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**DEPARTMENT OF THE INTERIOR**

**Fish and Wildlife Service**

**50 CFR Part 17**

**[Docket No. FWS-R5-ES-2015-0001; 50120-1113-000]**

**RIN 1018-AY05**

**Endangered and Threatened Wildlife and Plants; Removing the Eastern Puma (=Cougar) from the Federal List of Endangered and Threatened Wildlife**

**AGENCY:** Fish and Wildlife Service, Interior.

**ACTION:** Final rule.

**SUMMARY:** We, the U.S. Fish and Wildlife Service (Service), determine the eastern puma (=cougar) (*Puma (=Felis) concolor cougar*) to be extinct, based on the best available scientific and commercial information. This information shows no evidence of the existence of either an extant reproducing population or any individuals of the eastern puma subspecies; it also is highly

unlikely that an eastern puma population could remain undetected since the last confirmed sighting in 1938. Therefore, under the authority of the Endangered Species Act of 1973 (Act), as amended, we remove this subspecies from the Federal List of Endangered and Threatened Wildlife.

**DATES:** This rule is effective [INSERT DATE 30 DAYS AFTER THE DATE OF PUBLICATION IN THE *FEDERAL REGISTER*].

**ADDRESSES:** This final rule is available on the Internet at <http://www.regulations.gov> under Docket No. FWS-R5-ES-2015-0001. Comments and materials received, as well as supporting documentation used in rule preparation, will be available for public inspection, by appointment, during normal business hours at the Service's Maine Fish and Wildlife Service Complex, Ecological Services Maine Field Office, 306 Hatchery Road, East Orland, Maine 04431, and on the Eastern Cougar website at: <http://www.fws.gov/northeast/ecougar>.

**FOR FURTHER INFORMATION CONTACT:** Martin Miller, Northeast Regional Office, telephone 413-253-8615, or Mark McCollough, Maine Field Office, telephone 207-902-1570. Individuals who are hearing or speech impaired may call the Federal Relay Service at 1-800-877-8337 for TTY assistance. General information regarding the eastern puma and the delisting process may also be accessed at: <http://www.fws.gov/northeast/ecougar>.

## **SUPPLEMENTARY INFORMATION:**

### **Executive Summary**

*Why we need to publish a rule*—Under the Act, a species warrants protection through

listing if it is endangered or threatened. Conversely, a species may be removed from the Federal List of Endangered and Threatened Wildlife (List) if the Act's protections are determined to be no longer required based on recovery, original data error, or extinction. Removing a species from the List can be completed only by issuing a rule. This rule finalizes the removal of the eastern puma (=cougar) (*Puma (=Felis) concolor cougar*) from the List due to extinction, as proposed on June 17, 2015 (80 FR 34595).

*The basis for our action*—Our decision to remove the eastern puma from the List due to extinction is based on information and analysis showing that the eastern puma likely has been extinct for many decades, long before its listing under the Act. Eastern puma sightings have not been confirmed since the 1930s, and genetic and forensic testing has confirmed that recent validated puma sightings in the East, outside Florida, were animals released or escaped from captivity, or wild pumas dispersing eastward from western North America.

*Peer review and public comment*—During two comment periods on the proposed rule (June 17 through August 17, 2015 [80 FR 34595, June 15, 2015]; and June 28 through July 28, 2016 [81 FR 41925, June 28, 2016]), we sought review from the public and from independent scientific experts to ensure that our final determination responds to public concerns and is based on scientifically sound data, assumptions, and analyses. We received comments from the public on several substantive issues, including the basis for delisting, the likelihood that any undetected population of eastern puma continues to exist, the potential for restoring pumas to Eastern North America, and protection of nonlisted pumas occurring within the eastern puma's historical range. We also received peer review comments from scientists with expertise in puma population ecology, management, demographics, conservation, and population genetics. Expert comments focused primarily on the likelihood of eastern puma extinction and on North American puma

taxonomy. In preparing the final rule, we considered all comments and information received during both comment periods. The proposed rule and other materials relating to this final rule can be accessed at: <http://www.regulations.gov> under Docket No. FWS–R5–ES–2015–0001.

### **Previous Federal Actions**

The eastern puma (=cougar) was originally listed as an endangered species on June 4, 1973 (38 FR 14678). On June 17, 2015, the Service published a proposed rule (80 FR 34595) to remove the eastern puma from the List, with a comment period extending through August 17, 2015. The comment period for the proposed rule was subsequently reopened on June 28, 2016 (81 FR 41925). For more information on previous Federal actions concerning the eastern puma, refer to the proposed rule available at: <http://www.regulations.gov> under Docket No. FWS–R5–ES–2015–0001.

### **Species Information**

Here we summarize the biological and legal basis for delisting the eastern puma. For more detailed information, refer to the proposed rule and supplemental documents available at: <http://www.regulations.gov> under Docket No. FWS–R5–ES–2015–0001.

The eastern puma (*Puma* (= *Felis*) *concolor cougar*) is federally listed as a subspecies of puma. The puma is the most widely distributed native wild land mammal in the New World. At the time of European contact, it occurred through most of North, Central, and South America. In North America, breeding populations still occupy approximately one-third of their historical range but are now absent from eastern regions outside of Florida. The puma was documented historically in a variety of eastern habitats from the Everglades in the Southeast to temperate

forests in the Northeast. Aside from presence reports, few historical records exist regarding the natural history of the eastern puma subspecies.

### *Taxonomy*

The eastern puma has a long and varied taxonomic history, as described in the Service's 5-year status review of this subspecies (USFWS 2011, pp. 29–35). Until recently, standard practice was to refer to the puma species as *Puma concolor* (Linnaeus 1771) and the eastern puma subspecies as *Puma concolor couguar*. The taxonomic assignment of puma subspecies is now under question; at issue is whether North American pumas constitute a single subspecies or multiple subspecies. As discussed in detail in our response to comment 4 (see **Summary of Comments and Responses**, below), the Service acknowledges the broad acceptance within the scientific community of a single North American subspecies, identified as *Puma concolor couguar* (applying the scientific nomenclature that has been used to refer to the eastern puma subspecies to all North American pumas), based on genetic analysis. However, the Service has not yet conducted a comprehensive assessment of all available scientific information pertinent to North American puma taxonomy, including any potential subspecies. We will undertake a comprehensive assessment of North American puma taxonomy in our status assessment for the Florida panther, and will determine whether to accept a single North American subspecies taxonomy. Since determining whether an entity is listable is relevant only to *extant* species, such a comprehensive treatment is unnecessary for the eastern puma, but will be necessary for completing the status assessment for the Florida panther. In the absence of a comprehensive analysis concluding that the Young and Goldman (1946) taxonomy is no longer the best

available information on taxonomy, we evaluate for purposes of this rule the status of the listed entity—the eastern puma subspecies—and whether or not it has become extinct.

### *Biology and Life History*

There is little basis for believing that the ecology of eastern pumas was significantly different from puma ecology elsewhere on the continent. Therefore, in lieu of information specific to eastern pumas, our biological understanding of this subspecies relies on puma studies conducted in various regions of North America and, to the extent possible, from eastern puma historical records and museum specimens. This information is detailed in the 2011 status review for the eastern puma (USFWS 2011, pp. 6–8).

### *Historical Range, Abundance, and Distribution*

Details regarding historical eastern puma abundance and distribution are provided in USFWS 2011 (pp. 8–29, 36–56). Although records indicate that the eastern puma was formerly wide-ranging and apparently abundant at the time of European settlement, only 26 historical specimens from seven eastern States and one Canadian province reside in museums or other collections. Based on this evidence, Young and Goldman (1946) and the 1982 recovery plan for the eastern cougar (USFWS 1982, pp. 1–2) generally described the eastern puma’s historical range as southeastern Ontario, southern Quebec, and New Brunswick in Canada, and a region bounded from Maine to Michigan, Illinois, Kentucky, and South Carolina in the Eastern United States. The most recently published assessment of the eastern puma in Canada, conducted by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), described the subspecies’ range as Ontario, Quebec, and eastern Canada (Scott 1998, pp. v, 10, 29-30). Scott

(1998, p. v, 29) indicated that “Manitoba is the easternmost part of Canada for which there is objective evidence of the virtually uninterrupted survival of a cougar population from European settlement to the present. Genetically, this population must have been closely related to, if not identical with, the original eastern cougars in western Ontario, and less closely related to the original cougars in Quebec and the Maritimes.” Note, however, our response to comment 11 (see **Summary of Comments and Responses**), which indicates that despite the persistent presence of pumas in Manitoba, we cannot infer from the available evidence that puma occurrence there represents an extant puma population.

The historical literature indicates that puma populations were considered largely extirpated in Eastern North America (except for Florida and perhaps the Smoky Mountains) by the 1870s and in the Midwest by 1900. Their disappearance was attributed primarily to persecution stemming from fear of large predators, competition with game species, and occasional depredation of livestock. Other causes of eastern puma losses during the late 1800s included declining habitat conditions and the near-extirpation of their primary prey base, white-tailed deer. By 1929, eastern pumas were believed to be “virtually extinct,” and Young and Goldman (1946) concurred that “they became extinct many years ago.”

Conversely, puma records from New Brunswick in 1932 and Maine in 1938 suggest that a population may have persisted in northernmost New England and eastern Canada. In the Service’s 1976 status review (Nowak 1976), R.M. Nowak professed his belief that the large number of unverified sightings of pumas constituted evidence that some populations had either survived or become reestablished in the central and eastern parts of the continent and may have increased in number since the 1940s. Similarly, R.L. Downing, as stated in the Eastern Cougar Recovery Plan (USFWS 1982, pp. 4, 7), had thought it possible that a small population may have

persisted in the southern Appalachians into the 1920s; however, his investigations during preparation of the recovery plan led him to conclude that “no breeding cougar populations have been substantiated within the former range of *F.c. couguar* since the 1920s” (USFWS 1982, p. 6). This analysis and conclusion were shared by F. Scott in his COSEWIC review (Scott 1998, entire).

Thus, the most recent confirmed eastern puma sightings date from the mid-1800s to around 1930. Confirmed reports of pumas in Eastern North America (outside Florida) since then have been shown to be either western puma dispersers, as in Missouri, or released or escaped animals, as in Newfoundland.

Although habitat conditions now appear to be suitable for puma presence in various portions of the historical range described for the eastern puma, the many decades of both habitat and prey losses belie the sustained survival and reproduction of this subspecies over that time. A more detailed discussion of the historical status, current confirmed and unconfirmed puma sightings, potential habitat, and legal protection of the eastern puma in the States and provinces is provided in the 5-year status review (USFWS 2011, pp. 8–26).

### **Summary of Changes from the Proposed Rule**

We have not made substantive changes from the proposed rule (80 FR 34595, June 17, 2015). In this final rule, we have added or corrected text to clarify information and respond to input received during the public and peer review comment periods regarding the proposal. These changes have been incorporated into this final rule as presented below.

### **Summary of Comments and Responses**



In the proposed rule (80 FR 34595, June 15, 2015), we requested that all interested parties submit written comments on the proposal by August 17, 2015. We also solicited peer review of the scientific basis for the proposal by reopening the comment period on June 28, 2016 (81 FR 41925). As appropriate, Federal and State agencies, tribes, scientific organizations, and other interested parties were contacted directly and invited to comment on the proposal. Press releases inviting general public comment were widely distributed, and notices were placed on Service websites.

We did not receive any requests for a public hearing. During the two public comment periods, a total of 75 letters submitted from organizations or individuals addressed the proposed delisting of the eastern puma. Attached to one letter was an appeal containing 2,730 names and addresses of individuals opposed to removing the eastern puma from the List. Many letters contained applicable information, which has been incorporated into this final rule as appropriate. Substantive public comments and peer review comments, with our responses, are summarized below.

#### *Comments from the States*

(1) *Comment:* The North Carolina Wildlife Resources Commission (NCWRC) concurred with our finding that pumas are extirpated from the State of North Carolina. Based on that finding and its consideration of the Service's 2011 status review, the NCWRC indicated there is sufficient evidence to remove the eastern puma from the List.

*Our response:* We agree with the NCWRC.

(2) *Comment:* The Commonwealth of Virginia Department of Game and Inland Fisheries (VDGIF) supports delisting of the eastern puma consistent with our 2011 finding

(USFWS 2011) that all known populations have been extirpated from their former range. The VDGIF believes that any wild pumas which may appear in the future will prove to be dispersers from western populations.

*Our response:* We agree with the VDGIF.

### *Public comments*

(3) *Comment:* Several commenters expressed concern that delisting would prevent the Service from reestablishing or reintroducing pumas in Eastern North America where suitable habitat and prey populations now occur. As a top-level carnivore, pumas are needed to restore balance to ecosystems in Eastern North America, where this role in biotic communities has been missing for over a century. Some commenters cited Cardoza and Langlois (2002) and Maehr et al. (2003), who encouraged proactive leadership on the part of government agencies to assess the possibility of reintroducing pumas to Eastern North America.

In commenting on the ecological importance of pumas as apex predators, several reviewers noted that ungulate populations (like white-tailed deer) have overpopulated in their absence. Ungulate overpopulation may cause overbrowsing, “trophic cascades,” and reduced biodiversity (Goetch et al. 2011). It may also lead to declines in mast production (McShea et al. 2007), understory recruitment of certain tree species, and reduced ground-nesting bird habitat (Rawinsky 2008) across the eastern deciduous forest. In addition to maintaining biodiversity and ecosystem functioning (Ripple et al. 2014), restoring pumas would reduce risk to the public from vehicle collisions with deer and other large ungulates (Gilbert et al. 2016) and would reduce human health issues associated with deer ticks as a vector for Lyme disease (Kilpatrick et al. 2014). Some commenters noted that restoring pumas to unoccupied portions of their historical

range would be similar to the Service's restoration of wolves to unoccupied portions of their historical range.

Finally, some commenters argued that the reestablishment or reintroduction of other puma subspecies into the historical range of the eastern puma should not be considered until the status of the eastern puma as extinct is officially recognized through removal of the subspecies from the List. They indicated that delisting the eastern puma could eliminate complications associated with Federal listing and open the door for State restoration projects.

*Our response:* The Service acknowledges the science concerning the important ecological role that pumas and other large carnivores serve as apex predators (e.g., Kunkel et al. 2013, Ripple et al. 2014, Wallach et al. 2015) as well as the ecological consequences of high populations of ungulates (e.g., Russell et al. 2001, Ripple and Beschta 2006, McShea et al. 2007, Rossell et al. 2007, Baiser et al. 2008, Rawinsky 2008, Beschta and Ripple 2009, Goetsch et al. 2011, Brousseau et al. 2013, Cardinal et al. 2012a, Cardinal et al. 2012b). We agree that ecological science supports the contention that healthy populations of large carnivores can maintain balance in ecosystems and ameliorate adverse effects such as damage to native vegetation from grazing ungulates (e.g., Ripple et al. 2010) and population increases of small carnivores (e.g., LaPoint et al. 2015). We also acknowledge the potential value of puma recolonization associated with reducing vehicle–deer collisions (Gilbert et al. 2016).

The Service recognizes that within the historical range of the eastern puma there are large, intact areas of habitat with suitable prey resources and little human disturbance that could support puma populations (USFWS 2011, pp. 8, 11–25). Scientific articles published before and after our 2011 review conclude that potential habitat for pumas occurs in the Southeast (Keddy 2009), Georgia (Anco 2011), the Midwest (Smith et al. 2015), the Adirondack region of New

York (Laundre 2013), numerous locations in New England (Glick 2014), and the Great Lakes region (O'Neil et al. 2014). Some authors predict that pumas will continue to expand their range eastward and naturally recolonize some areas of Eastern North America (LaRue and Nielsen 2014).

Despite the apparent opportunities for puma recolonizations or reintroductions, the Service does not have the authority under the Act to pursue establishment of other puma subspecies within the historical range of the eastern puma. Furthermore, while the purpose of the Act is to provide a means whereby the ecosystems upon which endangered and threatened species depend may be conserved, the Act gives the Service the authority to pursue ecosystem conservation only to the extent necessary to recover listed species. Thus, the Service cannot maintain the extinct eastern puma subspecies on the List for the purpose of facilitating restoration of other, nonlisted puma subspecies, whether to address overpopulation of deer and other ungulates or to achieve any other objective.

Delisting the eastern puma subspecies, in and of itself, would not foreclose future opportunities to reestablish pumas in Eastern North America. Although extinction of the eastern puma obviously precludes reintroduction of this particular subspecies, we concur that officially recognizing the eastern puma as extinct by removing it from the List could eliminate any perceived complications associated with the establishment of other, nonlisted puma populations into the historical range of the eastern puma. We note that authority over the establishment of nonlisted puma populations resides with the States.

*(4) Comment:* Several commenters questioned the conclusions in the Service's 2011 status review (pp. 29–35) regarding the taxonomy of the eastern puma subspecies. One individual asked why the Service concluded that “Young and Goldman's (1946) taxonomy of

cougars was inadequate, even by the standards of their time...” yet incorporated this flawed taxonomy into its delisting recommendation. Several reviewers indicated that the published range maps of the subspecies were vague and poorly defined, and that the locations of specimens used to determine these ranges were not depicted on the maps. In addition, several reviewers commented that the best available science includes the genetic data indicating that all North American pumas should be classified as a single subspecies (Culver et al. 2000). Some commenters suggested that recent evidence of pumas dispersing far from the Dakotas supports the hypothesis that the North American puma functions as one extensive population with no restrictions to mating.

A few commenters asserted that, based on the widespread acceptance of genetic information leading to the recommendation to revise the taxonomy to recognize all pumas in North America as a single subspecies, the Service should delist the eastern puma subspecies on the basis of original data error rather than extinction. They also stated that, were the Service to determine that delisting is called for due to data error, we must withdraw the proposed rule and publish a new proposal explaining our rationale.

Finally, some commenters suggested that, to resolve these taxonomic questions, the Service should conduct a complete taxonomic review and analysis of the subspecies status of North American pumas, including genetic, morphological, ecological, and behavioral considerations, prior to making a listing determination.

*Our response:* The 5-year review in 2011 recommended that the Service propose delisting the eastern puma, and that recommendation was based on extinction (p. 57) and not on taxonomy. We note that delisting the eastern puma based on either extinction or original data

error would lead to the same outcome, that is, the eastern puma's removal from the Federal List of Endangered and Threatened Wildlife.

The 2011 status review recognized that more-recent genetic information introduced "significant ambiguities" in the species taxonomy that Young and Goldman had outlined in 1946. However, rather than recommending delisting as a result of those ambiguities, the status review recommended that a full taxonomic analysis be conducted to determine whether the taxonomy should be revised (p. 35). Since completion of our eastern puma status review in 2011, there appears to have been increasing acceptance of scientific nomenclature indicating a single subspecies, *Puma concolor couguar* (Kerr 1792), in North America. For example:

- The Smithsonian Institution's Museum of Natural History documents current taxonomy ([http://vertebrates.si.edu/msw/mswcfapp/msw/taxon\\_browser](http://vertebrates.si.edu/msw/mswcfapp/msw/taxon_browser)) and recognizes a single North American subspecies of puma, *P.c. couguar*, citing W.C. Wozencraft (Wilson and Reeder 2005).
- The Federal government's Interagency Taxonomic Information System (ITIS, <http://www.itis.gov/>), with the Department of the Interior and the Service as partners, aims to set governmental taxonomic standards and "to incorporate classifications that have gained broad acceptance in the taxonomic literature and by professionals who work with the taxa concerned." It is important to note, however, that the Service does not consider ITIS to be a legal authority for statutory or regulatory purposes. The ITIS acknowledges a single North American subspecies, *P.c. couguar*, and calls all separate North American subspecies (=synonyms) invalid taxa, based on expert input from A.L. Gardner (Curator of North American Mammals and Chief of Mammal Section, National Biological Services, Smithsonian Institution), W.C. Wozencraft (Wilson and Reeder

2005), and prior references (Hall 1981, Currier 1983, Wilson and Reeder 1993, and Wilson and Ruff 1999).

- In 2009, the Convention for the International Trade of Endangered Species of Wild Flora and Fauna (CITES) received a proposal from Canada to review the taxonomy and classification of the genus *Puma* (<https://cites.org/sites/default/files/eng/com/ac/24/E24-18-02.pdf>). CITES reviewed the standard nomenclatural procedures, and reviewers recommended accepting a single North American subspecies, *P.c. cougar*. The Convention referred this “technical issue” to the Animals Committee for review. As of February 5, 2015, the CITES Appendices (<https://www.cites.org/eng/app/appendices.php>) continued to list the subspecies *P.c. cougar* and *P.c. coryi* as separate subspecies. The Animals Committee next reviewed the status of North American pumas on September 3, 2015 (<https://cites.org/sites/default/files/eng/com/ac/28/E-AC28-20-03-02.pdf>), when Canada and the United States proposed that the eastern puma (*P.c. cougar*) and the Florida panther (*P.c. coryi*) subspecies be transferred to Appendix II, because “*P.c. cougar* is considered extinct...” and there is ample protection under the Act for the Florida panther. Concerning taxonomy, “There is uncertainty regarding the traditional subspecies classification of *Puma concolor*. Recent genetic work suggests that most traditionally described subspecies are poorly differentiated (Culver et al. 2000), and the new proposed taxonomy has been adopted by the most recent version of Wilson and Reeder (2005) and by the International Union for the Conservation of Nature (IUCN, 2008). CITES continues to acknowledge the subspecies *coryi* and *couguar* based on Wilson and Reeder (2nd Edition 1993).” On October 5, 2016, CITES considered a formal proposal to move

all North American pumas to Appendix II

([https://cites.org/sites/default/files/eng/cop/17/prop/CA\\_puma.pdf](https://cites.org/sites/default/files/eng/cop/17/prop/CA_puma.pdf)), which concluded that the eastern puma subspecies was extinct by 1900. The CITES Committee accepted the proposal by consensus and also agreed that the taxonomic reference for *Puma concolor* would henceforth be Wilson and Reader (2005), with all North American cougars belonging to a single subspecies, *P.c. cougar*

([https://cites.org/sites/default/files/eng/cop/17/CITES\\_CoP17\\_DECISIONS.pdf](https://cites.org/sites/default/files/eng/cop/17/CITES_CoP17_DECISIONS.pdf), last accessed June 5, 2017).

- The IUCN now recognizes one subspecies of cougar (*Puma concolor*) in North America: *P.c. cougar*. Concerning its most recent taxonomic decisions, “A more recent study of mtDNA in pumas throughout their range, although with lower sample sizes, supports only two main geographical groupings of North America populations having colonized since circa. 8,000 years before present (Caragiulo et al. 2013) ... On this basis, we tentatively recognize two subspecies within *Puma concolor*: *Puma concolor concolor* ...[and] *Puma concolor cougar* (Kerr 1792)” (Kitchener et al. 2017, p. 33).
- The Global Biodiversity Information Facility (GBIF, <http://www.gbif.org/>) recognizes one subspecies of cougar in North America, *P.c. cougar*. All other subspecies are considered synonyms for *P.c. cougar* based on the conclusions of ITIS, January 3, 2011.
- NatureServe currently acknowledges several subspecies, including *P.c. cougar* and *P.c. coryi*, but notes, “... mtDNA analysis by Culver et al. (2000) indicated that *Puma concolor* was genetically homogeneous in overall variation across North America, relative to Central and South American populations”



*([http://explorer.natureserve.org/servlet/NatureServe?searchSpeciesUid=ELEMENT\\_GLOBAL.2.101183](http://explorer.natureserve.org/servlet/NatureServe?searchSpeciesUid=ELEMENT_GLOBAL.2.101183), last accessed June 5, 2017).*

Although some authorities indicate acceptance of a taxonomy identifying a single North American puma subspecies (USFWS 2011, pp. 29-35), others continue to recognize the eastern puma as a separate subspecies. This has created an ambiguous situation that does not clearly replace Young and Goldman as the best scientific and commercial data available on puma taxonomy. We conclude that, despite its deficiencies, Young and Goldman (1946) remains the best available taxonomic information for the puma. We anticipate that in our status assessment for the Florida panther, now underway, we will complete a comprehensive taxonomic treatment that considers all other available scientific information—including morphological, ecological, and behavioral factors, in addition to genetics.

Notwithstanding the commenters' questions about the taxonomy of the species, we continue to base the delisting of the eastern puma on extinction for several reasons. First, although the Act and its implementing regulations at 50 CFR 424.11(d) allow for species to be delisted for reasons of recovery, extinction, or error in the original data for classification, neither the Act nor the implementing regulations compel the Service to choose one basis for delisting over another when more than one basis is available.

Second, the eastern puma's existence has been questioned for decades—long before its listing as an endangered species under the Act. We therefore place importance on officially acknowledging our finding, through this rulemaking, that the listed entity is extinct. Clear recognition of this finding should also forestall any speculation that we have discovered evidence of the existence of eastern pumas, a perception that could be triggered by changing the basis for delisting from extinction to original data error.

Third, because the eastern puma has likely been extinct since the early to mid-1900s, and because its existence had not been confirmed at the time of listing, delisting due to extinction in this case could be considered a delisting due to original data error that is more precisely described as “prior extinction.” And because the eastern puma’s existence was questioned long before listing, while new information bringing its taxonomy into doubt did not appear until well after listing, original data error based on prior extinction reasonably has precedence over original data error based on a more-recent taxonomic understanding.

Fourth, although delisting the eastern puma due to taxonomic error would have no immediate effect on the listed status of the Florida panther, it could presuppose the taxonomic status of *P.c. coryi* and thus cause confusion regarding the current protections afforded the Florida panther under the Act.

Finally, accepting that all pumas in North America are a single subspecies would not fully address the question as to whether the eastern puma is a listable entity. When a vertebrate animal is found not to be a valid species or subspecies, a determination that it is not a listable entity requires that it further be found not to be a “distinct population segment” (DPS) of a vertebrate species as defined in the Act and in the 1996 Interagency Distinct Population Segment policy (61 FR 4722, February 7, 1996). The eastern puma does not qualify as a DPS because it is extinct (see also our response to comment 5). Extinction, therefore, is the most fundamental basis for delisting, because it is justified whether or not the eastern puma ever constituted a taxonomically listable entity.

In sum, while the best available scientific information provides some evidence that North American pumas constitute a single subspecies, taxonomic revision awaits full resolution and does not constitute the most fundamental basis for delisting the eastern puma. The best available

information also indicates that the entity described as the eastern puma was extirpated throughout its historical range long before its listing, and that this is a primary and sufficiently proven basis for delisting.

We note that the consequences of delisting the eastern puma with regard to Federal protection of dispersing western pumas are the same whether delisting were to be based on extinction or taxonomic error (see our response to comment 3, above). Western pumas dispersing into the historical range of the eastern puma subspecies currently lack protection under the Act and would not receive protection under either delisting scenario. Dispersing western pumas receive, and will continue to receive, those protections afforded by individual States.

*(5) Comment:* We received comments that the eastern puma should be re-listed as a DPS so that dispersing pumas from western populations could be protected from take under the Act. One person commented that the eastern puma should be re-listed under the significant portion of the range (SPR) provision of the Act.

*Our response:* Our DPS policy (61 FR 4722, February 7, 1996) requires that, for a population to be determined to be a DPS, it must be discrete, significant, and endangered or threatened. Because we have determined that the eastern puma subspecies no longer exists, it cannot be considered to be currently discrete, significant, and endangered or threatened, and so cannot be a DPS.

The Service's 2014 SPR policy (79 FR 37577, July 1, 2014) states that listing considerations are based solely on the status of the species in its current range. Regardless of the status of our 2014 SPR policy, the Service maintains this position. Because we have determined that the eastern puma subspecies is extinct—that is, that it does not exist in any part of its range

and, therefore, has no current range—it cannot be considered endangered or threatened throughout all of its range or in any portion of its range. Therefore, a continued listing of the eastern puma based on endangered or threatened status within a significant portion of its range is not possible.

*(6) Comment:* Several reviewers pointed to scientific evidence that populations of eastern pumas still exist, primarily in Canada. Some commented that pumas are nearly impossible to detect and can live in suboptimal habitats (citing Stoner et al. 2006, Stoner et al. 2013a, and Stoner et al. 2013b), and others noted the tens of thousands of eyewitness reports (Glick 2014). Some commented that it is impossible to prove extinction and provided examples of species that have gone undetected for many decades or were thought to be extinct before being rediscovered.

*Our response:* We addressed many of these points in our 2011 status review. The Service continues to conclude that the best available scientific information, including information published since 2011, supports our finding that breeding populations of pumas no longer exist in Eastern North America outside of Florida. Although there is evidence of individual pumas (not breeding populations), there is no proof whatsoever that any pumas discovered since the 1930s within the eastern puma’s historical range are members of the listed eastern puma subspecies.

Commenters cited Cumberland and Demsey (1994), Cardoza and Langlois (2002), Maehr et al. (2003), Bertrand et al. (2006), Rosatte (2011), Mallory et al. (2012), Lang et al. (2013), and Glick (2014) as corroborating documentation for the occurrence of extant puma populations in eastern Canada. Our review of these sources found that Cumberland and Demsey (1994) documented a single puma (from tracks) in New Brunswick in 1992, concluding that “these data

lend little support to the existence of a remnant Eastern Cougar population. It is possible that the animal responsible for the tracks could have been an escaped or released animal.” Bertrand et al. (2006) documented hair samples from two pumas in Fundy National Park in New Brunswick in 2003. One of these was from South America, indicative of an escaped or released pet, and there has been no further evidence confirming the existence of pumas in New Brunswick since 2003. Lang et al. (2013) collected 19 confirmed puma hair samples in eastern Canada from scratching post stations from 2001 to 2012. Several of these samples likely were from the same animal. Two samples were shown to be from the same pumas reported by Bertrand et al. (2006), while six were Central and South American haplotypes (assumed to be released pets), and 10 were of North American origin (whether captive or wild was undetermined). They also evaluated the origin of three known mortalities from 1992 to 2002. One was of South American origin, one was of North American origin (uncertain whether captive origin or wild), and one was of unknown origin. From these data, Lang et al. (2013) concluded that pumas have been present in eastern Canada but provide no confirmation of the existence of the eastern puma or evidence of any breeding population of pumas. Rosatte (2011) documented 21 puma occurrences with a high degree of certainty in Ontario from 1998 to 2010, including 15 confirmed tracks, 1 hair sample consistent with pumas, genetic confirmation of 2 scats, and 3 photographs “consistent with a cougar.” Mallory et al. (2012) collected eight “potential” puma hairs (Sudbury, Ontario) identified by hair scale pattern, and reanalyzed a scat collected in 2004 from Wainfleet, Ontario, and reported in Rosatte (2011). Mallory et al. (2012) reported that trapping records from 1919 to 1984 contained no information on puma pelts sold in Ontario or in eastern Canada except for eight animals sold in Quebec from 1919 to 1920; the origin of these animals (Quebec or western Canada) cannot be confirmed. Finally, Rosatte et al. (2015) documented six additional

occurrences in Ontario from 2012 to 2014, including one scat sample (North or South America haplotype not reported), three photographs, one set of tracks, one pregnant female shot (captive origin), and one young male captured (believed to be of captive origin).

Most of these authors (e.g., Cumberland and Demsey 1994, Bertrand et al. 2006, Rosatte 2011, Lang et al. 2013) acknowledge that the pumas reported recently in eastern Canada were most likely escaped or released pets or dispersers from areas supporting extant populations, as we concluded in our 2011 status review. Bertrand et al. (2006) reported that the two pumas documented in New Brunswick could be members of a remnant population, although this conclusion is contradicted by the fact that they recognized one of the two as being of South American origin. Rosatte (2011) believed that pumas may not have been extirpated in Ontario: “In my opinion, the majority of Cougars currently in Ontario are most likely a genetic mixture of escaped/released captives (or their offspring), immigrants (or their offspring), and/or native animals ... In view of this, at least some native Cougars in Ontario may have survived the decimation of eastern Cougar populations in the 1800s. This would be feasible, given the size of Ontario (area of more than 1 million km<sup>2</sup>) and the remoteness of the province, especially in the north. However, the presence of Cougars in Ontario between the 1930s and 1980s may also have been the result of immigration from the west or escaped/released captive animals (Bolgiano and Roberts 2005).” Mallory et al. (2012) indicated that the origin of the pumas in Ontario “remains unclear,” but added, “Nevertheless, sightings of Cougars with kittens and reports of young animals suggest that a breeding population exists in Ontario and adjacent provinces (Wright 1953, Nero and Wrigley 1977, Gerson 1988, Rosatte 2011).” We note that Bertrand et al. (2006), Rosatte (2011), and Mallory et al. (2012) provide no confirmed evidence of adult or lactating female pumas, kittens, or breeding, or of an abundance of confirmed occurrences

typically associated with small puma populations such as those occurring in Nebraska, the Dakotas, and Florida. Neither do they document any evidence of a continuous presence of pumas in their study areas since the late 1800s.

Given the absence of trapping records and confirmed historical records in eastern Canada since the late 1800s, the best available information points to the extirpation of puma populations in this portion of the eastern puma's historical range. Areas of Canada most likely to have been historically occupied by eastern pumas (southern Ontario and Quebec, New Brunswick, and Nova Scotia) were extensively trapped and logged, and evidence of a small breeding population would, in all probability, have been noted. With no confirmation of breeding pumas in eastern Canada for many decades, the Service concludes that those puma populations were extirpated. Further, because there is no indication of breeding or the abundant evidence of presence typically associated with small, reproducing populations, the Service concludes that the individual pumas occasionally found in Eastern Canada and the Eastern United States (outside Florida) are escaped or released pets or animals that have dispersed from western populations (or, rarely, Florida); refer to Comment 16 below for more detail).

One commenter mistakenly indicated that, among other investigators, Cardoza and Langlois (2002) and Maehr et al. (2003) provide substantial scientific evidence that eastern pumas continue to exist. On the contrary, Cardoza and Langlois (2002) shared skepticism of the plethora of anecdotal reports and sightings, concluding that "the search for cougars in the East must be conducted as a scientific endeavor." They encouraged the Service to delist the eastern puma if it is extinct or re-list it as a DPS if any populations exist. If the subspecies were to remain listed, they encouraged the Service to revise the recovery plan, because "agencies have failed to meet the objective of ... having found or established ..." at least three self-sustaining

populations. Maehr et al. (2003) called for recovery of pumas in Eastern North America but provided no documentation of a persistent population outside of Florida.

*(7) Comment:* We received several comments stating that pumas are wary and cryptic and could possibly escape detection for many years (citing Stoner et al. 2006, 2013).

*Our response:* Using data on puma harvests in Utah, Stoner et al. (2013) predicted that remote habitats are more likely to harbor relict populations of pumas, regardless of habitat quality, when range contractions are caused by humans. That is, pumas faced with human-induced range contraction were more likely to recede along a gradient determined by human population density rather than habitat quality; thus, remote, low-quality habitats may have greater refugia value to pumas.

Puma refugia in western North America are often characterized by remote, steep, mountainous terrain with little infrastructure for human access and relatively low ungulate populations (Stoner et al. 2013). In contrast, potential refugia for pumas in Eastern North America (e.g., Laundre 2013, Glick 2014, O’Neil et al. 2014) are neither mountainous nor remote, are readily accessible and continue to be heavily used by humans, and exist in a landscape having much higher human density (Glick 2014). Observing that small puma populations in refugia in Florida, Nebraska, and the Dakotas leave ample evidence of their presence (USFWS 2011, pp. 42-43), we infer that any remnant population of pumas persisting in Eastern North America outside Florida would have left a more or less continuous record of credible evidence since the late 1800s (e.g., pumas trapped and shot, road mortalities, carcasses, tracks, and/or photographs). Although one person commented that species can go many decades without being sighted, or can be thought extinct before being rediscovered (so-called “Lazarus species”), we received no comments providing scientific data indicating that a small, breeding



population of pumas exists, only conjecture that they *may* exist. We agree that the historical record and the best available scientific information presented in our 2011 status review, along with scientific articles published since then, provide evidence that individual pumas (of captive origin or dispersing animals) are encountered with increasing frequency in Eastern North America. Nonetheless, there is no available scientific information, nor has any evidence been provided in comments on the proposed rule, that a breeding population of pumas has persisted in Eastern North America anywhere other than Florida.

*(8) Comment:* Some commenters maintained that delisting a species based on extinction requires absolute certainty that it is gone, while one reviewer requested that the Service document extinction using valid statistical methods with appropriate statistical power. The same reviewer stated that we must clearly demonstrate that the eastern puma subspecies is extinct according to government regulations at 50 CFR 424.11(d)(3).

*Our response:* Proving whether a taxon is extant or extinct presents a dilemma for conservation biologists (Diamond 1987). With regard to delisting on the basis of extinction, the Act's implementing regulations at 50 CFR 424.11(d) describe the burden of proof: "Unless all individuals of the listed species had been previously identified and located, and were later found to be extirpated from their previous range, a sufficient period of time must be allowed before delisting to indicate clearly that the species is extinct."

The IUCN Standards and Petitions Subcommittee (IUCN 2014) has established criteria to track the conservation status of species, and it is instructive to consider those criteria here. The "extinct" category is used by the IUCN when there is evidence beyond a reasonable doubt that the last individual of a taxon has died, recognizing that this is extremely difficult to detect. The IUCN designates a taxon as extinct only after adequate surveys have failed to record the species

and local or unconfirmed reports have been investigated and discounted. Relevant types of evidence supporting an IUCN designation of extinct include the following (Butchart et al. 2006):

- For species with recent last records, the decline has been well documented;
- Severe threatening processes are known to have occurred (e.g., extensive habitat loss, the spread of alien invasive predators, intensive hunting); and
- The species possesses attributes known to predispose taxa to extinction (e.g., flightlessness for birds).

Such evidence should be balanced against the following opposing considerations

(Butchart et al. 2006):

- Recent field work has been inadequate (surveys have been insufficiently intensive/extensive or inappropriately timed, or the species' range is inaccessible, remote, unsafe, or inadequately known);
- The species is difficult to detect (it is cryptic, inconspicuous, nocturnal, nomadic, or silent, or its vocalizations are unknown, identification is difficult, or the species occurs at low densities);
- There have been reasonably convincing recent local reports or unconfirmed sightings; and
- Suitable habitat (free of introduced predators and pathogens, if relevant) remains within the species' known range, and/or allospecies or congeners may survive despite similar threatening processes.

The IUCN has not issued a determination that the eastern puma subspecies, *P.c. cougar*, is extinct, because they have accepted that all pumas in North America constitute one subspecies

that is extant in Florida and western North America. However, the IUCN standards for extinction have been met for the eastern puma.

Many decades have passed since documentation of the last credible eastern puma records, which are contained in the scientific literature and are documented for each State and province within the eastern puma's historical range in our 2011 status review. In addition, severe threats (indiscriminate shooting, trapping, poisoning, deforestation, and extirpation of ungulate prey in much of the range) were evident at the time eastern puma populations were extirpated. Further, pumas are prone to extirpation because of their relatively small population sizes and low population densities, large habitat area requirements, and relatively slow population growth traits (Purvis et al. 2000).

Service-sponsored surveys in the early 1980s in the southern (Downing 1994a, 1994b) and northern (Brocke and VanDyke 1985) parts of the eastern puma's historical range failed to detect any pumas, noting that while difficulty of detection may be expected in the South, it should not be particularly difficult to detect pumas in the North, where there is snow. Our 2011 review also describes numerous other wildlife surveys that did not detect a breeding population of pumas in Eastern North America outside of Florida, and negative survey data are available for many portions of the historical range that still have intact habitat. Despite suggestions that we conduct further surveys, we are not aware of areas within the historical range of the eastern puma with enough evidence of a breeding population to merit the additional effort.

In our 2011 status review, we acknowledged the thousands of reported puma sightings while noting that 90 to 95 percent of these sightings have been shown to be invalid (Brocke 1981, Downing 1984, Hamilton 2006); these invalid reports have generally involved instances of misidentification and, at times, deliberate hoaxes. With respect to increasing frequency of

confirmed puma sightings in recent years, we recognize that suitable habitat is available within the historical range of the eastern puma (see our response to comment 3, above), that past threats have been largely eliminated (with some level of protection for dispersing pumas), and that, according to some biologists, western pumas will continue to expand their range eastward (e.g., LaRue and Nielsen 2015).

There is no regulatory requirement for the Service to conduct statistical analyses in order to draw conclusions about extinction. Both our 2011 status review and our review of scientific information that has become available since then point to overwhelming evidence that the eastern puma subspecies is extinct (see also our earlier responses to comments 2, 7, and 10). Given that the last eastern pumas that were assumed to have existed were killed in Maine (1938) and New Brunswick (1932), the preponderance of scientific evidence fully supports our conclusion that breeding populations of pumas in Eastern North America outside of Florida and, until recent decades, Manitoba have been absent for at least the past 80 years, and that pumas recently sighted within the historical range of the eastern puma are escaped or released pets and western (and, rarely, Florida) dispersers. This conclusion and our use of the best available scientific information were sustained by peer reviewers (see comment 20, below).

*(9) Comment:* One commenter stated that puma populations in South Dakota, North Dakota, and Nebraska may be at the western edge of the eastern puma's historical range and may still retain genetic structure similar to the eastern puma subspecies. Thus, eastern pumas exist and should remain listed.

*Our response:* Pumas were extirpated from most of the Dakotas and Nebraska by the early 1900s (Thompson 2009, Wilson et al. 2010). Since 1970, breeding populations of pumas farther west—within the mapped range of the subspecies *P.c. hipolestes*—have expanded their

ranges into eastern Montana (Desimone et al. 2005), eastern Wyoming (Moody et al. 2005), eastern Colorado, eastern New Mexico, eastern Texas, western North and South Dakota, and Nebraska (Wilson et al. 2010, LaRue et al. 2012). Molecular genetic data show that pumas in the Black Hills of South Dakota are most closely related to pumas in Wyoming (Thomson 2009, Jaurez et al. 2015), and that pumas breeding in Nebraska are likely from Wyoming and South Dakota (Wilson et al. 2010). The Service has found no evidence that pumas in the Dakotas and Nebraska are descended from the eastern puma subspecies.

*(10) Comment:* We received one comment about high hunting mortality in the easternmost puma populations in the Dakotas and Nebraska, raising a concern about fewer eastward-dispersing pumas to potentially recolonize former habitat. This commenter questioned the accuracy of the Service's statements that "cougar populations are growing in the West" and "pumas may continue to disperse into midwestern states."

*Our response:* This comment is outside the scope of this rule, which concerns only the delisting of the eastern cougar due to extinction.

*(11) Comment:* We received one comment that cited Morrison (2015) to dispute information in our 2011 status review indicating that the easternmost extant breeding population of pumas in Canada occurs in Manitoba.

*Our response:* Morrison (2015) stated that a newly colonized area in southwest Saskatchewan and southeast Alberta "now supports the easternmost confirmed breeding population of cougars in Canada." However, the scientific information available at the time of our 2011 review, including the 1998 COSEWIC review of pumas in Canada (Scott 1998), indicated that the easternmost breeding population of pumas occurred in Manitoba (USFWS 2011, pp. 11–12; Hutlet 2005). In addition, Watkins (2006) documented multiple confirmed

puma reports in Manitoba, including two pumas killed in 2004. Another puma, radio tagged in South Dakota, was killed in Manitoba in 2008. Most recently, individual pumas in Manitoba have been trapped in 2011 and killed in 2015 and 2016

([http://www.naturenorth.com/winter/Cougar/Cougar\\_1.html](http://www.naturenorth.com/winter/Cougar/Cougar_1.html)).

Manitoba biologists have documented 20 occurrences of pumas since 2002 (carcasses, tracks, photos), including 6 puma carcasses (3 male and 3 female) since 2004. However, there has been no conclusive evidence of kittens or lactating females, and thus breeding status is uncertain. Biologists are unsure whether an increased number of dispersing pumas in Manitoba is on the cusp of developing a breeding population or whether a small breeding population currently exists (W. Watkins, Manitoba Conservation and Water Stewardship, email dated February 1, 2016). In either event, there is no evidence showing that any of these pumas is the eastern puma subspecies.

*(12) Comment:* We received numerous comments from people who believed they had seen a puma or evidence of a puma (deer kills, vocalizations, missing pets, dead livestock, tracks, game camera photos, collections of alleged sightings on maps, YouTube videos). Some reviewers expressed concern that pumas are dangerous and bound to attack humans, and others asserted that the sheer number of sighting reports proves the existence of eastern pumas.

*Our response:* As discussed in our response to comment 8, above, we acknowledge the thousands of reports of pumas in Eastern North America, but most of these are unverified and, in the majority of cases, represent misidentifications (Downing 1984, Brocke and VanDyke 1985, Hamilton 2006, South Dakota Fish, Wildlife and Parks 2005). Still, confirmed occurrences of pumas within the historical range of the eastern puma are increasing, particularly in the Midwest (LaRue et al. 2012, LaRue and Nielsen 2015). The best available scientific information supports

the conclusion that confirmed occurrences of pumas in Eastern North America are released or escaped pets or dispersers from western populations. In recent decades, pumas have incrementally expanded their breeding population eastward in both Canada and the United States, and LaRue and Nielsen (2014) provide a scientific rationale for why range expansion will likely continue.

*(13) Comment:* One commenter stated that Michigan has a resident population of pumas (citing a 1994 book by D. Evers, *Endangered and Threatened Wildlife of Michigan*, and Swanson and Ruzs 2006), asserting that these are neither escaped or released pets nor transients moving east from South Dakota. The commenter contends that Michigan has a long, uninterrupted history (80 years) of puma presence, including puma reports from 1966 and 1984 (i.e., before the Black Hills population in South Dakota was large enough to have dispersing animals) and further notes that the Michigan Department of Natural Resources (MDNR) verified puma evidence in 2008 and 2009. The commenter suggested that the Service ought to collect puma samples, conduct a full genetic analysis of samples collected in each State/region, and review related information about pumas in eastern Canada.

*Our response:* We have reviewed all information provided by the public with respect to pumas in Michigan along with data obtained for the 2011 status review and information obtained since then. Regarding a resident Michigan puma population, the MDNR stated (in a letter dated March 30, 2007) that “all available information suggests the eastern puma subspecies was extirpated after the turn of the century [1900].” The MDNR also expressed concerns about the scientific validity of information presented in Swanson and Ruzs (2006), except for one confirmed occurrence in Delta County (2004). Kurta and Schwartz (2007) further refuted Swanson and Ruzs’s (2006) conclusion that a population of eight pumas existed in Michigan.

Nonetheless, as in most eastern States and provinces, there continue to be numerous reports of pumas in Michigan, the most credible of which are investigated by the MDNR following its response protocol. At the time of the 2011 review, the MDNR had confirmed one puma report from Alcona County (1998) and one “likely” occurrence in Menominee County (2004). Since then, additional confirmed occurrences have been documented in the Upper Peninsula of Michigan in Ontonagon County (two in 2011), Houghton County (one in 2011), Keweenaw County (three in 2011), Baraga County (one in 2011, two in 2012), Marquette County (four in 2012, two in 2013), Delta County (one in 2015), Menominee County (one in 2010, two in 2012, one in 2015), Schoolcraft County (one carcass in 2015), Luce County (one in 2013, one in 2014), Mackinac County (two in 2014), and Chippewa County (one in 2014).

Noting that many of these records could represent multiple confirmations of the same animal, the number of confirmed puma occurrences in the Upper of Peninsula of Michigan has totaled 27 since 2010. This is in marked contrast to the number of confirmed puma records in Nebraska (255 since 2010), with its small breeding population of about 25 pumas.

The overall record of pumas dispersing eastward has grown substantially since the 2011 status review, with 271 confirmed puma occurrences east of documented breeding areas in the Dakotas, Nebraska, Colorado, and Texas ([www.cougarnet.org/confirmations](http://www.cougarnet.org/confirmations)). The majority of these animals are dispersing juvenile males (although see our response to comment 11 concerning Manitoba). Many scientists, including MDNR biologists, think it possible that a breeding population of pumas could become reestablished in Michigan and other midwestern States and Canadian provinces; however, at this time, the MDNR has concluded that pumas in Michigan, documented exclusively in the Upper Peninsula, are all dispersing animals from western populations (R. Mason, MDNR Wildlife Division, emails dated 2 February 2016). All



four puma carcasses examined by MDNR to date (mortalities from various causes), as well as trail camera photos where sex can be determined, have been males. The MDNR has no current evidence of any females and no evidence of puma reproduction in Michigan (R. Mason, MDNR Wildlife Division, emails dated 2 February 2016). Similarly, the Service has not found evidence that breeding occurs east of Saskatchewan, North Dakota, South Dakota, and Nebraska.

*(14) Comment:* One commenter contested the genetic basis for the South Dakota origin of the puma killed in Connecticut in 2014.

*Our response:* The Service recently reviewed Hawley et al. (2016) regarding the puma killed in Connecticut in 2014. DNA samples from this puma had mitochondrial DNA consistent with haplotype “M,” which is widespread in North American pumas (Culver et al. 2000, Culver and Schwartz 2011). Structure analysis indicated that, genetically, this animal was most closely related to the subpopulation of pumas found in the Black Hills of South Dakota. Assignment tests showed that this animal had a 99.9-percent chance of originating from the South Dakota puma population compared to other populations in the database (U.S. Forest Service Rocky Mountain Research Lab, Missoula, Montana).

*(15) Comment:* Several reviewers expressed concern that, after delisting of the eastern puma, pumas occurring or dispersing into the former range of the eastern puma would be left unprotected. Some commenters observed that State laws would not adequately protect pumas in the absence of its Federal listing, noting that only 7 of 19 States in the historical range protect the subspecies under a State endangered species law or its equivalent. Thus, the Act’s protections against take are needed to promote natural recolonization of animals with genetics identical to pumas originally occurring in Eastern North America. Others commented that pumas need to be

managed at a metapopulation level to ensure access to refugia and safe passage between populations.

*Our response:* Advances in molecular biology in the last 10 to 15 years have enabled scientists to document the origin of many of the pumas reported in Eastern North America. Further, within the last 5 years, advances in isotope analysis allow determinations of whether an animal has had a history of being in captivity. Analyses have revealed that some of the pumas found in Eastern North America are of South American origin or show evidence of having been in captivity. Outside Florida (with the exception of the panther killed in Georgia in 2008; see comment 16, below), pumas of North American origin have been found to be either wild western pumas or to have been captive animals.

The take protections of the Act do not extend to nonlisted pumas, irrespective of their origin or the fact that they have been found within the eastern puma's historical range. However, despite the Act's inapplicability to these pumas, some States have enforced their respective wildlife laws to protect all pumas within their jurisdictions. In addition to the take prohibitions associated with some State endangered species laws, many States within the historical range have closed seasons on pumas, affording some level of protection, and similar provincial protections are provided to pumas that may disperse into eastern Canada. Florida panthers, wherever they occur, continue to be protected from take under the Act, and all other pumas occurring in Florida continue to be protected under a similarity of appearance designation (32 FR 4001, March 11, 1967).

We emphasize that the authority and responsibility for protection and management of pumas not listed under the Act resides with the States, and balancing a public interest in natural recolonization with the concern for public, pet, and livestock safety will be a challenging

endeavor. Recent studies of public attitudes toward pumas recolonizing or being reintroduced in Eastern North America provide a good foundation for management plans, policy decisions, and educational initiatives (Davenport et al. 2010, Thornton and Quinn 2010, Jacobsen et al. 2012, Bruskotter and Wilson 2014, McGovern and Kretzer 2014, Smith et al. 2015, McGovern and Kretzer 2015). These human dimension studies also identify the many social and political challenges associated with such initiatives.

*(16) Comment:* Some commenters expressed a concern that if the eastern puma is delisted, there will be no protection under the Act for Florida panthers that disperse beyond Florida. Pumas can travel long distances (over 1,000 miles); thus, dispersing Florida panthers could potentially occur through much of the historical range of the eastern puma subspecies. Protection from take is important for the natural range expansion of the Florida panther. Some commenters suggested that the Florida panther be reclassified as a DPS to ensure continued Federal protection from take. Commenters also stated that Florida panthers are a source population that could, potentially, naturally recolonize other parts of Eastern North America.

*Our response:* As a listed subspecies, Florida panthers are protected under the Act from take wherever they occur—both in and outside of Florida. For instance, a dispersing Florida panther killed in Georgia in 2008 was protected under the Act and became a subject of Federal investigation. These protections against take of Florida panthers will continue in the event of delisting the eastern puma on the basis of extinction.

*(17) Comment:* Several commenters suggested that the Service update its analysis to consider new information regarding confirmed puma sightings in the historical range of the eastern puma. The Service should actively search for new reports of pumas within their Eastern North America historical range.

*Our response:* Since completing our 2011 status review, we have continued to monitor confirmed records of pumas in Eastern North America (e.g., through *cougarnet.org*; see earlier comments 2, 7, and 10). We also refer reports and sightings of pumas we receive to the respective State wildlife agencies. Although pumas continue to be confirmed in Eastern North America, the available scientific information fully supports our conclusion that these animals are released or escaped pets or dispersers from western populations or, rarely, Florida. To date, there remains a complete lack of evidence of breeding eastern pumas in locations not already documented in the 2011 review, and despite many additional puma reports in Eastern North America, the best available information indicates that the eastern puma subspecies is extinct. For these reasons, it is not necessary or advisable to conduct surveys or actively solicit additional reports of pumas in Eastern North America to determine eastern puma status.

*(18) Comment:* Several commenters stated that the current listing requires insignificant funding and staff resources, and that therefore it does no harm to keep eastern pumas on the List. The Service should thus heed the precautionary principle (Simson 2015) and give listed pumas the benefit of the doubt. Furthermore, the Service has already set a precedent for listing species in unoccupied portions of their historical range (e.g., wolves).

*Our response:* Section 4(b)(1)(A) of the Act requires that listing decisions under section 4(a)(1) be made solely on the basis of the best scientific and commercial data available. Therefore, in making the determination whether to delist the eastern puma, we did not consider the funding and staffing consequences of keeping it on the List or removing it from the List. Nonetheless, the Service disagrees that retaining the extinct eastern puma on the List has no repercussions. Keeping an extinct entity on the List can cause confusion—in this case, confusion over whether escaped or released captive pumas and dispersing animals from non ESA-listed

western puma populations are protected when found in the historical range of the eastern puma. Confusion surrounding the Service's responsibilities relating to pumas also unnecessarily complicates the States' management of puma issues. Additionally, this final rule will not change the Act's protections for the Florida panther (*P.c. coryi*). Florida panthers, wherever they occur, continue to be protected from take under the Act, and all other pumas occurring in Florida continue to be protected under a similarity of appearance designation (32 FR 4001, March 11, 1967). Pumas occurring elsewhere in the U.S. do not receive the protections of the Act.

There also continue to be costs associated with retaining the eastern puma on the List. Maintaining the eastern puma on the List obligates the Service to continue to compile information relating to puma science and reported sightings and to respond to reported sightings. The Service therefore expends considerable staff time addressing puma reports and questions, diverting limited resources from conservation efforts for listed species that still exist.

While many listed species have areas of unoccupied range, there is no precedent for listing a species when its entire range is unoccupied because the entity is extinct. It is important to recognize that under the Act the Service cannot list a "vacant" range—we can list only species, subspecies, and DPSs. Thus, if a species as defined by the Act is determined to be extinct, we can neither list it nor keep it listed. We acknowledge that this commenter could be implying that the eastern puma should remain listed because its entire unoccupied historical range represents a portion of the historical range of a higher-level taxon to which it belongs (e.g., a North American subspecies). However, for any higher-level taxon of puma to be listed, the Service would need to determine that it meets the definition of an endangered species or a threatened species, and this determination must be based on its status where it currently occurs, not on its status as absent in a portion of its historical range.

Almost 80 years have passed (including more than 40 years while listed under the Act) with no confirmation of the existence of the eastern puma. In addition to the effort and resources put into evaluating all available scientific evidence, this amount of time is sufficient to determine the extinction of an animal that is not difficult to detect wherever it exists as a breeding population—this reasoning satisfies the precautionary principle. See also our response to comment 8.

*(19) Comment:* Some commenters suggested that the Service develop a recovery plan to address puma recolonization and habitat protection across the North American continent. One commenter was impressed by the California Department of Fish and Wildlife’s draft wolf plan, (<https://www.ca.gov/conservation.mammals/gray-wolf>), developed before wolves began to breed in that State, and would like to see a study of the issues State wildlife agencies anticipate if pumas should naturally recolonize the East and Midwest.

*Our response:* Because the eastern puma listing imparts no protection either directly or indirectly to other pumas, there would be no benefit to retaining the listed status of the extinct subspecies for the purpose of allowing State wildlife agencies to prepare for recolonization of pumas from western populations to Eastern North America. For a species that has recovered, delisting may require States to demonstrate that the species will be managed to maintain its recovered status, and States often develop management plans to show that their oversight will be adequate to address any emerging or reemerging threats. Because we are delisting due to extinction rather than recovery, there is no need for States to foresee problems and demonstrate adequate management solutions for the eastern puma.

Section 4 of the Act authorizes the Service to develop recovery plans for species listed as endangered or threatened. With regard to listed pumas, recovery plans were developed for the

eastern puma ([http://ecos.fws.gov/docs/recovery\\_plan/820802.pdf](http://ecos.fws.gov/docs/recovery_plan/820802.pdf)) and Florida panther ([http://ecos.fws.gov/docs/recovery\\_plan/081218.pdf](http://ecos.fws.gov/docs/recovery_plan/081218.pdf)). The eastern puma recovery plan called for the discovery or establishment of at least three self-sustaining populations. This goal has proven to be unachievable given the absence of any source individuals, making the plan moot. Finalization of this rule will not affect the Florida panther recovery plan, which will continue to be implemented.

In some instances, the Service has promoted the development of multi-State conservation plans for species that are petitioned or are candidates for Federal listing (e.g., sage grouse, New England cottontail); however, we do not have the authority to develop recovery plans for nonlisted species (i.e., for pumas dispersing from western populations). The Federal government does share authority for managing and conserving fish and wildlife with the States, but our limited fiscal resources are focused on Federal trust resources, including threatened and endangered species, migratory birds, and migratory fish. Thus, it would be inappropriate for the Service to oblige States to develop a plan for recolonizing or reintroducing nonlisted pumas, nor would we have any authority to require that Canadian provinces participate in such an effort.

#### *Peer review comments*

In accordance with our 1994 peer review policy (59 FR 34270, July 1, 1994), we invited six independent scientists to comment on our proposed delisting proposal (81 FR 41925, June 28, 2016). These individuals are recognized for their expertise in large carnivore ecology and management, with particular knowledge in one or more of the following areas: puma population ecology, management, demographics, conservation, and population genetics. In response to our request, we received comments from five experts.

We reviewed all peer review comments for substantive issues and new information regarding the status of the eastern puma. With the exception of our position in the proposed rule on current North American puma taxonomy, the peer reviewers largely endorsed our methods and overall conclusions, and provided new information and suggestions to improve the final rule. Specific peer review comments are addressed below and incorporated as appropriate into this rule or into supplemental documents (such as references cited), available at:

<http://www.regulations.gov> under Docket No. FWS-R5-ES-2015-0001.

*(20) Peer review comment:* With regard to the current status of the eastern puma, three reviewers concurred with the Service's conclusion that there are no breeding populations of pumas in the historical range of the eastern puma and that the eastern puma subspecies is extinct, and agreed that the Service adequately documented this conclusion with the best available scientific information. One reviewer cited unpublished genetic data showing that all puma samples from Eastern North America evaluated in her laboratory were of South American origin, consistent with animals originating from captive sources, while another reviewer concluded that pumas in Eastern North America are not extinct but live in a highly discrete, endangered population segment in southern Florida. Two reviewers concurred that the vast majority of recently documented sightings represent either misidentifications or misrepresentations, and that the rare confirmed reports are likely dispersers from western puma populations or pumas that have been released or escaped from captivity.

One reviewer provided extensive comments and data concerning confirmed puma reports in Eastern North America. Based on this information, the reviewer surmised that there is not a breeding population of pumas within the historical range of the eastern puma. This reviewer also discussed published studies that suggest evidence of resident puma populations in Eastern North



America (e.g., Johnston 2002, Bertrand et al. 2006, Swanson and Rusz 2006, Rosatte 2011, Mallory 2012), concluding that most of these claims were based on unreliable eyewitness accounts and noting the lack of evidence of kittens. The reviewer disagreed with the reasoning presented in some of these papers that a breeding population of pumas could exist within the historical range of the eastern puma without being detected. This reviewer also reviewed genetic evidence from Bertrand et al. 2006, Swanson and Rusz 2006, Kurta et al. 2007, Mallory et al. 2012, Lang et al. 2013, and Rosatte 2013, and, based on these collective sources, concluded that recent confirmed reports do not constitute compelling evidence of a breeding population, and that the confirmed individuals within the historical range represent animals that have dispersed from western populations.

*Our response:* We concur with these comments, which validate or further corroborate the best available scientific information and conclusions in our 2011 status review (USFWS 2011).

*(21) Peer review comment:* Four of the five peer reviewers stated that the best available scientific information (Culver et al. 2000, Culver 2010) supports the conclusion that there is a single subspecies of puma, *Puma concolor cougar*, in North America. A fifth peer reviewer did not comment on this issue. Two peer reviewers noted that the revised taxonomy, *P.c. cougar*, is identical to the nomenclature used for the listed eastern puma subspecies, which could create confusion with a determination that the listed eastern puma subspecies, *P.c. cougar*, is extinct. These peer reviewers recommended that the Service accept the revised taxonomy and consider the single North American subspecies extant but extirpated within the historical range previously delineated for the eastern puma. Another peer reviewer further suggested that genetic evidence, documentation of long-distance dispersal of pumas, and lack of geographic barriers support a

single North American subspecies. Two peer reviewers pointed out that species-wide morphological studies based on more than 1,000 puma skulls (Gay 1994, Gay and Best 1996, Wilkens et al. 1997) did not support separation of populations into the 32 previously described subspecies, with one reviewer discussing Wilkens et al.'s (1997) findings of the skull measurements, pelage color, mid-dorsal whorl, kinked tail, and deformed sperm thought to be unique to the Florida panther. Based on morphological and genetic studies, these two peer reviewers concluded there was no evidence that the eastern puma was ever a valid subspecies and suggested that the Service should delist based on taxonomic error. One reviewer suggested that the incorrect original classification of the eastern puma subspecies may warrant a reassessment of taxonomy. Another peer reviewer indicated that the original subspecies designation was arbitrary and the eastern puma still persists as the Florida panther.

*Our response:* These peer review comments reflect those expressed by many public reviewers, to which we provide a detailed response under comment 4, above. Although mounting evidence appears to support a single North American puma subspecies, resolution of any remaining uncertainty would constitute an additional, rather than a preemptive, line of reasoning for delisting the eastern puma. Because we have determined that drawing a conclusion regarding a revision of North American subspecies taxonomy is not necessary to delist the eastern puma based on extinction, we have no compelling basis for withdrawing our proposal to delist due to extinction in order to consider delisting due to original data error. Therefore, for the purposes of this regulatory action, we continue to treat the eastern puma as a subspecies as originally listed under the Act.

(22) *Peer review comment:* Two peer reviewers commented that the only remnant population of pumas in Eastern North America persists in Florida, and that it should be

designated as a DPS. Going further, one of these reviewers suggested that an endangered DPS designation should encompass the entire historical range of the Florida panther and the eastern puma subspecies.

*Our response:* These peer review comments are similar to several comments from the public, and our response is discussed in detail under comments 4 and 5.

*(23) Peer review comment:* One reviewer suggested that a recovery plan should be developed for pumas in Eastern North America including, specifically, pumas from Florida. This recovery plan should also include translocating animals from western puma populations and protecting dispersing individuals from western populations.

*Our response:* We address this issue in our response to public comments concerning a recovery plan for pumas in Eastern North America (see our response to comment 19).

### **Assessment of Species Status**

Section 4 of the Act and its implementing regulations (50 CFR part 424) set forth the procedures for listing species, reclassifying species, and removing species from listed status. “Species” is defined by the Act as including any species or subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature (16 U.S.C. 1532(16)). To determine whether a species should be listed as endangered or threatened, we assess the likelihood of its continued existence using the five factors described in section 4(a)(1) of the Act (see **Consideration of Factors Affecting the Species**, below). A species may be reclassified or removed from the List on the same basis. With regard to delisting a species due to extinction, “a sufficient period of time must be allowed before delisting to indicate clearly that the species is extinct” (50 CFR 424.11(d)(1)). According

to these dual standards, we must determine whether the eastern puma subspecies is a valid listed entity that remains extant in order to determine its appropriate listing status.

With regard to the validity of the eastern puma as a subspecies and, therefore, as a listable entity, we recognize that support for a single North American subspecies has gained wide acceptance in the scientific community. However, the Service has not yet conducted a comprehensive assessment of all available scientific information pertinent to North American puma taxonomy and therefore has not yet drawn a conclusion whether to accept the single North American subspecies taxonomy. Furthermore, the Service has determined that, because drawing a conclusion on the single North American subspecies taxonomy is not needed to delist the eastern puma based on extinction, we have no essential basis for withdrawing our proposal to delist due to extinction in order to consider delisting due to original data error. Therefore, for the purposes of this regulatory action, we continue to treat the eastern puma as a subspecies as originally listed under the Act.

With regard to a determination that the eastern puma subspecies is extinct, it is important to note that the continuing presence of pumas in Eastern North America is not debated. However, physical and genetic evidence indicates that pumas recently observed in Eastern North America are released or escaped captive animals, with the exception of some wild pumas that have dispersed from western populations or, rarely, Florida.

Most significantly, no evidence whatsoever has been found to show that either individuals or relict populations of the eastern puma subspecies remain extant. The most recent confirmed records of pumas native to Eastern North America are from Tennessee (1930), New Brunswick (1932), and Maine (1938). These records coincide with the extirpation of white-tailed deer in most of the eastern puma's range in the 1800s, with the exception of a few

remaining large forest tracts, and a shift of eastern pumas toward the northern periphery of their historical range during that time. In contrast, areas throughout North America that still support extant populations of native pumas have had a long and continuous record of confirmed occurrences.

Given the puma's life span, generally thought to be 10 to 11 years, it is implausible that nonbreeding eastern pumas could have persisted in the wild without being detected for more than seven decades and under conditions of habitat loss and lack of their primary prey base. By the same token, it is highly improbable that a breeding population of the subspecies could have gone undetected for that long. Together with the complete lack of either a recent report or a long-term record of eastern puma presence, these factors are indicative of the long-term absence of this subspecies.

In summary, we find that pumas (except for single transients) are reasonably detectable, that no contemporary puma sightings in Eastern North America have been verified as the eastern puma subspecies since 1938, and that it is extremely unlikely that undetected individuals or eastern puma populations could have survived the long period during which most of their habitat was lost and their primary prey was nearly extirpated. We therefore conclude that the eastern puma subspecies, *Puma (=Felis) concolor couguar*, is extinct.

### **Consideration of Factors Affecting the Species**

As mentioned under **Assessment of Species Status** above, section 4 of the Act and its implementing regulations (50 CFR part 424) set forth the procedures for listing, reclassifying, or removing species from listed status. When we evaluate whether a species should be listed as an endangered species or threatened species, we must consider the five listing factors described in

section 4(a)(1) of the Act: (A) The present or threatened destruction, modification, or curtailment of the species' habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; and (E) other natural or manmade factors affecting the species' continued existence. We must consider these same factors in reclassifying a species or removing it from the List. Discussion of these factors and their application to the eastern puma follows. The principal factors leading to the listing of the eastern puma were widespread persecution (via poisoning, trapping, hunting, and bounties) (factors B and D), decline of forested habitat (factor A), and near-extirpation of white-tailed deer populations during the 1800s (factor A). Other natural or manmade factors affecting the species' continued existence (factor E) and disease or predation (factor C) were not identified as threats. These impacts led to the extirpation of most eastern puma populations by 1900. However, because we have determined that all populations of pumas described as the eastern puma have been extirpated and no longer exist, analysis of the five factors under section 4(a)(1) of the Act, which apply to threats facing extant populations, is immaterial.

As stated above, given the period of time that has passed without verification of even a single eastern puma, the Service concludes that the last remaining members of this subspecies perished decades ago. Therefore, the eastern puma is no longer extant and cannot be evaluated as an endangered species or threatened species.

## **Determination**

After a thorough review of all available information, we have determined that the subspecies *Puma (=Felis) concolor couguar* is extinct. Based upon this determination and

taking into consideration the definitions of “endangered species” and “threatened species” contained in the Act and the reasons for delisting as specified in 50 CFR 424.11(d), upon its effective date this rule removes the eastern puma from the List of Endangered and Threatened Wildlife at 50 CFR 17.11.

### **Available Conservation Measures**

Conservation measures provided to species listed as endangered or as threatened under the Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices. However, because the Service has determined the eastern puma to be extinct, this final rule removes any Federal conservation measures for any individual eastern pumas as originally listed on June 4, 1973 (38 FR 14678) (*Puma (=Felis) concolor couguar*). This final rule will not change the Act’s protections for the Florida panther (*P.c. coryi*).

### **Effects of the Rule**

This final rule revises 50 CFR 17.11 by removing the eastern puma from the List of Endangered and Threatened Wildlife due to extinction. Upon the effective date of this rule, the prohibitions and conservation measures provided by the Act will no longer apply to this subspecies. There is no designated critical habitat for the eastern puma.

### **Post-delisting Monitoring**

Section 4(g)(1) of the Act, added in the 1988 reauthorization, requires the Service to implement a program, in cooperation with the States, to monitor for not less than 5 years the status of all species that have recovered and been removed from the Lists of Endangered and Threatened Wildlife and Plants (50 CFR 17.11 and 17.12). Because we have determined that the eastern puma is extinct, post-delisting monitoring is not warranted.

## **Required Determinations**

### *National Environmental Policy Act*

We have determined that an environmental assessment or an environmental impact statement, as defined under the authority of the National Environmental Policy Act of 1969, need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Act. We published a notice outlining our reasons for this determination in the *Federal Register* on October 25, 1983 (48 FR 49244).

### *Government-to-Government Relationship with Tribes*

In accordance with the President's memorandum of April 29, 1994, Government-to-Government Relations with Native American Tribal Governments (59 FR 22951), E.O. 13175, and the Department of the Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. In accordance with Secretarial Order 3206 of June 5, 1997 (American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act), we readily acknowledge our responsibilities to work directly with Tribes in developing programs for healthy ecosystems, to acknowledge that tribal lands are not subject to the same controls as Federal public lands, to remain sensitive to Indian culture, and to make information available to Tribes. Accordingly, the Service communicated with Tribes during the public comment period on the proposed rule and received no comments expressing concern about our conclusion that the eastern puma is extinct.

## **References Cited**



A complete list of references is available as a supplemental document at <http://www.regulations.gov> under Docket No. FWS–R5–ES–2015–0001. References are also posted on <http://www.fws.gov/northeast/ecougar>.

### **Authors**

The primary authors of this rule are the staff members of the Service’s Maine Fish and Wildlife Service Complex, Ecological Services Maine Field Office, and the Hadley, Massachusetts, Regional Office (see **FOR FURTHER INFORMATION CONTACT**).

### **List of Subjects in 50 CFR Part 17**

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

### **Regulation Promulgation**

Accordingly, we amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

## **PART 17—ENDANGERED AND THREATENED WILDLIFE AND PLANTS**

1. The authority citation for part 17 continues to read as follows:

**Authority:** 16 U.S.C. 1361–1407; 1531–1544; and 4201–4245, unless otherwise noted.

### **§ 17.11 [Amended]**

2. Amend § 17.11(h) by removing the entry for “Puma (=cougar), eastern” under “Mammals” in the “List of Endangered and Threatened Wildlife.”

**Dated:** December 1, 2017.

Signed James W. Kurth

Deputy Director

U.S. Fish and Wildlife Service

Exercising the Authority of the Director

U.S. Fish and Wildlife Service

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