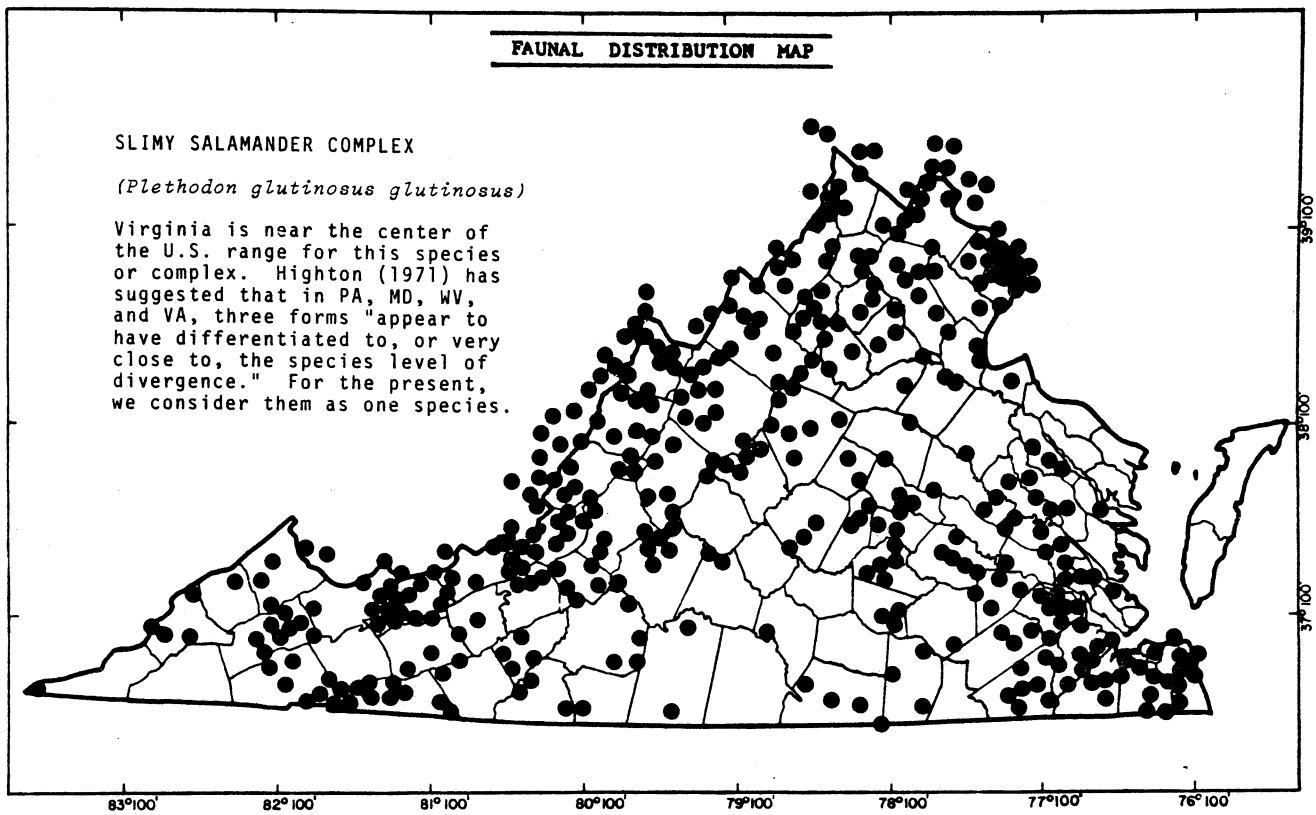


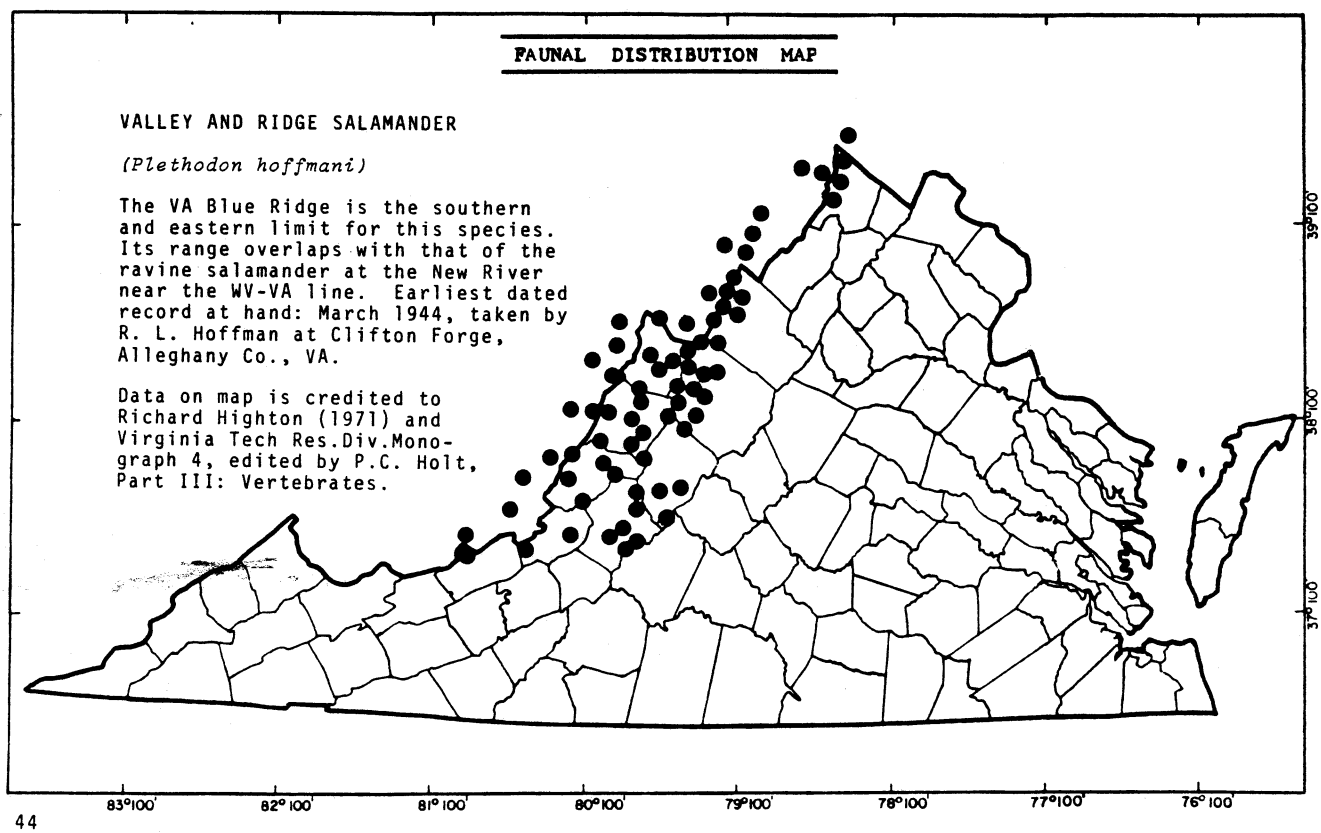
YONAHLOSSEE SALAMANDER

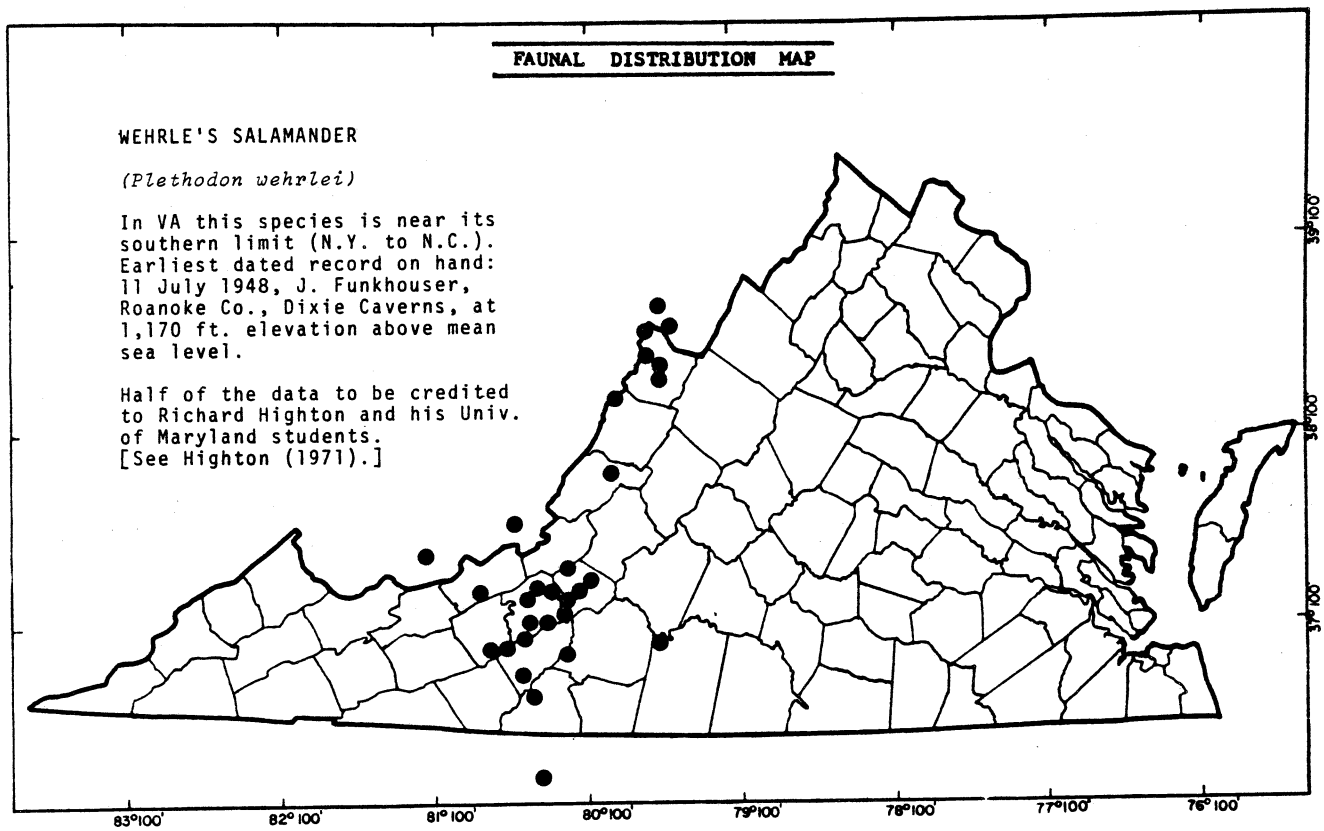
(Plethodon yonahlossee)

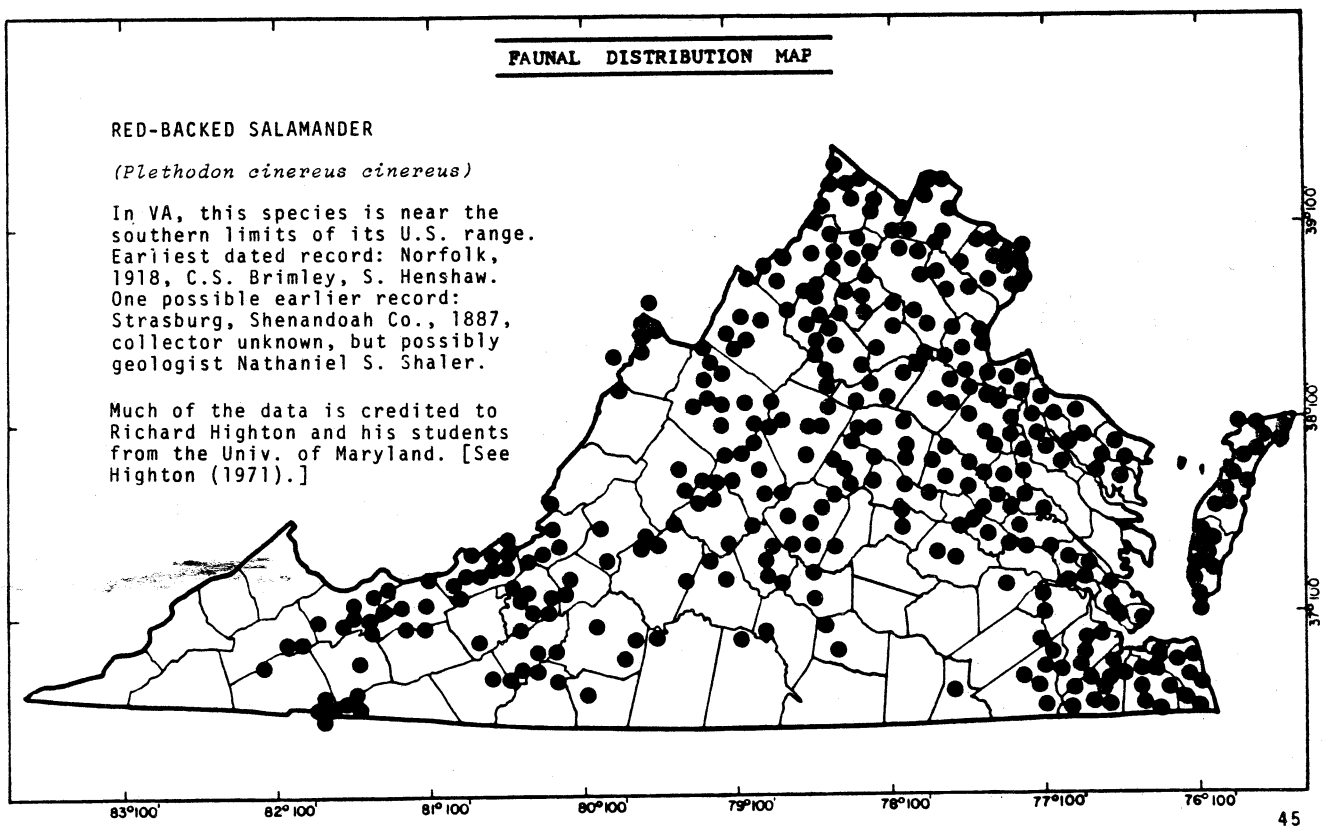
The southern Blue Ridge in VA is the northern limit of this montane species. It prefers elevations of 2,500 to 2,700 feet. Nocturnal in habit. Earliest dated record: White Top Mountain, Grayson County, E.R. Dunn, 1919.




FAUNAL DISTRIBUTION MAP
SLIMY SALAMANDER COMPLEX
(Plethodon glutinosus glutinosus)
Virginia is near the center of the U.S. range for this species or complex. Highton (1971) has suggested that in PA, MD, WV, and VA, three forms "appear to have differentiated to, or very close to, the species level of divergence." For the present, we consider them as one species.
39°100'
38°100'
37°100'
83°100'
82°100'
81°100'
80°100'
79°100'
78°100'
77°100'
76°100'


FAUNAL DISTRIBUTION MAP
VALLEY AND RIDGE SALAMANDER
(Plethodon hoffmani)
The VA Blue Ridge is the southern and eastern limit for this species. Its range overlaps with that of the ravine salamander at the New River near the WV-VA line. Earliest dated record at hand: March 1944, taken by R. L. Hoffman at Clifton Forge, Alleghany Co., VA.
Data on map is credited to Richard Highton (1971) and Virginia Tech Res.Div.Monograph 4, edited by P.C. Holt, Part III: Vertebrates.
39°100'
38°100'
37°100'
83°100'
82°100'
81°100'
80°100'
79°100'
78°100'
77°100'
76°100'


FAUNAL DISTRIBUTION MAP
WEHRLE'S SALAMANDER
(Plethodon wehrlei)
In VA this species is near its southern limit (N.Y. to N.C.). Earliest dated record on hand: 11 July 1948, J. Funkhouser, Roanoke Co., Dixie Caverns, at 1,170 ft. elevation above mean sea level.
Half of the data to be credited to Richard Highton and his Univ. of Maryland students. [See Highton (1971).]
39°00'
38°00'
37°00'
83°00'
82°00'
81°00'
80°00'
79°00'
78°00'
77°00'
76°00'


FAUNAL DISTRIBUTION MAP
RED-BACKED SALAMANDER
(Plethodon cinereus cinereus)
In VA, this species is near the southern limits of its U.S. range. Earliest dated record: Norfolk, 1918, C.S. Brimley, S. Henshaw. One possible earlier record: Strasburg, Shenandoah Co., 1887, collector unknown, but possibly geologist Nathaniel S. Shaler.
Much of the data is credited to Richard Highton and his students from the Univ. of Maryland. [See Highton (1971).]
39°00'
38°00'
37°00'
83°00'
82°00'
81°00'
80°00'
79°00'
78°00'
77°00'
76°00'

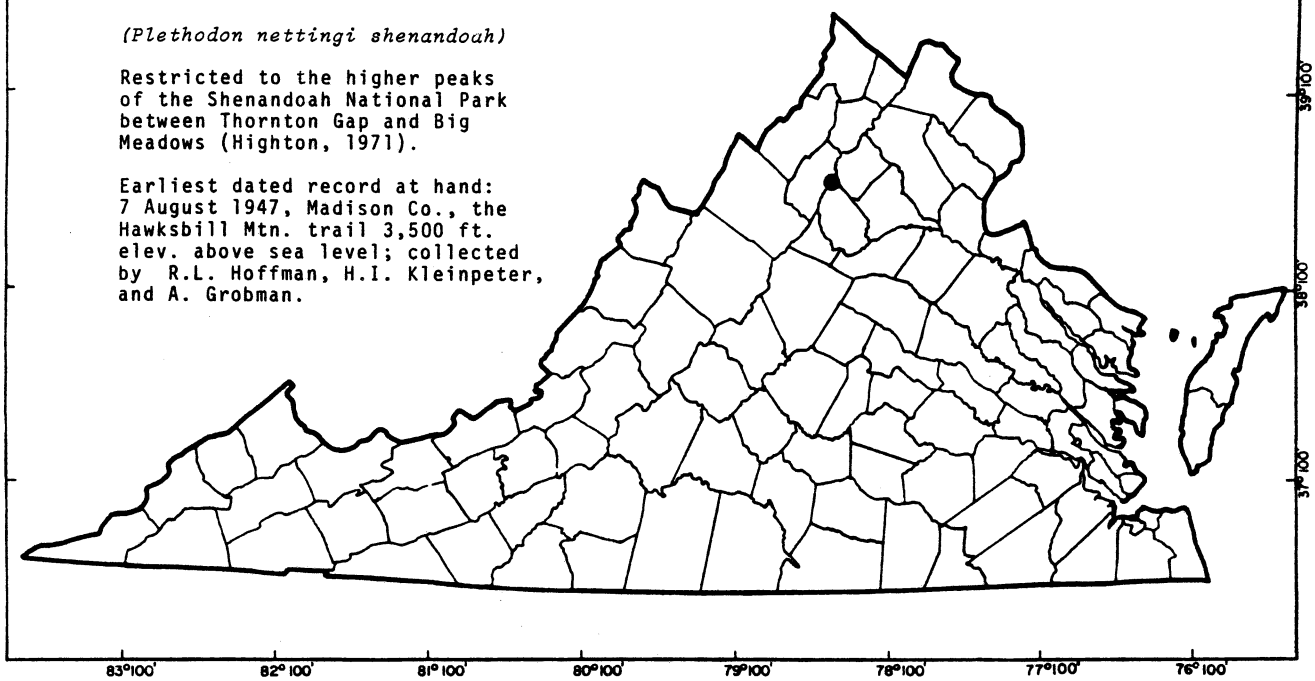
FAUNAL DISTRIBUTION MAP

SHENANDOAH SALAMANDER

(Plethodon nettingi shenandoah)

Restricted to the higher peaks of the Shenandoah National Park between Thornton Gap and Big Meadows (Highton, 1971).

Earliest dated record at hand: 7 August 1947, Madison Co., the Hawksbill Mtn. trail 3,500 ft. elev. above sea level; collected by R.L. Hoffman, H.I. Kleinpeter, and A. Grobman.



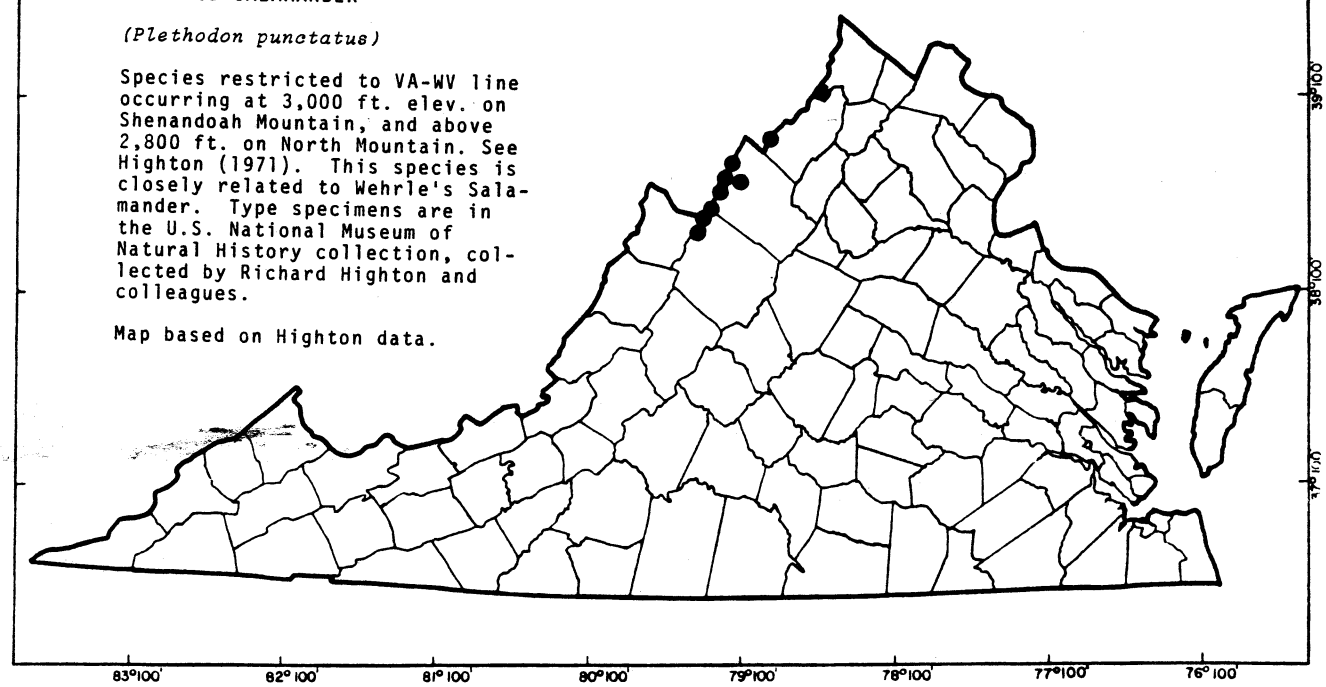
FAUNAL DISTRIBUTION MAP

COW KNOB SALAMANDER

(Plethodon punctatus)

Species restricted to VA-WV line occurring at 3,000 ft. elev. on Shenandoah Mountain, and above 2,800 ft. on North Mountain. See Highton (1971). This species is closely related to Wehrle's Salamander. Type specimens are in the U.S. National Museum of Natural History collection, collected by Richard Highton and colleagues.

Map based on Highton data.



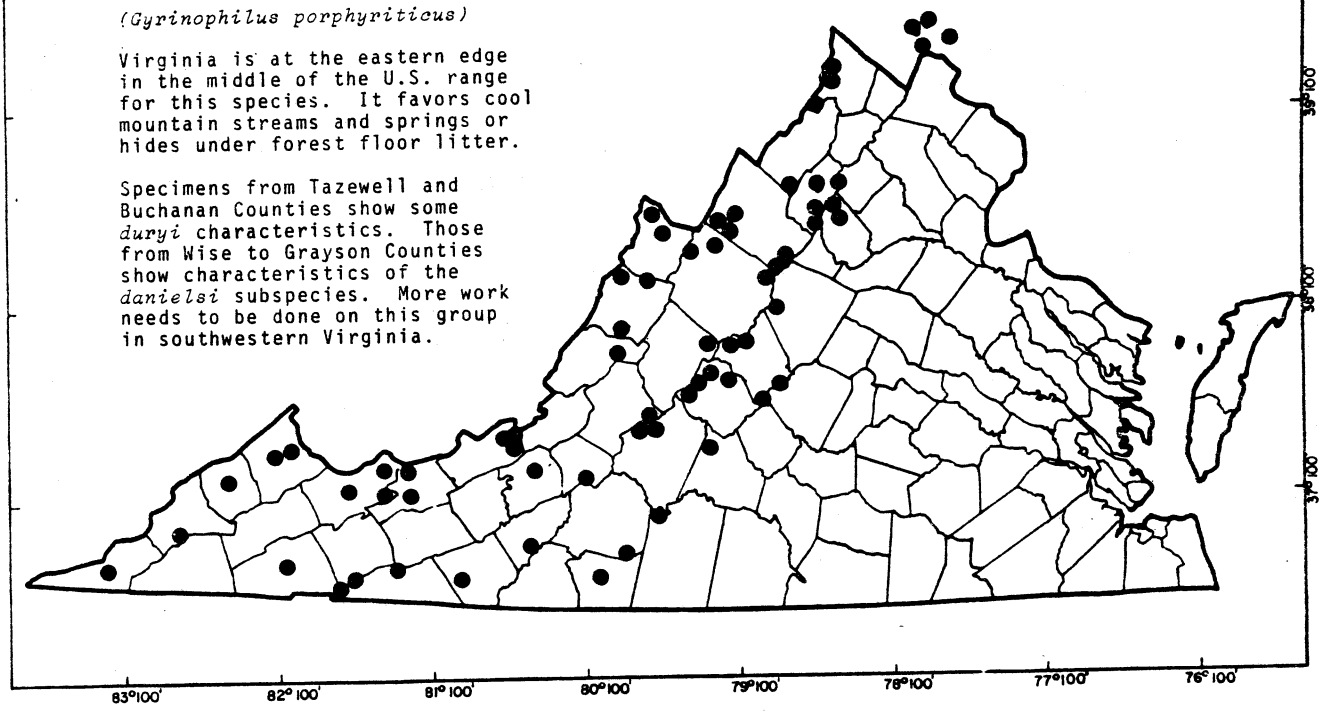
FAUNAL DISTRIBUTION MAP

NORTHERN SPRING SALAMANDER GROUP

(Gyrinophilus porphyriticus)

Virginia is at the eastern edge in the middle of the U.S. range for this species. It favors cool mountain streams and springs or hides under forest floor litter.

Specimens from Tazewell and Buchanan Counties show some *duryi* characteristics. Those from Wise to Grayson Counties show characteristics of the *danielsi* subspecies. More work needs to be done on this group in southwestern Virginia.

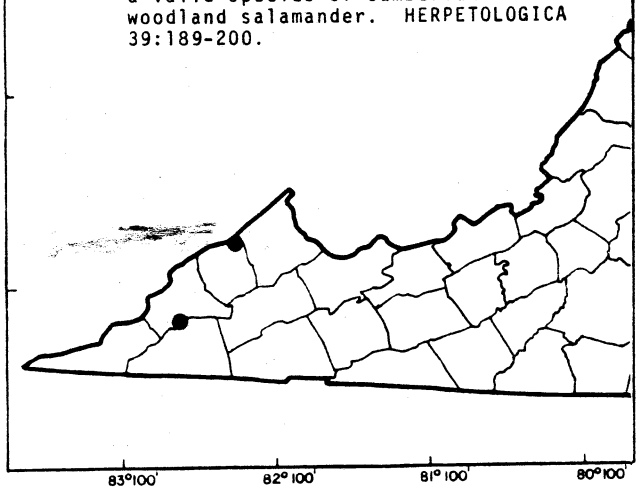


FAUNAL DISTRIBUTION MAP

CUMBERLAND PLATEAU SALAMANDER

(Plethodon kentucki)

This is a recently described new species of woodland salamander. (See Highton, R. and J.R. MacGregor. 1983. *Plethodon kentucki* Mittleman: a valid species of Cumberland Plateau woodland salamander. HERPETOLOGICA 39:189-200.

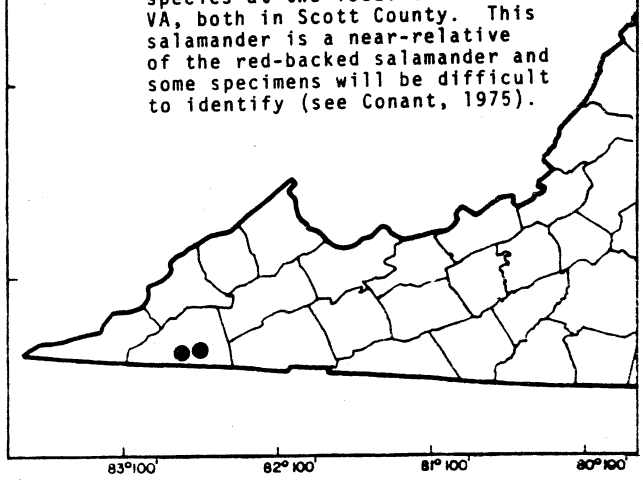


ZIGZAG SALAMANDER

(Plethodon dorsalis dorsalis)

Occurrence in VA reflects the easternmost disjunct population of this species presently known.

Richard Highton has found this species at two localities in SW VA, both in Scott County. This salamander is a near-relative of the red-backed salamander and some specimens will be difficult to identify (see Conant, 1975).

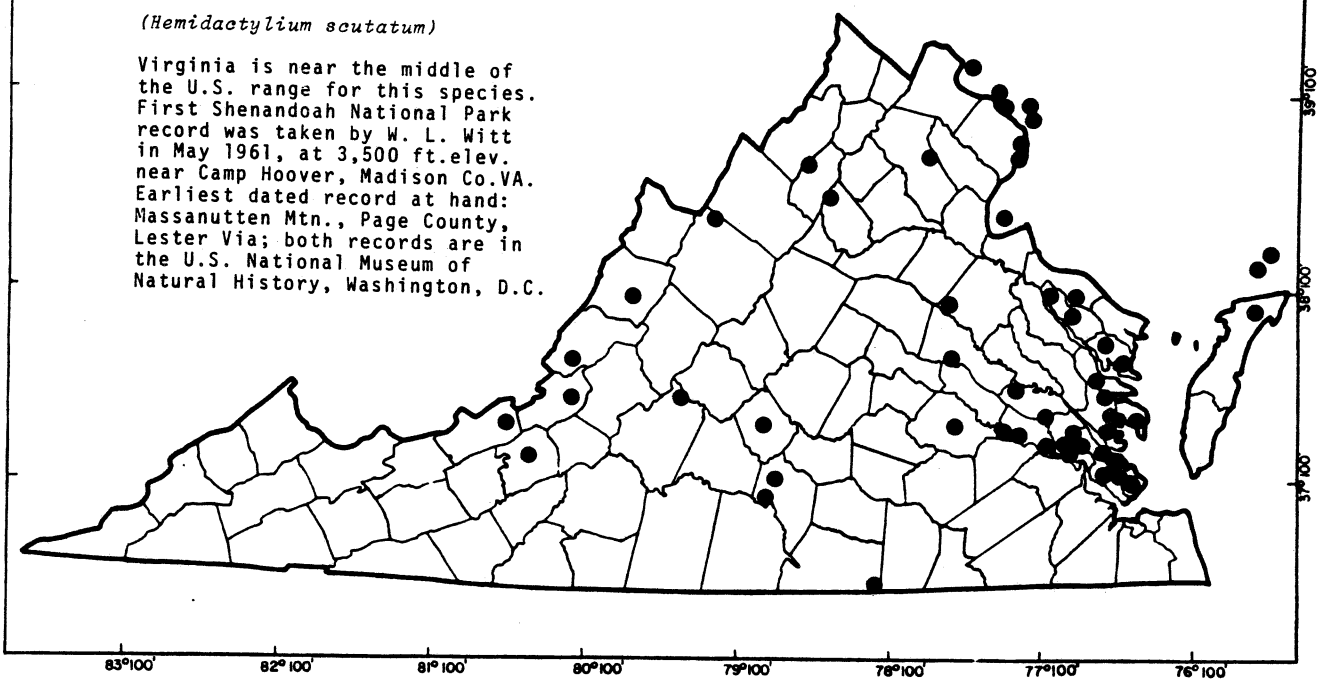


FAUNAL DISTRIBUTION MAP

FOUR-TOED SALAMANDER

(Hemidactylium scutatum)

Virginia is near the middle of the U.S. range for this species. First Shenandoah National Park record was taken by W. L. Witt in May 1961, at 3,500 ft.elev. near Camp Hoover, Madison Co.VA. Earliest dated record at hand: Massanutten Mtn., Page County, Lester Via; both records are in the U.S. National Museum of Natural History, Washington, D.C.

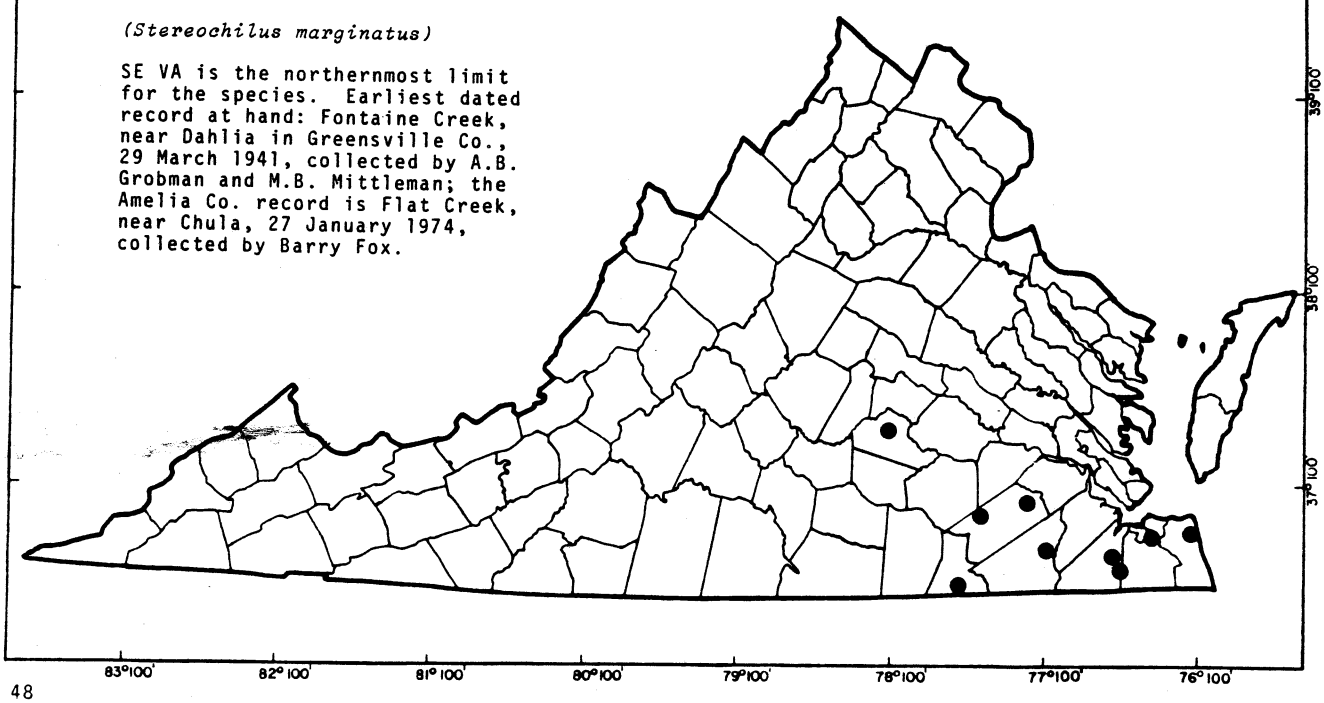


FAUNAL DISTRIBUTION MAP

MANY-LINED SALAMANDER

(Stereochilus marginatus)

SE VA is the northernmost limit for the species. Earliest dated record at hand: Fontaine Creek, near Dahlia in Greensville Co., 29 March 1941, collected by A.B. Grobman and M.B. Mittleman; the Amelia Co. record is Flat Creek, near Chula, 27 January 1974, collected by Barry Fox.

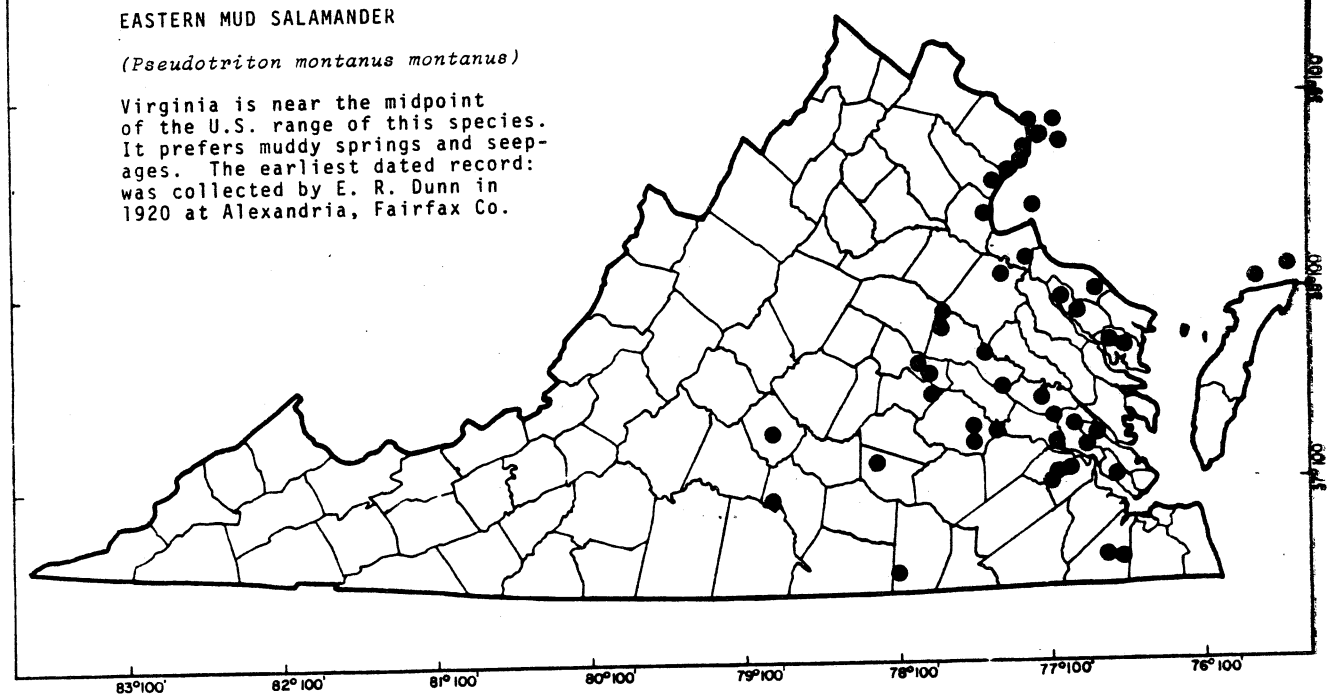


FAUNAL DISTRIBUTION MAP

EASTERN MUD SALAMANDER

(Pseudotriton montanus montanus)

Virginia is near the midpoint of the U.S. range of this species. It prefers muddy springs and seepages. The earliest dated record: was collected by E. R. Dunn in 1920 at Alexandria, Fairfax Co.



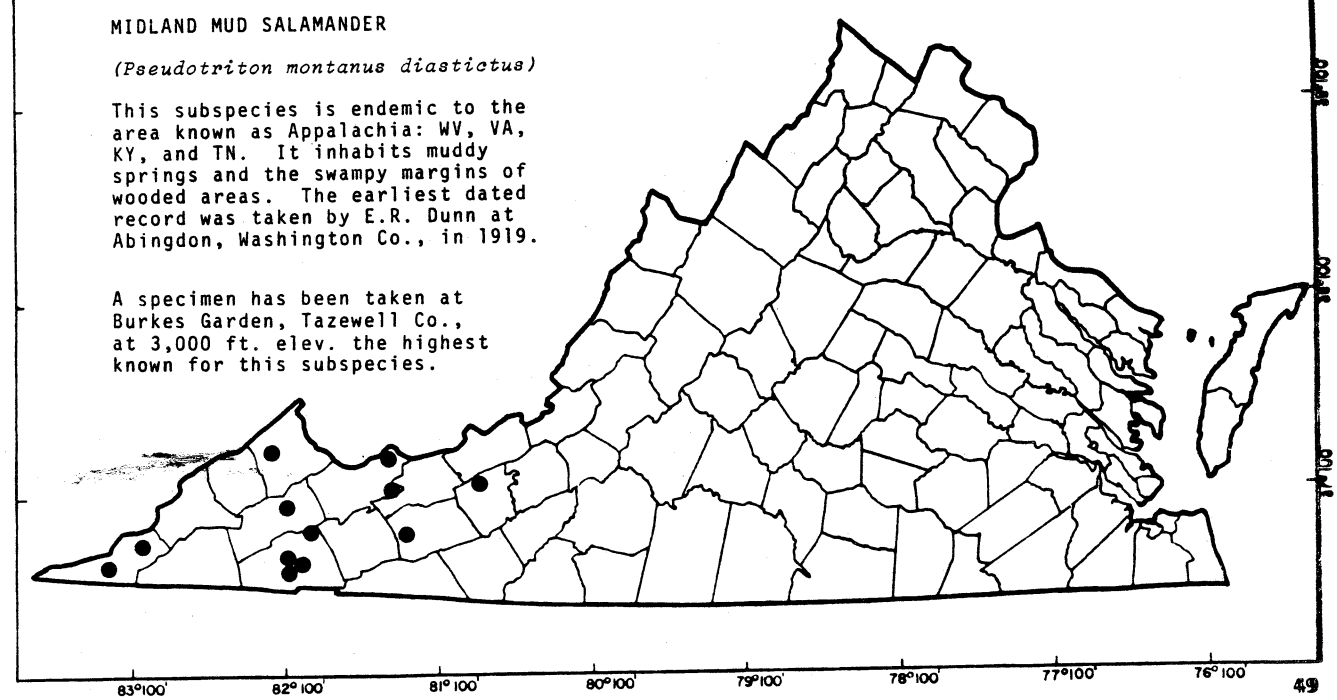
FAUNAL DISTRIBUTION MAP

MIDLAND MUD SALAMANDER

(Pseudotriton montanus diastictus)

This subspecies is endemic to the area known as Appalachia: WV, VA, KY, and TN. It inhabits muddy springs and the swampy margins of wooded areas. The earliest dated record was taken by E.R. Dunn at Abingdon, Washington Co., in 1919.

A specimen has been taken at Burkes Garden, Tazewell Co., at 3,000 ft. elev. the highest known for this subspecies.

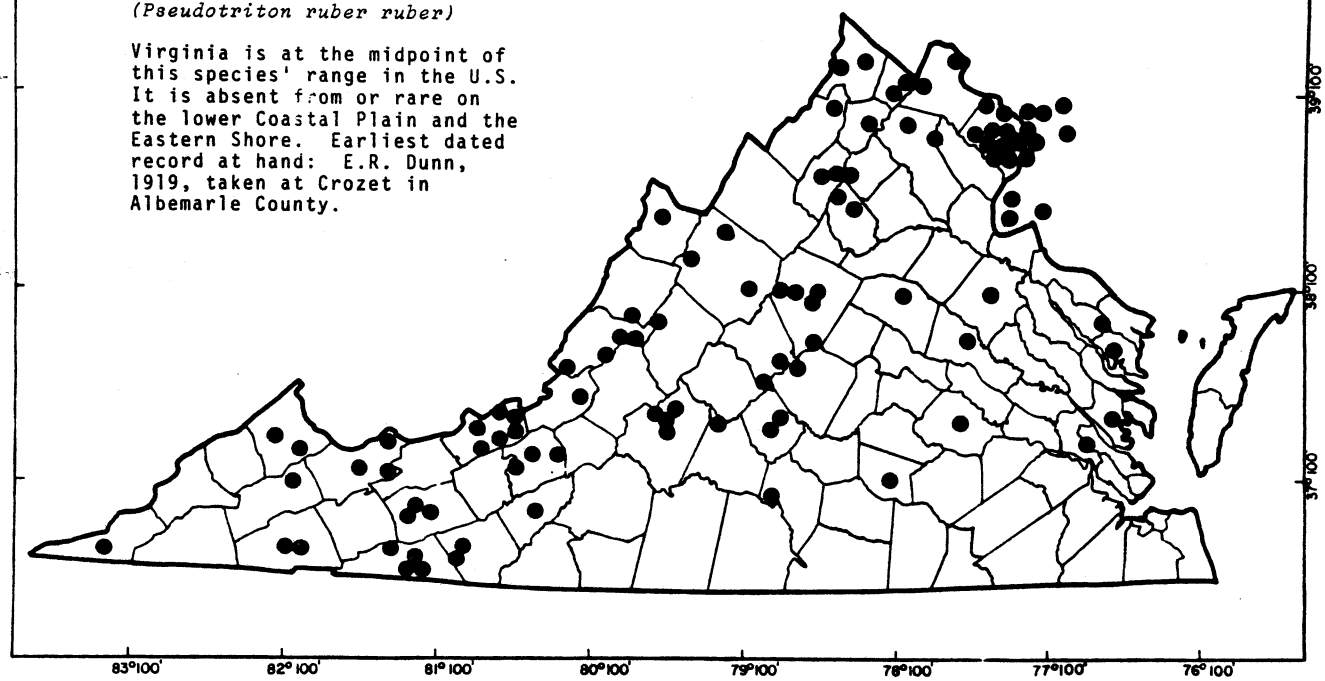


FAUNAL DISTRIBUTION MAP

NORTHERN RED SALAMANDER

(Pseudotriton ruber ruber)

Virginia is at the midpoint of this species' range in the U.S. It is absent from or rare on the lower Coastal Plain and the Eastern Shore. Earliest dated record at hand: E.R. Dunn, 1919, taken at Crozet in Albemarle County.

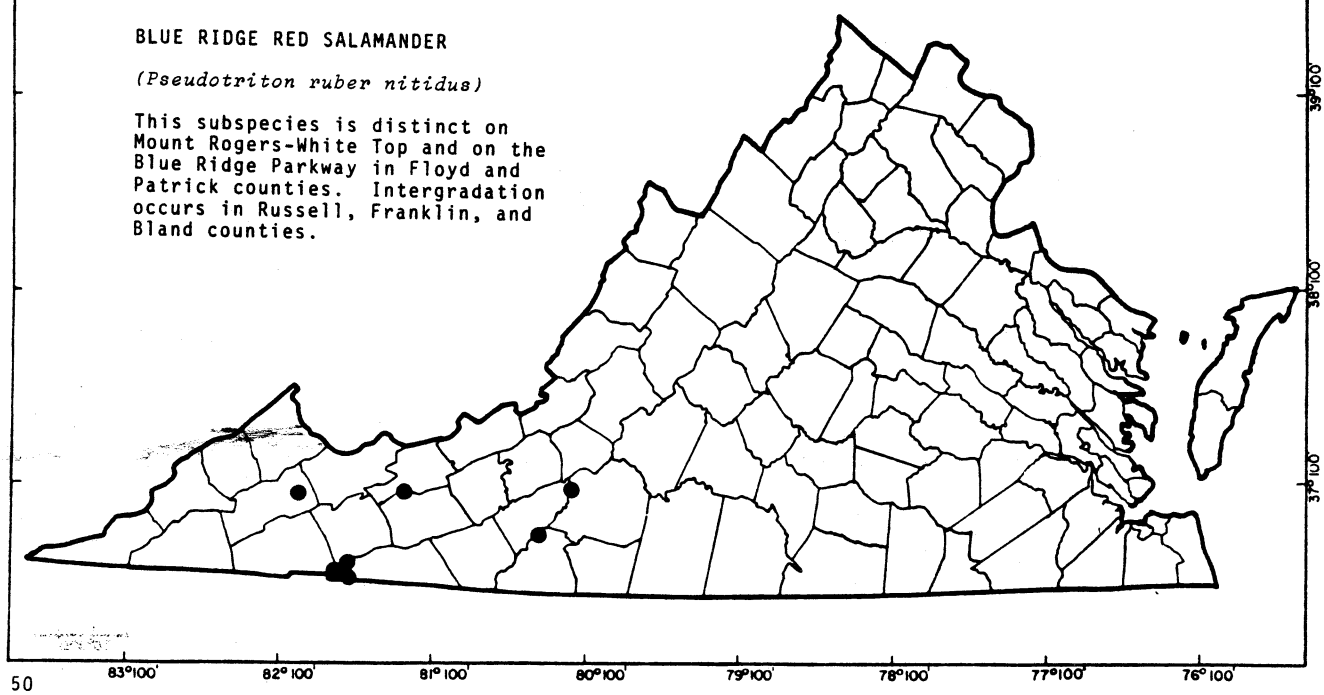


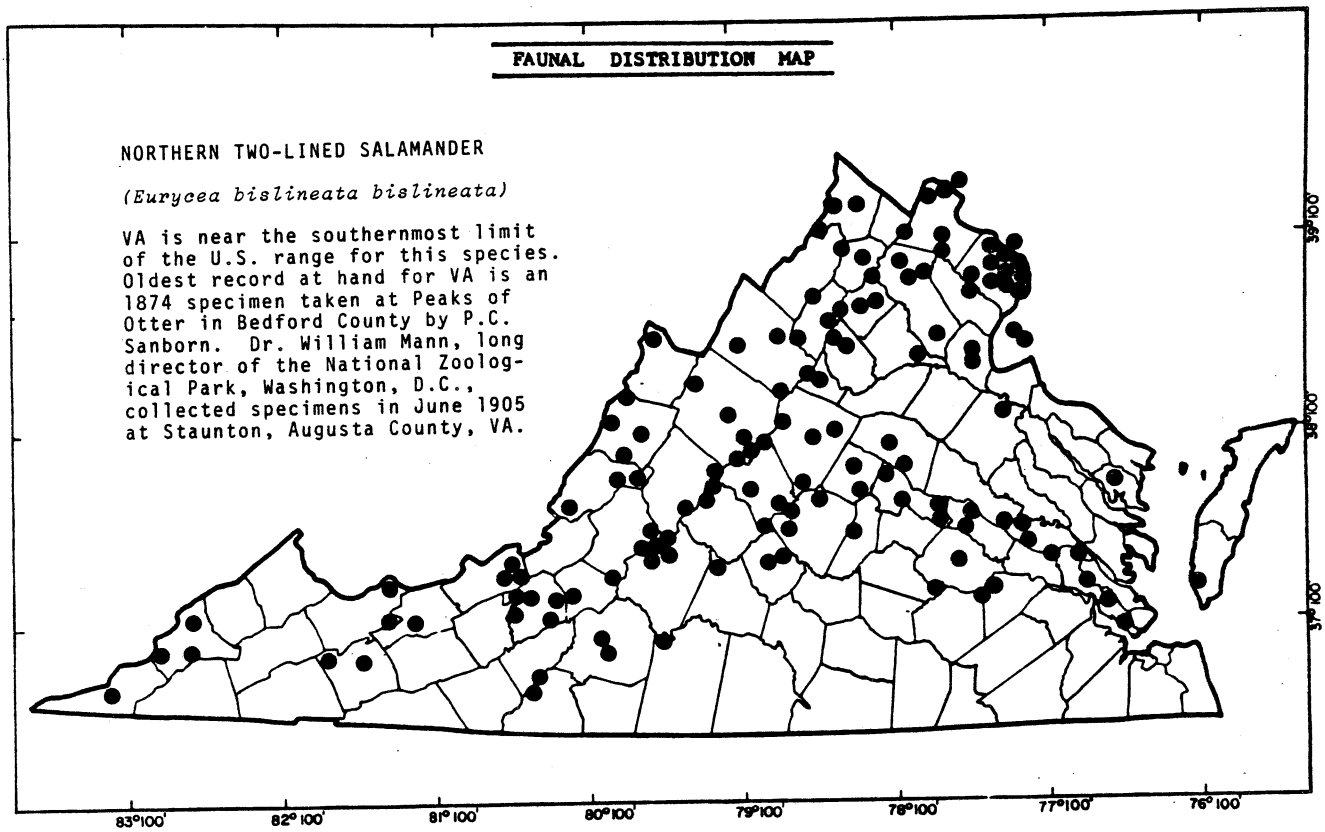
FAUNAL DISTRIBUTION MAP

BLUE RIDGE RED SALAMANDER

(Pseudotriton ruber nitidus)

This subspecies is distinct on Mount Rogers-White Top and on the Blue Ridge Parkway in Floyd and Patrick counties. Intergradation occurs in Russell, Franklin, and Bland counties.




FAUNAL DISTRIBUTION MAP
NORTHERN TWO-LINED SALAMANDER
(Eurycea bislineata bislineata)
VA is near the southernmost limit of the U.S. range for this species. Oldest record at hand for VA is an 1874 specimen taken at Peaks of Otter in Bedford County by P.C. Sanborn. Dr. William Mann, long director of the National Zoological Park, Washington, D.C., collected specimens in June 1905 at Staunton, Augusta County, VA.
39°100'
38°100'
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81°100'
80°100'
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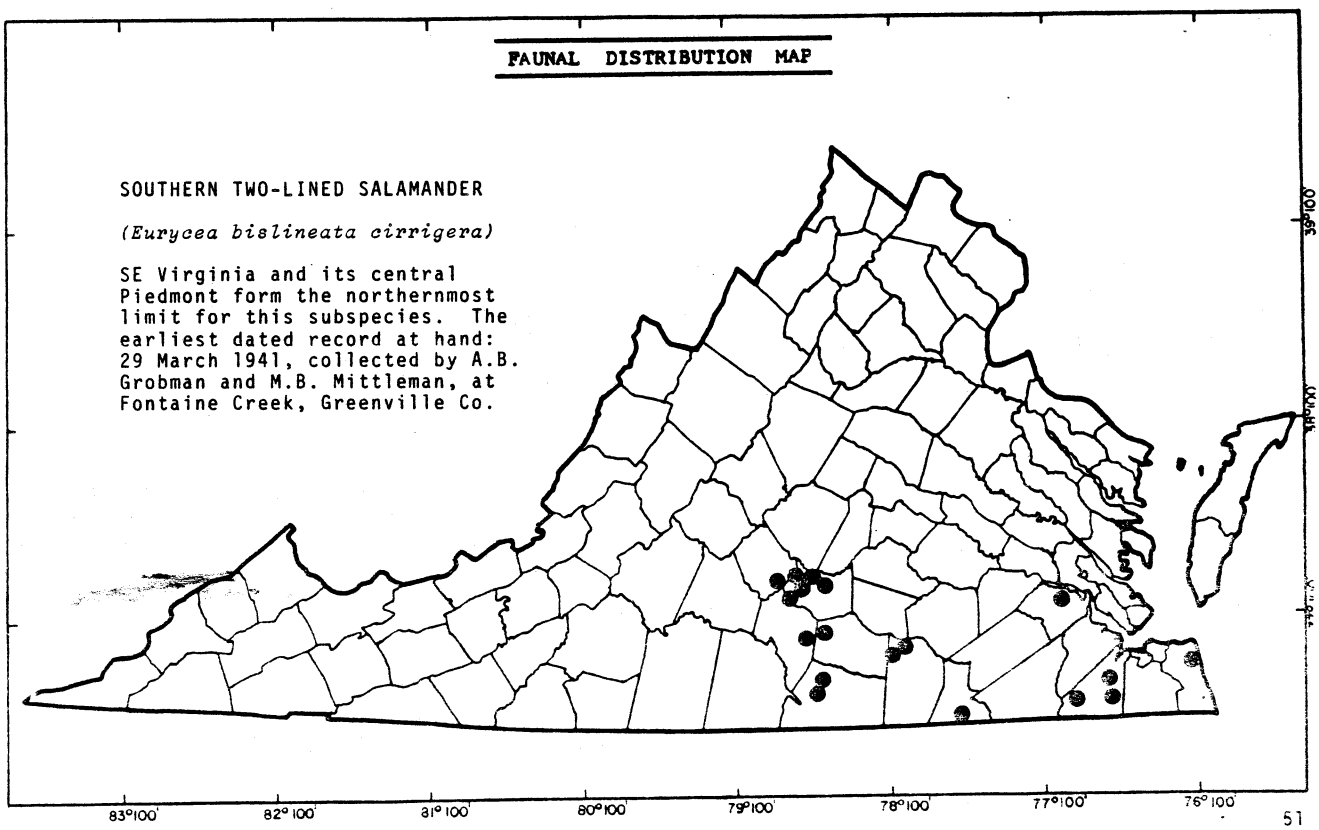
78°100'
77°100'
76°100'

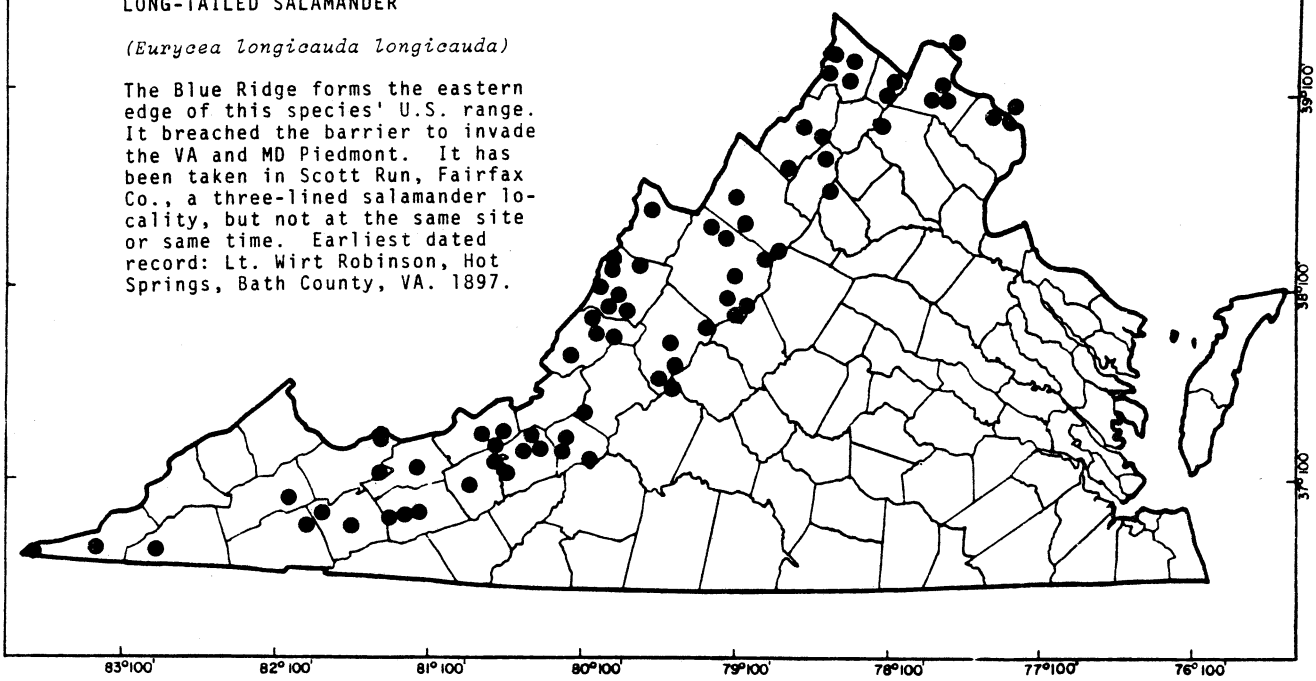

FAUNAL DISTRIBUTION MAP
SOUTHERN TWO-LINED SALAMANDER
(Eurycea bislineata cirrigera)
SE Virginia and its central Piedmont form the northernmost limit for this subspecies. The earliest dated record at hand: 29 March 1941, collected by A.B. Grobman and M.B. Mittleman, at Fontaine Creek, Greenville Co.
39°100'
83°100'
82°100'
81°100'
80°100'
79°100'
78°100'
77°100'
76°100'

FAUNAL DISTRIBUTION MAP

LONG-TAILED SALAMANDER

(Eurycea longicauda longicauda)

The Blue Ridge forms the eastern edge of this species' U.S. range. It breached the barrier to invade the VA and MD Piedmont. It has been taken in Scott Run, Fairfax Co., a three-lined salamander locality, but not at the same site or same time. Earliest dated record: Lt. Wirt Robinson, Hot Springs, Bath County, VA. 1897.

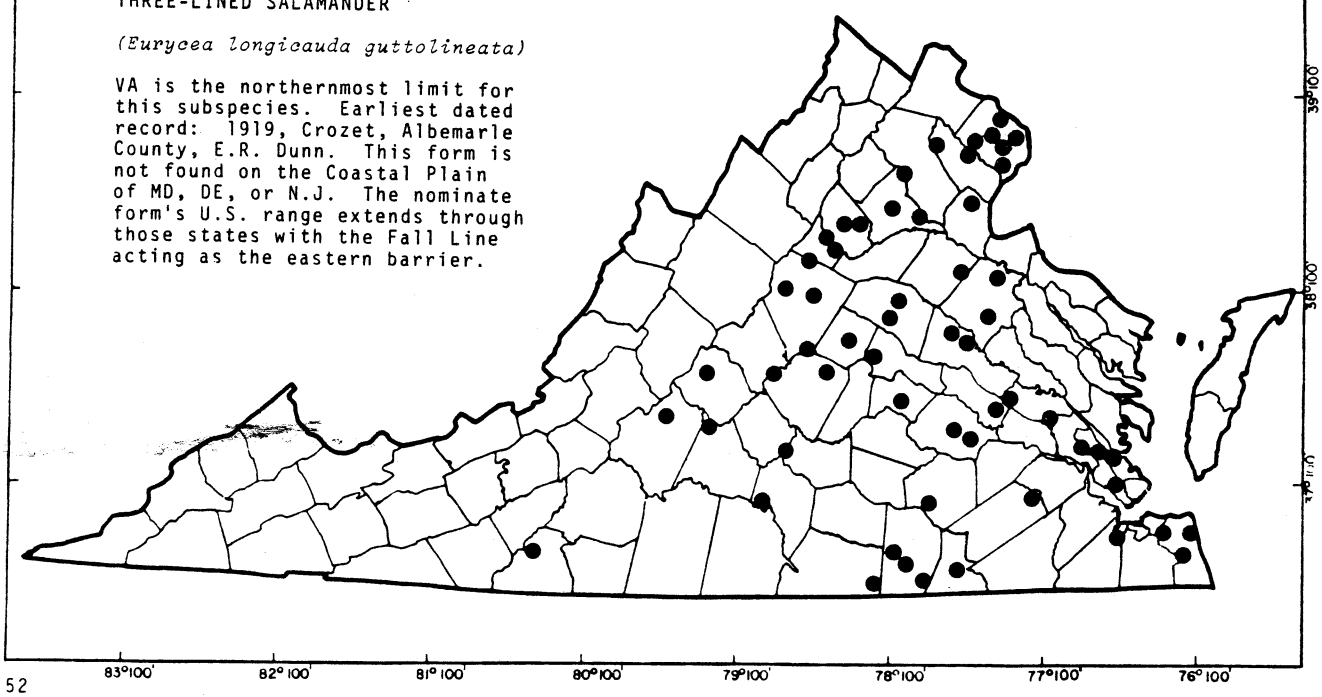


FAUNAL DISTRIBUTION MAP

THREE-LINED SALAMANDER

(Eurycea longicauda guttolineata)

VA is the northernmost limit for this subspecies. Earliest dated record: 1919, Crozet, Albemarle County, E.R. Dunn. This form is not found on the Coastal Plain of MD, DE, or N.J. The nominate form's U.S. range extends through those states with the Fall Line acting as the eastern barrier.

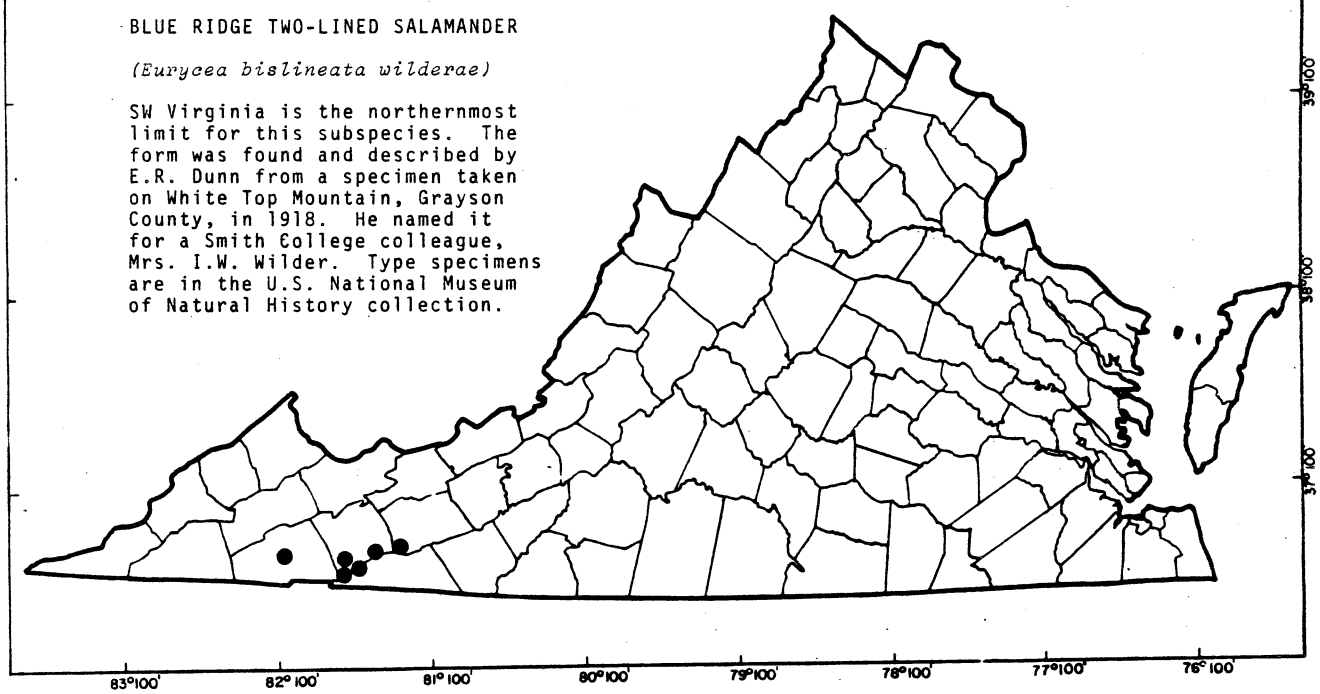


FAUNAL DISTRIBUTION MAP

BLUE RIDGE TWO-LINED SALAMANDER

(Eurycea bislineata wilderae)

SW Virginia is the northernmost limit for this subspecies. The form was found and described by E.R. Dunn from a specimen taken on White Top Mountain, Grayson County, in 1918. He named it for a Smith College colleague, Mrs. I.W. Wilder. Type specimens are in the U.S. National Museum of Natural History collection.

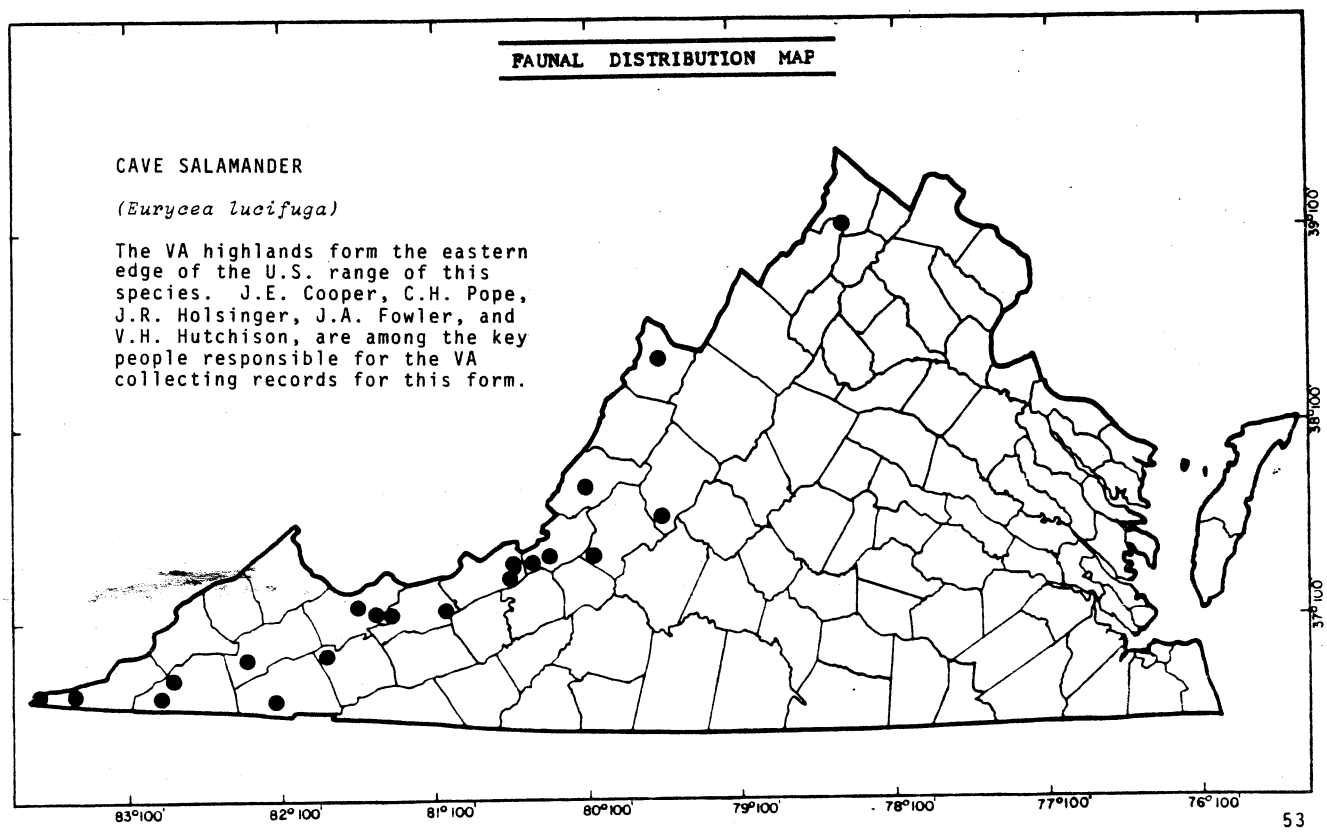


FAUNAL DISTRIBUTION MAP

CAVE SALAMANDER

(Eurycea lucifuga)

The VA highlands form the eastern edge of the U.S. range of this species. J.E. Cooper, C.H. Pope, J.R. Holsinger, J.A. Fowler, and V.H. Hutchison, are among the key people responsible for the VA collecting records for this form.

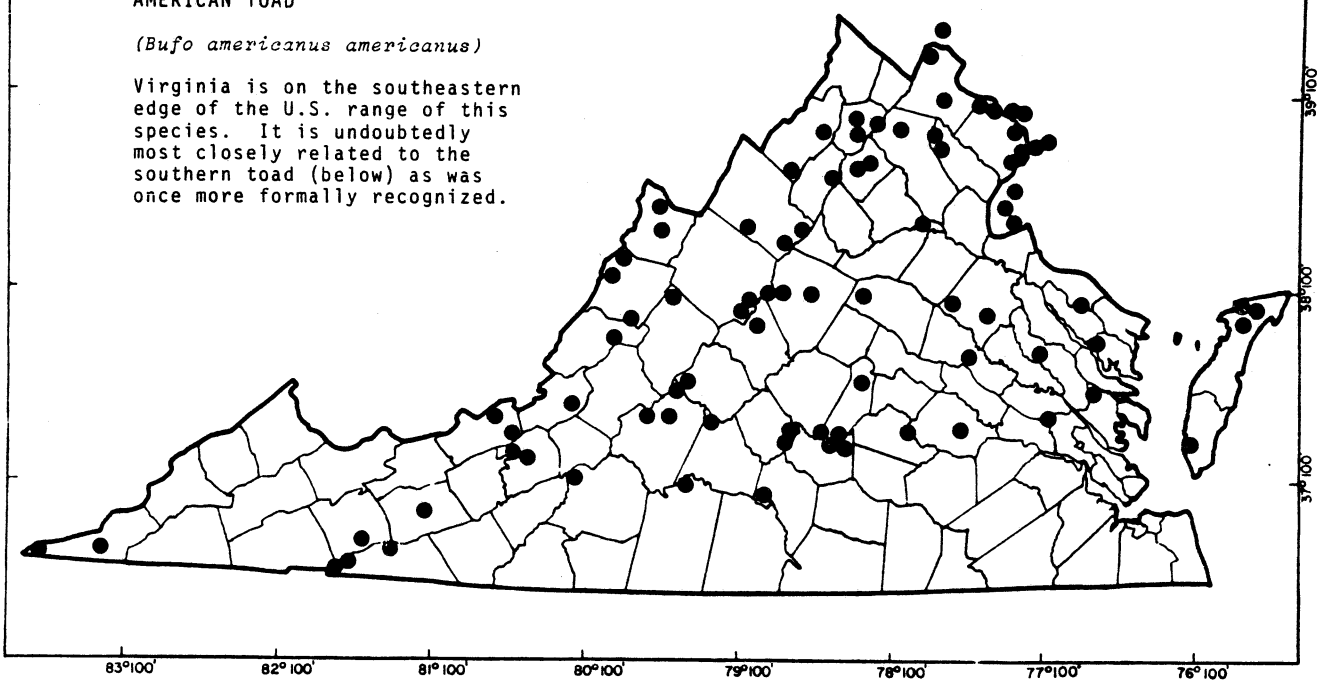


FAUNAL DISTRIBUTION MAP

AMERICAN TOAD

(Bufo americanus americanus)

Virginia is on the southeastern edge of the U.S. range of this species. It is undoubtedly most closely related to the southern toad (below) as was once more formally recognized.

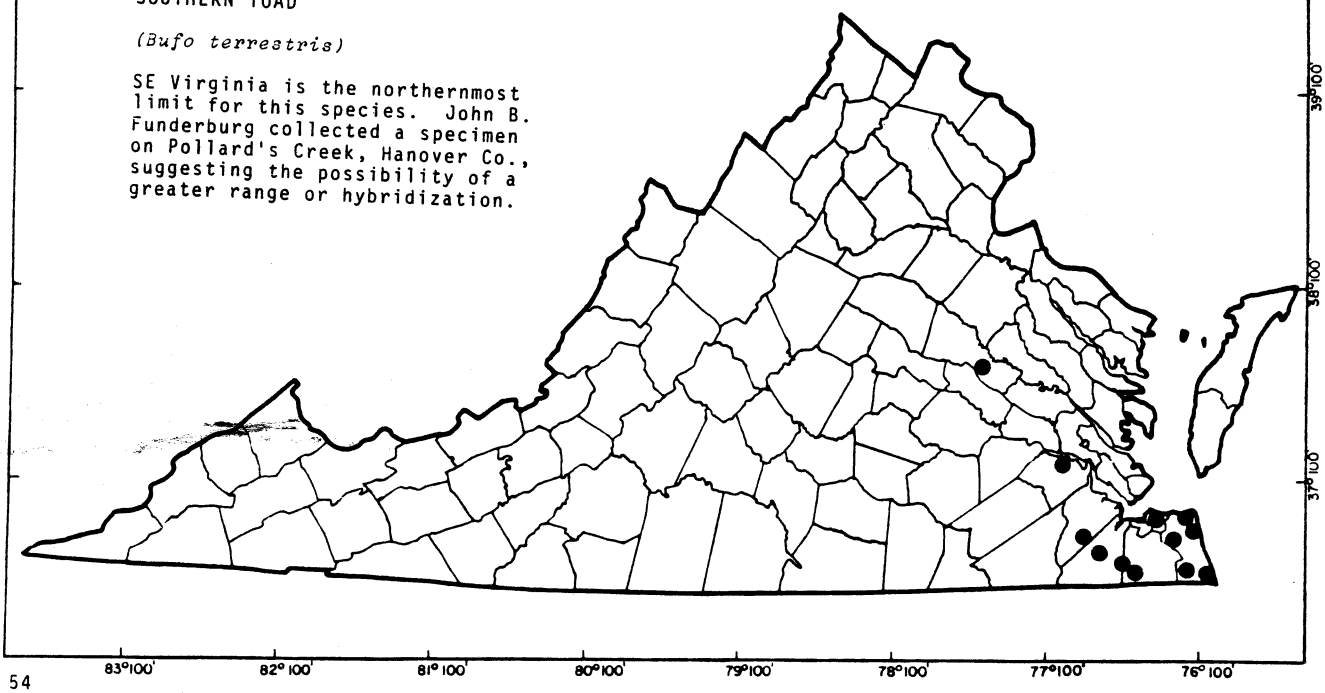


FAUNAL DISTRIBUTION MAP

SOUTHERN TOAD

(Bufo terrestris)

SE Virginia is the northernmost limit for this species. John B. Funderburg collected a specimen on Pollard's Creek, Hanover Co., suggesting the possibility of a greater range or hybridization.

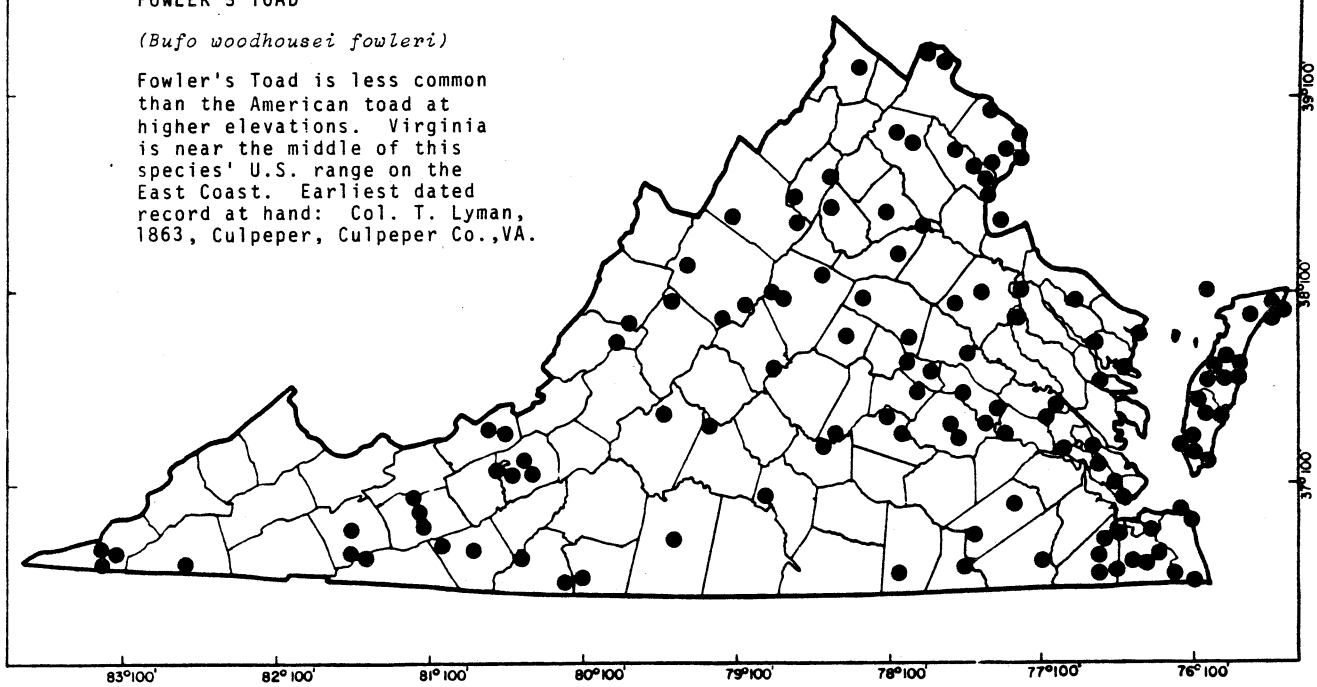


FAUNAL DISTRIBUTION MAP

FOWLER'S TOAD

(Bufo woodhousei fowleri)

Fowler's Toad is less common than the American toad at higher elevations. Virginia is near the middle of this species' U.S. range on the East Coast. Earliest dated record at hand: Col. T. Lyman, 1863, Culpeper, Culpeper Co.,VA.

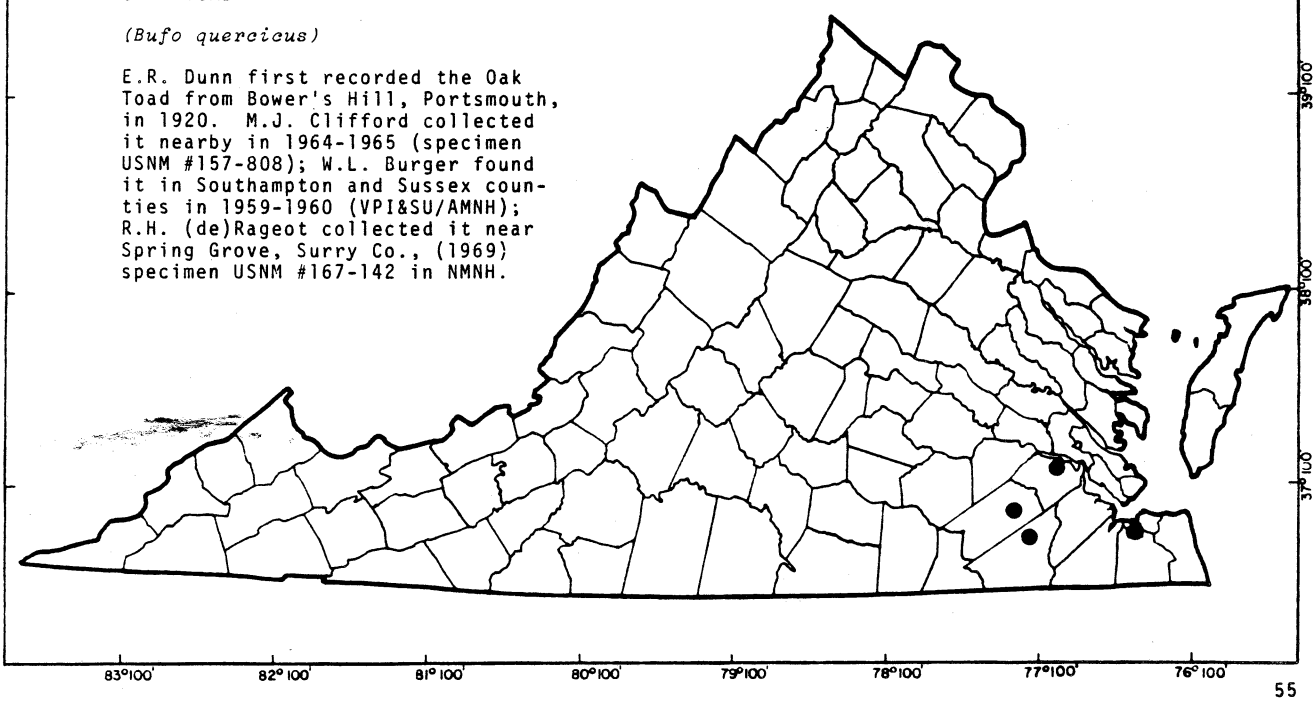


FAUNAL DISTRIBUTION MAP

OAK TOAD

(Bufo quercicus)

E.R. Dunn first recorded the Oak Toad from Bower's Hill, Portsmouth, in 1920. M.J. Clifford collected it nearby in 1964-1965 (specimen USNM #157-808); W.L. Burger found it in Southampton and Sussex counties in 1959-1960 (VPI&SU/AMNH); R.H. (de)Rageot collected it near Spring Grove, Surry Co., (1969) specimen USNM #167-142 in NMNH.

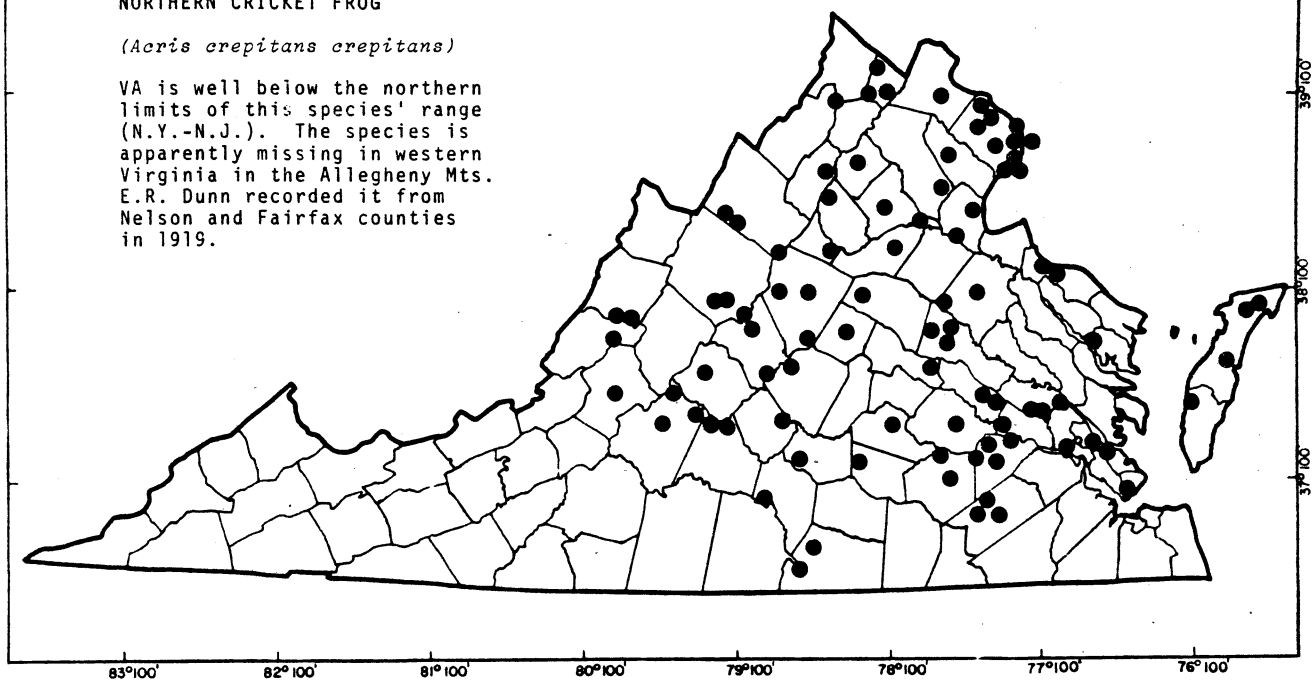


FAUNAL DISTRIBUTION MAP

NORTHERN CRICKET FROG

(Acris crepitans crepitans)

VA is well below the northern limits of this species' range (N.Y.-N.J.). The species is apparently missing in western Virginia in the Allegheny Mts. E.R. Dunn recorded it from Nelson and Fairfax counties in 1919.

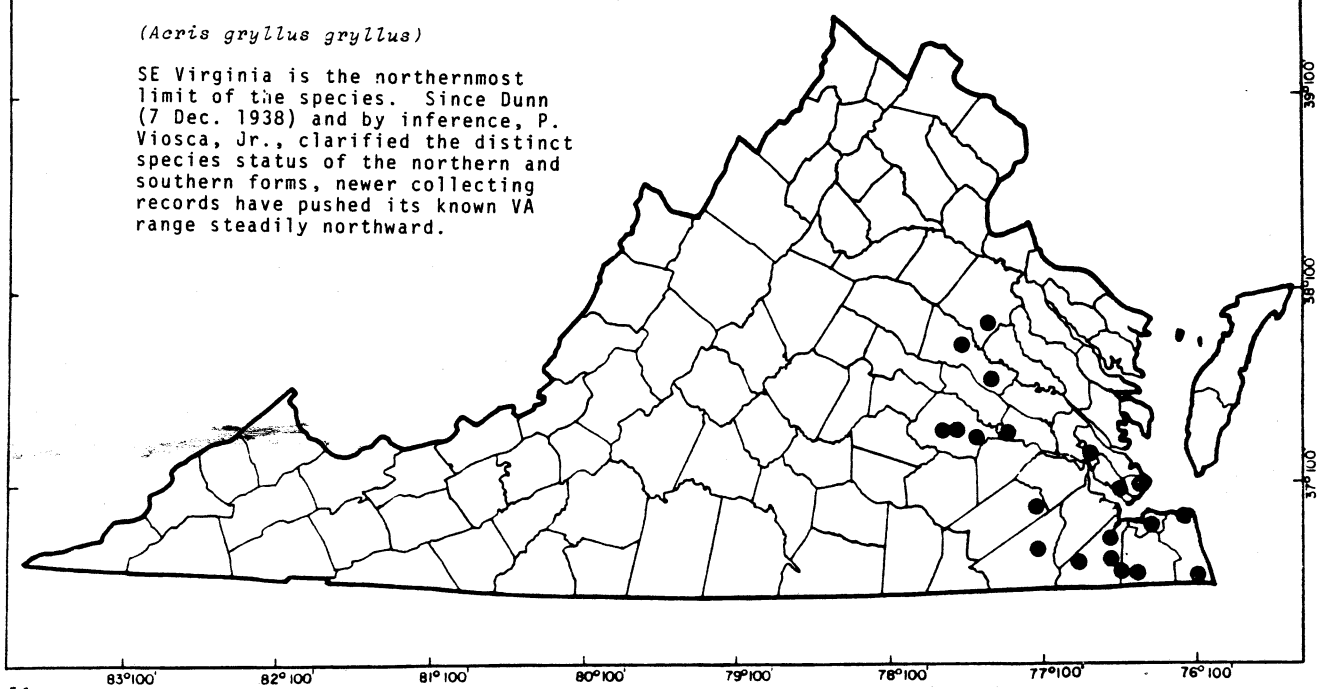


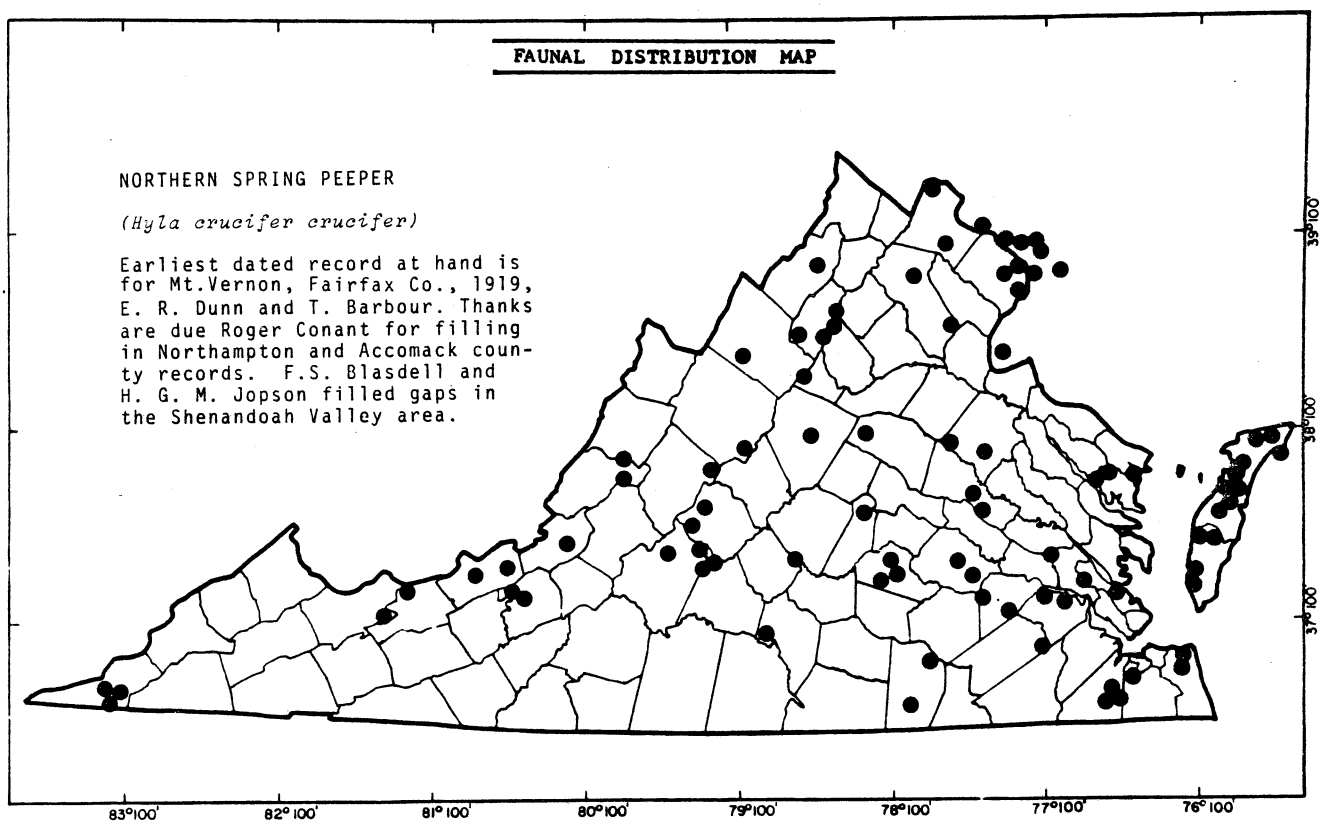
FAUNAL DISTRIBUTION MAP

SOUTHERN CRICKET FROG

(Acris gryllus gryllus)

SE Virginia is the northernmost limit of the species. Since Dunn (7 Dec. 1938) and by inference, P. Viosca, Jr., clarified the distinct species status of the northern and southern forms, newer collecting records have pushed its known VA range steadily northward.




FAUNAL DISTRIBUTION MAP
NORTHERN SPRING PEEPER
(Hyla crucifer crucifer)
Earliest dated record at hand is for Mt.Vernon, Fairfax Co., 1919, E. R. Dunn and T. Barbour. Thanks are due Roger Conant for filling in Northampton and Accomack county records. F.S. Blasdell and H. G. M. Jopson filled gaps in the Shenandoah Valley area.
39°100'
38°100'
37°100'
83°100'
82°100'
81°100'
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78°100'
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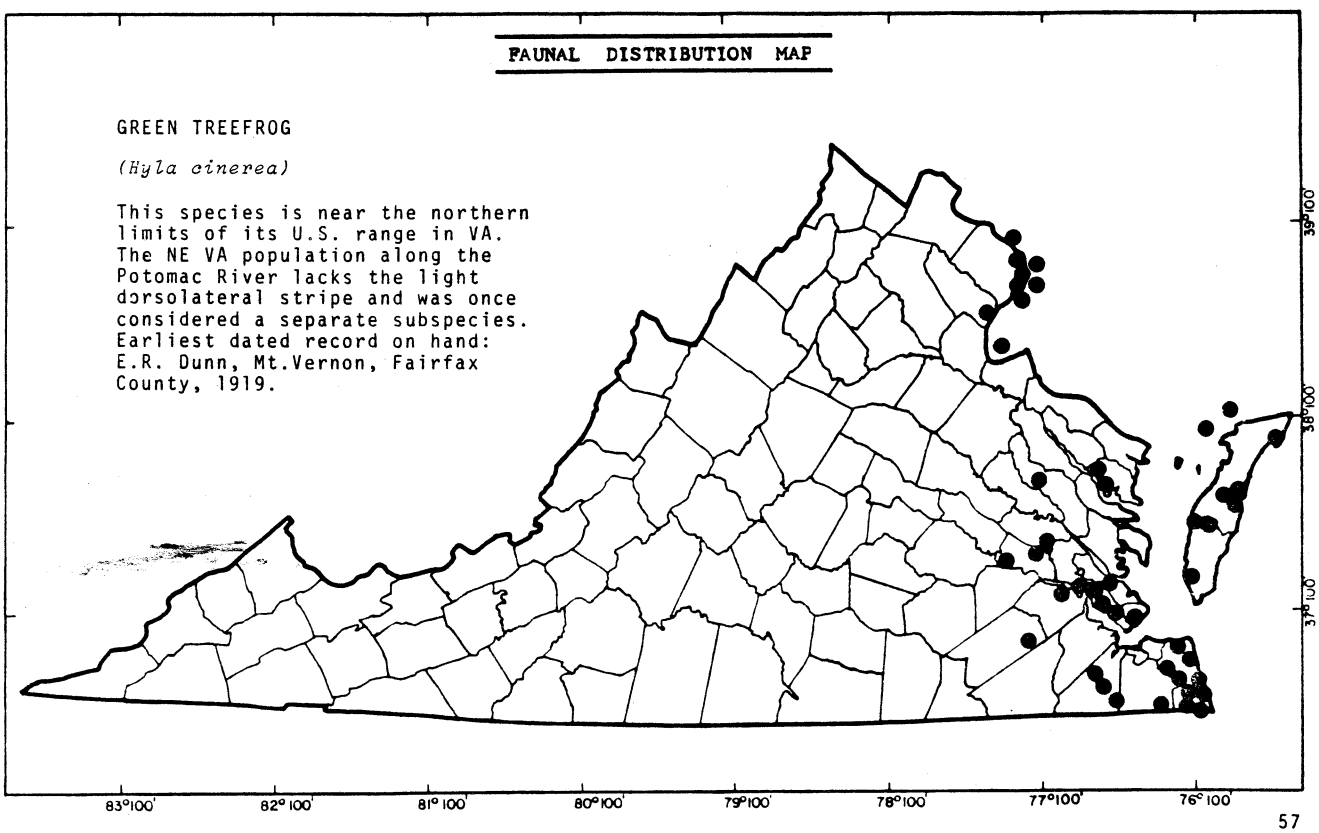
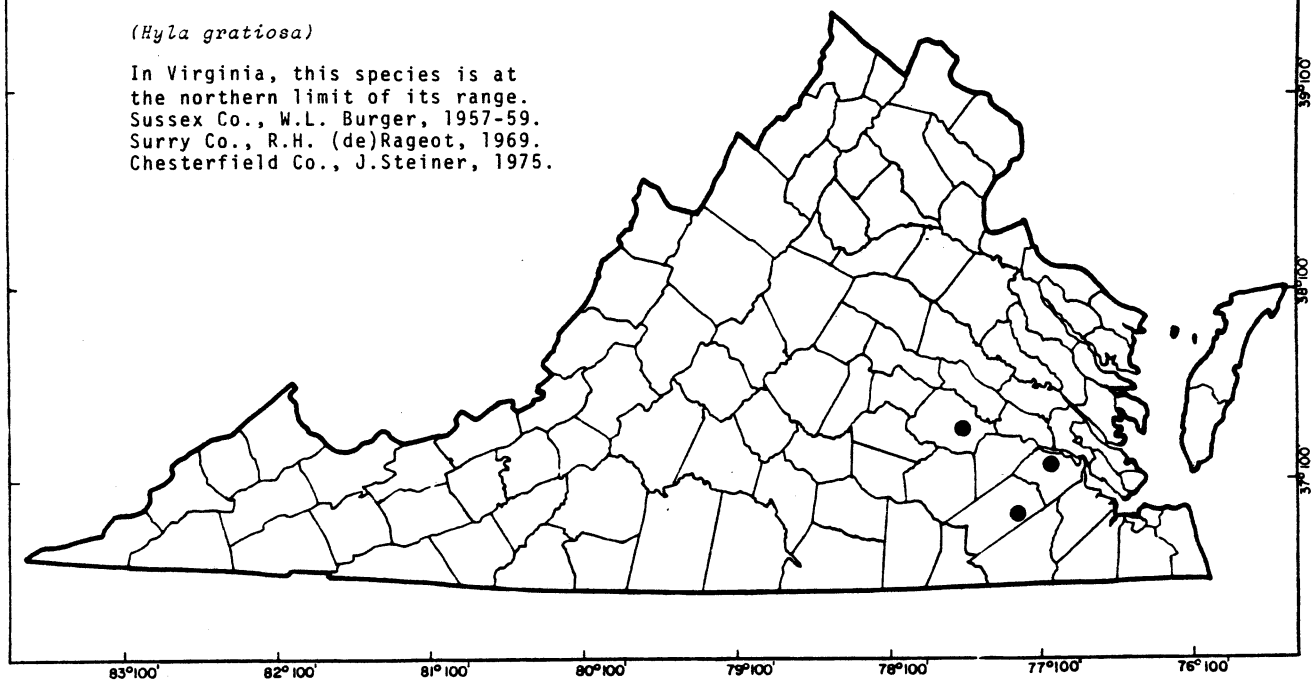

FAUNAL DISTRIBUTION MAP
GREEN TREEFROG
(Hyla cinerea)
This species is near the northern limits of its U.S. range in VA. The NE VA population along the Potomac River lacks the light dorsolateral stripe and was once considered a separate subspecies. Earliest dated record on hand: E.R. Dunn, Mt.Vernon, Fairfax County, 1919.
39°100'
38°100'
37°100'
83°100'
82°100'
81°100'
80°100'
79°100'
78°100'
77°100'
76°100'

FAUNAL DISTRIBUTION MAP

BARKING TREEFROG

(Hyla gratiosa)

In Virginia, this species is at the northern limit of its range.
Sussex Co., W.L. Burger, 1957-59.
Surry Co., R.H. (de)Rageot, 1969.
Chesterfield Co., J.Steiner, 1975.

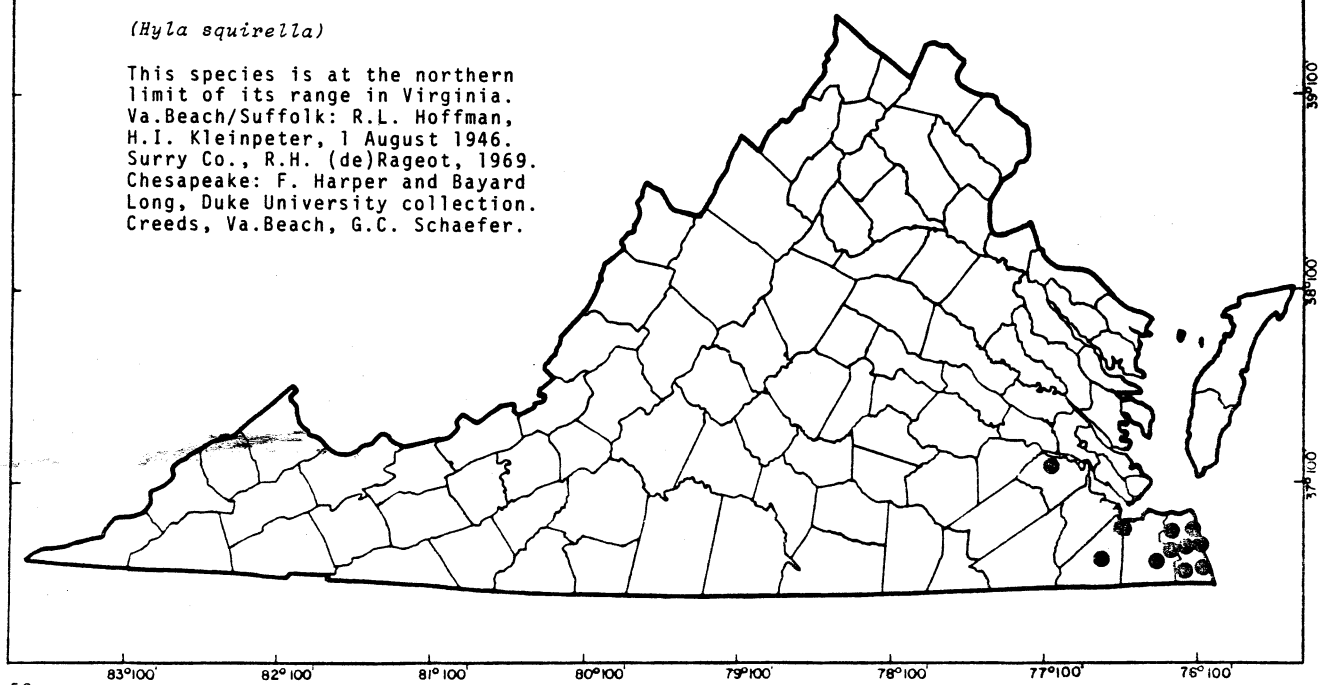


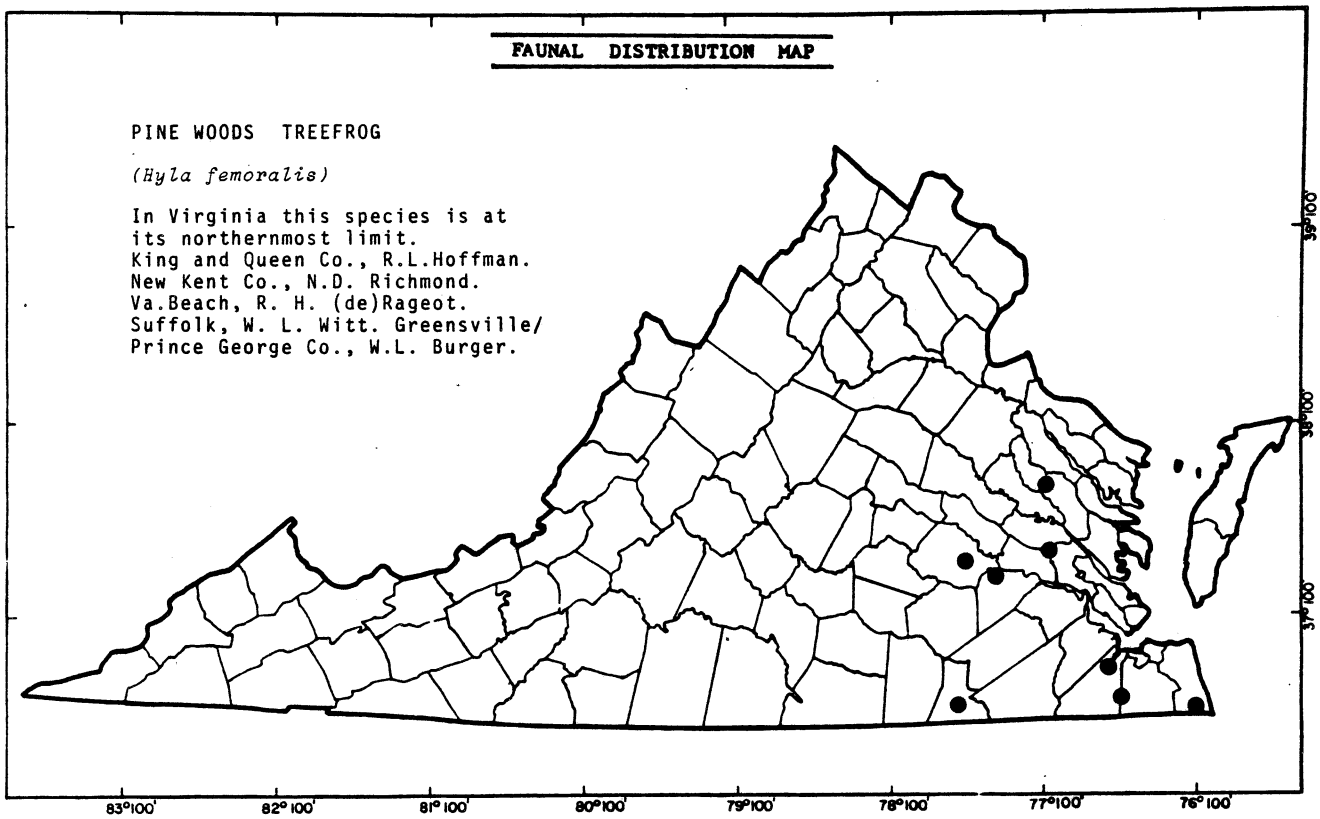
FAUNAL DISTRIBUTION MAP

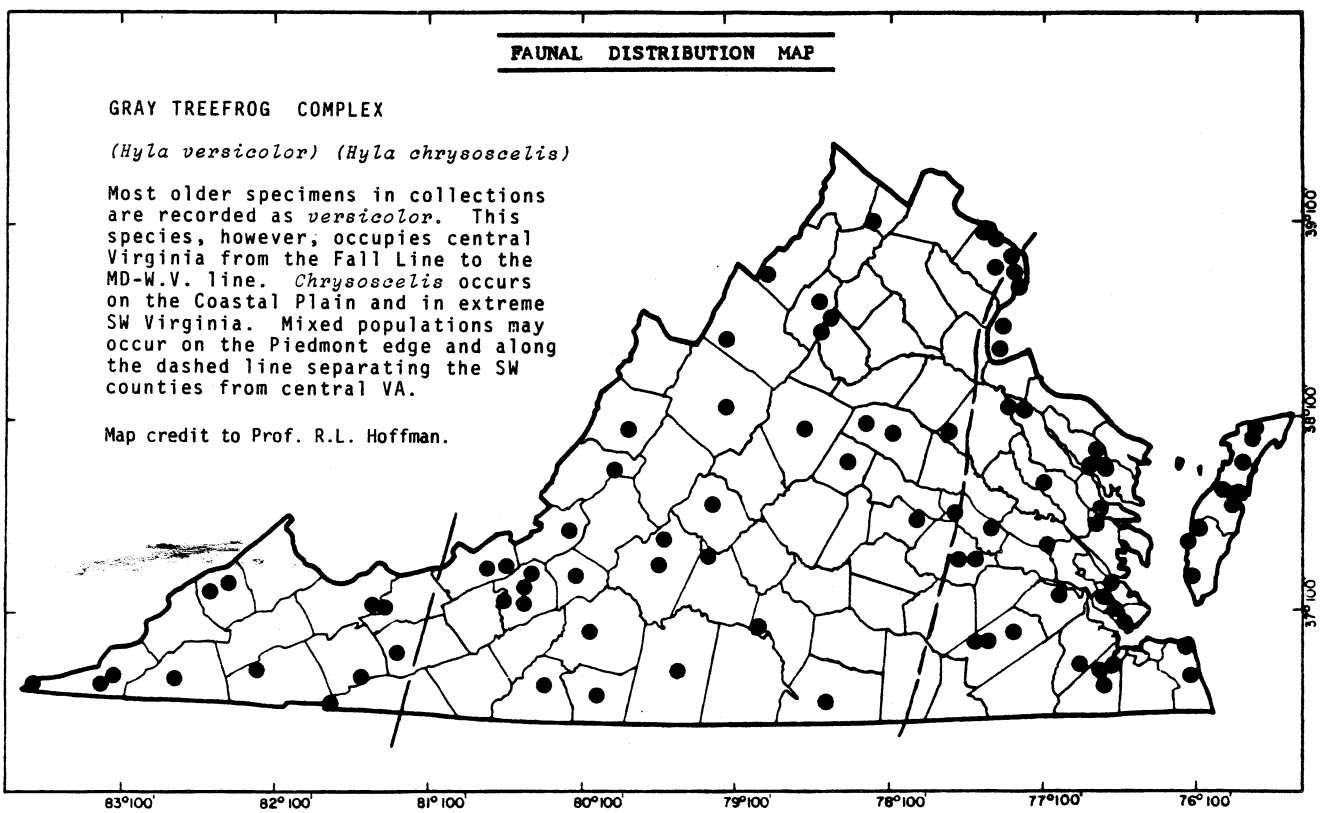
SQUIRREL TREEFROG

(Hyla squirella)

This species is at the northern limit of its range in Virginia.
Va.Beach/Suffolk: R.L. Hoffman, H.I. Kleinpeter, 1 August 1946.
Surry Co., R.H. (de)Rageot, 1969.
Chesapeake: F. Harper and Bayard Long, Duke University collection.
Creeds, Va.Beach, G.C. Schaefer.




FAUNAL DISTRIBUTION MAP
PINE WOODS TREEFROG
(Hyla femoralis)
In Virginia this species is at its northernmost limit.
King and Queen Co., R.L.Hoffman.
New Kent Co., N.D. Richmond.
Va.Beach, R. H. (de)Rageot.
Suffolk, W. L. Witt. Greensville/
Prince George Co., W.L. Burger.
83°100'
82°100'
81°100'
80°100'
79°100'
78°100'
77°100'
76°100'

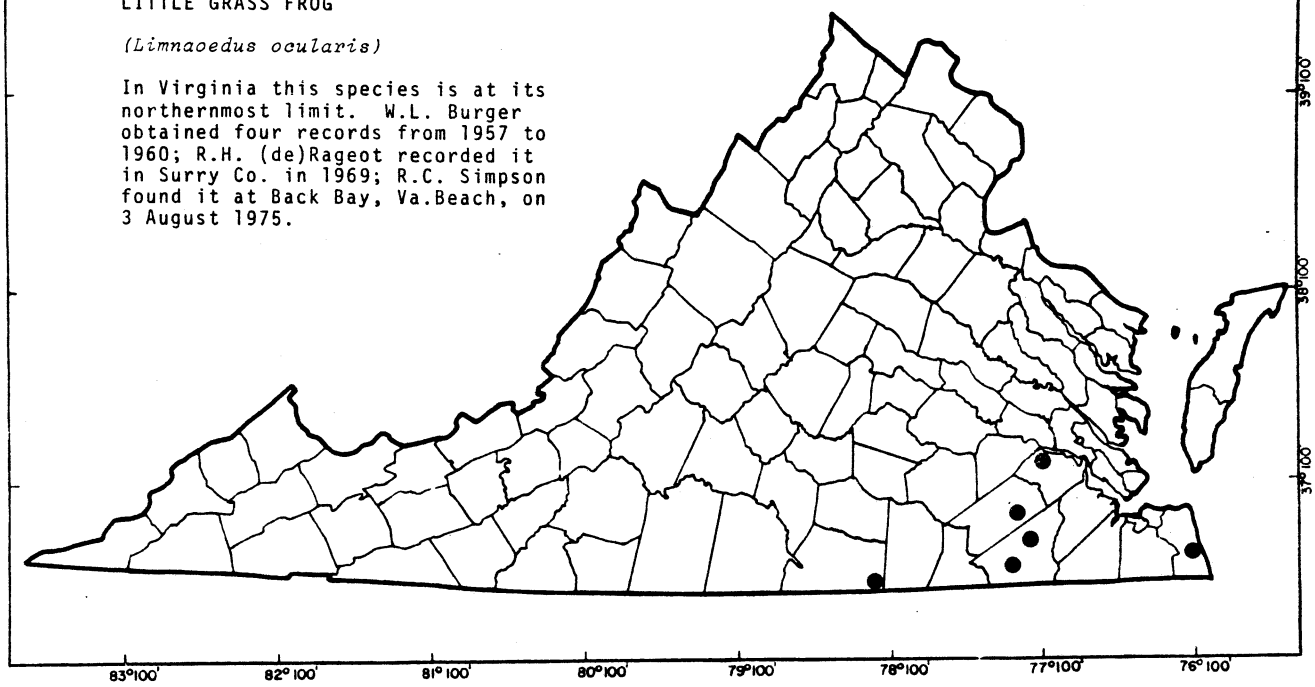

FAUNAL DISTRIBUTION MAP
GRAY TREEFROG COMPLEX
(Hyla versicolor) (Hyla chrysoscelis)
Most older specimens in collections are recorded as versicolor. This species, however, occupies central Virginia from the Fall Line to the MD-W.V. line. Chrysoscelis occurs on the Coastal Plain and in extreme SW Virginia. Mixed populations may occur on the Piedmont edge and along the dashed line separating the SW counties from central VA.
Map credit to Prof. R.L. Hoffman.
83°100'
82°100'
81°100'
80°100'
79°100'
78°100'
77°100'
76°100'

FAUNAL DISTRIBUTION MAP

LITTLE GRASS FROG

(Limnaoedus ocularis)

In Virginia this species is at its northernmost limit. W.L. Burger obtained four records from 1957 to 1960; R.H. (de)Rageot recorded it in Surry Co. in 1969; R.C. Simpson found it at Back Bay, Va.Beach, on 3 August 1975.

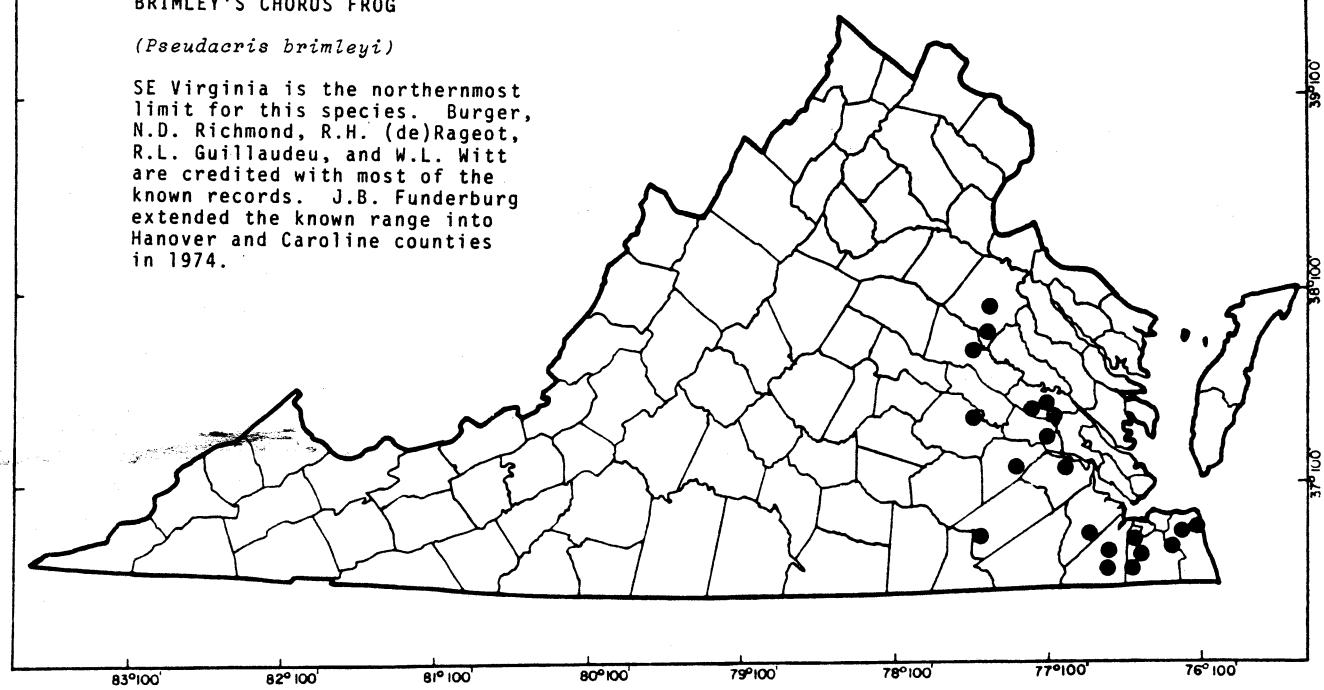


FAUNAL DISTRIBUTION MAP

BRIMLEY'S CHORUS FROG

(Pseudacris brimleyi)

SE Virginia is the northernmost limit for this species. Burger, N.D. Richmond, R.H. (de)Rageot, R.L. Guillaudeu, and W.L. Witt are credited with most of the known records. J.B. Funderburg extended the known range into Hanover and Caroline counties in 1974.

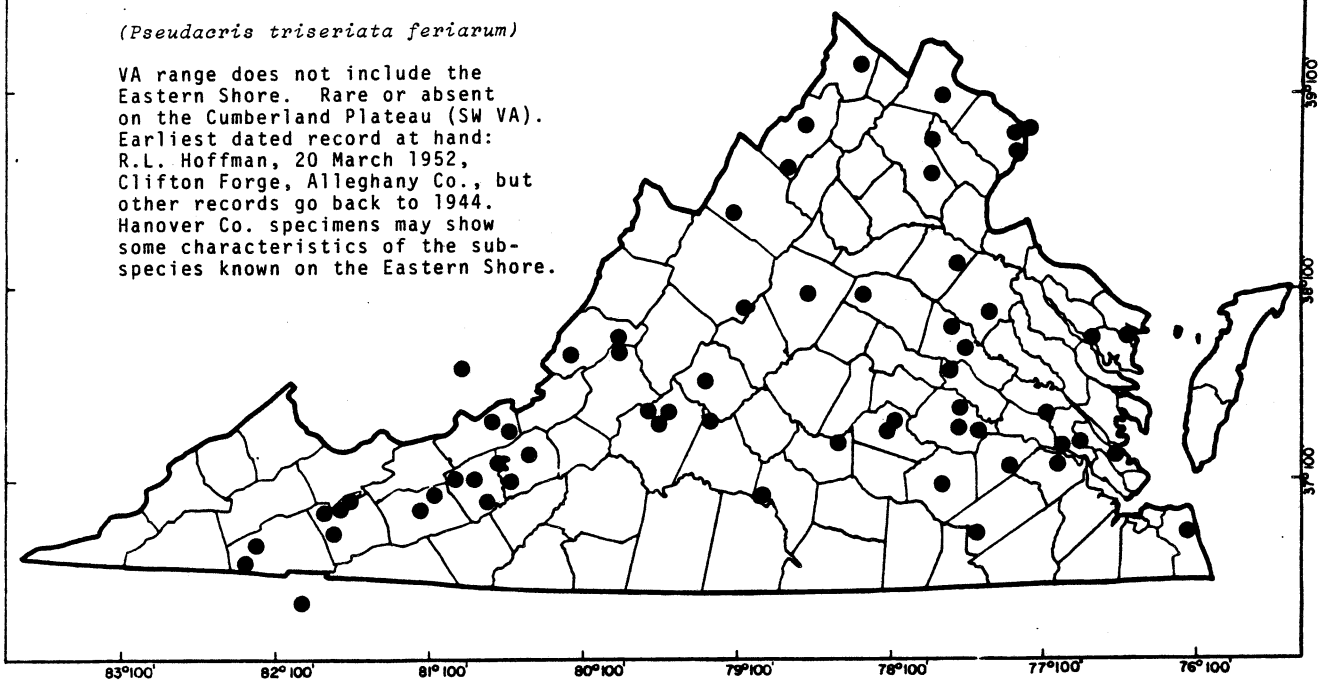


FAUNAL DISTRIBUTION MAP

UPLAND CHORUS FROG

(Pseudacris triseriata feriarum)

VA range does not include the Eastern Shore. Rare or absent on the Cumberland Plateau (SW VA). Earliest dated record at hand: R.L. Hoffman, 20 March 1952, Clifton Forge, Alleghany Co., but other records go back to 1944. Hanover Co. specimens may show some characteristics of the subspecies known on the Eastern Shore.



FAUNAL DISTRIBUTION MAP

MOUNTAIN CHORUS FROG

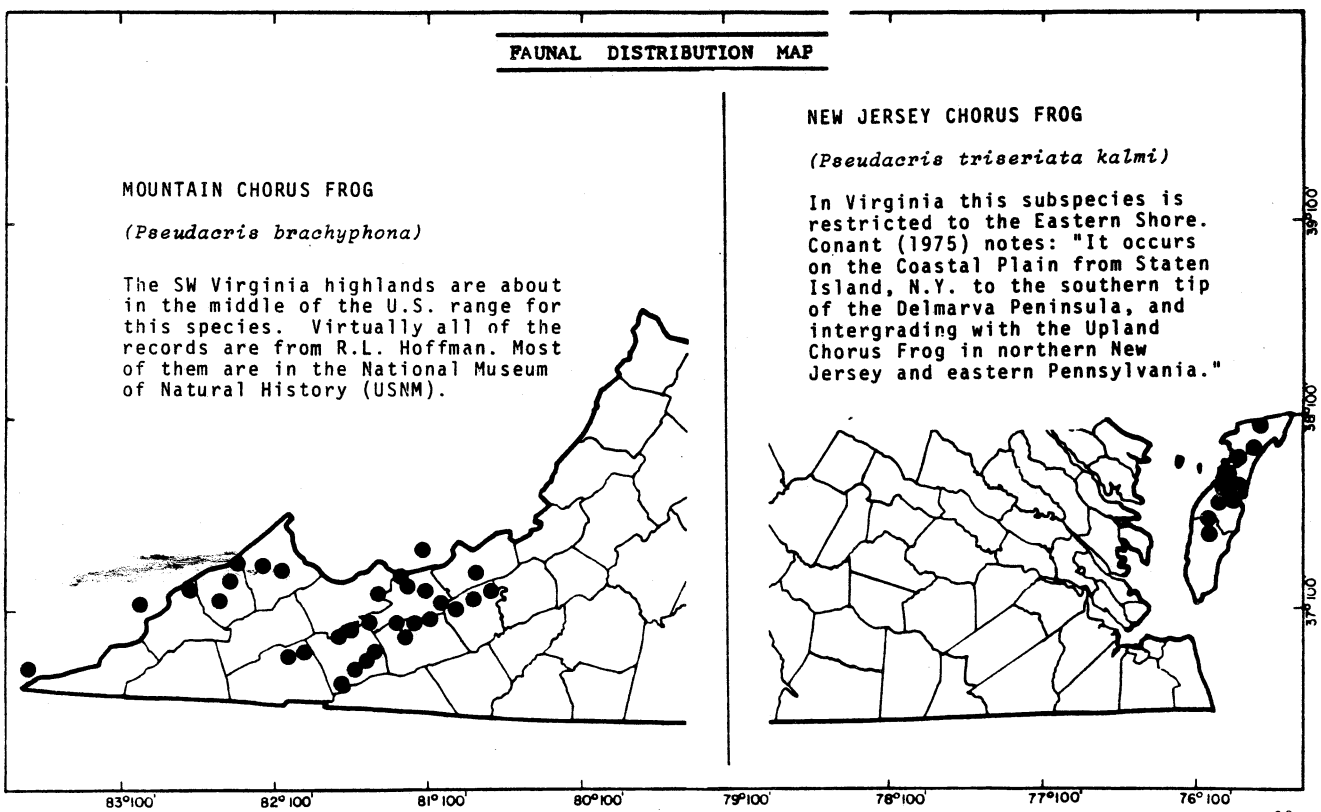
(Pseudacris brachyphona)

The SW Virginia highlands are about in the middle of the U.S. range for this species. Virtually all of the records are from R.L. Hoffman. Most of them are in the National Museum of Natural History (USNM).

NEW JERSEY CHORUS FROG

(Pseudacris triseriata kalmi)

In Virginia this subspecies is restricted to the Eastern Shore. Conant (1975) notes: "It occurs on the Coastal Plain from Staten Island, N.Y. to the southern tip of the Delmarva Peninsula, and intergrading with the Upland Chorus Frog in northern New Jersey and eastern Pennsylvania."

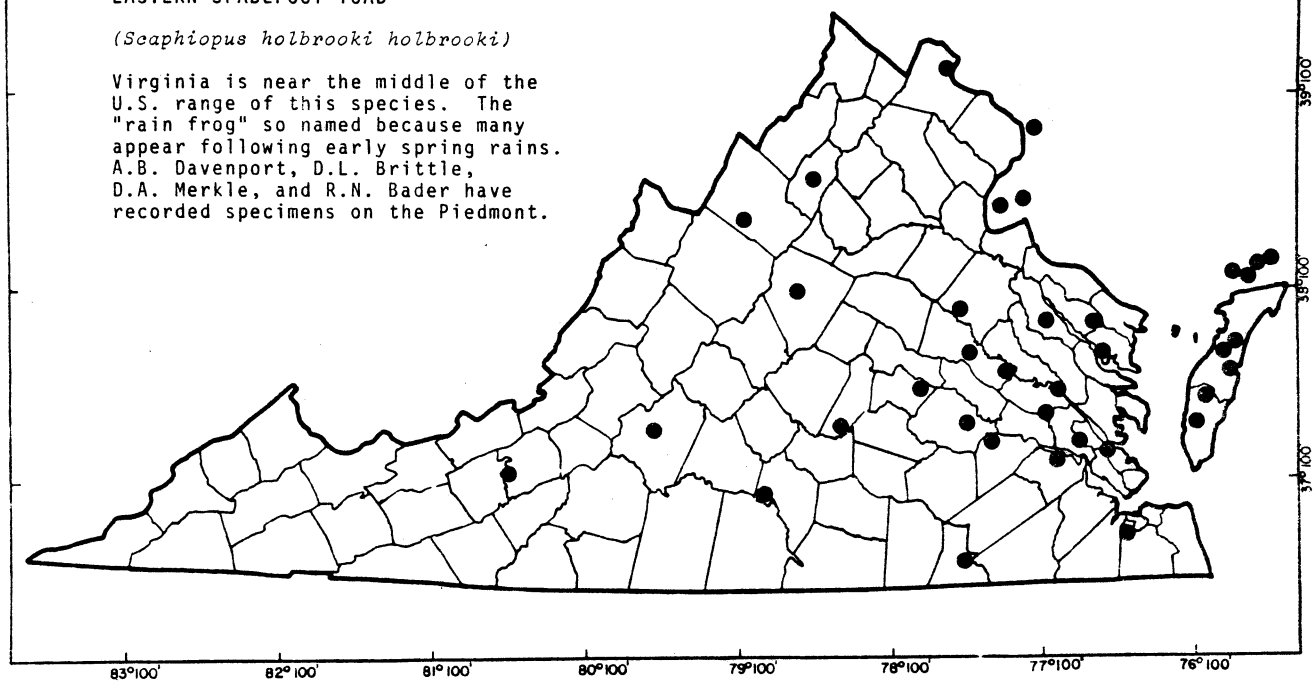


FAUNAL DISTRIBUTION MAP

EASTERN SPADEFOOT TOAD

(Scaphiopus holbrooki holbrooki)

Virginia is near the middle of the U.S. range of this species. The "rain frog" so named because many appear following early spring rains. A.B. Davenport, D.L. Brittle, D.A. Merkle, and R.N. Bader have recorded specimens on the Piedmont.

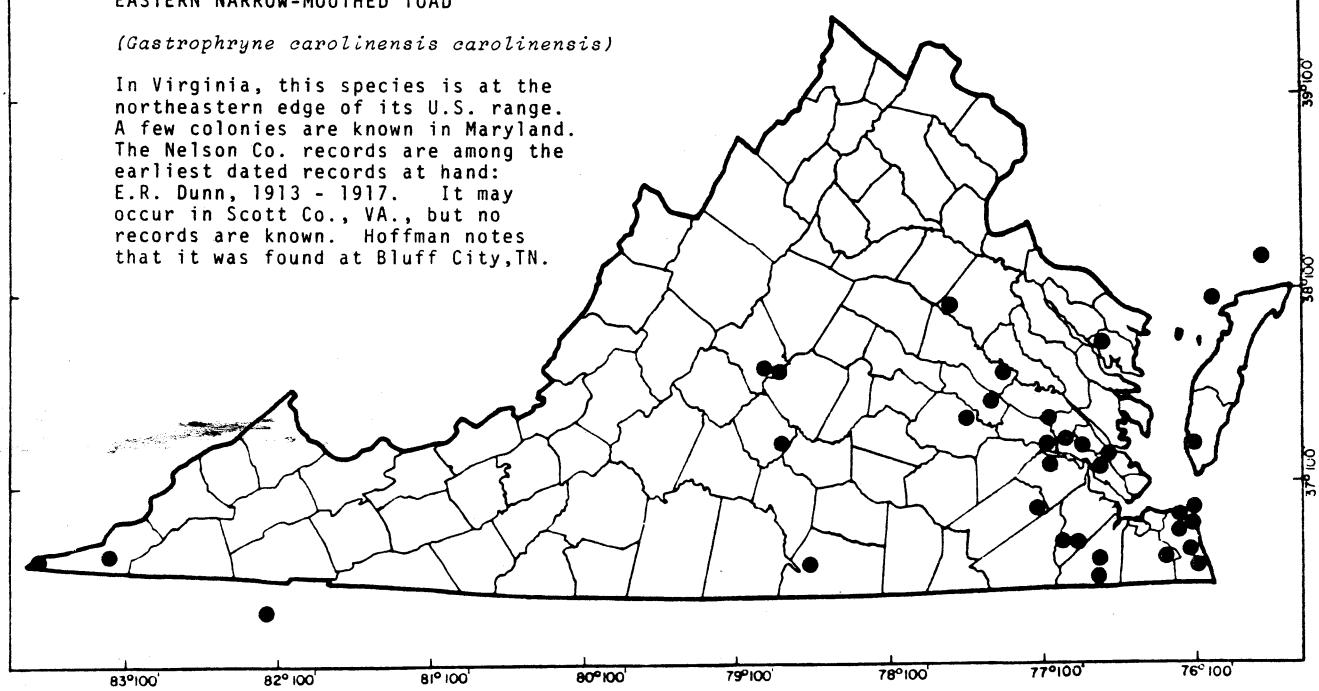


FAUNAL DISTRIBUTION MAP

EASTERN NARROW-MOUTHED TOAD

(Gastrophryne carolinensis carolinensis)

In Virginia, this species is at the northeastern edge of its U.S. range. A few colonies are known in Maryland. The Nelson Co. records are among the earliest dated records at hand: E.R. Dunn, 1913 - 1917. It may occur in Scott Co., VA., but no records are known. Hoffman notes that it was found at Bluff City,TN.

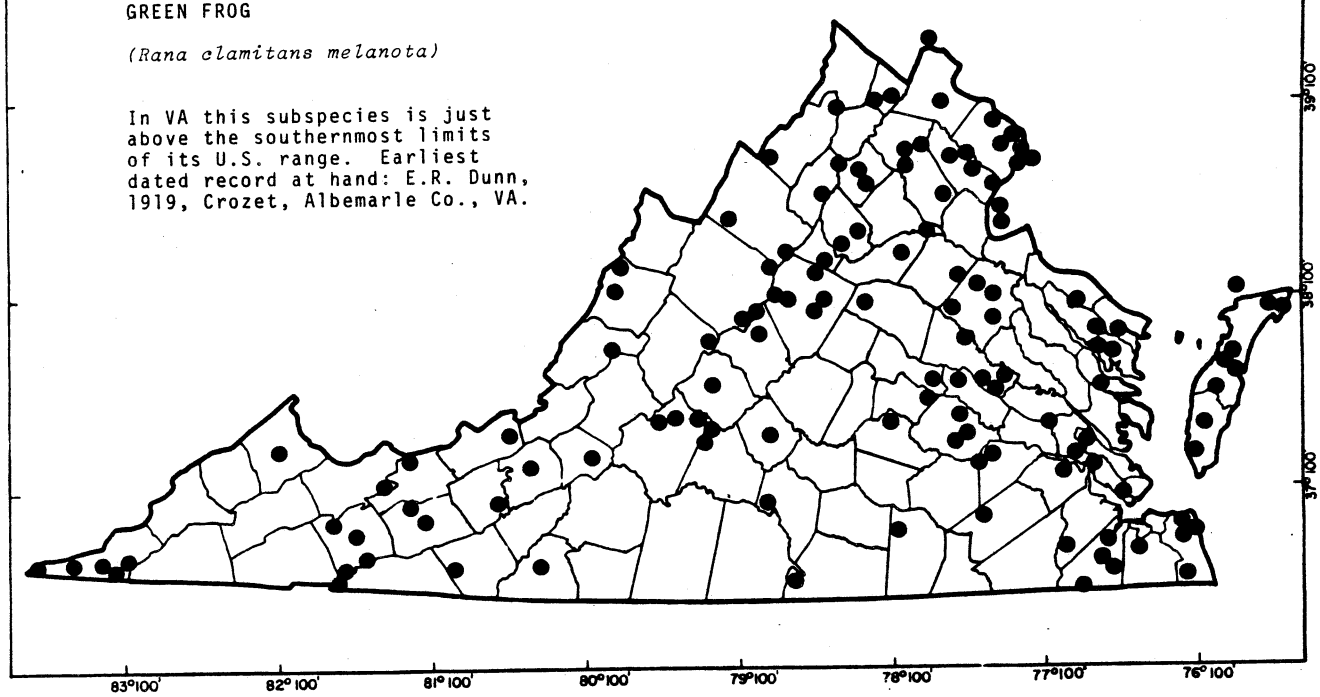


FAUNAL DISTRIBUTION MAP

GREEN FROG

(Rana clamitans melanota)

In VA this subspecies is just above the southernmost limits of its U.S. range. Earliest dated record at hand: E.R. Dunn, 1919, Crozet, Albemarle Co., VA.

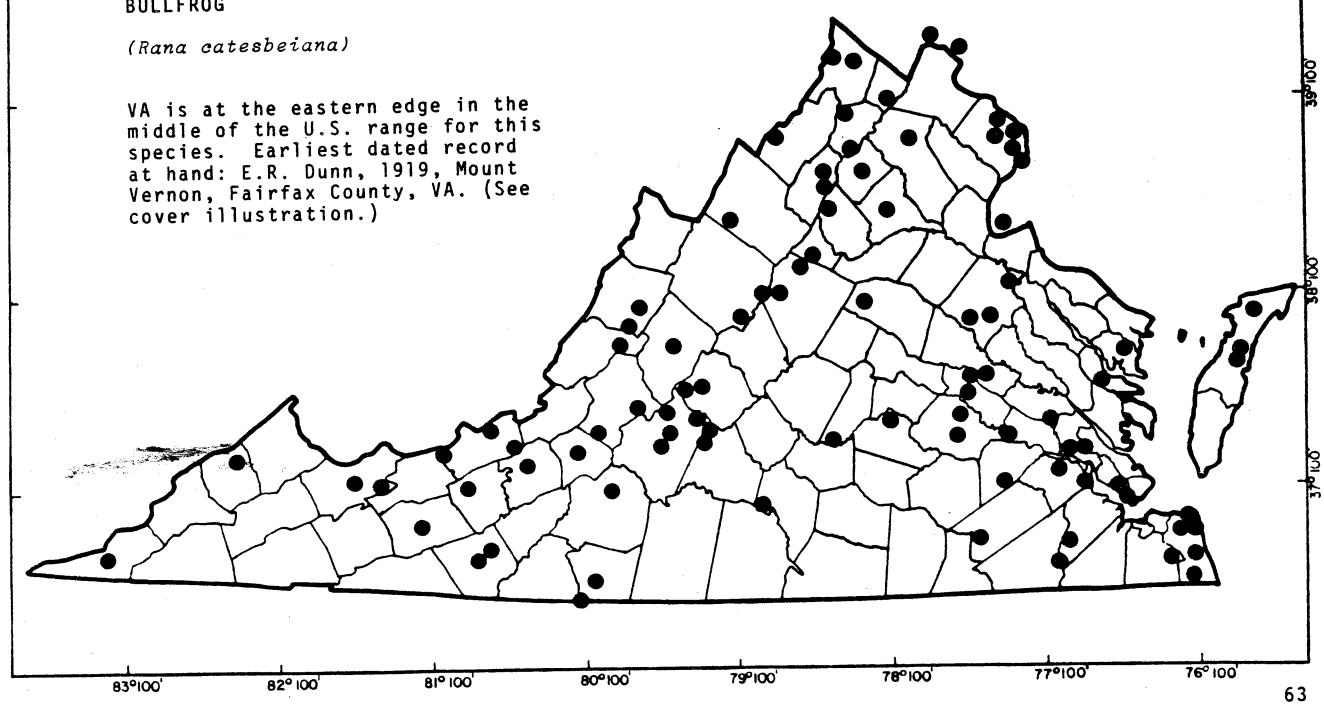


FAUNAL DISTRIBUTION MAP

BULLFROG

(Rana catesbeiana)

VA is at the eastern edge in the middle of the U.S. range for this species. Earliest dated record at hand: E.R. Dunn, 1919, Mount Vernon, Fairfax County, VA. (See cover illustration.)

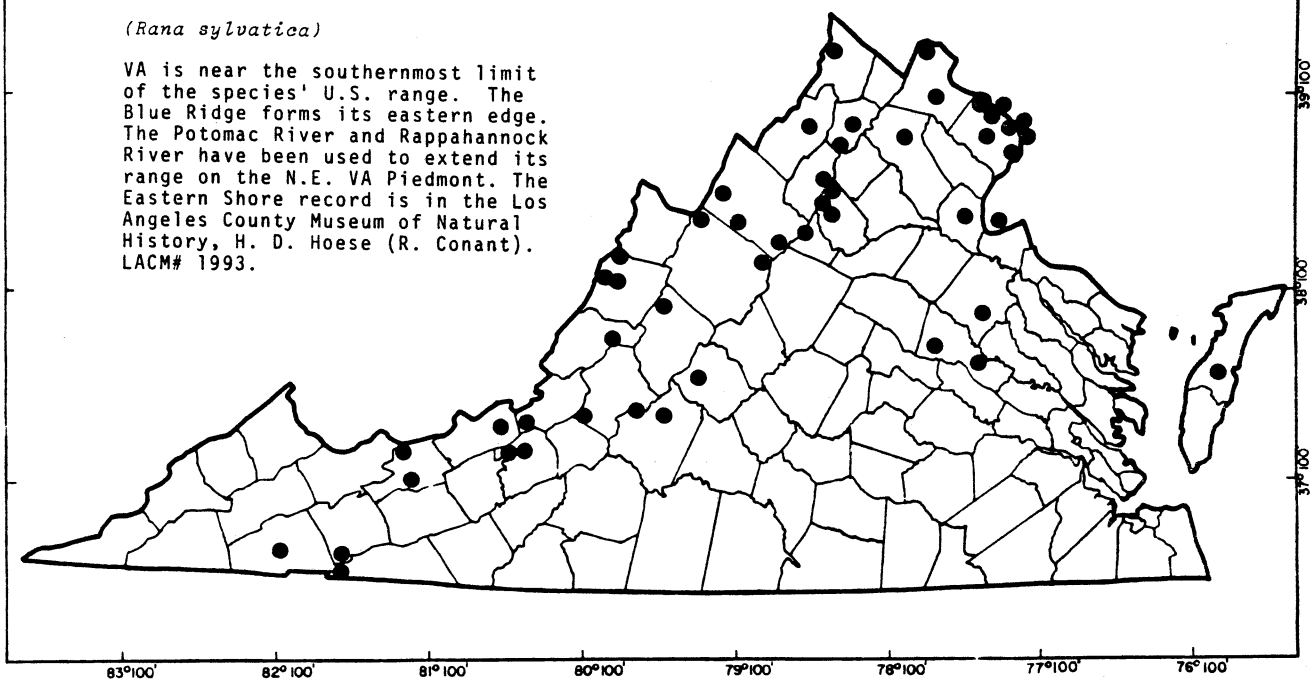


FAUNAL DISTRIBUTION MAP

WOOD FROG

(Rana sylvatica)

VA is near the southernmost limit of the species' U.S. range. The Blue Ridge forms its eastern edge. The Potomac River and Rappahannock River have been used to extend its range on the N.E. VA Piedmont. The Eastern Shore record is in the Los Angeles County Museum of Natural History, H. D. Hoese (R. Conant). LACM# 1993.

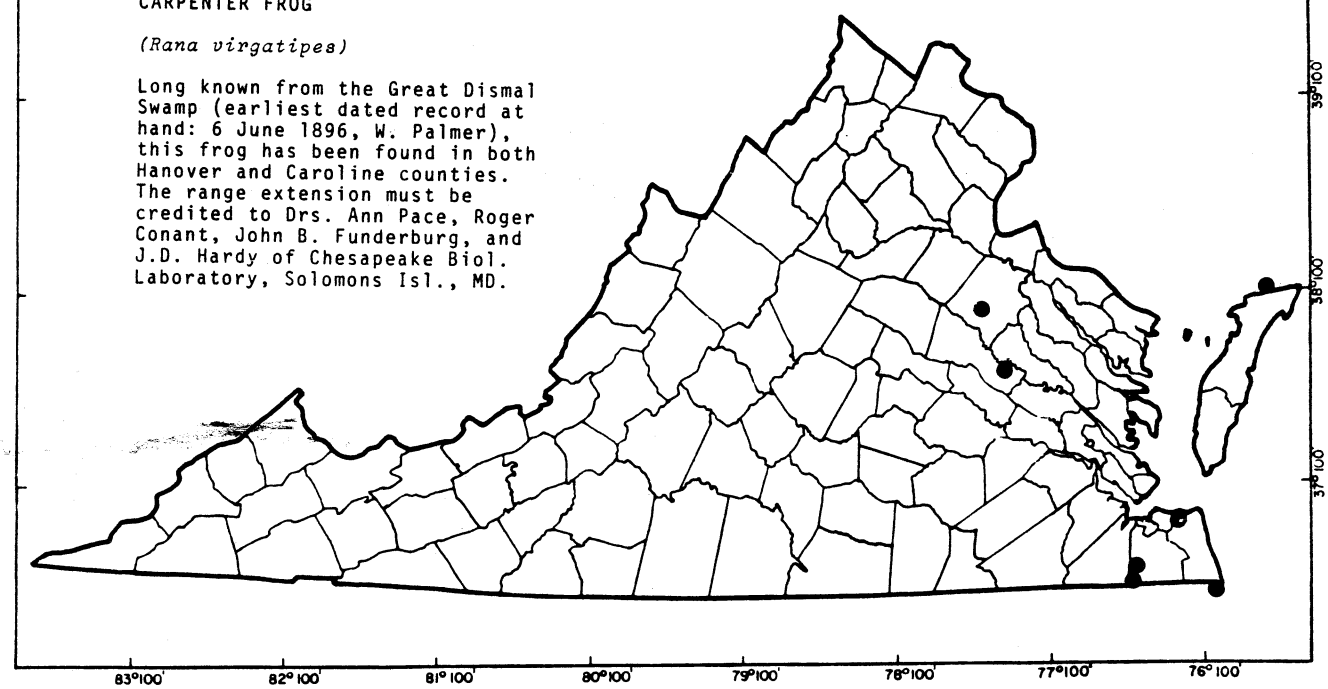


FAUNAL DISTRIBUTION MAP

CARPENTER FROG

(Rana virgatipes)

Long known from the Great Dismal Swamp (earliest dated record at hand: 6 June 1896, W. Palmer), this frog has been found in both Hanover and Caroline counties. The range extension must be credited to Drs. Ann Pace, Roger Conant, John B. Funderburg, and J.D. Hardy of Chesapeake Biol. Laboratory, Solomons Isl., MD.

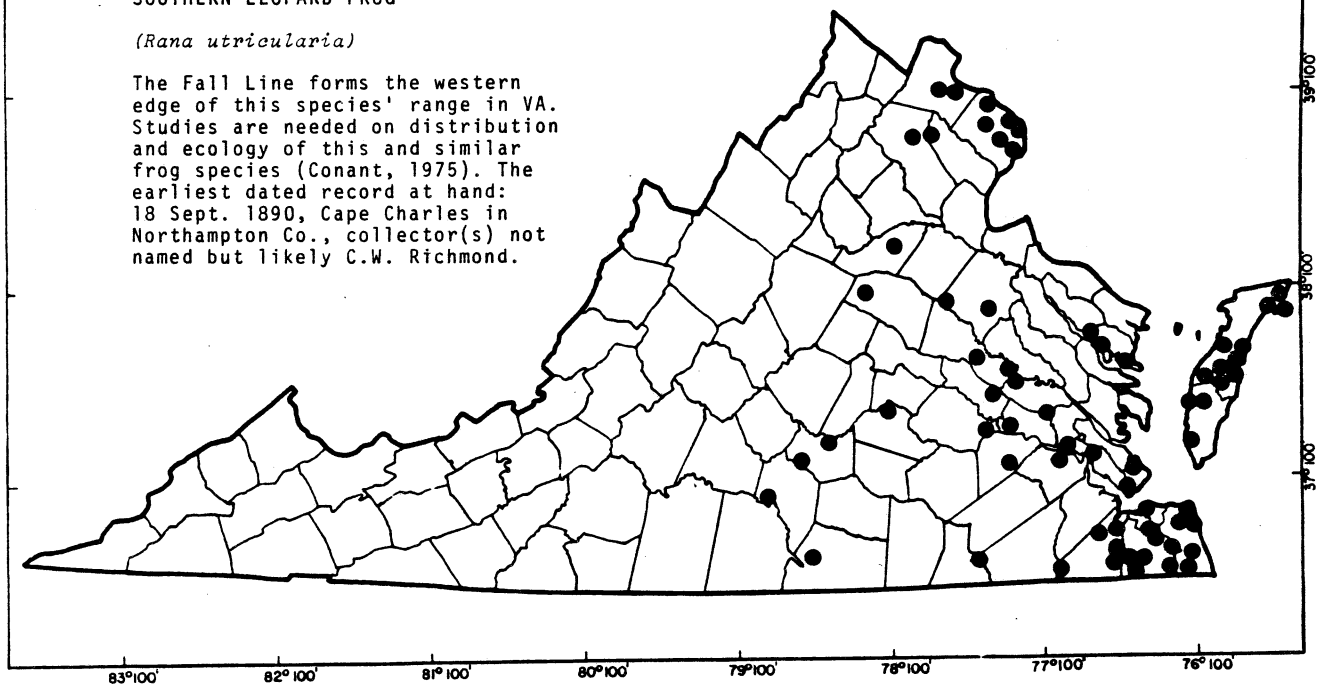


FAUNAL DISTRIBUTION MAP

SOUTHERN LEOPARD FROG

(Rana utricularia)

The Fall Line forms the western edge of this species' range in VA. Studies are needed on distribution and ecology of this and similar frog species (Conant, 1975). The earliest dated record at hand: 18 Sept. 1890, Cape Charles in Northampton Co., collector(s) not named but likely C.W. Richmond.

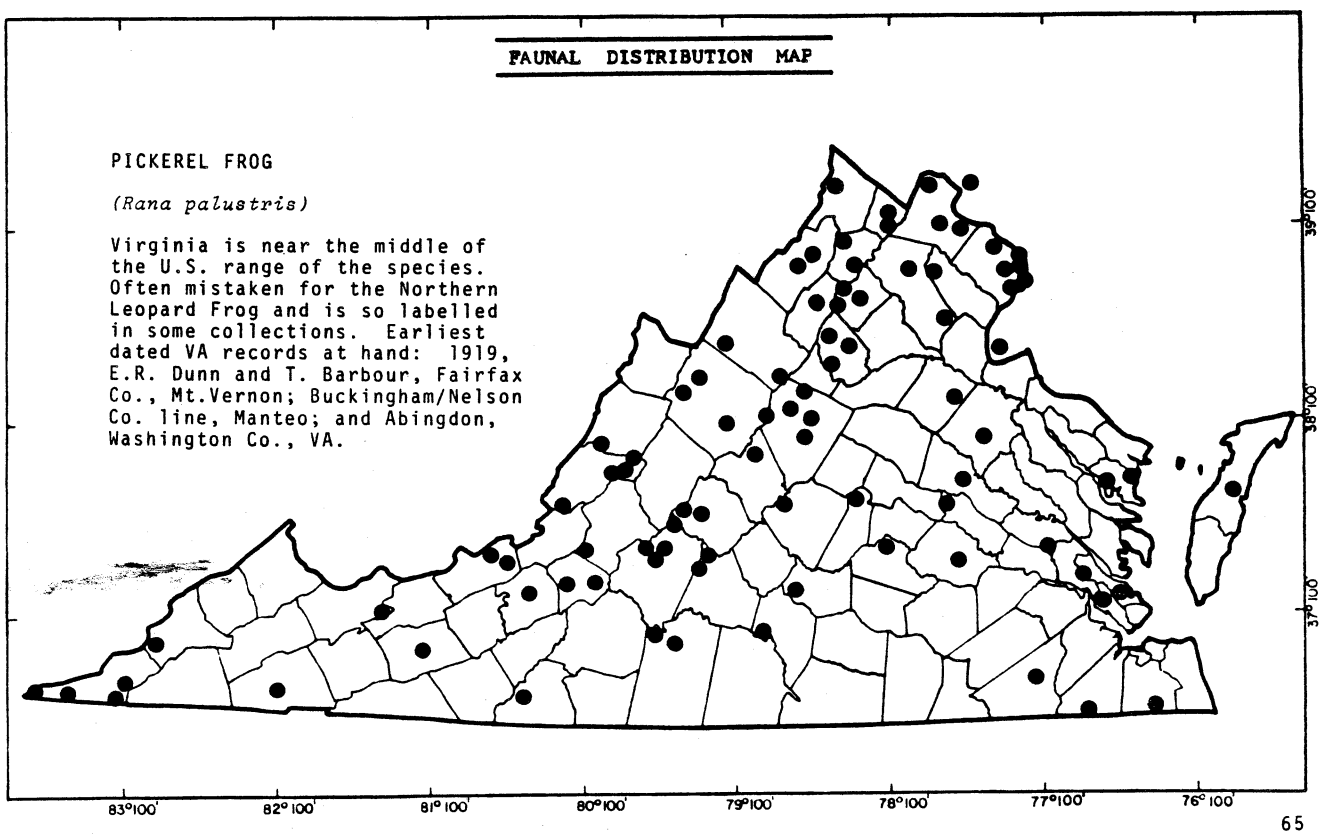


FAUNAL DISTRIBUTION MAP

PICKEREL FROG

(Rana palustris)

Virginia is near the middle of the U.S. range of the species. Often mistaken for the Northern Leopard Frog and is so labelled in some collections. Earliest dated VA records at hand: 1919, E.R. Dunn and T. Barbour, Fairfax Co., Mt.Vernon; Buckingham/Nelson Co. line, Manteo; and Abingdon, Washington Co., VA.

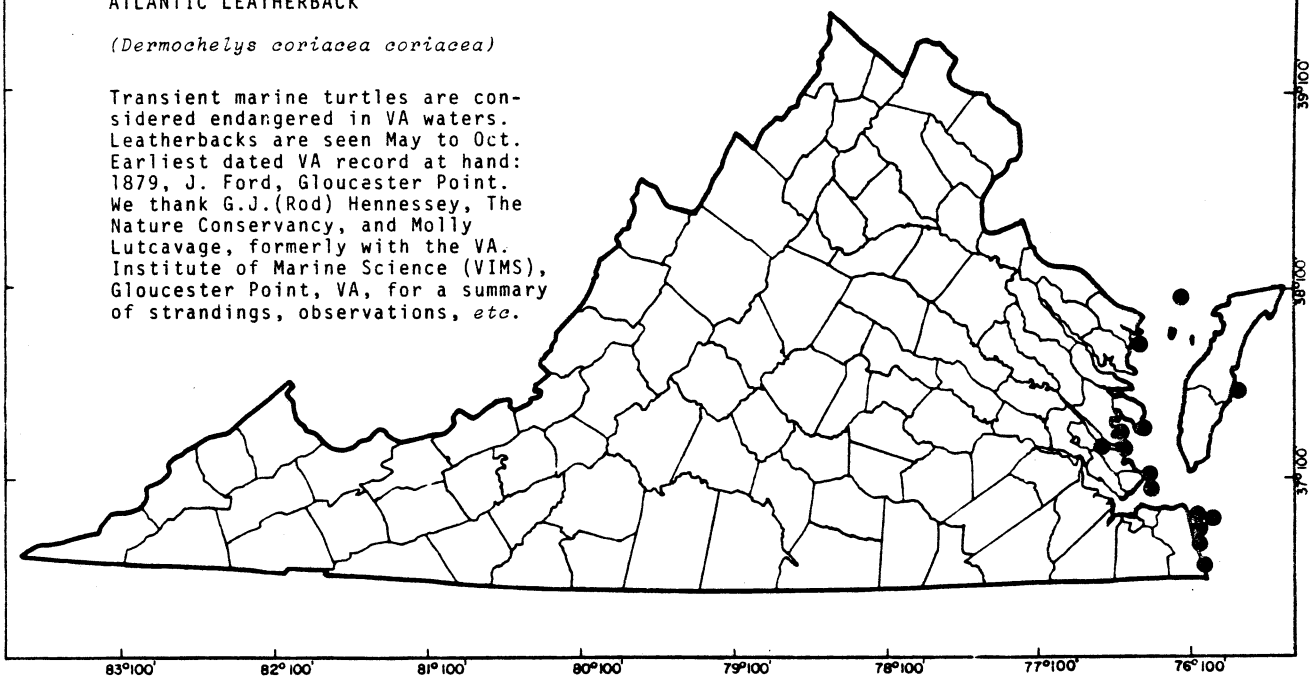


FAUNAL DISTRIBUTION MAP

ATLANTIC LEATHERBACK

(Dermochelys coriacea coriacea)

Transient marine turtles are considered endangered in VA waters. Leatherbacks are seen May to Oct. Earliest dated VA record at hand: 1879, J. Ford, Gloucester Point. We thank G.J.(Rod) Hennessey, The Nature Conservancy, and Molly Lutcavage, formerly with the VA. Institute of Marine Science (VIMS), Gloucester Point, VA, for a summary of strandings, observations, *etc.*

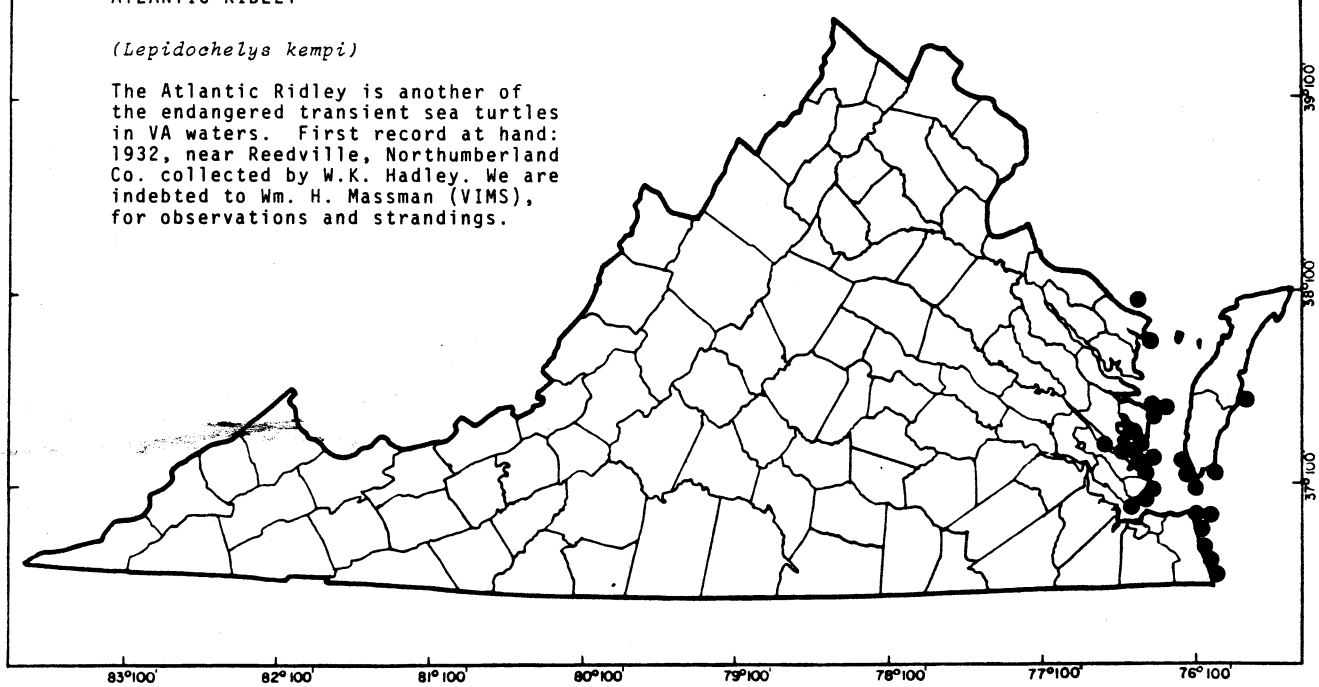


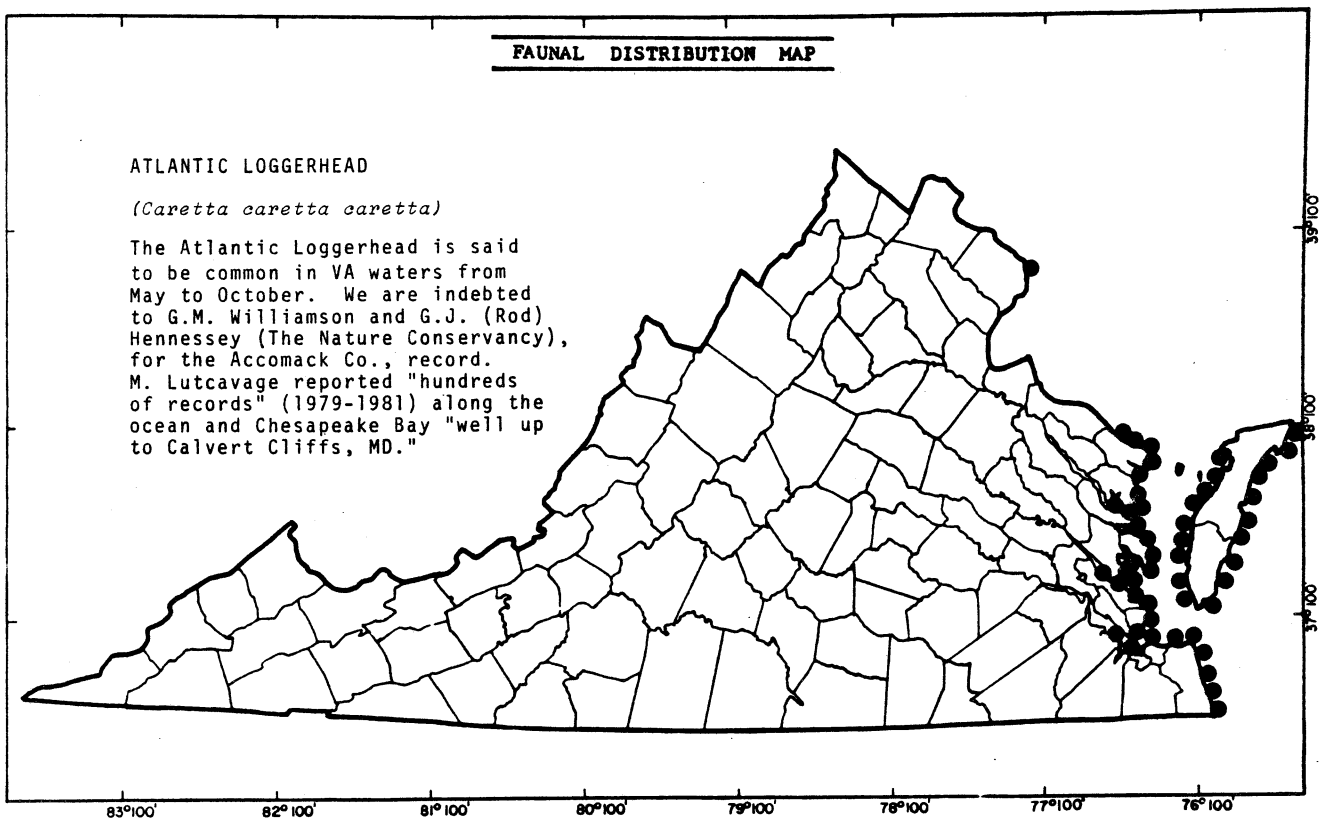
FAUNAL DISTRIBUTION MAP

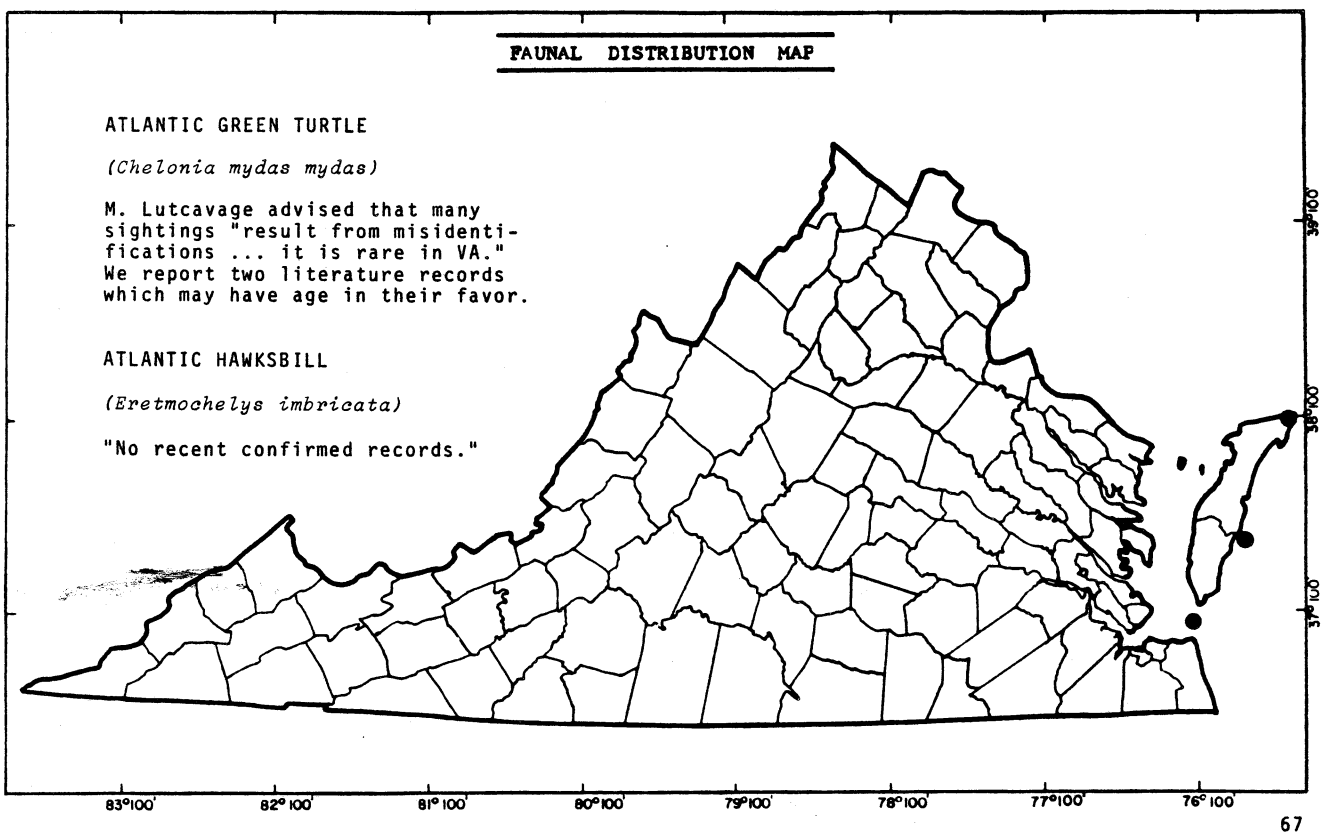
ATLANTIC RIDLEY

(Lepidochelys kempi)

The Atlantic Ridley is another of the endangered transient sea turtles in VA waters. First record at hand: 1932, near Reedville, Northumberland Co. collected by W.K. Hadley. We are indebted to Wm. H. Massman (VIMS), for observations and strandings.




FAUNAL DISTRIBUTION MAP
ATLANTIC LOGGERHEAD
(Caretta caretta caretta)
The Atlantic Loggerhead is said to be common in VA waters from May to October. We are indebted to G.M. Williamson and G.J. (Rod) Hennessey (The Nature Conservancy), for the Accomack Co., record. M. Lutcavage reported "hundreds of records" (1979-1981) along the ocean and Chesapeake Bay "well up to Calvert Cliffs, MD."
39°100'
38°100'
37°100'
83°100'
82°100'
81°100'
80°100'
79°100'
78°100'
77°100'
76°100'

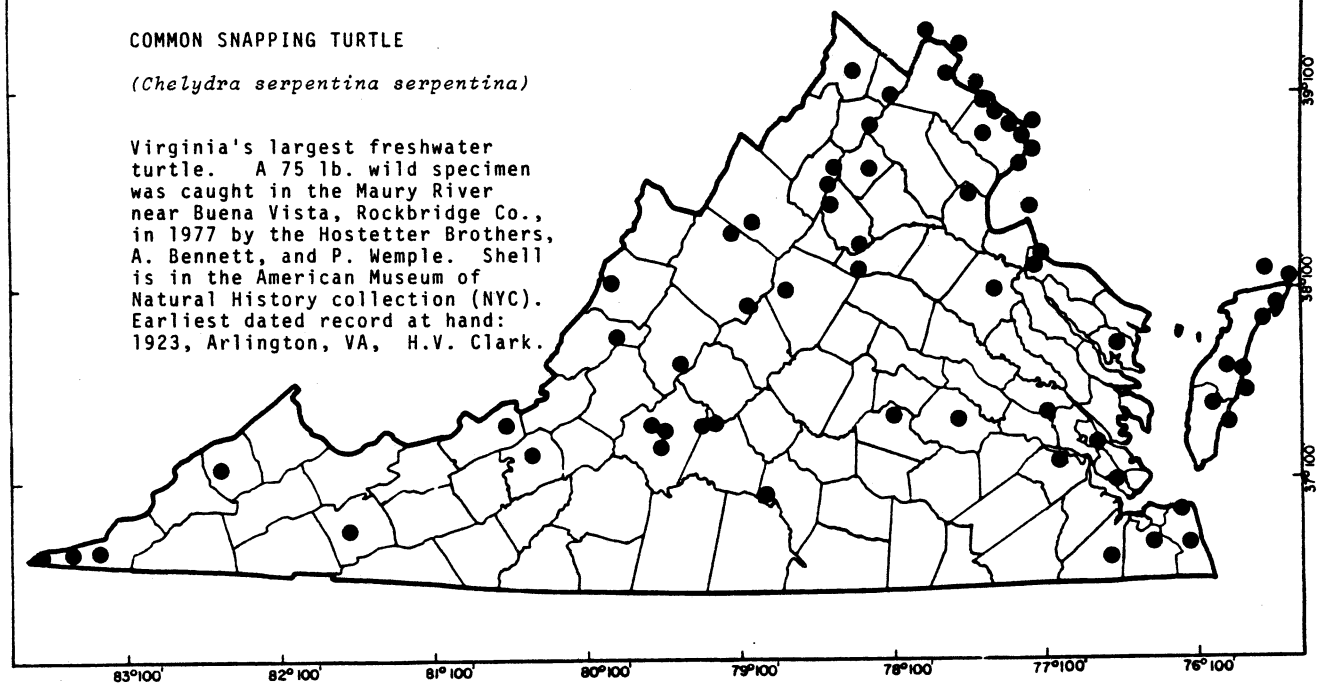

FAUNAL DISTRIBUTION MAP
ATLANTIC GREEN TURTLE
(Chelonia mydas mydas)
M. Lutcavage advised that many sightings "result from misidentifications ... it is rare in VA." We report two literature records which may have age in their favor.
ATLANTIC HAWKSBILL
(Eretmochelys imbricata)
"No recent confirmed records."
39°100'
38°100'
37°100'
83°100'
82°100'
81°100'
80°100'
79°100'
78°100'
77°100'
76°100'

FAUNAL DISTRIBUTION MAP

COMMON SNAPPING TURTLE

(Chelydra serpentina serpentina)

Virginia's largest freshwater turtle. A 75 lb. wild specimen was caught in the Maury River near Buena Vista, Rockbridge Co., in 1977 by the Hostetter Brothers, A. Bennett, and P. Wemple. Shell is in the American Museum of Natural History collection (NYC). Earliest dated record at hand: 1923, Arlington, VA, H.V. Clark.

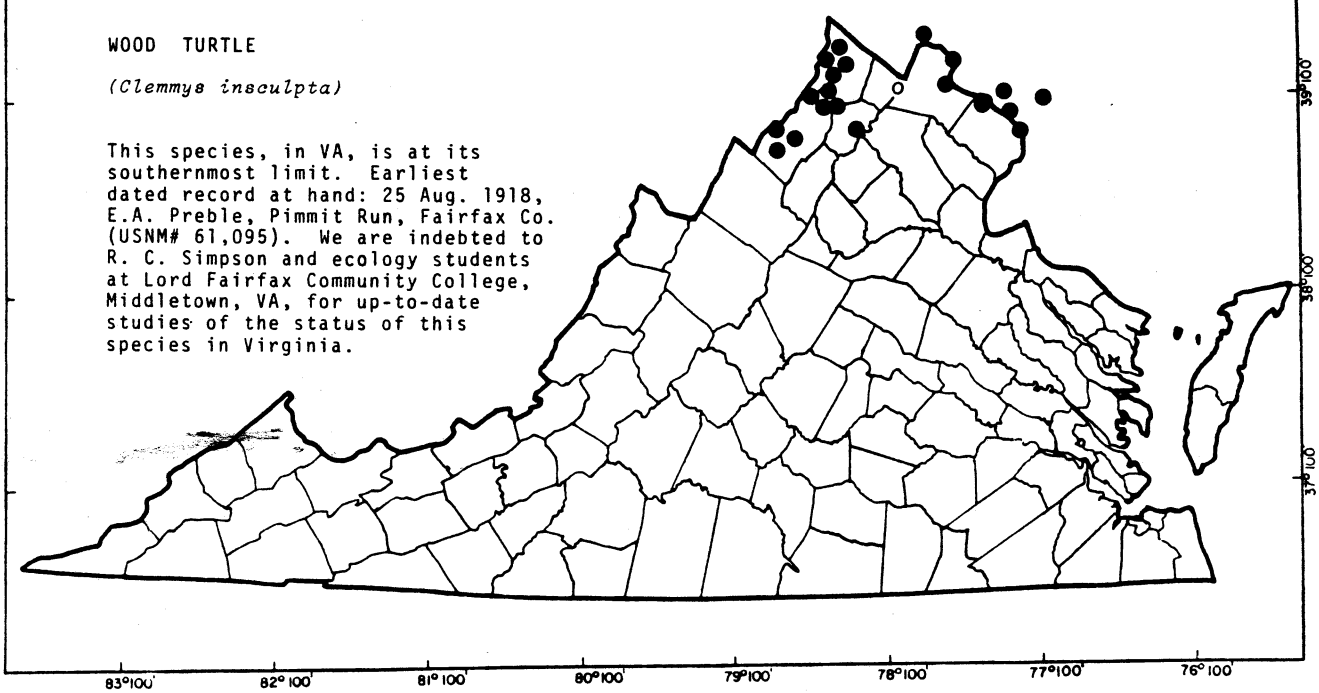


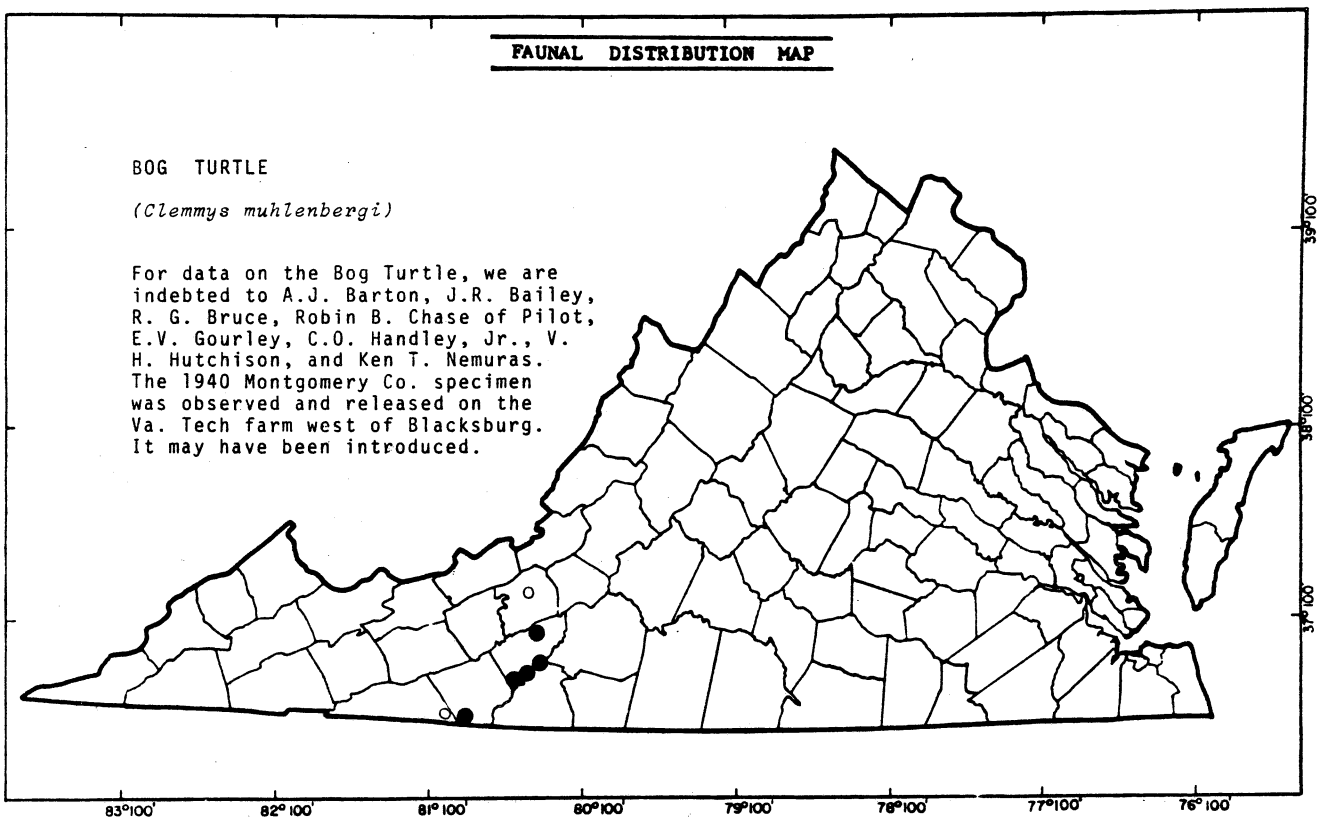
FAUNAL DISTRIBUTION MAP

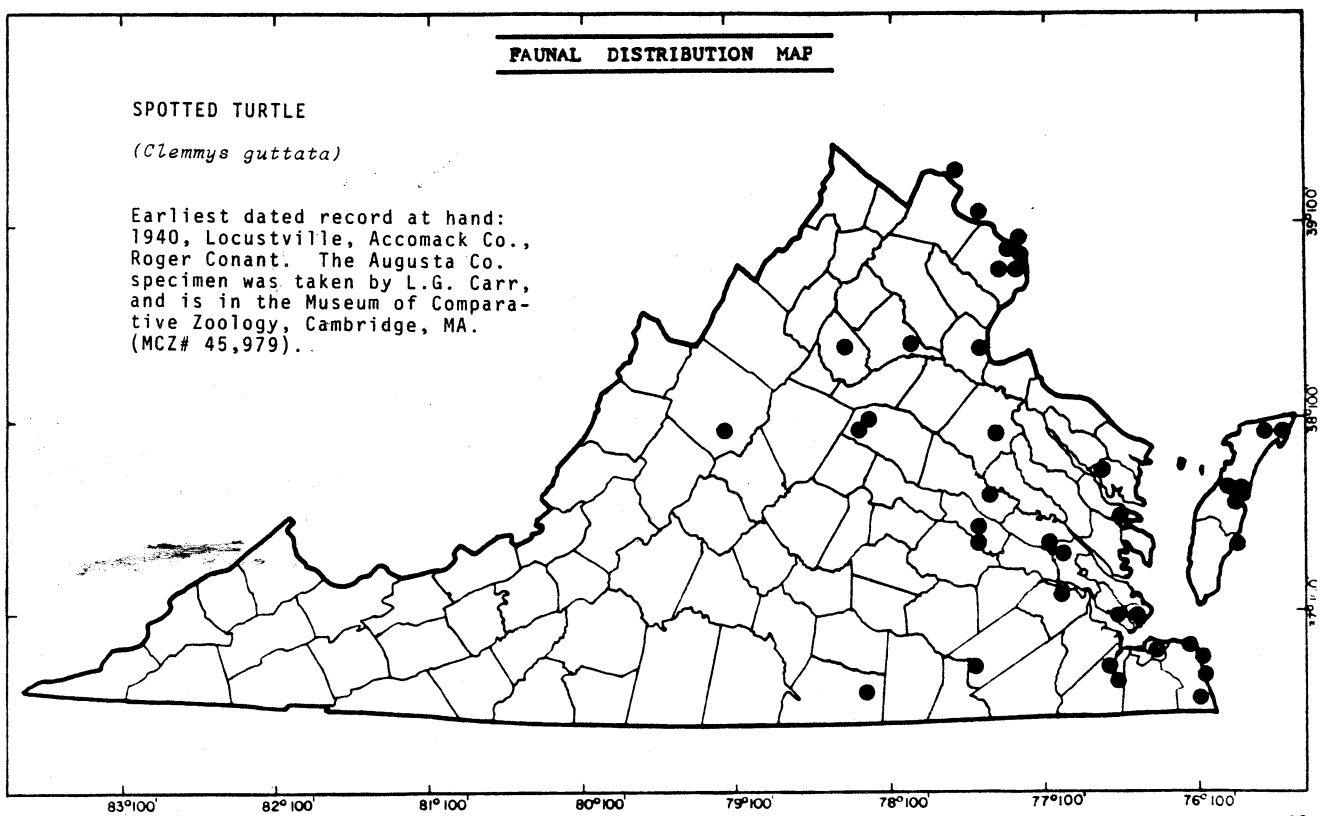
WOOD TURTLE

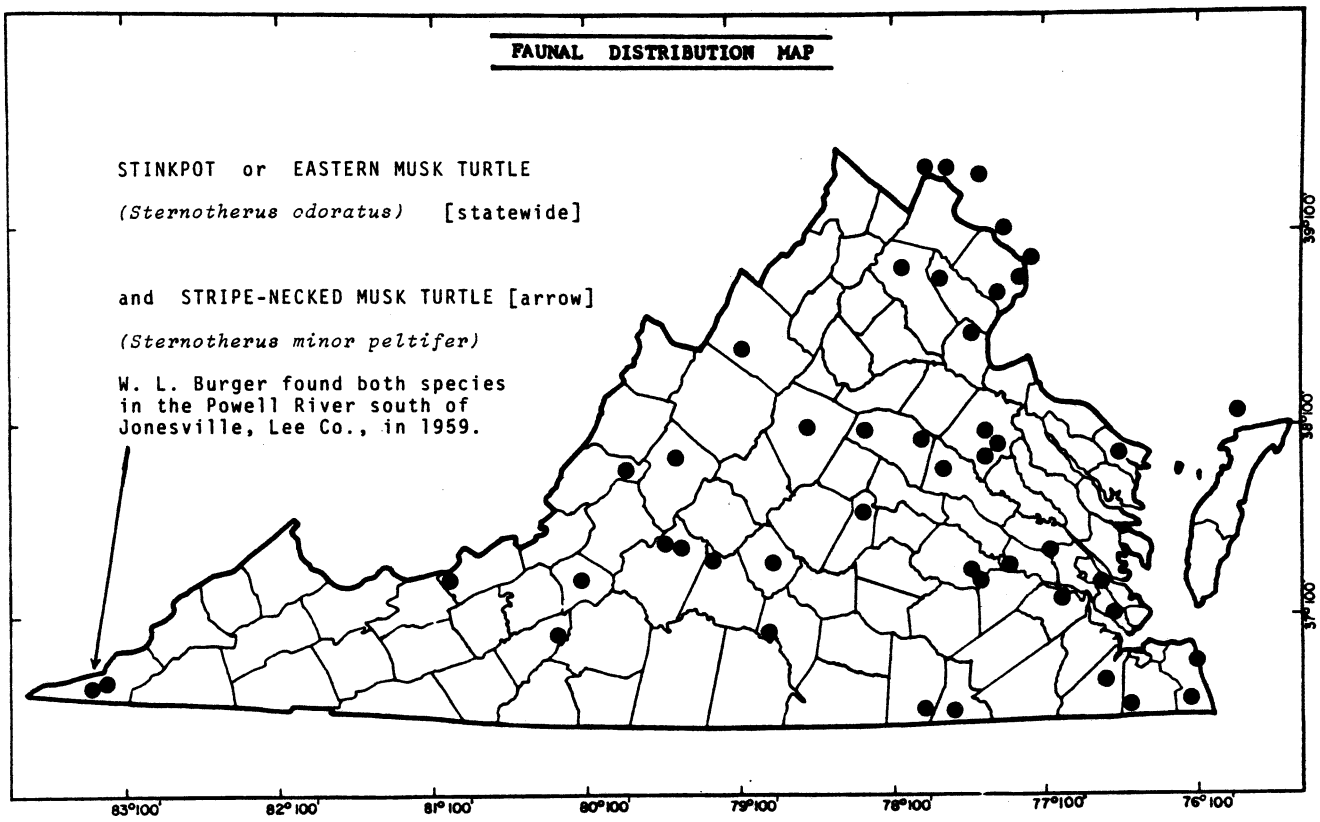
(Clemmys insculpta)

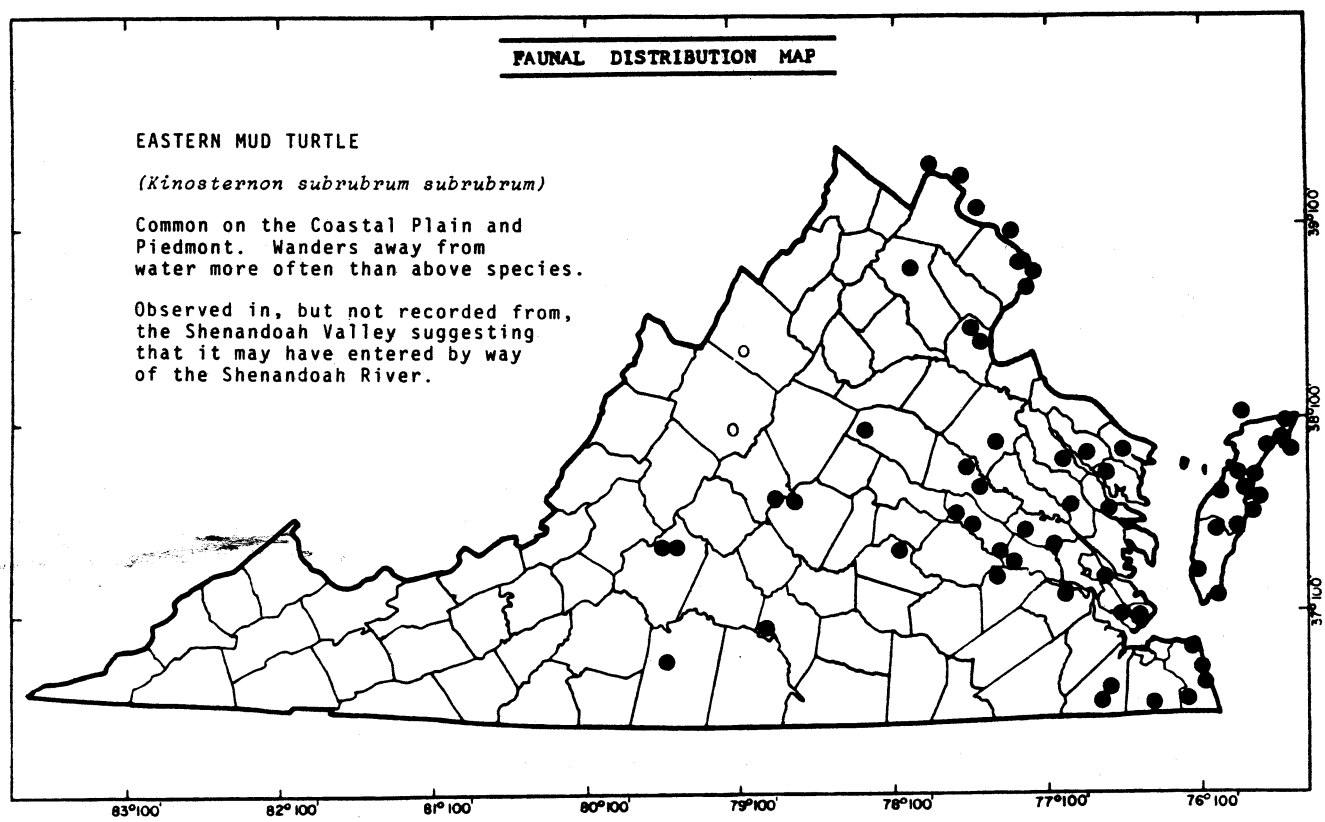
This species, in VA, is at its southernmost limit. Earliest dated record at hand: 25 Aug. 1918, E.A. Preble, Pimmit Run, Fairfax Co. (USNM# 61,095). We are indebted to R. C. Simpson and ecology students at Lord Fairfax Community College, Middletown, VA, for up-to-date studies of the status of this species in Virginia.




FAUNAL DISTRIBUTION MAP
BOG TURTLE
(Clemmys muhlenbergi)
For data on the Bog Turtle, we are indebted to A.J. Barton, J.R. Bailey, R. G. Bruce, Robin B. Chase of Pilot, E.V. Gourley, C.O. Handley, Jr., V. H. Hutchison, and Ken T. Nemuras. The 1940 Montgomery Co. specimen was observed and released on the Va. Tech farm west of Blacksburg. It may have been introduced.
39°100'
38°100'
37°100'
83°100'
82°100'
81°100'
80°100'
79°100'
78°100'
77°100'
76°100'


FAUNAL DISTRIBUTION MAP
SPOTTED TURTLE
(Clemmys guttata)
Earliest dated record at hand: 1940, Locustville, Accomack Co., Roger Conant. The Augusta Co. specimen was taken by L.G. Carr, and is in the Museum of Comparative Zoology, Cambridge, MA. (MCZ# 45,979).
39°100'
38°100'
83°100'
82°100'
81°100'
80°100'
79°100'
78°100'
77°100'
76°100'


FAUNAL DISTRIBUTION MAP
STINKPOT or EASTERN MUSK TURTLE
(Sternotherus odoratus) [statewide]
and STRIPE-NECKED MUSK TURTLE [arrow]
(Sternotherus minor peltifer)
W. L. Burger found both species in the Powell River south of Jonesville, Lee Co., in 1959.
83°100'
82°100'
81°100'
80°100'
79°100'
78°100'
77°100'
76°100'
39°100'
38°100'
37°100'

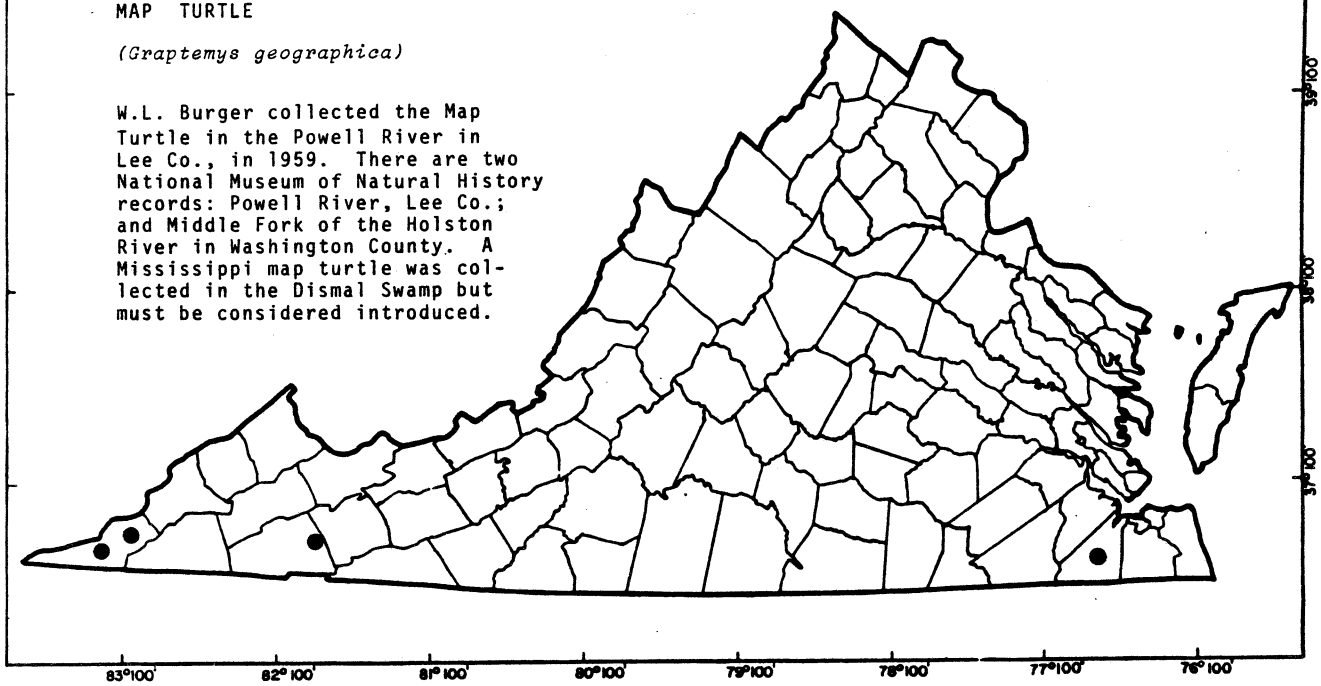

FAUNAL DISTRIBUTION MAP
EASTERN MUD TURTLE
(Kinosternon subrubrum subrubrum)
Common on the Coastal Plain and Piedmont. Wanders away from water more often than above species.
Observed in, but not recorded from, the Shenandoah Valley suggesting that it may have entered by way of the Shenandoah River.
83°100'
82°100'
81°100'
80°100'
79°100'
78°100'
77°100'
76°100'
39°100'
38°100'
37°100'

FAUNAL DISTRIBUTION MAP

MAP TURTLE

(Graptemys geographica)

W.L. Burger collected the Map Turtle in the Powell River in Lee Co., in 1959. There are two National Museum of Natural History records: Powell River, Lee Co.; and Middle Fork of the Holston River in Washington County. A Mississippi map turtle was collected in the Dismal Swamp but must be considered introduced.

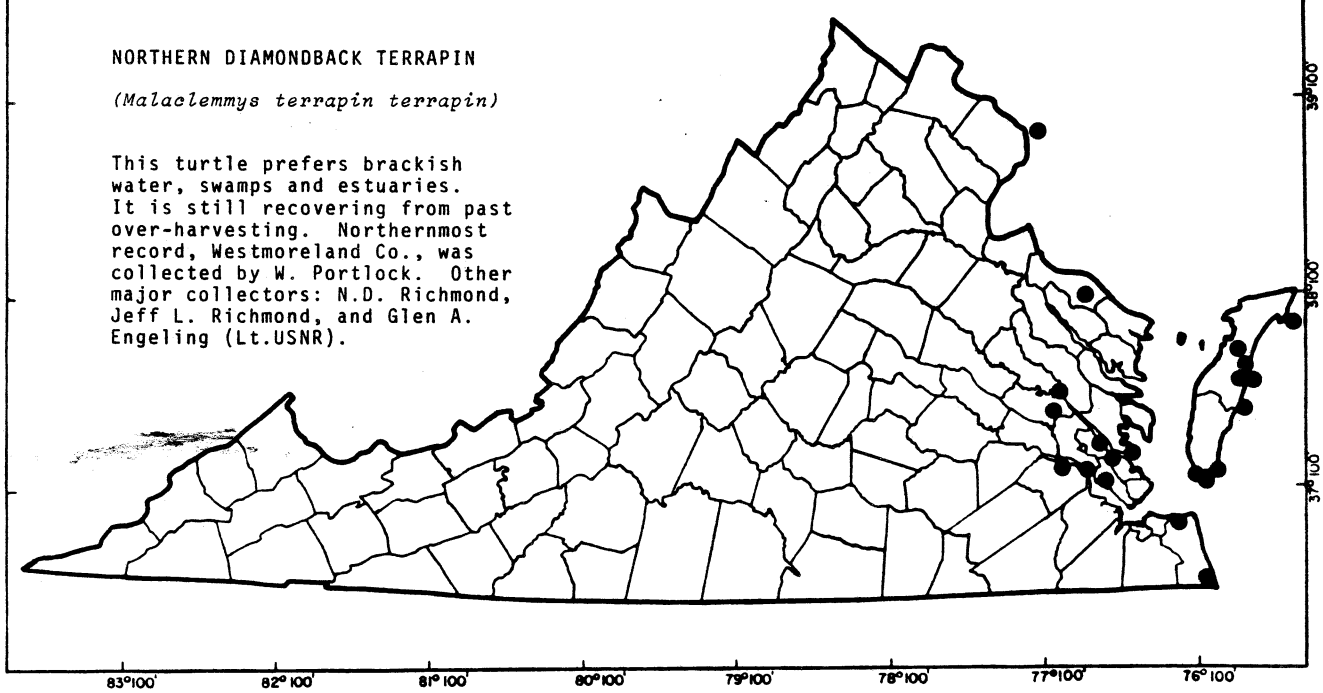


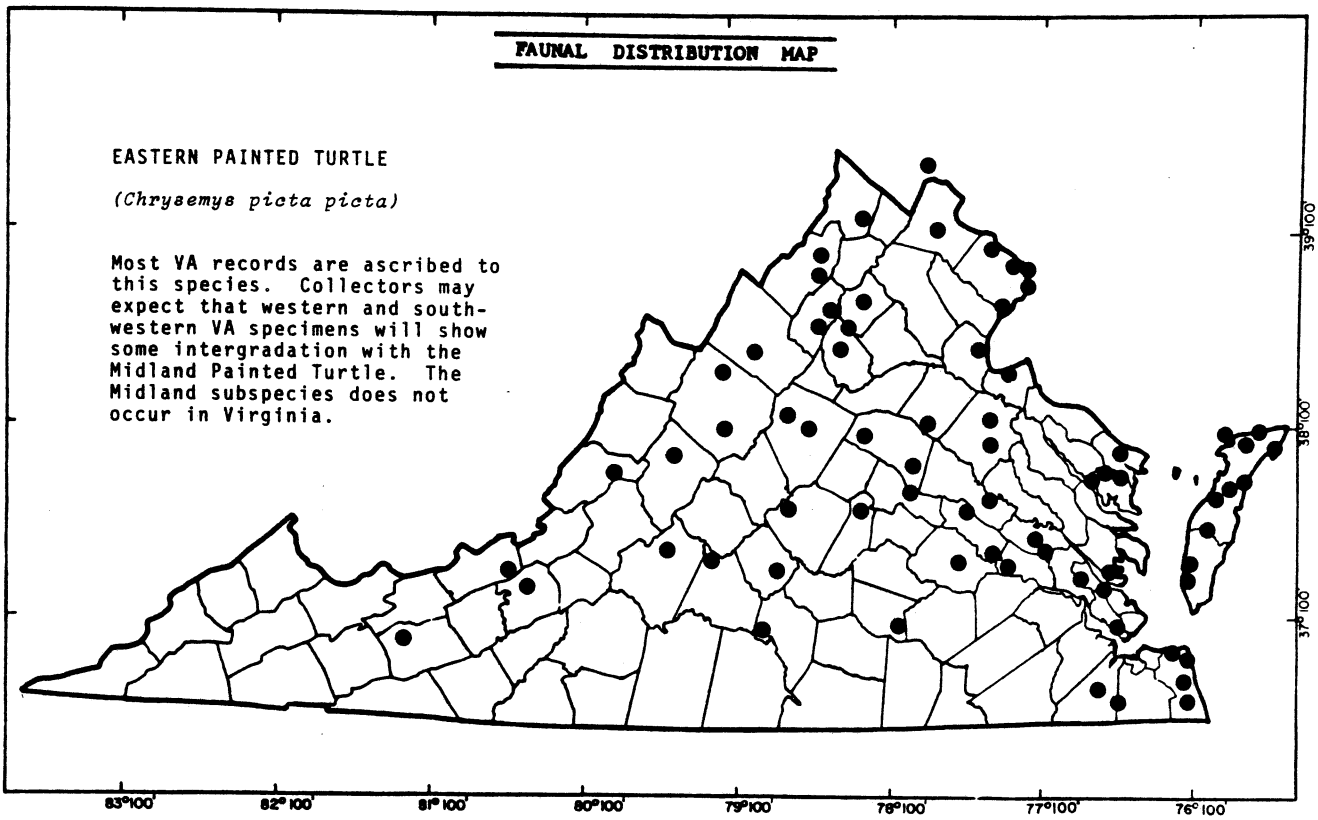
FAUNAL DISTRIBUTION MAP

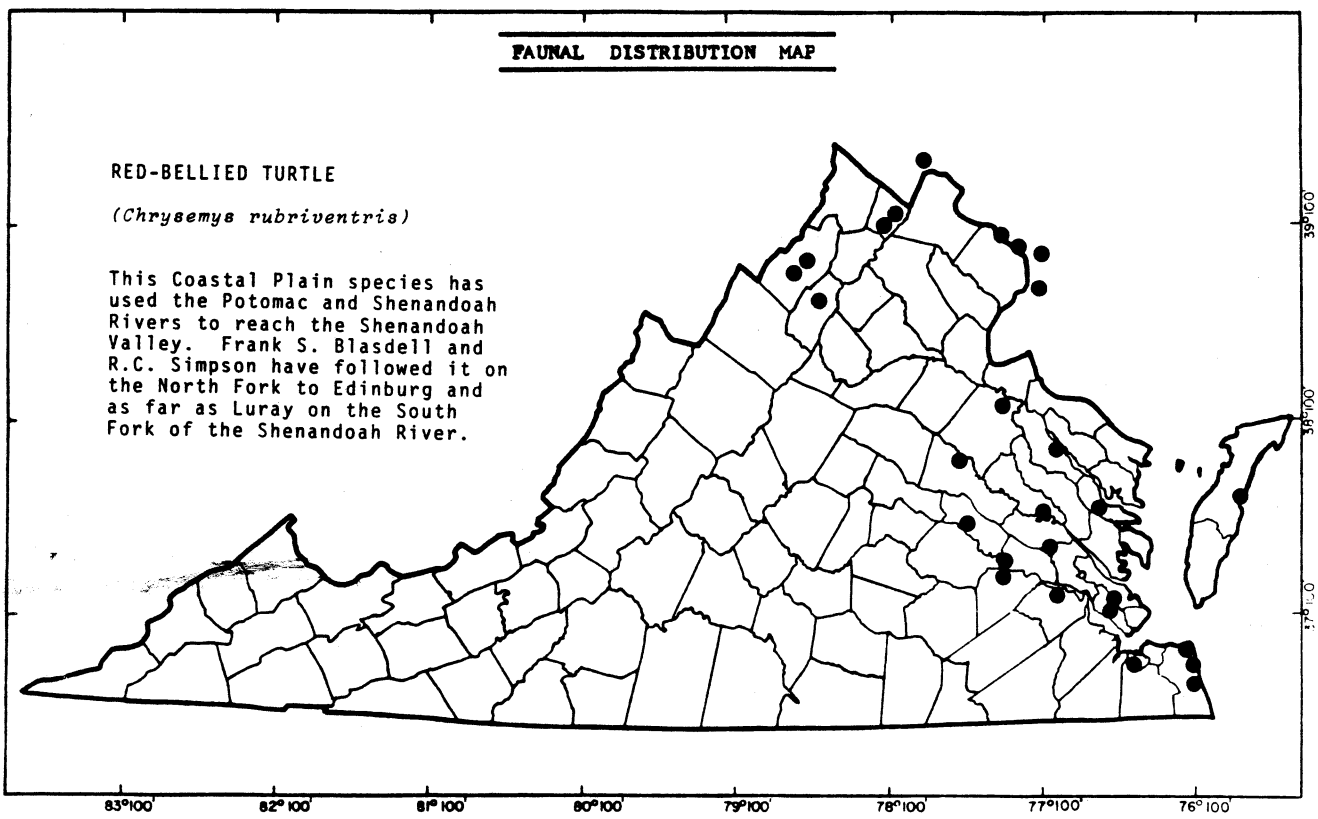
NORTHERN DIAMONDBACK TERRAPIN

(Malaclemmys terrapin terrapin)

This turtle prefers brackish water, swamps and estuaries. It is still recovering from past over-harvesting. Northernmost record, Westmoreland Co., was collected by W. Portlock. Other major collectors: N.D. Richmond, Jeff L. Richmond, and Glen A. Engeling (Lt.USNR).




FAUNAL DISTRIBUTION MAP
EASTERN PAINTED TURTLE
(Chrysemys picta picta)
Most VA records are ascribed to this species. Collectors may expect that western and southwestern VA specimens will show some intergradation with the Midland Painted Turtle. The Midland subspecies does not occur in Virginia.
83°100'
82°100'
81°100'
80°100'
79°100'
78°100'
77°100'
76°100'
39°100'
38°100'
37°100'

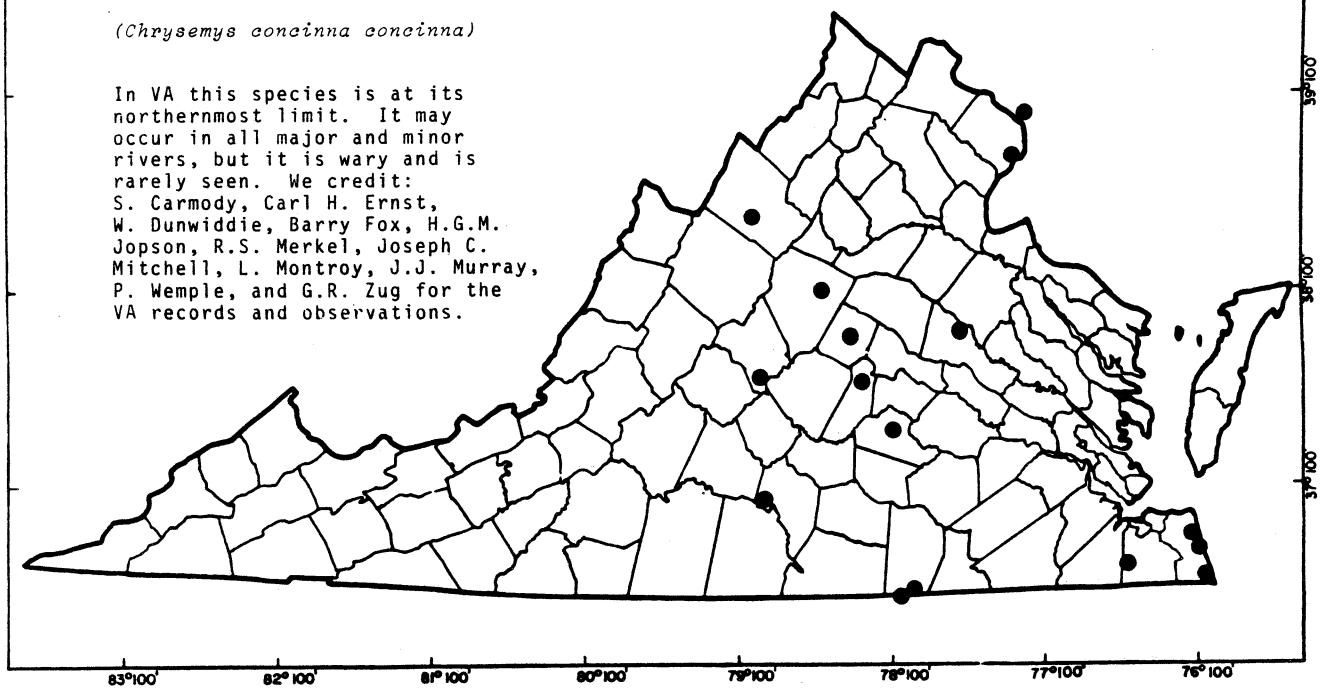

FAUNAL DISTRIBUTION MAP
RED-BELLIED TURTLE
(Chrysemys rubriventris)
This Coastal Plain species has used the Potomac and Shenandoah Rivers to reach the Shenandoah Valley. Frank S. Blasdell and R.C. Simpson have followed it on the North Fork to Edinburg and as far as Luray on the South Fork of the Shenandoah River.
83°100'
82°100'
81°100'
80°100'
79°100'
78°100'
77°100'
76°100'
39°100'
38°100'

FAUNAL DISTRIBUTION MAP

RIVER COOTER

(Chrysemys concinna concinna)

In VA this species is at its northernmost limit. It may occur in all major and minor rivers, but it is wary and is rarely seen. We credit: S. Carmody, Carl H. Ernst, W. Dunwiddie, Barry Fox, H.G.M. Jopson, R.S. Merkel, Joseph C. Mitchell, L. Montroy, J.J. Murray, P. Wemple, and G.R. Zug for the VA records and observations.



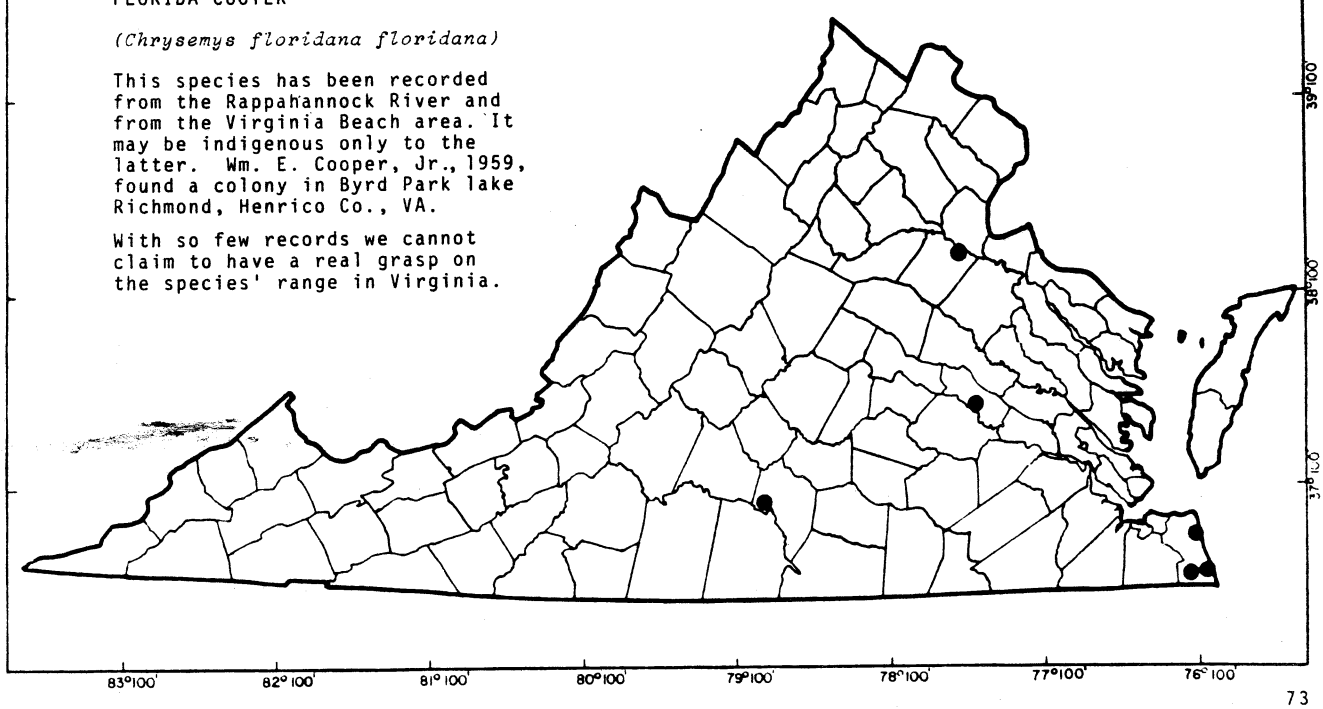
FAUNAL DISTRIBUTION MAP

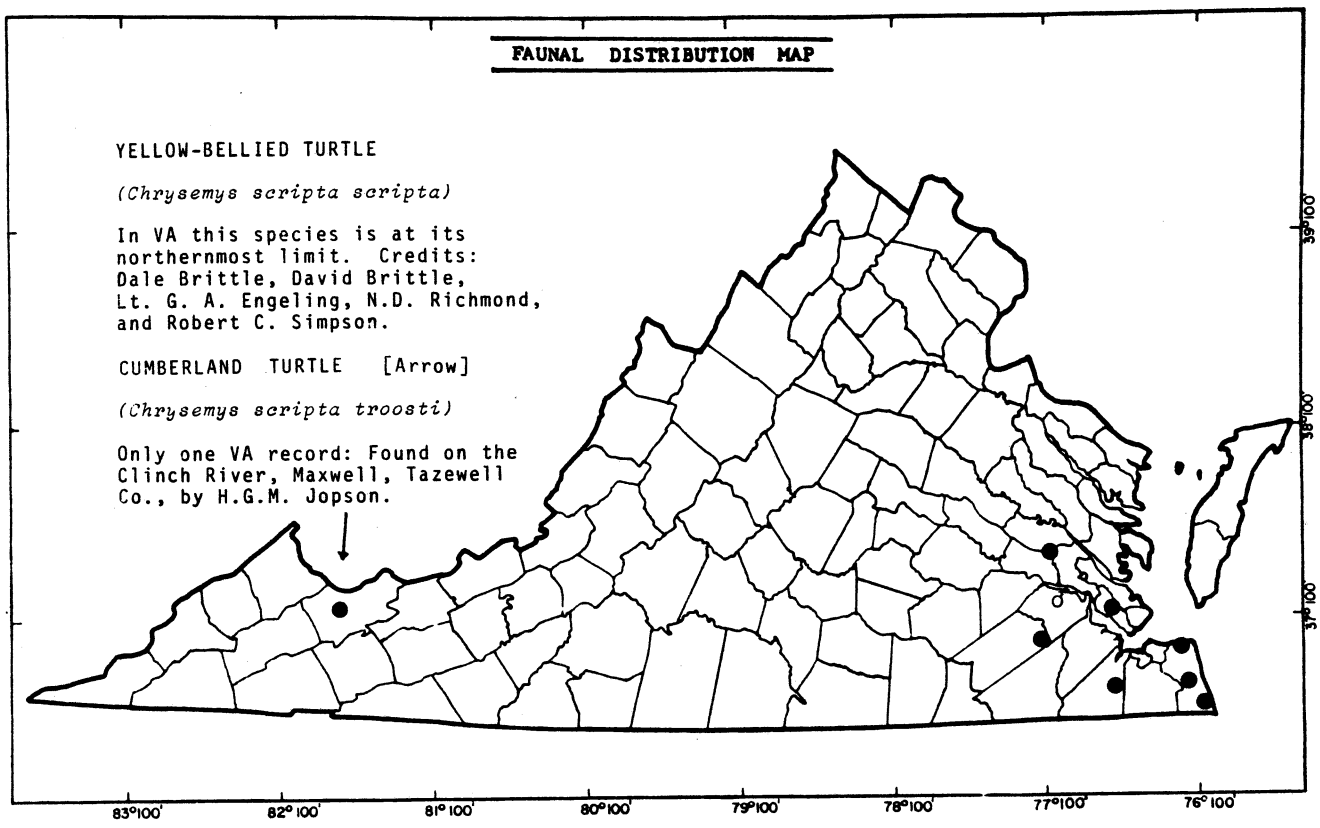
FLORIDA COOTER

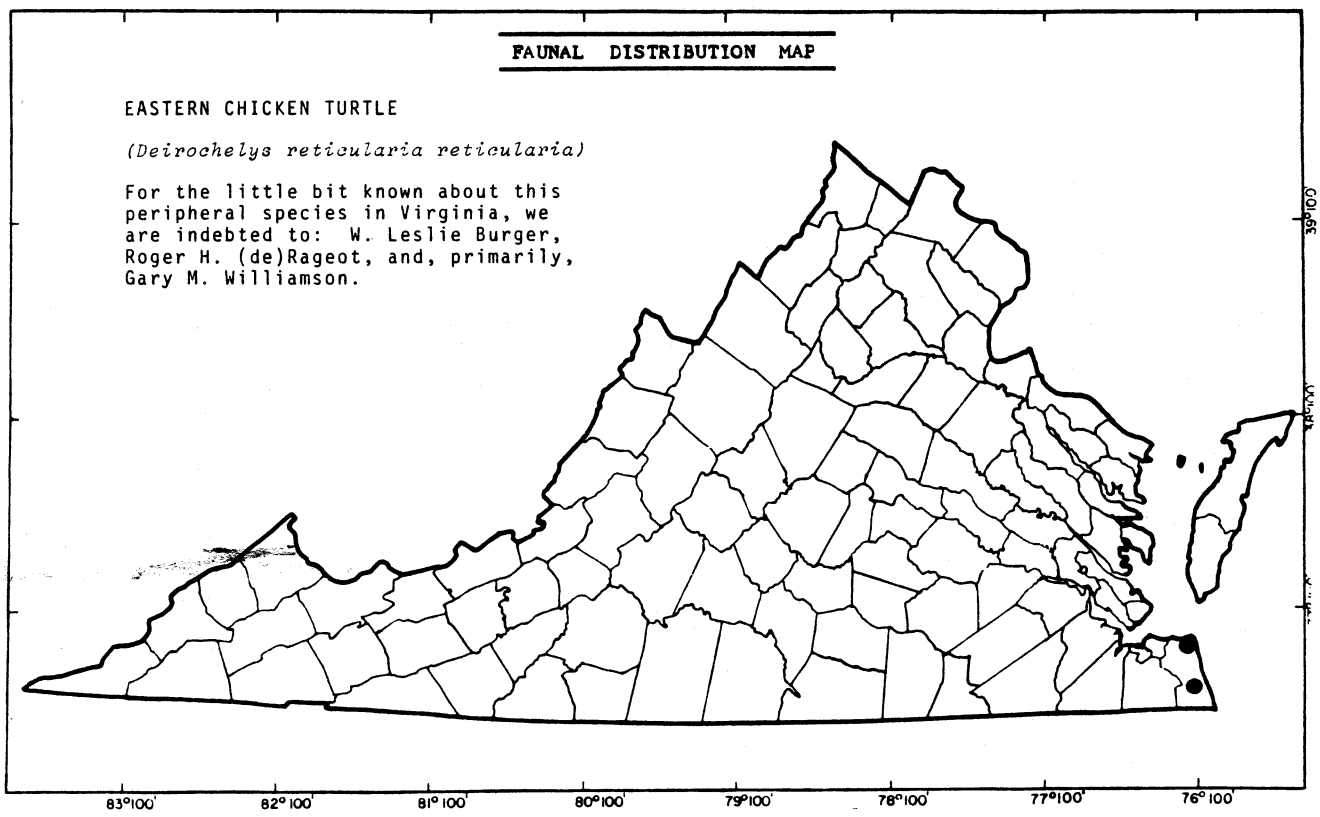
(Chrysemys floridana floridana)

This species has been recorded from the Rappahannock River and from the Virginia Beach area. It may be indigenous only to the latter. Wm. E. Cooper, Jr., 1959, found a colony in Byrd Park lake Richmond, Henrico Co., VA.

With so few records we cannot claim to have a real grasp on the species' range in Virginia.




FAUNAL DISTRIBUTION MAP
YELLOW-BELLIED TURTLE
(Chrysemys scripta scripta)
In VA this species is at its northernmost limit. Credits: Dale Brittle, David Brittle, Lt. G. A. Engeling, N.D. Richmond, and Robert C. Simpson.
CUMBERLAND TURTLE [Arrow]
(Chrysemys scripta troosti)
Only one VA record: Found on the Clinch River, Maxwell, Tazewell Co., by H.G.M. Jopson.
83°100'
82°100'
81°100'
80°100'
79°100'
78°100'
77°100'
76°100'

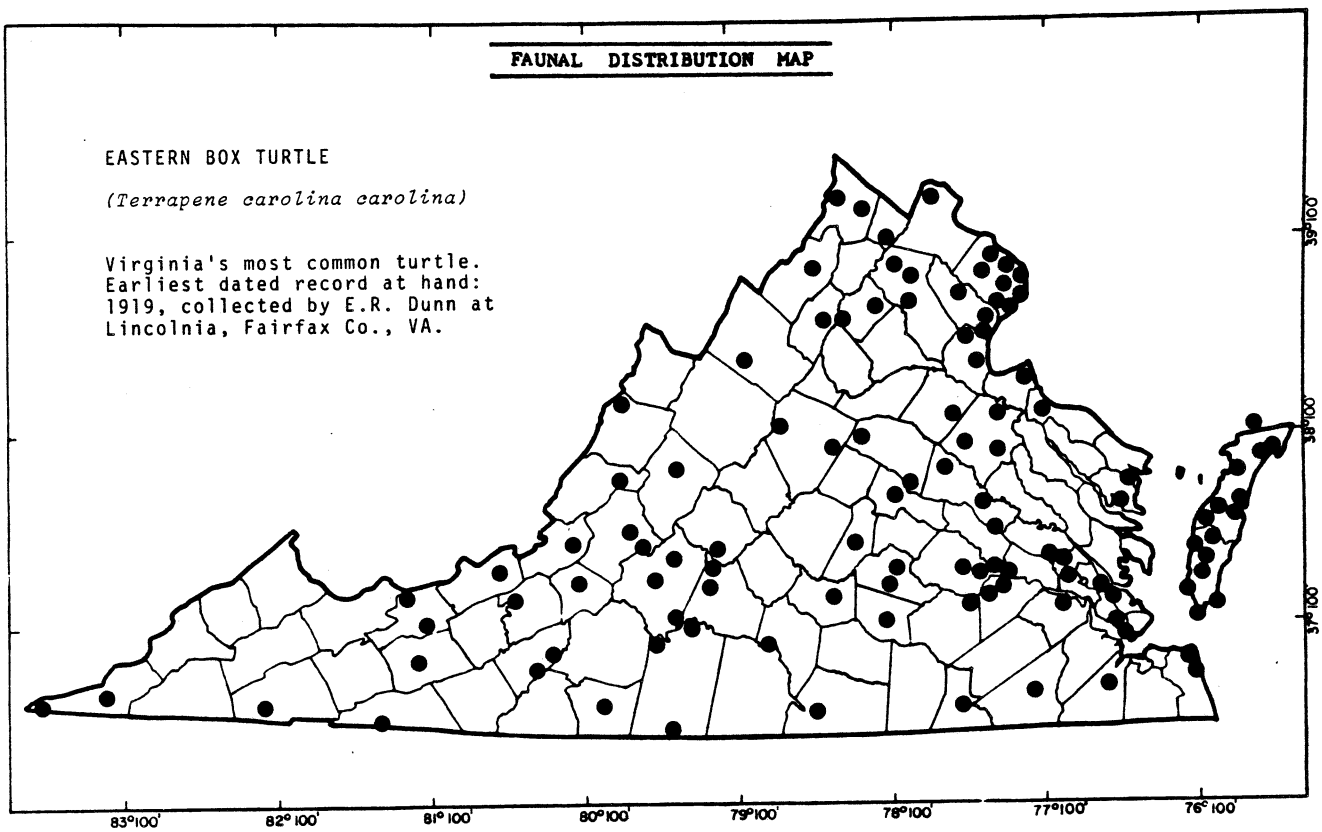

FAUNAL DISTRIBUTION MAP
EASTERN CHICKEN TURTLE
(Deirochelys reticularia reticularia)
For the little bit known about this peripheral species in Virginia, we are indebted to: W. Leslie Burger, Roger H. (de)Rageot, and, primarily, Gary M. Williamson.
83°100'
82°100'
81°100'
80°100'
79°100'
78°100'
77°100'
76°100'

FAUNAL DISTRIBUTION MAP

EASTERN BOX TURTLE

(Terrapene carolina carolina)

Virginia's most common turtle. Earliest dated record at hand: 1919, collected by E.R. Dunn at Lincolnia, Fairfax Co., VA.

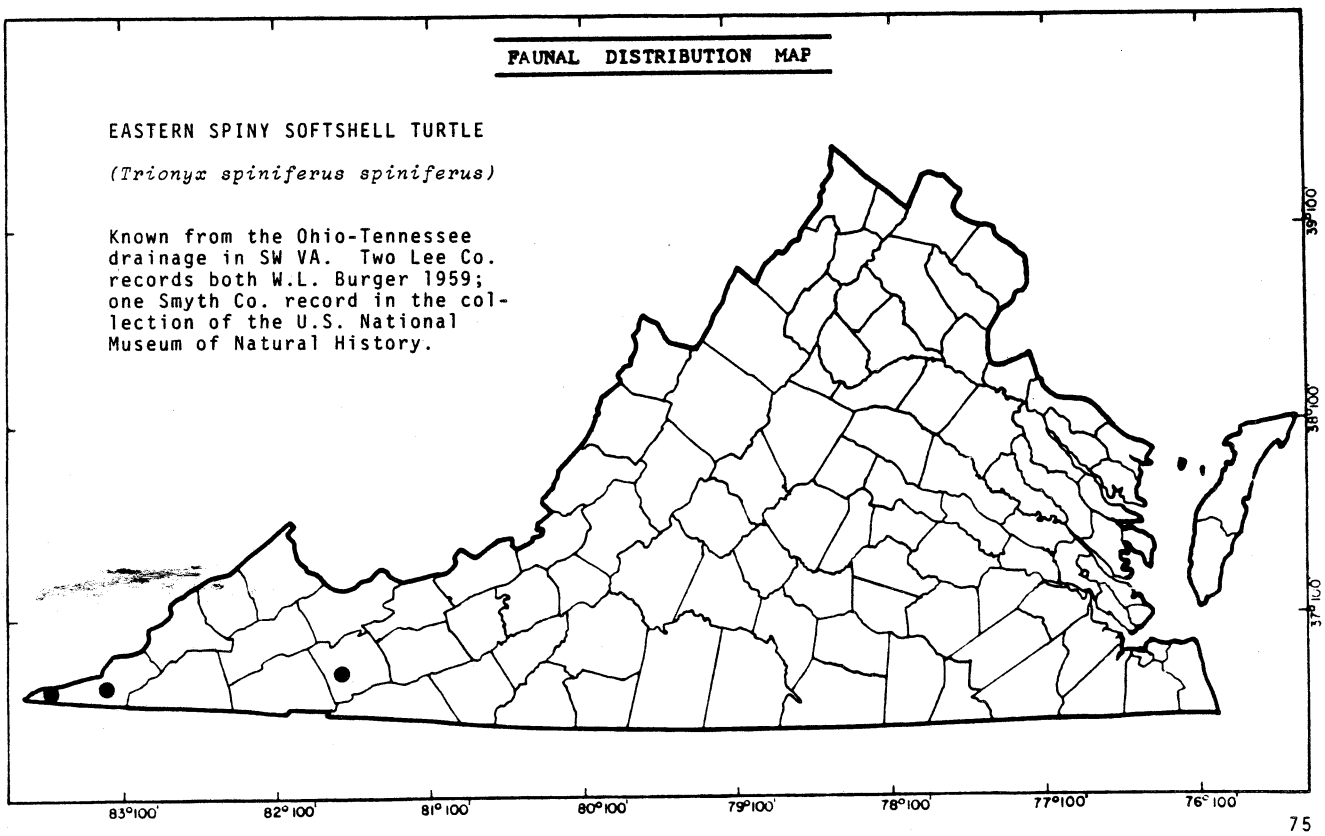


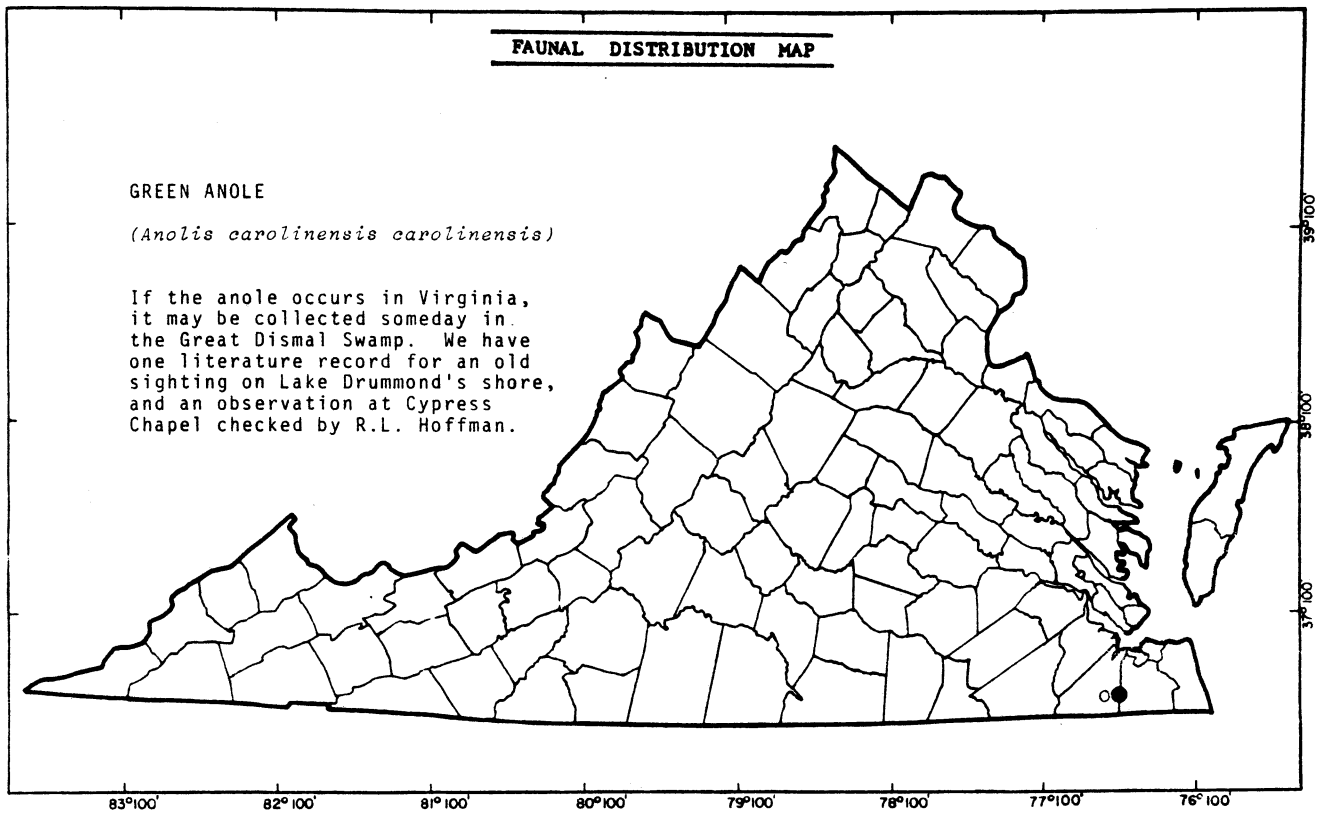
FAUNAL DISTRIBUTION MAP

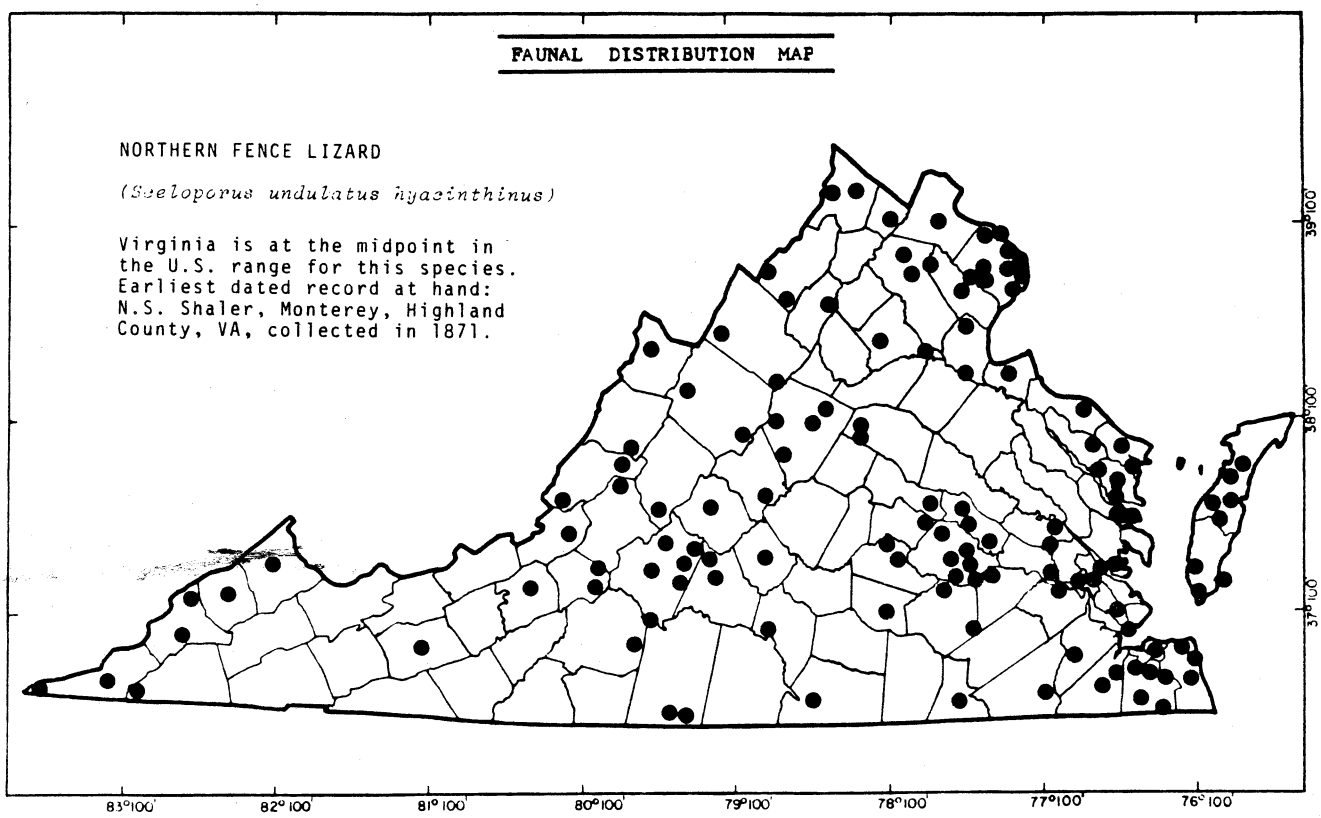
EASTERN SPINY SOFTSHELL TURTLE

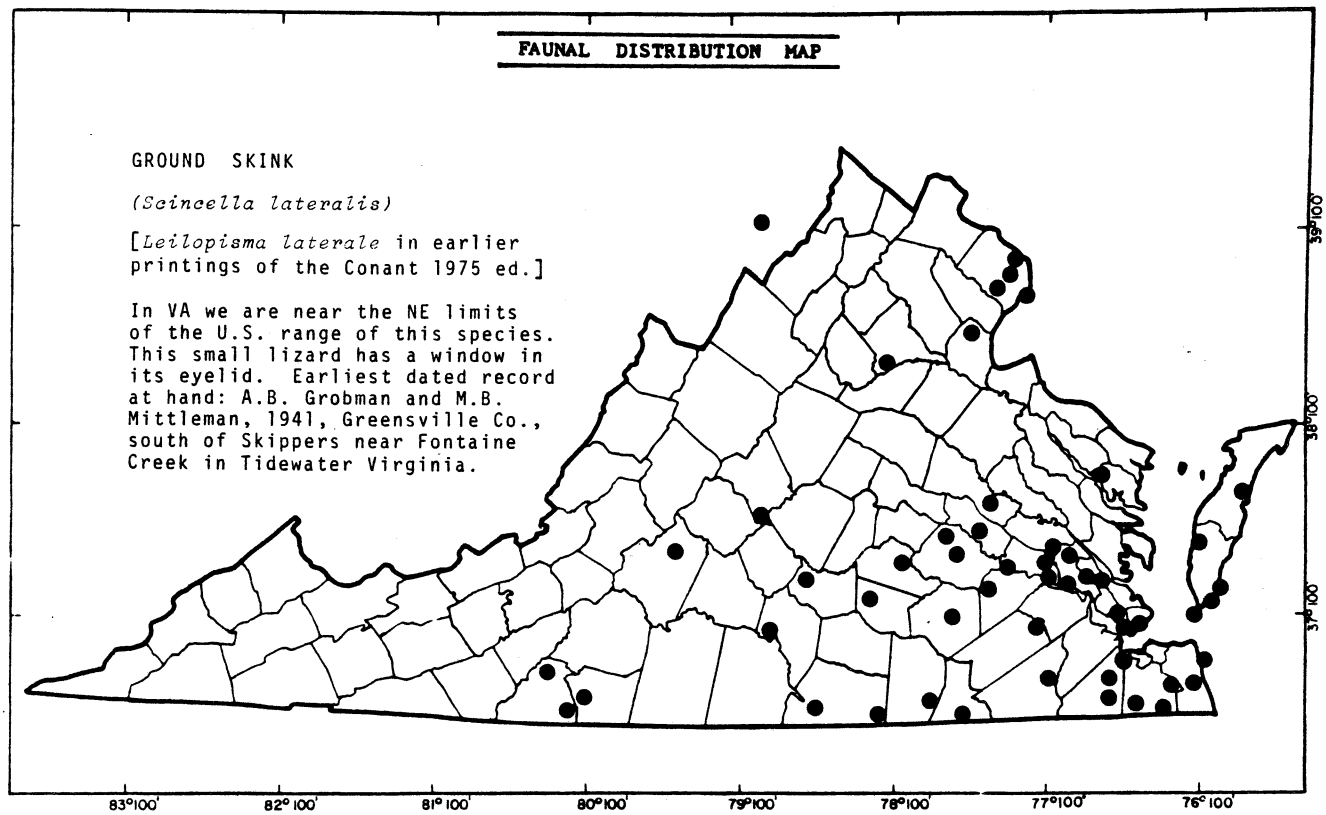
(Trionyx spiniferus spiniferus)

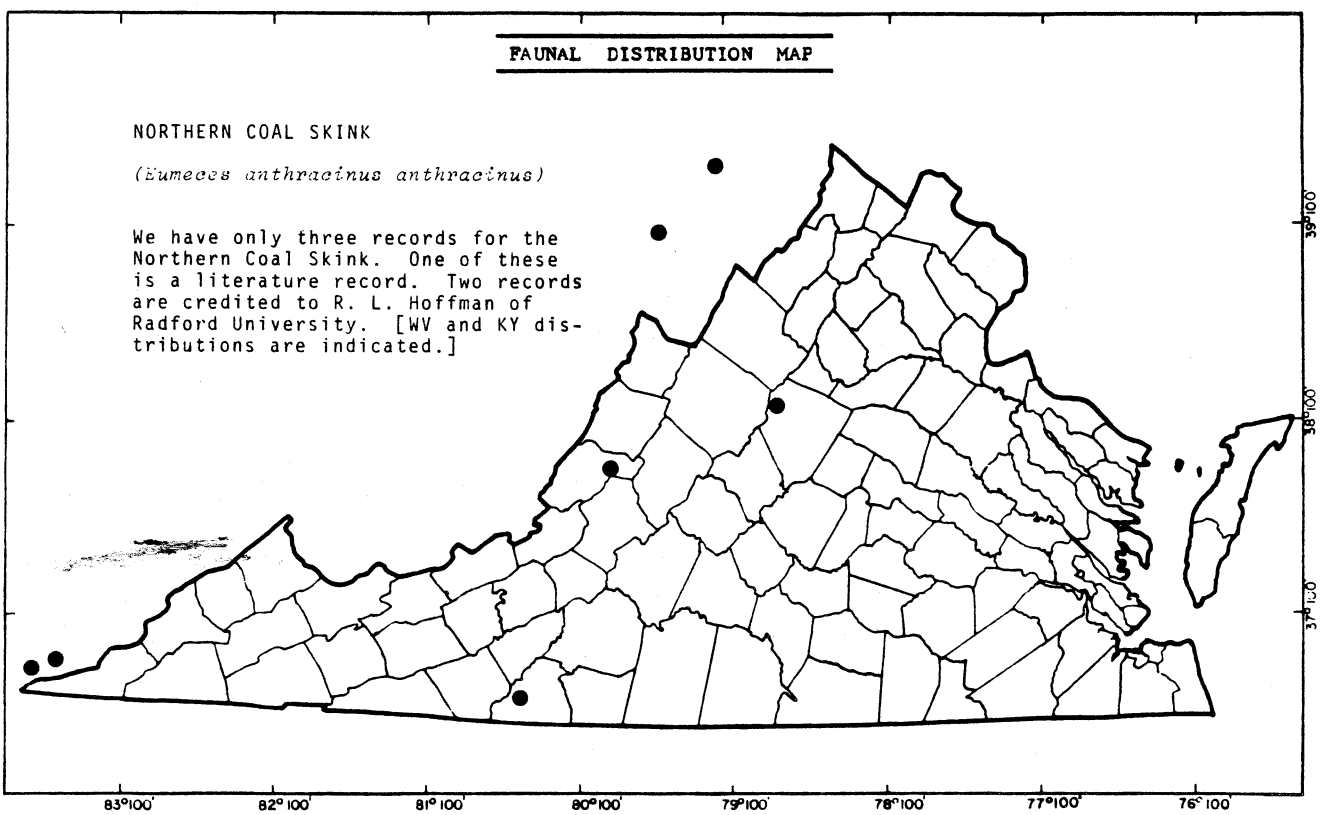
Known from the Ohio-Tennessee drainage in SW VA. Two Lee Co. records both W.L. Burger 1959; one Smyth Co. record in the collection of the U.S. National Museum of Natural History.




FAUNAL DISTRIBUTION MAP
GREEN ANOLE
(Anolis carolinensis carolinensis)
If the anole occurs in Virginia, it may be collected someday in the Great Dismal Swamp. We have one literature record for an old sighting on Lake Drummond's shore, and an observation at Cypress Chapel checked by R.L. Hoffman.
39°100'
38°100'
37°100'
83°100'
82°100'
81°100'
80°100'
79°100'
78°100'
77°100'
76°100'


FAUNAL DISTRIBUTION MAP
NORTHERN FENCE LIZARD
(Sceloporus undulatus hyacinthinus)
Virginia is at the midpoint in the U.S. range for this species. Earliest dated record at hand: N.S. Shaler, Monterey, Highland County, VA, collected in 1871.
39°100'
38°100'
37°100'
83°100'
82°100'
81°100'
80°100'
79°100'
78°100'
77°100'
76°100'


FAUNAL DISTRIBUTION MAP
GROUND SKINK
(Scincella lateralis)
[Leiolopisma laterale in earlier printings of the Conant 1975 ed.]
In VA we are near the NE limits of the U.S. range of this species. This small lizard has a window in its eyelid. Earliest dated record at hand: A.B. Grobman and M.B. Mittleman, 1941, Greensville Co., south of Skippers near Fontaine Creek in Tidewater Virginia.
39°100'
38°100'
37°100'
83°100'
82°100'
81°100'
80°100'
79°100'
78°100'
77°100'
76°100'


FAUNAL DISTRIBUTION MAP
NORTHERN COAL SKINK
(Eumeces anthracinus anthracinus)
We have only three records for the Northern Coal Skink. One of these is a literature record. Two records are credited to R. L. Hoffman of Radford University. [WV and KY distributions are indicated.]
39°100'
38°100'
37°100'
83°100'
82°100'
81°100'
80°100'
79°100'
78°100'
77°100'
76°100'

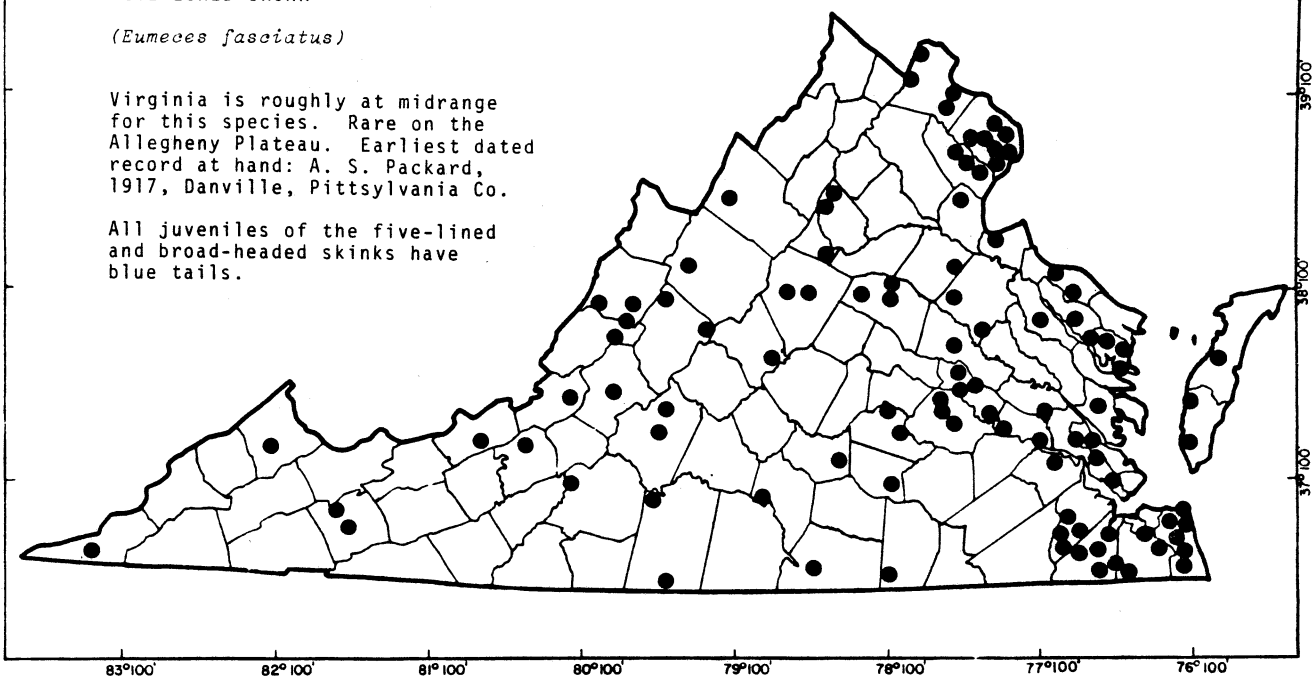
FAUNAL DISTRIBUTION MAP

FIVE-LINED SKINK

(Eumeces fasciatus)

Virginia is roughly at midrange for this species. Rare on the Allegheny Plateau. Earliest dated record at hand: A. S. Packard, 1917, Danville, Pittsylvania Co.

All juveniles of the five-lined and broad-headed skinks have blue tails.

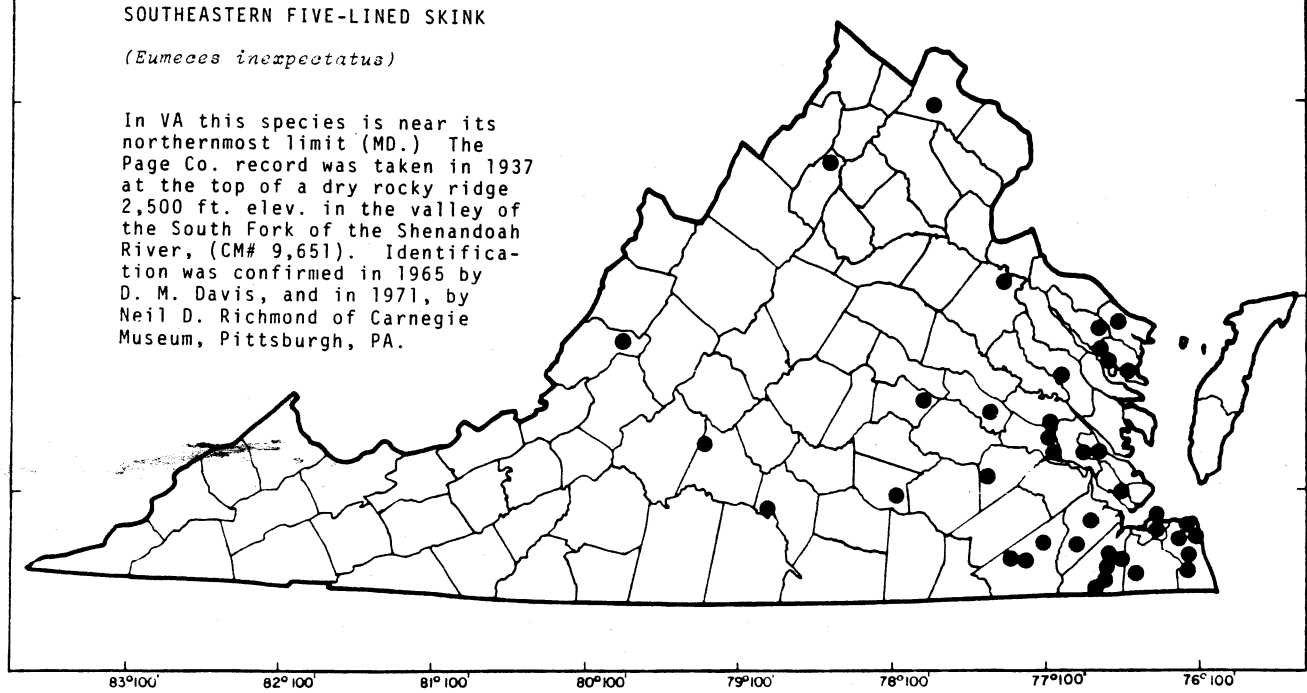


FAUNAL DISTRIBUTION MAP

SOUTHEASTERN FIVE-LINED SKINK

(Eumeces inexpectatus)

In VA this species is near its northernmost limit (MD.) The Page Co. record was taken in 1937 at the top of a dry rocky ridge 2,500 ft. elev. in the valley of the South Fork of the Shenandoah River, (CM# 9,651). Identification was confirmed in 1965 by D. M. Davis, and in 1971, by Neil D. Richmond of Carnegie Museum, Pittsburgh, PA.

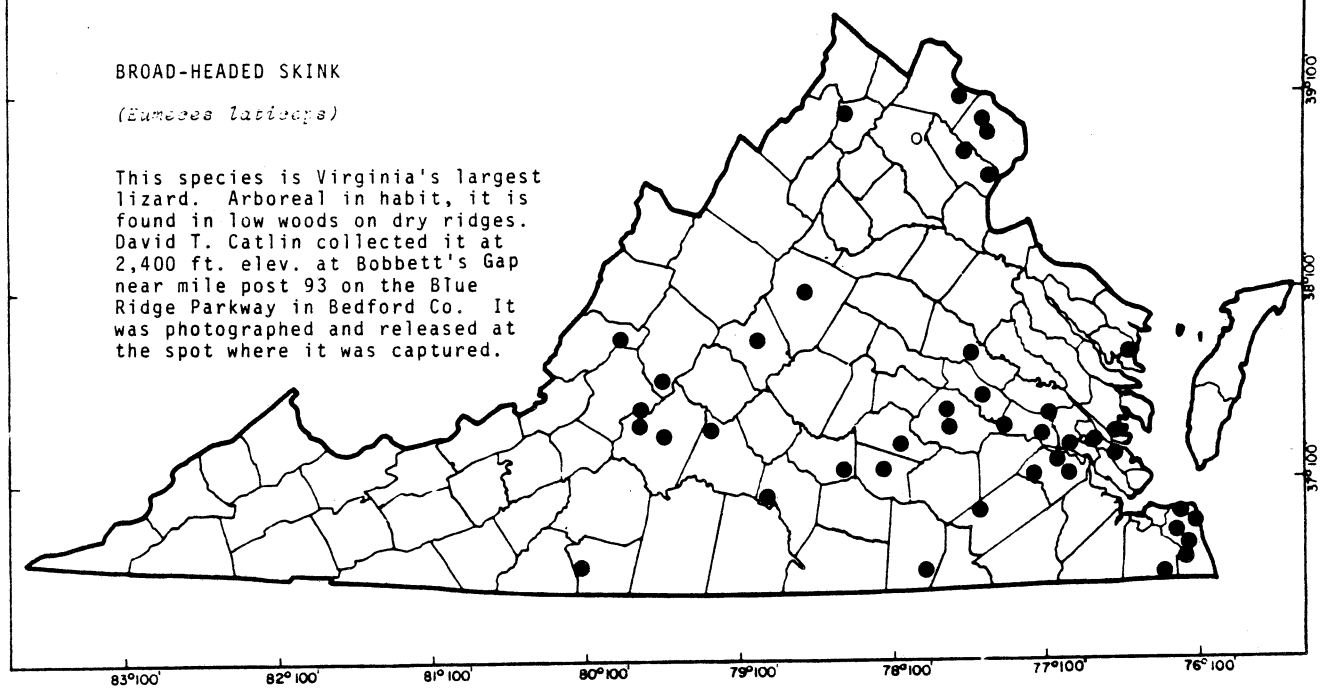


FAUNAL DISTRIBUTION MAP

BROAD-HEADED SKINK

(Eumeces laticeps)

This species is Virginia's largest lizard. Arboreal in habit, it is found in low woods on dry ridges. David T. Catlin collected it at 2,400 ft. elev. at Bobbett's Gap near mile post 93 on the Blue Ridge Parkway in Bedford Co. It was photographed and released at the spot where it was captured.

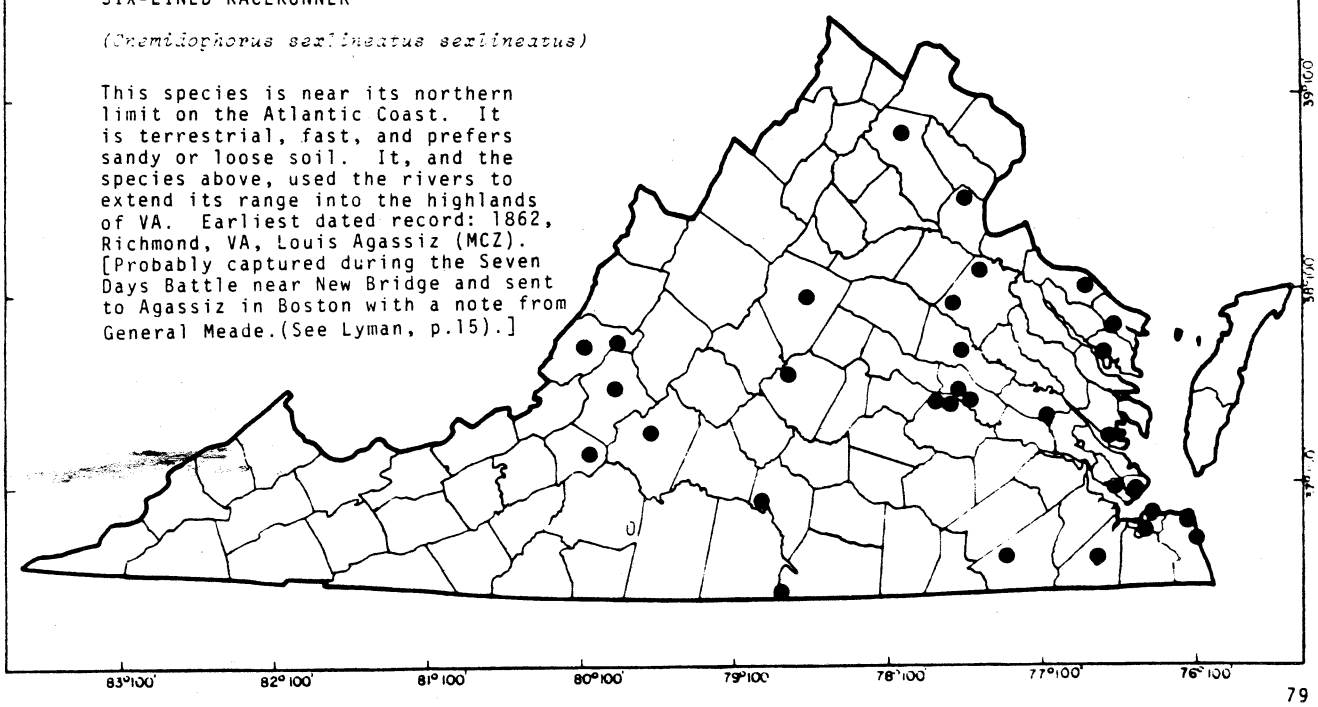


FAUNAL DISTRIBUTION MAP

SIX-LINED RACERUNNER

(Cnemidophorus sexlineatus sexlineatus)

This species is near its northern limit on the Atlantic Coast. It is terrestrial, fast, and prefers sandy or loose soil. It, and the species above, used the rivers to extend its range into the highlands of VA. Earliest dated record: 1862, Richmond, VA, Louis Agassiz (MCZ). [Probably captured during the Seven Days Battle near New Bridge and sent to Agassiz in Boston with a note from General Meade.(See Lyman, p.15).]

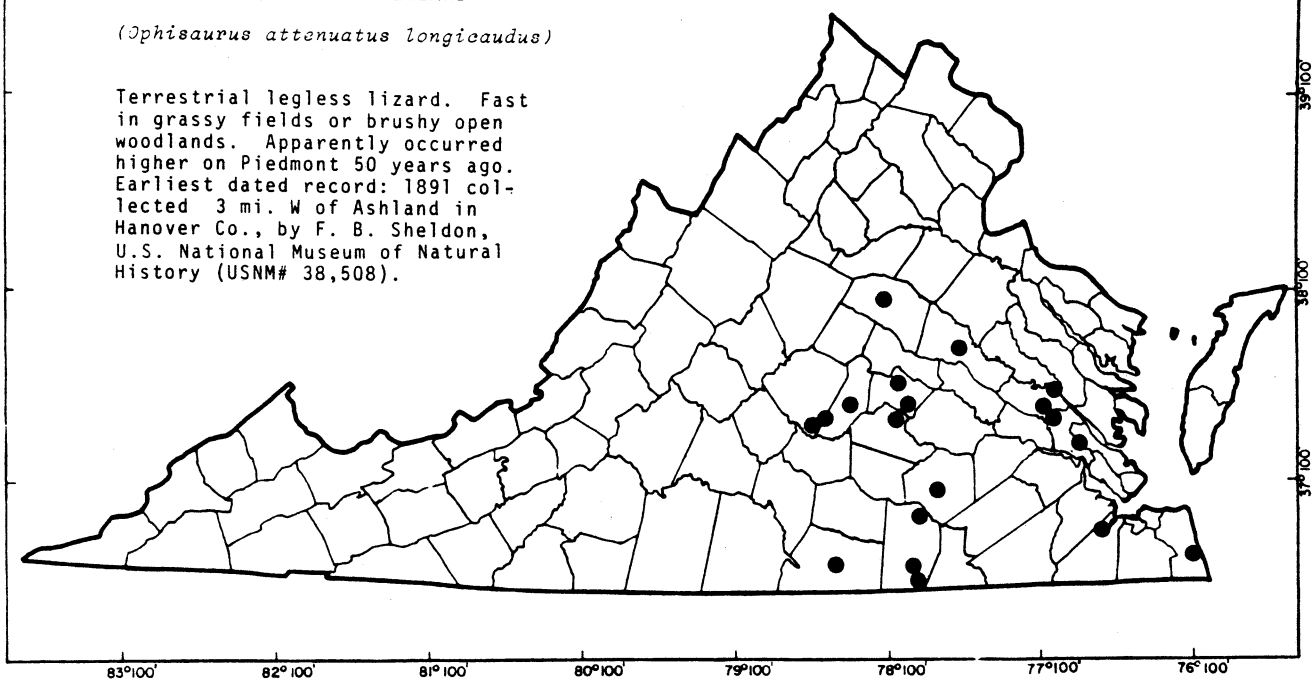


FAUNAL DISTRIBUTION MAP

EASTERN SLENDER GLASS LIZARD

(Ophisaurus attenuatus longicaudus)

Terrestrial legless lizard. Fast in grassy fields or brushy open woodlands. Apparently occurred higher on Piedmont 50 years ago. Earliest dated record: 1891 collected 3 mi. W of Ashland in Hanover Co., by F. B. Sheldon, U.S. National Museum of Natural History (USNM# 38,508).

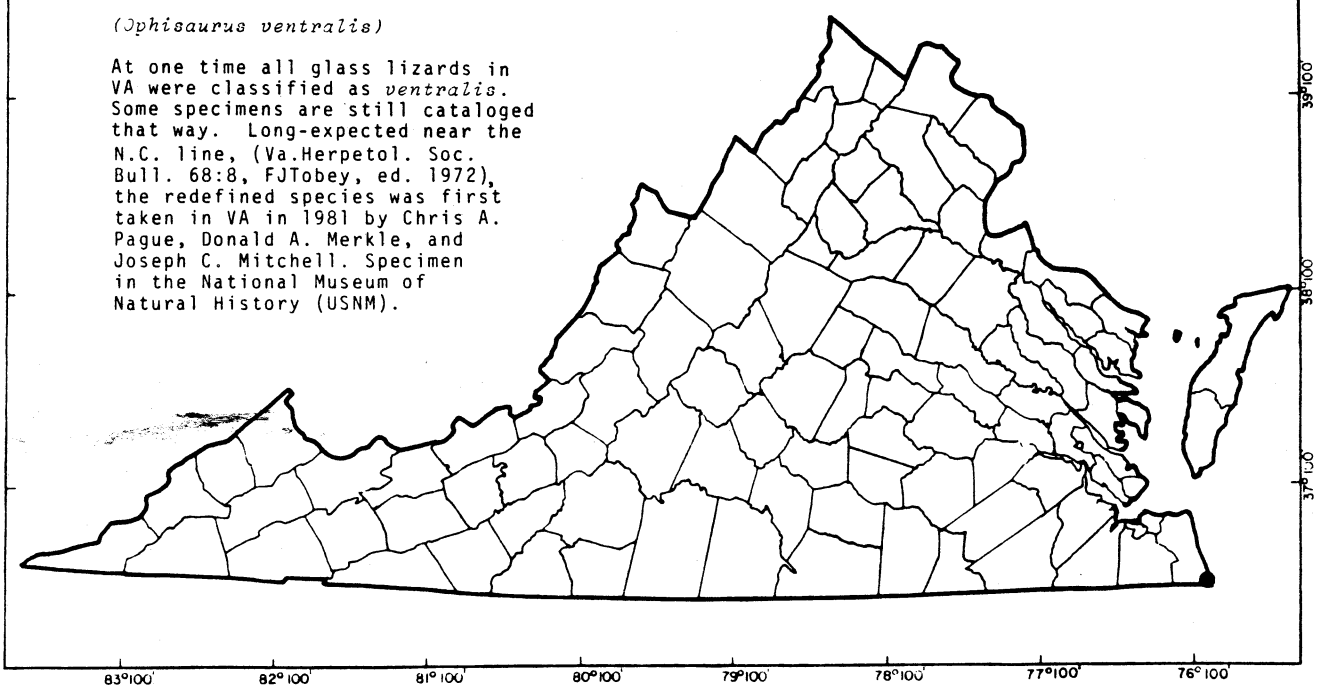


FAUNAL DISTRIBUTION MAP

EASTERN GLASS LIZARD

(Ophisaurus ventralis)

At one time all glass lizards in VA were classified as *ventralis*. Some specimens are still cataloged that way. Long-expected near the N.C. line, (Va.Herpetol. Soc. Bull. 68:8, FJTobey, ed. 1972), the redefined species was first taken in VA in 1981 by Chris A. Pague, Donald A. Merkle, and Joseph C. Mitchell. Specimen in the National Museum of Natural History (USNM).

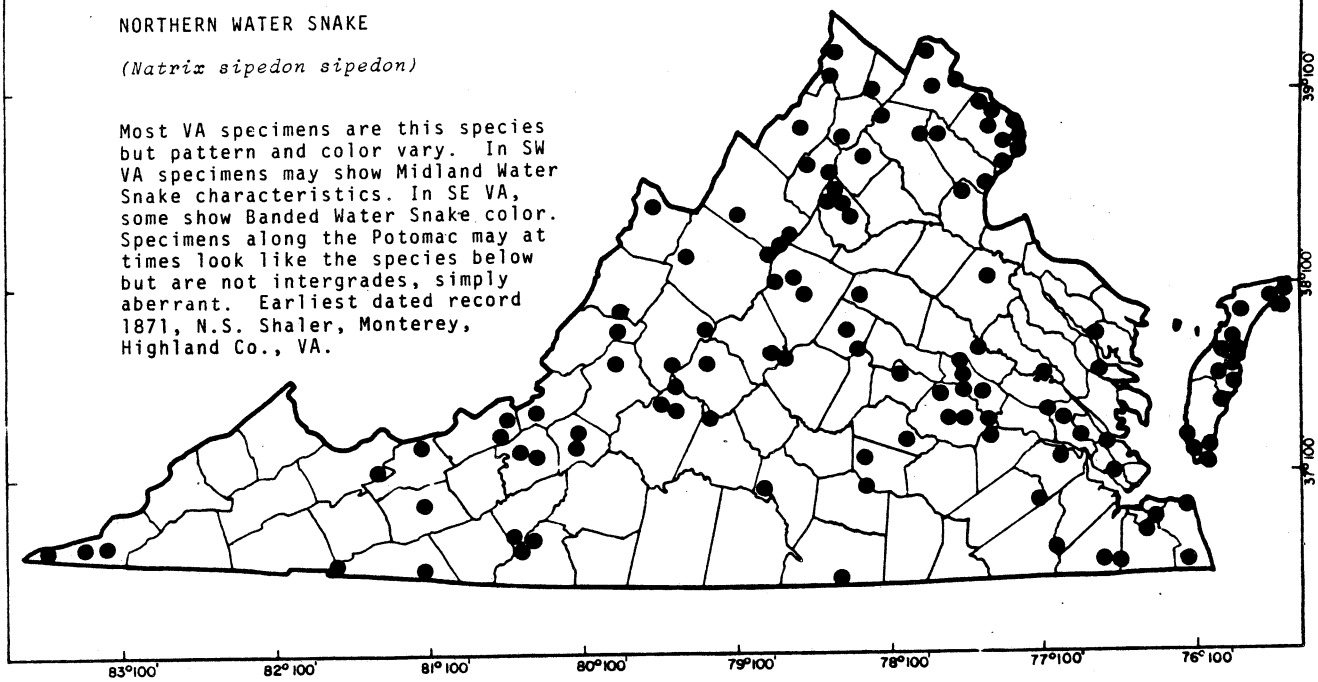


FAUNAL DISTRIBUTION MAP

NORTHERN WATER SNAKE

(Natrix sipedon sipedon)

Most VA specimens are this species but pattern and color vary. In SW VA specimens may show Midland Water Snake characteristics. In SE VA, some show Banded Water Snake color. Specimens along the Potomac may at times look like the species below but are not intergrades, simply aberrant. Earliest dated record 1871, N.S. Shaler, Monterey, Highland Co., VA.

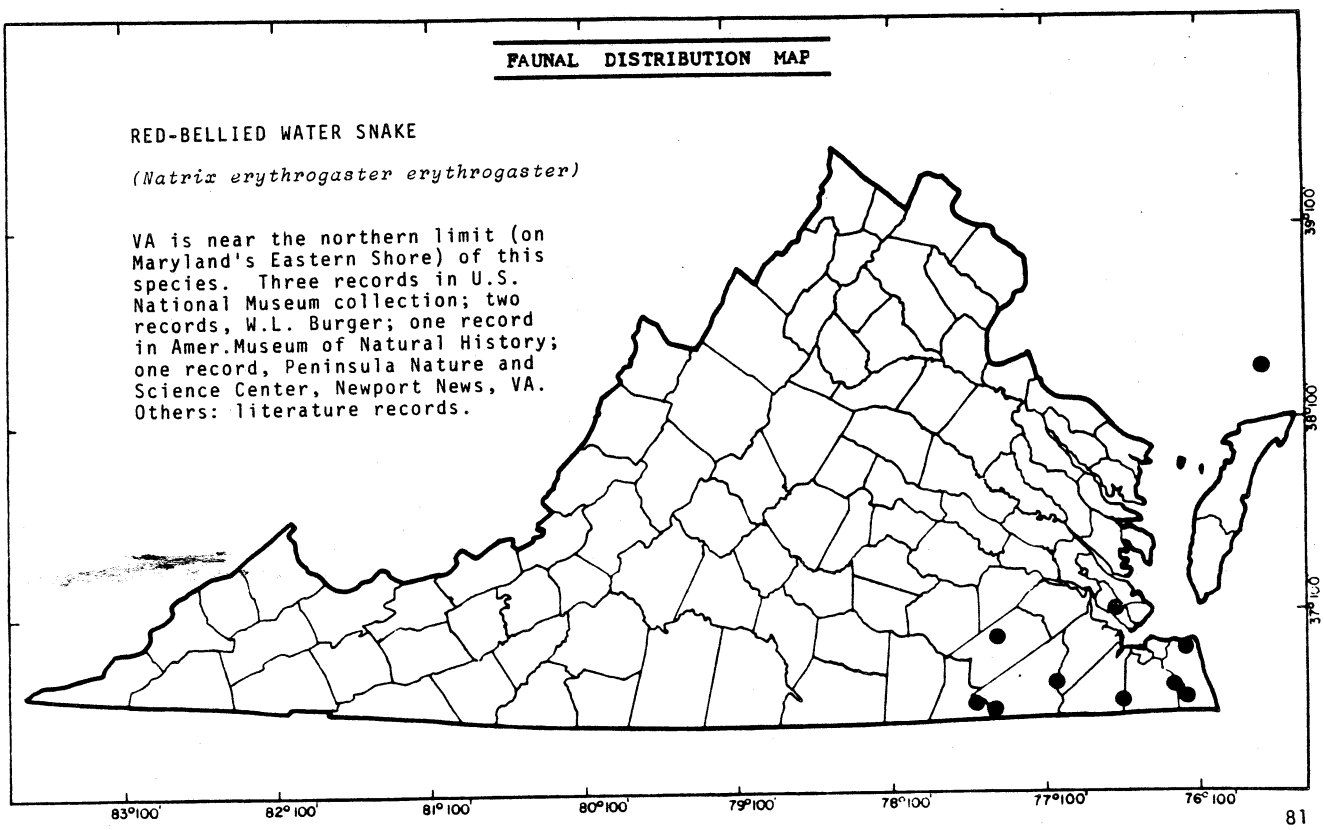


FAUNAL DISTRIBUTION MAP

RED-BELLIED WATER SNAKE

(Natrix erythrogaster erythrogaster)

VA is near the northern limit (on Maryland's Eastern Shore) of this species. Three records in U.S. National Museum collection; two records, W.L. Burger; one record in Amer.Museum of Natural History; one record, Peninsula Nature and Science Center, Newport News, VA. Others: literature records.

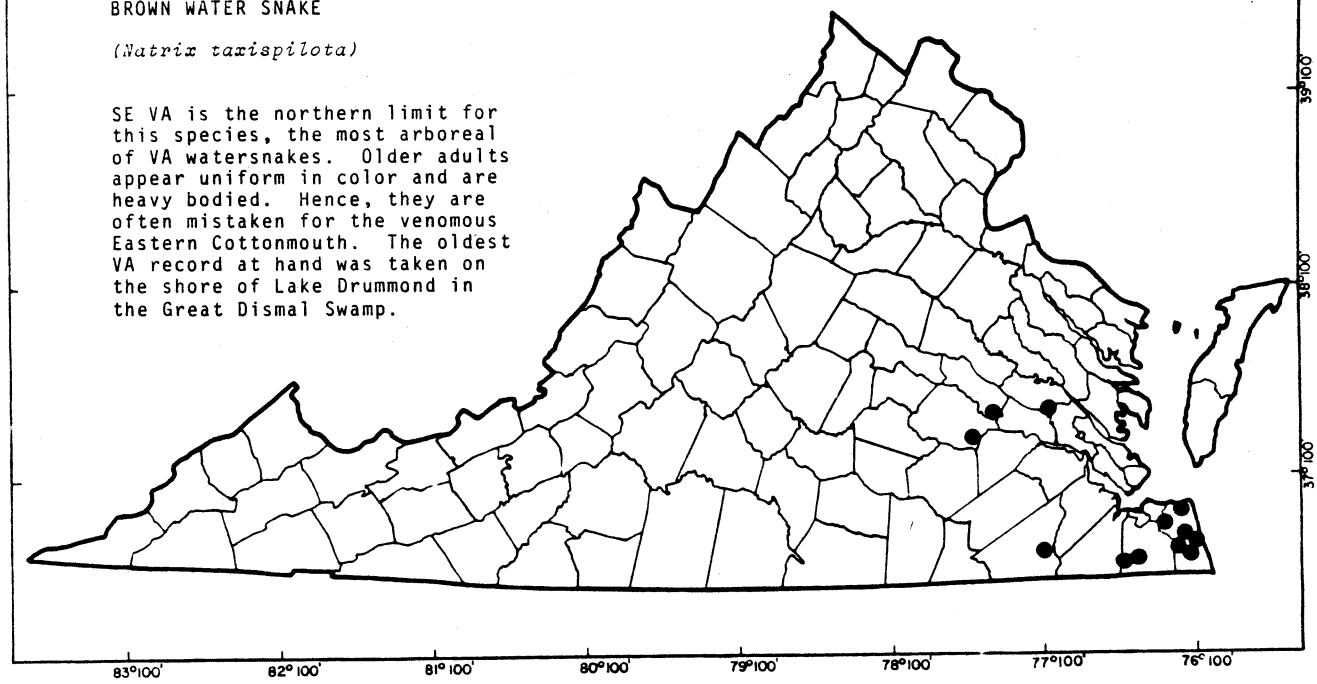


FAUNAL DISTRIBUTION MAP

BROWN WATER SNAKE

(Natrix taxispilota)

SE VA is the northern limit for this species, the most arboreal of VA watersnakes. Older adults appear uniform in color and are heavy bodied. Hence, they are often mistaken for the venomous Eastern Cottonmouth. The oldest VA record at hand was taken on the shore of Lake Drummond in the Great Dismal Swamp.



FAUNAL DISTRIBUTION MAP

QUEEN SNAKE

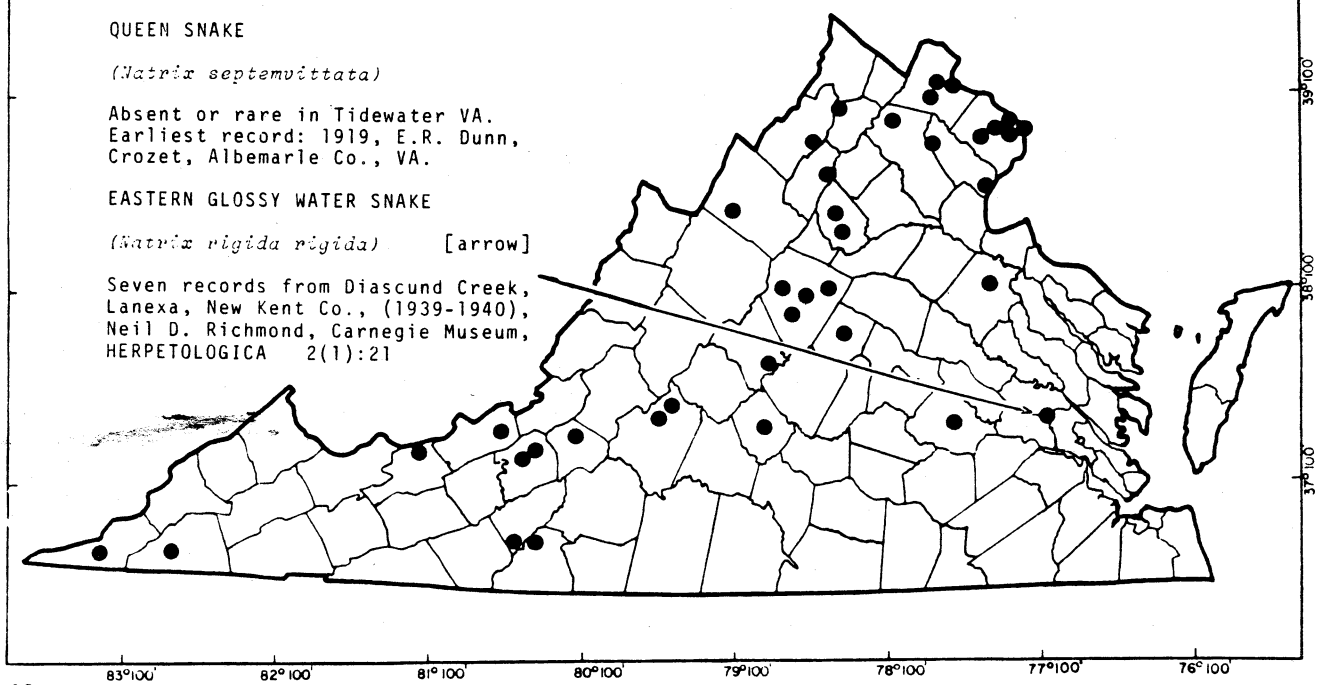
(Natrix septemvittata)

Absent or rare in Tidewater VA. Earliest record: 1919, E.R. Dunn, Crozet, Albemarle Co., VA.

EASTERN GLOSSY WATER SNAKE

(Natrix rigida rigida) [arrow]

Seven records from Diascund Creek, Lanexa, New Kent Co., (1939-1940), Neil D. Richmond, Carnegie Museum, HERPETOLOGICA 2(1):21

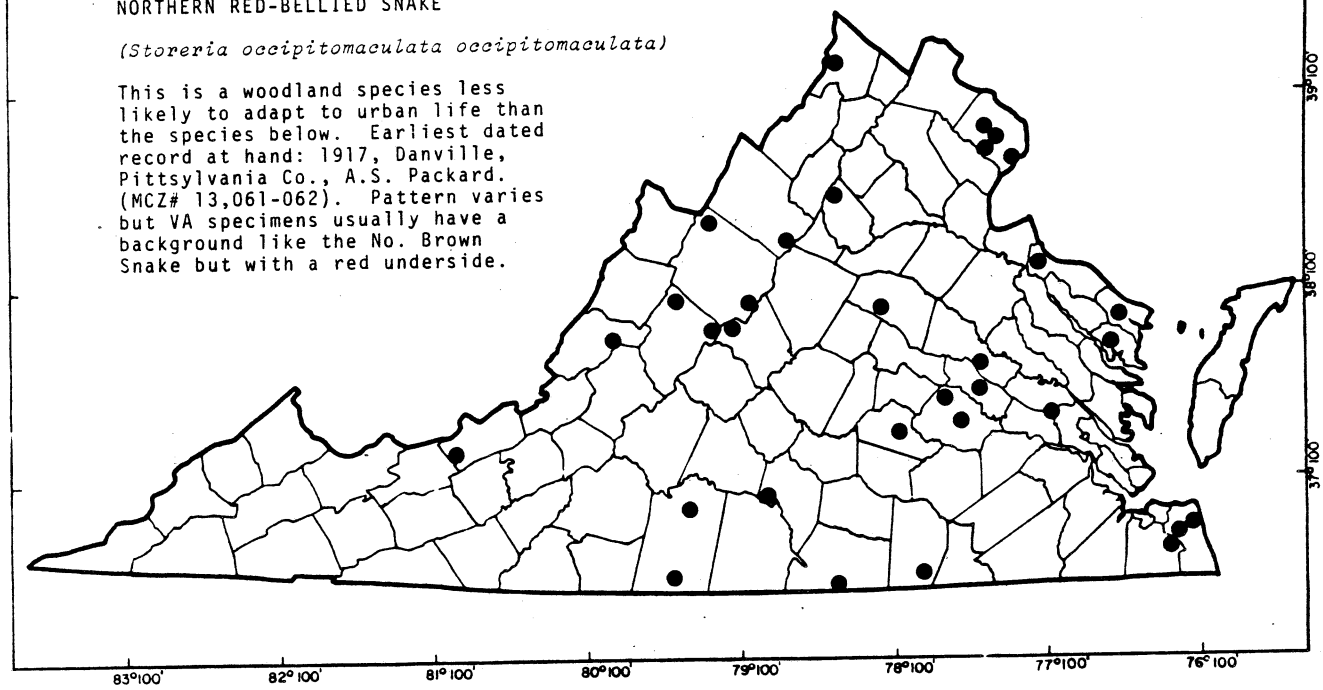


FAUNAL DISTRIBUTION MAP

NORTHERN RED-BELLIED SNAKE

(Storeria occipitomaculata occipitomaculata)

This is a woodland species less likely to adapt to urban life than the species below. Earliest dated record at hand: 1917, Danville, Pittsylvania Co., A.S. Packard. (MCZ# 13,061-062). Pattern varies but VA specimens usually have a background like the No. Brown Snake but with a red underside.

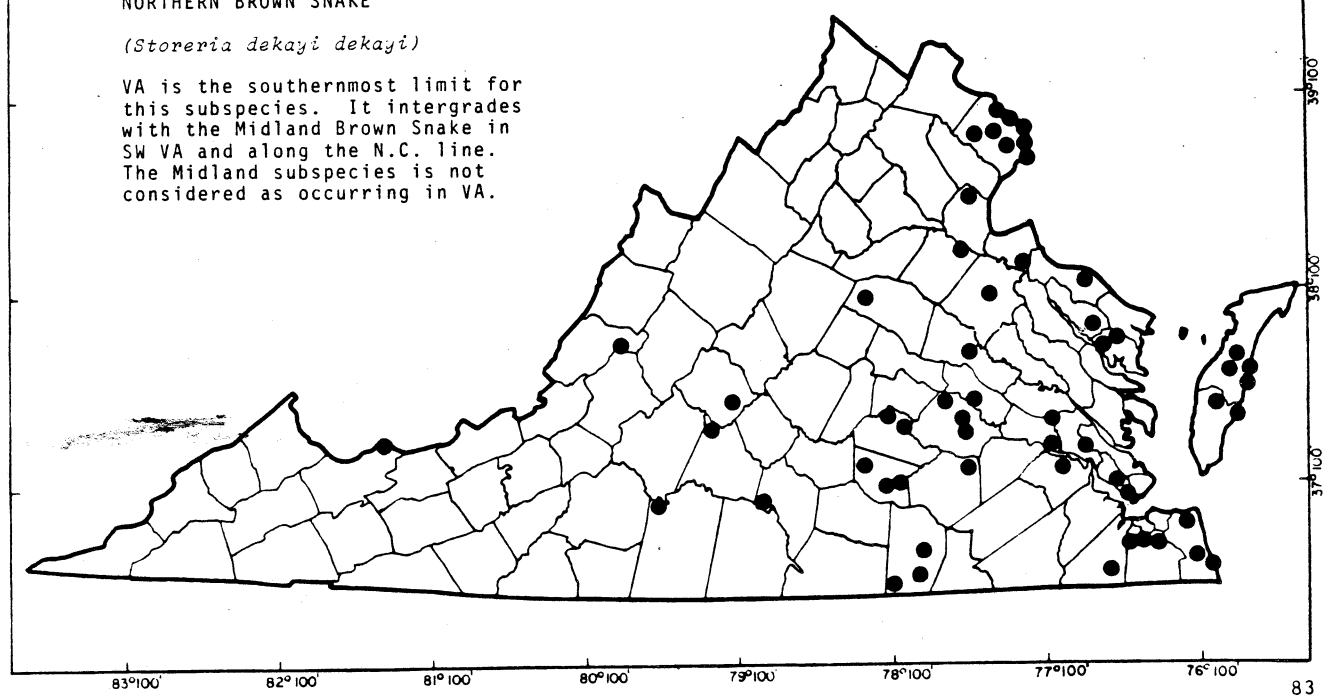


FAUNAL DISTRIBUTION MAP

NORTHERN BROWN SNAKE

(Storeria dekayi dekayi)

VA is the southernmost limit for this subspecies. It intergrades with the Midland Brown Snake in SW VA and along the N.C. line. The Midland subspecies is not considered as occurring in VA.

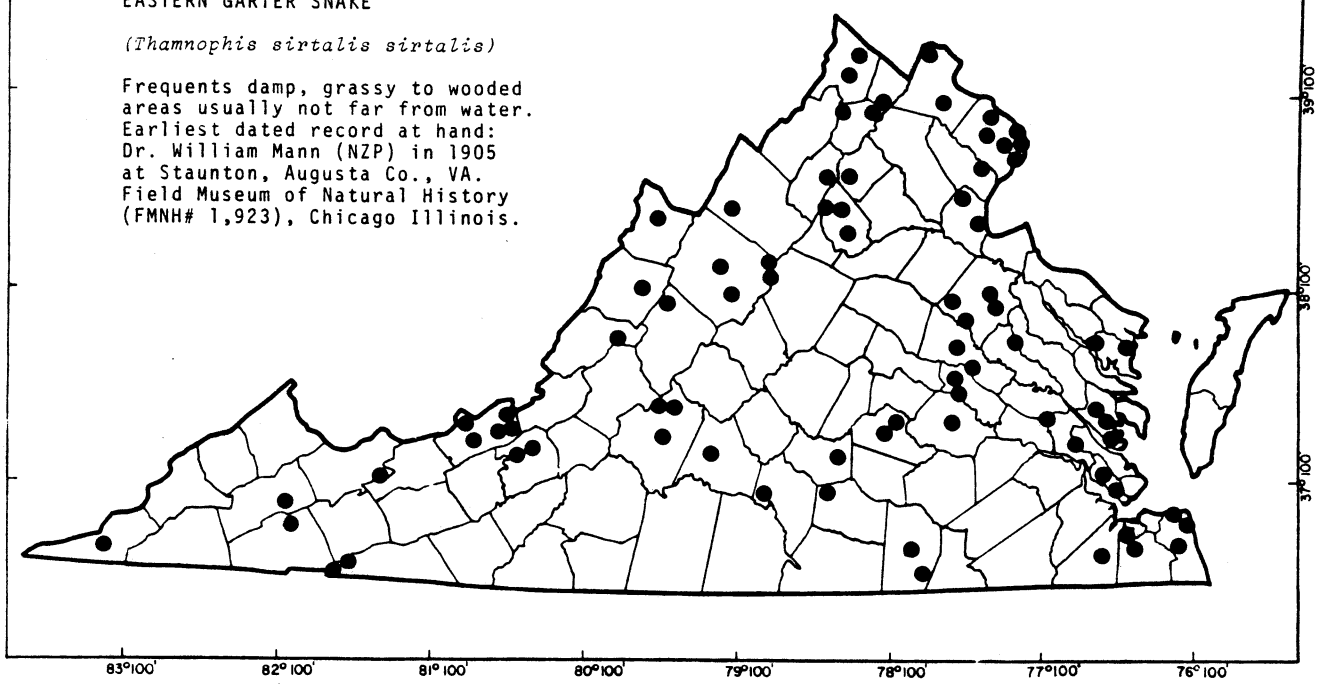


FAUNAL DISTRIBUTION MAP

EASTERN GARTER SNAKE

(Thamnophis sirtalis sirtalis)

Frequents damp, grassy to wooded areas usually not far from water. Earliest dated record at hand: Dr. William Mann (NZP) in 1905 at Staunton, Augusta Co., VA. Field Museum of Natural History (FMNH# 1,923), Chicago Illinois.

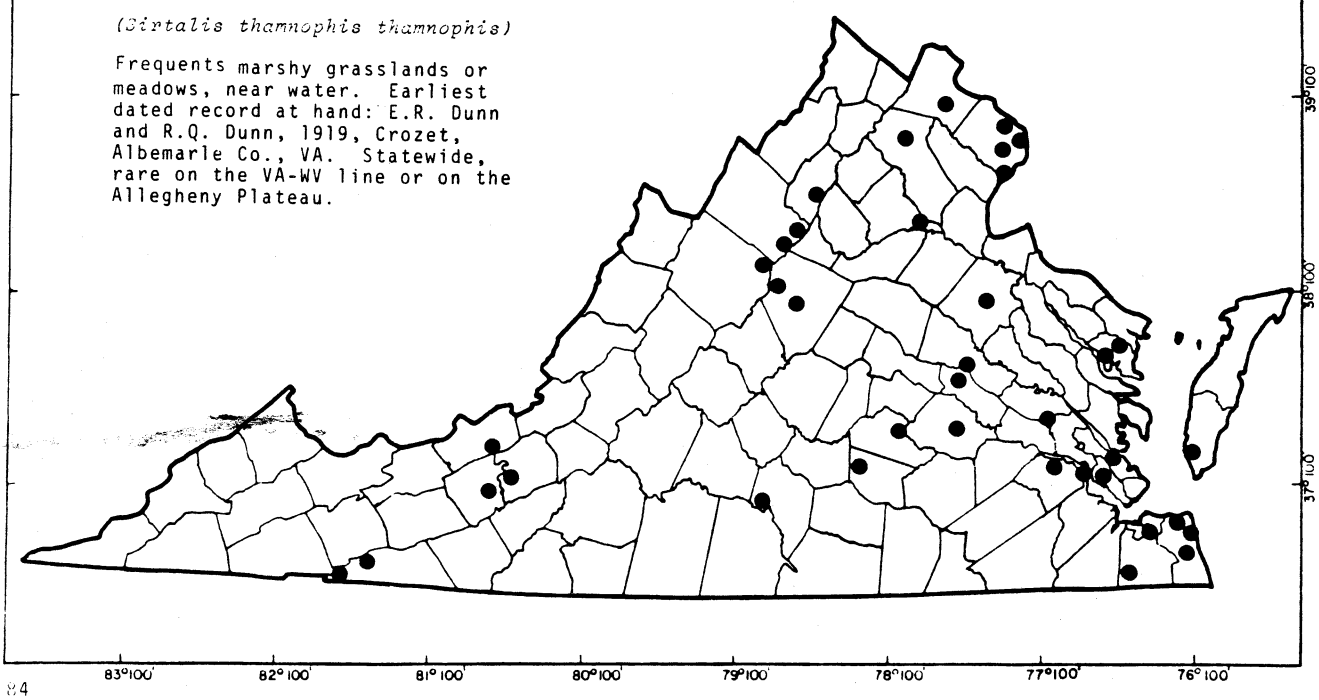


FAUNAL DISTRIBUTION MAP

EASTERN RIBBON SNAKE

(Sirtalis thamnophis thamnophis)

Frequents marshy grasslands or meadows, near water. Earliest dated record at hand: E.R. Dunn and R.Q. Dunn, 1919, Crozet, Albemarle Co., VA. Statewide, rare on the VA-WV line or on the Allegheny Plateau.

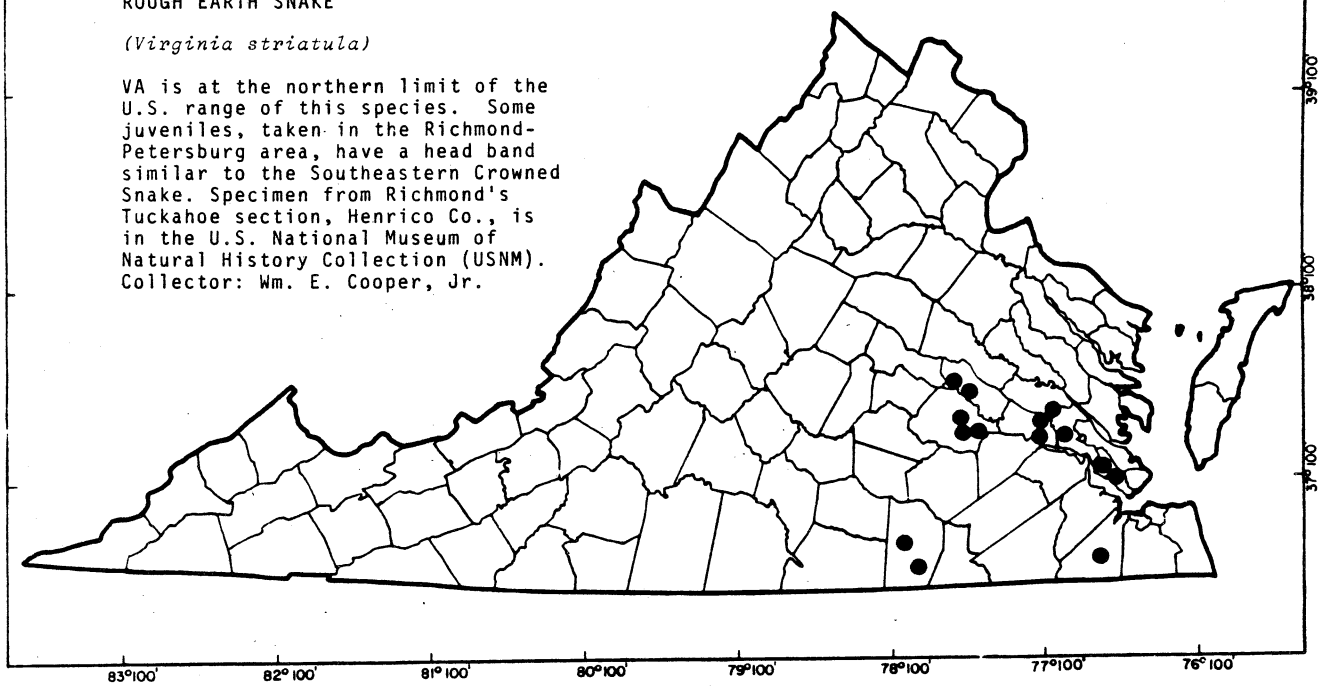


FAUNAL DISTRIBUTION MAP

ROUGH EARTH SNAKE

(Virginia striatula)

VA is at the northern limit of the U.S. range of this species. Some juveniles, taken in the Richmond-Petersburg area, have a head band similar to the Southeastern Crowned Snake. Specimen from Richmond's Tuckahoe section, Henrico Co., is in the U.S. National Museum of Natural History Collection (USNM). Collector: Wm. E. Cooper, Jr.



FAUNAL DISTRIBUTION MAP

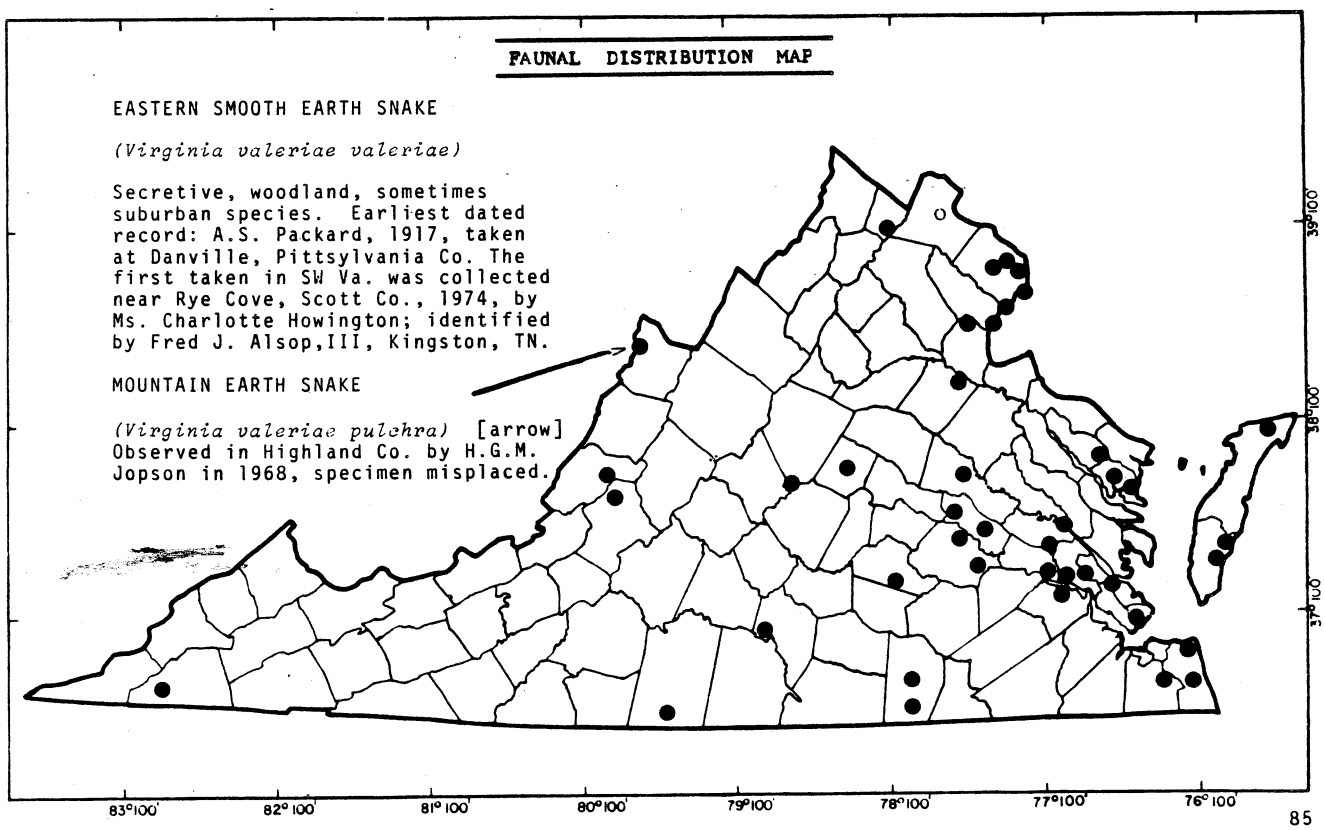
EASTERN SMOOTH EARTH SNAKE

(Virginia valeriae valeriae)

Secretive, woodland, sometimes suburban species. Earliest dated record: A.S. Packard, 1917, taken at Danville, Pittsylvania Co. The first taken in SW Va. was collected near Rye Cove, Scott Co., 1974, by Ms. Charlotte Howington; identified by Fred J. Alsop,III, Kingston, TN.

MOUNTAIN EARTH SNAKE

(Virginia valeriae pulchra) [arrow] Observed in Highland Co. by H.G.M. Jopson in 1968, specimen misplaced.

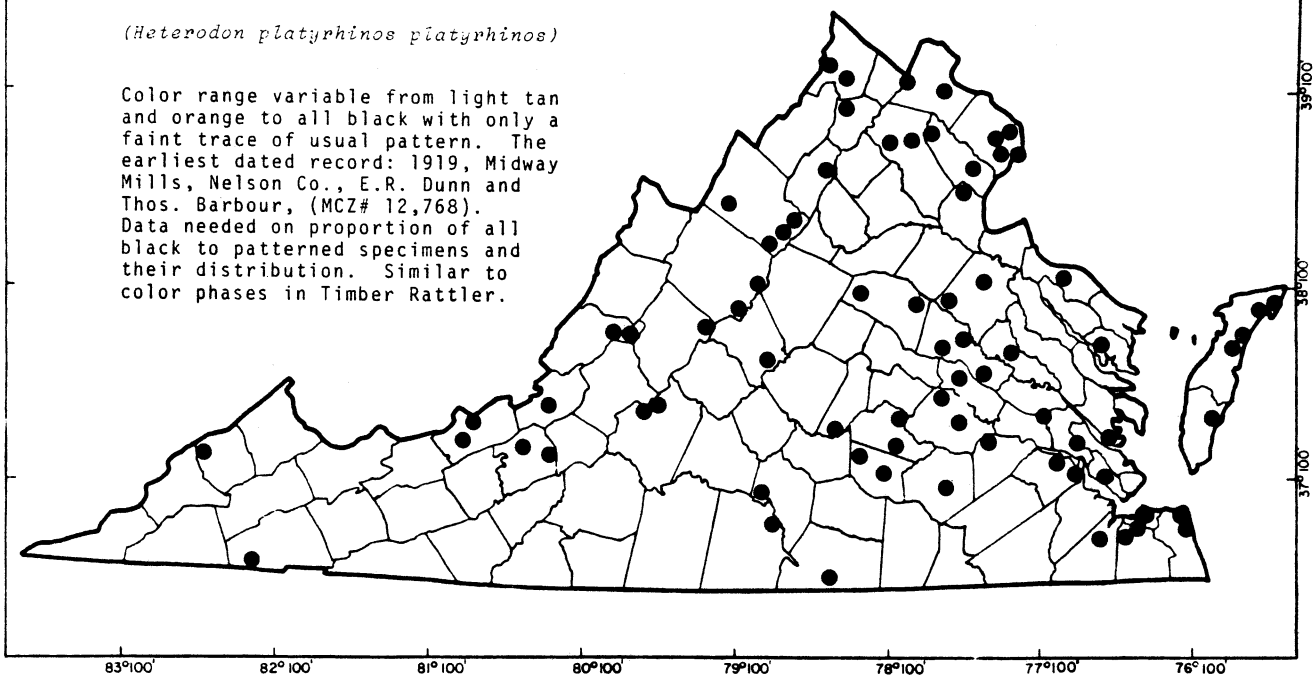


FAUNAL DISTRIBUTION MAP

EASTERN HOGNOSE SNAKE

(Heterodon platyrhinos platyrhinos)

Color range variable from light tan and orange to all black with only a faint trace of usual pattern. The earliest dated record: 1919, Midway Mills, Nelson Co., E.R. Dunn and Thos. Barbour, (MCZ# 12,768). Data needed on proportion of all black to patterned specimens and their distribution. Similar to color phases in Timber Rattler.

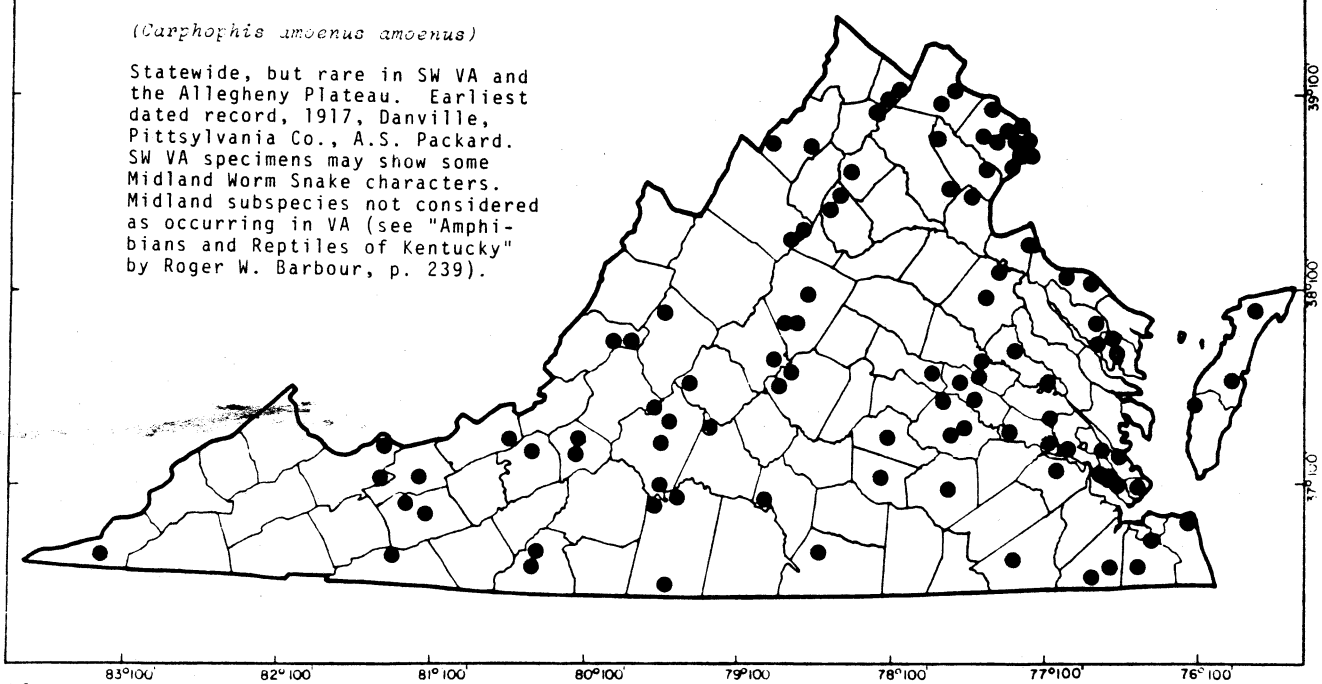


FAUNAL DISTRIBUTION MAP

EASTERN WORM SNAKE

(Carphophis amoenus amoenus)

Statewide, but rare in SW VA and the Allegheny Plateau. Earliest dated record, 1917, Danville, Pittsylvania Co., A.S. Packard. SW VA specimens may show some Midland Worm Snake characters. Midland subspecies not considered as occurring in VA (see "Amphibians and Reptiles of Kentucky" by Roger W. Barbour, p. 239).

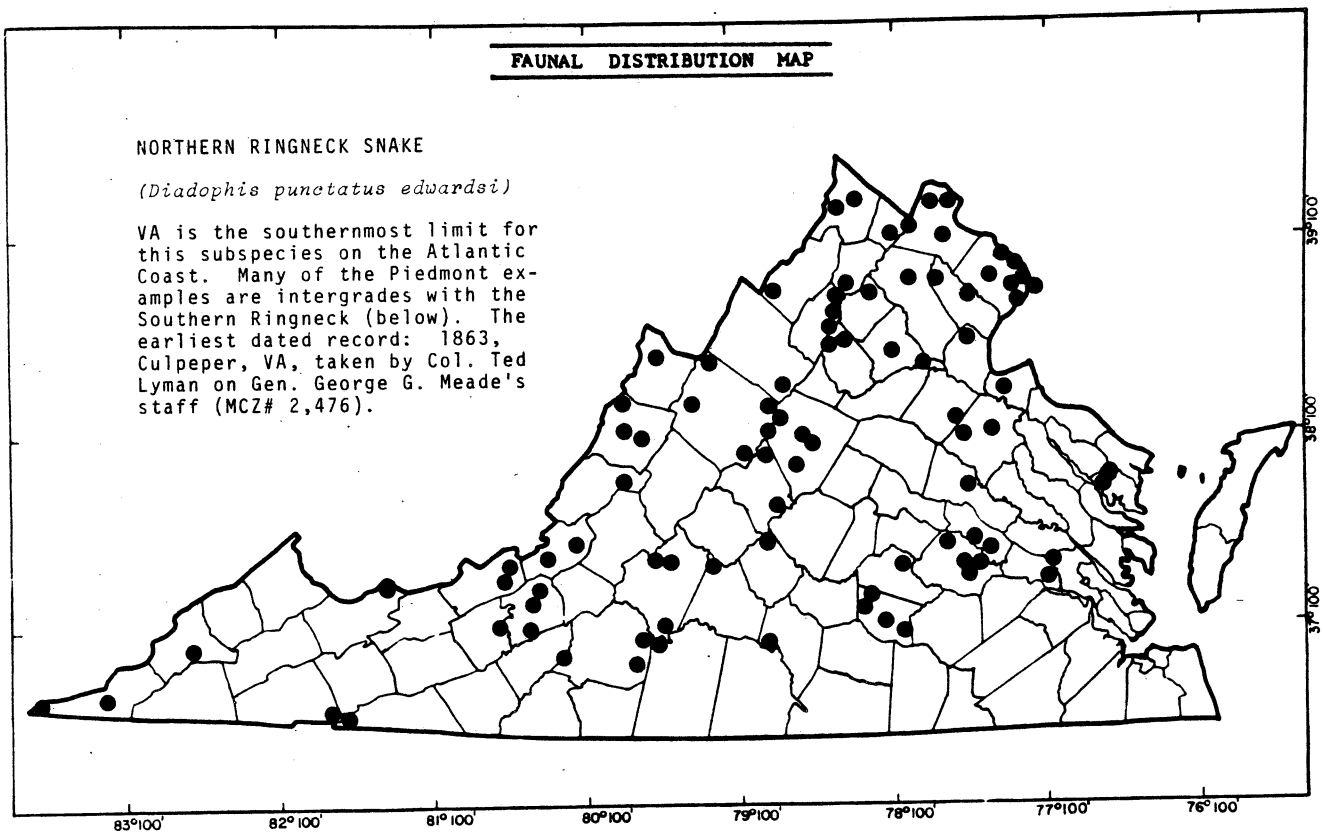


FAUNAL DISTRIBUTION MAP

NORTHERN RINGNECK SNAKE

(Diadophis punctatus edwardsi)

VA is the southernmost limit for this subspecies on the Atlantic Coast. Many of the Piedmont examples are intergrades with the Southern Ringneck (below). The earliest dated record: 1863, Culpeper, VA, taken by Col. Ted Lyman on Gen. George G. Meade's staff (MCZ# 2,476).

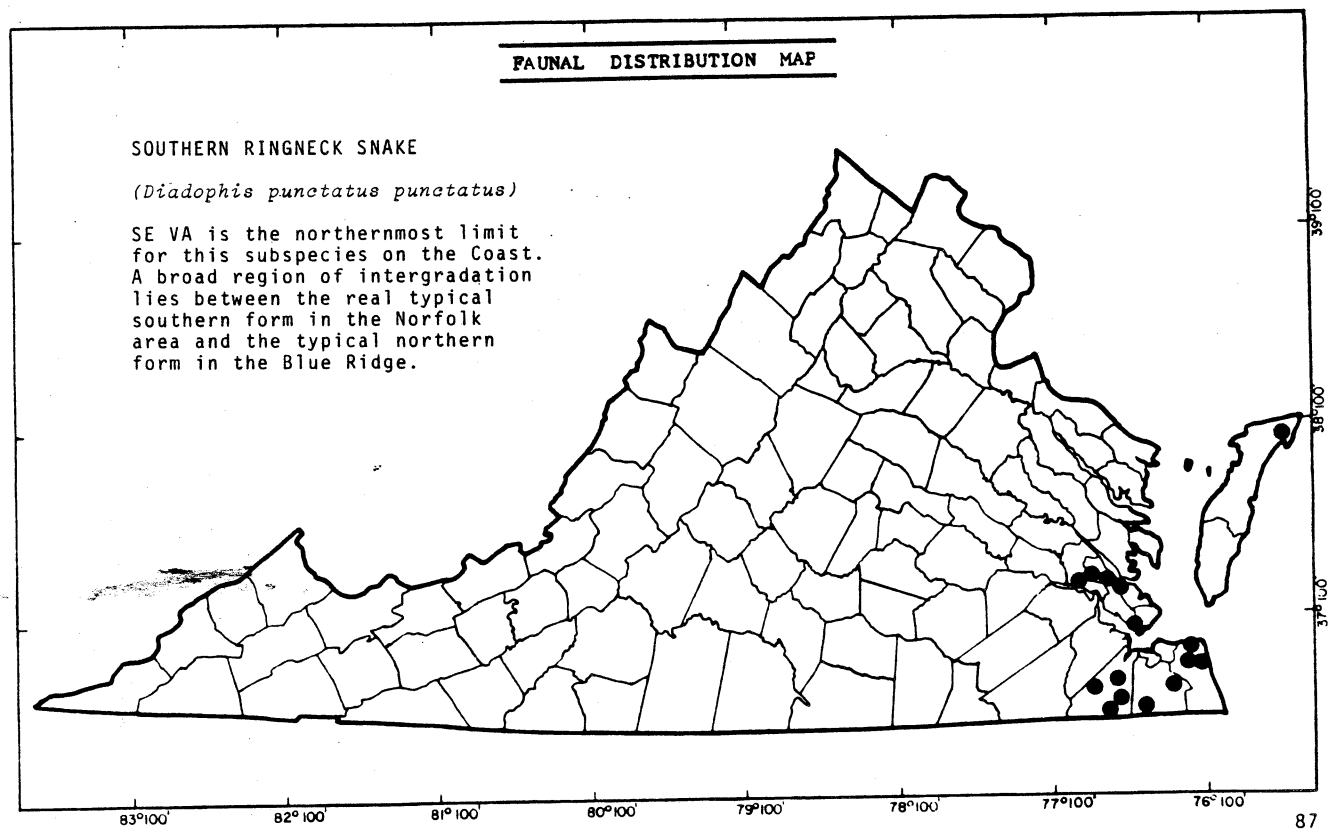


FAUNAL DISTRIBUTION MAP

SOUTHERN RINGNECK SNAKE

(Diadophis punctatus punctatus)

SE VA is the northernmost limit for this subspecies on the Coast. A broad region of intergradation lies between the real typical southern form in the Norfolk area and the typical northern form in the Blue Ridge.

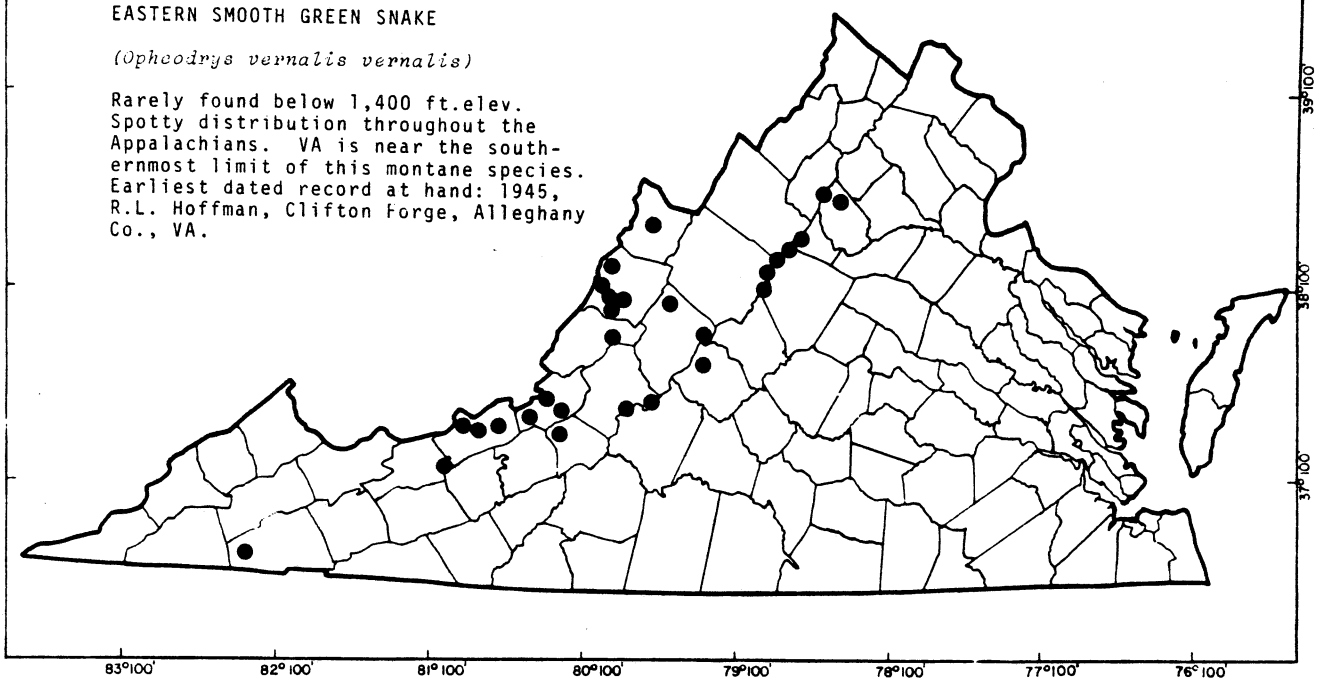


FAUNAL DISTRIBUTION MAP

EASTERN SMOOTH GREEN SNAKE

(Opheodrys vernalis vernalis)

Rarely found below 1,400 ft.elev. Spotty distribution throughout the Appalachians. VA is near the southernmost limit of this montane species. Earliest dated record at hand: 1945, R.L. Hoffman, Clifton Forge, Alleghany Co., VA.

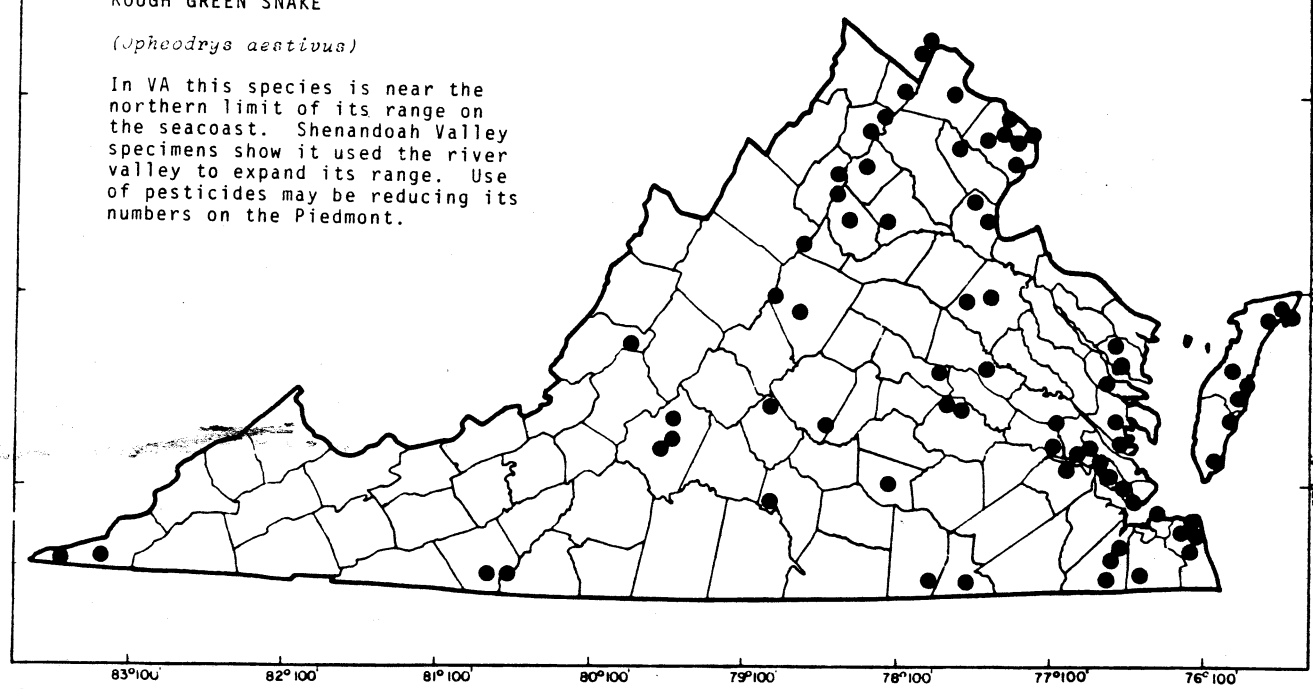


FAUNAL DISTRIBUTION MAP

ROUGH GREEN SNAKE

(Opheodrys aestivus)

In VA this species is near the northern limit of its range on the seacoast. Shenandoah Valley specimens show it used the river valley to expand its range. Use of pesticides may be reducing its numbers on the Piedmont.

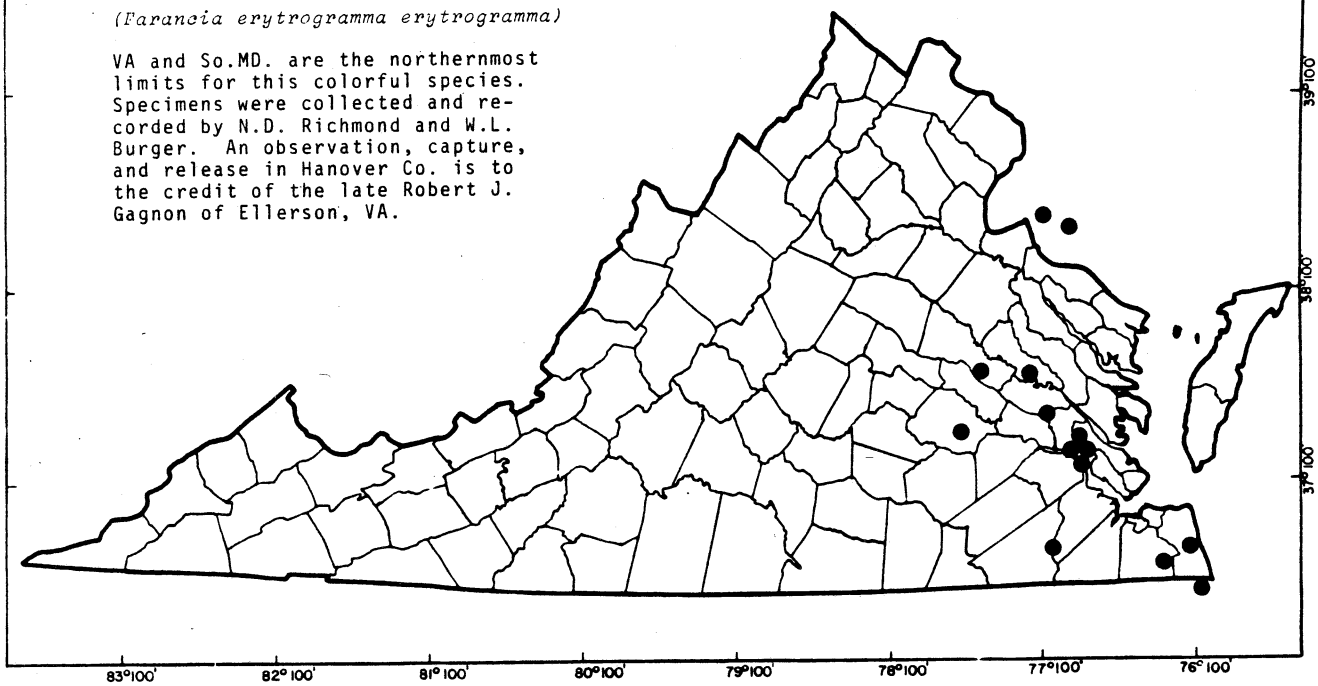


FAUNAL DISTRIBUTION MAP

RAINBOW SNAKE

(Farancia erytrogramma erytrogramma)

VA and So.MD. are the northernmost limits for this colorful species. Specimens were collected and recorded by N.D. Richmond and W.L. Burger. An observation, capture, and release in Hanover Co. is to the credit of the late Robert J. Gagnon of Ellerson, VA.

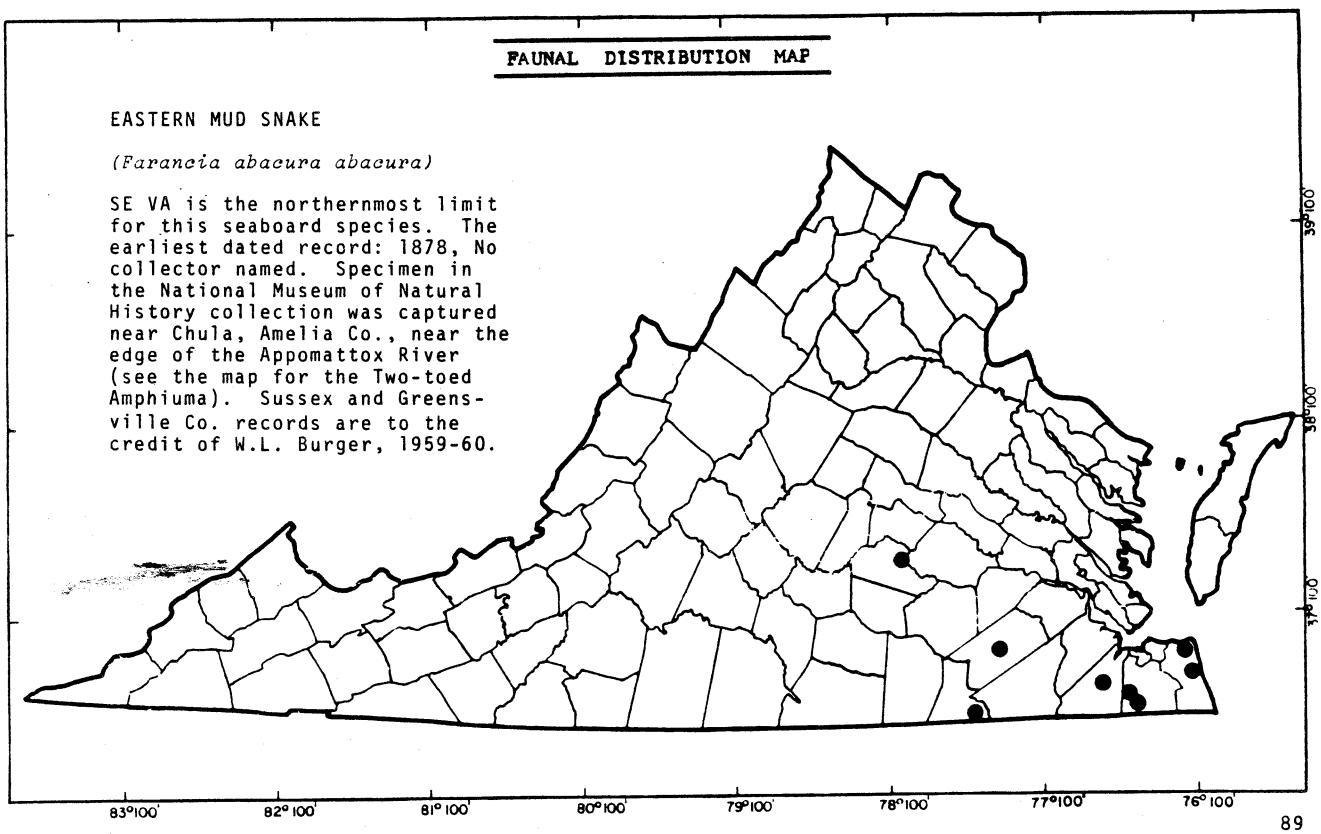


FAUNAL DISTRIBUTION MAP

EASTERN MUD SNAKE

(Farancia abacura abacura)

SE VA is the northernmost limit for this seaboard species. The earliest dated record: 1878, No collector named. Specimen in the National Museum of Natural History collection was captured near Chula, Amelia Co., near the edge of the Appomattox River (see the map for the Two-toed Amphiuma). Sussex and Greensville Co. records are to the credit of W.L. Burger, 1959-60.



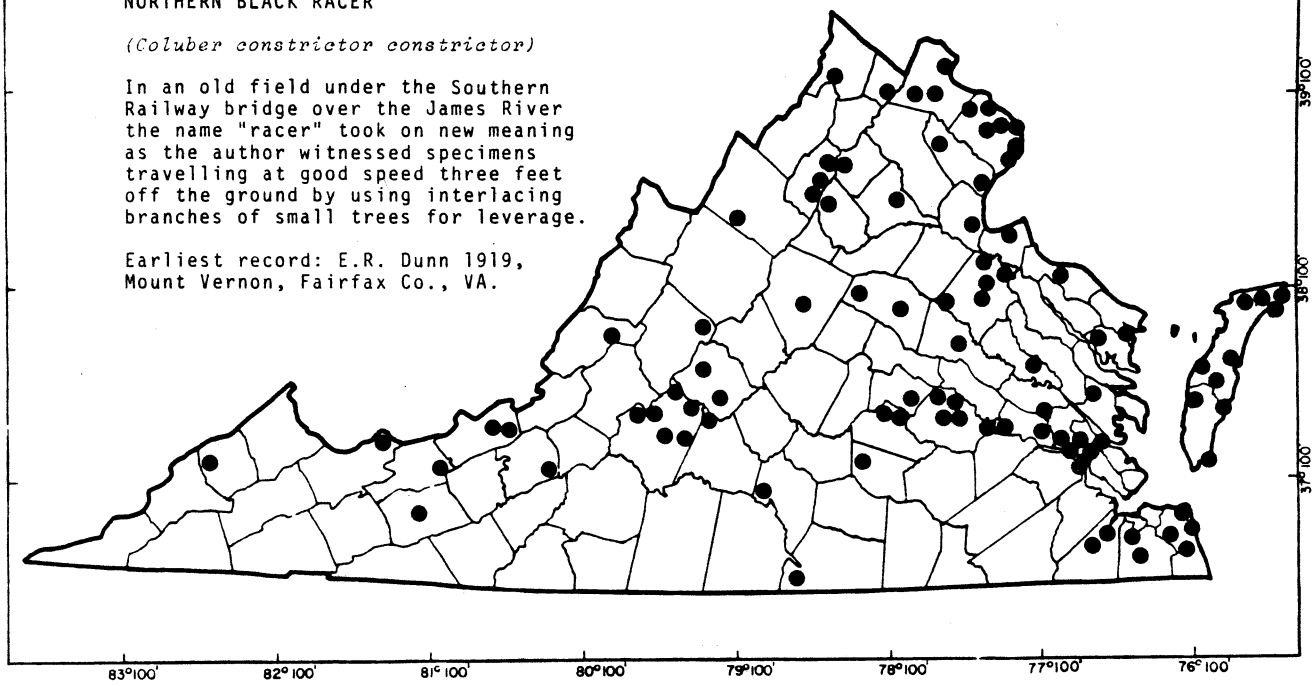
FAUNAL DISTRIBUTION MAP

NORTHERN BLACK RACER

(Coluber constrictor constrictor)

In an old field under the Southern Railway bridge over the James River the name "racer" took on new meaning as the author witnessed specimens travelling at good speed three feet off the ground by using interlacing branches of small trees for leverage.

Earliest record: E.R. Dunn 1919, Mount Vernon, Fairfax Co., VA.

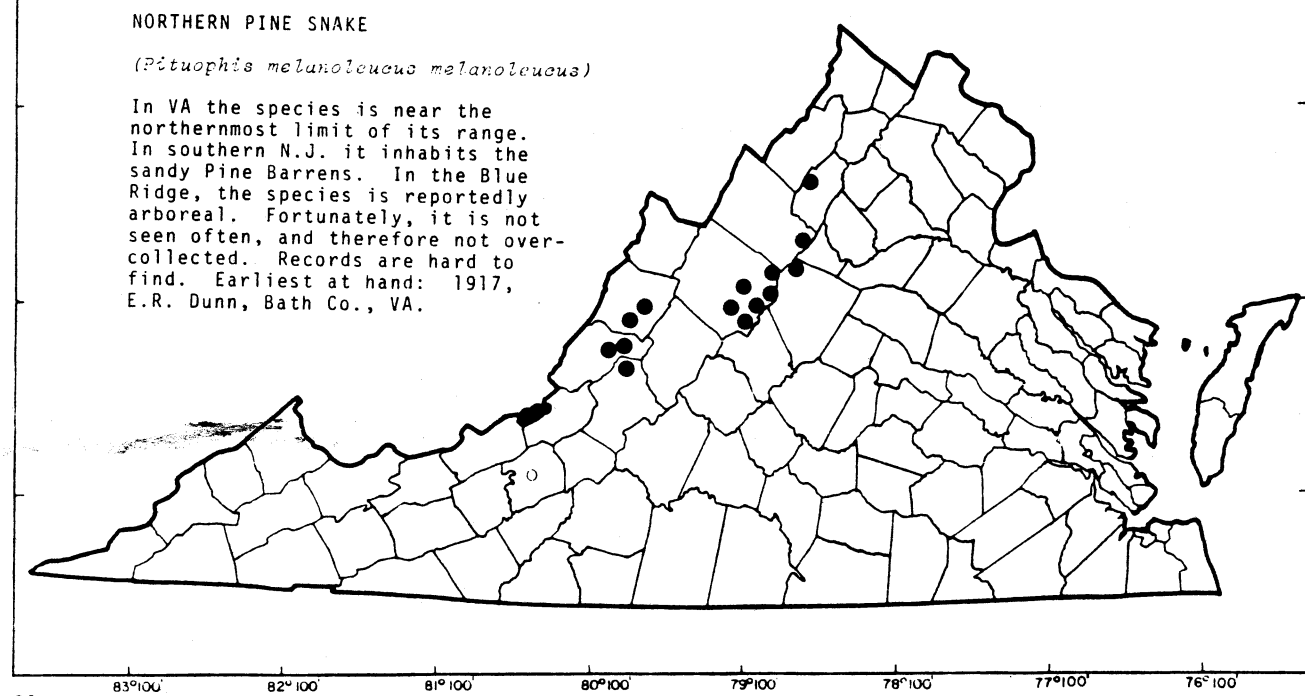


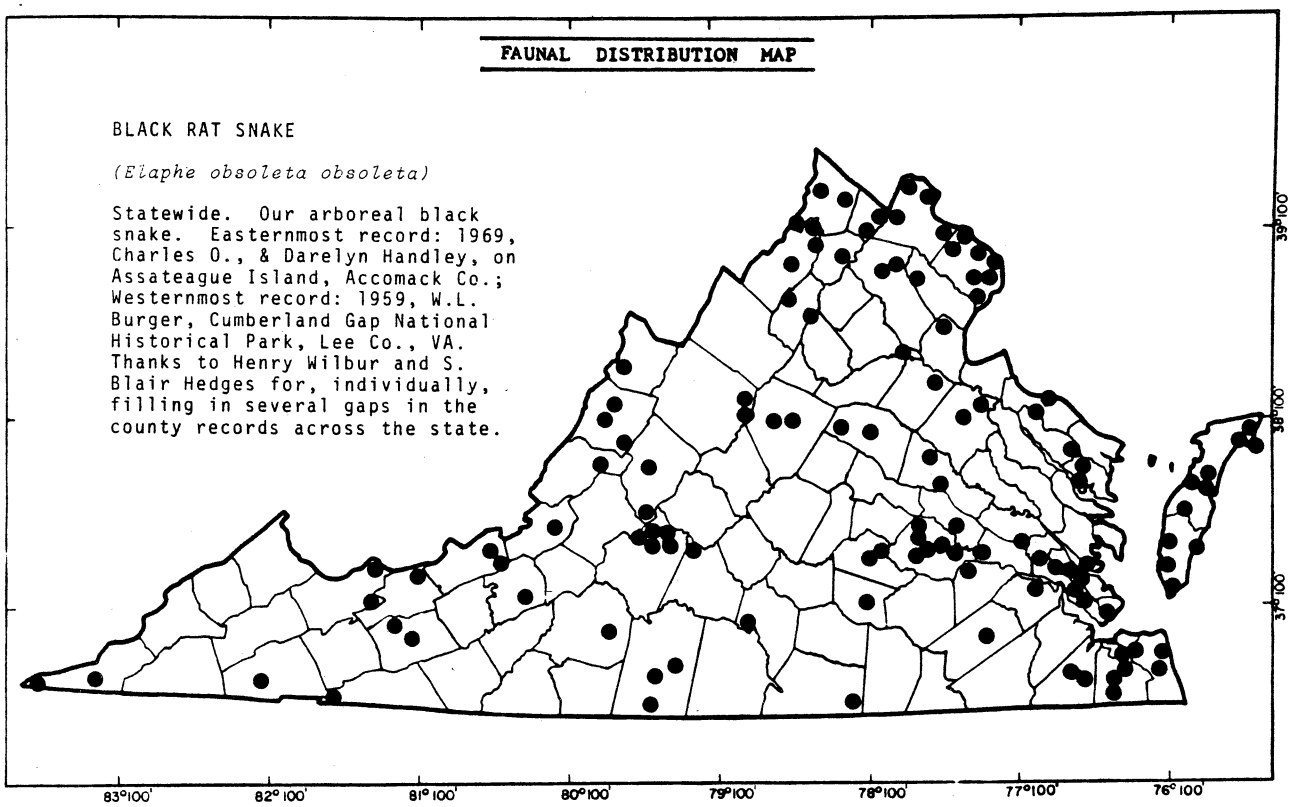
FAUNAL DISTRIBUTION MAP

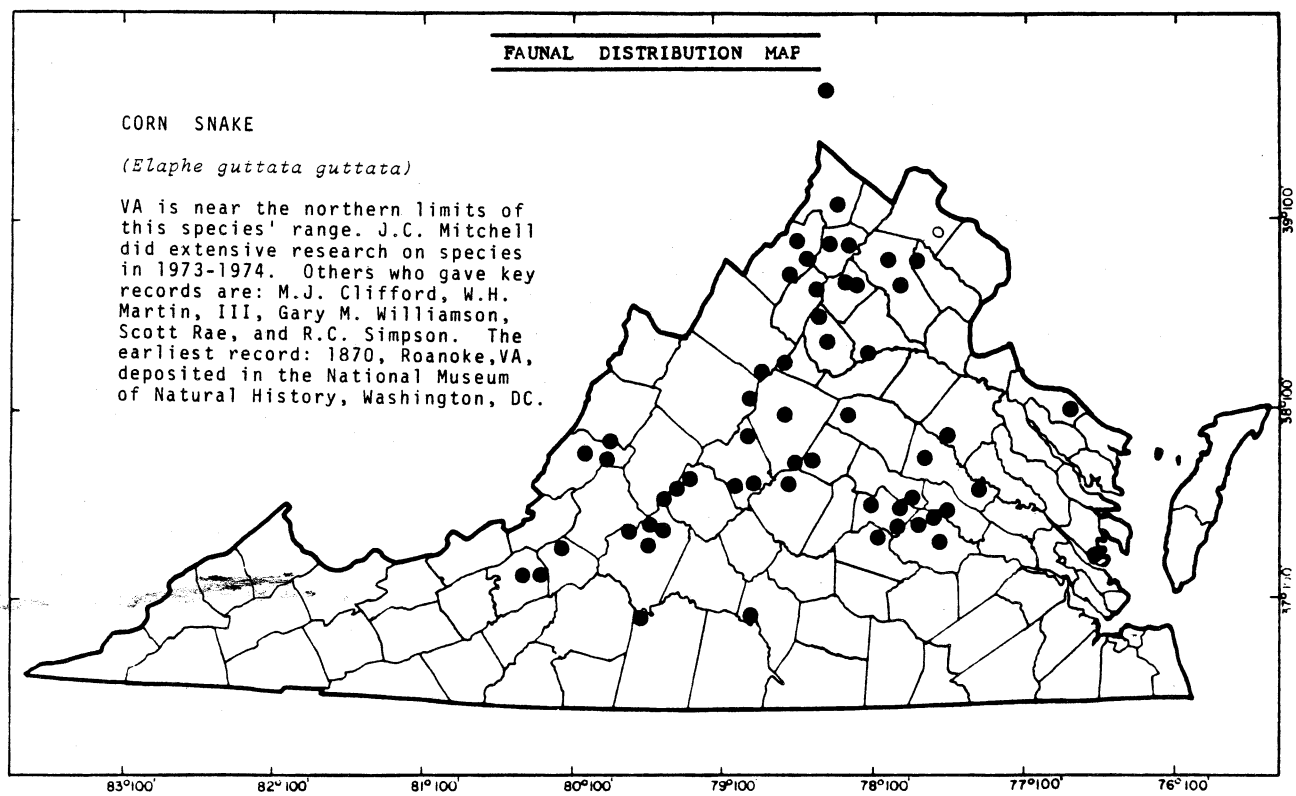
NORTHERN PINE SNAKE

(Pituophis melanoleucus melanoleucus)

In VA the species is near the northernmost limit of its range. In southern N.J. it inhabits the sandy Pine Barrens. In the Blue Ridge, the species is reportedly arboreal. Fortunately, it is not seen often, and therefore not over-collected. Records are hard to find. Earliest at hand: 1917, E.R. Dunn, Bath Co., VA.




FAUNAL DISTRIBUTION MAP
BLACK RAT SNAKE
(Elaphe obsoleta obsoleta)
Statewide. Our arboreal black snake. Easternmost record: 1969, Charles O., & Darelyn Handley, on Assateague Island, Accomack Co.; Westernmost record: 1959, W.L. Burger, Cumberland Gap National Historical Park, Lee Co., VA. Thanks to Henry Wilbur and S. Blair Hedges for, individually, filling in several gaps in the county records across the state.
39°100'
38°100'
37°100'
83°100'
82°100'
81°100'
80°100'
79°100'
78°100'
77°100'
76°100'

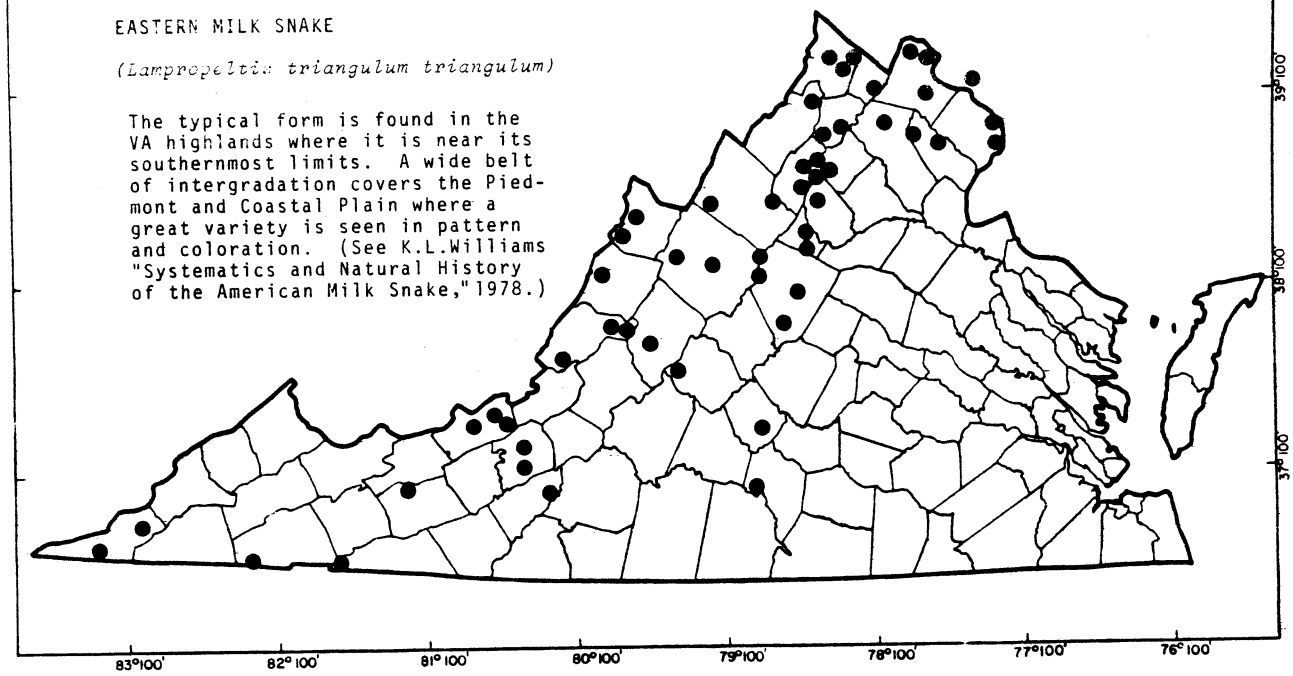

FAUNAL DISTRIBUTION MAP
CORN SNAKE
(Elaphe guttata guttata)
VA is near the northern limits of this species' range. J.C. Mitchell did extensive research on species in 1973-1974. Others who gave key records are: M.J. Clifford, W.H. Martin, III, Gary M. Williamson, Scott Rae, and R.C. Simpson. The earliest record: 1870, Roanoke,VA, deposited in the National Museum of Natural History, Washington, DC.
39°100'
38°100'
83°100'
82°100'
81°100'
80°100'
79°100'
78°100'
77°100'
76°100'

FAUNAL DISTRIBUTION MAP

EASTERN MILK SNAKE

(Lampropeltis triangulum triangulum)

The typical form is found in the VA highlands where it is near its southernmost limits. A wide belt of intergradation covers the Piedmont and Coastal Plain where a great variety is seen in pattern and coloration. (See K.L.Williams "Systematics and Natural History of the American Milk Snake," 1978.)

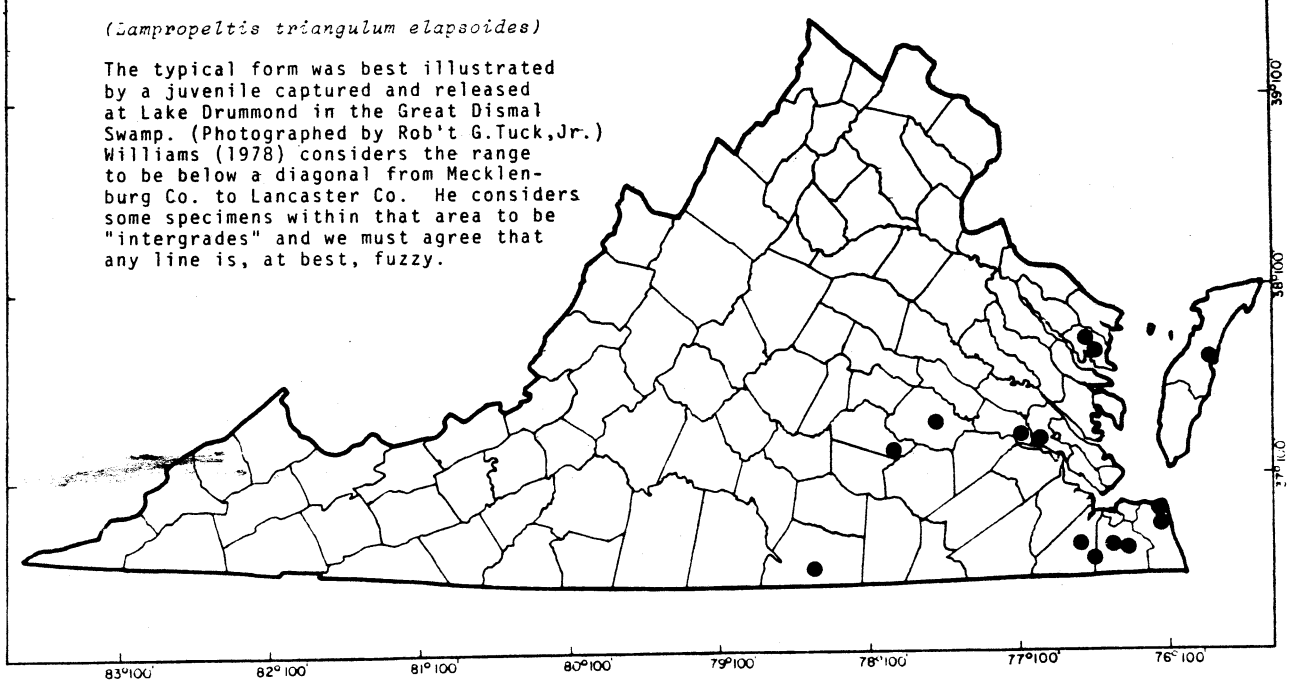


FAUNAL DISTRIBUTION MAP

SCARLET KINGSNAKE

(Lampropeltis triangulum elapsoides)

The typical form was best illustrated by a juvenile captured and released at Lake Drummond in the Great Dismal Swamp. (Photographed by Rob't G.Tuck,Jr.) Williams (1978) considers the range to be below a diagonal from Mecklenburg Co. to Lancaster Co. He considers some specimens within that area to be "intergrades" and we must agree that any line is, at best, fuzzy.

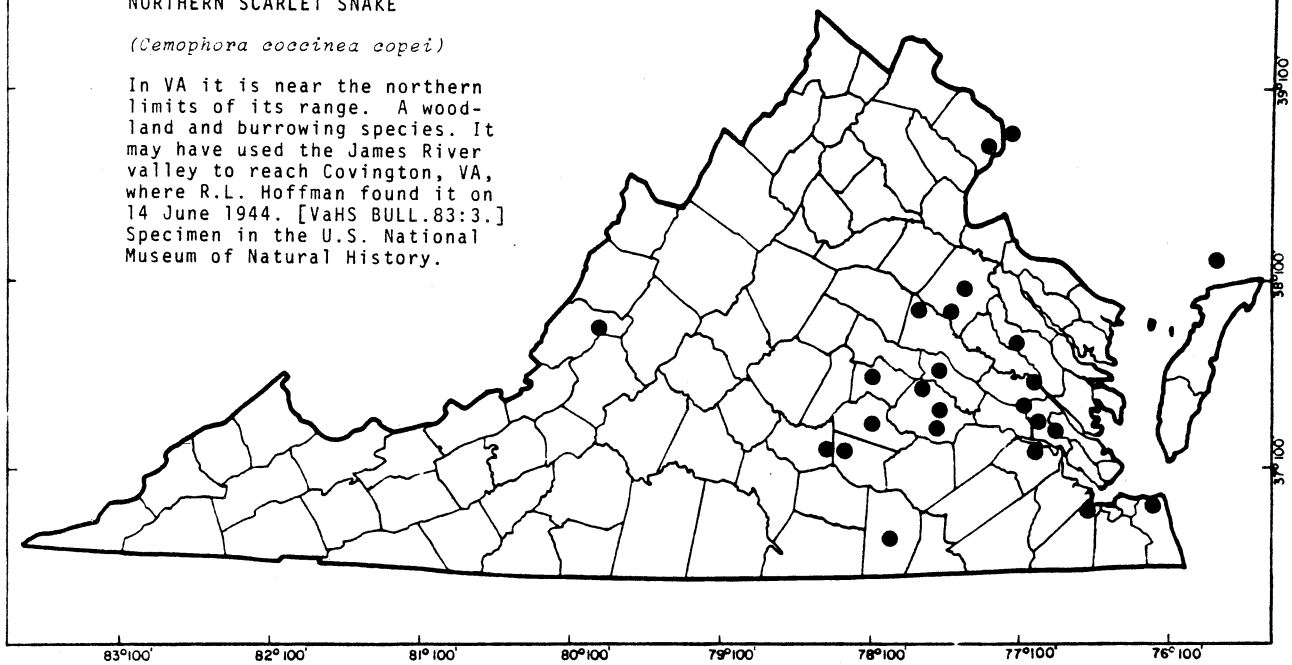


FAUNAL DISTRIBUTION MAP

NORTHERN SCARLET SNAKE

(Cemophora coccinea copei)

In VA it is near the northern limits of its range. A woodland and burrowing species. It may have used the James River valley to reach Covington, VA, where R.L. Hoffman found it on 14 June 1944. [VaHS BULL.83:3.] Specimen in the U.S. National Museum of Natural History.

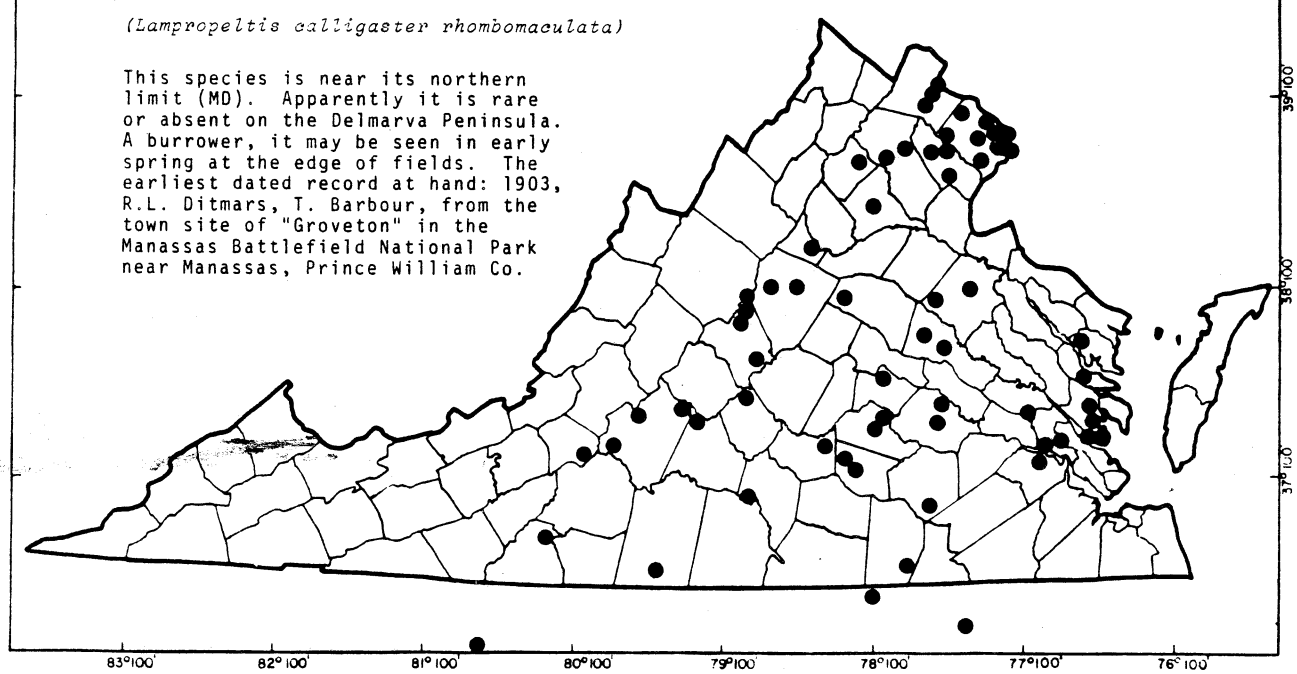


FAUNAL DISTRIBUTION MAP

MOLE SNAKE

(Lampropeltis calligaster rhombomaculata)

This species is near its northern limit (MD). Apparently it is rare or absent on the Delmarva Peninsula. A burrower, it may be seen in early spring at the edge of fields. The earliest dated record at hand: 1903, R.L. Ditmars, T. Barbour, from the town site of "Groveton" in the Manassas Battlefield National Park near Manassas, Prince William Co.



FAUNAL DISTRIBUTION MAP

EASTERN KINGSNAKE

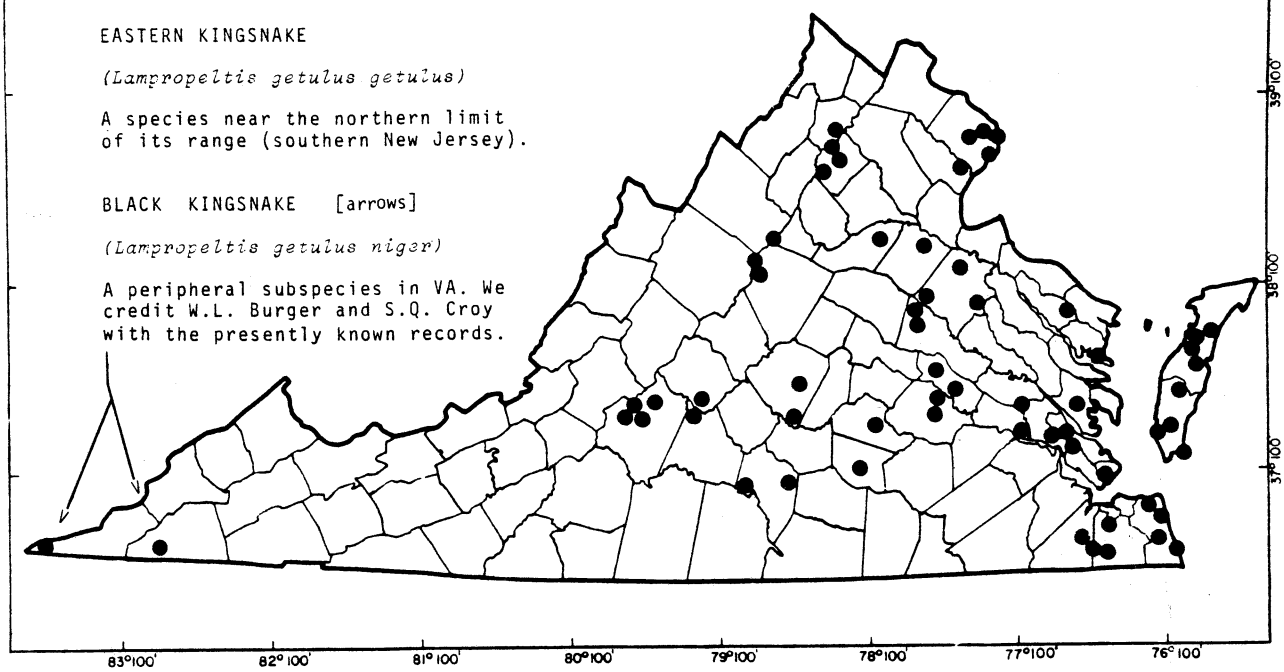
(Lampropeltis getulus getulus)

A species near the northern limit of its range (southern New Jersey).

BLACK KINGSNAKE [arrows]

(Lampropeltis getulus niger)

A peripheral subspecies in VA. We credit W.L. Burger and S.Q. Croy with the presently known records.

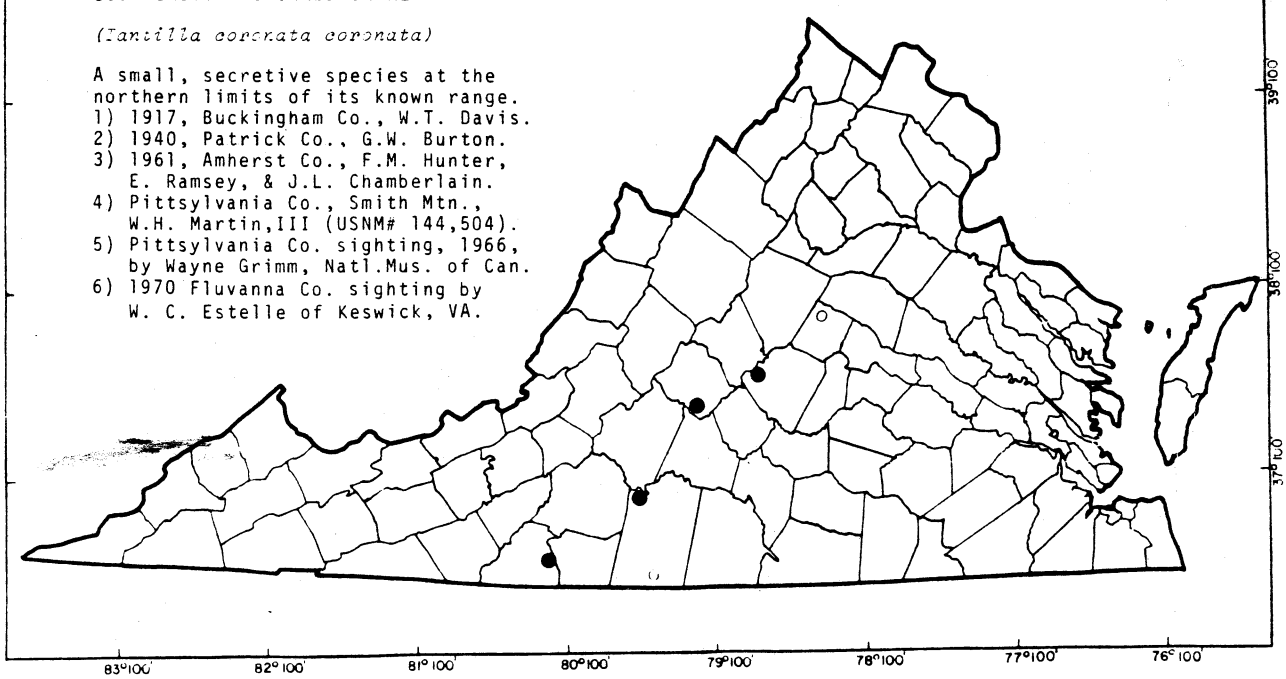


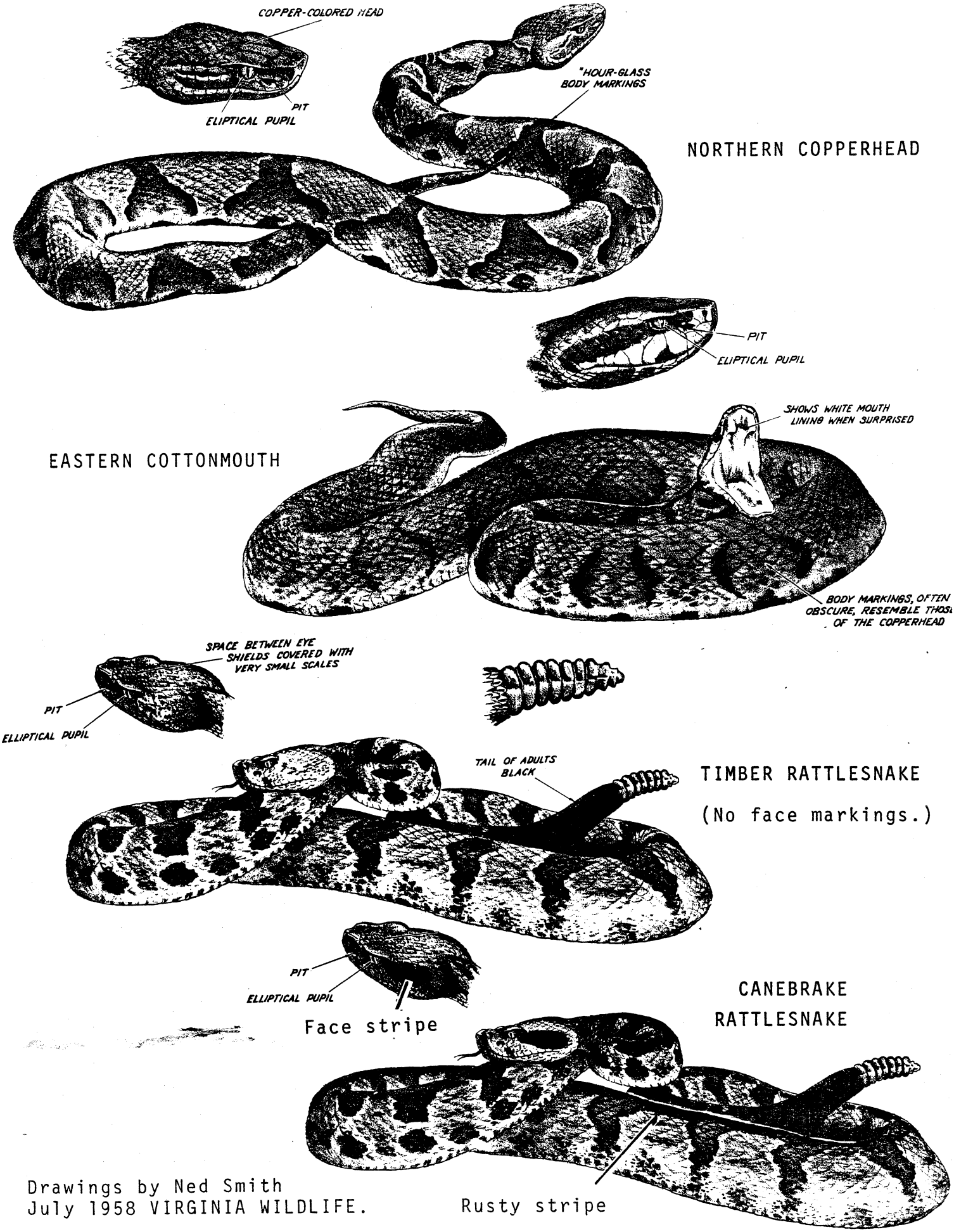
FAUNAL DISTRIBUTION MAP

SOUTHEASTERN CROWNED SNAKE

(Tantilla coronata coronata)

A small, secretive species at the northern limits of its known range.
1) 1917, Buckingham Co., W.T. Davis.
2) 1940, Patrick Co., G.W. Burton.
3) 1961, Amherst Co., F.M. Hunter, E. Ramsey, & J.L. Chamberlain.
4) Pittsylvania Co., Smith Mtn., W.H. Martin,III (USNM# 144,504).
5) Pittsylvania Co. sighting, 1966, by Wayne Grimm, Natl.Mus. of Can.
6) 1970 Fluvanna Co. sighting by W. C. Estelle of Keswick, VA.





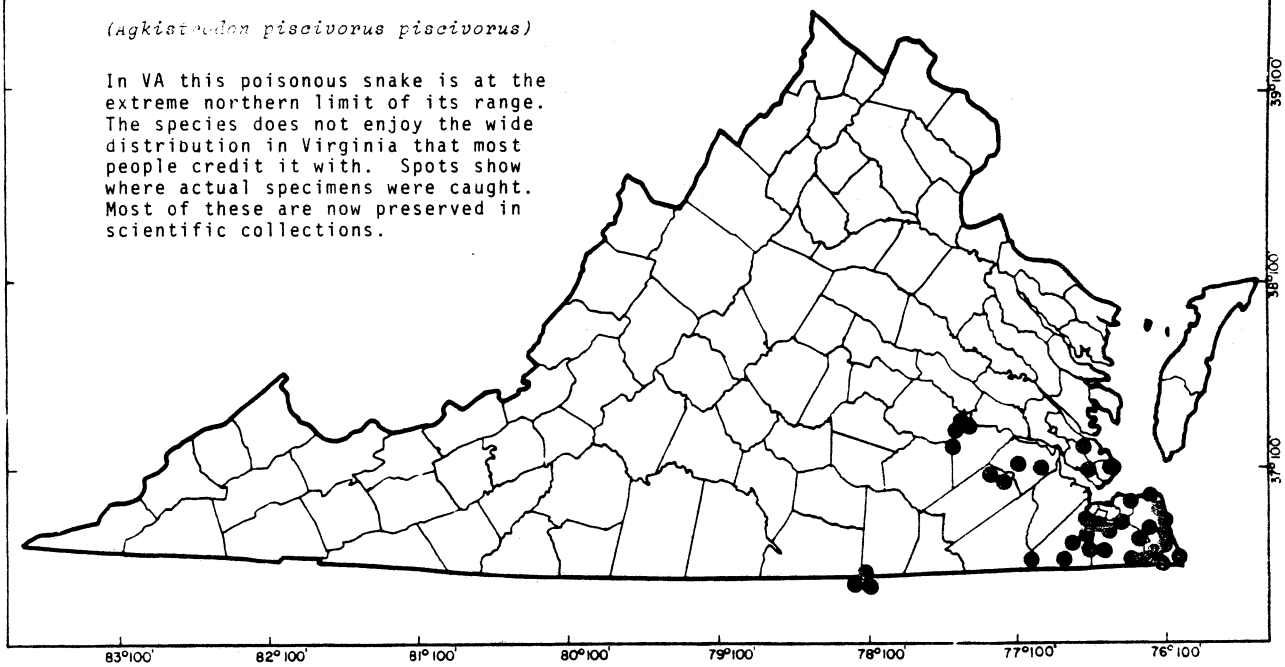
Drawings by Ned Smith
July 1958 VIRGINIA WILDLIFE.

FAUNAL DISTRIBUTION MAP

EASTERN COTTONMOUTH

(Agkistrodon piscivorus piscivorus)

In VA this poisonous snake is at the extreme northern limit of its range. The species does not enjoy the wide distribution in Virginia that most people credit it with. Spots show where actual specimens were caught. Most of these are now preserved in scientific collections.



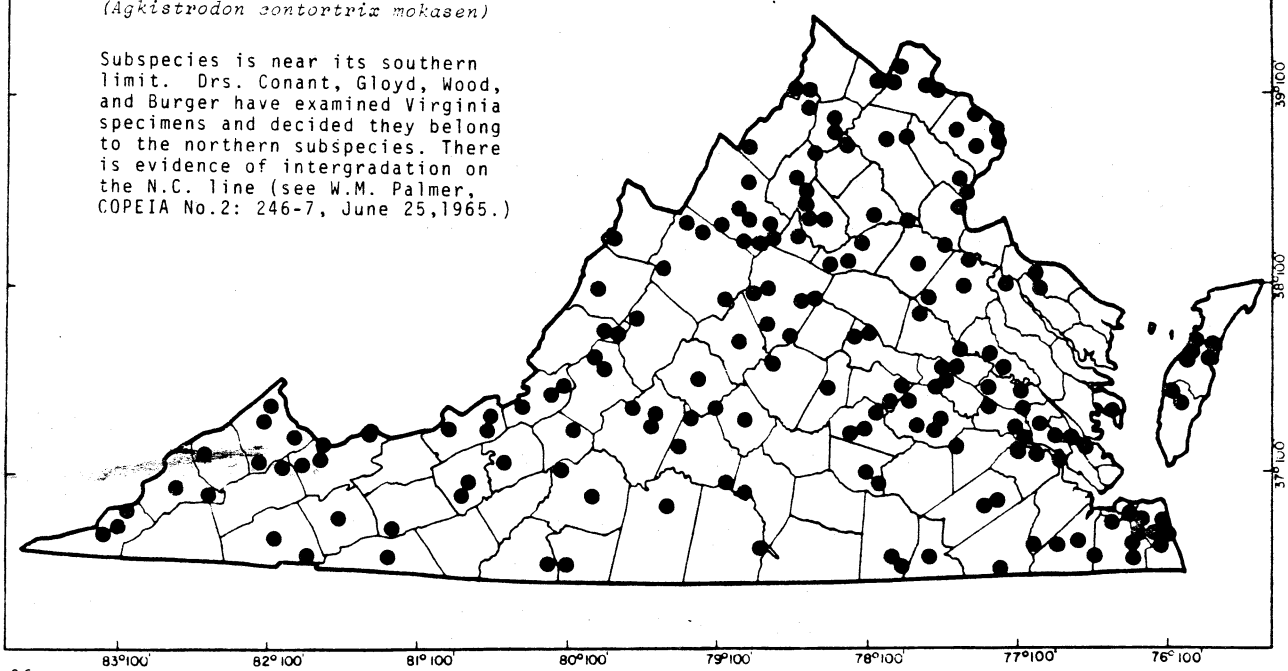
THESE MAPS show where POISONOUS snakes have been found over the past 50-75 years. They are based on the 1954 maps of John T. Wood, M.D.; new data have been added.

FAUNAL DISTRIBUTION MAP

NORTHERN COPPERHEAD

(Agkistrodon contortrix mokasen)

Subspecies is near its southern limit. Drs. Conant, Gloyd, Wood, and Burger have examined Virginia specimens and decided they belong to the northern subspecies. There is evidence of intergradation on the N.C. line (see W.M. Palmer, COPEIA No.2: 246-7, June 25,1965.)

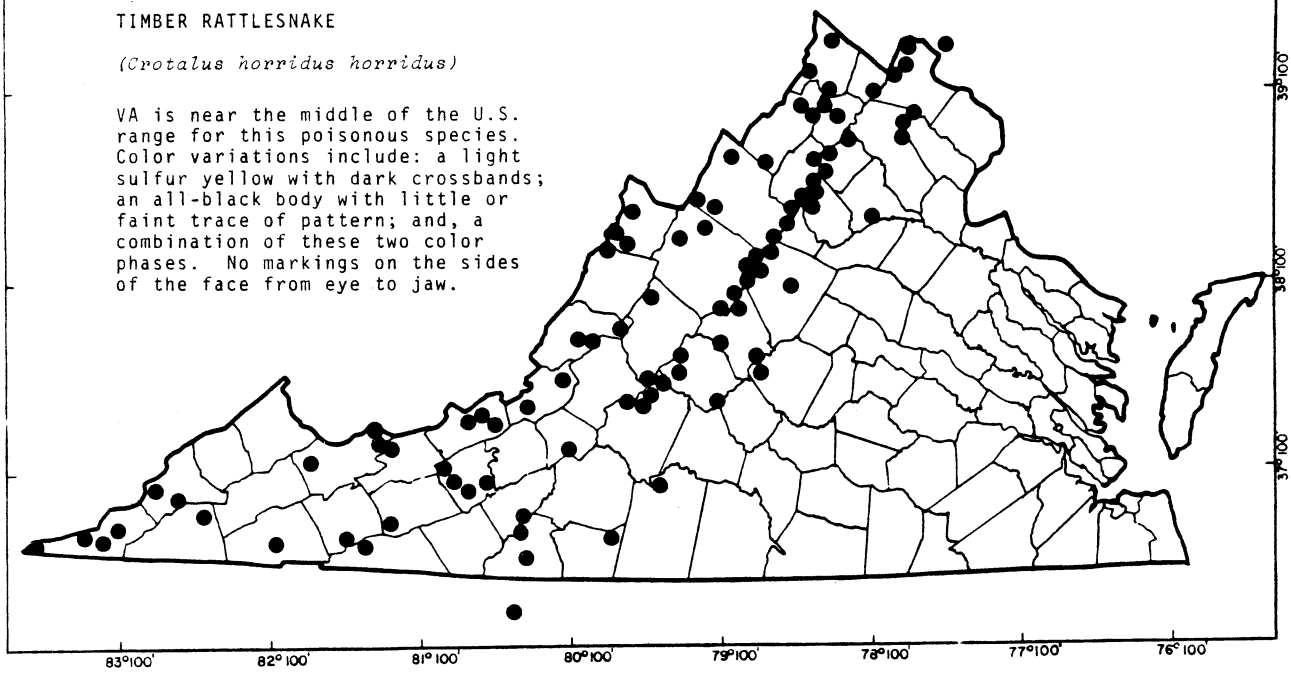


FAUNAL DISTRIBUTION MAP

TIMBER RATTLESNAKE

(Crotalus horridus horridus)

VA is near the middle of the U.S. range for this poisonous species. Color variations include: a light sulfur yellow with dark crossbands; an all-black body with little or faint trace of pattern; and, a combination of these two color phases. No markings on the sides of the face from eye to jaw.



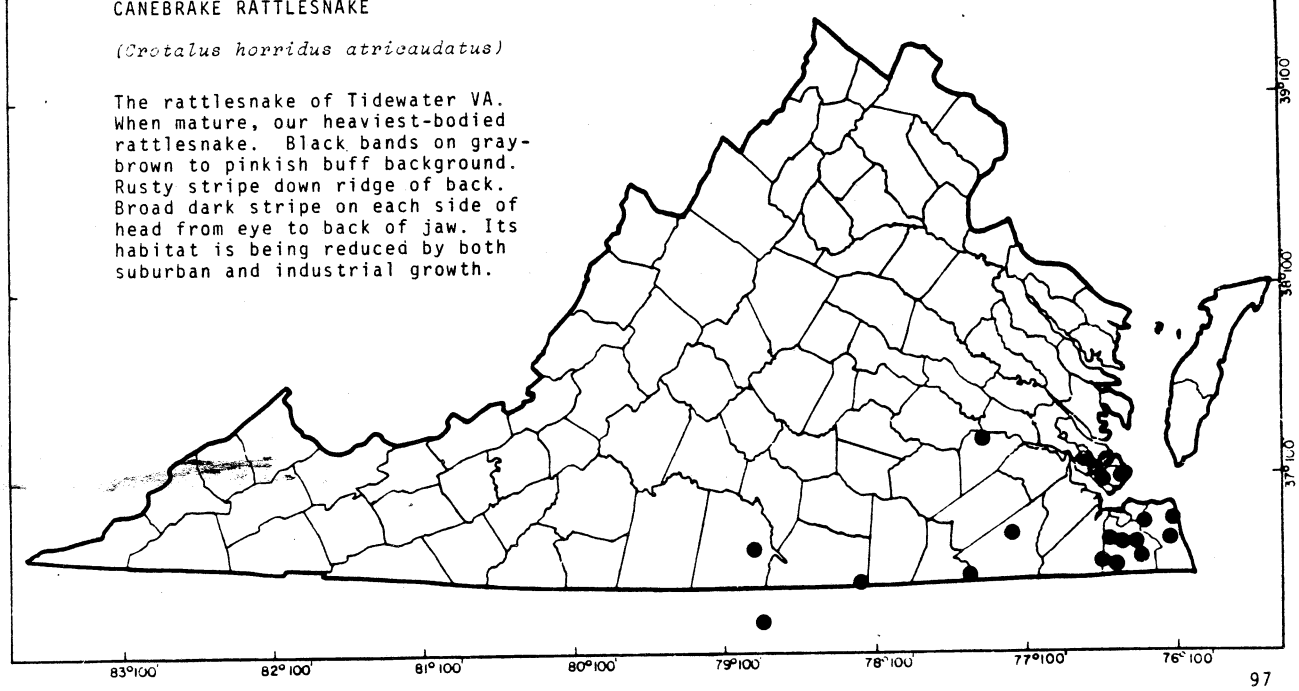
THESE MAPS show where POISONOUS snakes have been found over the past 50-75 years. They are based on the 1954 maps of John T. Wood, M.D.; new data have been added.

FAUNAL DISTRIBUTION MAP

CANEBRAKE RATTLESNAKE

(Crotalus horridus atricaudatus)

The rattlesnake of Tidewater VA. When mature, our heaviest-bodied rattlesnake. Black bands on gray-brown to pinkish buff background. Rusty stripe down ridge of back. Broad dark stripe on each side of head from eye to back of jaw. Its habitat is being reduced by both suburban and industrial growth.



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INDEX

The order of arrangement of amphibian and reptilian species and subspecies in this index is based upon their sequence in the Peterson Field Guide No. 12, second edition.

The Virginia survey map for each species appears in this booklet at the page number given in the first column headed "Survey Page."

The second, third, and fourth columns are a handy reference to the identification text, illustration, and map page numbers in the 1975 edition of "A Field Guide to Reptiles and Amphibians of Eastern and Central North America" (Conant, 1975) Number 12 in the Peterson Field Guide Series.

FJT

AMPHIBIANS OF VIRGINIA

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MARBLED SALAMANDER *Ambystoma opacum*	38	251	38	211
MABEE'S SALAMANDER *Ambystoma mabeei*	37	253	38	203
JEFFERSON SALAMANDER *Ambystoma jeffersonianum*	36	254	38	206
SPOTTED SALAMANDER *Ambystoma maculatum*	38	255	38	210
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VALLEY and RIDGE SALAMANDER *Plethodon hoffmani*	44	274	--	231
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SLIMY SALAMANDER COMPLEX *Plethodon glutinosus glutinosus*	44	276	41	230
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CUMBERLAND PLATEAU SALAMANDER *Plethodon kentucki*	47	---	--	---
YONAHLOSSEE SALAMANDER *Plethodon yonahlossee*	43	278	40	236
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REPTILES OF VIRGINIA

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RED-BELLIED WATER SNAKE *Natrix erythrogaster erythrogaster*	81	142	20	103
NORTHERN WATER SNAKE *Natrix sipedon sipedon*	81	144	20	99
QUEEN SNAKE *Natrix septemvittata*	82	149	21	109
EASTERN GLOSSY WATER SNAKE *Natrix rigida rigida*	82	150	21	108
NORTHERN BROWN SNAKE *Storeria dekayi dekayi*	83	153	22	128
NORTHERN RED-BELLIED SNAKE *Storeria occipitomaculata occipitomaculata*	83	156	22	127
EASTERN GARTER SNAKE *Thamnophis sirtalis sirtalis*	84	157	23	116
EASTERN RIBBON SNAKE *Thamnophis sauritus sauritus*	84	164	23	119
EASTERN SMOOTH EARTH SNAKE *Virginia valeriae valeriae*	85	167	22	125
MOUNTAIN EARTH SNAKE *Virginia valeriae pulchra*	85	168	--	125
ROUGH EARTH SNAKE *Virginia striatula*	85	168	22	124
EASTERN HOGNOSE SNAKE *Heterodon platyrhinos*	86	169	25	130
NORTHERN RINGNECK SNAKE *Diadophis punctatus edwardsi*	87	172	25	133
SOUTHERN RINGNECK SNAKE *Diadophis punctatus punctatus*	87	172	25	133

REPTILES continued:	SURVEY PAGE	FIELD GUIDE (1975) TEXT	PLATE	MAP
EASTERN WORM SNAKE *Carphophis amoenus amoenus*	86	174	25	131
EASTERN MUD SNAKE *Farancia abacura abacura*	89	176	25	138
RAINBOW SNAKE *Farancia erytrogramma erytrogramma*	89	177	25	137
NORTHERN BLACK RACER *Coluber constrictor constrictor*	90	178	26	139
ROUGH GREEN SNAKE *Opheodrys aestivus*	88	184	25	135
EASTERN SMOOTH GREEN SNAKE *Opheodrys vernalis vernalis*	88	185	25	134
CORN SNAKE *Elaphe guttata guttata*	91	190	28	150
BLACK RAT SNAKE *Elaphe obsoleta obsoleta*	91	193	28	149
NORTHERN PINE SNAKE *Pituophis melanoleucus melanoleucus*	90	199	27	147
EASTERN KINGSNAKE *Lampropeltis getulus getulus*	94	202	29	156
BLACK KINGSNAKE *Lampropeltis getulus niger*	94	203	29	156
EASTERN MILK SNAKE *Lampropeltis triangulum triangulum*	92	204	30	153
SCARLET KINGSNAKE *Lampropeltis triangulum elapsoides*	92	209	30	153
MOLE SNAKE *Lampropeltis calligaster rhombomaculata*	93	210	29	155
NORTHERN SCARLET SNAKE *Cemophora coccinea copei*	93	211	30,31	152
SOUTHEASTERN CROWNED SNAKE *Tantilla coronata coronata*	94	219	33	163
[POISONOUS SNAKES]				
NORTHERN COPPERHEAD *Agkistrodon contortrix mokasen*	96	226	34	174
EASTERN COTTONMOUTH *Agkistrodon piscivorus piscivorus*	96	228	34	173
TIMBER RATTLESNAKE *Crotalus horridus horridus*	97	233	35	178
CANEBRAKE RATTLESNAKE *Crotalus horridus atricaudatus*	97	234	35	178

APPENDIX

A NOTE ON THE CONCEPT OF SUBSPECIES

by Dr. James A. Peters
(1965)

In the course of collecting reptiles and amphibians in Virginia and elsewhere, any collector is likely to find within the range of one subspecies individuals that answer the description of a different subspecies. On the basis of such individuals there is a strong inclination to add the different subspecies to the faunal list of a state; to alter the described range of the subspecies; or to decide that the two subspecies are not truly different. Actually, none of these alternatives can be considered valid unless some additional investigations are made. This is a result of the basic methods used by the original describer in defining the subspecies.

First and foremost in the mind of the describer is the fact that he (or she) is working with populations, that is, groups of individual specimens. An effort is made to examine as many specimens as can be obtained from personal collecting and from museums, with the hope of seeing material from all parts of the species range. The describer tabulates a large number of characteristics, and then compares sample with sample, often using statistical methods to determine whether they come from the same or different populations, or from the same or a different subspecies.

When a scientist discovers that two groups of populations have a large number of characteristics in common, but differ from each other in one or more additional characteristics, he will quite often distinguish between these two groups of populations by assigning each a subspecific name. The differences need not be absolute (as, for example, one group all red and the other group all green), but often are only a matter of degree (as when one subspecies of snake has 131 to 141 ventrals, another 140 to 150). Even when absolute, the difference may not be exclusive. Thus, 8 out of 10 individuals in subspecies "A" might be red, with the rest green, while 8 out of 10 in subspecies "B" are green with the rest red. Some scientists have accepted what is known as the

75 percent rule, which can be interpreted to say that only 75 percent of subspecies "A" needs to be distinguishable from 75 percent of subspecies "B" for the subspecies to be recognized as validly different. In such a case, it should be clear that about one in four individuals collected in the range of one subspecies may look just like members of the other subspecies. The occurrence, then, of individuals found in a local area but appearing to belong to a foreign subspecies is not grounds, by itself, for any change in the status of the names in that area.

Scientists, of course, are not infallible, and they can make errors in the definitions of subspecies. Or, more properly, insufficient material from all parts of the range of the species makes it very difficult to be sure that the range of each subspecies is clearly delimited, that all the valid subspecies have been recognized, or that all differences utilized will survive the test of larger sample size. To challenge any of these things, however, the challenger must recheck the original material as well as any new population samples accumulated since the revision was published. If one does not wish to do this, the earlier decisions of the investigator who did do it must be accepted.

It would be highly unscientific to question a subspecies definition, or the range limits ascribed to that subspecies, on the basis of a single individual or sample drawn from cursory collecting. This can be done only after a thorough review of the pertinent literature and available collections.

In addition, the biological basis of the subspecies should always be taken into consideration. To use the term "subspecies" is to imply that the populations involved are all part of a single species, and thus have common access to a continuous gene pool. This communality of genes, accompanied by the assumption or demonstration of interfertility and gene flow, means that the similarities between subspecies will be much more numerous than the differences. Occasionally, just by chance, individuals within one population might be expected to have gene combinations that produce characteristics of a related subspecies. This is, in fact, predictable, if the concept of subspecies is valid.

Finally, it should be mentioned that there are a number of biologists who feel that the subspecies concept tends to obscure more knowledge of the biology of the species than it reveals, and would advocate dispensing with it entirely. While their ideas and arguments have not yet persuaded or, perhaps, even reached the majority of zoologists working with subspecies, the very existence of such ideas should be, in itself, a cautionary reminder to the collector who views subspecies as clear-cut, well-defined entities, unchallenged and unchallengeable. (Source VaHS BULLETIN No. 45: 3-4, Oct./Nov. 1965.)

1965 (Dr.) James A. Peters (1922-1972)

[These notes were prepared by Jim Peters while he was at the U.S. National Museum of Natural History, Smithsonian Institution, Washington, D.C. They were written to answer several questions raised by young students of Virginian herpetology.]

FRANKLIN J. TOBEY

Born in Newark, New Jersey. From 1933 to 1938 he was a member of the Newark Museum's Natural Science Club. In summer camp (1932-1935) assistant naturalist, and (1936-1940) assistant to the camp doctor. He gave emergency medical care in two snakebite cases. High School biology lab assistant (1937-1938) the only student simultaneously on the faculty payroll. Honors in chemistry.

At Columbia College in New York City (Class of '42) majored in zoology and political science. After World War II, returned to Columbia University for an M.A. (1947) in economics of government regulation of industry.

Inducted into U.S. Army (1942), he was in the first group at (then) Camp Pickett, Blackstone, VA., to undergo basic training (medical). Sent to Carlisle Barracks, PA, the Army Medical Field Service School, he was commissioned a Lieutenant, Medical Administrative Corps (1943).

At Camp Forrest, TN, he was instructor in topographical map reading and aerial photo interpretation. In Europe, he served in Ardennes, Rhineland, and Central Germany. By war's end he restored power and water supply to a camp (STALAG XIII-D) of 16,000 Soviet Army ex-Prisoners of War. He returned to the U.S. in early 1946.

Married the former Carolyn Wiederspahn on 22 February 1946. In June 1948, purchased a home in Oakton, Fairfax Co., Virginia.

Tobey was an associate editor/reporter on a national magazine in Washington, D.C. Covered the U.S. Senate and House of Representatives, Congressional committees, and Federal Agencies. In 1959, he was invited to join the staff of the U.S. Atomic Energy Commission as a public information officer. Duties included news media contacts and announcements on AEC bio-medical, physical science, and radiation safety programs. He was AEC liaison with the U.S. Public Health Service (PHS). He stayed with AEC successor agencies until June 1981.

As an Army Reservist, Tobey served at Forts Belvoir and Monroe and at other posts in Virginia. He held a mobilization staff assignment to the U.S. Army's Chief of Information, The Pentagon, Washington, as a Lt. Colonel. He retired from the Army Reserve in Feb. 1969.

Publications: Public Utilities FORTNIGHTLY (1947-1957,1974); the VIRGINIA WILDLIFE magazine (1957,1961); RADIOLOGICAL HEALTH DATA and REPORTS (1962-1967); Crowell-Collier's Encyclopedia YEAR BOOK (1960-1972) features on nuclear bio-medical & physical research.

Editor: P.U.R. Executive Information Service, weekly newsletter (1948-1957), P.U.R. Monthly Services on the Federal Power Act, the Natural Gas Act, and the Holding Company Act. Va. Herpetological Society BULLETINS (1958-1980). "Annual Report to Congress of the U.S. Atomic Energy Commission" and its supplement "Fundamental Nuclear Energy Research," (1967-1975). Report of the Amphibians and Reptiles Panel of the May 1978 Symposium on"Virginia's Endangered and Threatened Plants and Animals," Blacksburg, VA.,(1980).

With the publication and distribution of this booklet, all of the materials collected in its behalf will be deposited with the Department of Biology, University of Richmond, VA., for reference use and for use of the Virginia Herpetological Society.

This booklet may have a stimulating effect upon the collection of new data. There are several maps for species occurring in the state which certainly do not reflect the total Virginia range of the varieties represented. New data is badly needed. Please send any such information to one or more of the people listed below. Also, preserve any representative specimens.

At this time, the present survey coordinator, and past secretary of the board of VaHS directors (1958-1980) retires from all activity related to the Survey or the management of the VaHS.

December 1985

FRANKLIN J. TOBEY

New data would be welcomed by:

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