Species Listing PROPOSAL Form:

Listing Endangered, Threatened, and Special Concern Species in Massachusetts

Scientific name: *Haliaeetus leucocephalus* Current Listed Status (if any): Threatened

Common name: Bald Eagle

Proposed Action:

_____Add the species, with the status of: _____
_____Remove the species
__X__Change the species' status to: Special Concern

Change the scientific name to: _____
Change the common name to: _____
(Please justify proposed name change.)

Proponent's Name and Address:

Thomas W. French, Ph.D.
Assistant Director, DFW
Natural Heritage & Endangered Species Program
1 Rabbit Hill Road
Westborough, MA 01581

Phone: 508-389-6355
E-mail: Tom.French@state.us.ma
Fax: 508-389-7891

Association, Institution or Business represented by proponent:
Natural Heritage & Endangered Species Program, MA Division of Fisheries and Wildlife

Proponents' Signatures: Date Submitted:

Thomas W. French 6 March 2018

Please submit to: Natural Heritage & Endangered Species Program, Massachusetts Division of Fisheries & Wildlife, 1 Rabbit Hill Road, Westborough, MA 01581

Justification

Justify the proposed change in legal status of the species by addressing each of the criteria below, as listed in the Massachusetts Endangered Species Act (MGL c. 131A) and its implementing regulations (321 CMR 10.00), and provide literature citations or other documentation wherever possible. Expand onto additional pages as needed but make sure you address all of the questions below. The burden of proof is on the proponent for a listing, delisting, or status change.

(1) Taxonomic status. Is the species a valid taxonomic entity? Please cite scientific literature.

Yes. Originally described by Linnaeus as *Falco leucocephalus* in 1766 (American Ornithologists' Union 1998). Two subspecies (*Haliaeetus l. leucocephalus* Linnaeus, 1766; *H. l. alascanus* Townsend, 1897) described, with the generally larger *alascanus* occurring north and the smaller *leucocephalus* occurring south of an arbitrarily designated line of 40° North Latitude (Federal Register 43:6230–6233; Buehler 2000).

However, biological basis for recognition of the subspecies has been a subject of debate, causing the U.S. Fish and Wildlife Service to change its policy on the matter several times.

H. l. leucocephalus and H. l. alascanus were recognized as distinct subspecies in 1967 when *leucocephalus* was federally listed as Endangered under the Endangered Species Preservation Act of 1966 (Federal Register 32:4001). Recognition of the subspecies continued when *leucocephalus* maintained its listing status of Endangered after passage of the current Endangered Species Act in 1973. However, through a U.S. Fish and Wildlife Service final rulemaking in 1978, the subspecies *H. l. leucocephalus* was deleted from the List of Endangered and Threatened Wildlife and Plants and replaced with the entire species *H. leucocephalus* throughout the contiguous 48 states (Federal Register 43:6230–6233). Part of the stated justification for the rulemaking was that there ". . . is no morphological or geographical basis for distinguishing the two named subspecies. Although Alaska eagles average larger than Florida eagles, there is a gradual cline between the two extremes all across North America, with no clear breaking point." Thus, distinct population segments were then delineated on the basis of state boundaries rather than subspecies classifications, with all Bald Eagles in Washington, Oregon, Minnesota, Wisconsin, and Michigan federally listed as Threatened, and all Bald Eagles in the remaining 48 contiguous states federally listed as Endangered. Delineation of Bald Eagle populations on the basis of state boundaries was discontinued in 1995, whereupon the U.S. Fish and Wildlife Service classified all Bald Eagles in the contiguous 48 states as part of a single population (but distinct from Bald Eagles in Alaska; Federal Register 60:35999–36010). Hence, for purposes of listing, the Bald Eagle is treated as a single taxon (*H. leucocephalus*) in the lower 48 states.

(2) Recentness of records. How recently has the species been conclusively documented within Massachusetts?

In 2017, 68 nesting pairs were documented within Massachusetts.

(3) Native species status. Is the species indigenous to Massachusetts?

Yes. Prior to European settlement, the Bald Eagle likely nested in all of the continental U.S., except perhaps Rhode Island, West Virginia, and Vermont (USFWS 1983, Buehler 2000). No one really knows how common the Bald Eagle was in Massachusetts at the time of early European colonization. Nesting was not documented in the state for nearly 200 years when Allen (1846) reported that eagles had nested on Mount Tom. Other nest sites reported from the 1800s included locations in Beverly (Anon. 1864), Cheshire (Faxton and Hoffmann 1900), Sunderland on Mount Toby (Stearns 1884), and Winchendon in 1887 (Howe and Allen 1901) The last generally accepted nest record was at Bear Hollow near Snake Pond, Sandwich (1900-1905, Hill 1965). Bagg and Eliot (1937) reported later dates for nesting pairs in Brookfield near High Rocks (1908-1920), Colrain (1930s), and Conway (1930s). While these reports were based on the presence of adults in the spring and summer when they should be on their breeding territories, and in Brookfield over a period of 12 years, no nests were ever located.

(4) Habitat in Massachusetts. Is a population of the species supported by habitat within the state of Massachusetts?

Yes. In 2017, breeding pairs were known to be present at 40 bodies of water, including 23 ponds, lakes and reservoirs, and 17 streams and rivers throughout the state. The Connecticut River and Quabbin Reservoir each supported11 breeding pairs and were considered the core breeding areas in Massachusetts. An additional five breeding pairs were present along the Merrimack River (Amesbury, Haverhill (2), Methuen, Tyngsborough), three on the Westfield River (Agawam, Russell, Springfield), and two on the Chicopee River (Ludlow, Springfield)

Other single pairs nested as follows:

Berkshire County
Housatonic River (Sheffield), and Onota Lake (Pittsfield), Lake Buel (Marlborough/Monterey), Big Pond (Otis), Richmond Lake (Richmond), Laurel Lake (Lee/Lenox), Housatonic River (Stockbridge)

Franklin County
Deerfield River (Deerfield)

Hampshire County
Swift River (Belchertown)

Worcester County
Wachusett Reservoir (Boylston), Wachusett Lake (Westminster), Lake Shirley (Lunenburg), Quaboag Pond (Brookfield), Wickaboag Lake (West Brookfield), Lake Quinsigamond (Shrewsbury), Blackstone River (Northbridge), Beaver Brook (Royalston), Webster Lake (Webster), Foss Reservoir (Framingham), Pine Hill Reservoir (Paxton)

Middlesex County
Charles River (Waltham), Nashua River (Pepperell), Nagog Pond (Acton/Concord)

Essex County
Parker River (Newbury), Mill River (Rowley/Newbury), Suntaug Lake (Lynnfield)

Norfolk County
Neponset River (Milton)

Plymouth County
Pocksha Pond (Middleborough), Great Quittacas Pond (Lakeville), Halfway Pond (Plymouth), Sampson's Pond (Carver), Silver Lake (Pembroke), North River (Scituate/Marshfield)

Bristol County
North Watuppa Pond (Fall River), Westport River (Westport), Taunton River (Dighton)

In previous years, breeding pairs were also present at West Branch Farmington River/Colebrook River Lake (Sandisfield), Cobble Mountain Reservoir (Blandford), and Woods Pond (Lenox).

All of these bodies of water have forested shorelines and/or islands which provide nest and roost trees and contain adequate supplies of prey. There are a number of other water bodies that could support additional breeding pairs as the population continues to increase in Massachusetts. Examples currently un-occupied bodies of water that could support nesting Bald Eagles include Lake Mahkeenac in Stockbridge, Pontoosuc Lake in Pittsfield and Lanesborough, Cheshire Reservoir in Cheshire and Lanesborough, Otis Reservoir in Otis and Tolland, Springfield Reservoir in Ludlow, Upper Naukeag and Lower Naukeag lakes in Ashburnham, Sudbury Reservoir in Marlborough and Southborough, the reservoir complex in Framingham and Natick, South Watuppa Pond in Westport, Long and Assawompset ponds in Lakeville, Great South, and Great Herring, ponds in Plymouth, Wakeby and Mashpee ponds in Mashpee, Lake Cochicheweck in North Andover, and Lake Attitash in Amesbury.

In the previous down-listing proposal presenting the case for downlisting the Bald Eagle from Endangered to Threatened, potential nesting habitat was also included Big Pond in Otis, Halfway Pond in Plymouth, Webster Lake in Webster, the Framingham reservoir complex, and the Taunton River. All of these sites now have nesting Bald Eagles. Although no Bald Eagle nests have yet been documented on Cape Cod (Barnstable County), at least two nesting pairs are believed to be present.

(5) Federal Endangered Species Act status. Is the species listed under the federal Endangered Species Act? If so, what is its federal status (Endangered or Threatened)?

No. Southern subspecies (*H. l. leucocephalus*) was federally listed as Endangered in 1967 under the Endangered Species Preservation Act of 1966 (Federal Register 32:4001); said listing was maintained following passage of the Endangered Species Act of 1973. In 1978, distinct population segments were delineated on the basis of state boundaries rather than subspecies classifications, whereby Endangered status was expanded to include all Bald Eagles in the contiguous 48 states, except in Minnesota, Wisconsin, Michigan, Washington, and Oregon, where the species was federally listed as Threatened (Federal Register 43:6230–6233). In 1995, all Bald Eagles in the contiguous 48 states were delineated as a single population and reclassified as Threatened (Federal Register 60:35999–36010). The population was deemed "recovered" in July 2007 and consequently de-listed the following month (Federal Register 72:37345–37372).

(6) Rarity and geographic distribution.

(a) Does the species have a small number of occurrences (populations) and/or small size of populations in the state? Are there potentially undocumented occurrences in the state, and if so, is it possible to estimate the potential number of undocumented occurrences?

In 2017, 68 nesting pairs were documented within Massachusetts. Since the first modern nesting in Massachusetts in 1989, a total of 702 chicks have been documented as having fledged from Massachusetts nests, and additional chicks are believed to have fledged from poorly monitored and undocumented nests. During the restoration period (1982-1988), 41 wild-born chicks were released from a hack tower at Quabbin reservoir, and 27 additional captive-born chicks were released by fostering into wild nests (9) and direct release into the wild (18).

The proposal to downlist the Bald Eagle in Massachusetts from Endangered to Threatened was made in 2011. During the 2010 nesting season there were at least 32 pairs of Bald Eagles, which represented an all-time high since reintroduction efforts were initiated in 1982. The most recent national statistics date from 2004-2006 (USFWS 2007). At that time, the number of breeding pairs of Bald Eagle in Massachusetts was low relative to other states across the country. In fact, there were only 347 breeding pairs combined among New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, and Delaware. Hence, with the exception of Maine (n = 414 pairs in 2006), the Bald Eagle was rare in all northeastern states relative to other regions of the country. In 2016 the USFWS provided population estimates of Bald Eagles from data collected in 2009. These results showed a marked increase in the breeding population with a total of 143,000 individuals throughout the United States. The New England population was estimated to have 645 nesting pairs and a total of 3,000 individual birds (USFWS 2016). Since 2009 the numbers of nesting eagles in New England has continued to increase with approximately 800 pairs in Maine alone.

In 2017, 68 nesting pairs were documented within Massachusetts. Of these 68 pairs, 35 pairs successfully fledged at least 54 chicks. A rough estimate of population size in raptors may be calculated by counting the number of nesting adults and adding half that many juveniles and sub-adults. For Massachusetts, this calculation would provide an estimate of 204 Bald Eagles in Massachusetts, however there are several caveats, including the fact that there are certainly a few nesting pairs that have not yet been found and documented, juveniles and sub-adults float around the region with no regard for state boundaries, and the overall number of eagles in the state increases in the fall and winter when birds from farther north move south. However, it is probably safe to say that there are fewer than 300 individual Bald Eagles occurring in Massachusetts at any given time. By comparison, there are over 550 nesting pairs of Osprey in Massachusetts (Bierregaard et al. 2014).

It is important to consider the status and security of the Massachusetts Bald Eagle population within a regional context due to their high dispersal potential and far-ranging movement patterns. From a breeding

population perspective, Bald Eagles produced in Massachusetts now breed in other northeastern states, and, likewise, some Bald Eagles now nesting in Massachusetts were produced in other nearby states. For example, Bald Eagles produced in Massachusetts have been documented nesting in New Hampshire as far north as Squam Lake in Moultonborough, NH, as well as locations in Vermont, New York, Connecticut, and Rhode Island. Conversely, Bald Eagles produced in other states, such as New York, New Hampshire, Connecticut and Maine have been documented breeding in Massachusetts.

(b) What is the extent of the species' entire geographic range, and where within this range are Massachusetts populations (center or edge of range, or peripherally isolated)? Is the species a state or regional endemic?

The range of Bald Eagle includes most of Canada (except Nunavut), most of the United States (all states but Hawaii), and northern Mexico (Buehler 2000, NatureServe 2010); thus, the species is not a state or regional endemic. Most populations are distributed along coastal areas, large river systems, and large lakes or reservoirs. Although nesting Bald Eagles have been documented in every state (except Hawaii) and almost every province and territory within their range, the largest breeding populations is concentrated in Canada, Alaska, the Pacific Northwest (Washington, Oregon, northern California), the Great Lakes states (Minnesota, Wisconsin, Michigan), Chesapeake Bay, and Florida (Buehler 2000; Table 1). The last of the 48 contiguous states to document Bald Eagle nesting was Vermont in 2002. Most wintering populations are located in the lower 48 states and along coastal areas of Canada and Alaska (Millsap 1986). NatureServe (2010) classifies Bald Eagle as both globally and nationally "secure" (G5/N5 rank).

Massachusetts is located at the eastern edge of the continental range but contiguous with interior populations. In terms of latitude, Massachusetts represents an interior sector of the continental range. Regionally, Massachusetts is surrounded by states where numbers of breeding Bald Eagle have been increasing (Table 1). Therefore, the Massachusetts population is not isolated and can be considered part of a larger, regionally secure population. . The species is listed as "Endangered" in Vermont, "Threatened" in Massachusetts, Connecticut, and New York, and has been delisted in Maine (2009) and New Hampshire (2017).

Breeding and wintering eagles are wide-ranging across Massachusetts (present within eastern, central, and western regions of the state; Figure 1), with breeding occurring in over 65 towns. Although breeding is concentrated at two large bodies of water (13 breeding pairs along the Connecticut River and 11 breeding pairs at Quabbin Reservoir in 2017), about half of the Massachusetts Bald Eagle breeding population is distributed on water bodies in other areas of the state. Some of the strongest growth in eagle populations is occurring in eastern Massachusetts, including in urban landscapes around Boston.

(7) <u>Trends.</u>

(c) Is the species decreasing (or increasing) in state distribution, number of occurrences, and/or population size? What is the reproductive status of populations? Is reproductive capacity naturally low? Has any long-term trend in these factors been documented?

Breeding Bald Eagles were extirpated in Massachusetts during the early 1900s. However, both abundance and distribution of breeding pairs in Massachusetts have increased steadily (Figure 2) since reintroduction efforts were initiated in 1982 (Davis 2011, French 2016). Although annual reproductive capacity is low (≤ 3 young produced per breeding pair), the species is long-lived (up to 28 years; Schempf 1997, French 2017), and cumulative survival to adulthood is estimated to be 30%–61% (Buehler et al. 1991, Wood 1992, Bowman et al. 1995, Harmata et al. 1999). Bald Eagles continue to reproduce successfully in Massachusetts (Figure 2) and are expected to continue increasing in abundance and distribution during the foreseeable future. Abundance of wintering eagles in Massachusetts also shows an increasing trend.

Nationally, long-term upward trends in population size and distribution, combined with reduced threats and continued protection under the Bald and Golden Eagle Protection Act of 1940, were sufficient to warrant de-listing of Bald Eagle from the Federal List of Endangered and Threatened Wildlife in 2007 (Federal Register 72:37345–37372). Regionally, population size and distribution have trended upwards and some northeastern states have downlisted or delisted the Bald Eagle from their state rare species lists. Should there be an unexpected reversal of the upward trend in abundance and distribution of Bald Eagle in Massachusetts, source populations exist in other parts of the region and country.

(8) Threats and vulnerability.

(d) What factors are driving a decreasing trend, or threatening reproductive status in the state? Please identify and describe any of the following threats, if present: habitat loss or degradation; predators, parasites, or competitors; species-targeted taking of individual organisms or disruption of breeding activity.

Trends in abundance and distribution are positive. The threat of environmental pollution (e.g., contamination by DDT and other pesticides) is significantly lower now than during the mid- to late 1900s, when the U.S. population of Bald Eagles was decimated in the lower 48 states. Population recovery at the national scale is attributed largely to banning of DDT in 1972 and to reduced persecution (e.g., shooting) by humans (Federal Register 72:37345–37372).

Suburban sprawl and other development pressures are likely the greatest threat in Massachusetts, as there has been significant habitat loss along several major water bodies (e.g., Connecticut and Merrimack rivers). However, public drinking-water supplies (e.g., Quabbin, Wachusett, Cobble Mountain, and Cheshire reservoirs) are expected to remain protected from development indefinitely. Nests at Quabbin and Wachusett reservoirs represented 31% of the Massachusetts Bald Eagle breeding population in 2010. In addition, state and federal regulations and guidelines, including the National Bald Eagle Management Guidelines (USFWS 2007) are used to help landowners, land managers, and others meet the intent of the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c) and avoid disturbing bald eagles.

Timber-harvesting projects may cause disturbance to nesting eagles and degrade habitat conditions (e.g., by precluding growth and maintenance of suitable nesting trees as a result of short rotation intervals). However, the Natural Heritage and Endangered Species Program is developing guidelines (Forestry Conservation Management Practices [CMPs]) to protect nesting eagles and their habitats during timber-harvesting projects.

Considering the small population size (*n* = 68 breeding pairs) of Bald Eagle in Massachusetts, natural disasters (e.g., hurricanes and catastrophic fire) and/or disease are significant threats to the population. Of particular concern are major fire or flood events that could wipe out large areas of potential nesting habitat (e.g., the Cottonwoods [*Populus deltoides*] in the Connecticut River floodplain). Furthermore, a population of only 68 breeding pairs would not be expected to be resilient to a major outbreak of disease. However, when put in a regional context, eagles in other northeastern states may serve as a source population if a local, time-limited catastrophic event were to occur.

(e) Does the species have highly specialized habitat, resource needs, or other ecological requirements? Is dispersal ability poor?

Bald Eagles require relatively large bodies of water with ample foraging opportunities (e.g., shallow waters combined with high abundance of fish, and an availability of perches) and nesting sites (large, super-canopy trees with crotch structures capable of supporting large, heavy nests). Therefore, habitat requirements are somewhat specialized. Bald Eagle breeding territories tend to be large in size with some studies recording 0.4–0.8 sq mi [1–2 km^2] as average territory size (Stalmaster 1987), which further limits population density in areas where suitable habitat is present. The recommended minimum habitat area for breeding Bald Eagles in northern states has been estimated at 640 acres (USFWS 1983). However, suitable habitats can be much smaller depending on available resources. Dispersal ability is very high.

Conservation goals.

What specific conservation goals should be met in order to change the conservation status or to remove the species from the state list? Please address goals for any or all of the following:

(a) State distribution, number of occurrences (populations), population levels, and/or reproductive rates

The Northern States Bald Eagle Recovery Plan (USFWS 1983) set a target population size of 10 breeding pairs in Massachusetts to help meet broader goals for recovery of Bald Eagle at the national scale. This target was surpassed in 1999. However, the Massachusetts Division of Fisheries and Wildlife has not established a target population size or state conservation goals. These state population objectives will be established prior to a delisting proposal.

(b) Amount of protected habitat and/or number of protected occurrences

A habitat conservation strategy will be developed prior to a delisting proposal.

(c) Management of protected habitat and/or occurrences

Specific management objectives will be developed prior to a delisting proposal. At present, the Natural Heritage and Endangered Species Program is developing management practices (Forestry Conservation Management Practices [CMPs]) to protect eagle nesting areas during timber-harvesting projects.

Comments

In 321 CMR 10.03, Threatened is defined as “with reference to any species of plant or animal, means likely to become endangered within the foreseeable future throughout all or a significant portion of its range, or to be declining or rare as determined by biological research and inventory, and likely to become Endangered in Massachusetts in the foreseeable future.” Species of Special Concern is defined as “any species of plant or animal which has been documented by biological research and inventory to have suffered a decline that could threaten the species if allowed to continue unchecked or that occurs in such small numbers or with such a restricted distribution or specialized habitat requirements that it could easily become threatened within Massachusetts.

We feel the Bald Eagle no longer meets the criteria of a Massachusetts Threatened species as its population is increasing, it is widespread throughout the state, and it can be considered part of a larger regional population that is considered secure. However, numbers in Massachusetts are still low in comparison to most other raptor species in the state and state level protections are still warranted for the species. Therefore, we feel it is time to downlist the Bald Eagle from Threatened to Special Concern to

acknowledge the improvements in the overall population levels and distribution of the species in the state while still maintaining state level protections.

We are proposing to change the listing status of Bald Eagle in Massachusetts from Threatened to Special Concern because of the reestablishment of a breeding population of the species in the state followed by continuing upward trends in abundance and distribution at the state and regional level during the past several decades. Furthermore, the massive decline in Bald Eagles nationwide during the mid- to late 1900s was attributed largely to impacts of human persecution and use of DDT; neither of these threats are considered to be significant today and are not expected to be significant in the near future.

The Bald Eagle is still relatively rare in Massachusetts and other northeastern states south of Maine, and population recovery is still ongoing. Beginning with the first modern nest in 1987, the rate of population recovery is still in the exponential growth phase, and has not yet begun to level off (Figure 2). Likewise, the abundance and distribution trend in the northeast region in general is still in an upward trend (Table 1). Given the relatively small population size of the Bald Eagle in Massachusetts today, the species is still vulnerable to natural disasters and/or outbreaks of disease. Continued growth of the current population may be compromised by ongoing and future habitat loss. Therefore, Bald Eagle should remain on the Massachusetts list of Endangered, Threatened, and Special Concern species, but at a lower listing status than it has been in the past.

Literature cited, additional documentation, and comments.

Literature Cited

Allen, J.A. 1864. Catalogue of the birds found at Springfield Mass., with notes on their migration. Proceedings of the Essex Institute 4(4):48-98.

American Ornithologists' Union. 1998. Check-list of North American birds. 7th edition. American Ornithologists' Union, Washington, D.C., USA.

Anonymous. 1864. Additions to the museum and library for April, May, and June 1864. Proceedings of the Essex Institute 4:36. (Young eagle taken from the nest in Beverly, June 2nd)

Bagg, A.C. and S.A. Eliot Jr. 1937. Birds of the Connecticut Valley in Massachusetts. Northampton, MA: The Hanpshire Bookshop.

Bierregaard, R., A. Ben David, L. Gibson, R. Kennedy, A. Poole, M. Scheibel, and J. Victoria. 2014. Post-DDT Recovery of Osprey (*Pandion Haliaetus*) populations in southern New England and Long Island, New York, 1970-2013. Journal of Raptor Research 48(4):361-374.

Bowman, T. D., P. F. Schempf, and J. A. Bernatowicz. 1995. Bald Eagle survival and population dynamics in Alaska after the *Exxon Valdez* oil spill. Journal of Wildlife Management 59:317–324.

Buehler, D. A. 2000. Bald Eagle. No. 506 *in* A. Poole and F. Gill, editors. The birds of North America. Academy of Natural Sciences, Philadelphia, Pennsylvania, and American Ornithologists' Union, Washington, D.C., USA.

Buehler, D. A., J. D. Fraser, J. K. D. Seegar, G. D. Therres, and M. A. Byrd. 1991. Survival rates and population dynamics of Bald Eagles on Chesapeake Bay. Journal of Wildlife Management 55:608–613.

Davis, W.J. 2011. Bringing Back Magnificence: 30 Years of Bald Eagle Restoration. Massachusetts Wildlife 61(1):12-25.

Faxton, W. and R. Hoffmann. 1900. The birds of Berkshire county, Massachusetts. Collections of the Berkshire Historical and Scientific Society 3:107-166.

French, T. 2016. The History of Bald Eagle Decline and Recovery in Massachusetts. Bird Observer44(6):398-407.

French, T. 2017. Massachusetts' Oldest Bald Eagle Died Too Young. Bird Observer, 45(6):396-397.

Harmata, A. R., G. J. Montopoli, B. Oakleaf, P. J. Harmata, and M. Restani. 1999. Movements and survival of Bald Eagles banded in greater Yellowstone ecosystem. Journal of Wildlife Management 63:781–793.

Hill, N. P. 1965. The birds of Cape Cod, Massachusetts. William Morrow & Company, New York, New York, USA.

Howe, R.H., Jr. and G.M. Allen. 1901. Howe and Allen's Birds of Massachusetts. The Auk 18:278.

Millsap, B. A. 1986. Status of wintering Bald Eagles in the conterminous 48 states. Wildlife Society Bulletin 14:433–440.

NatureServe. 2010. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. <http://www.natureserve.org/explorer> Accessed December 29, 2010.

Schempf, P. E. 1997. Bald Eagle longevity record from southeastern Alaska. Journal of Field Ornithology 68:150–151.

Stalmaster, M. V. 1987. The Bald Eagle. Universe Books, New York, NY. 227 pp.

Stearns, W.A. 1884. Birds of Amherst. Bulletin of Massachusetts Natural History 1(1-4):6-23.

U.S. Fish and Wildlife Service [USFWS]. 1983. Northern states Bald Eagle recovery plan. U.S. Fish and Wildlife Service, Washington, D.C., USA.

U.S. Fish and Wildlife Service [USFWS]. 2007. Bald Eagle population size. U.S. Fish and Wildlife Service, Washington, D.C. < http://www.fws.gov/midwest/eagle/population/index.html> Accessed December 29, 2010.

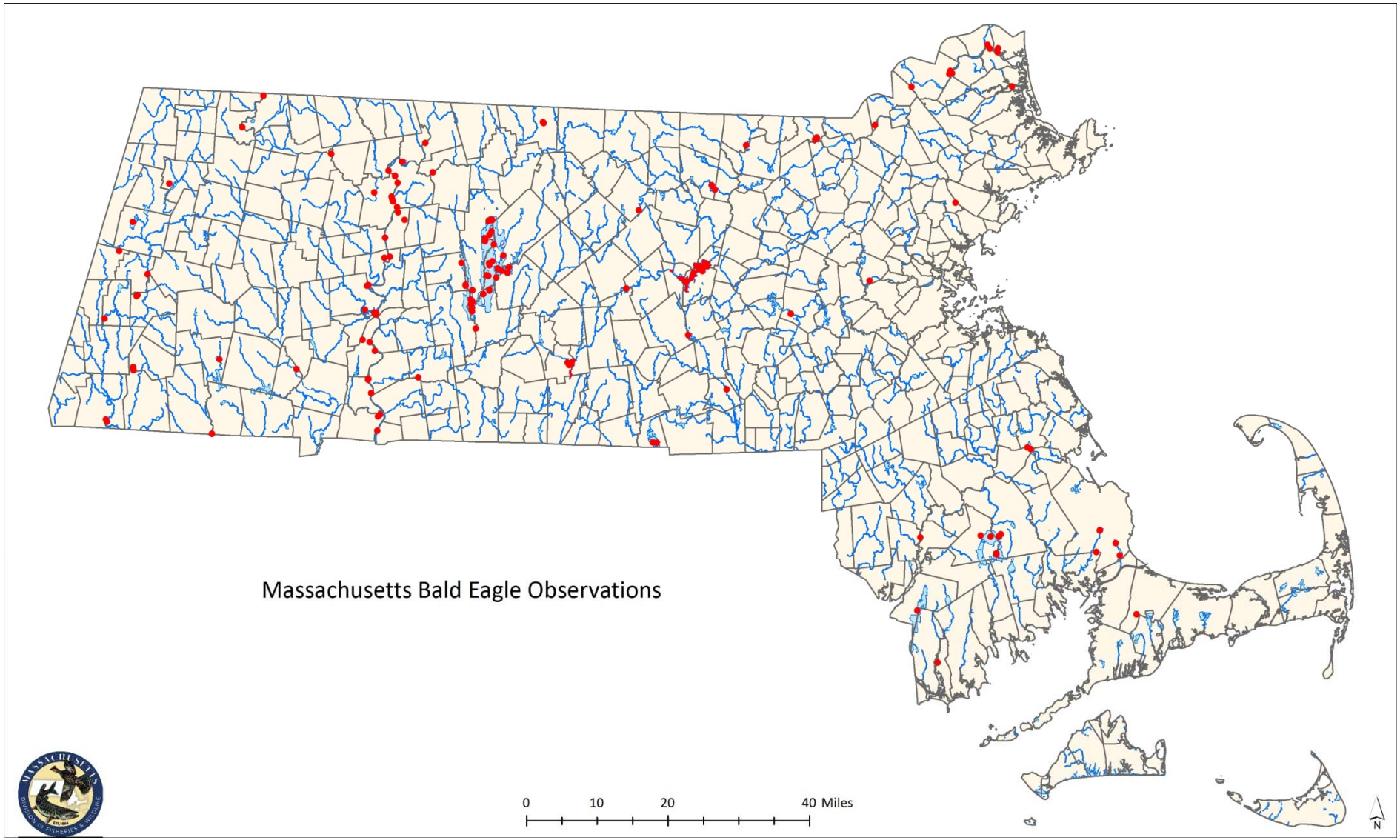
U.S. Fish and Wildlife Service. 2016. Bald and Golden Eagles: Population demographics and estimation of sustainable take in the United States, 2016 update. Division of Migratory Bird Management, Washington D.C., USA.

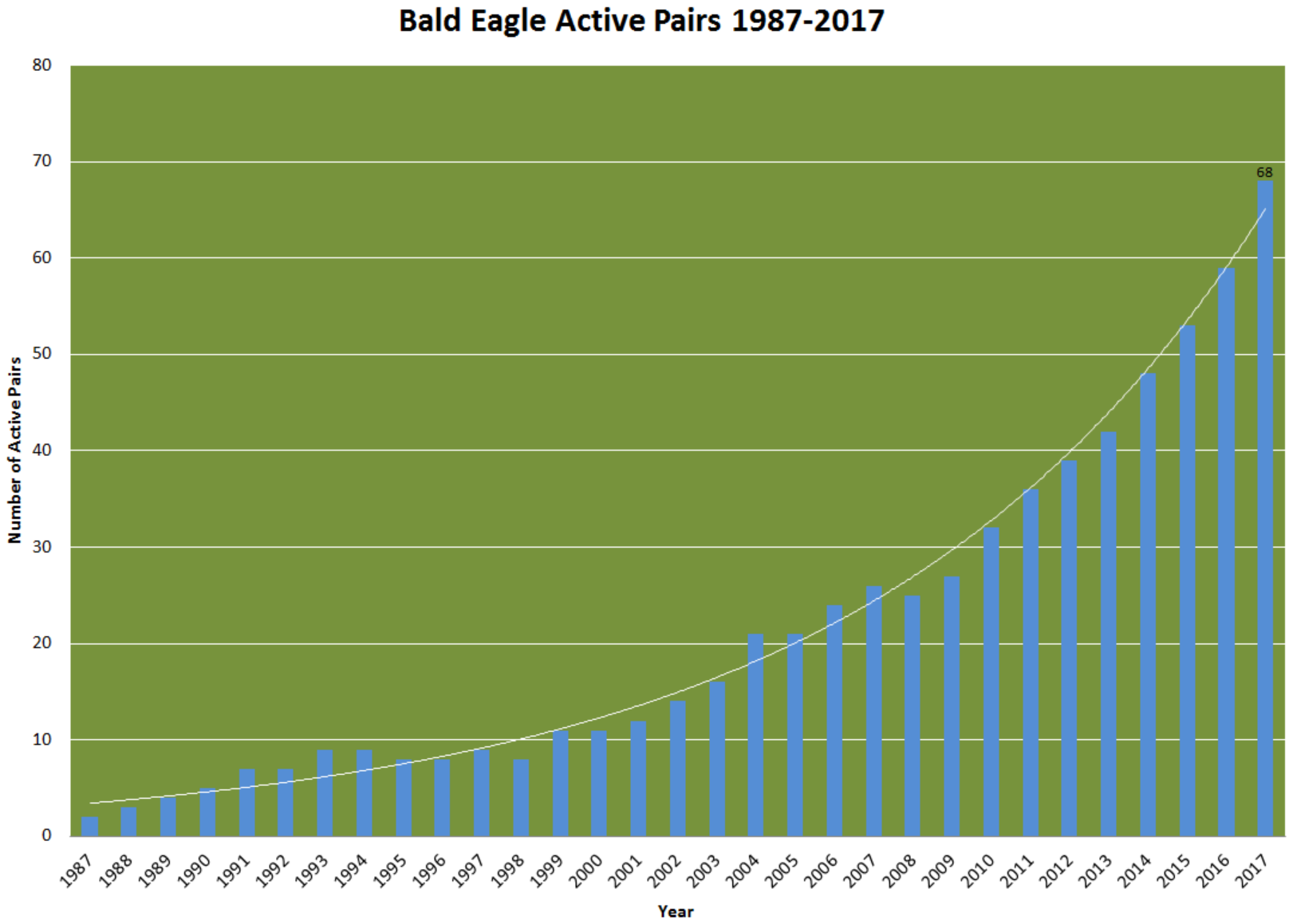
Wood, P. B. 1992. Habitat use, movements, migration patterns, and survival of subadult Bald Eagles in north Florida. Dissertation, University of Florida, Gainesville, USA.

Table 1

Number of Nesting Pairs of Bald Eagles in New England and New York

State	2007	2010	2016
Maine	414	633(2013)	780-915
New Hampshire	12	22	42
Vermont	1	7	21
Massachusetts	25	32	54
Rhode Island	1	1	4
Connecticut	10	18	44
New York	110	192	350


Massachusetts Bald Eagle Observations
0
10
20
40 Miles
N


Bald Eagle Active Pairs 1987-2017
Number of Active Pairs
Year
0
10
20
30
40
50
60
70
80
68
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017