

Periodic Status Review for the Peregrine Falcon



Washington
Department of
**FISH &
WILDLIFE**

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The Washington Department of Fish and Wildlife maintains a list of endangered, threatened, and sensitive species (Washington Administrative Codes 220-610-010 and 220-200-100). In 1990, the Washington Wildlife Commission adopted listing procedures developed by a group of citizens, interest groups, and state and federal agencies (Washington Administrative Code 220-610-110). The procedures include how species listings will be initiated, criteria for listing and delisting, a requirement for public review, the development of recovery or management plans, and the periodic review of listed species.

The Washington Department of Fish and Wildlife is directed to conduct reviews of each endangered, threatened, or sensitive wildlife species at least every five years after the date of its listing by the Washington Fish and Wildlife Commission. The periodic status reviews are designed to include an update of the species status report to determine whether the status of the species warrants its current listing status or deserves reclassification. The agency notifies the general public and specific parties who have expressed their interest to the Department of the periodic status review at least one year prior to the five-year period so that they may submit new scientific data to be included in the review. The agency notifies the public of its recommendation at least 30 days prior to presenting the findings to the Fish and Wildlife Commission. In addition, if the agency determines that new information suggests that the classification of a species should be changed from its present state, the agency prepares documents to determine the environmental consequences of adopting the recommendations pursuant to requirements of the State Environmental Policy Act.

This is the Periodic Status Review for the Peregrine Falcon. It contains a review of information pertaining to the status of Peregrine Falcons in Washington. It was reviewed by species experts and was available for a 90-day public comment period from 27 February 2024 through 27 May 2024. Comments received were considered during the preparation of the final periodic status review. The Department will present the results of this periodic status review to the Fish and Wildlife Commission at a meeting in June 2024.

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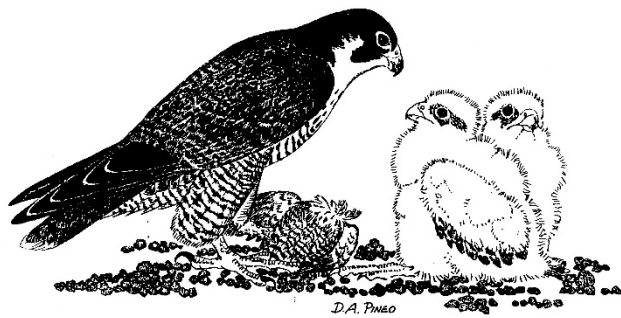
*Cover photos: Background and falcon with chicks courtesy of WDFW. Flying falcon courtesy of USGS.
Title page illustration by: Doug Pineo*



This work was supported in part by personalized and endangered species license plates



Periodic Status Review for the Peregrine Falcon in Washington



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ACKNOWLEDGING THE INDIGENOUS PEOPLE, LAND & CULTURE OF THE PACIFIC NORTHWEST

Since time immemorial, Indigenous People have lived in the Pacific Northwest and hunted, fished, and gathered natural resources, traditional foods, and medicinal plants to support their diverse cultures. They were the original occupants and stewards of this land that all Washingtonians enjoy today.

The very survival of the Pacific Northwest Tribes is a testament of resiliency of what they have endured and continue to endure throughout generations on the landscape. Through many historical encounters of massacre, renunciation of religious freedom, systemic racism, cultural assimilation of native children through institutional residential schools, and the fight for their inherent rights and liberties, they have prevailed. Throughout this painful history brought by colonization, abrogated treaties, infringement of civil rights, and the salmon protests of the 1960s, the Northwest Tribes and the Washington Department of fish and Wildlife (WDFW) have founded a commitment of respect, unity, and alliance informed by the realities of the past.

Today, tribal governments and WDFW work collaboratively to conserve and manage aquatic and terrestrial resources statewide and practice sound science to guide management decisions. The Tribes and WDFW work together to ensure the sustainability of fish, wildlife, ecosystems, and culture for the next seven generations and beyond.

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EXECUTIVE SUMMARY

Peregrine Falcons (*Falco peregrinus*) exhibited well-documented population declines across North America and much of their global range following the widespread use of DDT shortly after the Second World War. The Peregrine Falcon was listed nationally as an endangered species by the U.S. Fish and Wildlife Service in 1970 and by the Washington Fish and Wildlife Commission in 1980 when only five pairs were known in Washington. With the restriction placed on the use of DDT, the peregrine population has recovered and was removed from the federal endangered species list in 1999. In 2002, when >70 breeding territories were documented, the species was reclassified as a state sensitive species.

WDFW last completed comprehensive surveys of peregrine falcon territories in 2009. In that year, the Department identified 108 occupied territories, a continued linear increase in the number of occupied territories since 1990. The Peregrine Falcon was delisted by the Washington Fish and Wildlife Commission in 2016.

Although WDFW no longer actively monitors this species across the Washington range we work with partners to monitor opportunistically and around important management areas. WDFW reviews and maintains a record of the number of breeding territories and locations in Washington. The species continues to increase in abundance and as of December 2021 there were 190 known breeding territories in Washington, far exceeding historical levels and estimates of future abundance presented in the 2002 status review. The population has continued to increase across its range in North America. The status of the Peregrine Falcon in Washington is secure, and we recommend that its current designated status as a delisted species be maintained.

This is an update of the Periodic Status Review for the Peregrine Falcon in Washington that was published in 2016 (Vekasy and Hayes 2016). It has been minimally updated to include new data on ecology, contaminants, and survival estimates from Washington, and was revised throughout to improve conciseness and brevity.

INTRODUCTION

The Peregrine Falcon (*Falco peregrinus*) (Figure 1) was federally listed as endangered in 1970 after dramatic declines resulting from effects of environmental pollutants. In 1980, the peregrine was listed as endangered in Washington when only five pairs could be found nesting. Nationally, restrictions on DDT use combined with releases of young American Peregrine Falcons to the wild facilitated population recovery (Enderson et al. 1995, White et al. 2002). The Arctic Peregrine Falcon and American Peregrine Falcon were removed from the federal



Figure 1. Peregrine Falcon in adult plumage observed on the Washington coast during winter. Photo by Joe Buchanan.

endangered species list in 1994 and 1999, respectively (U.S. Fish and Wildlife Service 1999), a great success story in conservation (Cade and Burnham 2003). In Washington, the Peregrine Falcon was down listed to state sensitive status in 2002 and delisted in 2016 (Vekasy and Hayes 2016).

DISTRIBUTION AND NATURAL HISTORY

Peregrine Falcons are found across most of the state during one or more season. Most breeding locations are west of the Cascade Crest, and most sites throughout the state are associated with the marine environment or large freshwater bodies (Figure 2, Appendix A). The Peale's Peregrine Falcon (*F. p. pealei*) occurs in coastal regions of the state, primarily along the outer coast, northern coast of the Olympic Peninsula and apparently to some extent in the San Juan Islands. The American Peregrine Falcon (*F. p. anatum*) breeds in the Puget Sound basin, other parts of western Washington away from the coastal zone, and in eastern Washington. Some peregrines breeding along the outer coast and islands of Puget Sound may be intergrades between the *pealei* and *anatum* subspecies (U.S. Fish and Wildlife Service 1983, Brown et al. 2007). Individuals of the *tundrius* subspecies are rarely observed in Washington and most records are from the outer coast during migration (Varland et al. 2012).

Peregrine Falcon nesting is dependent upon availability of abundant prey in proximity to adequate nesting sites (Ratcliffe 1993, White et al. 2002). The greatest aggregations of nesting sites in the state occur in the San Juan Islands, the lowlands of Puget Sound, particularly in the cities, and along the northern outer coast. Aggregations occur elsewhere, such as at major water bodies in various parts of the state, and lower numbers occur along the forested slopes of the Cascade Range, in the Columbia River Basin, and elsewhere.

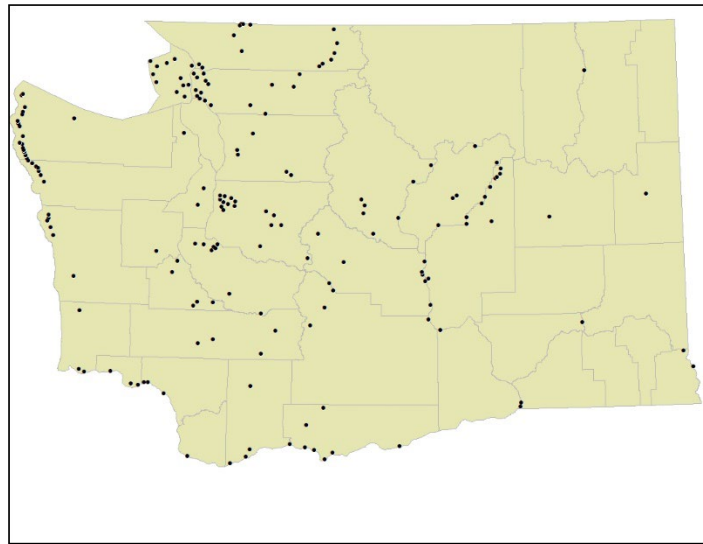


Figure 2. Distribution of Peregrine Falcon breeding territories in Washington.

Peregrine Falcons migrate through and overwinter in many parts of Washington. During the nonbreeding season, the species is probably most abundant at marine estuaries and beaches (Anderson and Herman 2005). They are also found in low-lying agricultural and pasture lands in most parts of the state, and in many urban areas (Anderson and Herman 2005). Although widespread in Washington, they are numerically uncommon.

Peregrine Falcons use a wide range of habitat and cover types to meet their life requisites. They nest on cliffs (Figure 3), offshore islands, and on human-built structures like bridges and tall buildings, and those nest locations can be found in many settings. These falcons use open areas for hunting during all seasons, including coastal and estuarine areas (beaches, tide flats, marshes), agricultural fields, airports, and the airspace above urban areas and other cover types (White et al. 2002).



Figure 3. Peregrine Falcon at breeding site on a cliff in coastal Washington. Photo by Tom Rowley.

Peregrine Falcons prey on a wide variety of birds found near nesting locations and the areas used during winter and migration. Prey species range in size from bats (occasionally) and small songbirds to ducks and rarely

geese (White et al. 2002). Peregrine Falcons also steal prey from other birds, often other falcons, and consume carrion, particularly where it is abundant, such as along coastal beaches (Varland et al. 2018).

Home ranges of peregrines vary in size and can be quite large. In Colorado, for example, the largest breeding season home ranges averaged between 405 mi² (1,126 km²) and 450 mi² (1,251 km²) for two males and three females, respectively (Enderson and Craig 1997); hunting flights within these home ranges extended as far as 12-26 mi (20-43 km) from the eyrie. In Washington, home range size during winter ranged between 23.7 mi² (65.8 km²) and 30.9 mi² (85.7 km²) for three immature falcons (Dobler and Spencer 1989, Dobler 1993).

Aspects of breeding behavior and demography are well documented, both in North America and globally (e.g., Ratcliffe 1993, White et al. 2002). These falcons often lay three or four eggs (Ratcliffe 1993, White et al. 2002). Peregrines may live up to 20 years of age (White et al. 2002). In Colorado, Craig et al. (2004) estimated survival rates of 54% for first-year birds, 67% for birds aged 1-2 years, and 80% for birds older than 2 years of age. In California, survival for similar ages classes was 38%, 86%, and 85% (Kauffman et al. 2003). For peregrines using Washington coastal beaches during the nonbreeding season, Varland et al. (2008b) estimated an annual apparent survival rate of 59.7%, which included both juvenile (<1 year old) and adult (≥1 year old) peregrines; in a more recent analysis from the same study area, survival rates were 42% for first-year birds, 66% for birds aged 1-2 years, and 74% for birds older than 2 years of age (Varland et al. 2020). The continued increase of peregrine abundance in Washington reflects robust survivorship is not limiting the population, and survivorship and productivity.

POPULATION AND HABITAT STATUS

North America

The Peregrine Falcon occurs throughout most of North America where suitable nest sites and prey are found. These falcons have adapted to urban areas and artificial nest structures and the numbers of nesting birds in most states are believed to rival historical estimates (Katzner et al. 2012, Gahbauer et al. 2015, Watts et al. 2015). This is in part due to the addition of urban and artificial nest sites, artificial habitat alterations (e.g., reservoirs), and increased availability of prey species such as the rock pigeon (Bond 1946, Enderson et al. 2012, Sharpe 2014, Barnes et al. 2015).

Historical estimates of peregrine abundance for North America are poorly known due to lack of systematic surveys (Enderson et al. 1995). Based on more complete records and new surveys, pre-decline abundance has been variously estimated as: 7,000-10,000 nesting territories with an 80-90% occupancy rate (Kiff 1988), 7,300 pairs (Enderson et al. 1995), and 10,600-12,000 pairs (Cade 2003). By the mid-1990s there were an estimated 7,169 pairs breeding in North America (Enderson et al. 1995), and an estimated 8,000-10,000 pairs by the late 1990s (White et al. 2002:32). Later, an estimate of

10,368 breeding pairs was criticized as too low by species experts (U.S. Fish and Wildlife Service 2008; critique therein), and subsequently an estimated 15,000 pairs north of latitude 54°N was presented by Franke (2016).

Washington

In 2003, the USFWS implemented a plan (U.S. Fish and Wildlife Service 2003) to monitor the status of the American Peregrine Falcon following federal delisting. Twenty-five nesting territories were randomly selected in Washington for the national monitoring project and were surveyed in 2003, 2006, 2009, and 2012 (and WDFW surveyed additional sites in 2003, 2006, and 2009). Surveys for this species have not been conducted in Washington since 2012. Based on data collected through 2012, the rate of occupancy of eyries in Washington was high. Over the 10-year period from 1992-2001, the occupancy rate averaged 79%, and was 82 % between 1997 and 2001 (Hayes and Buchanan 2002). High occupancy rates continued to be observed during surveys in 2006 (79%) and 2009 (82%). The overall occupancy rates compared well with those documented elsewhere with Peregrine Falcons with stable levels of abundance (Herbert and Herbert 1969, Rice 1969, Craig et al. 2004, Enderson et al. 2012).

A nesting pair is considered successful if it raises at least one young to 28 days (U.S. Fish and Wildlife Service 2003). However, in Washington, a nesting pair was considered successful if young were observed in the nest, regardless of age, which produces inflated success rates. Even taking this into account, it appears that actual nest success was high, averaging 62% between 1992 and 2001, and reaching 68% during comprehensive surveys in 2006; nest success was $\geq 50\%$ during the post-delisting monitoring, 2003-2012. Nest success rates ranged between 62% and 83% in other parts of the country (Tordoff and Redig 1997, Corser et al. 1999, Enderson et al. 2012).

In Washington, productivity was moderate during a period of substantial monitoring between 1997 and 2001. Over that five-year period, productivity averaged 1.53 young/occupied territory (Hayes and Buchanan 2002). In 2006 and 2009, productivity was 2.09 and 1.79 young/occupied territory, respectively. At some sites, productivity can consistently approach or exceed 3.0 young/occupied territory (WSDM). In the post-delisting monitoring of the species that began in 2003 productivity was >1.00 young/occupied territory. Overall productivity rates compare well with increasing peregrine abundance in other parts of the country (Tordoff and Redig 1997, Corser et al. 1999, Enderson et al. 2012).

Historical estimates of the number of territories in Washington (Bond 1946) vary and have likely underestimated the actual number of territories. Only nine territories were identified from a 1980 survey, although Herman (*in* Porter and White 1977) estimated there may have been as many as 25 territories. As of December 2021, WDFW had 190 nesting territories documented in its WSDM database. If we apply the 2009 occupancy rate of 82% to the 190 known territories, we estimate 155

territories would currently be occupied statewide, which far exceeds historical estimates and the minimum of 30 pairs established for Washington as part of the federal delisting criteria for the Pacific Coast American Peregrine Falcon (U.S. Fish and Wildlife Service 1982). Although the occupancy rate is based on data from over one decade ago, it is likely a reasonable estimate.

FACTORS AFFECTING CONTINUED EXISTENCE

Adequacy of regulatory mechanisms. Peregrines are protected by the Federal Migratory Bird Treaty Act and are classified as a protected species in Washington. Take is prohibited except as authorized under a valid permit. There are no federal laws that specifically protect the habitat of this species. However, loss of habitat was not identified as a limiting factor in peregrine recovery (U.S. Fish and Wildlife Service 1999) and was not a factor identified as contributing to the species' listing.

Contaminants. Environmental contaminants are or have been a concern to the health of Peregrine Falcons. DDT and its metabolites were the primary cause of peregrine falcon decline across North America and these compounds are persistent in the environment with a half-life up to 57 years (Cooke and Stringer 1982) and are still detected in Washington (Tuttle and Castro 2015). Bald Eagles, Osprey, and Peregrine Falcons, all impacted by DDT contaminants, continue to show population increases and healthy productivity.

Concerns have been expressed about potential impacts of mercury on Peregrine Falcons although none of the numerous studies conducted has linked mercury contamination to reduced abundance (see Barnes et al. 2018). Recent findings from the outer coast of Washington during migration and overwintering periods documented one of the highest levels of mercury in Peregrine Falcons globally (Barnes et al. 2018). However, the apparent survival rates from peregrines in that study area did not suggest a decline in abundance (Varland et al. 2020).

Organophosphates and neonicotinoid insecticides, PCBs, avicides, flame retardant chemicals (polybrominated diphenyl ethers: PBDEs) and oil are other chemicals that have the potential to impact peregrines (Chen et al. 2008, Park et al. 2009, Guerra et al. 2012, Goulson 2013, Mineau and Palmer 2013, Hallmann et al. 2014). Widespread presence of harmful chemicals or an oil spill that decimates prey species could impact local peregrines,



Figure 4. This Peregrine Falcon (visual ID code Z/V) was banded on the Washington coast as part of an ongoing monitoring program. Photo by Tom Rowley.

but current regulatory mechanisms are in place to limit environmental exposure to chemical pollutants. To date, it has not been demonstrated that any of these chemicals have impacted Peregrine Falcons at a population level or limited their abundance in Washington.

Climate change. Models of climate change indicate anticipated changes in precipitation levels and temperature throughout the Pacific Northwest. Although the models vary in their specific predictions, all of them indicate that substantial changes will occur. Consequently, it appears likely that such changes will alter conditions in the marine and other aquatic environments important to Peregrine Falcons. In the marine environment, future climate projections for sea surface temperature and upwelling intensity, based on a regional climate model for the California Current Ecosystem, have forecast accelerated declines of Cassin's Auklet abundance (Wolf et al. 2010). Declines in seabird productivity or abundance may impact coastal nesting peregrines, but to what degree is difficult to predict. Inland, late season storms and increased drought and fire could contribute to habitat loss of prey species and could negatively affect reproductive success of peregrines.

Other factors. A highly pathogenic avian influenza (HPAI) outbreak in the winter of 2014-2015 was responsible for the deaths of several Peregrine Falcons and Gyrfalcons (*Falco rusticolus*) (e.g., Ip et al. 2015), likely after they fed on infected wild-caught waterfowl. Captive falcons are highly susceptible to the virus (Lierz et al. 2007); however, large-scale die-offs caused by HPAI have not been detected in falcons, either due to difficulty in finding carcasses, or some degree of immunity in wild falcons. This disease is not known to limit the population of Peregrine Falcons or their abundance in Washington.

MANAGEMENT ACTIVITIES



Figure 5. The late Doug Pineo with his falcon, Winston.

A variety of management activities occur in Washington. Even following delisting, some land management entities have desired to protect Peregrine Falcon breeding activity. WDFW has been consulted by agencies and other entities to help develop site-specific monitoring and management plans or recommendations, typically involving site disturbance (recreation or other activities) and pesticide application. Long-term ongoing research on the Washington coast which involves marking individual falcons (Figure 4),

informs management, including take of falcons for falconry (D. Varland, pers. comm.).

WDFW authorizes the take of a small number of Peregrine Falcons (nestlings or fledglings) each year for falconry purposes (Figure 5). The allocation of individual falcons available for take is currently 12 first-year birds per year and is based on federal regulations and guidelines for the take of this species (U.S. Fish and Wildlife Service 2008). The current number of falcons taken – an average of about seven individuals annually in the last decade – is below the state-level allocation (i.e., currently 12 individuals). The level of allocated take may be adjusted across the United States based on new information regarding the size of the population in the United States and Canada (i.e., the abundance of Peregrine Falcons is greater than previously recognized; see Franke 2016) and will be based on analyses that were recently published (U.S. Fish and Wildlife Service 2023). Regional allocation of take will continue to be managed at state- and flyway-scales through the structure and process of the four North American flyway councils. WDFW will work within the federal and flyway level guidance, while considering the management needs of Washington’s abundance of falcons, when updating levels of take.

CONCLUSIONS AND RECOMMENDATION

When the Peregrine Falcon was federally listed in 1970, the primary factor contributing to its status under the Endangered Species Act was the accumulation of environmental contaminants. Following restrictions in the use of DDT, Peregrine Falcons slowly recovered. Although threat factors remain, none of them limit Peregrine Falcons. The abundance of peregrine breeding territories in Washington has continued to increase to the present. Delisting of the species in 2016 was appropriate and we recommend no action to alter its present status.



REFERENCES CITED

Table B presents the references cited in this document. Each reference is categorized for its level of peer review pursuant to section 34.05.271 RCW, which is the codification of Substitute House Bill 2661 that passed the Washington Legislature in 2014. A key to the review categories under section 34.05.271 RCW is provided in Table A.

Individual papers cited cover a number of topics discussed in the report, including information on: 1) the species' description, taxonomy, distribution, and biology; 2) habitat requirements; 3) population status and trends; 4) conservation status and protections; 5) research, monitoring, and restoration activities; and 6) factors affecting the continued existence of the species.

Table A. Key to 34.05.271 RCW Categories:

Category Code	34.05.271(1)(c) RCW
i	Independent peer review: review is overseen by an independent third party.
ii	Internal peer review: review by staff internal to the department of fish and wildlife.
iii	External peer review: review by persons that are external to and selected by the department of fish and wildlife.
iv	Open review: documented open public review process that is not limited to invited organizations or individuals.
v	Legal and policy document: documents related to the legal framework for the significant agency action including but not limited to: (A) federal and state statutes; (B) court and hearings board decisions; (C) federal and state administrative rules and regulations; and (D) policy and regulatory documents adopted by local governments.
vi	Data from primary research, monitoring activities, or other sources, but that has not been incorporated as part of documents reviewed under the processes described in (c)(i), (ii), (iii), and (iv) of this subsection.
vii	Records of the best professional judgment of department of fish and wildlife employees or other individuals.
viii	Other: Sources of information that do not fit into one of the categories identified in this subsection (1)(c).

Reference	34.05.271 RCW Review Category
Anderson, C.M. and S.G. Herman. 2005. Peregrine Falcon (<i>Falco peregrinus</i>). Pages 126-127 in T.R. Wahl, B. Tweit, and S.G. Mlodinow, editors. The Birds of Washington. Oregon State University Press, Corvallis, Oregon.	i, viii
Barnes, J.G., R.D. Haley, D.B. Thompson, and J.R. Jaeger. 2015. Attributes of a breeding population of Peregrine Falcons associated with reservoirs on the Colorado River. <i>Journal of Raptor Research</i> 49:269-280.	i
Barnes, J.G., D.E. Varland, T.L. Fleming, J.B. Buchanan, and S.L. Gerstenberger. 2018. Mercury contamination monitoring in Peregrine Falcons (<i>Falco peregrinus</i>) in coastal Washington, 2001-2016. <i>Wilson Journal of Ornithology</i> 130:958-968.	i
Bond, R.M. 1946. The peregrine population of western North America. <i>The Condor</i> 48:101-116.	i
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Craig, G.R., G.C. White, and J.H. Enderson. 2004. Survival, recruitment, and rate of population change of the Peregrine Falcon population in Colorado. <i>Journal of Wildlife Management</i> , 68:1032-1038.	i
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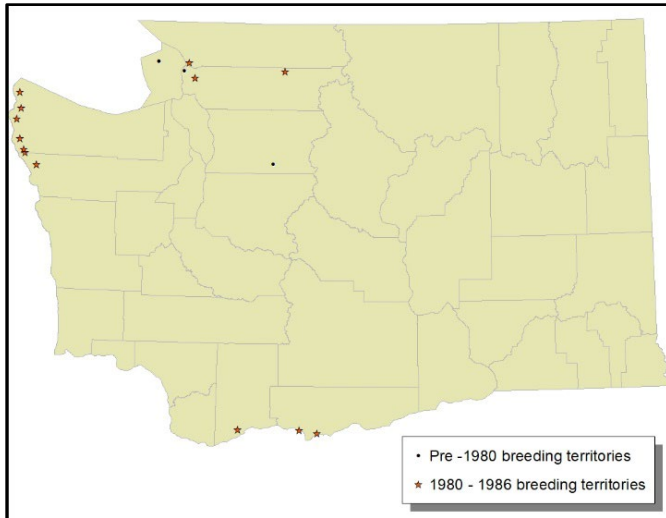
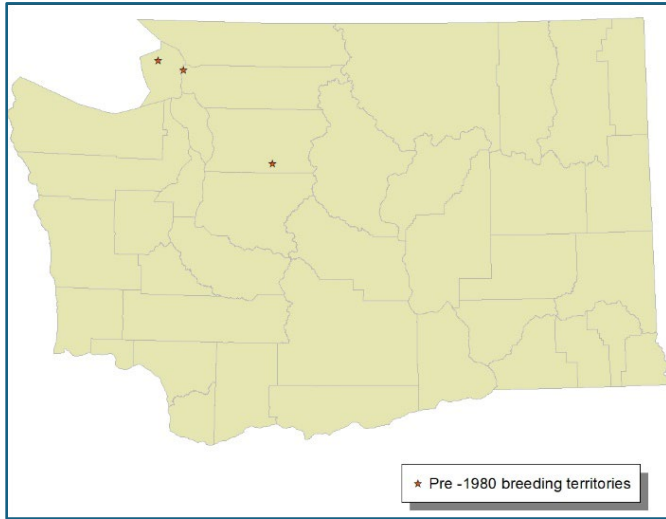
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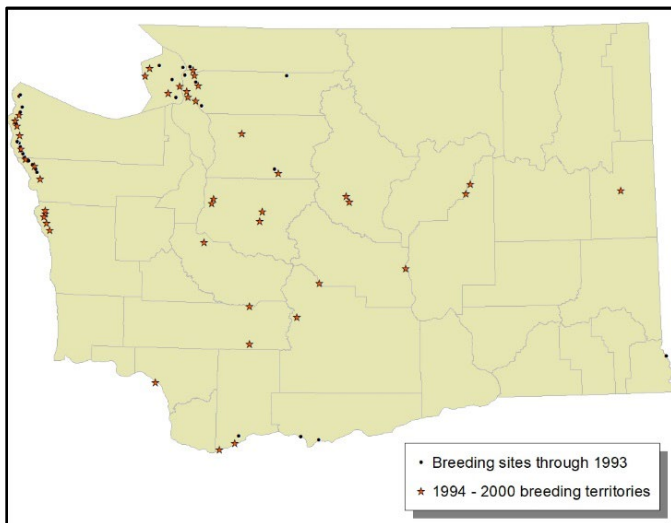
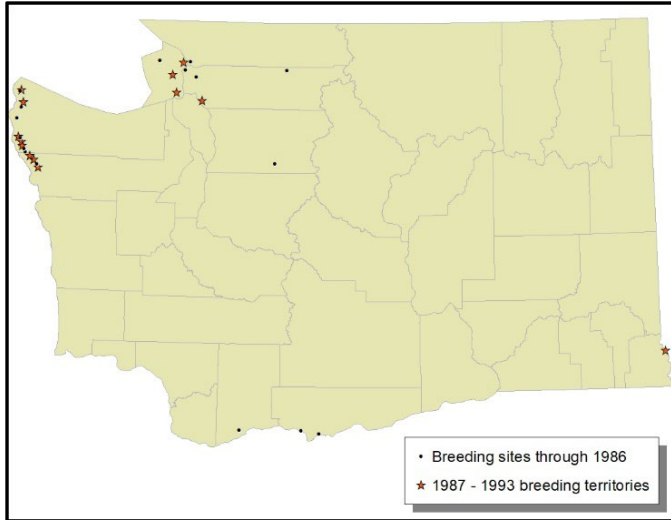
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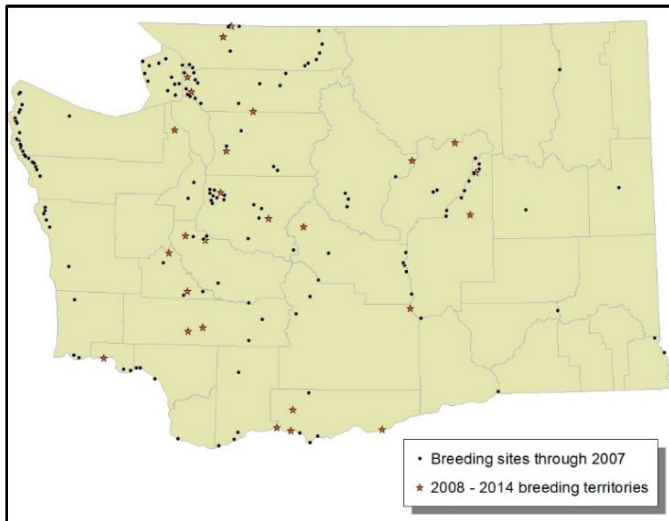
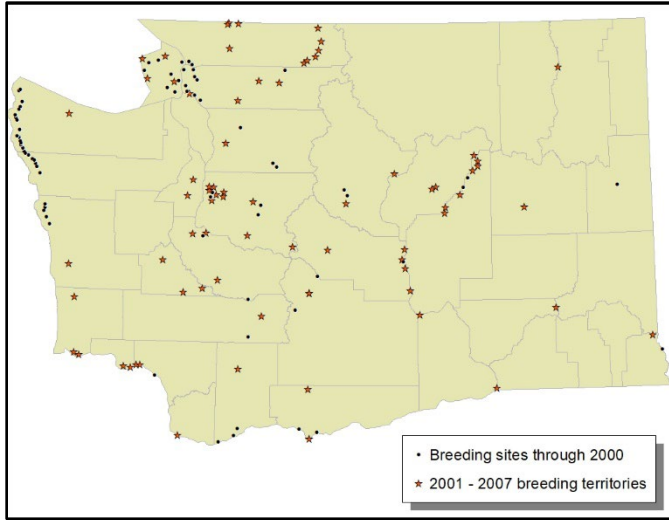
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APPENDIX A. MAPS

Time series maps of the location of documented Peregrine Falcon breeding territories in Washington. Many of these territories, especially those in the 20th century, were documented during dedicated surveys for this species. Many of the more recent territories were reported to WDFW by birders or biologists, and their documentation was not part of a comprehensive survey program (WSDM 2024).







APPENDIX B. PUBLIC COMMENTS

We received one comment on the Peregrine Falcon Periodic Status Review providing helpful suggestions to improve the language in the draft. We incorporated many of those edits into the final version.

WASHINGTON STATE STATUS REPORTS, PERIODIC STATUS REVIEWS, RECOVERY PLANS, AND CONSERVATION PLANS

Periodic Status Reviews

2024	Northern Spotted Owl
2024	Mardon Skipper
2023	Western Gray Squirrel
2023	Woodland Caribou
2023	Columbian White-tailed Deer
2022	American White Pelican
2022	Brown Pelican
2022	Snowy Plover
2022	Cascade Red Fox
2021	Ferruginous Hawk
2021	Oregon Vesper Sparrow
2021	Steller Sea Lion
2021	Gray Whale
2021	Humpback Whale
2021	Greater Sage-grouse
2020	Mazama Pocket Gopher
2019	Tufted Puffin
2019	Oregon Silverspot
2018	Grizzly Bear
2018	Sea Otter
2018	Pygmy Rabbit
2017	Fisher
2017	Blue, Fin, Sei, North Pacific Right, and Sperm Whales
2017	Sandhill Crane
2017	Western Pond Turtle
2016	Canada Lynx
2016	Marbled Murrelet
2016	Peregrine Falcon

Conservation Plans

2013	Bats
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Status Reports

2021	Oregon Vesper Sparrow
2019	Pinto Abalone
2017	Yellow-billed Cuckoo
2015	Tufted Puffin
2007	Bald Eagle
2005	Aleutian Canada Goose
1999	Northern Leopard Frog
1999	Mardon Skipper
1999	Olympic Mudminnow
1998	Margined Sculpin
1998	Pygmy Whitefish
1997	Aleutian Canada Goose

Recovery Plans

2020	Mazama Pocket Gopher
2019	Tufted Puffin
2012	Columbian Sharp-tailed Grouse
2011	Gray Wolf
2011	Pygmy Rabbit: Addendum
2007	Western Gray Squirrel
2006	Fisher
2004	Sea Otter
2004	Greater Sage-Grouse
2003	Pygmy Rabbit: Addendum
2002	Sandhill Crane
2001	Pygmy Rabbit: Addendum
2001	Lynx
1999	Western Pond Turtle

Status reports and plans are available on the WDFW website at: <http://wdfw.wa.gov/publications/search.php>

