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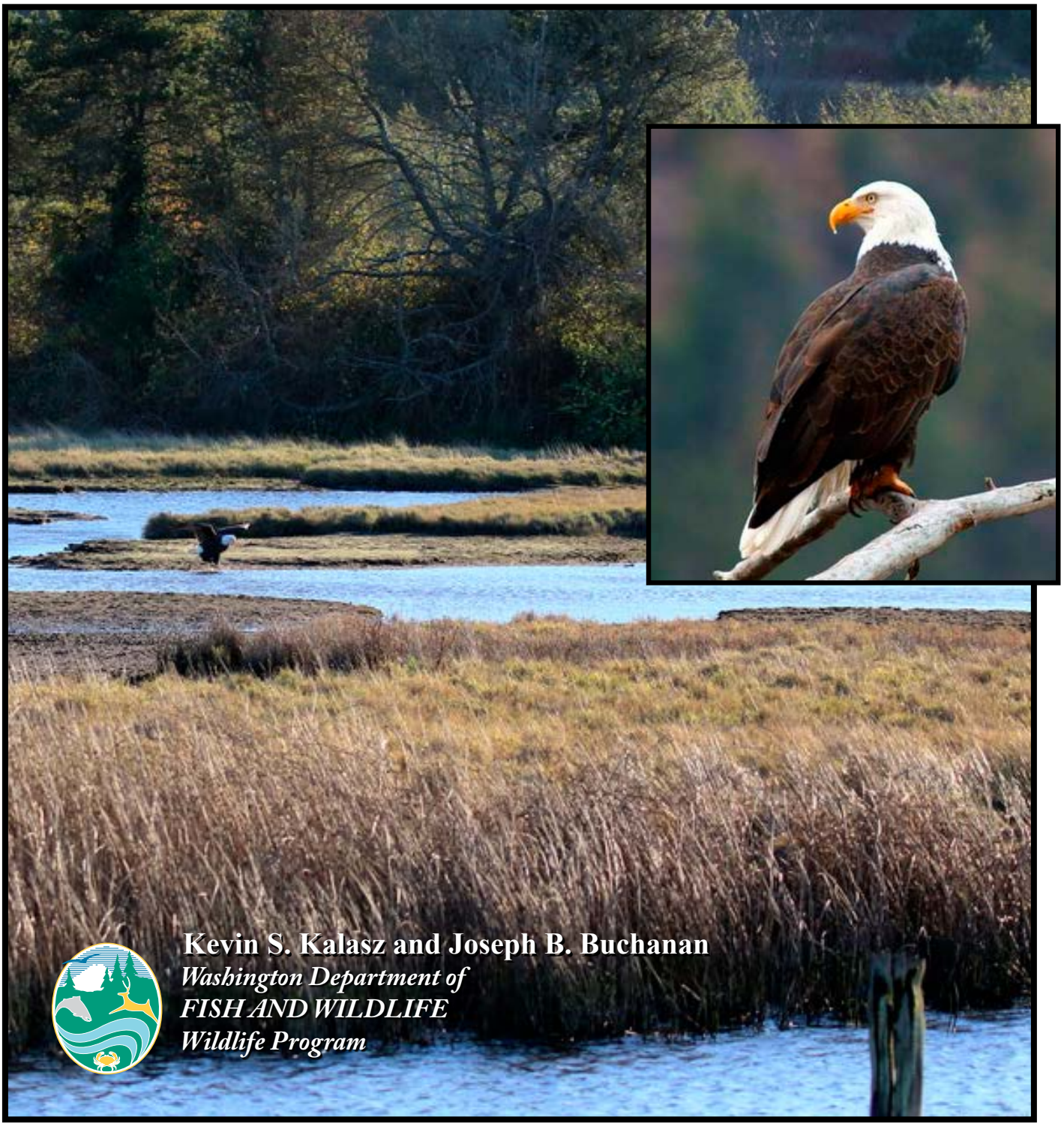
STATE OF WASHINGTON July 2016

Periodic Status Review for the Bald Eagle



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Wildlife Program

The Washington Department of Fish and Wildlife maintains a list of endangered, threatened, and sensitive species (Washington Administrative Codes 232-12-014 and 232-12-011). 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 232-12-297). 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 document is a Draft Periodic Status Review for the Bald Eagle. It contains an update of information pertaining to the status of the white pelican in Washington. The Department intends to present the results of this periodic status review to the Fish and Wildlife Commission at a meeting in November 2016.

Submit written comments by e-mail on this report by 10 October 2016 to:
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This report should be cited as:
Kalasz, K. S. and J. B. Buchanan. 2016. Draft periodic status review for the Bald Eagle in Washington. Washington Department of Fish and Wildlife, Olympia, Washington. 15+iii pp.

On the cover: photo of Bald Eagle at Blue Lake, Sinlahekin Wildlife Area by Justin Haug; background photo of Edmonds Marsh by Bill Anderson.

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

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ACKNOWLEDGMENTS

This document was improved by reviews and constructive comments provided by Kate Engel, Matthew Stuber and James Watson. We also thank Laurie Clark and Jake Verschuyl for providing a summary of knowledge relating to Bald Eagles.

EXECUTIVE SUMMARY

The recovery of Bald Eagle (*Haliaeetus leucocephalus*) populations across North America is one of the great species recovery success stories in the United States. When the species was first listed as Endangered under the federal Endangered Species Act in 1978, the primary reason for its imperiled status was due to the effects of chemical contaminants and, to a lesser extent, habitat loss. Protection measures have allowed Bald Eagles to make an incredible recovery both within Washington as well as nationally, which led to its federal delisting in 2007. Bald Eagles are well distributed in Washington, but the majority of the population is found west of the Cascade Range. Bald Eagles are found in association with marine environments and nearly all major waterways, inland lakes, and reservoirs. Bald Eagles are largely piscivorous and they also take birds and mammals; scavenging is commonly practiced.

Recent data from North America indicate that population growth between 1966 and 2012 was 5.3% annually, and modeling indicates that population growth across the range is projected to continue for another 10 to 20 years until the total population stabilizes at around 228,000 birds. A review of all known Bald Eagle territories in the Washington Species Data Management system indicates that the number of territories has increased by an average of 28 per year since 2005 when the species was downlisted in the state to Sensitive. As of 2015, the total number of known territories in the state was 1,334, but this total reflects the cumulative number of sites and not the number that are known to be active in any particular year.

Factors that have been known to impact populations include chemical contaminants and the absence of regulations that adequately protect Bald Eagles. With the restrictions placed on the use of DDT and the decline in use of other environmental contaminants the Bald Eagle population has rebounded, despite contaminants that remain present. While there are still threats to Bald Eagles, none of the threats that have previously impacted eagles are having known deleterious effects, and current population analyses indicate that Bald Eagle populations will continue to grow despite those threats.

We recommended that the designation of Sensitive status for Bald Eagles is no longer appropriate and that the species be removed from Washington's list of endangered species. This action does not remove protections intended to sustain the population. Bald Eagles will continue to be protected under three federal acts: the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act, and the Lacey Act. The population of Bald Eagles in Washington is robust and the species will continue to be an important and thriving part of our state's natural diversity for the foreseeable future.

INTRODUCTION

Figure 1. Adult pair of Bald Eagles. Photo by Justin Haug.

The Bald Eagle (*Haliaeetus leucocephalus*) (Fig. 1.) is one of the largest birds of prey in North America and is one of two eagle species found in Washington. It is our national symbol and has profound religious and cultural significance for Native Americans. Washington has long held an important place in Bald Eagle conservation.

In the face of a dramatic population decline in the 1960s, Washington was one of the few regions in the lower 48 states that still supported breeding Bald Eagles (Gerrard and Bortolotti 1988). When the species was first listed as Endangered under the Endangered Species Act in 1978, Washington was one of only five states where the population was listed as Threatened. Shortly after, in 1981, over 10% of the nests estimated in the lower 48 states were in Washington alone (Stinson et al. 2007). The imperiled status of the species was primarily due to the effects of chemical contaminants and, to a lesser extent, habitat loss. Protection measures have allowed Bald Eagles to make an incredible recovery both within Washington as well as nationally. The Bald Eagle was federally delisted in 2007 (U.S. Fish and Wildlife Service 2007). In this periodic status review, we briefly summarize the natural history, population status, threats, and recent conservation and management activities addressing Bald Eagles in Washington. This information will be used by the Washington Fish and Wildlife Commission to inform its decision about whether the species should retain its current state status as Sensitive or if it deserves reclassification.

DISTRIBUTION

Bald Eagles are distributed widely across North America where there are aquatic habitats, including marine coasts (oceans, bays, and estuaries), rivers and lakes. The breeding distribution extends from Alaska across Northern Canada and south throughout the lower 48 states with largest populations along the coasts and larger inland waterways. During the non-breeding season, Bald Eagles are primarily associated with aquatic areas that remain unfrozen and support an abundance of food. They can form large aggregations during the winter and migratory periods.

Bald Eagles are well distributed in Washington (Fig. 2) with the majority of the population occurring west of the Cascade Range. Most nest sites in Washington state are in or near the marine environment, including the San Juan Islands, the greater Puget Sound region, the Strait of Juan de Fuca, the Pacific Coast and associated estuaries, and the lower Columbia River. Bald

Eagles also are found in association with nearly all major waterways, inland lakes, and reservoirs away from the marine zone, including eastern Washington. Bald Eagles are scarce or absent in higher elevations and portions of the Columbia Basin and Palouse region.

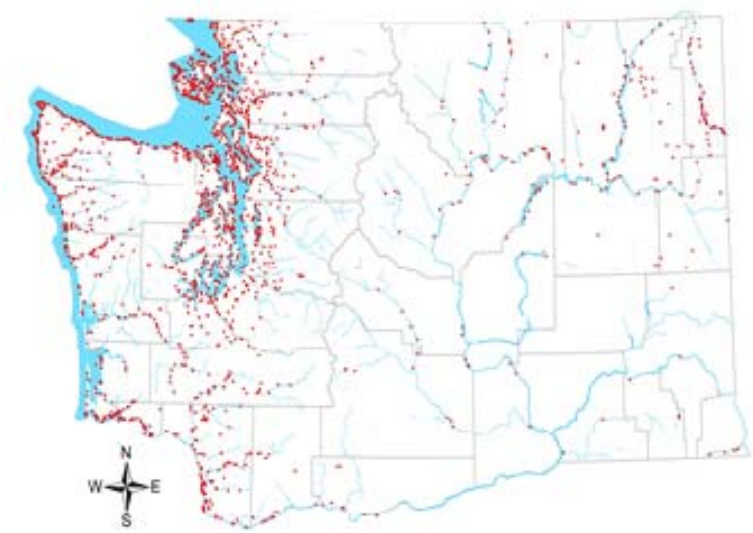

Figure 2. Distribution of the known Bald Eagle nests in Washington through 2015.

NATURAL HISTORY

Habitat requirements. Nesting habitat for Bald Eagles is typically defined by areas of large, mature trees close to large bodies of water and, generally screened or buffered from human development and activity (Stinson et al. 2007). Nest trees are large and are often among the largest trees in a forest patch (Watson and Pierce 1998). These large trees support nests up to 2m in diameter, over 1m tall and that may weigh several hundred pounds. The height or position of the selected tree typically provides easy access on approach and good visibility of the surrounding landscape. Nests are reused year after year; many territories contain additional large trees or even multiple alternate nest trees (Stalmaster 1987).

Human development and activity has played an important role in eagle behavior and nest site selection. Several studies conducted in Washington have demonstrated Bald Eagle sensitivity to human disturbance (Watson 1993, Parson 1994, Watson and Pierce 1998, Becker 2002, Watson 2004), including changes in behavior and avoidance of areas with visible or audible human activity. However, it appears that eagles are becoming more accustomed to human activity to the point that more eagles now nest in suburban landscapes adjacent to human activity (Parson 1994, Millsap 2004). This increasing tolerance of human activity from one eagle generation to the next is known as the generational habituation hypothesis (Guinn 2013).

***Diet and foraging*.** Bald Eagles are largely piscivorous birds with greater than 50% of their diet consisting of fish throughout most of their range. In Washington, one study indicated that bald eagle diets consisted primarily of fish (78%), followed by birds (19%), and then mammals (3%) (Watson 2002). The study further indicated that most prey was captured alive (73%), but that Bald Eagles also used carrion (15%) and pirated food from other species (12%) (Watson 2002, Watson et al. 1991). Bald Eagles that overwinter in Washington are particularly dependent on chum salmon and other salmon species in the fall and early winter (Stinson et al. 2007), and rely more heavily on waterfowl in mid- to late-winter (Elliott et al. 2011); carrion is also consumed during winter (Stalmaster 1987, Watson 2002).

Home range and movements. Home range sizes of Bald Eagles are largely dependent on the quality and availability of local food resources and nest sites. Home range size during the breeding season varies throughout Washington based on habitat type. Watson (2002) found the smallest home ranges (2.1 km^2) occurred in inland lake habitats, while the largest home ranges (6.4 km^2) were found in bays with extensive tidal flats. The average home range size during the breeding season over all habitats in Washington was 4.9 km^2 (Watson 2002, see Garrett et al. 1993). Information from Chesapeake Bay, Virginia, indicates that in areas with major anadromous fish spawning concentrations, Bald Eagles have been observed nesting within 100 m of each other (Bryan Watts, pers. comm.). This observation suggests that under certain conditions, the areas used by neighboring eagles can be quite close together.

Post-breeding dispersal of Bald Eagles is somewhat complex in Washington. After nestlings have fledged, breeding Bald Eagles generally migrate north to British Columbia and Southeast Alaska to forage on late summer and fall salmon runs and then return in early winter to their nesting territories (Watson and Pierce 2001). However, Washington also supports a substantial wintering population comprised mostly of eagles that nest in British Columbia, Alaska, and the Northwest Territories and migrate south to Washington (Watson and Pierce 2001). In addition, some Bald Eagles in Washington remain near where they nested throughout the year (Stinson et al. 2007).

Reproduction and survival. Bald Eagles are a long-lived species that can live over 20 years in the wild. Long-lived species tend to have high survival rates and Bald Eagles are no exception. For example, a recent analysis estimated first-year survival to be 0.86 and then 0.91 thereafter (Millsap et al. 2016).

A nesting pair of Bald Eagles will produce between one and three eggs per nest with two eggs being most typical (Buehler 2000). Nest productivity (number of young produced per territory) varies widely across the species' range and is likely influenced by a number of factors, particularly food availability, weather, and human disturbance (Buehler 2000). The estimated productivity across their range, excluding the American Southwest (which is slightly lower), was 1.12 (Millsap et al. 2016). Productivity in Washington was estimated to be 0.95 for the period 1980-1998 (Stinson et al. 2007).

POPULATION AND HABITAT STATUS

Global. The U.S. Fish and Wildlife Service used 2009 post-delisting monitoring data to estimate the Bald Eagle population in the United States to be nearly 143,000 birds (Millsap et al. 2016). The U.S. Fish and Wildlife Service also estimated the number of nesting territories, and in the proposed Pacific Flyway Eagle Management Unit, there were 1,039 territories in 2007 and 2,587 in 2009 (CI=2,073-3,101) (Millsap et al. 2016). The difference between the two years is likely due to both a real increase in population as well as differences in survey and analysis methods between 2007 and 2009 (Millsap et al. 2016). Breeding Bird Survey data indicate population growth during the period of 1966 through 2012 was 5.3% annually (Millsap et al. 2016). Population modeling indicates that population growth across the range is projected to continue for another 10 to 20 years until the total population stabilizes at around 228,000 birds (Millsap et al. 2016).

Washington. In the Pacific Northwest and vicinity, areas such as coastal British Columbia have shown population stability since approximately 2010 (Elliott et al. 2011). In Washington, nest density exceeded estimated carrying capacity by over 100 active territories by 2005 (Stinson et al. 2007). A review of all known Bald Eagle territories in the Washington Species Data Management system indicates that the number of territories has increased by an average of 28 per year since 2005, adding 281 territories since the last directed state-wide survey (Fig. 3). The total number of known territories in the state was 1,334 as of 2015. This total reflects the cumulative number of sites and not the number of sites that are known to be active in any particular year. Information on new territory locations over the past 10 years has been gathered opportunistically, primarily representing public reporting that was subsequently verified by WDFW biologists. Given the lack of recent comprehensive survey effort, it is likely other currently active territories have yet to be identified. In addition, it is very likely that some territories have been lost over time. In 2005, approximately 75% of the known territories had occupied nests (Stinson et al. 2007). Because of the lack of recent survey effort, the current percentage of breeding territories that are occupied is unknown. The results indicate that new Bald Eagle territories are still being established every year; some of these new territories are likely being occupied by previously non-breeding adults (Stinson et al. 2007).

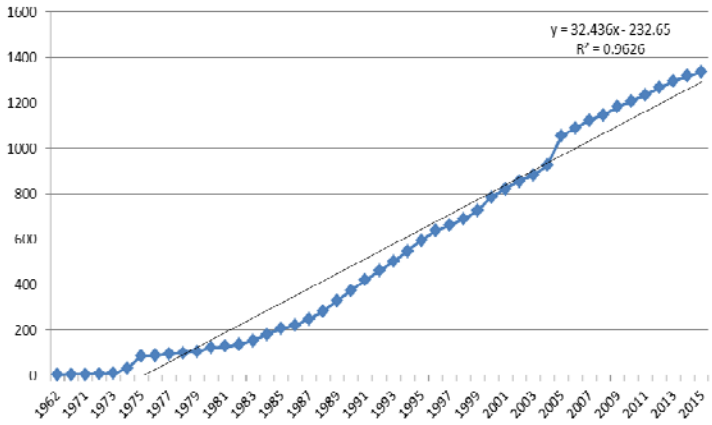

Figure 3. Cumulative number of Bald Eagle territories during the period 1962 through 2015. The species was down-listed to Sensitive status in 2007 based in part on survey information collected through 2005.

Information on the distribution and availability of quality habitat is extremely difficult to quantify. Bald Eagles typically nest near large bodies of water, but the attributes that make a particular location functional for eagles include trees that

are sufficiently large and have the branch structure necessary to support an eagle nest. To our knowledge there has been no published assessment of eagle habitat for Washington. Quantifying the availability of nest trees is currently extremely difficult, if not impossible, to accomplish in a GIS environment. Part of the reason for this difficulty is that eagles don't require large patches of forest for nesting and can use small patches or even single isolated trees for nesting. Methods such as remote sensing or aerial photo interpretation, which work well to detect obvious patches of contiguous or older forest, cannot assess the availability of individual nest trees. As a consequence, we must make some assumptions about the apparent adequacy of habitat that must be present to support the sizable population of Bald Eagles in the state.

FACTORS AFFECTING CONTINUED EXISTENCE

The sections below describe factors that may influence Bald Eagles individually or at the population level. Factors that have been known to impact populations include poisoning and the absence of regulations that adequately protect Bald Eagles. Discussion of additional factors is included in the following sections because they are sometimes identified as issues of concern, but none of those factors are known to impact populations.

Adequacy of Regulatory Mechanisms. There are significant protections afforded Bald Eagles at the federal level, including the Bald and Golden Eagle Protection Act, Migratory Bird Treaty Act (MBTA), and the Lacey Act. The Bald and Golden Eagle Protection Act (Eagle Act) is now the primary mechanism for Bald Eagle protection (the protections are currently comparable to the Endangered Species Act). It prohibits the unauthorized "taking" of Bald Eagles where "take" is defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb" (U.S. Fish and Wildlife Service 2016). Limited numbers of permits are available from the U.S. Fish and Wildlife Service to authorize Bald Eagle take that is incidental to an otherwise lawful activity. The U.S. Fish and Wildlife Service recently released a document outlining several proposed changes to the permitting regulations, but the substantial protections afforded to eagles under the Eagle Act will remain regardless of the outcome of this proposed rule change (U.S. Fish and Wildlife Service 2016).

Poisoning. Bald Eagles are apex predators and for this reason environmental contaminants present in aquatic systems may bioaccumulate through the food chain and into their tissues. Polyhalogenated aromatic hydrocarbons are endocrine disruptors that became widely distributed in the environment beginning in the mid-twentieth century (Cesh et al. 2010). Among these was a chemical known as dichloro-diphenyl-trichlorethane (DDT) which was largely responsible for the decline of Bald Eagles and other avian species. While DDT use was restricted decades ago, it breaks down in the environment to dichloro-diphenyl-dichloroethylene (DDE), and this metabolite of DDT remains persistent in the environment although in slowly decreasing concentrations in some areas (Dykstra et al. 2005). Other toxins in this group also remain in the environment and accumulate in the tissues of Bald Eagles. Many studies have tested Bald Eagles for the presence of various toxins, including polychlorinated biphenyls (PCBs), and polybrominated diphenyl ethers (PBDEs) (Cesh et al. 2010). PCBs were used in coolants, insulation, and lubrication, and are still detectable in the environment even though their use was

banned in the United States in 1979. PBDEs are used as a flame retardant and were reported in Bald Eagles on the west coast of the United States (McKinney et al. 2006); high concentrations have been reported in species such as Bald Eagles and River Otters (Dornbos et al. 2015).

The presence and concentration of these contaminants in Bald Eagles vary by location due to presence or absence of a source and by habitat type (lake vs river vs marine) which will dictate the degree of exposure to Bald Eagles (Elliot et al. 2009; Route et al. 2014). In one area of the Great Lakes, the presence of both PCBs and DDEs has declined in eaglets over time (Dykstra et al. 2005). Later, in another study from the Great Lakes, total PBDE levels in Bald Eagles declined likely due to restrictions on use (Route et al. 2014).

PDBEs and other toxins are declining both in the environment and in animal tissues (U.S. Environmental Protection Agency 2006), but they remain present and pose an unknown risk to Bald Eagles (Cesh et al. 2010). Contaminant levels in two regional Bald Eagle populations – Hood Canal and the lower Columbia River – appear to have depressed population performance of Bald Eagles in those areas (Mahaffy et al. 2001, Watson et al. 2002, Buck et al. 2005). There may continue to be localized risk for eagles near urban areas with significant industrial development or near landfills (Henny et al. 2009, Spears and Isanhart 2014). Because some contaminants are persistent in the environment, and can be a risk factor due to continued use or disturbance of sediments where they may have settled, the potential threat of contaminants will likely continue well into the future. While the presence of PDBEs in Bald Eagles is concerning and worthy of further investigation, there have been no identified acute or long term consequences to either the individual or local populations where it has been studied (Elliott et al. 2009, Dornbos 2015), and no correlations have been established between the levels of PDBEs and lethal or sub-lethal effects or declines in productivity (Cesh et al. 2010). The use of PDBEs has been banned in Washington. High levels of toxins were identified as the cause of death of 20 out of 142 Bald Eagles that were inspected for cause of death in Washington (James Watson, personal communication). Despite the continued presence of contaminants, Bald Eagle populations continue to increase both regionally and nationally.

Bald Eagles are known to scavenge carrion (Stalmaster 1987) and this practice exposes them to risk of lead poisoning. Scavenged items in Washington include (but are not limited to) discarded offal from hunter-killed deer and elk, hunter-killed coyote carcasses left in the field (Stauber et al. 2010), and injured or dead waterfowl. These scavenged food resources may contain fragments of lead ammunition that, when ingested, contribute to lead poisoning. High levels of lead have been documented in waterfowl, particularly swans (Degernes et al. 2006), and this source of contaminants in swans has been known for decades (see Lagerquist et al. 1994). There is also increasing evidence indicating that eagles likely acquire lead after feeding from hunter-shot deer (Hunt et al. 2009, Cruz-Martinez et al. 2012). A study in the upper Midwest found that 60% of Bald Eagle carcasses had detectable levels of lead and 38% had lead levels that were in the lethal range (Warner et al. 2014). In addition, they found that 36% of offal piles from hunter-killed deer contained lead particles (1-107 particles/pile) (Warner et al. 2014). In Washington, half of the injured or dead Bald Eagles recovered and admitted to the Washington Raptor Rehabilitation Program between 1998 and 2008 had greater than background lead levels and half of those were classified as “clinical” (possibly treatable) or “severe clinical” (recovery rare with

treatment) (Stauber et al. 2010). The incidence of lead poisoning might be higher than reported considering that healthy eagles were not sampled, and that the birds tested were either found alive and in need of treatment (Stauber et al. 2010) or were carcasses salvaged for the National Eagle Repository (Warner et al. 2014). While there are potentially other sources of lead in the environment, exposure to Bald Eagles from other sources is unlikely given their food preferences (Warner et al. 2014).

Bald Eagles also fall victim to other sources of poisoning including ingestion of animals poisoned for rodent or predator control. Rodenticides are still commonly used for rodent control (Huang et al. 2016) and the effects of their anticoagulant properties can be carried through the food chain to Bald Eagles resulting in sickness or death. Sick and dead Bald Eagles have been confirmed to be poisoned by the intentional poisoning of coyotes (Allen 1996, Wobeser 2004).

Habitat Loss. Washington's human population is expected to increase by 30% to nearly 9 million people by 2040 (Washington Office of Financial Management 2016). This will put increased pressure on natural resources to accommodate the needs of an expanding human population. The Growth Management Act will continue to be an important means to managing growth and development, but there will still be risk of losing Bald Eagle nesting and roosting habitat into the future. In addition, forest practices rules now provide substantial protection to riparian zones on nonfederal lands throughout Washington; the protection standards of those rules should result in recruitment of very large trees in riparian zones into the future. Provided the Eagle Act provides effective protection and Bald Eagles continue to show signs that they are adapting and habituating to human activity, it is hoped that the effects of a growing human population will not pose a major risk to Bald Eagle populations.

Food Availability. Winter food abundance has been identified as one of the major factors influencing Bald Eagle population size (Elliott et al. 2009). Most Bald Eagle mortality occurs in late winter (January-April) when salmon become less available. This situation forces eagles to switch to less-profitable food resources, primarily wintering waterfowl (Elliott et al. 2011) and waterbirds (Stinson et al. 2007). Decreased food abundance in late winter may force some birds into higher risk areas, exposing them to more anthropogenic threats (Millsap et al. 2004). Late winter food limitations can also impact the productivity of Bald Eagles, if birds were less fit due to lower food resources and increased inter-specific competition with increased densities of birds and territories. Competition for food resources is thought to be the factor that will cause the increasing population trend to level off in the future (Stinson et al. 2007). Human population growth may also put increased pressure on fisheries, particularly salmon important for wintering eagles. To the best of our knowledge information linking Washington salmon abundance to Bald Eagle populations has not been established.

The possible or likely status of future salmon populations in Washington is unclear. Recovery of salmon populations is an important goal of WDFW, Native American tribes, and numerous stakeholder agencies and organizations. Ongoing policy discussions and agreements have influenced management approaches to several key and sometimes controversial factors that influence salmon populations: hatchery populations, harvest management, habitat improvements, management of hydro-electric facilities, and predation on salmonids by piscivorous birds. There

is consensus among most stakeholders that addressing these factors will contribute to recovery of salmon (Bill Tweit, personal communication). Some of the challenges and solutions have been briefly summarized (Waples et al. 2009). At the same time, however, there is concern that factors related to climate change may complicate recovery efforts. In particular, increased water temperature, a lower flow of water in the summer, and increased winter flooding may negatively impact salmon populations (Mantua et al. 2010).

Disease. There are several diseases that affect Bald Eagles, but none of these are known to impact populations. A recent review of diagnoses of Bald Eagle mortality events from the National Wildlife Health Center revealed confirmed incidents of avian cholera, Avian vacuolar myelinopathy, avian botulism, clostridiosis, and West Nile virus (USGS 2016). The most frequent of these was Avian Vacuolar Myelinopathy which originates from cyanobacteria (*Aetokthonos hydrillicola*) associated with dense aquatic vegetation including invasive aquatic plants such as hydrilla, Brazilian elodea, and Eurasian milfoil (Wilde et al. 2014). The cyanobacteria coat the aquatic plants that are subsequently eaten by American Coots which are poisoned by the cyanobacteria. Bald Eagles that prey on or scavenge the poisoned coots then ingest the cyanobacteria, and the toxin is passed on to the eagle which experiences neurologic impairment and eventually death (Wilde 2014). Fortunately, hydrilla has been largely eradicated from Washington, but elodea and milfoil are still present in a number of lakes (Washington Department of Ecology 2016)

Climate change. It is not expected that predicted future climate change for this region will have an adverse effect on Bald Eagles with regard to potential effects on their metabolic rate (Harvey 2012). Warmer winters should not cause abandonment from the region. However, Bald Eagles could be impacted indirectly if future climate conditions impact the amount and timing of local salmon runs and the availability of these or other prey species (Harvey 2012). Another important consideration is the influence of predicted sea level rise in coastal estuaries on food resources including salmon, forage fish, and wintering waterfowl (and see section above on food availability).

Other factors. There continue to be incidents of Bald Eagles being targeted and shot though it is assumed this type of direct persecution is much lower in recent decades compared to prior to protections afforded by regulations in recent decades. Nine of 142 (6%) Bald Eagle carcasses examined between 2006 and 2016 had been shot (James Watson, personal communication). In addition, there have been several high-profile cases of illegal take of eagles in Washington in the last decade, with cases ranging from single eagles to “dozens” of them being killed (for example, The Globe and Mail [Vancouver, B.C.], 29 April 2006; Lakota Country Times, 19 March 2009; Seattle Post Intelligencer, 30 April 2014).

Bald Eagles are also vulnerable to collisions in a variety of contexts. The scavenging nature of Bald Eagles makes them susceptible to collision with cars as they feed on road-killed animals along roadsides. This is particularly true for eagles that fledged from suburban landscapes and are less wary of cars. Their first-year mortality is higher than those that fledged from rural landscapes (Millsap et al. 2004). Forty-two percent of 142 Bald Eagles for which cause of death could be identified had experienced some type of physical trauma (James Watson, personal

communication), potentially including related to automobiles. With an increasing level of eagle activity in urban and suburban landscapes there is a likelihood that this source of mortality will increase locally in the future.

Other collisions occur in association with activities related to energy development and distribution. Powerline collision and electrocution have been identified as a contributor to Bald Eagle mortality (Harness and Wilson 2001). Mortalities from power lines likely represent a relatively low source of mortality for Bald Eagles, with an estimated 15-25 deaths occurring each year (Stinson et al. 2007). In an assessment of 142 dead Bald Eagles with identifiable sources of mortality received or recovered between 2006 and 2016, 6% of the mortalities were associated with electrocution (James Watson, personal communication). A newer source of eagle mortality is collision from wind turbines in wind farms established for energy production. However, little information is available regarding Bald Eagle mortality associated with wind farms (Pagel et al. 2013). A survey of limited publicly available mortality records indicate that between 2008 and 2012 only eight records of Bald Eagles were attributable to wind farm collision (Pagel et al. 2013). In Washington, the risk of Bald Eagle collision with wind farm facilities may be lower because most wind farms are east of the Cascades and not among the most densely occupied areas of Bald Eagle distribution. Continued effort to appropriately site both new powerlines and wind energy facilities to minimize exposure to eagles will be needed to minimize impacts to populations.

MANAGEMENT ACTIVITIES

For many years WDFW worked with landowners to develop management plans that were designed to prevent or minimize human disturbance to Bald Eagles. At least 3000 of these plans, which mostly addressed activities in nesting territories, were negotiated throughout the state. An analysis of demographic data at sites with plans in comparison to sites that did not require plans (i.e., sites with little or no human activity) found no differences between the two site categories, indicating the effectiveness of the plans (Schirato and Parson 2006).

In 2007, the Bald Eagle was removed from the federal list of species protected under the Endangered Species Act and was down-listed in Washington from the designation of Threatened to Sensitive status. Several years after down-listing in the state, WAC language that authorized WDFW to negotiate site management plans was revised such that this authority would only apply if the species was listed as Threatened or Endangered (WAC 232-12-292).

Following federal delisting, the U.S. Fish and Wildlife Service designed and implemented a program of post-delisting monitoring across the continent (U.S. Fish and Wildlife Service 2009). WDFW participated in discussions relating to development of that survey and conducted surveys in Washington in support of that effort. The monitoring program was designed to “detect a 25 percent or greater change in occupancy of Bald Eagle nests over any period, measured at 5-year intervals based on an 80 percent chance of detecting such a change” (U.S. Fish and Wildlife Service 2009:9). That monitoring program was terminated by the U.S. Fish and Wildlife Service after only one survey due to funding constraints and general lack of concern about Bald Eagles given their strong recovery (U.S. Fish and Wildlife Service 2015).

Bald Eagles are doing well in Washington and there are many other species that require our conservation and management attention. Consequently, in the last few years we have worked diligently with the U.S. Fish and Wildlife Service to transition the responsibility of eagle management to that agency. Despite our earlier desire to streamline WDFW activities there was an ongoing workload associated with responding to reports of new Bald Eagle nests and communal roosts, managing submitted data, and interacting with the public and local governments. Even though permitting take is the responsibility of the U.S. Fish and Wildlife Service, requests for information and assistance are still being directed to WDFW. WDFW will continue to work with state and regional offices of the U.S. Fish and Wildlife Service to streamline the process for directing project proponents to the U.S. Fish and Wildlife Service for their permitting needs.

CONCLUSION AND RECOMMENDATION

The Bald Eagle population is growing nationally, regionally, and locally within Washington state and this population growth is expected to continue according to projections made by the U.S. Fish and Wildlife Service. The Bald Eagle population both in Washington and throughout most of its range has clearly recovered. Both Oregon and Idaho have already delisted the species from their state endangered species lists. While there are still threats to Bald Eagles, none of the threats that have been documented to impact populations are having known deleterious effects, and current population analyses indicate that Bald Eagle populations will continue to grow despite those threats (Millsap et al. 2016). It is, therefore, recommended that the designation of Sensitive status for Bald Eagles is no longer appropriate and that the species be removed from the Endangered Species list in the state of Washington. This action does not remove protections intended to sustain the population, because Bald Eagles are still protected under three federal acts: the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act, and the Lacey Act. The Washington population is robust and all indications are that the species will continue to be an important and thriving part of our state's natural diversity for the foreseeable future.

REFERENCES CITED

The references cited in the *Periodic Status Review for the Bald Eagle* are categorized for their 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. References were categorized by the authors in May 2016.

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	(i) Independent peer review: review is overseen by an independent third party.
ii	(ii) Internal peer review: review by staff internal to the department of fish and wildlife.
iii	(iii) External peer review: review by persons that are external to and selected by the department of fish and wildlife.
iv	(iv) Open review: documented open public review process that is not limited to invited organizations or individuals.
v	(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	(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	(vii) Records of the best professional judgment of department of fish and wildlife employees or other individuals.
viii	(viii) Other: Sources of information that do not fit into one of the categories identified in this subsection (1)(c).

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