

THE VIRGINIA BALD EAGLE SURVEY: A HISTORY

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The Virginia Bald Eagle Survey is a national treasure. The survey has become one of the most significant serial data sets in the world. Over the past 55 years, the survey has documented biocide-induced reproductive suppression, the resulting population low, and a dramatic recovery in both reproductive rates and the overall population following the ban of DDT and like compounds. The survey itself has become one of the most effective tools in the effort to recover the eagle population in Virginia, allowing for the enforcement of wildlife laws and providing information on the effectiveness of management actions. More than population information alone, the effort has produced a wealth of ecological information on a population recovering within an increasingly human-dominated landscape. It has become one of the best records of arguably the greatest conservation achievement in our nation's history. My objective here is to provide a brief history of the survey effort and some of the events that shaped its development.

Tyrrell Survey

In the spring of 1935, during a time when bald eagles were persecuted throughout their range, a bill was introduced in Congress to protect the national symbol from extinction. The bill passed the Senate, but failed in the House of Representatives. [A modification of this bill became the Bald and Golden Eagle Act of 1940 (16 U.S.C. 668-668d; 54 Stat. 250).] During the breeding season of 1934, W. Bryant Tyrrell and other members of the Natural History Society of Maryland made regular observations of an eagle nest along the Magothy River south of Baltimore, including prey use and chick development through the period of fledging. Photographs of the chicks appeared in the *New York Times* and were brought to the attention of Warren F. Eaton. Eaton was working on the status of hawks and owls and their economic importance. Eaton contacted Tyrrell about the possibility of a survey of eagles throughout the Chesapeake Bay region and an investigation of food habits.

Understanding the gravity of the situation and the need to collect information to support the Senate bill, Tyrrell wrote a letter to Professor R. V. Truitt of the University of Maryland inquiring about the potential for funding from the University or the State to support such a survey. Truitt contacted the National Audubon Society and in January of 1936 the president of that Society, John H. Baker, met with Warren Eaton and Bryant Tyrrell in New York City to lay out a plan and to acquire associated funding to survey nesting eagles throughout the Bay region, including New Jersey, Delaware, Maryland, and Virginia.

Tyrrell initiated the nest survey in February of 1936 (Tyrrell 1936). He began by contacting the community of ornithologists, oologists, game wardens, and other people

who were most likely to know of nest locations. Harold H. Bailey provided him with a map of 54 nests in Virginia. Edward J. Court, a prominent egg collector in the region, claimed to know of 90 nest locations, but provided Tyrrell with only eight that could not be climbed. Tyrrell used these eight locations as a basis for the survey, but when entering a new community he would also visit the country store and local landowners to take advantage of local knowledge about breeding pairs, and thus accumulated additional nest sites for the survey.

Although the survey was ground-based and covered only a portion of the region, it became the benchmark against which future efforts would be compared (e.g., Abbott, 1963; Byrd et al., 1990; Watts et al., 2008). This is true because it was the only major effort to quantify eagle numbers and productivity prior to the DDT era. In Virginia, the survey included the Potomac River to its mouth, a small portion of the Rappahannock River, approximately 20 miles of the James River east of Richmond, and the coastal area from Pungo through Back Bay. Tyrrell surveyed 19 nests, 16 of which were occupied in 1936. Fifteen of these nests successfully produced 33 chicks.

The efforts of Tyrrell have provided the conservation community with more than a population survey. His report to the National Audubon Society, notes, and nest logs provide an account of eagle-human interactions during a critical time before both the passage of the Bald and Golden Eagle Act and the DDT era, a time during which eagles were under considerable pressure from various sectors of society (e.g., loggers gave eagles no consideration and numerous nest trees were lost annually to forest clearing; many fur trappers, farmers, and waterfowl hunters shot eagles on sight; collectors staked out nests in order to take adult pairs and eggs for sale on the open market).

Modern Survey

Despite the fact that he never surveyed eagles within the Chesapeake Bay, Charles L. Broley and his work on Florida eagles ignited a national conservation movement and indirectly led to the establishment of the Chesapeake Bay Bald Eagle Survey. Broley, a retired bank manager from Winnipeg, Canada, spent the winter months in Tampa, Florida. He became increasingly concerned about habitat loss, shooting, and egg collecting in western Florida that he believed was causing eagle declines. At the age of 60, he initiated a banding program in 1939 and banded more than 1,200 eaglets over the following 20 years. Broley's seminal work not only documented new aspects of eagle ecology (Broley 1947), but also provided one of the most complete records of progressive nest failures during the early years of the DDT era. In an area where he once banded more than

150 chicks in a single year, by 1958 Broley could only locate a single chick to band. His energy and relentless advocacy on behalf of eagle conservation spawned efforts across the species range. His belief that the Chesapeake Bay could serve as a stronghold for the species in the East led to the Bay becoming one of the first focal monitoring locations.

In 1955, a committee was established within the Audubon Naturalist Society to collect data on the status of bald eagles within the Chesapeake Bay region (Abbott 1957). Jackson Miles Abbott was a member of that committee and would lead the survey effort for the next 20 years. Abbott, a military engineer, accomplished naturalist, artist, lecturer, and writer transformed the effort from a volunteer project to a formal survey. Many of the ecological discoveries made in the survey's early years led to the development of effective aerial monitoring. Abbott's detailed field notes and published papers provide a complete accounting of efforts and observations during a critical period of the survey's development. The survey would not have survived and prospered without his leadership and dedication.

Between 1956 and 1962, the survey progressed from a volunteer-based ground survey to a more effective aerial survey (Abbott 1967). The survey was first conceived as a volunteer effort. The committee executed an outreach campaign to recruit observers that included announcements in the *Washington Post*. In the first year, nine observers provided nest locations and observations. Despite a considerable outreach campaign, the committee was unable to engage a large enough pool of qualified observers to cover known nesting sites or to complete follow-up productivity observations. By 1960 the effort had collected information on 68 nest sites, but information on productivity was limited. During the first 4 years, Abbott was never able to exceed 20% coverage of known nests by volunteers, due to the small pool of observers and the remoteness of many nests. During these initial five years it became increasingly evident to Abbott that a ground effort would not be adequate to meet survey objectives. In the spring of 1959, Abbott had the first opportunity to do a limited flight for eagles in an H-23 army helicopter and realized that aerial surveys were the best option for monitoring nests. During the 1960 National Audubon Society convention in New York City, Alexander Sprunt IV announced a continental effort by the Society to assess bald eagle populations. The effort focused on a mid-winter survey and breeding surveys within selected geographic areas of importance. The Chesapeake Bay Survey joined this effort, and in 1962 Abbott conducted the first aerial survey of the Bay with an assessment of productivity (Abbott 1963). The army provided helicopter support along the Potomac and the United States Fish and Wildlife Service provided survey planes for the remaining areas.

In 1963, Frederick R. Scott III joined Abbott in conducting the aerial survey and the team flew the Bay for eagles through 1976. Often considered the dean of Virginia birdwatchers, Scott had an encyclopedic knowledge of bird populations, was the editor of *The Raven* for 27 years, and was one of the region's staunchest conservationists. During most years, Abbott flew the upper Bay from the Potomac River north and Scott flew the lower Bay from the Rappahannock River south. Through the 1960s and

1970s, Abbott and Scott served as witnesses to a stable but unsettled eagle population with low productivity and high abandonment rates.

The year 1977 was a transition year for the bald eagle survey and for eagle conservation within the Chesapeake Bay. In January of 1977, the Chesapeake Region Eagle Group was established with representatives from the Fish and Wildlife Service, Maryland Wildlife Administration, Virginia Game Commission, the National Wildlife Federation, the Audubon Naturalist Society, the Maryland Ornithological Society, and the Virginia Society of Ornithology. Very close to this time period, the Fish and Wildlife Service, under the authority of the Endangered Species Act, appointed a Chesapeake Bay Bald Eagle Recovery Team to develop a recovery plan and to oversee monitoring and recovery efforts. During that same year, the state wildlife agencies assumed responsibility for the nest survey. In Virginia, Mitchell A. Byrd, professor of biology at the College of William and Mary and a true pioneer of bird conservation, conducted the survey on behalf of the state agency, and he remained committed to the survey for the next 34 years. In 1991, Bryan D. Watts joined the Virginia survey and the two monitored the population together for the next 20 years.

Following the federal listing of bald eagles in 1967 under the Endangered Species Protection Act of 1966 (16 U.S.C. 668aa-668cc) and, subsequently, under The Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.), efforts were mounted throughout the species range and there was a movement toward more standardized monitoring programs. The Virginia survey transitioned to a standard two-flight approach, consisting of one flight in March to locate new nests and determine the status of known nests, and a second flight in late April and May to check active nests for productivity. The survey also became more systematic in its coverage of the Coastal Plain including Chesapeake Bay tributaries to the fall line, the Eastern Shore, and lower Tidewater including Back Bay and the North Landing River. Mapping of nests became more standardized, using 7.5 minute topographic quadrangles to provide the resolution needed to enforce regulations of The Endangered Species Act.

As bald eagle populations continued their remarkable recovery throughout the late 1990s, wildlife agencies across the species range began to divert resources away from eagle monitoring to more pressing priorities. Beginning in 2000, financial responsibility for the Virginia survey has been increasingly assumed by the Center for Conservation Biology, a research and conservation organization founded in 1992 by Bryan Watts and Mitchell Byrd. The Center is shared between the College of William and Mary and the Virginia Commonwealth University and is committed to long-term species conservation. This survey has continued to document eagle population growth, productivity and distribution to the present. The 2010 survey checked more than 900 nests and monitored 684 occupied territories (Watts and Byrd, 2010). Throughout the years, the survey has conducted more than 22,000 nest checks, including more than 13,000 since the year 2000.

Acknowledgments

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