

Wild Turkey Population History and Overview

Natural history

The North American wild turkey (*Melaeagris gallopavo*) and the ocellated turkey (*M. ocellata*) of Mexico are the only two species of wild turkey extant in the world today. Taxonomically, they belong to the order Galliformes, family Phasianidae, and subfamily Meleagridinae [1]. Six geographic subspecies of the North American wild turkey are recognized [2]. The eastern subspecies (*M. g. silvestris*) occupies roughly the eastern half of the United States and parts of southeastern Canada. The Florida wild turkey or Osceola subspecies (*M. g. osceola*) inhabits the Florida peninsula south of the Suwannee River. In the western half of the continent, the Merriam's wild turkey (*M. g. merriami*) occupies much of the intermountain West, and the Rio Grande turkey (*M. g. intermedia*) is found primarily in the plains states of the central United States and the northeastern Mexican states. The fifth subspecies, the Gould's wild turkey (*M. g. mexicana*), is found in southeastern Arizona, southwestern New Mexico, and in the Sierra Madre Occidental Mountains of Mexico.

The sixth subspecies, the Mexican wild turkey (*M.g. gallopavo*) is now thought to be extinct. It is from this subspecies that all domestic turkeys are believed to descend; a livestock species that in 2012 provided nearly 5.75 billion kg of meat to markets worldwide [3,4].

Historic decline

Pre-Columbian populations of wild turkeys in the United States were conservatively estimated at 10 million animals [6] and they were an important resource for Native Americans who used the animals for food, clothing, tools, and ceremonial purposes [2,6]. Early colonial accounts of wild turkey abundance are common and wild turkeys were obviously an important food source for settlers. As human populations grew, so did the demands for wild turkey meat. Entirely unregulated subsistence and market hunting were excessive and took their toll on populations. Accounts list single-day harvests that often numbered in the hundreds of birds [2,6]. Severe habitat loss during the same period also occurred and magnified the effects of unregulated harvest. The virgin forests were cleared for farmland and urban development and most in the East were gone by 1850, with those in the Atlantic coastal region especially hard hit. After the Civil War, industrial logging began in earnest. Railroads simultaneously opened up whole new forests as well as new markets, while using tremendous amounts of timber for crossties. In the South alone, tens of millions of forest acres were logged between 1870 and 1920 [7]. Intensive logging in the upper Midwest was concurrent but began even earlier, in about 1830, eventually peaking in about the 1990's [35].

As both unregulated hunting pressure and habitat loss increased, wild turkey populations rapidly declined [2]. By 1920, the wild turkey had disappeared completely from 18 of the 39 states they

originally occupied, and had disappeared from Ontario, Canada as well [5]. Their numbers declined further to reach what most accounts show as the low point of their general abundance and distribution by 1930-1940 [2,5,6]; see Figure 1.

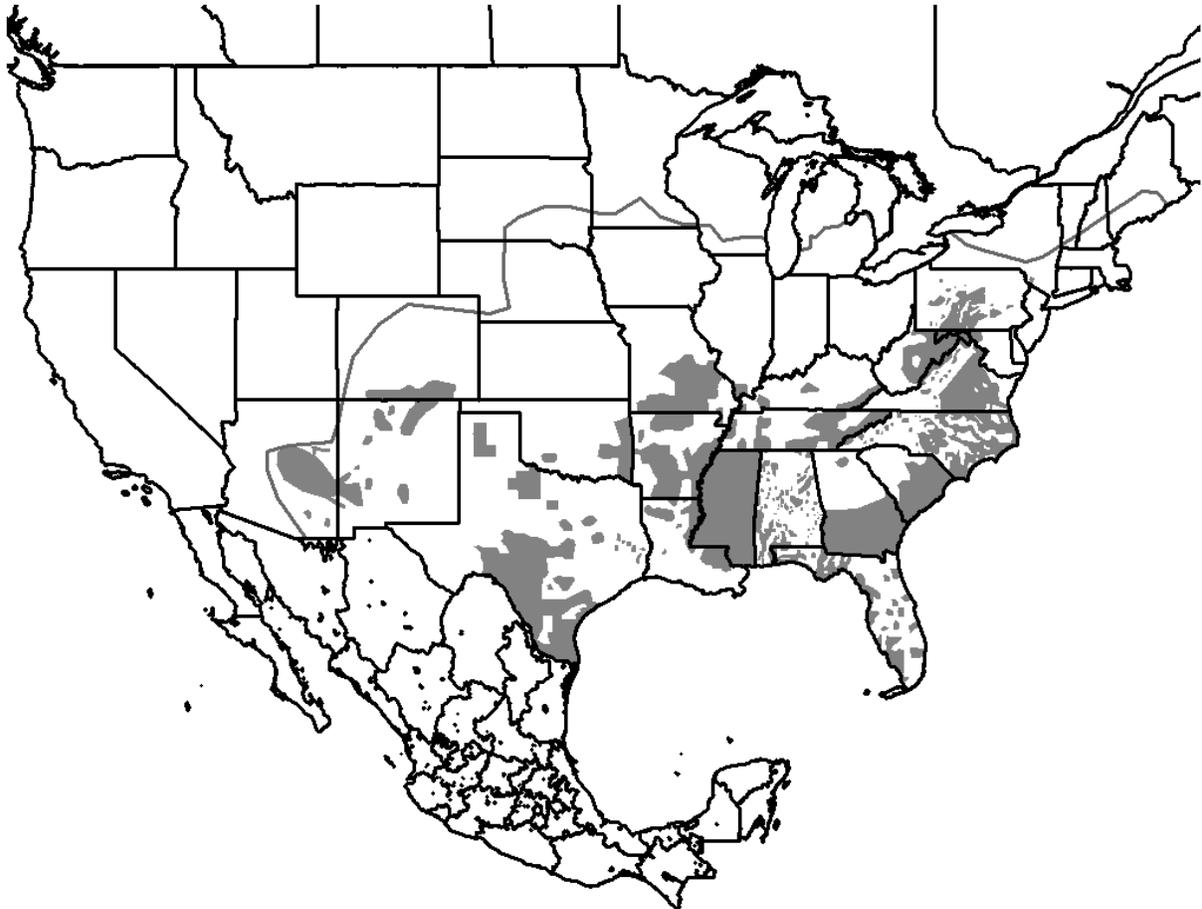


Figure 1. Range of the wild turkey in 1941 with original distribution area. Used with permission of the Virginia Department of Game and Inland Fisheries.

These population declines were not confined to any one region, though the timing varied somewhat by area depending on many factors. In the West, the Rio Grande subspecies generally fared better than its eastern and Florida counterparts, although their populations also declined greatly. By 1920, the number of wild turkeys in Texas, for example, had dropped to the point where general concern prompted efforts to secure legal protection and tighter control of private land [8]. Merriam's wild turkey populations, those in the later-settled intermountain west, were apparently stable up until about 1920, but dropped precipitously from 1920 to 1925. A combination of natural and man-induced limiting factors was blamed, including habitat degradation, hunting, and predation. The range occupied by the Merriam's turkey, meanwhile,

apparently reached its smallest size around 1925, with actual population lows occurring around 1942 when only 39,000 birds were thought to exist range-wide [9].

Estimates of the lowest nationwide wild turkey population numbers vary. Although a figure of 30,000 is often quoted, a lowest number of approximately 200,000 birds is more likely (T.W. Hughes, unpublished data) but this still represents an incredible decline from the original 10 million animals and indicates that by 1940 highly vulnerable populations of the once numerous wild turkey were strung precariously across the breadth of the continental United States as well as parts of Canada and Mexico. Continentally their populations had declined by more than 90 percent.

Early attempts at restoration

Efforts to restore wild turkey populations began in the early 1930s and pressure from sportsmen's groups was a major factor in accelerating early restoration attempts [10]. Lack of suitable wild turkey habitat was not a major limiting factor in restoration; and in fact social changes were actually proving beneficial to wild turkey recovery. During the Great Depression there was wholesale abandonment of family farms, as some 14 million rural Americans left their homes in search of work [11]. As these farms slowly reverted to native grasses, shrubs, and trees, wild turkey habitat began to emerge.

One of the first obstacles to successful eastern wild turkey restoration was the great difficulty capturing birds from existing populations for stocking in suitable habitat elsewhere. Early attempts at catching wild turkeys with pole traps, pen traps, funnel traps, and drop nets were ineffective. On account of this inability to catch sufficient numbers of wild turkeys for effective restoration, biologists in several states began attempts at raising turkeys in pens on game farms [2].

As early as 1929, the Virginia Commission of Game and Inland Fisheries began attempts to restore wild turkeys by releasing birds reared at game farms [5]. No viable populations resulted from the approximately 1,400 turkeys released, and this failure prompted research on how to produce better brood stock. It also inspired research on basic wild turkey biology and their habitat requirements. Virginia continued to work on producing better brood stock through the late 1930s by breeding captive-reared hens from wild eggs with native wild gobblers. By 1938, they felt they had a viable pen-reared wild turkey that could survive in the wild [5]. Extensive experimentation with the release of pen-reared turkeys continued for the next two decades, but the program remained unsuccessful and was discontinued by 1960 [12].

In a parallel effort, fueled by the disappearance of most of Pennsylvania's wild turkeys, the Pennsylvania Game Commission (PGC) created their first wild turkey game farm in 1930. Two years later they had successfully reared and released 720 turkeys [13]. Intensive effort followed these early game farm projects, with many more pen-reared turkeys bred and released. For years, the PGC considered the stockings to be successful because Pennsylvania's turkey

populations were growing. PGC biologists eventually realized the populations were not growing, however, where the game farm birds had been released, but rather growth was resulting from natural range expansion by remnant wild flocks. Despite mounting proof against it, the game farm mentality died hard in Pennsylvania, persisting until 1980 and producing more than 200,000 turkeys that were released into the wild, with little to no evidence that any had established populations [13].

Other states fared little better at establishing viable turkey flocks in the wild. A survey of 36 states that had released game farm turkeys showed that very few survived long enough to produce offspring and that only a token handful of populations were ever established [14]. The survey also showed that of all the states that had originally raised game farm turkeys for release, all but one had discontinued their programs.

As it turned out, artificially propagating turkeys for release into the wild was biologically unsound. It became apparent that the most important factor influencing mortality of juveniles was the survival behaviors learned from wild hens. Thus, no matter how genetically close pen-reared turkeys were to wild stock, they lacked the capacity to survive on their own in the wild without this component in their rearing [2].

Early restoration successes

Wildlife biologists continued to experiment with turkey restoration methods throughout the 1950s and 60s, focusing on refining methods for capturing wild birds for relocation efforts. The majority of this work was funded by hunter revenues including license fees and excise taxes.

In 1951, on the 6,880 hectare Waterhorn Unit of the Francis Marion National Forest near Charleston, South Carolina, Herman (Duff) Holbrook (a turkey hunter and a wildlife biologist with the United States Forest Service) became the first person to catch wild turkeys successfully using a cannon-fired net originally designed to capture waterfowl [15,16]. By 1957, Holbrook had used the cannon net to capture 241 eastern wild turkeys. These birds were released in eight major locations in South Carolina. At least four of these releases resulted in successful reproduction, and South Carolina wild turkey populations were set on the road to recovery. During the same period Wayne Bailey, a wildlife biologist for the state of West Virginia, also began experimenting with the cannon net. A lifelong hunter, Bailey developed an intense interest in wild turkeys and became a wildlife biologist because of this interest [17]. Bailey experimented with and perfected his cannon net capture techniques and successfully stocked wild-captured turkeys across West Virginia for almost 20 years [18].

Other states, inspired by these early successes, were soon using cannon nets and newly developed rocket nets as their primary methods in trap and transfer programs of their own, helping to restore the various subspecies of wild turkey throughout the United States. By 1959, 31 states were either active in turkey restoration or were well into the planning process [19-20,8,21] making this one of the most significant applied conservation efforts to emerge in the

early-to-mid twentieth century, not only in North America but anywhere in the world. While there were many motivations behind this effort, the desire to recover populations as a source of hunting recreation and food procurement were foundational as was the engagement of hunters themselves in many capacities.

In this regard, Holbrook and Bailey represented a new generation of hunters who entered the professional ranks of wildlife agencies in North America post-World War II and who positioned themselves to make a difference for wildlife. While the previous generation of hunters had founded organized groups that pushed for conservation legislation, this new cadre of university educated individuals devoted their professional careers to advocate, study, and advance wildlife conservation while at the same time pursuing a life-long interest in hunting.

Restoration efforts are expanded

Between 1951 and 1974 the wild turkey population of the United States grew from an estimated 320,000 animals to 1.4 million and while relocation efforts and other human factors contributed to this recovery much of it also reflected the adaptable nature of wild turkeys themselves; the birds quickly responded to changing habitats, encroaching human habitation, and even frigid northern winters. As restoration programs continued and wild turkey populations recovered to harvestable levels the number of states with turkey hunting seasons expanded from 20 in 1958 to 39 by 1974 [22]. One striking measure of the restoration's momentum was that sixteen of these states with huntable populations lay outside the wild turkeys' historical range [22].

While progress in wild turkey recovery continued in the 1970s, there were concerns with respect to how long the success could continue and whether full recovery to historic levels was possible given increasing human development and habitat loss. To help address these issues and also to help fund essential scientific research a new organization - the National Wild Turkey Federation (NWTf) - was founded in 1973 by Tom Rogers, an outdoor writer and avid turkey hunter [23]. The new organization's dual mission was the conservation of the wild turkey and the preservation of North America's hunting heritage.

One of the organization's first innovations was to create the Wild Turkey Technical Committee in 1975 which included turkey biologists from 35 states, all of whom were wild turkey project leaders in their jurisdictions, as well as members of The Wildlife Society's Wild Turkey Sub-Committee. Thus the new committee linked academics as well as state wildlife managers and the public user group, all in an effort to restore and manage sustainably wild turkey populations and to do so in a coordinated national effort [24]. This arrangement put the NWTf in the novel position of being a private organization raising funds to assist in state and federal research and restoration efforts. Its first research grant was issued in 1977 for \$2,900 and was provided to Dr. Bill Healy of US Forest Service, to be used for research on wild turkey reproduction and poult survival, movements and habitat selection.

The NWTF provided a vital new force for turkey conservation and restoration successes continued. By 1979 populations in the United States and Canada had further increased to over 1.8 million birds [25]. By this time, trapping techniques had progressed to the point where extensive recommendations on techniques and procedures were available to guide trappers on the most current and effective methods for catching wild turkeys [26]. By 1983, over 40 states had active trap and transfer programs [27].

Legal issues associated with interstate transfer of birds had to be resolved, however, to enable the turkey reintroduction program to reach its full potential. Although there was successful interstate transfer from states that had sufficient populations to serve as a source, there was often no efficient mechanism for facilitating the transfer, as the Lacey Act of 1907 prohibited the interstate sale and transfer of wildlife. This meant that states that needed to acquire wild turkeys for restoration had to depend either on the generosity of the donor state or had to reimburse the donor state for its efforts, which sometimes could involve arranging trades using other wildlife species. There was considerable variation and creativity in this process, and swaps included some unlikely species in trade for wild turkeys, including largemouth bass (*Micropterus salmoides*), river otters (*Lontra canadensis*), and ruffed grouse (*Bonasa umbellus*), to name just a few [27]. Although these trades were creative, they were limited in scope and efficiency because they depended on a mutual need existing between the states. This was not always the case. The process was also slow, with trapping often having to occur in multiple states to facilitate agreements.

The issues with interstate transfer were eventually resolved by the NWTF through a program led by Dr. James Earl Kennamer who was hired in 1980 as Director of Research [28]. Not only did his employment greatly increase the scientific stature of the organization, it resulted in a system of state-to-state transfers of wild turkeys that would ultimately fast track and rapidly expand restoration efforts. The challenge was to create a financial mechanism that would enable transfers and keep the process within the legal framework of Lacey Act prescriptions.

The development of this mechanism was a multi-step process. First, the NWTF created a “Super Fund” system in 1985 which enabled each NWTF state chapter to hold a portion of money from NWTF fundraising activities, with the caveat that the money be used to advance wild turkey and hunting heritage projects [29]. The Super Fund then became the mechanism enabling states receiving wild turkeys to refund the cost of trapping and transferring birds to the donor state. Using the Super Fund system, the recipient state was now able to deposit trap and transfer reimbursement funds supplied from its Super Fund account into the Super Fund account of the donor state [29]. With this innovative system in place the stage was finally set for nationwide wild turkey restoration.

Second, in 1987, NWTF, in conjunction with its Technical Committee, created the “Target 2000” program. This was an ambitious, cooperative agreement among state agencies and NWTF to release wild turkeys into all remaining suitable habitat in the United States by the year 2000

[29]. By 1994 the new funding mechanism and ambitious transfer program were proving highly successful and wild turkey populations had increased to approximately 4.2 million birds in the United States and Canada, up from the 1.8 million estimated in 1979 [30]. In addition, occupied range increased to 210 million hectares, up from 144 million hectares in 1989. As a result of this population increase, wild turkey hunters also increased and were estimated to number 2.1 million by 1994, with an annual harvest of 654,000 birds.

By the end of the 20th century, wild turkey populations and range had again increased significantly, although not all available habitat was occupied. By this time wild turkey numbers were estimated at approximately 5.4 million birds. Incredibly, eight individual states estimated their wild turkey population at over 200,000 birds, a number equaling nearly the total wild turkey population for the United States and Canada during the species' low point in the 1930s. Just a few years later, in 2004, the total wild turkey population had increased to 6.6–6.9 million birds, and some state populations had reached extraordinary numbers (see Figure 2). Missouri and Texas each estimated their populations at over 600,000 birds at this time. [31] NWTF records show that throughout the restoration efforts, beginning in the 1930s, 146,170 wild turkeys were released at more than 7,000 sites in the United States and Canada [32]

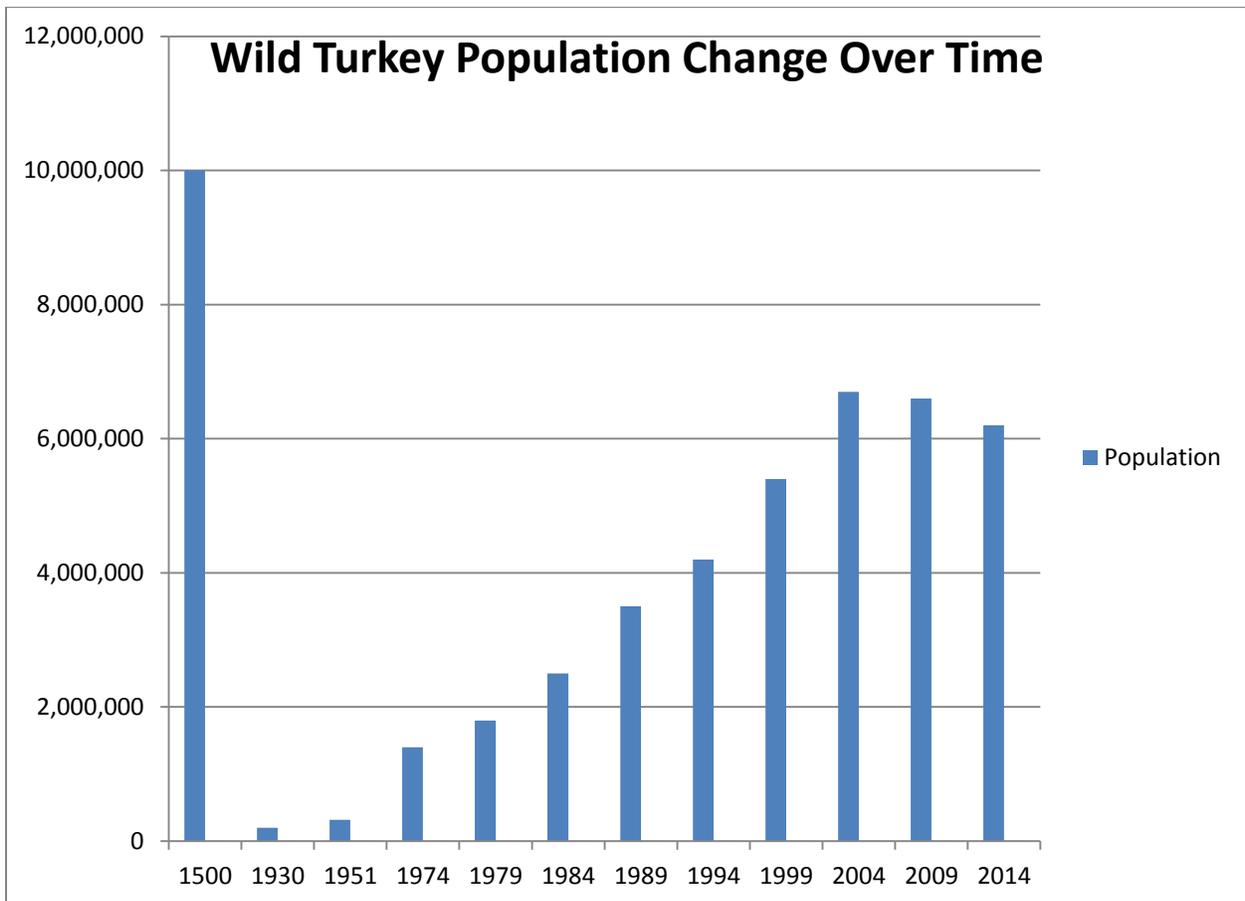


Figure 2. Change in wild turkey populations over time.

Restoration complete

Wild turkeys are currently found in self-sustaining populations in 49 of the 50 United States, six Canadian provinces, and in central and eastern Mexico [33] (See Figure 3) marking an extraordinary recovery from the scattered, remnant populations of less than a century ago. Current population numbers are slightly down from the peaks of the last decade, and are now estimated to be about 6.2 million nationwide, but this downturn may not be significant at this point [34]. In truth the species' current range is larger than at any time in recorded history. Given the massive changes in human population and footprint that have occurred since that time in North America, their recovery is even more remarkable and encouraging.

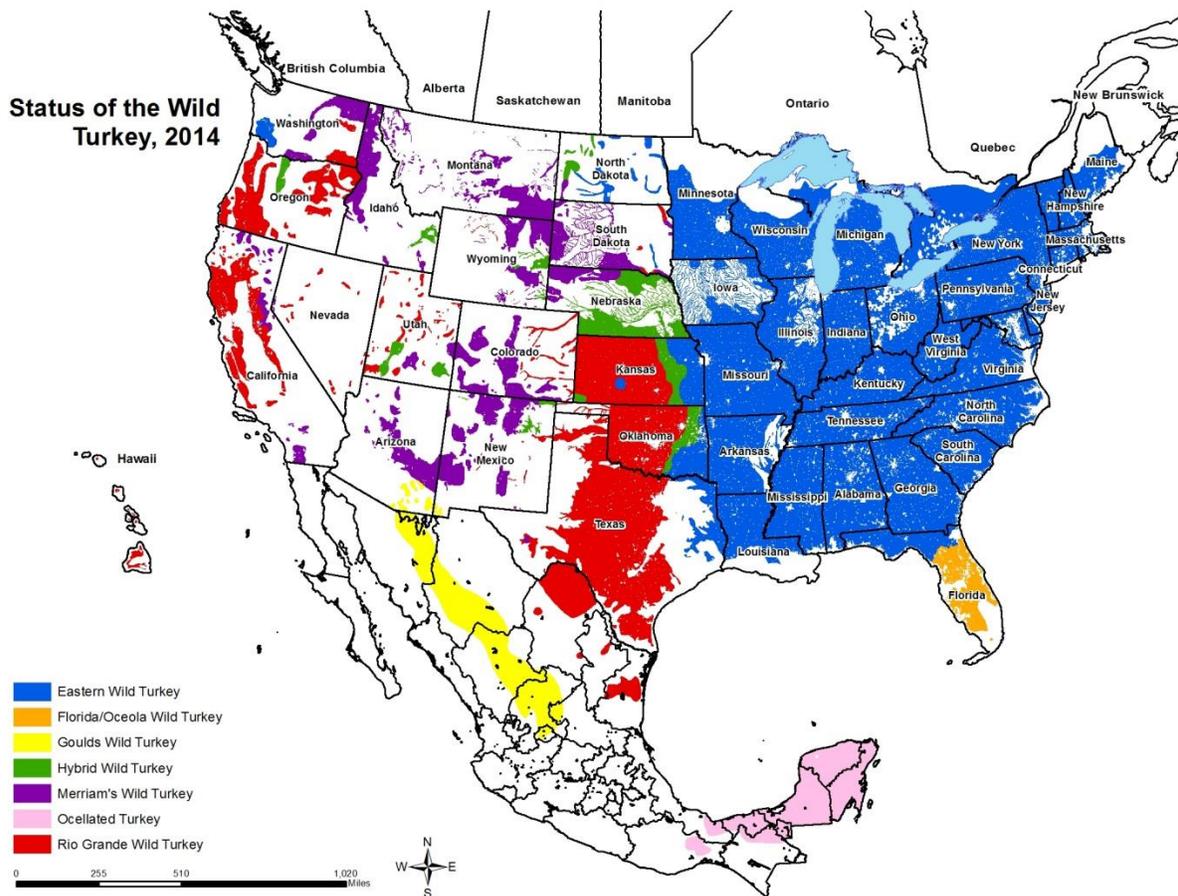


Figure 3. The range of the wild turkey in 2014.

References

- [1] Steadman, D.W., 1980, A review of the osteology and paleontology of turkeys (Aves: Meleagridinae). *Contributions in Science—Natural History Museum of Los Angeles County* **330**, 131–207.
- [2] Kennamer, J.E., Kennamer, M. and Breeneman, R., 1992, History. In: J.G. Dickson (Ed.) *The Wild Turkey: Biology and Management* (Mechanicsburg, PA: Stackpole Books), pp. 6–17.
- [3] Evans, T., 2012, Global poultry trends 2012. Available online at: <http://www.thepoultrysite.com/articles/2624/global-poultry-trends-2012-turkey-output-slowly-heads-towards-six-million-tonnes> (accessed 26/02/2014).
- [4] Anonymous, 2009, International egg and poultry review: turkey production. Available online at: <http://www.thepoultrysite.com/poultrynews/18860/international-egg-and-poultry-review-turkey-production> (accessed 30/07/2014).
- [5] Mosby, H.S. and Handley, C.O., 1943, *The wild turkey in Virginia: its status, life history and management*. (Richmond, VA: Virginia Division of Game, Commission of Game and Inland Fisheries. P-R Projects), pp. 3–122.
- [6] Schorger, A.W., 1966, Original distribution and numbers. In: *The Wild Turkey: Its History and Domestication* (Norman, OK: University of Oklahoma Press), pp. 42–61.
- [7] Trani, M.K., 2002, Terrestrial ecosystems. In: D.N. Wear and J.G. Greis (Eds.) *Southern Forest Resource Assessment. Gen. Tech. Rep. SRS-53* (Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station).
- [8] Glazener, W.C., 1967, Management of the Rio Grande turkey. In: O.H. Hewitt (Ed.) *The Wild Turkey and Its Management* (Washington, DC: The Wildlife Society), pp. 453–492.
- [9] Ligon, J.S., 1946, *History and management of Merriam's wild turkey* (Santa Fe: New Mexico Game and Fish Commission, University of New Mexico Publ. Biol. 1), pp. 1–84.
- [10] Thomas, Jr., E.D., 2010, *How Sportsmen Saved the World: The Unsung Conservation Effort of Hunters and Anglers*, Guilford, CT: Lyons Press, pp.1-231.
- [11] Smiley, G., 2008, The concise encyclopedia of economics. Great Depression. *Library of Economics and Liberty*. Available online at: <http://www.econlib.org/library/Enc/GreatDepression.html> (accessed 01/03/2014).
- [12] Bailey, R.W and Rinell, K.T., 1967, Management of the eastern wild turkey in the northern hardwoods. In: O.H. Hewitt (Ed.) *The Wild Turkey and Its Management* (Washington, DC: The Wildlife Society), pp. 261–302.
- [13] Kosack, J., 2013, A look back. Available online at: <http://www.portal.state.pa.us/portal/server.pt?open=514&objID=595809&mode=2> (accessed 01/ 03/2014).

- [14] Bailey, R.W. and Putnam, J.J., 1979, The 1979 turkey restoration survey. *Turkey Call* **6**(3), 28–30.
- [15] Holbrook, H.L., 1957, The Francis Marion turkey project; a progress report. *Proceedings of the Annual Conference, Southeast of Game and Fish Commissioners* **11**, 355–363.
- [16] Dill, H.H. and Thornsberry, W.H., 1950, A cannon-projected net trap for capturing waterfowl. *Journal of Wildlife Management* **14**, 132–137.
- [17] Bailey, R. W., 1983, *50 years hunting wild turkeys*. (Delmont, Pennsylvania, USA. Penn's Woods Products, Inc.) pp. 1-5.
- [18] Bailey, R.W., 1959, Preliminary report on wild turkey banding studies as applicable to management in West Virginia. *Proceedings of the National Wild Turkey Symposium* **1**, 146–158.
- [19] Williams, L.E., Jr. and Austin, D.H., 1988, *Studies of the wild turkey in Florida* (Gainesville, FL: Florida Game and Freshwater Fish Commission. Tech. Bull. 10), pp. 20–21.
- [20] Mosby, H.S., 1959, General status of the wild turkey and its management in the United States, 1958. *Proceedings of the National Wild Turkey Symposium* **1**, 1–11.
- [21] MacDonald, D. and Jantzen, R.A., 1967, Management of the Merriam's turkey. In: O.H. Hewitt (Ed.) *The Wild Turkey and Its Management* (Washington, DC: The Wildlife Society), pp. 493–534.
- [22] Mosby, H.S., 1975, The status of the wild turkey in 1974. *Proceedings of the National Wild Turkey Symposium* **3**, 22–26.
- [23] Bailey, R.W. and Weakly, N., 1993, A history of the early years, the National Wild Turkey Federation, 1973-1982, part 1. *Turkey Call* **20**(6), 32–37.
- [24] Bailey, R.W. and Weakly, N., 1994, A history of the early years, the National Wild Turkey Federation, 1973-1982, part 2. *Turkey Call* **21**(1), 36–39.
- [25] Bailey, R.W., 1980, The wild turkey status and outlook 1979. *Proceedings of the National Wild Turkey Symposium* **4**, 1–9.
- [26] Bailey, R.W., Dennett, D., Jr., Gore, H., Pack, J., Simpson, R. and Wright, G., 1980, Basic considerations and general recommendations for trapping the wild turkey. *Proceedings of the National Wild Turkey Symposium* **4**, 10–23.
- [27] Kennamer, J.E., 1983, *Status of the Wild Turkey in the United States* (Edgefield, SC: The National Wild Turkey Federation), pp. 36–43.
- [28] Bailey, R.W. and Weakly, N., 1994, A history of the early years, the National Wild Turkey Federation, 1973-1982, part 4. *Turkey Call* **21**(3), 44–49.
- [29] Dickson, J.G. and Groves, E., 1997, The second era (1983-1993) wild turkey restoration: a crowning moment for conservation. *Turkey Call* **24**(2), 90–99.
- [30] Kennamer, J.E. and Kennamer, M.C., 1996, Status and distribution of the wild turkey in 1994. *Proceedings of the National Wild Turkey Symposium* **7**, 203–211.
- [31] Tapley, J.L., Abernethy, R.K. and Kennamer, J.E., 2007, Status and distribution of the wild turkey in 2004. *Proceedings of the National Wild Turkey Symposium* **9**, 21–31.

- [32] Tapley, J.L., Abernethy, R.K. and Kennamer, J.E., 2001, Status and distribution of the wild turkey in 1999. *Proceedings of the National Wild Turkey Symposium* **8**, 15–22.
- [33] Tapley, J.L., Abernethy, R.K., Hatfield, M. and Kennamer, J.E., 2011, Status and distribution of the wild turkey in 2009. *Proceedings of the National Wild Turkey Symposium* **10**, 19–30.
- [34] Eriksen, R.E., Akridge, M.D., Brown, T.A., Hughes, T.W., Penner, C.A., Scott, K.B., 2015, Status and distribution of wild turkeys in the United States: 2014 status. *Proceedings of the National Wild Turkey Symposium* **11**, 7–18.
- [35] Andersen, B., Crow, T.R., Lietz, S.M., Stearns, F., 1996, *Transformation of a landscape in the upper mid-west, USA: The history of the lower St. Croix river valley, 1830 to present*. USDA Forest Service, North Central Forest Experiment Station, Forestry Sciences Laboratory, 5985 Highway L, Rhinelander, WI 54501.