U.S. Fish and Wildlife Service

Draft

Environmental Assessment

Depredation Permits for Common Raven Removal in Nevada

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Contents

1. Introduction

The United States Fish and Wildlife Service (Service) has prepared this Environmental Assessment (EA) pursuant to the National Environmental Policy Act (NEPA; 42 U.S.C. 421 et. seq.) for the purpose of evaluating the reasonably foreseeable environmental impacts of making decisions on Common Raven (*Corvus corax*; raven) permits for take in the state of Nevada. This concerns increasing the number of covered take of ravens primarily for the purpose of protecting livestock, agricultural resources, sensitive wildlife, and human health and safety. While this EA considers the potential environmental impacts of permitting actions, the Service will evaluate each permit application individually and make future decisions based on the criteria set forth in 50 C.F.R. §§ 21.100. (depredation), 21.73 (scientific collection), 21.95 (special purpose), and any future regulations that allow for lethal take. We are considering three alternatives described below: the maximum take option, reduced take alternative (the preferred alternative), and renewal of the most recent permit (no action).

2. Need for Action

Ravens have co-existed with other species in predator-prey relationships that evolved over tens of thousands of years. These relationships have been disrupted by the accelerating pace of human-caused modifications to the North American landscape, and raven population trends are no longer dependent on historical ecological drivers. Ravens are remarkably adaptable and can easily exploit resources made available due to human modifications to the landscape including supplemental food and nesting structures. Consequently, raven populations in recent decades have followed a significantly increasing trend (Sauer et al. 2017). Supplemental food sources such as garbage, crops, and roadkill may give ravens an advantage over less opportunistic feeders and have allowed their populations to increase precipitously in some areas (Boarman 1999). Power poles and other towers can provide elevated perching and nesting locations in areas where these features were previously nonexistent or uncommon. With this increasing trend has come a rise in conflicts with at-risk species, conflicts with agriculture (e.g., livestock and nut producers), and risks to human health and safety (e.g., on utility lines and at airports).

The Migratory Bird Treaty Act (MBTA; 16 U.S.C. § 703-712) prohibits take of migratory bird species without a permit, including ravens. Issuance of an MBTA permit would authorize take of ravens if deemed necessary for the protection of other wildlife and their resources, livestock and agriculture resources, and human safety. Issuing a permit for take constitutes a discretionary Federal action by the Service that is subject to NEPA. The scope of this EA includes applications for depredation, scientific collection, special purpose permits, and any future regulations that allow for lethal take to take ravens in Nevada.

The Service uses standard operating procedures developed by the Migratory Bird Permit Program in order to evaluate need for a take permit (See Appendix A). While developed for depredation activities, this guidance can be used for all lethal take. Take can be authorized for four types of damage: agricultural damage, private and public property damage, threats to human health and safety, and threats to the recovery of protected wildlife. The first step in the evaluation process is determining completeness of the application. Requirements include a description of damage, non-lethal method implementation and long-term solutions, species-specific take request, and a description of the method of take. Once an application is determined to be complete, it is reviewed for potential disqualifying factors. Some common examples of these factors are inability to demonstrate valid justification, lack of responsibility for the action, or authorization requests that threaten another wildlife or plant population. Following this, the reviewer evaluates the impact of take on species populations. If it is determined that the requested take will not have a significant impact on the population of the given species, which may be evaluated at the local, regional, or statewide scale, as appropriate, then the permit conditions are developed which list the authorized take, methods of take allowed, and other mandatory requirements such as reporting and disposal. The permit is issued once all of these steps have been completed.

In July 2020, United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services in Nevada (WS-Nevada) issued a final Environmental Assessment (WS-EA)[1] for Predator Damage Management in Nevada (WS-Nevada 2020). The WS-EA included an assessment of the impact of raven removal on the raven population in Nevada. Pursuant to NEPA, the Service was a cooperating agency in the preparation of the EA. We incorporate the WS-EA by reference in this EA to support our decisions for permit applications for the annual take (i.e., lethal removal) of ravens in the State of Nevada. As currently authorized by the MBTA, the Service may issue depredation, scientific collection, and special purpose permits. The Service receives applications for permits from WS-Nevada, the Nevada Department of Wildlife (NDOW), airports, agricultural producers, utilities, and other stakeholders affected by or studying ravens. Upon receipt of a properly executed application for a permit, the Service is required to make a determination and issue the appropriate permit unless one of the criteria under Issuance of Permits applies. The Service's purposes are to ensure that its permit decision is consistent with the MBTA, its underlying treaties, and implementing regulations as well as complies with other applicable Federal laws and regulations. The MBTA gives the Service broad authority to protect birds, but also to regulate their taking as long as their conservation is assured; the issuance of these permits must ensure that authorized take will not potentially threaten raven or other wildlife or plant populations (See 50 CFR 13.21(b)(4)).

This EA evaluates the Service's decisions to issue migratory bird permits to allow permitees to lethally remove ravens in Nevada if the proposed actions meet the issuance criteria for permits under MBTA and applicable regulations. The Service currently issues migratory bird permits to allow permitees to lethally remove ravens in Nevada and is evaluating the effects of increasing the total cumulative number of ravens that could be lethally removed based on the most up-do-date population estimates and trends as well as impact assessments. Migratory bird permits are issued by the Regional Bird Permit Offices.

[1] Available at https://www.aphis.usda.gov/wildlife_damage/nepa/states/NV/nv-2020-pdm-final-ea.pdf

Permits in Nevada would be issued by the Service's Pacific Southwest Region Permit Office in Sacramento, California.

3. Background

3.1. Raven Life History and Trends

For life history and status of ravens in Nevada, including population trends, refer to Section 3.5.4.1 (p. 270) in the WS-EA.

Since 1966, there has been approximately a three-fold increase in the number of ravens nationally and a five-fold increase in the number of ravens in Nevada (Sauer, J.R., Link, W.A., and Hines, J.E., 2020). The population of ravens in Nevada used in the WS-EA Appendix D modeling is 190,000 individuals (Partners in Flight 2013). However, it is evident that populations have increased since modeling was completed. The population of ravens in the United States is currently estimated at 2.5 million individuals, with 370,000 estimated in NV (Partners in Flight 2023).

3.2. Raven Threats to Resources

For a description of raven threats to resources, refer to WS-EA:

- Section 1.11.5 for natural resources, including Greater Sage-grouse (1.11.5.8, p. 116) and other wildlife species (1.11.5.9, p. 121);

  Ravens have been described as one of the most significant limiting factors to the recovery of sensitive species in Nevada. Not only do ravens predate nests and chicks, but also indirectly affect sage-grouse through habitat alteration. Anthropogenic development has supported a further increase in ravens and has made previously suitable habitat inadequate for sage-grouse. Other sensitive wildlife species are likely impacted in a similar fashion.

- Section 1.11.2 for livestock;

  Ravens have been noted as a significant threat to livestock, especially lambs. From FY12-FY16, ravens accounted for over $100,000 in value of livestock injured or depredated, only behind mountain lions and coyote. Non-lethal methods have been used to minimize general predation risk, but strategies used to reduce canid predation often make livestock more vulnerable to corvid predation.

  Section 1.11.3 for agricultural resource and property other than livestock;

  Ravens can cause substantial damage to agriculture, both directly and indirectly. They can disturb field crops, as well as fruit and seed crops, but also the buildings and infrastructure necessary for agricultural development via nesting. Damage to power lines and equipment can result in outages and fires which can pose risks both locally and

> regionally. Ravens have also altered landfills by spreading garbage and through accumulation of fecal matter, risking human health and safety.
>
> Section 1.11.4 for public safety and health.
>
> The increase in anthropogenic development has supported the growth of raven populations and has, thus, increased potential for human-avian conflicts. Risk of transmissible disease has become more prevalent as well. Furthermore, elevated raven populations can pose a greater safety threat through the heightened potential for collisions at airports and airfields.

Raven Removal Methods

Ravens in Nevada are predominantly taken using the avicide DRC-1339 (3-chloro-p-toluidine hydrochloride; EPA Special Local Need No. NV-150001). Other methods that may be authorized include, but are not limited to, firearms, hand capture, and nest/egg removal. In accordance with the Service's Standard Conditions for depredation permits, a permittee must have attempted to use non-lethal methods prior to applying for a permit. Some examples of non-lethal methods used for ravens are installation of physical barriers, elimination of attractants, minimization of perch availability, raptor abatement, and hazing techniques such as pyrotechnics, alarms and lasers. Permittees are required to continue to utilize non-lethal methods in conjunction with authorized lethal take.

DRC-1339 is currently registered in Nevada for use by WS-Nevada and the Nevada Department of Agriculture-Wildlife Services for addressing raven damage (EPA Special Local Need No. NV-150001). To use this method, hard-boiled chicken eggs are injected with DRC-1339 and placed strategically throughout a project area. The treated eggs are eaten by ravens, which leads to renal failure typically within 12 hours or less. DRC-1339 application methods are described in detail in the WS-EA, beginning on page 377.

Risks of DRC-1339 to non-target species are evaluated in several places in the WS-EA (e.g., p.276, p. 347, p. 379, p.423). WS-Nevada concluded the following in the WS-EA:

> DRC-1339 poses little risk of secondary poisoning to nontarget animals, including avian scavengers. DRC-1339 poses no risk to aquatic nontarget wildlife. Nontarget birds and mammals that are sensitive to DRC-1339 may be at risk to DRC-1339, but this risk can be reduced through label language designed to reduce exposure. Risks to pollinators and terrestrial plants is negligible based on the use pattern of DRC-1339 and available limited effects data. The… application rates that are mostly on private lands, results in negligible risk for the public. Dietary risk from DRC-1339 exposure to the public is low since the avicide has no registered food uses and does not pose a threat to drinking water. The risk to… applicators is also low because they receive training in the product's use, are certified by the State to use restricted use pesticides, and follow label instructions, including the use of appropriate PPE [personal protective equipment]. The release of DRC-1339 into the

environment is expected to have no or negligible cumulative impacts to nontarget species, the public, and the environment.

The humaneness of DRC-1339 is addressed in detail in the WS-EA, section 3.9.5.2.3 (page 378). Observational reports of birds treated with DRC-1339 document that convulsions, spasms or distress calls have not been observed in birds receiving a lethal dose, rather the birds die a seemingly quiet death. Birds that get a lethal dose may show no outward clinical signs for many hours and go about normal activities. About four hours before death, the birds cease to eat or drink and become listless and inactive, and possibly comatose; they perch with their feathers puffed up and appear to doze.

4. Alternatives

4.1. Alternative 1: Reduced Take Alternative (Preferred Alternative):

We expect that requests for lethal raven take will continue to increase and will exceed the amount requested and permitted in the recent past. NDOW and WS-Nevada have indicated to the Service that in order to provide protection to sensitive species adequate to meet species goals, they could, combined, request lethal take for up to 10,000 ravens per year. Allowing for an additional 1,000 ravens per year to protect other resources (e.g., human health and safety, agriculture, and livestock), under this alternative we would authorize the lethal removal of up to 11,000 ravens per year.

4.2. Alternative 2: Issue Permits for up to the Potential Lethal Take Maximum

The Service and WS-Nevada modelled the maximum potential lethal take that could be authorized for the NV raven population that would result in a stable population (WS-EA Appendix D). Using a conservative model based on a 2013 estimate of raven populations, we estimated that we could authorize lethal take for up to 19,042 total ravens per year without causing a decline in the NV population. This alternative would allow for lethal take of up to 19,042 ravens across the state of Nevada.

4.3. Maintain Permit at the Current Permitted Amount (No Action)

The Service currently authorizes the lethal take of approximately 5,000 ravens per year. This alternative would authorize the same number under a renewed permit, without an increase in take allowances despite the expected increase in take requests.

5. Environmental Effects

5.1. Population Analysis

As a cooperating agency, the Service provided WS-Nevada a population model using the potential take limit method to assess the potential effects of removing ravens across Nevada

(WS-EA Appendix D). The model uses the Potential Take Limit (PTL) method developed by USFWS – Division of Migratory Birds. The PTL method uses demographic estimates to produce the maximize potential fecundity estimate to develop a model to estimate different take levels that match management goals. We used the Partners in Flight Science Committee (2013) estimate of raven abundance by state for this analysis. We were interested in modeling effects of take on the number of ravens in Nevada, which was estimated at 190,000. The results estimate that up to 19,042 ravens can be removed annually in Nevada while still maintaining a stable population. The Nevada raven population estimate was updated to 370,000, with a 95% confidence interval from 220,000 to 590,000 (Partners in Flight Science Committee 2023). Although this confidence interval is large, it is still greater than the 2013 estimate and indicates that the model is conservative.

The raven population in Nevada is not isolated and is likely part of a larger meta-population of ravens in the western United States. The Service authorizes take of ravens annually throughout the west. The WS-EA analyzes proposed take of 10,000 ravens annually in Nevada and also its effect on the population when added to the maximum raven take authorized in the previous 12 years across seven states wholly within the Pacific Flyway, excluding Alaska; these are the states of Arizona, California, Idaho, Nevada, Oregon, Utah, and Washington (Section 3.5.4.3.3, page 276).

5.2. Alternative 1: Reduced Take Alternative

5.2.1. Effect on Raven Populations

If the Service chooses this alternative, new permit applications and amended existing permits could be approved for authorized take of ravens, conditional on completeness, necessary qualifications, and rationale. Total authorized take would be possible up to 11,000 ravens as described above.

5.2.1.1. Adult Take

We used a prescribed take level (PTL) model (Runge et al. 2009) to determine the effect of the proposed action on raven populations at the BCR scale. It combined the Great Basin (BCR9) and Sonoran and Mojave Desert (BCR 33) because together they encompass the entirety of Nevada. This PTL model is used to predict the response of a population with a given population growth rate to different management objectives and can be used to prescribe take levels to achieve those objectives. In accordance with the MBTA, the objective in this case would be no net loss to raven populations. The model is simple in that it assumes immigration and emigration does not influence the population being modeled. Due to the fact that we are analyzing population level effects on a large geographic scale, this “closed population” assumption is realistic.

The results of this model indicate that the population growth rate for ravens was approximately 0.230 for the 50th percentile. The Bayesian state-space model, which

accounts for variances of process and observation error, results in a similar rate of 0.234. Therefore, ravens may sustain an annual take of approximately 12.5% of the populations and remain stable at about one-half of the carrying capacity. Using a population size of approximately 190,000 ravens in Nevada, the 50th percentile PTL is 19,042 individuals. The 95% confidence interval ranges from 3,212 individuals to 46,305 individuals. Based on these results, we can conclude that 19,042 ravens could be removed annually from the state of Nevada and the population would remain stable.

At the BCR scale, removing 11,000 ravens equates to a take rate of approximately 2.99%, and thus would have a significant effect on population growth (Partners in Flight 2020). The Service considers a flyway- or BCR-scale for most migratory bird species. The analysis at the BCR scale is appropriate for ravens because they are highly mobile, and the local population is not considered unique. The current population estimate of ravens at a given time in Nevada, based on estimates from BCR 9 and 33, is 370,000 individuals.

NDOW and WS-Nevada request to increase the raven take limit from its current threshold of approximately 5,000 ravens per year to 11,000 ravens per year. They believe that this value will ensure adequate protection for sensitive species and other resources such as livestock. Increasing raven populations, along with an increased presence of human activity, can be expected to lead to a greater need for resource protection. The proposed amount of take represents a level that will not decrease BCR or statewide populations of ravens but is expected to help manage the impacts they have on the landscape.

5.2.1.2. Egg Take

Aside from the use of DRC-1339, it is possible that raven take could result from egg take via egg oiling and nest removal. Determining the number of eggs equivalent to one adult raven is important in maintaining authorized take levels. In order to do so, the Migratory Bird Permit Program developed a conversion rate of eggs to fledged ravens. To calculate fledging success, hatching success rate was multiplied by percentage of nestlings fledged for a 56% success rate (Knittle 1992, Smith and Murphy 1973a, Stiehl 1985). Therefore, approximately two raven eggs are equivalent to one fledged raven. This conversion should be used when considering overall raven take.

5.2.2. Effects on other species

The majority of raven take is related to the protection of Greater Sage-Grouse, according to WS-Nevada. Schroeder and Baydack (2001) suggested that as the habitat for this species become more fragmented, it becomes more important to consider pest management strategies to increase recruitment. Ravens have been documented as the most common predator of Greater Sage-Grouse nests, and their removal at local levels has shown to increase Greater Sage-Grouse recruitment and nest success (Coates et al. 2008, Lockyer et al. 2013, Peebles et al. 2017). An

increase in permitted raven take may increase Greater Sage-Grouse numbers in Nevada, particularly in areas where they may be already affected by human presence.

5.2.3. Effects on Non-Target Migratory Birds

5.2.3.1. Black-billed Magpie

Like ravens, magpies are omnivorous, opportunistic, and their diet includes eggs (Hall 1994). As such, and because it is a corvid (see Section 3.4.1), magpies might be exposed to DRC-1339-laced eggs. Precautions will be taken to expressly limit their exposure (see WS-EA Section 3.4.3), but some individual birds might be incidentally killed.

The estimated population of Black-billed Magpie in Nevada is 210,000 individuals (Partners in Flight 2020). Their population trends are relatively inconsistent and do not demonstrate a strong increase or decrease (Sauer et. al. 2020). There is no indication of a distinct increase or decrease in population size through the past 40 years.

With the abundance and somewhat stable trends at larger scales described above, any incidental take of magpies is not expected to be measurable at the fine, county, and BCR scales. Therefore, the incidental take of magpies associated with the proposed alternative is not significant.

5.2.3.2. American Crow

Crows are a highly intelligent and omnivorous corvid that also eat eggs (Johnson 1994). As with magpies, crows might be exposed to DRC-1339-laced eggs during the course of this action. The same exposure precautions will be taken as for magpie (see WS-EA Section 3.4.3), but some individual birds might be incidentally killed.

Crows are ubiquitous in the U.S. with an estimated population of 28 million individuals. In the state of Nevada, there are an estimated 72,000 individuals (Partners in Flight 2020). Populations trends, however, are showing a mixture of non-significant and significant declines in Nevada and generally across the Western U.S. BBS routes. The negative trend is steeper over the most recent two decades of analysis than the 50-year trend (Sauer et. al. 2020). Any incidental take of American Crows that might occur because of this experiment is expected to be undetectable at the population level at the fine, county, and BCR scales. Therefore, the incidental take of American Crows associated with the proposed alternative is not significant.

5.2.3.3. Other Corvids

Most members of the Family Corvidae (or 'corvids', including ravens, crows, jays, nutcrackers) prey on eggs of other birds (Jones and Hungerford 1972, Sieving and Willson 1999, Trost 1999, Verbeek and Caffrey 2002, Coates et al. 2008, Howe and Coates 2014) although the extent to which they may eat larger eggs such as the poultry eggs (used to deliver DRC-1339) varies by species. They also tend to be more sensitive to DRC-1339 than other species of birds (see Section 3.4.1.). Corvids which co-occur with sage-grouse habitat

include raven, American Crow (*Corvus brachyrhynchos*), and Black-billed Magpie (*Pica hudsonia*). Pinyon Jays (*Gymnorhinus cyanocephalus*) and Woodhouse's Scrub-Jays (*Aphelocoma woodhouseii*) live in pinyon and juniper woodlands and will likely not be exposed to these baits.

5.2.4. Effects to Raptors and Other Scavengers

DRC-1339 is considered to be highly selective because (1) the delivery method can be targeted to avian species that consume eggs (e.g., corvids) and (2) the lethal dose (LD_{50}) for corvids is ≤10 times that of most raptors and mammals. It is highly unlikely that use of DRC-1339 would result in death of raptors and scavengers of dead ravens because of the product's relatively low toxicity to species that might scavenge on birds killed by DRC-1339, and because of the tendency for DRC-1339 to be rapidly and almost completely metabolized in the target birds (Cunningham et al. 1979). Because death occurs in the target species upon excretion of harmless DRC-1339 metabolites, only minimal residual amounts of unmetabolized DRC-1339 typically remain in the target's carcass, and the residual is typically below toxic levels to avian and mammalian scavengers (DeCino et al. 1966, Cunningham et al. 1979, Schafer 1984, Eisemann et al. 2003). Laboratory research and field trials have shown that lethal secondary exposure of non-target species through consumption of raven carcasses is highly unlikely (DeCino et al. 1966, Besser et al. 1967, Ford 1967, Royall et al. 1967, Cunningham et al. 1979).

It is unlikely that the ground squirrels that consume egg baits are affected by DRC-1339 as the LD_{50} for similar sized small mammals is very high (Ford 1967, Sterner et al. 1992). In fact, the amount needed to kill a fasted female albino rat is 1170 mg/kg; using this as a proxy, an average-sized ground squirrel (0.33 kg) would need to consume 386 mg of DRC-1339, the equivalent of nearly 200 eggs (each baited egg contains approximately 2 g of chemical; Coates et. al. 2007).

No additional indirect or cumulative effects are anticipated for non-target species. No significant effects are anticipated.

5.2.5. Endangered Species Act Listed Species

There are currently 40 species listed under the Endangered Species Act (ESA) in Nevada, as well as designated critical habitat. Given the selective nature of DRC-1339, none of the listed species are expected to be affected by its use. NDOW and WS-Nevada have coordinated with the Service on formal and informal Section 7 consultations whenever threatened or endangered species are present in their targeted areas. WS-Nevada is required to stay in continued compliance with the ESA and to use the proper precautions to avoid any impacts to listed species.

5.2.6. Other Effects

The proposed reduced take action (preferred alternative) will not have a significant effect on individuals who wish to experience ravens in the natural environment because its limited geographic and temporal scope, combined with the rebounding and increasing nature of raven

populations ensure that raven populations ultimately will be maintained. The proposed action aims to temporarily reduce the distribution and density of, but not eliminate, ravens in areas of risk to protected species and human-avian conflict and thus ravens will continue to be available in those and other areas of the natural environment across the landscape for birdwatchers and others seeking to enjoy them.

The Potential Lethal Take Maximum was formulated to support a sustainable raven population in the state of Nevada. The aim of the Service's Migratory Bird Permit program is not to manage species populations. Rather, it is to support healthy population numbers, minimize human-avian conflict, and assist in the protection of high-risk species. By reducing raven populations to values deemed to benefit sage-grouse in peer-reviewed literature and by implementing the most humane methods for taking ravens, we believe that the reduced take action (preferred alternative) will not significantly affect individuals who seek to experience ravens in the natural environment.

5.3. Alternative 2: Authorize up to the Potential Lethal Take Maximum

5.3.1. Effects on Raven Populations

If the Service chooses this alternative, new permit applications and amended existing permits, conditional on completeness and necessity, could be approved for authorized take of ravens. Total authorized take would be possible up to the potential lethal take maximum.

5.3.1.1. Adult Take

The Services estimates that there could be authorized take of up to 19,042 ravens in Nevada without causing a decline in the overall population. This value is known as the Potential Lethal Take Maximum.

Using the same model and estimation process as above, we evaluated the impact of increased take on raven populations. At the BCR scale, removing the Potential Lethal Take Maximum of 19,042 ravens equates to a take rate of approximately 5.18%, and thus would have a significant effect on population growth (Partners in Flight 2020). The Service considers a flyway- or BCR-scale for most migratory bird species; the analysis at the BCR scale is appropriate for ravens because they are highly mobile and the local population is not considered unique. The current population estimate of ravens at a given time in Nevada, based on estimates from BCR 9 and 33, is 370,000 individuals.

The effect of this alternative on the raven population is likely to be more significant than the other options. Since it would take considerable effort, likely beyond the currently available resources, to remove more than 19,000 ravens per year, it is unlikely that the actual number of ravens taken would be close to the potential lethal take maximum; however, under this alternative it would be both an option and legal to do so. Therefore, we must analyze the impacts of this alternative as such.

5.3.1.2. Egg Take

The majority of raven take across all alternatives will be conducted by using DRC-1339 on adults, and egg oiling is expected to be minimal. We do not expect that the number of eggs oiled will be significantly different between the alternatives.

5.3.2. Effects on Sensitive Species

The majority of lethal raven take is expected to be for the purpose of minimizing Greater Sage-Grouse predation, based on previously reported need (WS-EA). Pursuing the maximum amount of take would presumably increase the benefit for this sensitive species in particular, especially in low quality habitat (Schroeder and Baydack 2001). However, since take has not been authorized to this level in Nevada before, the exact extent of benefits is not clear.

5.3.3. Effects on Non-Target Species

Under this alternative, egg baiting would potentially be more widespread since the authorized take limit is the greatest. Therefore, the chances for nontarget species to be exposed to the avicide DRC-1339 would be higher as the authorized take would increase. The effects to populations of Black-billed Magpie and American Crow, as well as other corvids, raptors and scavengers, would likely increase as a result. However, as discussed in section 5.3, the impacts to these species is expected to be minimal.

5.4. Alternative 3: Continue issuing permits up to presently authorized take limits (No Action)

5.4.1. Effects on Ravens

If the Service chooses this alternative, any new permit applications or amendments to existing permits requesting additional take would not be approved. The Service's decision would result in no effect on current raven population trends or sizes. It is likely that the raven population would grow at all geographic scales to some unknown upper limit in response to human population growth and accompanying infrastructure.

5.4.1.1. Adult Take

The average amount of actual take of ravens by WS-Nevada between 2012 and 2016 is 3,826 per year. This can be broken down into 25% for the protection of livestock, 64% for the protection of greater sage-grouse, and 10% for the purpose of human safety in the form of utilities, landfills and property. Recently additional effort has been applied to species protection and the total take is up to the permitted amount. If alternative 3 was chosen, we could expect the numbers of ravens taken to remain at the total permitted number. The raven population within Nevada is not expected to be impacted to an extent greater than at the current level of take.

5.4.1.2. Egg Take

Egg take should be considered in the same manner as Alternative 1.

5.4.2. Effects on Sensitive Species

Under this alternative, there would be no additional risk of non-target effects from the application of DRC-1339 compared to current conditions. However, it is possible that increasing raven populations also have a negative population effect on non-target species. Populations of sensitive species which are affected by ravens would be expected to experience increased effects (e.g., livestock and Greater Sage-Grouse) or competitive interactions for food or nest sites (for example Black-billed Magpies and American Crows; Wilmers et al. 2003, McKinstry and Knight 1993). Thus, populations of other species under this option could decrease at a faster rate within treatment areas than they might if the Service chooses either Alternative 1 or 2.

5.5. Cumulative Effects

The cumulative effect of raven take in NV on the Pacific Flyway raven population was evaluated in the WS-EA in section 3.5.4.3.3 starting on page 276; that evaluation is adapted in the following paragraphs. The WS-EA evaluated an increase of raven take in NV to 10,000 but included a contingency of 4,000 for increased take beyond that level; our preferred alternative would authorize an increase to 11,000, which is well within the contingency considered in the WS-EA.

The common raven population in Nevada is not isolated and is likely part of a larger meta-population of common ravens in the western United States. The USFWS authorizes take of common ravens annually throughout the west. The analysis considered the effect of the proposed take level in Nevada on the population when added to the maximum common raven take authorized in the previous 12 years (spanning 2006-2017) across the 7 states wholly within the Pacific Flyway, excluding Alaska; these are the states of Arizona, California, Idaho, Nevada, Oregon, Utah, and Washington. Using the maximum take authorized for each state during that period, and summing those values for each state, yields a hypothetical upper estimate of the maximum take of 19,361 common ravens that might be authorized during any single year of the proposed efforts. This is a hypothetical maximum for authorized annual common raven take. Given the permit history within these states from 2006 through 2017, the real maximum take authorized in any given year across that geography occurred in 2014, and was 15,387 common ravens. The estimate of the number of common ravens that were actually taken is substantially lower than authorized take each year. The maximum number that was reported taken in any year was 8,007, in 2013.

The cumulative effects analysis assumed a hypothetical maximum take scenario in which 23,361 common ravens are killed per year across these 7 western states (19,361 plus a contingency of an additional 4,000 to account for potential increases associated with continued growth of the common raven population over time). The estimated size of the common raven population in these states was 1,002,000 (Partner in Flight Science Committee 2013). Thus, the potential annual take of common ravens under this scenario would amount to about 2.33% of the total raven population in these western states. This percentage is well below the maximum sustainable yield, which is estimated to be 10% for the State of Nevada. Further, the populations of common ravens in each of these states has continued to increase significantly despite the take authorized by the USFWS.

The sum of the authorization considered in the preferred alternative with other similar actions across 7 western states suggests that, cumulatively, these authorized common raven mortalities will not affect the long-term viability of common ravens. In contrast, USFWS expects common raven populations to continue to grow coincident with the expanding human population in the west, as it has over the last 50 years.

6. Persons Consulted, Collaborators, and Stakeholders

When WS-Nevada began the process for their WS-EA in 2016, an invitation to participate in the development of the EA and the offer of consultation were sent to all federally recognized Tribes in Nevada. In response, WS-Nevada received two phone calls from Tribes, one clarifying the intent of the EA and the other expressing support for the process. In the spring of 2019, WS-Nevada sent all federally recognized Tribes in Nevada a copy of the Draft WS-EA for their review along with another invitation to engage in consultation. The Summit Lake Paiute Tribe responded with a letter and in October 2019, WS-Nevada and the Summit Lake Paiute Tribe met to discuss the WS-EA and how the PDM activities may affect the Tribe and their cultural values (WS-EA Section 3.12.2, page 453).

During preparation of the WS-EA, WS-Nevada received three comments related to the proposed raven management activities. Two of the comments supported the proposed action, and one opposed the action claiming there is no science supporting raven management for protection of sage-grouse. Responses to comments are in the WS-EA Section 5.25, page 556.

[Note to reviewers: this section will be updated with input received by the Service on this draft EA]

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Appendix A: Depredation Standard Operating Procedures Issuance Criteria and Justifications Overview

Approved by MB Leadership Team: October 5, 2017

1. What is Depredation?

Depredation is physical damage or physical loss caused by birds. Depredation permits are intended to provide short-term relief and/or reinforcement of non-lethal measures while the applicant progresses towards implementing a long-term, non-lethal solution to eliminate or significantly reduce the problem. The best place to start for questions on depredation is the Frequently Asked Questions with the Depredation Permit application form (https://www.fws.gov/forms/3-200-13.pdf).

2. What types of Damage can Depredation Permits be Authorized for?

Depredation is categorized into four broad categories: (a) Agricultural Damage (see #4), (b) Private or Public Property Damage (see #5), (c) Threats to Human Health and Safety (see #6), and (d) Threats to Recovery of Protected Wildlife (see #7). Each of these categories are expanded below. Each category and subcategory below is further expanded in the Examiner-Level portion of the Depredation Standard Operating Procedure (SOP).

3. How are Depredation applications reviewed?

The Depredation Regulation (50 CFR 21.41) does not specify issuance criteria. However, the Migratory Bird permit program has drawn upon the relevant treaties, statutes, regulations, and policy[2] as well as the professional expertise of USDA-Wildlife Services to establish a consistent practice for reviewing Depredation permit applications.

We also use the General Permit Procedures (50 CFR 13.21). Under part 13.21(b), we must receive a properly executed application prior to issuance of a permit. For depredation, this includes (a) the description of the damage to people, property, or wildlife (b) the non-lethal methods that have been implemented, (c) the species, number, method, and location of take proposed, (d) the long-term, non-lethal solution proposed, and (e) the recommendation provided by Wildlife Services ("Form 37").

Once an application is determined to be complete, it must be reviewed for disqualifying factors (13.21(c)). The most common conditions a Depredation permit would not be issued are:

[2] The Depredation (50 CFR 21.41) regulation implies a preference for non-lethal alternatives, for example, no permit is required to scare or harass birds (21.41(a), but killing must be specifically authorized on the permit (21.41(c)(1)). Additionally, the regulatory requirement for implementation of non-lethal methods is found in Depredation Orders (21.43-44; 21.49-52). Service policy documents relating to Depredation activities also require nonlethal implementation prior to lethal take, such as the Policy on Issuing Permits to Take Raptors with the Use of Pole Traps as well as the Service Manual 724 FW 6 Depredating Birds at Fish Culture Facilities. The Service policy specific to Depredation Permits is further outlined on the Application Form (3-200-13), associated frequently asked questions, and permit issuance past practice. This OMB approved form requests the applicant to provide information on the nonlethal deterrents tried and a long-term strategy for the combination of lethal and nonlethal deterrent measures.

a. “The applicant has failed to demonstrate a valid justification for the permit and a showing of responsibility” (13.21(b)(3)); and

b. “The authorization requested potentially threatens a wildlife or plant population” (13.21(b)(4)).

It is possible for an application to be complete but fail to demonstrate a valid justification. For example, failure to implement reasonable nonlethal methods or the proposed solution is not likely to reduce the depredation problem. Under the Migratory Bird Treaty Act, we must also determine that take is compatible with the preservation of the species. These criteria must be met prior to issuance.

More information on how applications are reviewed, including expectations for different types of depredation, can be found in the Examiner-Level portion of this SOP.

4. What is Agricultural Damage?

Agricultural damage is damage or loss to commercial agriculture (for hobby or private agriculture see Property Damage). We use the USDA definition of “Farm or ranch” when considering whether something constitutes agricultural loss. A farm or ranch is defined as “any place from which $1,000 or more of agricultural products were raised and sold or would have been raised and sold during the previous year, but for an event beyond the control of the farmer or rancher” (7 CFR § 4284.902 Definitions). If all reasonable non-lethal methods have been implemented, permits may be considered for agricultural damage, including:

A. Crop Damage: Damage to crop fields (e.g. wheat, rice, sod), fruit shrubs or vines (e.g. grapes, blueberries), and fruit or nut trees (e.g. cherry, olive, hazelnut).

B. Animal Health & Loss: protection of herd animals (e.g. cattle, sheep), poultry, and consumption of livestock feed.

C. Aquaculture: both freshwater and saltwater. For private ponds, see Property Damage (#5).

D. Enclosed game animals raised for sale: both native (e.g. quail, waterfowl, rabbit) and non-native species (e.g. pheasant).

5. What is Private & Public Property Damage?

Property damage is damage or loss associated with an individual or entity’s property. If all reasonable non-lethal methods have been implemented, permits may be considered for property damage, including:

A. Building and Infrastructure Damage: private residences, commercial buildings, infrastructure, and public property

B. Vehicle and Equipment Damage: cars, boats, construction equipment, etc.

C. Vegetation: landscaping and ornamental plants, includes golf course turf damage

D. Animals: display animals (such as zoo exhibits)

E. Permits are not available for animals (e.g. hobby, pet, etc.) raised free-range or otherwise released in the wild.

6. What Constitutes a Threat to Human Health and Safety?

A threat to human health and safety includes the following (non-lethal requirements may vary based on the degree of emergency):

A. Airports (special permit type code: DPRDAP)

B. Disease and Contamination Threats: most commonly landfills, but includes disease outbreaks, fecal matter overloading, and disease threats from birds nesting in buildings or on structures. Supporting documentation from the State or County Health Department may be required.

C. Safety Emergencies: nests blocking navigational aids, impeding 911 capabilities, fire hazards, and other emergencies.

D. Safety Non-Emergency: these are uncommon but include situations such as walkways unsafe due to slippery fecal buildup or being chased by birds.

E. Birds Attacking Humans: rarely authorized unless injury to human(s) can be demonstrated and all options have been exhausted.

7. What Constitutes a Threat to the Recovery of Protected Fish and Wildlife?

A depredation permit may be issued to assist in the recovery of native protected fish and wildlife species, such as species listed as endangered, threatened, or of special concern. Species must be native to the location and the population must be important to recovering or maintaining a sustainable population of that species. A sustainable population is a population that is able to maintain a long-term trend with numbers above a level that would not result in a major decline or cause a species to be threatened or endangered. Permits may not be issued under this justification for abundant or non- native species, nor to protect resources for recreational purposes (i.e. stocking recreational fisheries). Take must be to address a depredation problem and not be for population control of the depredating species.

A. Protected wildlife may include species federally or state listed as threatened, endangered, or of conservation concern. If not listed, the applicant must justify why the species (or population) requires protection. Protected wildlife may be enclosed or free-roaming.

B. Abundant & Non-native Species: A private property damage justification may be considered but not under recovery of protected wildlife.

C. Recreational Use: A depredation permit may not be issued to protect wildlife for recreational use purpose.

8. Is a depredation permit appropriate for situations with no physical damage or physical loss?

No. Depredation permits are intended to resolve physical damage, physical loss, or threats to safety or wildlife. Economic loss can be used as information to illustrate the scope and scale of physical loss. However, a depredation permit cannot be issued to cover solely economic loss, such as delays in construction timelines.

For situations where the damage or loss is solely economic, and no physical damage or physical loss occurs, applicants may apply for other permit types. For more information, see the Nest FAQ.