From: Jasmine Minbashian
To: SEPADesk2 (DFW);
Subject: Comments on wolf plan from Conservation Northwest
Date: Friday, January 08, 2010 4:44:11 PM
Attachments: CNWwolfplanDEIScomments.pdf

Dear Ms. Eturaspe,

Please accept the attached as official comments from Conservation Northwest on the DEIS for the Wolf Conservation and Management Plan for Washington.

Thank you,
Jasmine Minbashian

Jasmine Minbashian,
Special Projects Director
Conservation Northwest
800.878.9950 ext. 29 / 360.671.8429 fax / 1208 Bay Street #201, Bellingham, WA 98225

Our strength lies in our membership. Please join the community of individuals who support protecting and connecting wild places from the Washington Coast to the Canadian Rockies for the benefit of both people and wildlife.

Conservation Northwest
Keeping the Northwest Wild

January 8, 2010

Responsible Official: Teresa A. Eturaspe
SEPA/NEPA Coordinator
Washington Department of Fish and Wildlife
600 Capitol Way North
Olympia, WA 98501-1091
SEPAdesk2@dfw.wa.gov

Re: Wolf Conservation and Management Plan DEIS

Dear Ms. Eturaspe,

I am writing to express Conservation Northwest's support for the recovery of wolves in Washington State and to provide comments on the Washington Department of Fish and Wildlife's (WDFW) Draft Environmental Impact Statement (DEIS) for the Wolf Conservation and Management Plan for Washington (draft plan).

Conservation Northwest is a regional non-profit membership organization dedicated to protecting and connecting wild areas and wildlife habitat from the Washington Coast to the Canadian Rockies. We have four staff offices in Bellingham, Seattle, Spokane, and Republic, and field staff in Twisp, Omak, Kettle Falls, and Castlegar, B.C.

Since our start in 1989, we have been committed to the recovery of a healthy population of gray wolves in Washington State. One of our first events as an organization was an educational symposium "Of Wolves and Washington" co-sponsored with Wolf Haven at the Mountaineers Building in Seattle in 1991. Since then, we have continued to pursue many diverse strategies to ensure that the gray wolf does not disappear from the landscape of the Pacific Northwest.

Today, our staff members are still engaged in strategies to assist wolf recovery in Washington. Derrick Knowles, based in Spokane, has served on the state's wolf working group for the last two years, building alliances with sportsmen and livestock producers. Jay Kehne in Omak has been communicating directly with affected ranchers and organized a training field day for biologists and ranchers in the Twisp area to promote use of nonlethal and proactive methods to reduce livestock conflicts with wolves. Jen Watkins leads our remote camera program, with help from George Wooten in Twisp, which led to the first photos of wolf pups in the state in over seventy years. Our outreach staff is engaged in broader education and outreach efforts, including organizing showings of the important film, "Lords of Nature: Life in a Land of Great Predators"

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around the state to help the public understand the important ecological role of top predators such as wolves in an ecosystem.

Throughout our work, we are consistently impressed by WDFW's collaborative approach and your experienced staff who are very effective in handling very challenging and complex issues. We are also appreciative for the opportunity to participate in the process of developing the Wolf Conservation and Management Plan and to submit our comments for consideration.

Summary of Comments

Conservation Northwest fully supports the recovery of wolves in Washington State. The return of the wolf could restore important ecological processes to the state's ecosystems by naturally regulating the population and distribution of other animals, such as deer, elk, and coyotes, and by providing benefits to riparian ecosystems, as documented in Yellowstone National Park. We applaud the excellent work that the staff at the Washington Department of Fish Wildlife has put into developing the draft plan to date. Their commitment to gathering and considering scientific and public input is evident in the quality of the DEIS.

We also feel that the use of a stakeholder group to identify and resolve concerns was highly effective. And though the wolf working group did not reach consensus on every issue, the group served as an important venue for individuals representing different interests to share ideas and discuss their concerns in a constructive way.

Conservation Northwest remains committed to the wolf working group process and will continue to engage if future meetings are held. We respect and support WDFW's decision to use the working group's recommendations only as guidance, while also incorporating suggestions from outside experts who have had more extensive experience and history in wolf conservation and management.

We strongly support all the stated goals in the DEIS (p. 12) and believe they provide a meaningful gauge for the effectiveness of the strategies and tools outlined in the plan:

> *1. Restore the wolf population in Washington to a self-sustaining size and geographic distribution that will result in wolves having a high probability of persisting in the state through the foreseeable future (>100 years).*

2. Manage wolf-livestock conflicts in a way that minimizes livestock losses, while at the same time not negatively impacting the recovery or long-term perpetuation of a sustainable wolf population.

3. Manage ungulate populations in Washington to maintain harvest opportunities for hunters and an adequate prey base for wolves so that wolf conservation goals can be met.

4. Develop public understanding of the conservation and management needs of wolves in Washington, thereby promoting the public's coexistence with the species.

While we found the DEIS to be both comprehensive and balanced in nature, we have identified five critical issues with WDFW's preferred alternative (Alternative 2) that must be addressed if the goals of the plan are to be met:

1. The plan needs a stronger analysis and evaluation of habitat connectivity to other states and within the state.

2. WDFW should take a more conservative approach to meeting its recovery goal by requiring higher numbers of breeding pairs before delisting and downlisting.

3. The preferred alternative recognizes the suitability of the Pacific Coast Region as excellent wolf habitat, but fails to provide concrete recovery goals and objectives for this important, but isolated, region.

4. WDFW needs to eliminate the "caught in the act" killing provision, at the endangered and threatened phases of wolf recovery.

5. The plan should provide a funding schedule and triggers for wolf translocation, especially to the Pacific Coast region, where natural migration is severely hampered by I-5.

Alternative 3 in the draft plan provides the highest likelihood that wolves will be fully recovered in Washington State. It is the only alternative that provides separate population recovery goals for the Pacific Coast region, where high quality wolf habitat and increased public support justify the region having its own recovery objectives. It is also the only alternative which does not allow lethal take by livestock owners at the endangered and threatened phases of recovery. For

these reasons, Conservation Northwest strongly recommends that WDFW adopt Alternative 3 as its final plan, along with addressing the additional issues referenced above and below.

Detailed Comments

The draft wolf plan currently under review includes four alternatives for wolf management in Washington. Some of the broad differences in the alternatives relate to geographic distribution of conservation targets, numbers of recovery areas, wolf translocation options, management options to address conflicts and compensation for livestock depredation.

Conservation Northwest supports Alternative 3 over the others because it places the greatest emphasis on protection and restoration of wolves in Washington and is "predicted to have a higher probability of achieving and maintaining a long-term viable wolf population in Washington compared to the other alternatives." We believe that Alternative 3 has the highest likelihood for success without hindering the other stated goals of the draft plan.

Alternative 3 also sets a higher standard for the geographic distribution of conservation/recovery objectives for downlisting and delisting wolves, including a requirement that they be present in a fourth recovery region – the Pacific Coast Recovery Region – before the species can be downlisted and delisted. Specifically, this alternative requires three breeding pairs in eastern Washington, three in the north Cascades, three in the southern Cascades, three in the Pacific coastal range, and three more anywhere in the state. This alternative is the most restrictive on when management tools for addressing livestock conflicts can be implemented, which needs to be modified to better meet wolf conservation goals (see below) and it also recommends the most liberal compensation package for documented cases of confirmed and probable depredation.

Alternative 2, WDFW's preferred alternative, is largely on the right track and incorporates many of the recommendations made by the wolf working group, including the important strategy and tool for recovery: translocation of wolves within the state. While we support many aspects of Alternative 2, after evaluating comments from scientific and expert peer reviewers, we have identified some critical issues with preferred alternative that we believe must be addressed if the plan is to meet its goal of restoring a self-sustaining wolf population in Washington. The following provides a more detailed explanation of the issues Conservation Northwest has with the preferred alternative:

1. The plan needs a stronger analysis and evaluation of habitat connectivity to other states and within the state.

The plan does not consider introduction of wolves from outside the state and relies heavily on natural migration from Idaho, Oregon, and British Columbia as the primary strategy for the establishment of a self-sustaining population of wolves in the state. The plan also suggests that wolves in Washington are part of a larger metapopulation that includes wolves in Montana, Idaho, British Columbia and Oregon. This makes the importance of understanding, maintaining, and improving habitat connectivity to other states and within the state paramount, yet the plan only provides a cursory evaluation of the current state and quality of habitat connectivity. The current draft includes more information on connectivity than in earlier drafts, and we commend WDFW for this. However, given the importance of this strategy, the plan still needs a stronger evaluation of habitat connectivity and what measures can be taken to ensure that wolves will be able to move safely into the state from source areas and within the state from northeast and southeast Washington to the Cascades, and from the Cascades to the Olympics, especially given the major barriers that exists between these areas.

For example, current information in the plan does not clearly demonstrate that there is sufficient habitat connectivity between wolves in the northern Cascades and wolves in the US/BC Rockies to sustain a population over time. In fact, the information in the draft plan suggests significant barriers exist to wolf movement between these areas (i.e. upper Columbia River, Pend Oreille Valley, Okanogan Valley, and the Fraser-Coquihalla region):

Singleton et al. (2002) also showed a broad band of south-central British Columbia extending north from a line between about Osoyoos and Grand Forks as being of lower permeability for wolves, meaning that wolves attempting to move between eastern Washington and the Washington Cascades could find better travel conditions in the northern tier of Washington than in a sizeable portion of southernmost British Columbia.

Furthermore, the US Fish and Wildlife Service considers Highway 97 in eastern Washington as western boundary for dispersal of the Northern Rockies distinct population segment. Thus it seems risky to rely heavily on a strategy that assumes that all wolves in Washington are part of a metapopulation of wolves that includes the Rockies.

This places a greater importance on maintaining north-south habitat connectivity into the BC Cascades for wolves in Washington's northern Cascades, yet the draft plan does not offer a

sufficient assessment of connectivity in this area to justify the assumption that this population is part of a larger metapopulation to north.

Providing a more detailed assessment of the condition of habitat connectivity to the BC Cascades, along with the current estimated population of wolves and rules regarding wolf trapping and hunting in BC, would provide a more realistic picture on whether the northern Cascades are part of a larger metapopulation that includes BC or whether the wolves of Washington's northern Cascades are an isolated population. Perhaps the work of the Washington Wildlife Habitat Connectivity Group will be helpful in this regard.

2. WDFW should take a more conservative approach to meeting its recovery goal by requiring higher numbers of breeding pairs before delisting and downlisting.

As mentioned above, the plan does not consider reintroduction from outside the state and relies heavily on natural migration from Idaho, Oregon, and British Columbia as the primary strategy for the establishment of a self-sustaining population of wolves in the state. The plan makes assumptions that wolves in Washington are part of a larger metapopulation with adjacent states and thus fifteen breeding pairs are sufficient to achieve recovery in the state. In fact, all of the alternatives, including Alternative 3, are limited to the establishment of 15 breeding pairs to delist wolves in Washington State, and no other scenarios were considered.

Yet there is little scientific rationale presented in the plan that 15 breeding pairs will secure recovery or even allow for an interconnected, viable wolf population. Many of the scientific and expert peer reviewers indicated the fifteen breeding pairs was either insufficient or the bare minimum needed to recover a self-sustaining population of wolves in the state. Given this, the lack of clarity regarding the quality of habitat connectivity, the aggressive hunting programs implemented this year by the states of Idaho and Montana, and the liberal trapping and hunting policies of the BC government, it is very likely that dispersal into and across Washington from populations outside the state will be more challenging than assumed in the draft plan.

For these reasons, WDFW should include a stronger scientific rationale for its numbers, raise its numbers, or allow reintroduction from outside the state. Requiring more breeding pairs to be established in Washington prior to delisting is a safer, more conservative approach to wolf recovery, if indeed it proves that wolf dispersal to the state and within the state is more challenging than assumed in the plan.

3. The preferred alternative recognizes the suitability of the Pacific Coast Region as excellent wolf habitat, but fails to provide concrete recovery goals and objectives for this important, but isolated, region.

The draft plan does a good job of identifying the Olympic Peninsula and the Pacific Coast Region as good habitat for gray wolves. With its large elk populations and distance from population centers, the Pacific Coast Region is a prime locale for wolf recovery.

Wolf predation would strengthen the Roosevelt elk population in the Olympics and likely redistribute elk browsing patterns, benefiting riparian forest development and aquatic habitats, as a recent study by scientists from Oregon State University suggests. Wolves would also have a tempering affect on burgeoning coyote populations in Olympic National Park, which have had adverse impacts on the park's endemic marmots.
The plan also identifies the challenges for dispersing wolves to access this habitat presented by barriers such as I-5 and Snoqualmie Pass. Therefore, it is critical that if wolves are to return to the Olympic Peninsula that there be specific goals in the plan to prioritize and facilitate their recovery. The Pacific Coast Region should also be a top priority for translocation efforts.

The wolf working group originally stayed away from discussing the Olympic Peninsula as a priority for restoration based on recommendations brought forward by one of the working group members who lives on the Peninsula. Later in the process, the same member acknowledged that his assessment of social acceptance of the idea was inaccurate. The large positive response from Peninsula residents at both the scoping meetings and the DEIS public meeting in fall of 2009 suggest that there is more support for the return of wolves on the Pacific Coast than originally believed by the wolf working group. Many of the scientific peer reviewers also strongly suggested the plan include the Pacific Coast as a separate recovery area.

Given these developments and the ecological importance of returning wolves to this region, we feel that is imperative that the final plan provide separate recovery goals for the Pacific Coast region.

4. WDFW needs to eliminate the "caught in the act" killing provision at the endangered and threatened phases of wolf recovery.

Given the history of poaching in this state and the potential for misuse, expanding lethal take provisions could seriously hamper recovery efforts and would be difficult to enforce. The

permission to conduct lethal control without agency supervision invites abuse and misuse of these actions. For example, if dead or dying livestock or birthing cows are present, this can entice wolves to prey on livestock. Domestic hunting dogs could also attract wolves, especially those defending wolf pups at their den or rendezvous sites, allowing dog owners to kill wolves even though the wolves were provoked to attack. Until wolves reach a minimum threshold population that secures their full recovery, only wildlife agencies should be allowed to determine if and when wolves are controlled lethally.

Investing in non-lethal deterrent methods and providing livestock owners with a fair compensation package are more effective approaches at the early stages of wolf recovery. Alternative 3 is the only alternative that provides for this.

5. The plan should provide a funding schedule and triggers for wolf translocation, especially to the Pacific Coast region, where natural migration is severely hampered by I-5.

Translocation is an important tool to facilitate speedier recovery of wolves in Washington. For regions like the Olympic Peninsula, it is likely the only strategy will lead to a recovered wolf population.

We recognize however that translocation could potentially involve an expensive, long process resulting in years of delay. Thus we feel it is critical that the agency begin preparing now for the implementation of translocation as a strategy and provide cost estimates and a funding strategy in the final plan so that funding can be secured to ensure a speedier process. Additional triggers for using translocation as a tool beyond what is provided in the draft plan would also be helpful.

Additional Concerns and Suggestions

Compensation

In regard to compensation for livestock losses, paying twice the value of all confirmed and probable livestock losses on private and public land may address some livestock owner's concerns for being unpaid for missing livestock. While there is good evidence that compensation can prevent a decrease in livestock operators' tolerance for wolves (Musiani et al 2009), there is no evidence among compensation studies that using a multiplier for losses increases public tolerance for wolves. However, paying for values above known and documented losses may reduce the incentive for livestock owners to adopt reasonable, proactive deterrents and livestock

husbandry methods because some will consider getting twice the value for dead livestock as an economic benefit to their operation. The State could find itself paying for substantially more dead livestock than it would if it instead encouraged effective nonlethal preventative methods, which reduce livestock losses and better prepares livestock owners to adapt to the return of wolves.

"Full value" is not defined under this DEIS and could include value for breeding, pregnancies, animal losses covered by insurance, registered animals costing in excess of thousands of dollars, sentimental value, etc. WDFW would likely be unable to cover the costs of a compensation program if these values are not defined or limited.

Conservation Northwest supports Alternative 2 and 3's actions to hire wolf specialists whose duties would include providing technical assistance to livestock operators to implement proactive, nonlethal measures to reduce conflicts with wolves. Some of the most effective methods include: removal of dead or dying livestock, increased human supervision of livestock when possible, using livestock guarding dogs during certain times of the year, installing different types of fencing and lighting, and using a variety of scare devices. The effectiveness of these deterrents is highly dependent on a number of factors, including type, number, and age of livestock, grazing and pasture conditions, and season. However, counter to its enhanced recovery goals, Alternative 3 does not allow livestock operators to use nonlethal injurious harassment (e.g. rubber bullets, cracker shells, electrical fencing, etc) to deter wolves from preying on livestock until wolves are downlisted to "sensitive" status. This restriction may well have a reverse impact by increasing wolf depredation conflicts and result in more lethal control of wolves, which could have been avoided by using these tools. This restriction should be removed and WDFW should provide permits and training for ranchers to use these methods when needed to reduce wolf and livestock losses.

We encourage WDFW to provide not only information and training, but when appropriate, to also supply or loan equipment like fladry, turbofladry, lighting sensors, alarm systems, and other practical tools to ranchers who are in high priority wolf conservation areas. The wolf specialists should also work with other wolf managers and researchers to determine which methods are most effective in reducing livestock losses to wolves as this information is vitally important for national and international wolf conservation programs.

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Outreach and Education

Unlike Alternative 3, the preferred alternative does not place a high priority on public outreach and education even though the DEIS states "Several aspects of the plan are critical to its success… Because human tolerance has been and remains the primary limiting factor for wolf survival, tolerance and acceptance must be adequately addressed for citizens who will be directly affected by the presence of wolves. This makes technical assistance, compensation, and outreach some of the highest priorities for wolf conservation. An active outreach and education program must offer guidance and information about living with wolves and about rules and regulations related to management. Recovery of wolves means recognizing them as a native species of Washington, with legal, social, cultural, and biological value, and an important ecological role in maintaining native ecosystem functions and processes" (Chapter 1, page 14). Public outreach and education are crucial to the success of any wolf management program and must be supported as a high priority activity under the final plan.

Thank you for considering these comments. We look forward to reading the final draft and continuing our work with the department to recover gray wolves to their native habitat in Washington.

Sincerely,

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CASCADE CHAPTER

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Washington Department of Fish and Wildlife
Attn: Teresa A. Eturaspe
SEPA Responsible Official, SEPA Desk
600 Capitol Way N.
Olympia, WA 98501-1091

Re: Gray Wolf Management Policy, Draft EIS

Dear Ms. Eturaspe,

Representing the nine groups[1] of the Cascade Chapter of the Sierra Club, comprising approximately 30,000 members statewide, the Conservation Committee of the Chapter wishes to convey our gratitude to the Washington Department of Fish and Wildlife (WDFW) for the extensive Draft Environmental Impact Statement (DEIS) process over the past two years. In this letter we express our qualified support for Alternative 3 as outlined in the Washington State DEIS wolf conservation and management plan. We also discuss several points that should be included within Alternative 3. We believe that these changes will lead to the most viable and publicly supported wolf populations. Without these changes, the WDFW will not be able to adhere to the department's statutorily established mission which includes this mandate:

Legislative mandate (RCW 77.04.012): *The commission, director, and the department shall preserve, protect, perpetuate, and manage the wildlife and food fish, game fish, and shellfish in state waters and offshore waters.*

The stated goals of the Gray Wolf Management Policy are twofold:

1. *Implementing conservation strategies that will result in the reestablishment of a naturally reproducing and viable wolf population distributed in a significant portion of the species' former range in Washington, and*

2. *Managing wolf-livestock conflicts in a way that gives to livestock owners who are experiencing losses some tools to minimize future losses, while, at the same time, not negatively impacting the recovery or long-term perpetuation of sustainable wolf populations.*

The national Sierra Club has adopted the following policy on Threatened and Endangered Species:

> Threatened and Endangered Species – *Because of the value of species to ecosystems and to humans, and for their intrinsic values, every effort should*

[1] Groups of the Cascade Chapter: Upper Columbia, Palouse, Loo Wit, Tatoosh, South Seattle, Seattle, Eastside (Bellevue, Kirkland, Redmond, Issaquah), Snohomish, Mount Baker, and North Olympic Conservation Council

be made to prevent the extinction of species related to human activities. The Sierra Club vigorously supports strong and vibrant federal and state endangered species acts and related laws, as well as recovery programs that protect wildlife, plants, and natural ecosystems.

Given the lack of adequate, currently available science at the federal or state levels, the only way to ensure that Goal #1 will be met is to practice "the precautionary principle" and to err on the side of higher numbers of breeding pairs and viable breeding packs for Washington State. The stated number of "fifteen breeding pairs" should not be considered a reliable target prior to the release of a blind peer review. The lack of connectivity between and among the regions of suitable habitat within Washington State is a factor that should favor higher numbers of breeding pairs and genetically viable breeding packs. Some wildlife biologists specializing in gray wolf studies estimate that at least fifty breeding pairs would be required to ensure genetic viability and continuity. We need more sound science on wolf pack sizes, predator-prey-relationships, rates of dispersal, and estimates of connectivity between Washington and adjoining states and provinces.

Two regions of Washington State that would benefit greatly from translocation or reintroduction of wolves are the Gifford Pinchot National Forest/Mt. St. Helens area and the Olympic Peninsula. Environmental damage resulting from the extinction of wolves from those regions is well documented:

> But the loss of the stealthy predators in the early 1900s left a hole in the landscape that scientists say they are just beginning to grasp. The ripples extend throughout what is now Olympic National Park, leading to a boom in elk populations, overbrowsing of shrubs and trees, and erosion so severe it has altered the very nature of the rivers, says a team of Oregon State University biologists. The result, they argue, is an environment that is less rich, less resilient, and — perhaps — in peril.
>
> "We think this ecosystem is unraveling in the absence of wolves," said OSU ecologist William Ripple.[2]

Based upon the preceding points, the Cascade Chapter respectfully requests that you incorporate the following recommendations into Alternative 3:

1. support for a focused, rigorous, and transparent scientific review of factors affecting the conservation goals, especially the science related to requirements for genetically viable, healthy, sustainable populations of wolves in the several suitable habitat areas of Washington state.
2. support for a final plan that includes translocation and reintroduction of wolves in wilderness, parks, and other appropriate locations such as roadless areas.
3. support for rules to ensure that delisting is not considered until genetic diversity, genetic connectivity, and genetically viable population goals have been met for at least five years. Inbreeding, diseases, and unpredictable threats need to be included as potentials for negative impacts on populations of wolves. For these reasons a low number such as "fifteen breeding pairs" is unreliable as a target number for delisting.
4. support for an emphasis on non-lethal techniques for management, such as the use of guard animals and predator deterrent fencing where feasible.

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[2] Sandi Doughton. "Can wolves restore an ecosystem?" Seattle Times, Jan. 25, 2009.

5. support for investment in programs to educate citizens of Washington state about wolf ecology, including the facts that wolves are native to our state and provide benefits to our ecosystems.

6. support for the addition of a recovery area on the Olympic Peninsula, as well as the Gifford Pinchot/Mt. St. Helens area, where wolves were native before their extirpation. Because of natural and man-made barriers such as Puget Sound and Interstate 5, these are primary, preferred, and initial sites for translocation and for reintroduction that should begin as soon as possible. Similarly, we support a policy that enables viable wolf populations to establish themselves in the Selkirk Range, the Kettle Range, and the Okanogan Highlands of Eastern Washington.

We also urge the WDFW and the WDFW Commission to acknowledge the significant contribution that wolves in the wild make to the economy of the state of Washington. Tourism is one of the fastest growing sectors of our economy nationwide. Since wolves help maintain healthy wildlife populations, rivers, forests, and parks, they help sustain a $730 billion outdoor recreation industry, supporting 6.5 million jobs (one in twenty nationwide) and $88 billion in state and federal tax revenues.[3] Wolf-watching in Yellowstone National Park has added about $35 million per year in tourism dollars to the counties around the park.

The Sierra Club's motto, "Explore, Enjoy, and Protect," seems particularly fitting as we seek a wolf management policy that will provide adequate protections for one of our irreplaceable, symbolic species for future generations. We, the members of the Cascade Chapter, thank you again for all of your efforts and hope that you will give the utmost consideration to our suggested improvements to the plan so that the WDFW mission can be achieved.

Sincerely,

Tristin Brown, Chair
Conservation Committee
Cascade Chapter, Sierra Club

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[3] David Graves, "Op-ed." Wenatchee World. November 7, 2009.

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From: Linda Saunders
To: SEPADesk2 (DFW);
Subject: Comments of WDFW Draft Wolf Conservation and Management Plan and DEIS
Date: Tuesday, January 05, 2010 3:22:04 PM
Attachments: WDFW wolf conservation and management plan 1209.doc

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I have attached comments on the WDFW Draft Wolf Conservation and Management Plan and DEIS for your consideration. I also mailed a hard copy. Thanks again, Linda

January 5, 2010

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Responsible Official: Teresa A. Eturaspe
SEPA/NEPA Coordinator
600 Capitol Way North
Olympia, Washington 98501-1091

Re: Wolf Haven International Comments on the
DEIS and Draft Wolf Conservation and Management Plan for Washington

Wolf Haven International is a non-profit wolf conservation organization located in Tenino, Washington. We work for the conservation of wolves across the United States but naturally have taken particular interest in wolf conservation in our home state of Washington.

Washington should be commended for taking a proactive stance of developing a wolf management plan prior to attaining an established wolf population in the state. Not having a management plan will not stop the wolves from coming and the wolves are already naturally recolonizing suitable habitat in our state. As evidenced by other states attempting the same task, developing a management plan can be a long and sometimes painful process. Implementation of a state management and conservation plan is a vital step leading to state, rather than federal, control of local wolf populations. Washington citizens will have a much greater influence over wolf management if decisions are made at a state level.

The preferred alternative (Draft Plan) discussed in the DEIS was developed by a well-rounded group of stakeholders, including John Blankenship, the Executive Director for Wolf Haven International. Wolf Haven appreciates the collaborative approach pursued by the Wolf Working Group. Clearly, there are strong opinions on both sides of the issue, but a practical, science-based approach will garner the most support from the greatest number of Washington citizens in the larger scheme of things.

With this in mind, there are several issues discussed in the proposed Draft Plan that we believe could be strengthened to produce the most scientifically credible, successful wolf management plan for Washington.

Recovery Objectives for Viable Wolf Population in Washington

We believe that the number of breeding pairs described in all alternatives necessary for down-listing and eventual de-listing wolves within Washington is too low, particularly since the plan relies on natural migration from areas outside the state for recovery. Washington is bordered by the Pacific Ocean and Oregon, in addition to British Columbia and Idaho. While British Columbia and Idaho may be able to contribute wolves to the recovery in Washington, Oregon has a very limited population that is unlikely to contribute a large number of individuals or breeding pairs. Furthermore, in Idaho hunting of wolves is now permitted, which will further reduce the number of

wolves available to enhance any wolf population in Washington. Unlike British Columbia, Idaho, Montana, and Wyoming which all have large populations of wolves that have the ability to move from state to state, Washington is dependent on wolves coming from just two of these states to form the entire viable population.

It is critical that conservation and recovery objectives for downlisting and delisting a species be set at sufficient numbers of individuals and levels of geographic distribution to ensure that a permanently viable population is reestablished. The best available science on the subject of wolf population viability varies, but suggests that numbers of breeding pairs much larger than current recovery goals proposed in the Draft Plan would be necessary and would enhance the chance of **long-term** wolf population viability in Washington. The plan's proposed recovery numbers are inconsistent with USFWS's recommendations – scientific experts concluded that viability would be "enhanced by higher (500 or more wolves) rather than lower population levels (300) and longer (more than 3 years) rather than shorter (3 years) demonstrated time frames . . . the higher its probability of population viability will be." The numbers in the Draft Plan are not based on scientific studies.

We believe that currently, the number of wolves necessary for ensuring the recovery of Washington's wolf population is difficult to determine since we lack information for Washington on wolf population dynamics, pack densities, predator-prey relationships, immigration rates, and other relevant biological factors for the state. Even though this information is available for other states which have wolf packs, the difficultly lies in the translation to Washington's unique habitats, prey species and availability, and human densities. Therefore, until better information specific to Washington's wolf landscape is available, wolf recovery objectives should be higher than currently reflected in the Draft Plan, and should be high enough to ensure a healthy, viable population of wolves, not minimum levels.

Recovery objectives also have a geographic component as described in the Draft Plan. The Draft Plan identifies three recovery regions that need to have two successful breeding pairs of wolves to meet distribution requirements before downlisting wolves from endangered to threatened. We support having a fourth recovery region, the Pacific Coast region, with separate recovery objectives, due to the presence of high quality wolf habitat on the Olympic Peninsula. We recognize that having wolves on the Olympic Peninsula will likely require intensive management of the wolf population due to potential conflicts due to the close juxtaposition of humans, wolf prey and ultimately wolves. Even so, we believe that there is high quality wolf habitat as was described in a 1999 feasibility study, and we support having separate recovery objectives for this region to increase the options for wolf conservation and recovery within our state.

Lethal Kill Provisions

The four alternatives proposed in the DEIS vary in their thresholds for the use of lethal control of wolves that conflict with livestock and domestic dogs. The Draft Plan allows for lethal take of wolves "caught in the act of attacking livestock" by all livestock

owners, including family members and authorized employees, on private land they own or lease once the wolves are downlisted from endangered to **threatened status**. If recovery objectives remain as described in the Draft Plan, this means that once there are are six breeding pairs of wolves distributed in three geographic regions in the state that up to two wolves could be killed using this provision. **We believe that the provision should be eliminated and that wolves qualifying as threatened need full protection during the early phases of wolf recovery in Washington.** We believe that the early stages of wolf recovery in Washington are critical to achieving long-term viability, and that use of this provision could seriously hamper recovery efforts. Given that poaching of at least two wolves has already occurred within Washington, we do not feel that this liberal approach is appropriate. Rather, we would like to see emphasis in the Draft Plan on the use of non-lethal deterrent methods and a fair compensation package for livestock owners who suffer losses to wolves during this phase of wolf recovery. We believe that a fair compensation package includes compensation of 100% fair market value, and no more, for any livestock deaths confirmed to be caused by wolves.

Lethal take of wolves by private citizens on private lands in the act of attacking domestic dogs is allowed under the Draft Plan once wolves reach sensitive status. We believe that this provision is also too liberal for a species that is in the early stages of recovery, and that such lethal take should only be allowed by private citizens on public and private land once wolves are delisted in Washington.

Translocation

Wolf Haven International supports the translocation of wolves within Washington from areas with healthy wolf populations to another area to establish a new population to speed up the recovery process (and ultimately the delisting of wolves in the state). We believe that the Draft Plan should provide a schedule of funding for translocation, and that the WDFW prepare a feasibility assessment for translocating wolves into recovery areas where recovery objectives have not been met within the first year of Plan implementation. This will allow initiation of the necessary SEPA/NEPA processes for translocation and prevent possible delays in utilizing this tool to further recovery.

Thank you for the opportunity to provide input into this extremely important process which we all hope will lead to the best possible Management and Conservation Plan for wolves here in Washington.

Linda Saunders
Director of Conservation
Wolf Haven International

✓

19

From: Jeff Juel
To: SEPADesk (DFW);
cc: jjuel@landscouncil.org; mpetersen@landscouncil.org;
Subject: Comments on Washington's draft wolf management plan
Date: Wednesday, January 06, 2010 10:59:32 AM
Attachments: Wolf Management Plan DEIS.doc

Attached please find comments on the Draft Environmental Impact Statement for the state wolf conservation and management plan.

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Jeff Juel, Forest Policy Director
The Lands Council
25 W. Main Ave., Suite 222
Spokane, WA 99201
509-209-2401

✓

January 6, 2010

Washington Department of Fish and Wildlife
Comments emailed to: SEPAdesk@dfw.wa.gov

To Whom It May Concern:

These are comments on the Draft Environmental Impact Statement (DSEIS) for the Washington wolf conservation and management plan, on behalf of The Lands Council.

Wolves and other top predators are keystone species for ecosystem integrity. They are vital for the health of wildlife and plant communities and must be re-established and allowed to exist as wild populations in Washington. The citizens of this state have the responsibility to co-exist with all native wildlife species, and assist in recovering populations where necessary.

The Lands Council supports Washington Department of Fish and Wildlife (WDFW) taking the initiative on wolf management as wolf populations re-establish in the state. We also appreciate the collaborative approach taken by the establishment of the Wolf Working Group. We believe that these steps can help assure a scientifically defensible management plan that will ultimately serve all interests.

WDFW should heed scientific opinion that the proposed number for delisting (15 breeding pairs) is too low. WDFW should use the latest science to determine the numbers and distribution that define a viable population of wolves in the state of Washington.

We urge WDFW to create separate population recovery objectives for the Olympic Peninsula, where the high quality of habitat and public support justify those separate objectives.

The Lands Council is opposed to the plan's extremely risky "caught in the act" wolf killing provision for livestock owners. Unfortunately, until populations are established and certain segments of our community begin to understand that we CAN co-exist with wolves, there will be too much temptation to abuse this provision, which would cause needless delay and controversy during recovery. Experience in other areas has shown that utilizing non-lethal deterrent methods would be adequate, especially when combined with fair compensation to livestock owners when there are wolf-livestock conflicts.

The WDFW must factor in the economic benefits of having wolves as functioning components of the ecosystem. Additionally, economic benefits of wolves in parks, wildernesses, and other wild areas will be realized as tourists travel to experience wolves in their native environments.

We urge consideration of using translocation from areas where strong populations become established, to other areas such as the southern Cascades and the Olympics, to speed up recovery and eventual delisting.

Thank you for your attention to our concerns. Please keep The Lands Council on the list to receive further mailings on the wolf management plan.

Sincerely,

/s/

Jeff Juel
The Lands Council
25 W Main Ave, Ste 222
Spokane, Washington 99201
509-838-4912

28

From: Jessica Walz
To: SEPADesk2 (DFW);
Subject: Washington Wolf Conservation and Management Plan
Date: Friday, January 08, 2010 11:20:53 AM
Attachments: Final 2010 Jan Comments on the Washington Wolf Plan (2).doc

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Responsible official: Teresa Eturaspe or SEPA/NEPA coordinator,

Please accept these comments on behalf of the Gifford Pinchot Task Force regarding the Washington Wolf Conservation and Management Plan. If you have any questions or concerns please do not hesitate to contact me at 503 221-2102 ext.101 or Jessica@gptaskforce.org

Thank you,

Jessica Walz

Jessica Walz
Conservation Program Director
Gifford Pinchot Task Force
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GIFFORD PINCHOT TASK FORCE

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Responsible Official: Teresa Eturaspe
SEPA/NEPA Coordinator
600 Capitol Way North
Olympia WA 98501-1091

January 8, 2010

To Washington Department of Fish and Wildlife and the Fish and Wildlife Commission,

Please accept these comments in regards to the Washington Wolf Conservation and Management Plan on behalf of the Gifford Pinchot Task Force (Task Force). The Task Force is a non-profit organization with over 4,000 members who work to support the biological diversity and communities of the Northwest through conservation and restoration of forests, rivers, fish, and wildlife. The Task Force is excited that wolves are once again present in the state of Washington and looks forward to the benefits that wolves will bring for the ecosystems and habitats of Washington State. We also recognize the challenging social dynamics that the return of wolves brings to our state and the need to promote education regarding predators. The Washington Wolf plan is an important tool for the conservation and management of wolves, and we hope that our comments will be reviewed and incorporated to ensure strong protections for a remerging native carnivore.

I. Wolves in Washington

Wolves are an important part of Washington's ecosystem and have proven in other areas to be great companions to the restoration of our natural environment. We are supportive of Washington Department of Fish and Wildlife (WDFW) goals to return wolf populations to a self-sustaining level and to developing a public understanding of the conservation and management needs of wolves.

Returning top predators to our ecosystem will invigorate the natural trophic cascades of Washington. Top predators, like wolves, are considered a keystone species among many biologists because these species control herbivore populations, which in turn affects many other aspects of the ecosystem from the growth of species on which herbivores browse to microclimate and soil changes. Protecting keystone species is considered a priority among conservation biologists worldwide because of the value they represent to the ecosystem (Primack 1998). Conservation should be the number one priority of this plan.

The term trophic cascades originated in 1966 from experiments conducted by Robert T. Paine showing that predators have effects that permeate food webs from the top down (Ripple and Beschta 2005). In recent studies of various national parks Ripple and Beschta have been analyzing the loss of predator species and the effects this loss has on ecosystem health. In a 2005 study, Ripple and Beschta compiled historical data to compare timing of wolf kills and deer and elk explosions to evaluate temporal patterns and to consider predator and ungulate relations in the ecosystem (Ripple and Beschta 2005). They have found that with the return of wolves and top predators elsewhere elk herbivory has decreased which in turn has provided benefits to trophic levels below. For example, Ripple and Beschta

have described remerging streamside vegetation, which has created shaded pools sufficient for increased fish reproduction in addition to providing better habitat for beaver and streamside song birds. Ripple and Beschta concluded, "the removal of keystone predators effectively eliminated any wolf driven trophic cascades that had historically influenced elk numbers and foraging patterns, which, in turn, maintained a healthy distribution and structure of deciduous woody plant communities." (Ripple and Beschta 2005).

The Task Force believes that wolves in Washington will benefit the ecosystem. Wolves help control deer and elk populations and grazing patterns, which provide streamside vegetation the chance to grow, shade streams, and produce increased fish habitat. In addition, wolves provide a natural means to control overpopulation of ungulate species which could in turn lead to healthier herds.

II. Wolf Conservation

Numbers and Distribution

In order for the Washington Department of Fish and Wildlife to delist a species from endangered, threatened, or sensitive classification the species must no longer meet the definitions of those classifications based on "the preponderance of scientific data available" (WAC 232-12-97). "Sensitive" is defined under that section as "any wildlife species native to Washington that is vulnerable or declining and is likely to become endangered or threatened in a significant portion of its range within the state without cooperative management or removal of threats." The Draft Wolf Conservation and Management Plan establishes 15 breeding pairs maintained for three years as the qualification sufficient to delist wolves from classification as "state sensitive" to "game animal". However, the Management Plan also indicates that 30 wolf breeding pairs in a metapopulation would be necessary to ensure the populations' long term viability (Washington Wolf Conservation and Management Plan (Plan), pg 36, 50). In fact, WDFW recognizes that scientists who have reviewed this document believe that " 15 breeding pairs is considered minimal or barely adequate for population viability and achieving recovery" and are in favor of a higher breeding pair number prior to delisting that is much closer to the US Fish and Wildlife Service recommendation of 30 pairs (Plan, page 50). We recognize that WDFW choose this number to be within socially acceptable bounds as a product of negotiation within the Planning Group (Plan, page 46). However, WDFW should focus on achieving the stated goal of the plan, which is to create a self-sustaining population of wolves. This would include ensuring that genetic exchange between subpopulations is high enough to promote long-term population stability. In his earlier peer-review comments to WDFW Carlos Carroll stated that "[i]t is intuitive that larger populations are less at risk from extinction. This arises from several factors. Risk of extinction due to demographic stochasticity (for example, all offspring in a year are of one sex) decreases rapidly with increasing population size (Lande 1995). Risk from environmental stochasticity (for example, a series of years with little prey) decreases more slowly with population size (Lande 1995)." For this reason, WDFW should increase the number of breeding pairs prior to delisting to a more scientifically defensible number.

Additionally, the 15 breeding pair number is reliant on maintaining connectivity between other source populations in Idaho, British Columbia, and Oregon (Plan, page 50). Carlos Carroll's PATCH model demonstrates the importance of maintain cross border connectivity in sustaining a broadly distributed wolf population in Washington. Although connectivity is recognized as important component of this plan there is little to no information presented in the plan on how WDFW intends to maintain connectivity or enhance connectivity to provide the necessary travel ways to sustain a population. WDFW needs to incorporate in this plan a means to ensure connectivity and safe passage for predator species before WDFW can or should rely on low population levels to sustain a healthy wolf population in Washington. Until a suitable plan can be created that ensures connectivity between populations there

is no justifiable evidence to set the breeding pairs at 15 before delisting. The plan should use the more scientifically supportable target of 30 breeding pairs as calculated by the USFWS.

This plan should incorporate a connectivity subsection that complements WDFW's work and engagement with Habitat Connectivity Working Group. A subsection on maintaining the connectivity between source populations ensures that any number below 30, if chosen, is truly reflective of the goal of the working group to "[r]estore the wolf population in Washington to a self sustaining size and geographic distribution that will result in wolves having a high probability of persisting in the state through the foreseeable future (>100 years)" (Plan, page 13).

The Task Force fully supports the policy requiring the dispersal of wolves throughout the state of Washington. We believe requiring established populations in all three sections of the state will be important for the long term success of the species in Washington and provide ecologically important benefits to areas that according to the plan might not otherwise contribute to a viable wolf population in Washington because of the geographic isolation associated with that location (i.e. the Southern Cascades and/or Olympics). Furthermore, the requirement for a relatively larger number of breeding pairs in the *Southern Cascades and Northwest Coast Region*, which includes the Gifford Pinchot National Forest (GPNF), is appropriate since the GPNF offers abundant prey and appropriate habitat for the support of wolf populations.

This method of ensuring distribution is also more appropriate than that proscribed by Wyoming's 2007 Wolf Management Plan. This plan required 7 breeding pairs outside the state's national parks, but did not did not include provisions for ensuring that at least 8 breeding pairs remained inside the national parks (see *Defenders of Wildlife v. Hall, 565 F.Supp.2d 1160 (D.MT. 2008)*. Washington's delisting criteria of 3 breeding pairs in the Eastern and Northern Sections and 6 breeding pairs in the Southern Cascades will ensure that the wolf population has effectively distributed throughout the state.

Carroll et al. (2006) used a PATCH model to predict the distribution and demography of wolves in the western US. The PATCH analysis found several areas of high potential wolf habitat in Washington, including areas in the Olympics and southern Washington Cascades. Carroll's results also suggested that habitat restoration should be a priority to ensure occupancy by wolves (Carroll et al. 2006). One such way to improve habitat conditions is to include plans for road decommissioning. WDFW's plan should reference this objective and complement work being considered, supported, or conducted by other agencies including the Washington State Department of Ecology and the Forest Service, both of which are working to improve habitat conditions Washington. Road removal has the added benefit of reducing potential human-wolf conflicts by creating suitable habitat further from potential human disturbance. The Gifford Pinchot National Forest could increase suitable habitat for wolves by strategically removing low priority non-major roads from areas with high potential for suitable wolf habitat. The Task Force analyzed the GPNF road system and created a map that prioritizes roads for wolf recovery. Please see Attachment A.

In summary the plan's delisting rule should be revised to be closer to the scientifically acceptable population levels by having greater than 15 (closer to 30) breeding pairs spread out over the state in several populations with connectivity between subpopulations in Washington as well as with the larger populations in Idaho and British Columbia. Habitat restoration (road decommissioning) objectives should also be incorporated to fully provide for recovery needs of wolves in Washington State.

Monitoring

We would like to see WDFW work with other agencies and non-profits, to ensure that there is an adequate system in place to confirm or monitor wolf populations in the areas deemed most suitable for habitation. To adequately plan for and restore wolf populations, reliable information about their movements and habitat use is vital. We would like to see WDFW incorporate collaring and tracking of wolves much like other agencies and non-profits are doing in Oregon, Montana, Idaho, and Wyoming. Acquiring information on habitat use and travel is important to the overall connectivity goal. It is beneficial for WDFW to work with other agencies and non-profits to create a reliable documentation system and incorporate a well thought-out monitoring system in the plan itself.

Translocation

Translocation is a management tool currently included in the plan. We strongly believe that translocation should only be used as a last possible resort because of the complicated social and biological issues involved with its use.

First, wolves are social animals and require packs to survive. Translocating one wolf (or even several) to a region would not be a wise as it could actually decrease the number of wolves in Washington by disrupting pack dynamics. In addition, because of the low target number of breeding pairs which the current plan aims to achieve, relocation could actually hamper recovery efforts because not enough wolves would remain to maintain a stable and healthy population.

Second, relocating wolves to new areas rather than allowing them to recover naturally adds to the social unrest and intolerance that will already be present in many small communities. Allowing wolves to return on their own gives communities time to build support and understanding for the process and is easier for many to accept than the idea that the state is forcing an "unwanted" predator on them, which is likely how it would otherwise be portrayed.

Any translocation activity would of course call for an intensive education campaign within the affected communities before translocation occurs. We believe the presence of wolves could bring many ecological and economic benefits to local communities, and these types of positive effects as well as typical fears and concerns should be incorporated in such education efforts.

Management after Delisting

We support the use of a public process for reclassification of wolves upon delisting. It is important to consider how to manage wolves after they are delisted to maintain a healthy, productive population. The Task Force is opposed to a general hunting season as a way to manage wolves within the state. General hunting of wolves is an extremely controversial topic. In the last year, several states have opened a general hunting season for wolves to varied public response and management success. If management of wolf populations is necessary, it should be carefully planned, directed and implemented by the state. The state could have the option of holding special trainings for such a program in which members of the public could then be granted a special permit to help implement the state's plan. This type of highly orchestrated management strategy is far more likely to be effective than an open hunting season. For example, last year several wolf packs that had little to no conflict with livestock were targeted (i.e. the Yellowstone wolves), where other more conflict-prone packs where left. If hunting is to be used as a management tool, it needs to be more carefully managed and restricted to specific locations

where management of wolf populations is required. Carlos Carroll has stated that "hunting is ineffective at achieving reductions of wolf depredation on livestock for several reasons… Wolves targeted by hunters in a general season are not limited to depredating wolves but rather affect the general wolf population….General hunting seasons are much less likely than selective management control by agency to reduce depredation."

III. Wolf-Livestock Conflicts

As much of the debate over wolf-livestock conflicts is informed by Yellowstone's wolf reintroduction, we would like to first note that depredation of livestock by Yellowstone wolves was found to not have a negative effect on the livestock industry on the whole. However, there was an uneven effect causing some livestock owners to be more adversely affected than others (White et al. 2005). Given this fact, we would like to ensure that livestock owners are given adequate incentives to protect their livestock from wolves in order to avoid lethal methods of managing wolves.

We support proactive measures and modified husbandry practices as an alternative to lethal wolf control (Plan, pg 57-59). The use of range riders and herders as well as husbandry practices such as delaying turnout of cattle during calving should be strongly advocated by the plan to avoid depredation by wolves. Educating livestock owners and providing some monetary help for use of proactive measures should be included in the plan.

We do understand that even with preventative measures, wolf depredation can be costly to some livestock owners, thus, we a support a compensation program that is fair. However the program detailed in the plan concerns us because of the potential for abuse if it is not administered correctly. The Plan should emphasize that compensation will only be used when proper husbandry practices have been in place to prevent wolf- livestock conflict from occurring.

We strongly support WDFW investigation into the cause of suspected wolf depredation. The definitions of confirmed wolf depredation, probable wolf depredation, confirmed non-wolf depredation, and unconfirmed depredation are very clear and effective (Plan, pg 59). We commend WDFW's commitment to commence an investigation within 48 hours of receiving a reported incident of wolf depredation (Id). However, we would like to see a constraint on the amount of time allowable for livestock owners to wait before making such a report. Otherwise, valuable evidence could be lost which could be vital to the accuracy of the investigation.

Although we support a fair compensation program for livestock handlers we are opposed to lethal take by livestock owners by shooting wolves in the act of attacking in the threatened and endangered phase of the state program because of the potential for abuse of the system. Although we recognize that this provision can provide livestock owners with a sense of protection, the provision is simply too easy to abuse and too difficult to monitor. The plan does not include any provision to ensure prosecution of an offender if a wolf is shot when not in the actual act of killing livestock nor does it stipulate the penalties for illegally shooting wolves. Washington has already seen poaching of its wolves from Washington's first pack in 2008. Any removal of wolves that necessitates killing should be done by professional biologists in the employ of Washington State.

IV. Wolf Interactions with Ungulates and Non-prey Species

Although, as the management plan suggests, the effects of wolf introduction on ungulate prey, particularly elk, is unique to each ecological system, there is strong evidence that wolves will have a

beneficial relationship with the ecosystem. As mentioned above, numerous studies have shown that wolves serve as a top down regulatory factor which may in turn have a restorative effect on vegetation and thus many other ecosystem interactions and processes. Wolves control elk through "the ecology of fear" or cause them to change their behavior in other ways. Either way, there is a clear effect on the lower trophic levels. The wolf conservation and management plan indicates that the Mount St. Helens elk herd has caused chronic damage to agriculture and commercial forests (Plan, pg 68). Based on the latest research on wolves, the Task Force believes that population and behavior control of elk behavior by wolves would have significant ecological and economic benefits (to agricultural land and forest owners) in this area.

According to the Draft Environmental Impact Statement, WDFW will consider under the preferred alternative reducing wolf abundance in localized areas with at risk ungulate populations (those severely depressed and in danger of eventual extirpation) if research has determined that wolf predation is a key limiting factor for the ungulate population (Draft Environmental Impact Statement, page 48). We would like to see a more detailed analysis of when reduction of wolves would be appropriate. For example would alternate management methods be introduced prior to lethal reduction of wolves in an area? What would constitute a severely depressed elk population? These are important points to consider as there are varying degrees of understanding among the public in regards to appropriate management objectives for ungulate species.

WDFW should consider holding public meetings to discuss lethal take of wolves prior to authorizing take to provide the public with an opportunity to comment on the issues presented.

V. Education and Research

We support the strong commitment that WDFW is making to education and outreach efforts. Their proactive approach to these efforts will help reach a broad array of the public and provide necessary information that is essential to the recovery of wolves in Washington.

The Washington Department of Fish and Wildlife (WDFW) should include more focused education about wolves and the benefits they provide to our ecosystem as part of the plan. We strongly support WDFW's intentions to make education a top priority, but education should not be solely focused on the management needs. The public should be given the opportunity to learn about the unique characteristics that top predators provide for our ecosystems in order to create more social acceptance of wolves. Increased tolerance would of course ease the challenges involved in WDFW's management role. We would like WDFW to include on their website and as part of their intended education tools (pamphlets, letters, lectures) a clear and concise section educating the public about the emerging evidence of top predators' benefits for ecosystem recovery.

We are also pleased to see that research is considered a vital part of this plan. While the plan lists an array of partners, it fails to mention that non-profits can and should be viable partners in this cooperative effort. Both small and large non-profit organizations can provide essential service by monitoring specific areas through an array of programs. The Task Force, for example, is currently beginning a research project in coordination with WDFW and the Forest Service on the Gifford Pinchot National Forest using remote cameras to monitor for rare carnivores. We would hope that WDFW would consider partnerships with other non-profit organizations that can provide similar or related services in this important endeavor.

VI. Conclusion

The Task Force thanks you for the research, dedication, and time you have put into this very thorough plan. We hope that with this plan in place Washington will soon see the benefits of having a top predator restored to its ecosystems. If you have any questions regarding the comments submitted above please do not hesitate to contact me at 503 221-2102 ext. 101 or Jessica@gptaskforce.org.

Thank you,

Jessica Walz
Conservation Director

Reference List

Beschta, R.L. 2003. *Cottonwoods, elk, and wolves in the Lamar Valley of Yellowstone National Park.* Ecological Applications 13(5), 2003: 1295-1309.

Beschta, Robert L., and Ripple, William J. 2007. *Increased willow heights along northern Yellowstone's Blacktail Deer Creek following wolf reintroduction.* Western North American Naturalist 67(4), 2007: 613-617.

Beschta, R.L. 2005. *Reduced cottonwood recruitment following extirpation of wolves in Yellowstone's Northern Range.* Ecology 86(2), 2005: 391-403.

Hebblewhite,M 2005. Predation *by Wolves interacts with North American Oscillation(NPO) on a Western North American Elk Population.* Journal of Animal Ecology 74:226-233.

Ripple, W.J. and Beschta, R.L. 2007. *Restoring Yellowstone's aspen with wolves.* Biological Conservation 138, June 2007: 514-519.

Ripple, W.J. and Beschta, R.L. 2006. *Linking wolves to willows via risk-sensitive foraging by ungulates in the northern Yellowstone ecosystem.* Forest Ecology and Management 230, 2006: 96-106.

Ripple, W.J. and Beschta, R.L. 2005. *Willow thickets protect young aspen from elk browsing after wolf reintroduction.* Western North American Naturalist 65(1), 2005: 118-122.

Ripple, W.J. and Beschta, R.L. 2004a. *Wolves, elk, willows, and trophic cascades in the upper Gallatin Range of southwestern Montana, USA.* Forest Ecology and Management 200, 2004: 161-181.

Ripple, William J. and Beschta, Robert L 2004b. *Wolves and the ecology of fear: Can predation risk structure ecosystems?* BioScience Vo.l 54 No. 8, August 2004: 755-766.

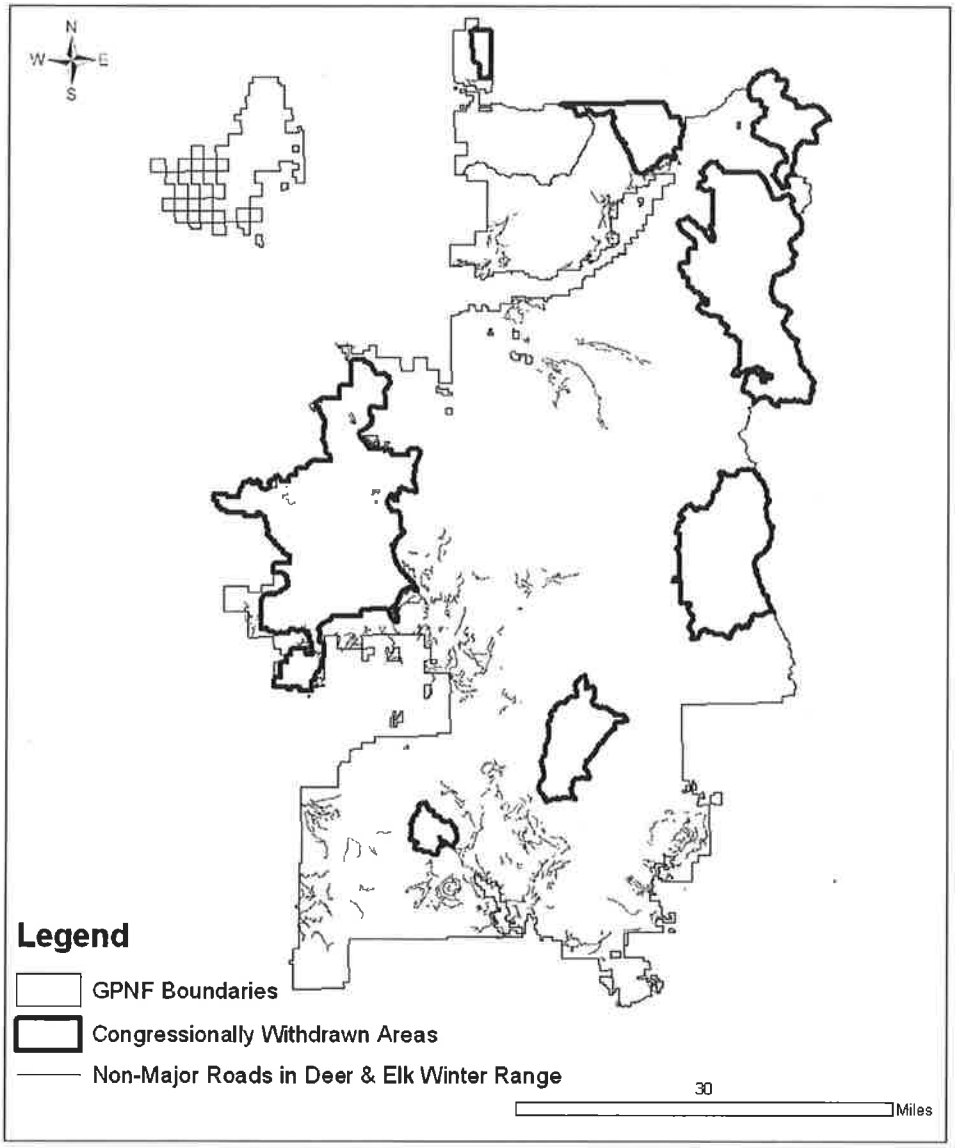
Ripple and Beschta. 2005; *Linking Wolves and Plants: Aldo Leopold on Trophic Cascades*, Bioscience:Vol. 55 No. 7).

Primack 1998. *Essentials of Conservation Biology*, Sinauer Associates, Massachusetts: 44.

Smith, D.W., R.O. Peterson, and D.B. Houston. 2003. *Yellowstone after Wolves*. BioScience 53:330-340.

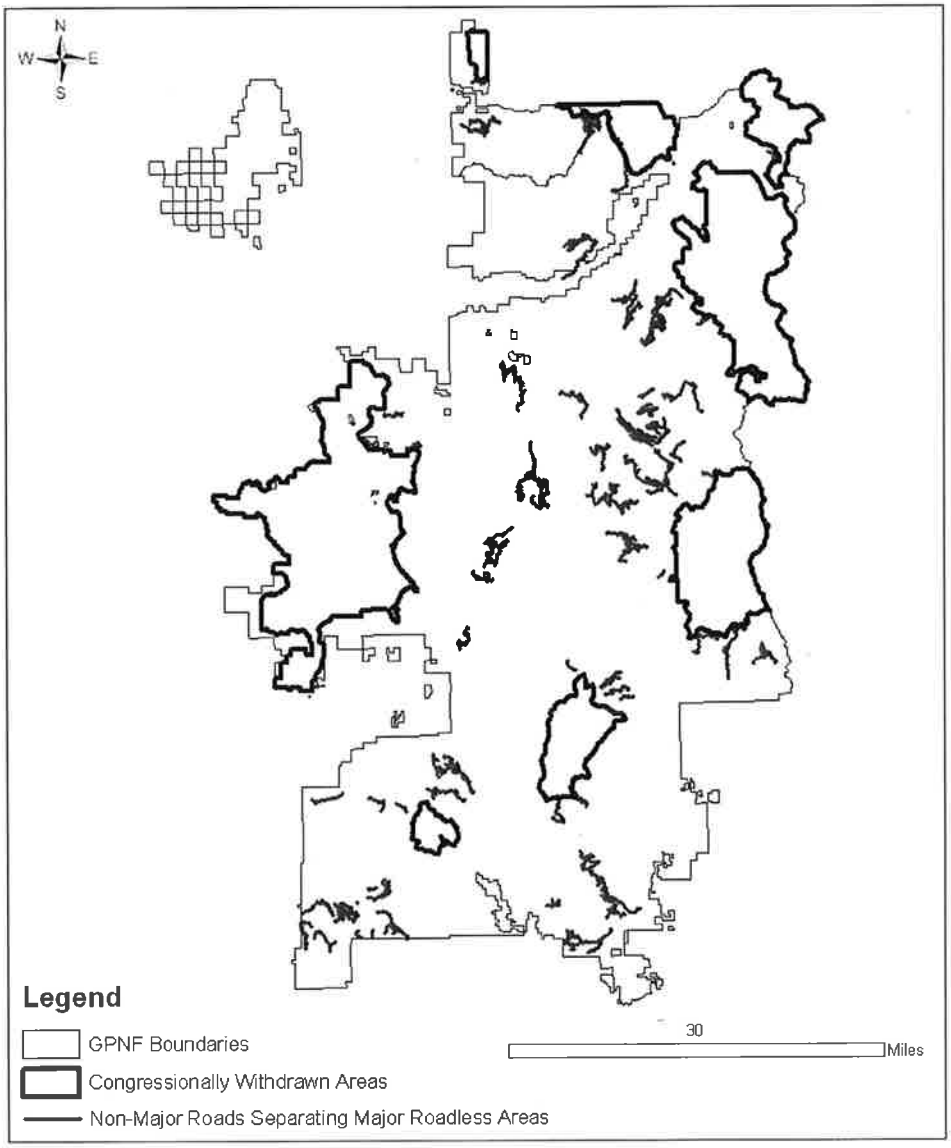
Attachment A

Figure 7a:
Non-Major Roads in Priority Wolf Habitat



Source: U.S. Forest Service

Figure 8a:
Non-Major Roads Separating Major Roadless Areas



Source: U.S. Forest Service

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January 6, 2010

Washington Department of Fish and Wildlife
SEPA Desk
600 Capitol Way N.
Olympia, WA 98501-1091

Re: Comments on the Final Draft Wolf Conservation and Management Plan for Washington and Draft Environmental Impact Statement

Dear Sir or Madam:

The National Parks Conservation Association (NPCA) respectfully submits the following comments on the Final Draft Wolf Conservation and Management Plan for Washington and Draft Environmental Impact Statement (DEIS). NPCA appreciates the effort contributed by the Wolf Working Group (WWG) and the Washington Department of Fish and Wildlife (WDFW) on a plan to reestablish a naturally producing and viable wolf population in the state of Washington while minimizing impacts to livestock owners in a way that will not impact the recovery of the wolf. Obviously a great deal of time and thought has been put into the plan and we appreciate the opportunity to submit our comments toward its further refinement. We also appreciate the 12 public hearings held throughout the state that allowed a large number of citizens to be involved in the development process, as well as the extended 95 day public comment period.

NPCA is America's only private nonprofit advocacy organization dedicated solely to protecting, preserving, and enhancing the U.S. National Park System for present and future generations. Founded in 1919, NPCA has more than 325,000 members of which over 10,000 reside in Washington State. As this plan will impact the health of national park ecosystems and visitor enjoyment of the same, we submit these comments.

In summary, NPCA supports Alternative 3 with modification of the target population. We feel that the target number of 15 breeding pairs for delisting of the gray wolf will not meet the goal of the plan – to establish a viable wolf population in Washington State. We support Alternative 3's designation of 4 recovery zones which provides the Pacific Coastal zone with its own recovery goal. Alternative 3 also allows for translocation and should include a focus on the Olympic Peninsula and Mount Saint Helens as the primary and initial sites.

I. Reintroduction Should Have Been Considered

NPCA believes the option of reintroduction of wolves into Washington State should have been considered during development of the Wolf Conservation and Management Plan. As the goal of the

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WDFW is to establish a viable wolf population and the goal of the livestock community is to have a population that does not require protection, the quickest way to meet both these goals is by reintroducing the wolves into the state. There was support for reintroduction at some of the public hearings, especially at the one held in Sequim, Washington. There is likely a great deal more support throughout the state that would be expressed if this option had been considered. Reintroduction would also provide genetic diversity which is vital to creating a healthy, viable wolf population. Without reintroduction, the livestock community will have years if not decades of restrictions on how to manage their herds as the wolf population slowly grows to a viable level in the defined recovery areas.

II. Range of Alternatives is Not Sufficient

NPCA appreciates the 4 alternatives described in the DEIS. However, an additional alternative, or two, that provided different target breeding pair numbers and the effect on the state and the environment of these different numbers should have been included in the DEIS. We hope the final environmental impact statement will select such an alternative based on the interest expressed at several of the public hearings and in written comments articulating support for higher numbers of breeding pairs before delisting. While the target numbers in a minority report presented by some WWG members are far from viable and ignore all the findings provided by sound science, alternatives that discussed both higher and lower numbers of breeding pairs would have provided a better prospective on how the WDFW can reach the goal of a viable, self-sustaining wolf population.

III. Target Numbers for Conservation and Recovery of Wolves Are to Low

NPCA values the effort of the WDFW to put together a WWG that includes a broad range of perspectives. Unfortunately, the compromise reached by the WWG will not reach the goal of the Wolf Conservation and Management Plan. It is our hope that the professionals within the WDFW will make changes in the target numbers necessary to reach the goal to "Restore the wolf population in Washington to a self-sustaining size and geographic distribution that will result in wolves having a high probability of persisting in the state through the foreseeable future" (Alternative 2, p. 13). A higher number of breeding pairs is necessary to have a plan that is scientifically justifiable and able to withstand legal challenges.

The WDFW's own purpose is "dedicated to preserving, protecting and perpetuating the state's fish and wildlife resources. The department operates under a dual mandate from the Washington Legislature to protect and enhance fish and wildlife and their habitats and provide sustainable, fish- and wildlife-related recreational and commercial opportunities" (WDFW Website, http://wdfw.wa.gov/about/). This mandate will include wolves as they return naturally to Washington. One could also infer that this mandate calls for the WDFW to put public interests above private interests, which is *not* reflected in the compromise reached by the WWG.

NPCA also believes the target population provided for in the final draft plan for reclassification and delisting will not guarantee the long-term survival of the state's wolf population and should be increased for the following reasons:

1) Target Wolf Numbers Are Inconsistent with USFWS's Recommendations

If the goal of the WDFW is to maintain a viable population, a target between 300 and 500 wolves is more appropriate than the 15 breeding pairs called for in the Preferred Alternative, which would result in approximately 150 wolves. The US Fish and Wildlife Service (USFWS) stated on page 37 of Alternative 2 that "Thirty or more breeding pairs comprising some 300+ wolves . . . . should have a high probability of long-term persistence. . . ." Furthermore, p. 38 of Alternative 2 quotes experts that concluded that viability would be "enhanced by higher (500 or more wolves) rather than lower population levels (300) and longer (more than 3 years) rather than shorter (3 years) demonstrated time frames . . . the higher its probability of population viability will be."

2) Target Wolf Numbers Are Inconsistent with Wolf Biologists' Recommendations

   A) A previous draft of the plan pointed out that many scientists with experience in wolf recovery do not believe that the current target population of 15 breeding pairs will lead to a viable population. The May 2, 2008 draft sets out the breeding pair levels as they are currently represented by the WWG. However, on page 41, it states, "Based on input from wolf biologists in Idaho and Montana, these numbers may be too low to maintain a viable population in the state." In order to maintain a viable population and avoid the possibility of re-listing that may occur under the current targets, the population numbers should be increased. As stated on p. 60 of Alternative 2, "After delisting occurs, it is in the best interest of wolves and the citizens of Washington that the state take whatever management steps are necessary to safeguard the species from a population decline that would necessitate relisting." Drastic steps will not be necessary if the state ultimately sets population goals that are higher and therefore less likely to experience a decline once delisted.
   B) The target population number of 15 breeding pairs is not based on science and will therefore have difficulty meeting the stated goal of restoring a viable wolf population. As stated in Alternative 2, Appendix E, p. 204, the WDFW used their understanding of biology to come up with starting numbers of 15 breeding pairs to transition from threatened to sensitive. The WWG apparently decided to disregard WDFW's suggestion to use "scientifically based estimates of the wolf numbers needed for recovery" (Alternative 2, Appendix E, p. 204). It is difficult to understand how the number recommended by WDFW scientists for transitioning from threatened to sensitive subsequently became the target for completely removing all protections for wolves without any scientific justification. NPCA is concerned that if the goal of this plan is to reach a viable wolf population, 15 breeding pairs is unlikely to lead to a successful recovery.
   C) Finally, on p.15 of the DEIS, "Based on scientific information about wolf population viability and initial scientific peer review of the conservation/recovery objectives proposed in the draft plan, the targets of 6, 12, and 15 successful breeding pairs for downlisting and delisting that are used in Alternatives 1, 2 and 3 are considered minimal or barely adequate for achieving population viability and recovery." The goal of maintaining a viable population does not seem to be well served by a population deemed "minimal or barely adequate."

3) Target Wolf Numbers Are Not Based on Science

NPCA is also concerned that the WDFW is releasing the Draft Environmental Impact Statement (DEIS) with Alternative 2 as the Preferred Alternative while conducting a double blind peer review. It is likely the blind peer review will lead to several suggested changes that should be strongly considered by the WDFW before releasing the final plan. Releasing the DEIS before considering the comments of the blind peer reviewers suggests the plan may not be based on science and that the blind peer review has limited purpose.

4) Target Wolf Numbers Dependent on Unreliable Linked Populations

Finally, the target numbers depend on maintaining connectivity to the broader wolf population of neighboring states (Alternative 2, p.10). Washington is bordered by the Pacific Ocean and Oregon, in addition to British Columbia and Idaho. While British Columbia and Idaho may be able to contribute wolves to the recovery in Washington, Oregon has a very limited population and is unlikely to contribute a large number of individuals or breeding pairs. Furthermore, in Idaho, hunting of wolves is now permitted, which will further reduce the numbers of wolves available to enhance populations in Washington. Unlike British Columbia, Idaho, Montana, and Wyoming, which all have large populations of wolves that have the ability to move from state to state, Washington is dependent on wolves coming from just two of these states to form the entire viable population. It has been over two decades since wolves first began to return to the western U.S. and yet Washington currently holds only two confirmed packs. If Washington hopes to establish and maintain a viable population, it is questionable whether the state can "be dependent on maintaining its connectivity to the broader regional wolf metapopulation" (Alternative 2, p. 10), when it has only resulted in a maximum of three packs in a period of 22 years. As a result, the plan should have a higher target number of breeding pairs if the state's aim is to maintain a viable wolf population.

IV. Recovery Goal Should Be Established for Pacific Coast Region

NPCA is pleased that Alternative 3 of the DEIS includes a fourth recovery region, the Pacific Coastal Region, as recommended by initial peer reviewers. As a separate region with different habitat, landscapes, and barriers to dispersal, specific recovery goals are needed for this region to ensure reaching the objective of having wolves distributed in a significant portion of the species' former range in Washington. Establishing this region would also accelerate the return of wolves to the Olympic Peninsula, which offers excellent habitat (as discussed below under "V. Translocation"). NPCA supports Alternative 3 due, among other reasons, to its inclusion of the Pacific Coastal recovery zone.

V. Translocation

NPCA believes that translocation is an important part of the Wolf Conservation and Management Plan, and is pleased to see it included in all alternatives. Specifically, NPCA feels it is important to identify both the Olympic Peninsula and Mount St. Helens as the primary, preferred, and initial sites for translocation. Historical analysis (Alternative 2, p. 17) shows that excellent wolf habitat on the Olympic Peninsula allowed wolves to persist as late as the 1950's, long after all other wolves in the state had been removed. For this and the reasons set out below, NPCA believes the Olympic Peninsula should be one of the primary translocation areas, a position NPCA feels is best achieved with four recovery zones instead of three.

1) Large Contiguous Blocks of Public Land

As Alternative 2, Appendix B, p. 199 states, "large contiguous blocks of public land . . . not only play an important role in sustaining a viable wolf population, but are also areas with comparatively lower levels of wolf/human conflicts." When one examines a map of Washington displaying contiguous blocks of public land, no area is more contiguous than the Olympic Peninsula, especially in the area of Olympic National Park and Olympic National Forest. Furthermore, with special consideration given by the WWG to the concerns of livestock owners, it seems the Olympic Peninsula would be a prime location for translocation considering the minimal amount of livestock production that continues on the Olympic Peninsula. Only 17.4 % of all the land on the Olympic Peninsula is used for cattle, sheep, horses, goats, lamas, and/or farmland (Alternative 2, p.140). This is much lower than any other area of the state. The plan also states that "areas with abundant deer, elk . . . reduced livestock use, and few potential human conflicts offer the best chance for recovery success. These locations include national forests, national parks, wilderness areas . . . and areas with low densities of open roads." This description on p. 40 of the plan perfectly corresponds to the characteristics of the Olympic Peninsula. From Olympic National Park and Olympic National Forest to the limited livestock activities on the peninsula, this area should be one of the preferred translocation sites. The Olympic Peninsula was also identified as an area of "potential wolf habitat" on p. 41 of the plan. Finally, the map on page 42, figure 4, of the plan graphically shows the large contiguous blocks of land that is the Olympic Peninsula. NPCA's map attached to these comments shows areas of the state with large contiguous areas of land which are appropriate wolf habitat (Contiguity of Suitable Wolf Habitat). According to this map, derived from figure 4, the Mount St Helens area and the Olympic peninsula are the best areas of the state for reestablishing wolf populations. Finally, Olympic National Park was identified by a 1980's National Park Service (NPS) study as the second best park for wolf reintroduction (after Yellowstone) and the US Forest Service completed a favorable feasibility study in 1999.

2) Abundant Ungulate Prey

The Olympic Peninsula also serves as excellent habitat for wolves due to abundant ungulate prey. Alternative 2, Appendix B, p. 199 put the availability of prey as important as large contiguous blocks of public land. The Olympic Peninsula not only has an abundance of prey, but has many areas of "lower elevations and gentle terrain where prey are more abundant, particularly in winter" (Alternative 2, p. 28). The lower elevation areas of the Olympic Peninsula tend to get less snow than many other areas of the state at the same elevation and are home to large populations of deer and elk. The plan also states on p.79 that 62% of the state's population of elk occurs west of the Cascade crest. According to WDFW statistics, the Olympic Peninsula is second in greatest abundance of elk only to Mount St. Helens by an estimated 3380 individuals. However, these numbers completely exclude elk located on tribal and NPS lands on the peninsula. On the Olympic Peninsula, tribal and NPS lands comprise more than 50% of the land mass and likely contain a very large population of elk – estimated on p. 83 of the plan to be 3060 in Olympic National Park alone. This does not include any elk residing in the large areas of tribal land. Therefore, the estimated elk population on the Olympic Peninsula is nearly as abundant as at Mount St. Helens and therefore an appropriate area for translocation.

3) Failure in Natural Dispersion

As Alternative 2, Executive Summary, states on p. 10, "Translocation may be used to establish and expand wolf populations in regions that wolves have failed to reach though natural dispersal." The

Olympic Peninsula will be very difficult for wolves to reach through natural dispersion. Assuming the majority of wolves come from the east, to reach the Olympic Peninsula they must overcome the natural barrier of the Puget Sound or the manmade barrier of Interstate 5. These 2 barriers disconnect the Olympic Peninsula from the rest of the state and will likely take decades for wolves to reach this prime habitat naturally. In the meantime, the ecosystem of the Olympic Peninsula will continue to be damaged by the effects of an incomplete food chain.

4) Health of the Olympic Ecosystem

As Alternative 2 states on p. 14, wolves play "an important ecological role in maintaining native ecosystem functions and processes." This is nowhere more true in Washington than on the Olympic Peninsula. As the final draft plan points out on p. 96, research from Beschta and Ripple demonstrate that the lack of wolves on the Olympic Peninsula has led to overgrazing of riparian vegetation by elk along the Hoh River. The presence of wolves would push elk away from overgrazing these areas and in turn help restore a functioning river ecosystem that would benefit numerous species. Other recent research has looked into the decline of the endemic Olympic marmot. One possible reason for their decline is an overabundance of coyotes. Wolves are known to control coyote populations, which would in turn stem the decline of the Olympic marmot as stated on p. 95 of Alternative 2. The Olympic marmot has gained even more importance recently when it was named the official Washington State endemic mammal. Finally, the recent reintroduction of fishers on the Olympic Peninsula has been very successful. The continued success of this species could be aided by the return of wolves. As Alternative 2 states on p. 94, "Increased availability of wolf-killed carcasses may benefit these species by providing more food for scavenging, particularly during the winter months." This is just another example of one of the many benefits the Olympic Peninsula ecosystem would experience through the return of wolves.

5) Cultural Importance of Wolves

As stated in Alternative 2 on p. 18, wolves play an important role in the creation stories of many Native American tribes, including those that live on the Olympic Peninsula including the Quinault, Quileute, Makah, and S'Klallam. The tie between Native American tribes and wolves is likely more important on the Olympic Peninsula than anywhere else in the state and should be taken into consideration when looking at translocation.

6) Olympic Meets Reasons Used for Focusing on Southern Cascade Mountains for Translocation

In Alternative 2, Appendix E, on page 207, the draft plan lists the reasons earlier discussions focused on the southern Cascade Mountains as the primary site for translocation. The Olympic Peninsula also contains these characteristics. According to the final draft plan, the southern Cascades:

A) "Contain about half of Washington's elk population and large continuous blocks of public land. Consequently, there is abundant natural prey for wolves combined with potentially lower levels of conflict with livestock when compared to areas with extensive private landholdings." The Olympic Peninsula has nearly the same number of elk as the Mount St. Helens herd when the number of elk within Olympic National Park is included. This still does not include elk residing on tribal land, which is extensive on the Olympic Peninsula. In terms of large continuous blocks of public land, well over half of the Olympic Peninsula is

made up of public land that includes Olympic National Park and Olympic National Forest. There is very little grazing and very little private landholdings in this area.

B) Are "distant from colonizing areas in Idaho and British Columbia, and there are more potential barriers to overcome for successful natural dispersal. However, once wolves are reestablished in the southern Cascades, extensive contiguous forested public lands will facilitate natural dispersal with this area." The Olympic Peninsula is also very far from colonizing areas and has many barriers, including Interstate 5 and Puget Sound. Again, the Olympic Peninsula has very extensive forested public lands for dispersal on the Peninsula.

C) Include an elk herd, "which is the largest herd in the state, [and] are currently experiencing problems due to advanced forest succession. Wolf recovery in the southern Cascades could help restore and contribute to ecological balance and integrity in these types of situations." The Mount St. Helens elk herd is only slightly larger than the Olympic Peninsula herd. The elk in Olympic, while not facing the same problems as the Mount St. Helens herd, are causing problems with the ecological health of the Peninsula, especially in riparian areas along the Hoh River. Furthermore, overpopulation of coyotes has led to a decrease in the population of endemic Olympic marmots. Wolves are the only historic species not found on the Olympic Peninsula and would help return balance to this extremely important ecosystem.

In conclusion, the Olympic Peninsula is one of the best areas in the state for translocation due to its excellent habitat and low probability of conflict with humans or livestock. The return of wolves would greatly aid the health of the Olympic Peninsula ecosystem.

VI. Benefits Derived from Wolf Recovery Outweigh Costs

The targets set by the WWG represent a compromise meant to appease livestock producers concerned about economic losses caused by returning wolves. There is ample evidence that the benefit of wolves returning to Washington State, both economic and ecological, outweigh the costs. Therefore, the target numbers should be increased for reasons beyond science alone. While some of the benefits have been discussed above, there are other benefits derived from wolf recovery:

1) Economic Benefits

Wolves could potentially benefit the economy of Washington. A large portion of the discussion in the final draft is on the *possible* economic losses to livestock producers. There is much less discussion of the possible economic benefits that could be experienced by the entire state from the return of wolves. It is addressed on p.11 of Alternative 2 when it states, "Washington could conceivably develop a wolf-related tourist industry, depending on where wolves reestablish, the population levels they achieve, and the ability of tourists to see or hear wolves." Later, on p.166 of Alternative 2, the success gateway communities outside Yellowstone National Park have experienced through wolf-related tourism is discussed. Recently, John Duffield of the University of Montana estimated that Yellowstone wolves have generated more than $35 million per year in economic benefits for local communities. Duffield says that $35 million grows to $70 million a year as the money gets passed around local communities. The city of Forks on the Olympic Peninsula has already created a cottage industry leading *Twilight* tours, which visits areas of the city where books of the popular series take

place. The most recent movie based on these books focused on wolves which defend the people of the Olympia Peninsula. The possibility of seeing one of these wolves could conceivably add considerable interest in taking one of these tours, further bringing economic gain to the community. Alternative 2 does contain many other examples on p. 166 and 167 of the economic benefits wolves can bring. Finally, on p. 199, Alternative 2 states that, "The economic gain for wolf tourism has the potential to offset or exceed the combined costs of livestock depredation and reduced hunting opportunities" (underline added). NPCA also expects that if more wolves persisted in the state, the economic benefits from wolf related tourism would also increase. Besides the scientific evidence that points to the need of more wolves than current target numbers, the potential economic benefits are another reason the numbers should be increased.

2) Ecological Benefits

A) There is scientific evidence that ungulate populations actually benefit from the return of wolves, instead of drastic declines as some fear. This is another reason to increase target populations to allow for a natural equilibrium to be established instead of allowing the killing of wolves at an arbitrary number. In many cases, as stated on p.75 of Alternative 2, wolves tend to prey on older, diseased, and injured ungulates instead of "healthy, prime-aged individuals." This leads to an overall healthier and more robust herd. Furthermore, on p.77, the plan states that "wolf predation has considerably less effect on reproductive rates and growth of populations" than hunting. Finally, on p.96, the plan explains that the presence of wolves, besides removing inferior prey, also leads to the "stimulation of prey productivity." This may lead to increased hunting opportunities instead of less.

B) Wolves also benefit grizzly bears, a very rare species in the state that also needs to be recovered. As started in Alternative 2 on p.93, "the presence of wolves might be beneficial to threatened populations of grizzlies by supplementing their diet with greater amounts of protein through increased availability of ungulate carcasses."

C) Increased numbers of ungulate carcasses benefit a number of species, as stated in Alternative 2 on p.94. These include red foxes, ravens, magpies, jays, golden eagles, bald eagles, and turkey vultures.

D) On p.207 of Alternative 2, Appendix E explains that the return of wolves will help the Mount St. Helens elk herd by preying on it. The wolves "could help restore and contribute to ecological balance and integrity in these types of situations." Current management determinations call for a reduction of the Mount St. Helens elk herd of 3000. The return of wolves would help reach this goal in a more natural way.

E) Finally, as discussed earlier, research from Beschta and Ripple demonstrate that the lack of wolves on the Olympic Peninsula has led to overgrazing of riparian vegetation by elk along the Hoh River. The return of wolves would benefit the Hoh River and various flora and fauna that inhabit the Hoh ecosystem.

VII. Conclusion

NPCA appreciates the efforts of the WDFW and the WWG in working towards the Wolf Conservation and Management Plan for the state of Washington. The current plan offers a wealth of information on wolves and the impacts they may have on the state. The objectives of the WWG are:

1) Implementing conservation strategies that will result in the reestablishment of a naturally reproducing and viable wolf population distributed in a significant portion of the species' former range in Washington, and
2) Managing wolf-livestock conflicts in a way that gives livestock owners who are experiencing losses tools to minimize future losses, while at the same time not negatively impacting the recovery or long-term perpetuation of sustainable wolf populations.

NPCA believes our suggested changes would better meet WDFW's goal of reestablishing a naturally reproducing and viable wolf population in Washington State. The population targets must be increased on the basis of scientific evidence from the UWFWS, the WDFW, and other scientists. An increased wolf population will also benefit the state economically from wolf tours and ecologically from healthier ecosystems. Finally, to reach the stated goal of a population distributed in a signification portion of the species' former range, NPCA feels the Olympic Peninsula should be one of the primary relocation sites and have its own recovery region. Besides the many barriers wolves must cross to reach the peninsula naturally, the superb habitat and low possibility of wolf/human conflict make the Olympic Peninsula one of the best areas for wolf recolonization in the state.

We appreciate your consideration of our comments and look forward to reviewing the final plan.

Sincerely,

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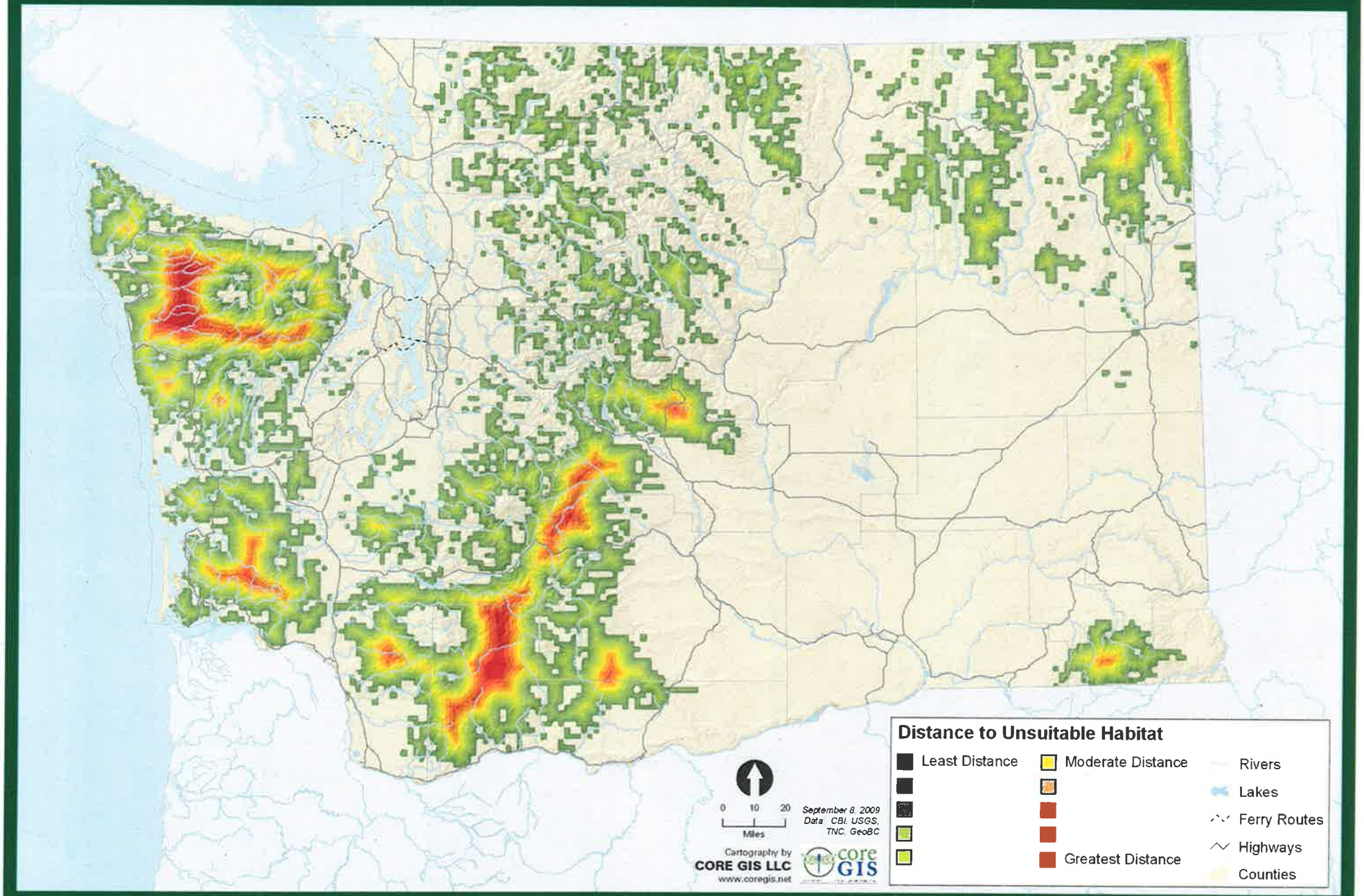
Contiguity of Suitable Wolf Habitat



From: Mike Leahy
To: SEPADesk2 (DFW);
Subject: Defenders of Wildlife Draft WA Wolf Plan comments
Date: Friday, January 08, 2010 5:01:01 PM
Attachments: Cmnts Defenders Draft WA Wolf Plan 1.10.pdf
raikkonnenetal2009.pdf
Bergstrom_et_al_BioScience_Final.pdf
Pages from WITH notes_Wolves A New Era july7-2.pdf

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December 15, 2010

Responsible Official: Teresa A. Eturaspe
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Re: "Wolf Conservation and Management Plan DEIS"

Dear Coordinator Teresa A. Eturaspe,

I'm writing today to express Defenders of Wildlife's enthusiastic support for the restoration of wolves in Washington State and to provide our comments and guidance on the development of the State's wolf management plan.

Introduction

Defenders of Wildlife (Defenders) is a national non-profit membership organization dedicated to the protection of all native animals and plants in their natural communities. We have more than 500,000 members nationwide and more than 13,000 members in Washington State. Founded in 1947, Defenders of Wildlife is one of the country's leaders in science-based, results-oriented wildlife conservation. We stand out in our commitment to saving imperiled wildlife and championing the Endangered Species Act, the landmark law that protects them. We work to protect and restore America's native wildlife, safeguard habitat, resolve conflicts, work across international borders and educate and mobilize the public.

Over the last three decades, Defenders has played a leading role in the recovery of wolves in the Northern Rockies, including the administration of Defenders of Wildlife Wolf Compensation Trust, which has reimbursed ranchers over $1,200,000 for livestock losses to wolves and grizzly bears since 1987. In 1998, we created The Defenders of Wildlife Proactive Carnivore Conservation Fund, which assists ranchers and farmers with nonlethal, proactive information and methods that help reduce or prevent livestock losses to wolves. These methods include sharing the cost of range riders, livestock guarding dogs, predator deterrent fencing, alternative grazing, and more.

Defenders has four staff offices in the Pacific Northwest/Northern Rockies region in Salem, Oregon; Boise, Idaho; and Missoula and Bozeman, Montana. The Idaho office manages our regional wolf conservation efforts. Before the first documented wolf packs were confirmed in Washington, we hosted a training workshop for state, tribal and federal agencies focused on non-lethal methods for preventing livestock depredations and our compensation program as a tool for reimbursing livestock owners for losses. We have offered to pay compensation for the few

documented livestock losses that have occurred in Washington State since wolves have returned as well. Most recently, Defenders co-hosted a training field day for biologists and ranchers in the Twisp area to promote use of nonlethal and proactive methods to reduce livestock conflicts with wolves in the area and we have conducted public outreach efforts statewide.

We greatly appreciate the opportunity to participate in this public comment period and to submit our comments for consideration.

Background

Historically, wolves were found across Washington State. Along with the other western states, wolves were extirpated from Washington by the 1930's through trapping and hunting with the exception of a few individuals dispersing periodically into the state. Gray wolves were classified as endangered in Washington at the federal level in 1973 and at the state level in 1980. They were delisted under federal law in 2009 in the eastern third of Washington (a decision Defenders and co-plaintiffs are challenging in court), and remain federally listed in the western two-thirds of the state. They are state listed throughout Washington. According to state officials, there are currently two confirmed wolf packs in the state. The first pack, documented in July 2008, is in the listed zone near Twisp, Washington and its members originated from British Columbian wolves. The second pack was documented in 2009 in the delisted zone along the Idaho/Canada border. This pack's alpha female apparently originated from wolves in the British Columbian coastal region and the alpha male from the Rocky Mountain region. There is also potentially a third, though as of yet unconfirmed, pack in the state near the eastern Washington/Oregon border.

Washington Wolf Conservation and Management Plan DEIS Goals

The goals of the Washington wolf conservation and management plan are to:

1) Restore the wolf population in Washington to a self-sustaining size and geographic distribution that will result in wolves having a high probability of persisting in the state through the foreseeable future (>100 years).
2) Manage wolf-livestock conflicts in a way that minimizes livestock losses, while at the same time not negatively impacting the recovery or long-term perpetuation of a sustainable wolf population.
3) Manage ungulate populations in Washington to maintain harvest opportunities for hunters and an adequate prey base for wolves so that wolf conservation goals can be met.
4) Develop public understanding of the conservation and management needs of wolves in Washington, thereby promoting the public's coexistence with the species.

Defenders of Wildlife Summary of Comments

Defenders of Wildlife fully supports the restoration of wolves in Washington State. The established goals (see above) are excellent guideposts for the state's wolf management efforts. The DEIS developed by the state is both comprehensive and balanced in nature. We also applaud the state's implementation of a stakeholder process to assist in the development of this plan. The plan addresses possible translocation of wolves as a conservation tool, education and outreach of citizens, proactive measures for reducing conflicts and provides for a compensation program. Important non-lethal management methods would be emphasized, especially while wolf numbers are low.

Our primary concerns with the 4 alternatives set by the state are 1) the low number of wolves (15 breeding pairs) as the criteria for delisting; 2) the preferred Alternative 2's limitation of only 3 recovery regions which doesn't include the Pacific Coast, a highly important region for wolves; 3) restrictions limiting wolf restoration only to wolves that disperse on their own into the state, which may hinder wolf recovery and the genetic health of the population; 4) allowing livestock owners or their representatives to kill wolves for taking livestock or the public to kill wolves for attacking domestic dogs (which appears to include hunting dogs) while wolf numbers are exceedingly low; and 5) a failure to explicitly provide for wolf restoration to the important suitable habitat of the Olympic Peninsula.

The plan offers no scientific justification for delisting wolves at 15 breeding pairs. The final plan should include a scientific analysis of wolf population goals needed to secure a self-sustaining, healthy wolf population that will have a high probability of thriving into the foreseeable future (>100 years) identified as a primary goal of this DEIS (see above). The plan should also secure wolf recovery in the Pacific Coast and Olympic National Park regions, which offer the lowest livestock conflicts of all the regions while providing important suitable habitat where wolves were originally established as a native species before their extirpation. Additionally, the state cannot rely on regular dispersal of wolves from Idaho, Montana or Canada to provide for a genetically viable wolf population at such low numbers but should adopt a plan for augmenting the wolf population if natural dispersal fails to occur before an adequate threshold of wolves is established in the state.

The Four Alternatives

The draft wolf plan currently under review includes four alternatives for wolf management in Washington. Some of the broad differences in the alternatives relate to geographic distribution of conservation targets, numbers of recovery areas, wolf translocation options, management options to address conflicts and compensation for livestock depredation. Alternative 2 is the draft wolf conservation and management plan and the state's preferred alternative. The following are descriptions of the four alternatives identified within the DEIS combined with Defenders' position and concerns regarding each alternative.

Alternative 1:

Defenders opposes this alternative, which has a lower standard for protection and restoration of wolves in the state and a more aggressive lethal control strategy. It would implement lethal control options at earlier listing statuses than the other alternatives, allowing livestock owners or their representatives to kill wolves for taking livestock and the public to kill wolves for attacking domestic dogs. The permission to conduct lethal control without agency supervision invites abuse and misuse of these actions. For example, if dead or dying livestock are present, this can entice wolves to prey on livestock. Domestic hunting dogs could also attract wolves, especially while defending wolf pups at their den or rendezvous sites, allowing dog owners to kill wolves even though the wolves were provoked to attack. Until wolves reach a minimum threshold population that secures their full recovery, only wildlife agencies should be allowed to determine if and when wolves are lethally controlled.

This alternative also sets a lower standard for geographic distribution of recovery objectives of only 2 breeding pairs in eastern Washington, 2 in the northern Cascades, 2 in the southern Cascades, and 9 breeding pairs added anywhere in these three region. Under this scenario, the state

downlisting and delisting of the species could occur with the majority of animals present in only one or two recovery regions, significantly reducing the chances for full wolf recovery in the state.

In regard to compensation for livestock losses, this alternative pays full value for confirmed wolf depredations and half of the full value for probable losses that occur only on private lands. (Table 1, page 21.) While this system may better protect the compensation program from fraud or misuse, the limitation may be too rigid to achieve the major benefits of a compensation program, which are to reduce the cost of wolf restoration to livestock owners and to promote greater tolerance for wolves in agricultural communities. "Full value" is not defined under this DEIS and could include value for breeding, pregnancies, animal losses covered by insurance, registered animals costing in excess of thousands of dollars, sentimental value, etc. The state would likely be unable to cover the costs of a compensation program if these values are not defined or limited.

Related to compensation, this alternative does allow WDFW to work with livestock operators to provide technical assistance to implement proactive measures to reduce conflicts with wolves. However, unlike Alternatives 2 and 3, WDFW would rely on existing staff adding to their current duties instead of hiring wolf specialists to focus on implementing proactive measures. This alternative would not likely provide enough support to achieve the DEIS goal to "Manage wolf-livestock conflicts in a way that minimizes livestock losses, while at the same time not negatively impacting the recovery or long-term perpetuation of a sustainable wolf population."

Under this alternative, once there are 12 breeding pairs of wolves in the state, they could be moved or killed if wolf predation is considered a limiting factor for elk herds that are below objectives as set by the state. Limiting factors are not adequately defined under this plan but any reduction of wolf numbers at this low population level could be detrimental to the re-establishment of wolves in the state. This alternative does not place additional emphasis on improving ungulate management to support wolf restoration efforts.

Unlike Alternative 3, this alternative does not place a high priority on public outreach and education even though the DEIS states "Several aspects of the plan are critical to its success… Because human tolerance has been and remains the primary limiting factor for wolf survival, tolerance and acceptance must be adequately addressed for citizens who will be directly affected by the presence of wolves. This makes technical assistance, compensation, and outreach some of the highest priorities for wolf conservation. An active outreach and education program must offer guidance and information about living with wolves and about rules and regulations related to management. Recovery of wolves means recognizing them as a native species of Washington, with legal, social, cultural, and biological value, and an important ecological role in maintaining native ecosystem functions and processes." (Washington Wolf DEIS Chapter 1, page 14) Public outreach and education are crucial to the success of any wolf management program and must be supported as a high priority activity under the final plan.

Alternative 2 (The State's Preferred Alternative):

Alternative 2 was selected by the state (though not the wolf advisory committee) as the preferred alternative because the State believes it meets the goals and objectives for establishing a long-term viable wolf population in Washington while addressing wolf-livestock conflicts and interactions between wolves and ungulates. However, Alternative 2 sets a more moderate geographic distribution of conservation/recovery objectives for downlisting and delisting, with an emphasis on adequate numbers being present in the Southern Cascades/Northwest Coast recovery region.

Specifically, before delisting can occur, this alternative requires 2 breeding pairs in eastern Washington, 2 in the north Cascades, 5 in the southern Cascades/northwest coast and 6 more anywhere in the state.

Defenders supports many of the concepts and goals established in this alternative, which includes a range of proactive, non-lethal and lethal control options for addressing livestock conflicts. However, we oppose Alternative 2 overall because it falls short of establishing wolves in the Pacific Coast and Olympic Peninsula recovery regions to achieve delisting and it allows livestock owners or their representatives to kill wolves for taking livestock or the public to kill wolves for attacking domestic dogs while wolf numbers are below 15 breeding pairs. Until wolves reach a minimum threshold population that secures their recovery, and that has yet to be substantiated, only wildlife agencies should be allowed to determine if and when wolves are lethally controlled.

In regard to compensation for livestock losses, paying twice the value of confirmed livestock losses on grazing sites of 100 or more acres may address some livestock owner's concerns about being unpaid for missing livestock. However, it will also reduce the incentive for livestock owners to adopt reasonable, proactive deterrents and livestock husbandry methods because some will consider getting twice the value for dead livestock as an economic benefit to their operation. This will be especially true in cases where livestock losses are most easily confirmed such as a large pasture. The state could find itself paying for substantially more dead livestock than it would if it instead encouraged effective nonlethal preventative methods, which reduce livestock losses and better prepare livestock owners to adapt to the return of wolves. Again, "full value" is not defined under this DEIS and could include value for breeding, pregnancies, animal losses covered by insurance, registered animals costing in excess of thousands of dollars, sentimental value, etc. The state would likely be unable to cover the costs of a compensation program if these values are not defined or limited.

Defenders supports Alternative 2 and 3's actions to hire wolf specialists whose duties would include providing technical assistance to livestock operators to implement proactive, nonlethal measures to reduce conflicts with wolves. Some of the most effective methods include: removal of dead or dying livestock, increased human supervision of livestock when possible, using livestock guarding dogs during certain times of the year, installing different types of fencing and lighting, and using a variety of scare devices. The effectiveness of these deterrents is highly dependent on a number of factors, including type, number, and age of livestock, grazing and pasture conditions, and season. However, we encourage the State to provide not only information and training, but when appropriate, to also supply or loan equipment like fladry, turbofladry, lighting sensors, alarm systems, monitoring devices, and other practical tools to ranchers who are in high priority wolf conservation areas. The wolf specialists should also work with other wolf managers and researchers to determine which methods are most effective in reducing livestock losses to wolves as this information is vitally important for national and international wolf conservation programs.

Under Alternative 2, once wolves are delisted with 15 breeding pairs in the state, they may be moved or killed if research indicates that wolves are a "limiting factor" for "at-risk" ungulate populations. Neither "limiting factor" nor "at-risk" are adequately defined. However, this alterative does allow the state to manage ungulate hunting to benefit wolf restoration efforts.

Unlike Alternative 3, this alternative does not place a high priority on public outreach and education even though the DEIS states "Several aspects of the plan are critical to its success… Because human tolerance has been and remains the primary limiting factor for wolf survival,

tolerance and acceptance must be adequately addressed for citizens who will be directly affected by the presence of wolves. This makes technical assistance, compensation, and outreach some of the highest priorities for wolf conservation… An active outreach and education program must offer guidance and information about living with wolves and about rules and regulations related to management. Recovery of wolves means recognizing them as a native species of Washington, with legal, social, cultural, and biological value, and an important ecological role in maintaining native ecosystem functions and processes" (Washington Wolf DEIS Chapter 1, page 14). Public outreach and education are crucial to the success of any wolf management program and must be supported as a high priority activity under the final plan.

Alternative 3:

Defenders supports this alternative, with modifications below, over the others because it places the greatest emphasis on protection and restoration of wolves in Washington and is "predicted to have a higher probability of achieving and maintaining a long-term viable wolf population in Washington compared to the other alternatives." It sets a higher standard for the geographic distribution of conservation/recovery objectives for downlisting and delisting wolves, including a requirement that they be present in a fourth recovery region – the Pacific Coast Recovery Region – before the species can be downlisted and delisted. Specifically, this alternative requires 3 breeding pairs in eastern Washington, 3 in the north Cascades, 3 in the southern Cascades, 3 in the Pacific coastal range, and 3 more anywhere in the state. This alternative is the most restrictive on when management tools for addressing livestock conflicts can be implemented, which needs to be modified to better meet wolf conservation goals (see below) and it also recommends the most liberal compensation package for documented cases of confirmed and probable depredation.

Alternative 3 is the most likely to secure a healthy, statewide wolf population that includes the Pacific Coast and Olympic National Park region. However, Alternative 3 does not explicitly provide for and ensure the restoration of wolves to the Olympic Peninsula. This is important suitable habitat for wolves, and restoring wolves to Olympic National Park and the surrounding areas will likely have significant economic benefits for nearby communities due to increased tourism. We recommend Alternative 3 be modified to explicitly ensure the restoration of wolves to the Olympic Peninsula.

Alternative 3 still allows livestock owners or their representatives to kill wolves for taking livestock and the public to kill wolves for attacking domestic dogs while wolf numbers are below 15 breeding pairs. As explained above in Alternative 1, Defenders opposes allowing such liberal control authority until wolves reach a minimum threshold population that secures their recovery. Prior to this recovery standard being met, only wildlife agencies should be allowed to determine if and when wolves are lethally controlled.

In regard to compensation for livestock losses, paying twice the value of all confirmed and probable livestock losses on private and public land may address some livestock owner's concerns for being unpaid for missing livestock. While there is good evidence that compensation can prevent a decrease in livestock operators' tolerance for wolves (Musiani et al 2009), there is no evidence among compensation studies that using a multiplier for losses increases public tolerance for wolves. However, paying for values above known and documented losses may reduce the incentive for livestock owners to adopt reasonable, proactive deterrents and livestock husbandry methods because some will consider getting twice the value for dead livestock as an economic benefit to their operation. The State could find itself paying for substantially more dead livestock

than it would if it instead encouraged effective nonlethal preventative methods, which reduce livestock losses and better prepares livestock owners to adapt to the return of wolves. Again, "full value" is not defined under this DEIS and could include value for breeding, pregnancies, animal losses covered by insurance, registered animals costing in excess of thousands of dollars, sentimental value, etc. The State would likely be unable to cover the costs of a compensation program if these values are not defined or limited.

Defenders supports Alternative 2 and 3's actions to hire wolf specialists whose duties would include providing technical assistance to livestock operators to implement proactive, nonlethal measures to reduce conflicts with wolves. Some of the most effective methods include: removal of dead or dying livestock, increased human supervision of livestock when possible, using livestock guarding dogs during certain times of the year, installing different types of fencing and lighting, and using a variety of scare devices. The effectiveness of these deterrents is highly dependent on a number of factors, including type, number, and age of livestock, grazing and pasture conditions, and season. However, counter to its enhanced recovery goals, Alternative 3 does not allow livestock operators to use nonlethal injurious harassment (e.g. rubber bullets, cracker shells, electrical fencing, etc) to deter wolves from preying on livestock until wolves are downlisted to "sensitive" status. This restriction may well have a reverse impact by increasing wolf depredation conflicts and result in more lethal control of wolves, which could have been avoided by using these tools. This restriction should be removed and the State should provide permits and training for ranchers to use these methods when needed to reduce wolf and livestock losses.

We encourage the State to provide not only information and training, but when appropriate, to also supply or loan equipment like fladry, turbofladry, lighting sensors, alarm systems, and other practical tools to ranchers who are in high priority wolf conservation areas. The wolf specialists should also work with other wolf managers and researchers to determine which methods are most effective in reducing livestock losses to wolves as this information is vitally important for national and international wolf conservation programs.

Under this alternative, once wolves are delisted with 15 breeding pairs in the state, they may be moved or killed if research indicates that wolves are a "limiting factor" for "at-risk" ungulate populations. Neither "limiting factor" nor "at-risk" are adequately defined. The alternative restricts hunting harvest of ungulates to benefit wolves in each recovery area. If those restrictions are taken too far, it may have the reverse effect of reducing public tolerance for wolves, especially among hunters, which could undermine wolf conservation efforts.

This alternative places the highest priority on public education and outreach. As these tools are imperative to the success of any wolf management program, this aspect of Alternative 3 is better aligned than the other alternatives to ensure that the State's wolf conservation goals are achieved: "Develop public understanding of the conservation and management needs of wolves in Washington, thereby promoting the public's coexistence with the species."

Alternative 4 – No Action (Current Management):

This alternative emphasizes protection and restoration of wolves using existing programs, but does not develop a conservation and management plan for the Washington. As a result, wolves would continue to be listed as endangered until a state recovery plan was completed that established recovery objectives. Limited management options would be used to address conflicts, and

compensation provided for livestock depredation would be through the Defenders of Wildlife program until the Washington State legislature's wolf compensation program (SHB 1778 effective July 1, 2010) replaces Defenders' wolf compensation program. With wolves now returning to Washington State, this alternative would put state officials in a reactive rather than proactive management scenario. A solid wolf management plan is needed now to ensure the future of wolves in the state.

Additional Concerns and Suggestions

These alternatives are all limited to the establishment of 15 breeding pairs or less to delist wolves in Washington State yet there is no evidence that 15 breeding pairs will secure recovery or even allow for an interconnected, viable wolf population. The final plan should include a scientific analysis of wolf population goals needed to secure a self-sustaining, healthy wolf population that will have a high probability of thriving into the foreseeable future (>100 years) identified as a primary goal of this DEIS.

None of these four alternatives allow for reintroduction of wolves to the state under any scenario, which could lead to genetic malformations in the wolf population unless the current wolf numbers are supplemented by more dispersing, genetically diverse wolves that successfully breed with the existing wolves or their offspring. The Isle Royale wolf population has been used as an example for those claiming that small, isolated wolf populations are not affected by genetic issues. New findings from Isle Royale show the importance of genetic connectivity to the health of wolf populations. Scientists who have been conducting long-term studies on these wolves have recently documented that 58 percent of Isle Royale's wolves have suffered spinal malformations due to extreme inbreeding (Raikkonen et al 2009). These malformations can cause rear leg pain and weakness and even paralysis. Given that wolves rely on their ability to run and chase to survive, this is clearly a concern for wolf populations managed at or starting from such low population levels as those in Washington state.

The State is also relying exclusively on dispersing wolves from Idaho, Montana and Canada to provide adequate wolf recolonization and genetic diversity for its founding wolf population. However, wolves in Idaho and Montana have been recently delisted and under the current federal wolf delisting plan, these states are allowed to reduce the regional wolf population from over 1600 wolves to 450 or fewer. If the northern Rockies wolf population is reduced that dramatically, wolf subpopulations could become isolated from one another preventing them from breeding with other subpopulations or dispersing to states like Washington and Oregon. As such, augmentation of the state's wolf population should be added to the final EIS as a tool to ensure genetic health of the wolves, especially while wolf numbers remain low. Augmentation should also be considered when determining which type of wolves would best be suited for the state's diverse landscapes. For example, wolves from the coastal range of British Columbia would likely be the best suited for Washington's Pacific coastal range because of the similar habitat and prey base in these areas.

The use of lethal control of wolves should not be allowed until after all reasonable, nonlethal methods have been exhausted. In the northern Rockies, that provision was included in the original wolf reintroduction EIS and had stronger emphasis when there were 6 or fewer breeding pairs in each recovery area. Lethal control was also prevented when there were attractants present that enticed wolves to prey on livestock (e.g. the presence of dead or dying livestock). By adding these provisions to Washington's wolf plan, the State will be better prepared to achieve its stated goals:

1) Restore the wolf population in Washington to a self-sustaining size and geographic distribution that will result in wolves having a high probability of persisting in the state through the foreseeable future (>100 years).
2) Manage wolf-livestock conflicts in a way that minimizes livestock losses, while at the same time not negatively impacting the recovery or long-term perpetuation of a sustainable wolf population.

Conclusion

We appreciate the opportunity to submit our comments and look forward to working with the State of Washington to support the successful restoration of wolves. I'll be on leave through February 2010 but if you have any questions, please feel free to contact Mike Leahy, our Rocky Mountain Regional Director or Jesse Timberlake, our Northern Rockies Associate. Mike can be reached at (406) 586-3970, or by email at mleahy@defenders.org; Jesse can be reached at (208) 424-9385, or at jtimberlake@defenders.org.

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Congenital bone deformities and the inbred wolves (*Canis lupus*) of Isle Royale

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ABSTRACT

The wolf (*Canis lupus*) population on Isle Royale, a remote island in Lake Superior, North America, is extremely inbred. Nevertheless, the consequences of genetic deterioration have not been detected for this intensively studied population, until now. We found that 58% ($n = 36$) of Isle Royale wolves exhibited some kind of congenital malformation in the lumbosacral region of the vertebral column and 33% exhibited a specific malformity, lumbosacral transitional vertebrae. By contrast, only 1% (1 of 99) of wolves sampled from two outbred, wolf populations exhibited this malformity. Moreover, in domestic dogs (*Canis lupus familiaris*) lumbosacral transitional vertebrae are associated with cauda equina syndrome, which can cause paresis, paralysis, locomotor difficulties in the rear legs and tail, and back pain. Whereas many studies illustrate how genetic deterioration affects population-level phenomena, such as survival and reproduction, these results are distinctive for demonstrating how genetic deterioration has compromised the morphology of individuals in a free-ranging population. The results are also significant because many policy makers and stakeholders and some conservation professionals use examples like Isle Royale wolves to downplay the consequences of genetic deterioration.

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1. Introduction

The detrimental effects of genetic deterioration are well documented for both captive and free-ranging populations and for a diverse set of taxa (e.g., Hedrick and Kalinowski, 2000; Keller and Waller, 2002). Nevertheless, many conservation professionals and policy makers downplay the threats posed by genetic deterioration for many populations of conservation concern (see Spielman et al., 2004; Jamieson, 2007). For example, genetic concerns are addressed by only a small portion of recovery plans for species protected by the US Endangered Species Act (Fallon, 2007). Some believe this lack of concern is justified, in part, by instances where populations appear viable and unaffected by genetic deterioration, despite being small and isolated.

One such instance is the wolf (*Canis lupus*) population on Isle Royale, an island in Lake Superior, North America. Since being founded by one female and one or a few males in the late 1940s, the population's average census size has been 24, and its long-term effective population size, N_e, has been ~3.8 (Peterson et al., 1998). Despite being highly inbred and despite intense, long-term observation, the effects of genetic deterioration have not, to date, been detected for this population. Here, we present the first evidence that this population has long been adversely affected by genetic deterioration.

The finding has relevance because this population is among several prominent examples that some conservation workers and policy makers use to support arguments that small populations can avoid genetic deterioration and be viable (e.g., Table 6.9 of Fuller et al., 2003; Fritts and Carbyn, 1995; Boitani, 2003; see also Wehausen, 1999 and references therein). These arguments have affected conservation policy. For example, the US Fish and Wildlife Service has used (and continues to use, as of 2008) such reasoning to defend, in part, their position that populations in the Northern Rockies and Great Lakes regions are large enough to be considered viable (USFWS, 2000). Similar reasoning has also affected conservation policies for the Scandinavian wolf population (Ekström, 1999; Regeringens Proposition, 2000).

1.1. The study population

Wolves first colonized Isle Royale (544 km^2) in the late 1940s by crossing an ice bridge connecting Isle Royale to the mainland, which are separated by ~24 km. Moose (*Alces alces*) represent about 90% of these wolves' diet. Humans do not harvest wolves or moose on Isle Royale. The wolf and moose populations of Isle Royale have been monitored intensively since 1958 (see Peterson et al., 1998; Vucetich and Peterson, 2004a; Vucetich et al., in press).

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The Isle Royale wolf population possesses a single mtDNA type, which is extremely rare in nearby mainland populations (Wayne et al., 1991). This suggests the population may have been founded by a single female. More recent evidence suggests the population was founded by one female and one, or perhaps two, males (J. Adams, unpublished data). Otherwise Isle Royale's wolf population is thought to be isolated from other populations.

Between 1958 and 2008, the population has been typically comprised of approximately 24 wolves (interquartile range = [17, 27], range = [12, 50]), living in three packs (interquartile range = [3, 3], range = [1, 5]), or breeding groups. In a typical year only three pairs of wolves breed. These and other factors (Nunney, 1996) cause the long-term, effective population size (N_e) of the wolf population to be approximately 3.8 (Peterson et al., 1998).

Given a N_e of 3.8, and that the generation time for Isle Royale wolves is ~4.3 years, this population is expected to have lost approximately 80% of its neutral genetic diversity during its time on Isle Royale, between 1950 and 2008 (see Peterson et al., 1998). Preliminary, unpublished analyses comparing microsatelite DNA from the Isle Royale population and from wolves on the nearby mainland suggest that Isle Royale wolves have lost approximately 60% percent of their genetic diversity during their first twelve generations on Isle Royale (J. Pollinger, unpublished data). Although the discrepancy between predicted and observed levels of genetic diversity has not yet been explained, a similar pattern has been observed and assessed for Scandinavian wolves (Liberg et al., 2005).

Despite high rates of inbreeding, key demographic properties of the Isle Royale population are comparable to outbred populations of wolves (see Fuller et al., 2003). The average annual mortality rate is 0.25 (0.17 SD) and the average annual recruitment rate (i.e., pups surviving to their first January) is 0.27 (0.14 SD). Pack size and per capita kill rates are also comparable to other populations that feed primarily on moose.

To date, the only evidence for inbreeding depression has been circumstantial. Between 1980 and 1982 the wolf population crashed from 50 to 14 wolves and remained in the low teens until the mid-1990s. The population crash was caused by the coincident occurrence of canine parvovirus (CPV) and food shortage (Peterson et al., 1998). However, the long period of low wolf abundance that followed is not easily explained by CPV or shortage of food. Moose had exceeded their long-term average abundance by 1984, and CPV had disappeared by 1989 (Peterson et al., 1998).

Moreover, wolf population dynamics differ dramatically before and after the outbreak of CPV. Prior to 1981, the average number of moose required to support a wolf was 36.3 ± 3.3 SE; afterward, that ratio increased to 53.3 ± 7.5 SE (Vucetich and Peterson, 2004b). Also, wolves represented an important influence on moose population dynamics prior to 1981; afterward, the influence of wolves was almost entirely replaced by the influence of winter climate (Wilmers et al., 2006). It is plausible, but far from certain, that these patterns are associated with genetic deterioration in the wolf population.

2. Materials and methods

Skeletal material was collected from 36 wolves that died between 1964 and 2007. These specimens included the entire vertebral column from atlas to sacrum. In some cases one or a few thoracic/lumbar vertebrae were missing due to fractures or scavengers that had taken parts of specimens before they were recovered. The coccygeal region was far from complete in most specimens (Table 1). Following methods described in Räikkönen et al. (2006), we examined the vertebrae of these wolves for congenital malformations. We focussed on vertebral malformations because such malformations are well studied in other populations of *Canis spp.* (see below). For context, the backbone of a normal wolf consists of seven cervical, C (1–7); 13 thoracic, T (1–13); seven lumbar, L (1–7); three fused sacral S (1–3); and around 20 coccygeal vertebral segments, Co (1–22) (Gilbert, 1997).

We also compared the rates of lumbosacral transitional malformations among samples collected from two small, inbred populations, contemporary Scandinavia (Liberg et al., 2005) and Isle Royale; and two large, outbred populations, contemporary Finland (Aspi et al., 2006) and historic Scandinavia. The contemporary population from Scandinavia was founded in the 1980s from three founders, one female and two males (Vilá et al., 2003). The materials from Finland and Scandinavia are further described in Räikkönen et al. (2006).

3. Results

3.1. Isle Royale wolves

Fifty-eight percent (21 of 36) of the individuals from Isle Royale had congenital malformations in the lumbosacral region of the vertebral column (Figs. 1, 2 and 4; see also Table 1). Among samples of known sex, males and females did not differ with respect to incidence of vertebral malformity ($p = 0.85$, $G = 0.033$, $df = 1$).

The incidence of vertebral malformity also increased substantially during the past five decades among specimens for whom the date of birth could be estimated ($p = 0.02$, $n = 33$, Fig. 5). For the six specimens whose age at death is known only to be within some range, the year of birth was estimated from the mid-point of that range. In these cases, the error in date of birth would be no more than 1 year. For 10 specimens, death is only known to have occurred during adulthood. We assumed these wolves died at the mean age of death for Isle Royale wolves (4 years). Because few wolves live beyond the age of 6, the estimated year of birth is unlikely to be in error by more than 2 years. Inspecting the scale of the x-axis in Fig. 5 suggests that these uncertainties are minor and unimportant. More generally, our inference (i.e., Fig. 5) is likely robust to these uncertainties, because slopes tend to be steeper than estimated when predictor variables are measured with error (Fuller, 1987).

Several wolves where characterized by more than the normal number of vertebrae. Specifically, 25% (9 of 36) of wolves had eight, rather than the normal seven lumbar vertebrae. One wolf (#3122) was very unusual for having 29 presacral vertebrae. The normal number is 27, and the extra vertebrae of this wolf were found in the thoracic and lumbar spine.

Thirty-three percent (12 of 36) of the wolves exhibited lumbosacral transitional vertebrae, LSTV. Transitional vertebrae exhibit features typical of two adjacent divisions of the vertebral column, can be found at any division (Morgan, 1968), and can also occur within a spinal segment (Breit and Künzel, 1998). Transitional vertebrae have also been reported in a variety of mammals (e.g. see Winckler, 1949; Searle, 1954; Wegner, 1959; Simoens et al., 1983; Junge et al., 2001; Newitt et al., 2008).

Lumbosacral transitional features exist in a variety of forms, including unilateral or bilateral patterns (Morgan, 1999; Flückiger et al., 2006). Most of the LSTV in Isle Royale wolves were bilateral asymmetries. Some unilateral asymmetrical patterns were also found. For example, wolf #378 had a sacral vertebral segment with a sacral process on the right side and a lumbar process on the left side (Fig. 1).

Some individuals exhibited a failure of the normal union of sacral segments. When the first sacral segment is transitional two fused sacral segments may remain. Several wolves also exhibited sacralization of the first coccygeal segment, where the first coccygeal segment is shifted to result in three sacral segments

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Table 1
Wolves collected at Isle Royale between 1964 and 2007. Age at time of death is based on counting annual cementum rings in the canines or information from having radio-collared some of the wolves. When date of death is known it is based on collecting the carcass within a year of the animal's death. In some cases, not all vertebrae were inspected because not all vertebrae were collected from the field.

Specimen	Sex	Age in years	Date of death	Vertebrae examined[a]	Nature of observed congenital vertebral malformity
377	Male	6	1964	Atlas-Co1	None
378	Female	5	1966	Atlas-sacrum	Lumbosacral transitional
532	?	5	1969	Atlas-T7, T9-Co2	None
436	Male	4	1969	Atlas-sacrum	None
503	?	1	1970	Atlas-Co1	None
1301	?	Adult	?	Atlas-Co3	None
1429	?	4	1978	Atlas-Co13	None
1521	Male	10	1980	Atlas-Co1	Sacrococcygeal transitional
1565	Male	10	1980	Atlas-Co18	Lumbosacral transitional
1667	?	6–7	1981	Atlas-T3, T5, T10-Co9	Sacrococcygeal transitional
1757	Male	4	1982	Atlas-Co11	None
1828	Female	6	1986	Atlas-L3, L5-Co4	Severe asymmetry at Co1
1872	Male	10	1987	Atlas-Co14	Lumbosacral transitional
2147	Female	5	1990	Atlas-Co8	None
2224	Male	11	1991	Atlas-Co12	Eight lumbar vertebrae
2509	Male	11	1993	Atlas-Co16	Thoracolumbar, lumbosacral transitional
2518	Male	10	1994	Atlas-Co9	Lumbosacral transitional
2542	Female	9	1994	Atlas-Co17	Lumbosacral transitional
2613	Female	1–2	1995	Atlas-sacrum	None
3114	?	4	1997	Atlas-T5,T7-Co3	None
3086	Female?	Adult	1997	Atlas-S2 (fracture at S3)	Thoracolumbar, 8 lumbar vertebrae
3020	?	Adult	1997	L3-sacrum	Lumbosacral transitional
3529	?	Adult	Late 1990s	Atlas-T11, L1-Co1	Cervical intrasegmental transitional, asymmetry at C6, L1 and lumbosacral transitional
3122	?	Adult	1998	Atlas-S2 (fracture at S3)	Cervical intrasegmental transitional, extra thoracic vertebra and eight lumbar vertebrae
3722	Male	Adult	2003	Atlas-Co19	Atlas foramina anomaly (developmental)
2475	Male	Adult	?	Atlas-T4, L1-Co12	Lumbosacral transitional
520	?	Adult	?	Atlas-S2 (fracture at S3)	Lumbosacral transitional
3387	?	Adult	2004	Atlas-Co18	Thoracolumbar, lumbosacral transitional
9876	?	Adult	2004	Atlas-Co13	Thoracolumbar, 8 lumbar vertebrae
3397	?	2–3	2005	Atlas-sacrum	Eight lumbar vertebrae
3398	?	2–3	2005	Atlas-T12, L1-Co3	None
4045	Female	8–10	2005	Atlas-sacrum	Eight lumbar vertebrae
4052	Male	8–10	2006	Atlas-sacrum	Lumbosacral transitional
4112	Male	Adult	2006	Atlas-sacrum	Eight lumbar vertebrae
4118	Male	Adult	2006	Atlas-sacrum	Minor asymmetry at C7, thoracolumbar transitional, 8 lumbar vertebrae
4282	Female	Adult	2007	Atlas-sacrum	Eight lumbar vertebrae, caudal asymmetry at sacrum

[a] Vertebral abbreviations: C: cervical, T: thoracic, L: lumbar, S: sacral, Co: coccygeal.

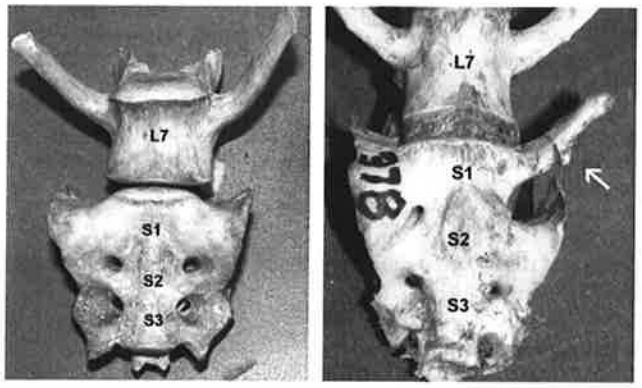

Fig. 1. The right photo shows the ventral view of wolf # 378 which exhibited a unilateral transitional segment at its sacrum, S1, see arrow (photo by J. Räikkonen). The left photo shows a normal wolf sacrum (photo by J. Räikkonen).

(see also Morgan et al., 2000). For example, the first sacral segment of wolf #3387 was separated with an abnormal disc space and exhibited lumbar features like a transverse process causing a very unequal illial attachment. Only two fused sacral segments remained. The associated asymmetries in the rest of sacrum were severe. The first coccygeal segment was sacralized and only connected dorsally to sacrum (Fig. 2). There were wolves that exhibited changes coupled to congenital malformations like secondary bony osteophytes and narrowed vertebral canals (see also Räikkönen et al., 2006).

The Isle Royale sample also contained a variety of transitional vertebrae at other regions in the vertebral column and other congenital malformations. Specifically, some wolves exhibited thoracolumbar transitional vertebrae at L1, two wolves (#3529 and #3122) had intrasegmental transitional vertebrae at the same vertebral location of the cervical spine (C7) (Fig. 3). Specimen #3529 also exhibited asymmetry at C6 and specimen #4118 exhibited minor asymmetry at C7. Specimen #1828 exhibited severe asymmetry at Co1.

Specimen #3722 exhibited incomplete ossification of the cranial border of atlas (C1) left lateral vertebral foramen, a minor developmental variant (see also Richards and Watson, 1991). This wolf also exhibited syndactyly, fusion of the soft tissue between the middle toes on both front feet. Syndactyly is a congenital malformity, a recessive trait, and more common among individuals from inbred lineages for a variety of mammals (e.g., Fossey, 1983; Gul and Oktenli, 2002; Drögemüller and Distl, 2006; Naruse et al., 2007). Italian wolves also exhibit partial fusion of the soft tissue between the middle toes on both front feet (F. Marucco, *pers. comm.*)

3.2. Interpopulation comparison

The incidence of lumbosacral transitional vertebrae (LSTV) is greater among Isle Royale wolves compared to those of Scandina-

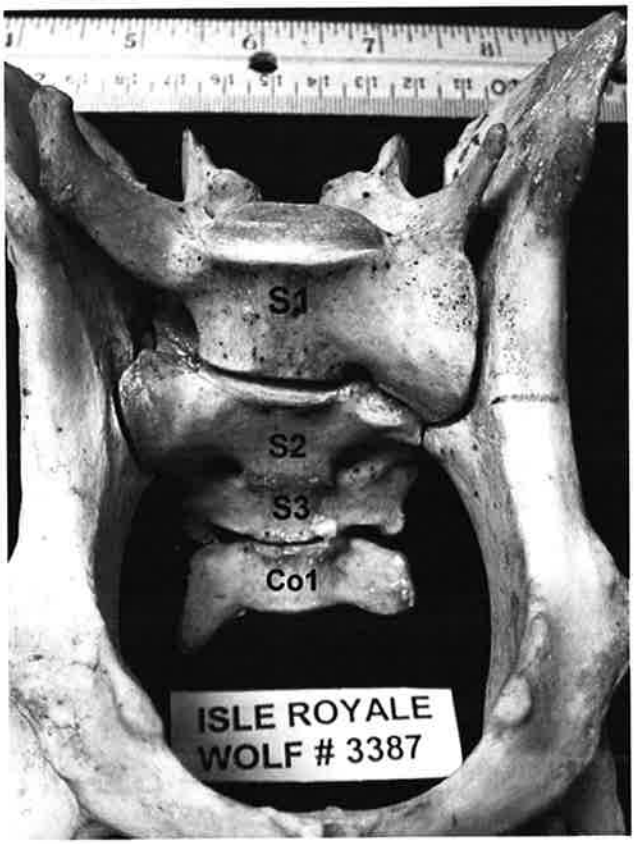

Fig. 2. Ventral view of wolf # 3387 which exhibited lumbosacral transitional vertebrae with severe changes at sacrum with an anomalous disc space (photo by J. Bump).

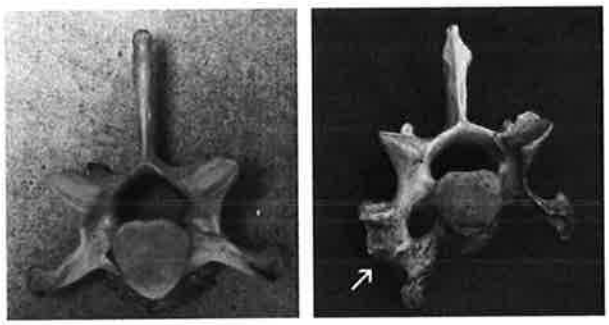

Fig. 3. The right photo shows the cranial view of wolf #3529 that exhibited a unilateral intrasegmental transitional vertebra at C7 (photo by J.A.Vucetich). One side of the vertebra resembles C6 with a transverse foramen (arrow). The left photo shows a normal C7 without transverse foramen (photo by R.O. Peterson).

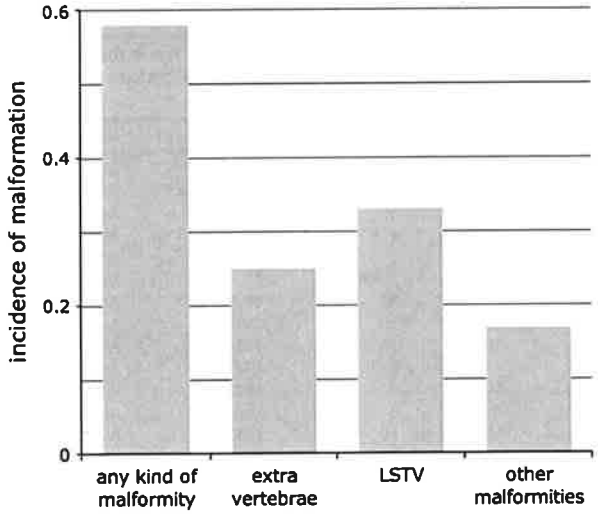

Fig. 4. The incidence of vertebral malformations in a sample of 36 Isle Royale wolves. The last three categories sum to more than the first category because some wolves had more than one kind of malformity. LSTV refers to lumbosacral transitional vertebrae. "Other malformities" include thoracolumbar transitional vertebrae, intrasegmental transitional vertebrae, asymmetrical vertebrae, and incomplete ossification of the cranial border of the first cervical vertebrae.

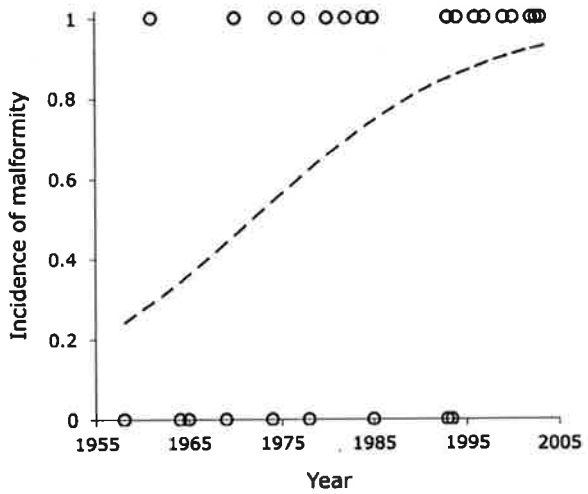

Fig. 5. The incidence of vertebral malformity in relation to the estimated year of birth for Isle Royale wolves. Symbols are observations and the curve is the best fit logistic regression ($p = 0.02$).

via and Finland (Fig. 6). An exact test comparing these proportions is not possible because the incidence for the historic Scandinavian population is zero. However, a conservative test can be conducted by presuming that one of the 25 samples from the historic Scandinavian population was malformed. The result of this test is that the incidence of LSTV is not equal among the populations ($p < 10^{-4}$, G-statistic = 24.9, $df = 3$).

More precisely, the incidence of LSTV is greater for Isle Royale wolves compared the other populations, when those samples are pooled ($p < 10^{-5}$, G-statistic = 20.8, $df = 1$), and compared to contemporary Scandinavia, the other inbred population ($p = 0.01$, G-statistic = 6.72, $df = 1$). Finally, the incidence of deformities is also greater for the inbred populations than for the outbred populations ($p < 10^{-4}$, G-statistic = 17.3, $df = 1$).

4. Discussion

4.1. Consequences of congenital vertebral malformations

The clinical significance of the cervical asymmetries we observed is unknown. However, the kinds of vertebral malformations common among Isle Royale wolves are likely detrimental (Morgan et al., 1993; Morgan, 1999; Steffen et al., 2004; Flückiger et al., 2006). For example, domestic dogs (*Canis lupus familiaris*) with lumbosacral transitional vertebrae tend to suffer from cauda equina syndrome, CES (Morgan et al., 1993). CES entails injury to the cauda equina, the most caudal region of the spinal cord and associated nerve roots (Berzon and Dueland, 1979). The consequences

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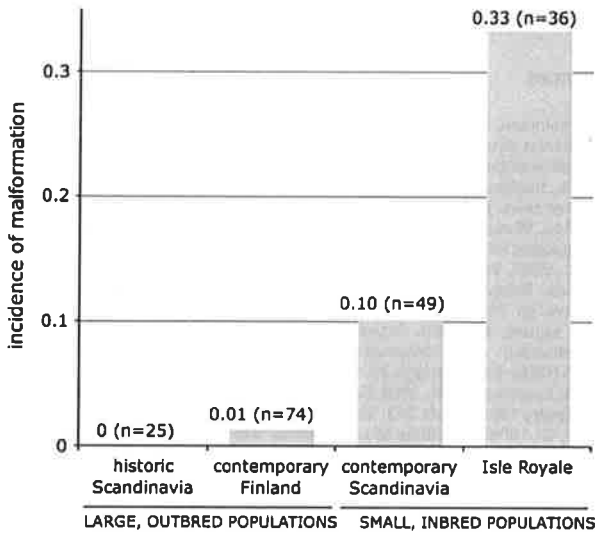

Fig. 6. The incidence of lumbosacral transitional malformations for different wolf samples. The Finnish and Scandinavian samples are described in Räikkönen et al. (2006).

of CES, which are independent of its etiology (Morgan et al., 2000), are variable and include paresis or paralysis; deficits in placing reactions when walking; deficits in voluntary movement of the tail; loss of muscle tone causing weakness of the hind limbs and flaccidity of the tail, low back pain and incontinence (Morgan et al., 1993, 2000).

Several Isle Royale individuals exhibited a sacral process with strong illial attachment on one side and a process of lumbar nature on the other side. This condition weakens the sacroiliac joint, may accelerate degeneration of the disc and result in disc protrusions (Morgan et al., 2000). Such disc degeneration with dorsal protrusion is also a common cause of CES. Dogs exhibiting disc protrusion also tend to suffer low back pain and lameness (Steffen et al., 2004). Asymmetrical sacroiliac attachment can also be associated with pelvic obliquity that can result in gait irregularities (Larsen, 1977) and detrimental development of the hip joints (Morgan et al., 2000).

4.2. Evidence for inbreeding depression

There is now good reason to think that Isle Royale wolves have been suffering from genetic deterioration. A substantial portion of Isle Royale wolves exhibit vertebral malformities that tend to be detrimental (Figs. 1–4). Lumbosacral transitional vertebrae are associated with inbreeding in dogs (Damur Djuric et al., 2006; Morgan et al., 1993, 1999; Morgan, 1999). Also, the incidence of these malformities tends to be associated with the extent of inbreeding among the examined populations (Fig. 6). For context, the Isle Royale wolf population has had a smaller N_e for a longer period of time than the wolf population of contemporary Scandinavia. Moreover, these Scandinavian wolves exhibit significant inbreeding depression in juvenile survival (Liberg et al., 2005). Comparable analyses have yet to be conducted for Isle Royale wolves, but are forthcoming.

Although Isle Royale wolves appear to exhibit compromised phenotypes in response to genetic deterioration, survival or reproduction remain comparable to those of other healthy wolf populations. Nevertheless, the observed vertebral malformities could affect wolf population dynamics. After a population bottleneck caused by introduced disease in 1980–1982, the number of moose required to support a wolf increased substantially after 1980, even while reproduction and survival did not exhibit detectable changes. The most plausible mechanism to explain these patterns is – using the parlance of predator–prey theory – a reduction in attack rates and (or) efficiency of conversion (Vucetich and Peterson, 2004b). It is possible, though far from certain, that these changes in predation ecology are associated with the skeletal malformities described here. This hypothesis is consistent with the observation that many Isle Royale wolves with vertebral malformities lived long lives (Table 1). That is, the vertebral malformities may have impacted the predatory performance of individual wolves, without our detecting an effect of the malformities on other vital rates.

For these inferences to be reliable, one would expect that either the incidence or severity of malformities to have increased after 1980. Such an increase has been observed (Fig. 5).

The observed malformations may have been caused by either inbreeding depression (i.e., decreased fitness for the offspring of related parents) or genetic load (i.e., a reduction in population fitness from the optimum possible) (Kirkpatrick and Jarne, 2000). Genetic load is increasingly found to be the cause of reduced fitness for small, isolated populations (e.g., Roelke et al., 1993; Fredrickson et al., 2007). In such cases, the introduction of non-related individuals is expected to result in "genetic rescue" (Tallmon et al., 2004), as was observed for Florida panthers and Mexican wolves. Forthcoming analysis may be able to distinguish between these potential causes for the Isle Royale population.

4.3. Mitigation

The effects of genetic deterioration might be mitigated by gene flow from non-related wolves raising the question of whether mitigation should be attempted. Because wolves often kill non-territorial wolves, such mitigation could be technically challenging. However, the appropriateness of such mitigation also depends on important, unresolved ethical issues. Peterson (1995) discusses some of these issues to better understand the appropriateness of reintroduction should Isle Royale wolves go extinct. That discussion focused on (i) the aesthetic and scientific values of perpetuating a predator–prey system largely unaffected by humans, and (ii) how to balance mandates associated with Isle Royale's designation as US Federal Wilderness, which values minimizing human intervention but also values actively mitigating past anthropogenic effects.

Peterson (1995) took for granted the appropriateness of not intervening while wolves persisted in order to maximize the prospect of improved scientific understanding of population viability in small populations. Assessing the appropriateness of this position now seems complicated by several new considerations. First, we now know genetic deterioration has at least compromised the anatomy of these wolves. Given current knowledge about population viability and the non-experimental circumstances characterizing Isle Royale, as much scientific insight might be gained by assessing the potential effects of genetic rescue as from continuing to observe the effects of population isolation.

Second, the potential benefits of gene flow to wolves may be unexpectedly detrimental to the viability of wolf–moose interactions on Isle Royale. That is, because ticks and other factors associated with climate warming have recently increasingly impacted moose (Vucetich and Peterson, 2008), a more vigorous wolf population could be importantly detrimental to moose. Third, genetic deterioration now seems to have been causing individual wolves to suffer – suffering that might be mitigated by intervention. Any decision about intervening on Isle Royale seems to involve balancing the value of basic scientific knowledge, health of ecological collectives (i.e., population viability and ecosystem health), the welfare of individual animals, and what is taken to be a virtue for wilderness areas, non-intervention (see Vucetich and Nelson,

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2007). In this way, the Isle Royale case is an example of a general and profound challenge for environmental ethics.

4.4. Conservation implications

Attitudes that downplay the threats posed by genetic deterioration seem associated with a set of beliefs. The first of these beliefs seem to be that the consequences of genetic deterioration are serious, but only for the very smallest populations. More specifically, concern for genetic viability is relatively unimportant for populations large enough to be considered viable when demographic concerns are taken into account. This overly simple conception has roots extending back to ideas presented in Lande (1988). Second, that effects of genetic deterioration would be detrimental should they arise, but that risk is relatively small. Being of small risk, its expected cost (invoking the parlance of risk analysis) is small compared to the social and financial costs (which would be large and certain) for recovering or maintaining populations to sizes that would ensure genetic viability.

The justifications offered to support these beliefs include: (i) arguments that demographic factors are a greater threat to viability than genetic factors (e.g., Lande, 1988), (ii) purging mitigates inbreeding depression (Templeton and Read, 1984; Shields, 1993), (iii) the perceived lack of examples where genetic deterioration has affected viability or caused extinction (e.g., Caro and Laurenson, 1994; Caughley, 1994; Maehr and Caddick, 1995), and (iv) taking the existence of small, isolated populations as evidence that such populations are viable, demographically and genetically (e.g., Fritts and Carbyn, 1995; Wehausen, 1999; Fuller et al., 2003).

Unfortunately, these justifications refer to outdated literature or fallacious reasoning. For example, purging is now understood to be unreliable for mitigating inbreeding depression (Boakes et al., 2007; see also Lynch and Walsh, 1998). Also, the rarity of populations identified with inbreeding depression is not evidence for inbreeding depression's rarity, but evidence for the difficulty of detecting inbreeding depression. The detection of inbreeding depression is favored by experimental control, replication, and precise measurement of fitness-related traits over a sufficiently long period of time. These conditions characterize the investigation of few free-ranging populations. Finally, counterexamples (i.e., the existence of small, isolated populations) are not evidence for the viability of small populations. Empirical experiments and mathematical analyses clearly indicate that, even when inbreeding depression is generally important, the magnitude and timing of inbreeding depression is highly variable among species and even among populations within the same species (e.g., Lynch, 1988; Lacy et al., 1996; Vucetich and Waite, 1999). Counterexamples also exist because, for any specified extinction risk (i.e., probability of extinction over some time frame), the realized time to extinction is highly variable (Vucetich and Waite, 1998). These sources of variation and the difficulty of detecting the effects of genetic deterioration are the explanation for counterexamples.

Despite these explanations, apparent counterexamples are still used to buoy arguments that downplay the effects of genetic deterioration. The findings of this paper remove one more example that some use to make poor arguments that have the effect of working against conservation.

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References

Aspi, J., Roininen, E., Ruokonen, M., Kojola, I., Vilá, C., 2006. Genetic diversity, population structure, effective population size and demographic history of the Finnish wolf population. Molecular Ecology 15, 1561–1576.

Berzon, J.L., Dueland, R., 1979. Cauda equina syndrome: pathophysiology and report of seven cases. Journal of the American Animal Hospital Association 15, 635–643.

Boakes, E.H., Wang, J., Amos, W., 2007. An investigation of inbreeding depression and purging in captive pedigreed populations. Heredity 98, 172–182.

Boitani, L., 2003. Wolf conservation and recovery. In: Mech, L.D., Boitani, L. (Eds.), Wolves: Behavior, Ecology and Conservation. University of Chicago Press, Chicago, pp. 317–340.

Breit, S., Künzel, W., 1998. Osteologische Besonderheiten an Wirbelsäulen von Rassehunden: eine röntgenologische und morphologische studie. Wiener Tierärztliche Monatsschrift 85, 340–350 (in German).

Caro, T.M., Laurenson, M.K., 1994. Ecological and genetic-factors in conservation – a cautionary tale. Science 263, 485–486.

Caughley, G., 1994. Directions in conservation biology. Journal of Animal Ecology 63, 215–244.

Damur Djuric, N., Steffen, F., Hässig, M., Morgan, J.P., Flückiger, M.A., 2006. Lumbosacral transitional vertebrae in dogs: classification, prevalence, and association with sacroiliac morphology. Veterinary Radiology & Ultrasound 47, 32–38.

Drögemüller, C., Distl, O., 2006. Genetic analysis of syndactyly in German Holstein cattle. The Veterinary Journal 171, 120–125.

Ekström, S., 1999. Sammanhållen rovdjurspolitik, SOU 1999:146. Fakta Info Direkt, Stockholm (in Swedish).

Fallon, S., 2007. Genetic data and the listing of species under the US Endangered Species Act. Conservation Biology 21, 1186–1195.

Flückiger, M.A., Damur Djuric, N., Hässig, M., Morgan, J.P., Steffen, F., 2006. A lumbosacral transitional vertebra in the dog predisposes to Cauda Equina syndrome. Veterinary Radiology & Ultrasound 47, 39–44.

Fossey, D., 1983. Gorillas in the Mist. Houghton Mifflin, Boston.

Fredrickson, R.J., Siminski, P., Woolf, M., Hedrick, P.W., 2007. Genetic rescue and inbreeding depression in Mexican wolves. Proceedings of the Royal Society of London Series B 274, 2365–2371.

Fritts, S.H., Carbyn, L.N., 1995. Population viability, nature reserves, and the outlook for gray wolf conservation in North America. Restoration Ecology 3, 26–38.

Fuller, W.A., 1987. Measurement Error Models. John Wiley & Sons, NY.

Fuller, T.K., Mech, L.D., Cochrane, J.F., 2003. Wolf population dynamics. In: Mech, L.D., Boitani, L. (Eds.), Wolves: Behavior, Ecology and Conservation. University of Chicago Press, Chicago, pp. 161–191.

Gilbert, B.M., 1997. Mammalian Osteology. Missouri Archaeological Society (Library of Congress Cataloging-in-Publication Data).

Gul, D., Oktenli, C., 2002. Evidence for autosomal recessive inheritance of split hand/split foot malformation: a report of nine cases. Clinical Dysmorphology 11, 183–186.

Hedrick, P.W., Kalinowski, S.T., 2000. Inbreeding depression in conservation biology. Annual Review of Ecology and Systematics 31, 139–162.

Jamieson, I.G., 2007. Has the debate over genetics and extinction of island endemics truly been resolved? Animal Conservation 10, 139–144.

Junge, R.E., Muhlbauer, M., Haines, V., West, G., 2001. Clinical challenge. Transitional vertebra at the lumbosacral junction. Journal of Zoo and Wildlife Medicine 32, 87–88.

Keller, L.F., Waller, D.M., 2002. Inbreeding effects in wild populations. Trends in Ecology & Evolution 17, 230–241.

Kirkpatrick, M., Jarne, P., 2000. The Effects of a Bottleneck on Inbreeding Depression and the Genetic Load. The American Naturalist 155, 154–167.

Lacy, R.C., Alaks, G., Walsh, A., 1996. Hierarchical analysis of inbreeding depression in *Peromyscus polionotus*. Evolution 50, 2187–2200.

Lande, R., 1988. Genetics and demographic in biological conservation. Science 241, 1455–1460.

Larsen, J.S., 1977. Lumbosacral transitional vertebrae in the dog. Journal of the American Veterinary Radiology Society 18, 76–79.

Liberg, O., Andrén, H., Pedersen, H.C., Sand, H., Sejberg, D., Wabakken, P., Åkesson, M., Bensch, S., 2005. Severe inbreeding depression in a wild wolf (*Canis lupus*) population. Biology Letters 1, 17–20.

Lynch, M., 1988. Design and analysis of experiments on random drift and inbreeding depression. Genetics 120, 791–807.

Lynch, M., Walsh, B., 1998. Genetics and Analysis of Quantitative Traits. Sinauer Associates, Sunderland, Massachusetts.

Maehr, D.S., Caddick, G.B., 1995. Demographics and genetic introgression in the Florida panther. Conservation Biology 9, 1295–1298.

Morgan, J.P., 1968. Congenital anomalies of the vertebral column of the dog: a study of the incidence and significance based on a radiographic and morphologic study. Journal of the American Veterinary Radiology Society 9, 21–29.

Morgan, J.P., 1999. Transitional lumbosacral vertebral anomaly in the dog: a radiographic study. Journal of Small Animal Practice 40, 167–172.

Morgan, J.P., Bahr, A., Franti, C.E., Bailey, C.S., 1993. Lumbosacral transitional vertebrae as a predisposing cause of cauda equina syndrome in German shepherd dogs: 161 cases (1987–1990). Journal of the American Veterinary Medical Association 202, 1877–1882.

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Morgan, J.P., Wind, A., Davidson, A.P., 1999. Bone dysplasias in the labrador retriever: a radiographic study. Journal of the American Animal Hospital Association 35, 332–340.
Morgan, J.P., Wind, A., Davidson, A.P., 2000. Lumbosacral disease. In: Morgan, J.P. (Ed.), Hereditary Bone and Joint Disease in the Dog. Schlütersche, Hannover, Germany, pp. 209–229.
Naruse, T., Takahara, M., Takagi, M., Ogino, T., 2007. Early morphological changes leading to central polydactyly, syndactyly, and central deficiencies: an experimental study in rats. Journal of Hand Surgery-American 32, 1413–1417.
Newitt, A., German, A.J., Barr, F.J., 2008. Congenital abnormalities of the Feline vertebral column. Veterinary Radiology & Ultrasound 49, 35–41.
Nunney, L., 1996. The influence of variation in female fecundity on effective population size. Biological Journal of the Linnean Society 59, 411–425.
Peterson, R.O., 1995. The Wolves of Isle Royale: A Broken Balance. Willow Creek Press, Minoqua, Wisconsin.
Peterson, R.O., Thomas, N.J., Thurber, J.M., Vucetich, J.A., Waite, T.A., 1998. Population limitation and the wolves of Isle Royale. Journal of Mammalogy 79, 828–841.
Räikkönen, J., Bignert, A., Mortensen, P., Fernholm, B., 2006. Congenital defects in a highly inbred wild wolf population (*Canis lupus*). Mammalian Biology 71, 65–73.
Regeringens proposition., 2000. Sammanhållen rovdjurspolitik, prop. 2000/01:57. Riksdagens tryckeriexpedition, Stockholm (in Swedish).
Richards, M.W., Watson, A.G., 1991. Development and variation of the lateral vertebral foramen of the atlas in dogs. Anatomia Histologia Embryologica 20, 363–368.
Roelke, M.E., Martenson, J.S., ÓBrien, S.J., 1993. The consequences of demographic reduction and genetic depletion in the endangered Florida panther. Current Biology 3, 340–350.
Searle, A.G., 1954. Genetical studies on the skeleton of the mouse. IX. Causes of skeletal variation within pure lines. Journal of Genetics 52, 68–102.
Shields, W.M., 1993. The natural and unnatural history of inbreeding and outbreeding. In: Thornhill, N.W. (Ed.), The Natural History of Inbreeding and Outbreeding: Theoretical and Empirical Perspectives. University of Chicago Press, Chicago, pp. 143–169.
Simoens, P., DeVos, N.R., Lauwers, H., Nicaise, M., 1983. Numerical vertebral variations and transitional vertebrae in the goat. Zentralblatt für Veterinärmedizin. Reihe C, Anatomia, Histologia, Embryologia 12, 97–103.
Spielman, D., Brook, B.W., Frankham, R., 2004. Most species are not driven to extinction before genetic factors impact them. Proceedings of the National Academy of Sciences of the United States of America 101, 15261–15264.
Steffen, F., Berger, M., Morgan, J.P., 2004. Asymmetrical, transitional, lumbosacral vertebral segments in six dogs: a characteristic spinal syndrome. Journal of the American Animal Hospital Association 40, 338–344.
Tallmon, D.A., Luikart, G., Waples, R.S., 2004. The alluring simplicity and complex reality of genetic rescue. Trends in Ecology and Evolution 19, 489–496.
Templeton, A.R., Read, B., 1984. Factors eliminating inbreeding depression in a captive herd of Speke's gazelle. Zoo Biology 3, 177–199.
US Fish & Wildlife Service., 2000. Proposal to reclassify and delist the gray wolf in the lower 48 states. Federal Registry 65, 43450–43496, 13 July 2000.
Vilá, C., Sundqvist, A.-K., Flagstad, Ø., Seddon, J., Björnerfeldt, S., Kojola, I., Casulli, A., Sand, H., Wabakken, P., Ellegren, H., 2003. Rescue of a severely bottlenecked wolf (*Canis lupus*) population by a single immigrant. Proceedings of the Royal Society of London Series B 270, 91–97.
Vucetich, J.A., Nelson, M.P., 2007. What are 60 warblers worth? Killing in the name of conservation. Oikos 116, 1267–1278.
Vucetich, J.A., Peterson, R.O., 2004a. Long-term population and predation dynamics of wolves on Isle Royale. In: Macdonald, D., Sillero-Zubiri, C. (Eds.), Biology and Conservation of Wild Canids. Oxford University Press, Oxford, pp. 285–296.
Vucetich, J.A., Peterson, R.O., 2004b. The influence of prey consumption and demographic stochasticity on population growth rate of Isle Royale wolves, *Canis lupus*. Oikos 107, 309–320.
Vucetich, J.A., Peterson, R.O., 2008. The Wolves of Isle Royale, 2008 Annual Report. Michigan Technological University, Houghton, Michigan, USA.
Vucetich, J.A., Waite, T.A., 1998. On the interpretation and application of mean times to extinction. Biodiversity and Conservation 7, 1539–1547.
Vucetich, J.A., Waite, T.A., 1999. Erosion of heterozygosity in fluctuating populations. Conservation Biology 13, 860–868.
Vucetich, J.A., Peterson, R.O., Nelson, M.P., in press. Will the future of Isle Royale wolves and moose always differ from our sense of their past? In: Musiani, M., Boitani, L., Paquet, P. (Eds.), The World of Wolves: New Perspectives on Ecology, Behaviour and Policy. University of Calgary Press.
Wayne, R.K., Lehman, N., Girman, D., Gogan, P.J.P., Gilbert, D.A., Hansen, K., Peterson, R.O., Seal, U.S., Eisenhawer, A., Mech, L.D., Krumenaker, R.J., 1991. Conservation genetics of the endangered Isle Royale gray wolf. Conservation Biology 5, 41–51.
Wegner, R.N., 1959. Lumbosacrale Übergangswirbel bei einer Gabelantilope. Anatomischer Anzeiger 107, 279–290 (in German).
Wehausen, J.D., 1999. Rapid extinction of mountain sheep populations revisited. Conservation Biology 13, 378–384.
Wilmers, C.C., Post, E.S., Peterson, R.O., Vucetich, J.A., 2006. Predator disease outbreak modulates top-down, bottom-up and climatic effects on herbivore population dynamics. Ecology Letters 9, 383–389.
Winckler, G., 1949. Contribution à l'étude du sacrum irregulier et asymmétrique chez certains mammifères et chez l'homme. Archives d'Anatomie, d'Histologie et d'Embryologie Strasbourg 32, 182–200 (in French).

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The Northern Rocky Mountain Gray Wolf Is Not Yet Recovered

BRADLEY J. BERGSTROM, SACHA VIGNIERI, STEVEN R. SHEFFIELD, WES SECHREST, AND ANNE A. CARLSON

Without seeking independent scientific review, Interior Secretary Ken Salazar recently approved a 14 January 2009 Bush administration rule to remove endangered species protection from the northern Rocky Mountain (NRM) Distinct Population Segment (DPS) of gray wolves less than 14 years after their reintroduction to Idaho and Wyoming. The "delisting" rule does not adequately address lack of genetic connectivity between Yellowstone wolf packs and other NRM populations, for which reason a federal court overturned the 2008 predecessor of the rule. The US Fish and Wildlife Service defies its own policies by delisting the Idaho and Montana portions of the DPS while Wyoming wolves remain endangered. Criteria for this delisting are inconsistent with prior delistings of recovered birds and mammals. New scientific understanding of species recovery argues for a higher delisting threshold for the NRM gray wolf metapopulation. Finally, we argue that ecosystem recovery should be a recovery criterion for this unique keystone predator.

Keywords: northern Rocky Mountain gray wolf, Endangered Species Act, US Fish and Wildlife Service, genetic connectivity, population viability analysis

Barack Obama, president of the United States, has promised to let scientific facts, unclouded by politics or ideology, guide his administration's environmental policy decisions. As scientists, we applaud this promise. We believe that Interior Secretary Salazar broke that promise, however, with his 6 March 2009 endorsement—without further independent scientific review—of a politically motivated Bush administration decision to remove protection for an endangered species. Since its preplanning stages in the 1980s, the 1995–1996 reintroduction of the extirpated gray wolf (*Canis lupus*) in Yellowstone National Park (YNP) and parts of Idaho, and its subsequent recolonization of surrounding ecosystems within a portion of the northern Rocky Mountain (NRM) Distinct Population Segment (DPS), has been embroiled in regional and state politics, with powerful special interests opposing the return of this native species. In this article we make the case that the current delisting rule for the NRM gray wolf is premature and inadequate because it (a) is not based on the best available science, (b) is insufficient for maintaining a viable metapopulation, (c) violates the policies of the US Fish and Wildlife Service (USFWS) on DPSs, and (d) does not address deficiencies in state management plans that leave wolf populations at risk.

A brief history of the restoration and delisting of the NRM gray wolf

In the 1970s, 40 years after wolves were extirpated in the western United States, naturally dispersing gray wolves from Canada began to colonize northwestern Montana. These populations were immediately protected under the 1973 Endangered Species Act (ESA; 16 U.S.C. 1531–1544, 87 Stat. 884), joining those in northeastern Minnesota as the only extant gray wolves in the contiguous United States. Over the next decade, widespread public support for reintroducing the only native large mammal missing from America's first national park induced the USFWS to develop a plan to reintroduce gray wolves to YNP. Because wolf reintroduction was strongly opposed by some powerful public-lands user groups—primarily those with interests in ranching and hunting—and by state legislators in the region, the USFWS's proposal included liberal lethal control measures and designation of these wolves as a "non-essential experimental population." In 1987, in order to facilitate acceptance of wolf reintroduction amid strong opposition, the USFWS set recovery goals of only 10 packs (or breeding pairs) and 100 animals in each of the three states surrounding YNP. These numbers were based not on scientific data or population

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viability analysis but on the "opinions of recovery team members" (USFWS 1987, 2009a). The numbers were subsequently "validated" by a 1992 questionnaire sent to biologists asking whether 10 breeding pairs sustained for three consecutive years in a state constituted "a viable population" (EIS 1994).

Once reintroduced into central Idaho and YNP in 1995–1996, wolves expanded quickly into vast areas of federal land in the Greater Yellowstone Ecosystem (GYE) with large populations of ungulate prey; YNP alone had more than 19,000 elk (*Cervus elaphus*) at one census prior to wolf reintroduction (Smith et al. 2003). By 2001, the gray wolf population of Wyoming, Montana, and Idaho had grown to 550, of which 80 were in the naturally colonized area of northwestern Montana. Five years later, the NRM population had grown to 1300; nearly half of the wolves were in central Idaho (USFWS 2009b), where a single, contiguous, roadless expanse of 13,000 square kilometers (km^2)—an area larger than the GYE—forms the core of the federal public lands comprising 63 percent of Idaho.

By the end of 2008, the USFWS (2009a) claimed that the NRM wolf population had exceeded minimum recovery goals (300 wolves, overall, in the 250,000 km^2 core recovery area, which is a fraction of the area of the NRM DPS) for nine consecutive years, and now exceeded minimum goals fivefold. In this claim, the USFWS shifted the original goalposts of 10 pairs per state sustained for three years (see above); in fact, the northwestern Montana population first reached this minimum in 2007. The lack of rigorous scientific analysis supporting the original population thresholds was not considered in this conclusion, nor was the equally important original goal of genetic connectivity among subpopulations—"The importance of movement of individuals between sub-populations cannot be overemphasized" (EIS 1994, p. 42)—which had not been achieved between the isolated YNP wolf packs and the rest of the DPS (VonHoldt et al. 2008). Without demonstrating the presence of genetic exchange among subpopulations in the putative DPS (a requirement for metapopulation function and prevention of isolation effects; Hedrick 1996), the USFWS had no legal or biological claim that the DPS was validly defined for delisting under the ESA.

The Bush administration delisted the NRM gray wolf in March 2008, but the US District Court in Montana reinstated ESA protections in July 2008 (*Defenders of Wildlife v. Hall*, 565 F. Supp. 2d 1160 [D. Mont. 2008]), declaring the delisting rule illegal under the ESA and the 1994 Wolf Recovery Plan written by the USFWS. The judge emphasized that genetic connectivity had not been reestablished. On 14 October 2008, the federal court approved the USWFS request to vacate the delisting rule and remanded it to the USFWS for further consideration. The USFWS then proposed a nearly identical rule on 14 January 2009. Minimum recovery goals had increased, arbitrarily, to 15 packs and 150 animals in each of the three states (USFWS 2009a). Secretary Salazar, surprisingly, after a month in office and on the advice of USFWS acting director Rowan W. Gould, published the final delisting rule without seeking public comment or an independent scientific review of it, despite some modifications to the Bush administration–era plan. The final delisting rule became effective 4 May 2009 (USFWS 2009a).

Politics trumps science in arbitrary definition of DPS

The USFWS is disregarding much current scientific research, and its own precedents, in its rush under Secretary Salazar to delist the gray wolf in Idaho and Montana, while admitting that wolves in the Wyoming portion of the DPS are not recovered. Political pressure to control and even reduce current wolf populations is strong in all three states. The USFWS feels it has a solid case for rejecting only Wyoming's wolf management plan, but in a 2004 letter the agency itself ruled as illegal the option of proceeding with a partial delisting before the entire DPS was recovered. The Wyoming management plan allows wolves to be shot on sight in most of the state outside national parks, a practice the USFWS has concluded will put wolves at risk of extirpation in Wyoming. Besides being biologically indefensible, using political boundaries both to define a DPS and to subdivide it for delisting has been ruled illegal in previous court cases (*Defenders of Wildlife v. Secretary, US Department of Interior*, 354 F. Supp. 2d 1156 [D. Oreg. 2005]); moreover, it violates the USFWS's own precept that DPS boundaries be "supported by sound biological principles." An unintended consequence of the sudden change in status across state lines will most likely be the shooting of "protected" wolves from Wyoming, and indeed from the YNP, as soon as they cross into Idaho or Montana (see box 1). Protected dispersal corridors are not explicitly defined in this rule, either for the protection of Wyoming wolves or for the facilitatation of genetic exchange, which the USFWS acknowledges is vital for the long-term viability of wolf populations (USFWS 2009a).

In announcing the delisting rule, Secretary Salazar stated that Idaho and Montana should not be "punished" for Wyoming's failure to produce a viable wolf management plan (Schneider 2009), which implies, of course, that hosting an endangered species living mostly on federal public lands in the northern Rockies is forced punishment on a state. The governors and state congressional delegations from Idaho and Montana hailed the decision and praised Salazar; Wyoming's reaction was a comparatively restrained show of displeasure at their continuing so-called punishment.

Delisting rule ignores the lack of genetic connectivity

The court ruled that the Bush administration's 2008 delisting plan was biologically indefensible: Plaintiffs had proved that the YNP population was genetically isolated and would suffer decline as a result of inbreeding, and the USFWS acknowledged the point (*Defenders of Wildlife v. Hall*). Recent studies suggest that extinction risk from inbreeding depression and the loss of genetic diversity generally has been underestimated in recovery planning (Frankham 2005). The 2009 delisting rule for the gray wolf differs from its predecessor in two respects: (1) Wyoming has been excluded from the

delisting, and (2) the USFWS proposes to facilitate genetic exchange among isolated populations through vehicular transport of wolves around the DPS (USFWS 2009a). It is biologically indefensible to argue that a species is recovered when its persistence requires such extensive and ongoing human intervention ("human-assisted migration management," in USFWS [2009a] terms). Perhaps more important, recent genetic studies of highly structured metapopulations of gray wolves have shown that adaptation to local ecosystems occurs (Musiani et al. 2007), that dispersal may be limited by climate and habitat (Geffen at al. 2004), and that prey specialization can restrict gene flow (Carmichael et al. 2007). Thus, it is vital that wolves make their own "dispersal decisions"; that is, a natural preselection of suitable migrants is necessary to maintain a proper balance between gene flow and local adaptation.

Box 1. Sound management? Idaho may reduce wolf population by 40 percent in first year.

On 17 August 2009, the Idaho Fish and Game Commission voted 4–3 to set "conservative" harvest limits of 220 wolves for the 2009 hunting season; three commissioners voted to set the quota at 430 wolves (*Idaho Mountain Express and Guide*, 19 August 2009). At the same time, the commission agreed to an eventual reduction to 518 wolves, using methods in addition to hunter harvest. In 2008, 153 wolves were known to have died in Idaho, 108 from lethal control actions (Idaho Progress Report 2008, USFWS 2009a). If a similar number of deaths in 2009 were added to the 220 harvested, 373 wolves could die in Idaho in 2009, which, if the population growth rate were the same as the previous year's (10 percent), would mean a 40 percent population reduction in one year. The commission said it will reconsider its 2009 harvest quotas at its November meeting.

The state of Montana set a 2009 harvest quota of 75 wolves. At the time this article went to press, a lawsuit to overturn the NRM delisting, filed by 14 conservation groups, was pending. An injunction filed by those groups to halt the Idaho and Montana harvests was rejected by the federal district court on 8 September 2009, but in the ruling Judge Molloy implied that the plaintiffs might prevail in their overall suit. He wrote: "The service has distinguished a natural population of wolves based on a political line, not the best available science. That, by definition, seems arbitrary and capricious" (*New York Times*, 10 September 2009).

The fallacy of assuming that Wyoming wolves remain protected, given the lack of buffer zones around Yellowstone National Park in state wolf hunts, came into sharp focus this autumn. An early hunt in Montana's Absaroka-Beartooth Wilderness just north of Yellowstone resulted in the deaths of 6 members of the "Cottonwood Pack," which was central to a long-term study of one of the last remaining unharvested gray wolf populations, and whose territory was 95 percent inside park boundaries. These wolves took only wild prey. On 3 October 2009, the radio-collared alpha female of that pack, who had provided crucial data for five of her seven years of life, was killed by a hunter (Morrell 2009).

Nascent success of wolf restoration may be stalled to placate grazing interests

The premature delisting decision and the definition of the delisted DPS along boundaries of political convenience, which include vast areas of suitable habitat (Carroll et al. 2006) currently unoccupied by wolves (figure 1), run counter to the stated purpose of the ESA: "to provide a means whereby the ecosystems upon which endangered species... depend may be conserved." The success of NRM wolf reintroduction to date is a triumph and a credit to USFWS and state and National Park Service biologists, but the serious compromises to the initial recovery plan and goals, including liberal lethal control and "non-essential experimental status," were made not on the basis of scientific evidence of species recovery but rather on the politics of livestock ranching. The argument that a healthy wolf population will cause significant loss of livestock is not supported when the numbers are examined.

Across the three-state NRM region in 2008, biologists documented that wolves killed 214 cattle, 355 sheep, 28 goats, 21 llamas, 10 horses, and 14 dogs; but the same year, a single severe storm killed more than 1200 calves and lambs (USFWS 2009a). A recent study found that only 3 percent of all livestock losses in the northern Rockies were due to all native predators combined (Van Camp 2003). Worldwide, livestock losses to wild canids generally total less than 2 percent of all losses in a given year, regardless of canid population densities (Alderton and Tanner 1994). Records compiled by the

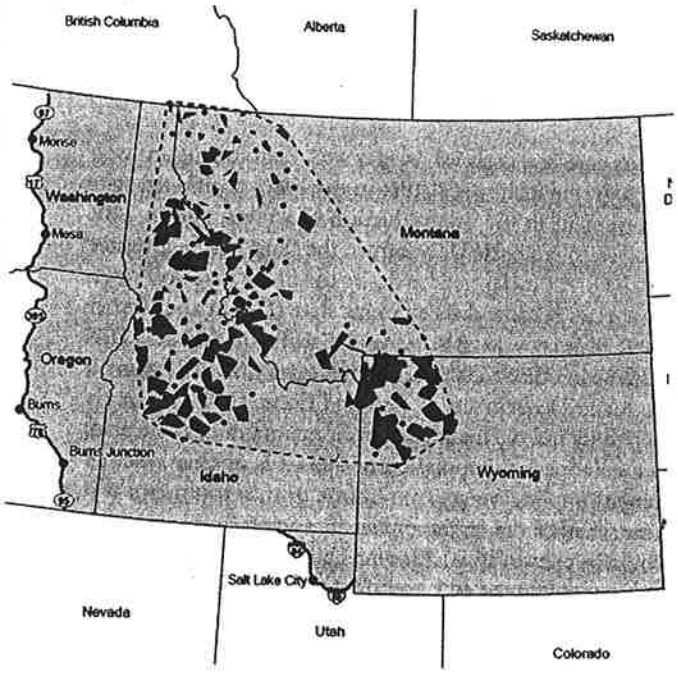

Figure 1. Boundaries of the Northern Rocky Mountain Distinct Population Segment (NRM DPS) as identified in the April 2009 delisting rule for the gray wolf (gray shading); distribution map of existing wolf packs as of 2007 (dark polygons); and location of core recovery area (dashed line) as published in the Federal Register *(USFWS 2009b).*

Montana Department of Livestock show that in 2002, Montana's 108 wolves caused less than 0.000008 percent of total livestock losses in the state (including weather, disease, and other causes; Van Camp 2003). In Idaho in 2001, 10 cattle and 54 to 62 sheep were killed by wolves, whereas 2600 cattle and 11,600 sheep were killed by other predators—60 percent of the latter being coyotes (*Canis latrans*) and 9 percent being domestic dogs (*Canis lupus familiaris*), compared with about 0.005 percent killed by wolves (Van Camp 2003).

In fact, domestic dogs commit substantially more depredation on livestock than wolves in many parts of the world where they co-occur (Francis 2004). Wolves in YNP (Berger et al. 2008) and elsewhere (Fuller and Keith 1981) have been shown to suppress coyote populations and increase the relative proportion of carrion in coyote diets, so it is quite plausible that reducing wolf densities could trigger mesopredator release (Crooks and Soulé 1999, Prugh et al. 2009) and actually increase overall depredation of livestock by coyotes.

The cost to federal and state agencies to investigate NRM wolf killings and to destroy 246 suspect wolves in 2008 was about $1 million. From the start of wolf recovery programs in the region through July 2009, a compensation program funded largely by Defenders of Wildlife has awarded livestock owners $1,341,558 in restitution for wolf depredation (USFWS 2009a). In a recent survey, roughly equal majorities of ranchers identified themselves as "very concerned" about both wolf depredation and transmittal of brucellosis to their stock from wild elk (Stronena et al. 2007). This divided concern reveals an unmet need for public education in wildlife management—wolves, which preferentially prey on old and diseased elk (Wright et al. 2006), are in fact strong allies in controlling ungulate disease.

Idaho's equivocal goals for the gray wolf. Epitomizing antiwolf ideology, the Idaho legislature in the 1980s prohibited state involvement in the reintroduction of wolves, and in 2001 resolved to eradicate wolves from the state. Idaho governor Butch Otter proclaimed his desire to kill the first wolf when the species became delisted in his state (Brown and Flesher 2009). Idaho now has 846 of the 1645 wolves in the NRM DPS (table 4b in USFWS 2009a [2008 Interagency Annual Report]); the Idaho Department of Fish and Game (IDFG) recently revised its management plan from maintaining 104 wolves to a new "target" population of 500 (it is unclear whether "target" implies average, minimum, or maximum; nor is it clear whether the target applies to a winter census, which would be conservative). Montana has committed to a target wolf population of 400, and the USFWS itself promises to maintain, at minimum, 300 wolves in Wyoming (USFWS 2009a). Salazar's decision to uphold the Bush administration's delisting of the NRM gray wolf will entrust the conservation of more than half the recovering population of wolves to the state of Idaho, whose legislature and chief executive oppose the very principle of wolf restoration. Despite Idaho and Montana's newly promised target populations of several hundred individuals, each state must maintain only 150 wolves in 15 packs to forestall USFWS relisting under the ESA. When the Bush administration first delisted the NRM gray wolf DPS in March 2008, 100 wolves were slaughtered in 112 days (USFWS 2009a [2008 Interagency Annual Report]); should the current harvest scenario follow suit—as is likely—the current populations will decline to the minimal limits within three years (see box 1).

Recovery goals should be updated with new science and data

Recent genetic studies have estimated that 380,000 gray wolves populated the western contiguous United States and Mexico before European settlement (Leonard et al. 2005). By 1930, western US gray wolves had been extirpated, resulting in a 50 percent loss of genetic diversity (Leonard et al. 2005) from pre-extirpation levels. Thus, western wolves have been declared recovered with a population that is less than 1 percent of its original size, and with drastically depleted genetic diversity. This loss of genetic variation is essentially permanent and may in itself reduce the adaptability and viability of the newly founded DPS, even more so if it remains too small to function as a metapopulation. Genetic diversity was never considered in the original recovery goals, which is a significant failure even if it is twice as high as we now know it to be (see Frankham 2005). In light of this new evidence and to avoid further loss of genetic diversity, updated recovery goals should be based on an explicit calculation of the current population's effective population size (N_e, or the number of individuals contributing to the gene pool—which must consider minimum number of breeding pairs, spatial dispersion, dispersal and other factors, and can be a small fraction of the census population; Hedrick 1996).

Whether populations are reduced to the legal minimum of 300 wolves in Idaho and Montana or to 900, as those states now promise (including the Wyoming wolves under USFWS management, the legal minimum would be 600 and the promised minimum 1200), we maintain that both the initial recovery goals and the goals of the state management plans are unrealistically low for full recovery, which must include reintegration of wolf populations into ecosystems across the region.

Culling this recovering population will put it at demographic risk. Although 1600 wolves may possibly allow adequate connectivity and genetic exchange to sustain the metapopulation, the population numbers proposed under Idaho and Montana's management plans do not. The best-case scenario is the loss of nearly half the population—a substantial population bottleneck (Hedrick 1996). Furthermore, the pack structure of wolves, which in general is one breeding pair per family group, means that the N_e is considerably fewer than the census number. The unregulated harvests allowed under the proposed management plans will disrupt pack structure, which can lead to inbreeding (VonHoldt et al. 2008) and the loss of dispersing individuals, thus further minimizing connectivity and gene flow.

These genetic and structural factors alone could eventually cause the decline of the NRM population, but the wolf-culling levels proposed by Idaho and Montana will directly cause an even more rapid, unsustainable decline. We conducted simple population viability analyses with the program Vortex (Lacy 1993), using the approximate NRM population sizes (1500 in NRM, 150 in YNP), proposed best-case harvest levels (600 animals across the management unit without regard to sex or age of animals taken), and well-documented gray wolf natural history (single litter, mean of six pups per year; Mech 1974). We varied several parameters (age distribution, breeding pool, total percentage of breeding wolves, dispersal survival, age at mortality, and percentage dispersing between NRM and YNP), from realistic and conservative values to extremely liberal (in terms of facilitating persistence) and unrealistic values. In 100 percent of 10,000 simulations for all conditions, the population declined, effectively, to extinction (i.e., 100 individuals, a size well below the 450 at which the DPS would need to be relisted) in less than 10 years.

An ecosystem recovery cascade has begun but will not be sustained. More than two-thirds of the NRM DPS is uninhabited by gray wolves (figure 1). Calling for higher recovery goals and recovery over a larger area within the DPS is justified not only because the wolf population is neither genetically nor demographically viable under state management plans but also because the trophic cascade triggered by successful reestablishment of the top predator has already proved to restore degraded ecosystems. In YNP, the reintroduction of wolves has led to restoration of riparian habitat and beaver-pond communities (Ripple and Beschta 2003), aspen forests (Ripple and Beschta 2007), and songbird assemblages (Berger et al. 2001). The recolonization of gray wolves in Banff, Canada, produced similar ecosystem benefits (Hebblewhite et al. 2005), and such benefits have been attributed to other mammalian carnivores worldwide. Further, gray wolves have been shown to buffer the effects of climate change, specifically on carrion availability in YNP (Wilmers and Getz 2005).

These restoration effects were seen in YNP ecosystems when the wolf population reached its "ecologically effective" density (Soulé et al. 2005) of 16 per 1000 km^2 throughout the park's 8980 km^2 (Ripple and Beschta 2004), although the density of wolves in prime habitats of YNP's northern range had already reached 50 per 1000 km^2 by 2002 (Smith et al. 2003). The current density of wolves throughout the NRM DPS is about 5.5 wolves per 1000 km^2 (Carroll et al. 2006); if reduced to 150 in each of three states, it would be 1.6 per 1000 km^2. In contrast, Minnesota's postdelisting management plan precludes hunting and trapping for at least five years after delisting and calls for a minimum wolf population of 1600, which is 18 wolves per 1000 km^2 (MDNR 2001). A similar density of wolves, well-distributed across 277,377 km^2 of suitable habitat in the NRM DPS (Carroll et al. 2006), would equal a metapopulation exceeding 17,000. This does not include some suitable habitat in areas of Oregon, Washington, Utah, and Colorado that are outside the arbitrarily drawn DPS boundaries. Utah and Colorado alone could support an estimated 1600 wolves (Carroll et al. 2006).

The ESA's stated purpose is ecosystem conservation, and evidence is plentiful that restoration of this once-extirpated keystone predator is effecting ecosystem recovery in the NRM DPS. We believe that the wolf management plans put forth by Idaho and Montana will so deplete the numbers of gray wolves that they will no longer be able to serve as an ecologically effective keystone predator. Soulé and colleagues (2005) recommend that ecological effectiveness be made one criterion for recovery planning and argue that the authority to do so resides within the ESA. Carroll and colleagues (2006) argue that the gray wolf, which has been shown to exert strong top-down controls within ecosystems, is an ideal candidate for use of this criterion. We agree, and we further emphasize that determining ecologically effective densities is a much more scientifically robust method for establishing recovery goals than is opinion polling of recovery team members, the starting point for the USFWS's 1987 recovery plan.

If the NRM gray wolf loses ESA protection permanently and harvesting reduces the population to minimum legal levels, it will very likely decline rapidly to the point where it will, by federal law, require relisting. This will result in a genetically depleted, small, and ineffective population in terms of ecosystem function. Recovery of such a population then will require a substantial and unnecessary additional expense—the federal government has already spent an estimated $30 million for gray wolf recovery efforts in the NRM DPS (USFWS 2009a).

Misguided concern for ungulate populations also drives aggressive state wolf management

There is no biological basis for declaring the NRM wolf DPS recovered, nor is there a wildlife management justification for the scale of the culling proposed by the states following delisting. Statistics from the IDFG show that wolves account for less than 10 percent of elk deaths in Idaho (much less than the number killed by hunters), that hunter harvest rates of elk were higher in 2005 than they were before wolf reintroduction, that elk mortality due to wolf predation is mostly replaceable, and that elk populations generally are at or above management goals, requiring cow harvest in some units (Wright et al. 2006, IDFG 2007). An IDFG press release in February 2009 reiterated that elk herd numbers had reached or were above management objectives in 26 of 29 hunting districts in Idaho. Further, the idea that wolf control will actually increase adult prey populations remains scientifically unproven. A review of this question completed by the National Academy of Science's Commission on Life Sciences concluded that several specific criteria had to be met for wolf control to affect adult prey populations (NRC 1997). Importantly, one of these was that wolves had to be the dominant predator on all stages of the life cycle of the prey species. In a three-year (2004–2006) study of elk calf mortality in northern Yellowstone, where wolves are particularly

abundant, grizzly bears (*Ursus arctos horribilis*) and black bears (*Ursus americanus*) accounted for 58 to 60 percent of calf deaths, whereas wolves accounted for 14 to 17 percent (Barber-Meyer et al. 2008).

Minnesota wolves appear closer to being recovered

The USFWS also removed the western Great Lakes DPS of the gray wolf from the endangered species list in 2009. We see this DPS—where the amount of federal lands and public-lands grazing is a small fraction of that of the NRM—as a mature analogy to the NRM gray wolf. More than 35 years of protection under the federal ESA allowed the initial population of 350 wolves in Minnesota to increase and disperse to Michigan and Wisconsin, reestablishing sustainable populations in those two states; the regional population of nearly 4000 wolves is much better connected with populations in Canada than is the NRM metapopulation. Reestablishment was a slow and gradual process, taking nearly three times as long as the NRM wolves have been given to disperse across a much larger area (MDNR 2001). Allowing time for natural dispersal to reestablish breeding populations of NRM gray wolves in significant portions of Utah and Colorado, which still lack breeding wolves, or in Oregon, which recorded its first breeding pair in 2009, as well as a broader distribution in Wyoming, Idaho, Washington, and Montana, would enhance natural gene flow and increase the likelihood of long-term recovery of the NRM DPS. Even if that effort is successful, in the western United States the gray wolf will still occupy only a fraction of its historic range (figure 2), with a population two orders of magnitude below historic levels (Leonard et al. 2005).

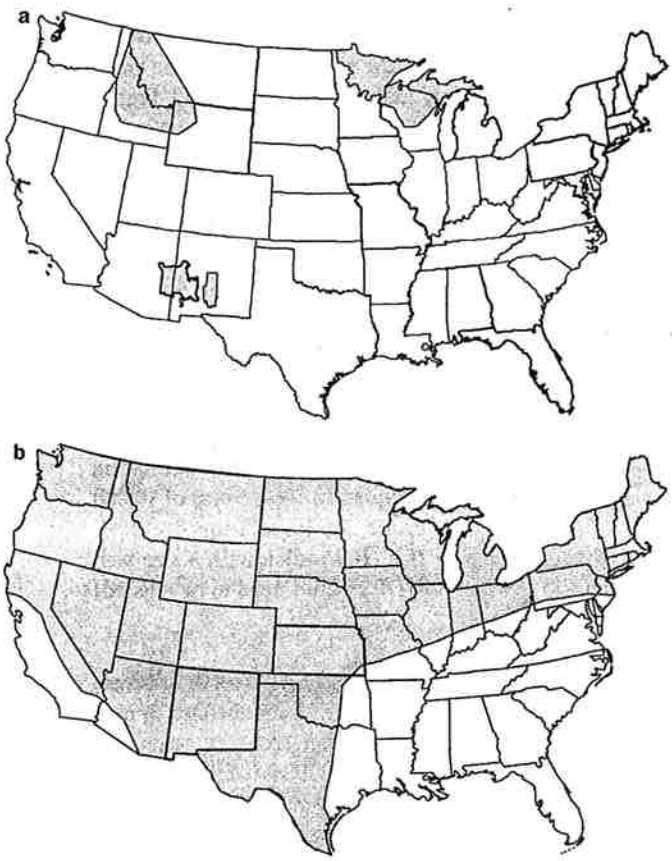

*Figure 2. (a) Current distribution of three populations of gray wolf (Northern Rocky Mountain, NRM; and in clockwise order, Western Great Lakes and Mexican gray wolf) (*Canis lupus baileyi*) in the contiguous United States. Source: USFWS (2009b). (b) Original distribution of the gray wolf (*Canis lupus*) in the contiguous United States. Source: USFWS (2009b).*

What has recovery looked like for other species?

Before the gray wolf delistings, only nine North American species of mammals and birds had been delisted as a result of recovery (table 1; USFWS 2009b). In these delisting cases, the recovered taxa (or DPSs) had achieved one or both of the following: (1) a minimum population of 1000 breeding pairs, or (2) an increasing or stable population well distributed across the majority of the original range of the species. At least six of these delisted species met both criteria. In contrast, the NRM gray wolf will have been recovered over only about 6 percent of its original range (or 26 percent of the DPS area; table 1; figures 1, 2a, 2b). The USFWS (2009a) claims that the currently unoccupied portion of the DPS area lacks enough suitable habitat to support pack persistence—an assertion Carroll and colleagues (2006) dispute—and thus will not be managed to allow wolf colonization. Aggressive wolf control in these areas will make it unlikely that suitable habitat beyond the DPS boundaries will be colonized.

Extrapolating from data on YNP wolf packs showing that there were only six breeding pairs for 124 wolves (NPS 2008), the current NRM metapopulation could have as few as 77 breeding pairs. The USFWS claims there are "about 100 breeding pairs" in the NRM (USFWS 2009a [press release, 14 January 2009]), but extrapolation from the YNP example suggests that even if the states (and the USFWS, in its management of wolves in Wyoming) maintain the targets they promise, there may be as few as 58 breeding pairs following delisting. Of course, only if the NRM gray wolf metapopulation drops below 450 individuals—which could mean as few as 22 breeding pairs—will the requirement for relisting be triggered.

None of the previously delisted species has been subjected to any significant level of purposeful population reduction; in fact, harvest will be allowed for only one of these delisted species (grizzly bear), and that harvest allowance is not expected to reduce the population size (IGBST 2005; see footnote a on table 1). In contrast, we fully expect that the NRM gray wolf population will be substantially reduced from its current level, especially in Idaho. Most of the species delisted before 2007 have increased considerably since delisting (e.g., a several-fold increase in the North American

Table 1. Mammals and birds delisted as a result of recovery.

Species	Taxon delisted	Year	Numbers at time of delisting	Extent of original range occupied	Populations or subspecies still listed as threatened or endangered
Brown pelican (*Pelecanus occidentalis*)	Atlantic and East Gulf coastal populations	1985	17,000 bp	Nearly all	Pacific and western Gulf coast populations[a]
Gray whale (*Eschrichtius robustus*)	Eastern Pacific DPS	1944	Fewer than 17,000 individuals	Nearly all	Western Pacific population
Arctic peregrine falcon (*Falco peregrinus tundrius*)	Subspecies	1944	190 bp	Majority	American peregrine falcon subspecies
American peregrine falcon (*Falco peregrinus amatus*)	Subspecies	1999	1000 bp	Majority	None in North America
Aleutian Canada goose (*Branta canadensis leucopareia*)	Subspecies	2001	Fewer than 20,000 individuals	Nearly all	None
Columbian white-tailed deer (*Odocoileus virginianus leucurus*)	Douglas County, Oregon, DPS	2003	5000 individuals	Nearly all	Columbia River DPS
Grizzly bear (*Ursus arctos horribilis*)	Yellowstone DPS	2007[b]	500 individuals	68%	Other lower 48 populations
Bald eagle (*Haliaeetus leucocephalus*)	Lower 48 populations	2007	About 10,000 bp	Nearly all	Sonoran Desert DPS relisted
Virginia northern flying squirrel (*Glaucomys sabrinus fuscus*)	Narrowly endemic subspecies	2008	Unspecified	Less than 85%	*Glaucomys sabrinus coloratus* subspecies
Gray wolf (*Canis lupus*)	Western Great Lakes DPS	2009	About 4000 individuals	About 30% DPS	Outside DPS boundaries
Gray wolf (*Canis lupus*)	NRM DPS	2009	About 1600 individuals	About 26% DPS; 6% region[c]	Outside DPS boundaries

bp, breeding pairs; DPS, distinct population segment.

a. On 12 November 2009, the Department of the Interior announced it would delist these populations of brown pelican.

b. On 21 September 2009, Federal District Court Judge Donald Molloy overturned the 2007 delisting, citing insufficient state protections and failure of the USFWS to adequately consider the decline of whitebark pine, a key winter food for grizzlies (*Idaho Statesman*, 22 September 2009).

c. The 250,000-square-kilometer core recovery area (CRA) = 26 percent of DPS (land area of Wyoming, Idaho, and Montana, plus portions of Washington, Oregon, and Utah); DPS = 23 percent (CRA = 6 percent) of land area of the US states west of the 97th parallel originally inhabited by non-Mexican subspecies of *Canis lupus* (excludes New Mexico and Arizona).

peregrine falcon population; USFWS 2009b). Meeting the two criteria stated above (a minimum of 1000 breeding pairs and a stable population over most of the original range) was not a coincidence for most of the nine delisted species but was actually a legal requirement of the ESA, which defines as endangered "any species which is in danger of extinction throughout all or a significant portion of its range." A threatened species is "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." Therefore, by law, a species must no longer be at risk of becoming endangered across a significant part—much less a majority—of its range before it can be considered recovered and delisted (Vucetich et al. 2006). In the case of the NRM gray wolf, the state and federal plans have the explicit goal of preventing colonization of areas outside the core gray wolf recovery zone, which certainly equates to a "significant portion of its range" (figures 1, 2b). Given that American society has deemed such a loss unacceptable, as evidenced by the unanimous passage of the ESA by the US Senate in 1973, it has been argued that achieving restoration across a minority of a species' range does not pass the normative test for delisting, regardless of the results of population viability analyses or other scientific data (Vucetich et al. 2006).

Restoring science to its rightful role in environmental policy. In summary, despite the Obama administration's stated intention to ensure the inclusion of science in policy decisions, it appears that in the decision to delist the NRM gray wolf, the USFWS and the new Interior secretary have ignored the best and latest available science, as well as the legal letter and spirit of the ESA. The documented, politically motivated suppression of science in many US government agencies, especially in the USFWS (UCS 2005), should dictate that all decisions made over the last eight years be subject to intense, independent scientific review. In this specific case, there has been no new evidence presented that runs counter to recent court decisions (*Defenders of Wildlife v. Hall*). The administration has not sufficiently reviewed the delisting rule, which is based overwhelmingly on biased state plans and an outdated and inadequate federal plan, claiming that gray wolf recovery has been and will continue to be sufficient. The complex life history, ecology, and important functional role of wolves within the NRM ecosystem preclude a rushed decision on the basis of poor science. Indeed, the ESA requires that a species be restored to its native role within its ecosystems. The United States should provide global leadership in supporting the effective conservation and restoration of native large mammal species, starting with the GYE, one of the

few remaining areas in the world with an intact historical species assemblage and, hence, an intact ecosystem (Morrison et al. 2007). Under this flawed delisting plan, the current status of the NRM gray wolf, both biologically and legally, clearly does not meet the definition of recovery and must be rescinded if President Obama is to keep his promise on science-based environmental policy.

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References cited

Alderton D, Tanner B. 1994. Foxes, Wolves and Wild Dogs of the World. Blanford Press.

Barber-Meyer SM, Mech LD, White PJ. 2008. Elk calf survival and mortality following wolf restoration to Yellowstone National Park. Wildlife Monographs 169: 1–30.

Berger J, Stacey PB, Bellis L, Johnson MP. 2001. A mammalian predator-prey imbalance: Grizzly bear and wolf extinction affect avian Neotropical migrants. Ecological Applications 11: 947–960.

Berger KM, Gese EM, Berger J. 2008. Indirect effects and traditional trophic cascades: A test involving wolves, coyotes, and pronghorn. Ecology 89: 818–819.

Brown M, Flesher J. 2009. Salazar OKs wolf removal from endangered species list. Idaho Statesman 6 March 2009. (9 October 2009; *www.westernwolves.org/index.php/news/32/59/salazar-oks-wolf-removal-from-endangered-species-list*)

Carmichael LE, Krizan J, Nagy JA, Fuglei E, Dumond M, Johnson D, Veitch A, Berteaux D, Strobeck C. 2007. Historical and ecological determinants of genetic structure in Arctic canids. Molecular Ecology 16: 3466–3483.

Carroll C, Phillips MK, Lopez-Gonzales CA, Schumaker NH. 2006. Defining recovery goals and strategies for endangered species: The wolf as a case study. BioScience 56: 25–37.

Crooks KR, Soulé ME. 1999. Mesopredator release and avifaunal extinctions in a fragmented system. Nature 400: 563–566.

[EIS] EIS [Environmental Impact Statement]Team Wolf Scientist and Northern Rocky Mountain Wolf Recovery Coordinator. 1994. Memorandum regarding a viable wolf population in the Northern Rocky Mountains, appendix 9 to Final Environmental Impact Statement: The Reintroduction of Gray Wolves to Yellowstone National Park and Central Idaho, U.S. Department of the Interior Fish and Wildlife Service. (14 October 2009; *www.fws.gov/mountain-prairie/species/mammals/wolf/EIS_1994.pdf*)

Francis M. 2004. Livestock Depredation by Wolves. Wildlife Damage Management, Internet Center for Rocky Mountain Wolf Recovery, Annual Reports. (14 October 2009; *http://digitalcommons.unl.edu/wolfrecovery/16*)

Frankham R. 2005. Genetics and extinction. Biological Conservation 126: 131–140.

Fuller TK, Keith LB. 1981. Non-overlapping ranges of coyotes and wolves in northeastern Alberta. Journal of Mammalogy 62: 403–405.

Geffen E, Anderson MJ, Wayne RK. 2004. Climate and habitat barriers to dispersal in the highly mobile grey wolf. Molecular Ecology 13: 2481–2490.

Hedrick PW. 1996. Genetics of metapopulations: Aspects of a comprehensive perspective. Pages 29–52 in McCullough DR, ed. Metapopulations and Wildlife Conservation. Island Press.

Hebblewhite M, White CA, Nietvelt CG, McKenzie JA, Hurd TE, Fryxell JM, Bayley SE, Paquet PC. 2005. Human activity mediates a trophic cascade caused by wolves. Ecology 86: 2135–2144.

[IDFG] Idaho Fish and Game Department. 2007. Elk PR report, Project W-170-R-31. Progress Report. IDFG.

[IGBST] Interagency Grizzly Bear Study Team. 2005. Reassessing Methods to Estimate Population Size and Sustainable Mortality Limits for the Yellowstone Grizzly Bear. IGBST, US Geological Survey, Northern Rocky Mountain Science Center, Montana State University.

Lacy R. 1993. VORTEX: A computer simulation model for population viability analysis. Wildlife Research 20: 45–65.

Leonard JA, Vila C, Wayne RK. 2005. Legacy lost: Genetic variability and population size of extirpated US grey wolves (*Canis lupus*). Molecular Ecology 14: 9–17.

[MDNR] Minnesota Department of Natural Resources. 2001. Minnesota Wolf Management Plan. Division of Wildlife, MDNR.

Mech D. 1974. *Canis lupus*. Mammalian Species 37: 1–6.

Morrell V. 2009. Research wolves of Yellowstone killed in hunt. Science 326: 506–507.

Morrison JC, Sechrest W, Dinerstein E, Wilcove DS, Lamoreux JF. 2007. Persistence of large mammal faunas as indicators of global human impacts. Journal of Mammalogy 88: 1363–1380.

Musiani M, Leonard JA, Cluff HD, Gates C, Mariani S, Paquet PC, Vilas C, Wayne RK. 2007. Differentiation of tundra/taiga and boreal coniferous forest wolves: Genetics, coat colour and association with migratory caribou. Molecular Ecology 16: 4149–4170.

[NPS] National Park Service. 2008. Wolf Restoration Status Report. (16 April 2009; *www.nps.gov/yell/naturescience/wolves.htm*)

[NRC] National Research Council. 1997. Wolves, Bears, and Their Prey in Alaska: Biological and Social Challenges in Wildlife Management. National Academy Press.

Prugh LR, Stoner CJ, Epps CW, Bean WT, Ripple WJ, Laliberte AS, Brashares JS. 2009. The rise of the mesopredator. BioScience 59: 779–791.

Ripple WJ, Beschta RL. 2003. Wolf reintroduction, predation risk, and cottonwood recovery in Yellowstone National Park. Forest Ecology and Management 184: 299–313.

———. 2004. Wolves and the ecology of fear: Can predation risk structure ecosystems? BioScience 54: 755–766.

———. 2007. Restoring Yellowstone's aspens with wolves. Biological Conservation 138: 514–519.

Schneider B. 2009. Salazar approves wolf delisting. New West Travel and Outdoors, 6 March. (14 October 2009; *www.newwest.net/topic/article/salazar_approves_wolf_delisting/C41/L41/*)

Smith DW, Peterson RO, Houston DB. 2003. Yellowstone after wolves. BioScience 53: 330–340.

Soulé ME, Estes JA, Miller B, Honnold DL. 2005. Strongly interacting species: Conservation policy, management, and ethics. BioScience 55: 168–176.

Stronena AV, Brook RK, Paquet PC, Mclachlan S. 2007. Farmer attitudes toward wolves: Implications for the role of predators in managing disease. Biological Conservation 135: 1–10.

[UCS] Union of Concerned Scientists. 2005. US Fish and Wildlife Service Survey Summary. (14 October 2009; *www.ucsusa.org/assets/documents/scientific_integrity/fws_survey_summary_1.pdf*)

[USFWS] US Fish and Wildlife Service. 1987. Northern Rocky Mountain Wolf Recovery Plan. USFWS. (22 October 2009; *www.fws.gov/mountain-prairie/species/mammals/wolf/NorthernRockyMountainWolfRecoveryPlan.pdf*)

———. 2009a. Final Rule to Identify the Northern Rocky Mountain Population of Gray Wolf as a Distinct Population Segment and to Revise the List of Endangered and Threatened Wildlife. (14 October 2009; *www.fws.gov/mountain%2Dprairie/species/mammals/wolf/*)

———. 2009b. Threatened and Endangered Species System: Delisting Report. Environmental Conservation Online System. (14 October 2009; *http://ecos.fws.gov/tess_public/DelistingReport.do*)

Van Camp R. 2003. Lethal Controls: The Fate of Wolves of the Northern Rockies. Alliance for the Wild Rockies. (14 October 2009; *www.wildrockiesalliance.org*)

VonHoldt BM, Stahler DR, Smith DW, Earl DA, Pollinger JP, Wayne RK. 2008. The genealogy and genetic viability of reintroduced Yellowstone grey wolves. Molecular Ecology 17: 252–274.

Vucetich JA, Nelson MP, Phillips MK. 2006. The normative dimension and legal meaning of endangered and recovery in the US Endangered Species Act. Conservation Biology 20: 1383–1390.

Wilmers CC, Getz WM. 2005. Gray wolves as climate change buffers in Yellowstone. PLoS Biology 3: 571–576.

Wright GJ, Peterson RO, Smith DW, Lemke TO. 2006. Selection of northern Yellowstone elk by gray wolves and hunters. Journal of Wildlife Management 70: 1070–1078.

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2.2 Compensation and Non-lethal Deterrent Programs: Building Tolerance for Wolf Restoration in the Rockies

Suzanne A. Stone

INTRODUCTION: WOLVES IN THE NORTHERN ROCKIES

In 1993, the U.S. Fish and Wildlife Service (USFWS) proposed five alternative plans ranging from "no wolves" to reintroduction of wolves with full-endangered species status and protection, which received more than 160,000 comments from all fifty U.S. states and forty countries, one of the largest public comment responses received on any wildlife restoration action ever proposed by the agency. Among the alternatives for reintroducing wolves was a "non-essential" status allowed under section 10(j) of the Endangered Species Act. This alternative, the most favoured of all the plans, included a provision that would allow wolves that preyed on livestock to be moved or killed, in order to protect regional livestock producers. During 1995 and 1996, wolves were reintroduced to central Idaho and Yellowstone National Park (USFWS et al. 2007; Bangs et al., this volume). Naturally recolonizing wolves are also present in northwest Montana. Finally, dispersing wolves have been found in Oregon, Washington, Utah, and, most recently, Colorado, although there is no confirmation that wolves are forming packs or reproducing in these states.

As wolf populations increase, their effect on the ecosystems becomes stronger, as shown by the wolf's role in culling weak and old elk and other ungulates (Smith et al. 2003) and reducing the long-term concentration of elk herds on sensitive meadows and wetlands (Ripple and Beshta 2004). With less grazing pressure from elk, streambed vegetation such as willow and aspen appear to be regenerating after decades of over-browsing. As the vegetation regrows, it improves habitat for native birds, fish, beaver, and other species.

However, as wolves returned in the northern Rockies, the age-old conflicts that led to their original demise also re-emerged. First among these conflicts is the issue of livestock losses to wolves. Annually, wolves kill less than 0.1 per cent of livestock within their range (Bangs et al., this volume). According to the National Agricultural Statistics Service (2006) report, 95.3 per cent of livestock death losses were due to disease, bad weather, theft, poisoning, etc. In regard to predation losses, "Coyotes and dogs caused the majority of cattle and calf [predator] losses, accounting for 51.1% and 11.5% respectively." Wolves attributed less than 3 per cent of the estimated overall predator losses. However, wolf conflicts are commonly sensationalized by local media and these stories rarely report on other causes of loss, heightening the perceived damages by wolves and undermining public support for wolf conservation. Livestock owners also experience anxiety over the added threat of livestock losses posed by the presence of wolves (Fritts et al. 2003). To minimize conflict, government agencies often kill wolves that prey on livestock to prevent additional depredations (Bangs et al., this volume). Often agency managers attempt to target individual "problem" wolves that develop a penchant for killing.

COMPENSATION TO ADDRESS WOLF AND HUMAN CONFLICTS

Wolf compensation programs to reimburse livestock owners for their losses are aimed at reducing conflicts associated with livestock losses. Most programs are administered and funded by government agencies and are,

in some countries, the only means of addressing conflicts with wolves. These programs generally function to reimburse farmers and ranchers for livestock losses that are attributed to wolves but vary in type of animals covered, amount of compensation paid, compensation recipients, proof required for verification, sources of funding, and government versus private administration.

The issue of compensation was addressed during the 2003 World Wolf Congress held in Banff, Canada. Biologists reported that the Spanish government expends more than US$1 million annually for a population of less than three thousand wolves, the Italian government program reimbursement includes losses to bears, wolves, and feral dogs, and in Sweden, most livestock are compensated at market value with a standard compensation for hunting dogs at US$1,000. Some Swedish villages receive a fixed amount (normally US$100,000–US$150,000 annually) for reindeer depredation losses based on the presence of wolves. Though nearly all sheep are kept in fenced enclosures, there is increased interest in using electric fencing to reduce predation, which would in turn reduce funding needed for compensation. The Swedish government subsidizes about US$300,000 of electric fencing costs for farmers. In Slovakia, approximately 85 per cent of the country's 300,000 plus domestic sheep are raised within range of the country's more than a thousand wolves. The traditional system for raising sheep is in pastures, and sheep are gathered at night to be milked. Flocks average four to five hundred sheep with four to six shepherds per flock who work on a rotational system. Until 2002, there was no compensation for losses, but a new law was recently established allowing for compensation to livestock owners but remained unfunded when the program was initiated. An estimated four to six hundred sheep are killed by wolves annually, equal to US$25,000–50,000. Several countries, including for example Bulgaria, Romania, and India, do not have compensation programs and wolf conflicts remain largely addressed through lethal control of wolves or are not addressed at all (see India, where wolves are protected).[1]

1 Wolves in India are accorded schedule '1' endangered species status under the Indian Wildlife Protection Act of 1972 and the Convention on International Trade in Endangered Species (CITES).

In 1987, Defenders of Wildlife, an American-based environmental organization, initiated the first privately funded livestock compensation program of its kind in North America to reimburse livestock owners for wolf-caused losses while wolves are under federal protection. The idea originated from William Mott, a former National Park Service director, who in 1985 encouraged Defenders of Wildlife to consider private compensation for livestock losses as a way to build tolerance for wolves. While other types of compensation programs worldwide are typically administered by government agencies, none of the federal agencies involved in wolf restoration had legal authority to create a compensation program to reimburse private livestock owners. To date, the Bailey Wildlife Foundation Wolf Compensation Fund, named in honour of its largest contributor, has reimbursed ranchers more than $700,000 in the northern Rockies for their livestock losses to wolves.

By acknowledging that wolf conservation is largely dependent on the tolerance of local residents, the compensation program has achieved success in maintaining more local acceptance of wolves than would exist without the program. Ranchers, biologists, conservationists, local government leaders, and others actively endorse the intent and effectiveness of the program, but there are still concerns about its limitations. For example, it is not possible to document every wolf depredation, which is necessary for receiving compensation, and some undetected losses may still have significant impacts for some ranchers (Oakleaf et al. 2003). In a study conducted on a cattle allotment in a mountainous region of Idaho with high vegetation and low human presence, researchers determined that under these remote conditions less than one in six wolf kills may be documented by investigators (ibid.).

Another common allegation made against compensation programs is that most ranchers either refuse or are denied compensation for confirmed depredations. However, this is not borne out by the facts. Since the program's inception in 1987, USFWS reports that wolves were "confirmed" to have killed 528 cattle, 1,318 sheep, 83 dogs, 12 goats, 9 llamas, and 6 horses. During that same period, Defenders of Wildlife has paid livestock owners for 488 cattle, 1,418 sheep, 30 dogs (Defenders of Wildlife pays

only for livestock guard and herding dogs), 10 goats, 6 llamas, and 5 horses. Defenders of Wildlife's program also pays 50 per cent of the market value for "probable" losses, which have included an additional 102 cattle, 228 sheep, and 4 dogs. These statistics demonstrate that most livestock owners who experience verified depredation losses to wolves do seek and receive compensation for their confirmed losses. The additional sheep losses paid by Defenders of Wildlife represent a hundred sheep that either died later of injuries or mature unborn lambs, which were not reported to USFWS.

EVALUATING THE WOLF COMPENSATION PROGRAM

In an effort to determine the effectiveness of this compensation program as a tool for promoting wolf conservation, data were gathered from a survey sent to all wolf compensation recipients in the U.S. northern Rockies during 2002 to 2004 (n = 138). By comparing livestock losses reported by the USFWS with those submitted to Defenders of Wildlife for compensation over this time period, it was determined that the losses suffered by these compensation recipients represent approximately 90 per cent of total documented losses during this three-year period. These survey recipients also represented a majority of the livestock owners with verified livestock losses to wolves from 1987 to 2004. These surveys were only sent to individuals who received compensation, which restricted the scope of the research findings to those with verified losses. Because wolf restoration is highly controversial in the region, attempts to contact recipients were limited to a single survey solicitation in order to reduce the likelihood that local media or word of mouth communication about the survey may influence its results. Despite limited solicitation, 44 per cent (n = 61) of those surveyed returned their completed questionnaires, demonstrating high interest in the issue.

COMPONENTS OF THE COMPENSATION PROGRAM

Defenders of Wildlife's compensation program is structured to reimburse livestock owners for the fair market value of verified livestock lost to wolves and to offer these payments in a timely manner. The program relies on the assistance of the United States Department of Agriculture–Wildlife Services (USDA–WS) agency, to professionally investigate claims of losses and accurately report their findings. That agency's mission is to provide federal leadership for resolving conflicts with wildlife (USDA–WS 2003). In cooperation with USFWS, state and tribal agencies, USDA–WS field investigators determine the cause of death of livestock and can implement non-lethal and lethal control measures to avoid or reduce depredation losses.

Livestock owners who seek compensation and meet the criteria for confirmed losses are paid 100 per cent of the market value (typically the peak price) up to $3,000 per animal, at an average expected weight (Defenders of Wildlife 2004). For example, a young calf has a reduced value, compared to when it matures months later, as most beef cattle are purchased by the pound. For losses that are determined to be "probable" wolf depredations, the program compensates livestock owners for 50 per cent of the market value. Under the definitions established by USDA–WS, "confirmed" depredations occur when there is "reasonable physical evidence that an animal was actually attacked" by wolves and "probable" depredations are classified as "some reasonable evidence exists but not enough to clearly confirm the cause of the species that killed or injured the animal" (USDA–WS 2003). Livestock currently covered by the program include cattle, sheep, goats, llamas, mules, horses, donkeys, pigs, fowl, and livestock guarding and herding dogs (Defenders of Wildlife 2004).

DISCUSSION OF FINDINGS

Cattle owners represented 71 per cent (n = 44) of the total survey respondents, followed by 18 per cent sheep producers (n = 11), and 5 per cent horse owners (n = 3). Single respondents reported losses for a goat, llama, and a livestock dog (n = 3). Although sheep losses to wolves are greater numerically than cattle losses, these figures reflect a representative proportion of livestock owners experiencing wolf depredations (i.e., more cattle producers experience wolf depredations than sheep producers, but more sheep are typically killed per depredation occurrence). Seventy per cent of respondents stated that they have raised livestock for more than thirty years (n = 43). The survey respondents reported receiving information about the compensation program from USFWS (29%), USDA–WS (28%), a state agency (19%), or news media (10%). Almost all (98%) stated that they received adequate information in order to file their compensation claim.

The survey recipients also held quite strong opposition to wolves, with 80 per cent objecting to wolves in their area (n = 49). Despite their animosity toward the species, more than two-thirds (69%) stated that they were "somewhat satisfied" (n = 28) or "highly satisfied" (n = 14) with the amount of compensation that they received for their losses, while only 23 per cent stated they were "somewhat dissatisfied" (n = 9) or "highly dissatisfied" (n = 5; Fig. 2.2.1).

Those who expressed dissatisfaction most commonly identified lack of compensation for unconfirmed or missing livestock as their primary concern. The issue of missing livestock is often raised as the leading complaint about the existing compensation program and is one of the most difficult to address as these losses cannot be attributed exclusively to wolves. Livestock commonly went missing before wolves returned to the region, and there is no reliable method to distinguish wolf losses from other causes, such as disease, poisoning, old age, birth defects, straying, or theft.

Most respondents (80%) asserted that they were using non-lethal preventative methods. The most common methods they reported were increased human surveillance, such as range riders, and shepherds (66%), carcass removal (39%), alternate grazing (26%), and use of guard dogs

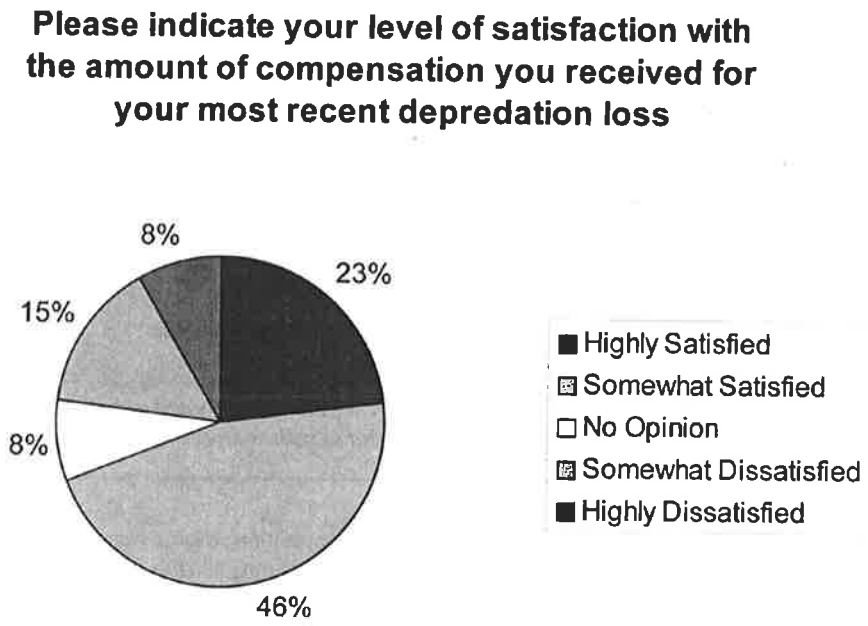
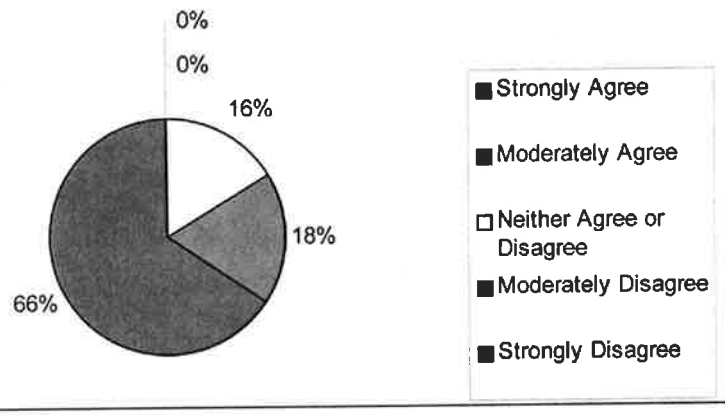


Figure 2.2.1. Responses obtained on level of satisfaction with amount compensated from a survey sent to wolf compensation recipients in the U.S. northern Rockies during 2002 to 2004 (n = 61).

(21%). With the exception of carcass removal, respondents rated these and non-lethal munitions (cracker shells, rubber bullets) as the most effective deterrents in reducing wolf depredations. Most respondents (59%) stated that they wanted more information about non-lethal deterrents. These survey findings revealed an important social factor for the wolf reintroduction program, as they indicated that even the people strongly opposed to wolves are still willing to try ways to co-exist with them.

Other studies have suggested that compensation does not necessarily increase tolerance for wolves (Linnell and Brøseth 2003; Naughton-Treves et al. 2003; Nemtzov 2003) and addressing this issue was a particularly important aspect of the survey. In the first question regarding tolerance, survey respondents were asked if receiving compensation increased their tolerance for wolves. More than 60 per cent said it *did not* increase their



Statement: Defenders' compensation program should be continued even if wolves are moved from federal management to state management.

Figure 2.2.2. Responses obtained on continuation of a compensation program from a survey sent to wolf compensation recipients in the U.S. northern Rockies during 2002 to 2004 (n = 61).

tolerance for wolves. However, a second question asked how their tolerance toward wolves would be affected if the compensation program were to end. This time, nearly the exact same ratio (59%) stated that their tolerance for wolves would *decrease* from "lower" (7%) to "significantly lower" (52%), marking a sharp decline in tolerance toward wolves by nearly two-thirds of the survey respondents. Lastly, survey respondents were asked if they agreed that Defenders of Wildlife's compensation program should be ended. Not a single respondent agreed, with 66 per cent strongly disagreeing, and, in fact, nearly all respondents (80%) wanted to see the compensation program continue after wolf management passes from federal to state management (Fig. 2.2.2).

Compensation for losses has a beneficial impact on livestock owners' tolerance toward wolves as well as providing important economic relief to those bearing the direct losses of wolf restoration. At a minimum, these survey results demonstrate that compensation can prevent erosion of tolerance among the stakeholder group most opposed to (and most affected by) wolf restoration.

CONSIDERATIONS FOR COMPENSATION PROGRAMS

Administering Defenders of Wildlife's wolf compensation program is extremely challenging. Unlike many government programs, it relies exclusively on donations and grants for funding. Wolves are currently popular, which makes raising these funds easier than for less charismatic species but still requires significant organizational resources. However, the public's attraction to charismatic species waxes and wanes, which may affect long-term support for the compensation program. This is also a limiting factor that could weigh in favour of government-administered programs that may be capable of relying on more stable funding sources.

Laws and management decisions affecting wolf conservation change as a result of new administrations, growth in wolf population numbers, and new management personnel. These changes have impacted Defenders of Wildlife's compensation program by reducing incentives to maintain conservation objectives. For example, under the original reintroduction section 10(j) rule established through the Endangered Species Act, federal wolf managers were legally required to "exhaust all non-lethal control" before being allowed to use lethal control. In 2005, this rule was modified and the USFWS entirely dropped the requirement to exhaust non-lethal control in Idaho and Montana. Wolves in the reintroduction areas of these states have significantly less legal protection than those generations before them, but the criterion for our compensation program remained unchanged: recipients are still required to utilize reasonable non-lethal methods in order to qualify. If a livestock owner or agency representative were to kill wolves without attempting reasonable non-lethal alternatives, the livestock owner may be ineligible to receive compensation. Consequently, compensation may provide an incentive for non-lethal alternatives and improved animal husbandry.

One of the most important elements of any compensation program is protecting against fraudulent or misidentified claims. Agency field investigators use a wide range of reporting forms and submit varying degrees of detail about the investigations, making it harder to evaluate claims in a

consistent manner. On occasion, reports are submitted without the necessary details to determine whether the report meets the standard criteria for confirmed or probable depredations. These problems delay or can prevent payments, which increases conflict and undermines the value of the compensation program. It is critically important that problems like these are carefully monitored and addressed; otherwise a program's success can be jeopardized.

Compensation programs must be carefully structured to avoid adversely impacting the species they are meant to benefit. Theoretically, the availability of compensation could be detrimental to wildlife conservation in certain situations by preserving economically unsustainable livestock producers or by creating new economic opportunities that encourage loss of wildlife habitat (Bulte and Rondeau 2005). Another potential pitfall is encouraging irresponsible animal husbandry practices when livestock owners know they will be paid for losses, even when they don't adequately protect their livestock from predation. Like the requirement for reasonable use of non-lethal methods, these programs should be structured to promote the use of best management practices by landowners. Compensation programs also need adequate insulation from political pressures that may undermine conservation objectives in lieu of economic or social perceptions and objectives.

It is not possible to document every wolf depredation and this continues to be a most contentious problem. While intensive agency investigations and wolf monitoring likely result in a lower rate of undetected wolf losses compared to other types of livestock losses, confirmed wolf losses should still be considered minimum numbers (Oakleaf et al. 2003). However, fear of wolves tends to promote exaggerated estimates of wolf–livestock depredations. Kills by other carnivores (especially coyote, *Canis latrans*) are misattributed to wolves, and missing animals (especially calves, lambs) are falsely blamed on wolves (Fritts 1982). Without close investigative scrutiny, wolves may account for only 20–50 per cent of depredations for which they are held liable (Zimen and Boitani 1979), which could diminish the effectiveness of a compensation program with respect to both economic affordability and public trust in the program.

In isolated areas with limited resources, a recently developed pilot incentive program for snow leopards in south and central Asia operates much like an insurance program by requiring local livestock owners to contribute part of the program's funding base. The program is also subsidized by international contributions from snow leopard conservation supporters, which provides for the majority of funding for compensation and deterrents to help farmers avoid depredations (Charudutt et al. 2003). As the livestock owners' participation requires a personal investment, they have greater incentives to report any fraudulent depredation claims, which helps reduce a major challenge with compensation administration. If an individual livestock owner chronically loses livestock, there is also more community pressure to help implement preventative methods to avoid depleting the insurance funding (M. Charudutt, personal communication). While this program is still in its early stages, it offers interesting alternative strategies to several components of standard compensation programs, which will be important to study as the program matures.

NON-LETHAL, PROACTIVE CONFLICT MANAGEMENT

The optimal way to manage conflicts between livestock owners and wolf conservationists is to proactively prevent wolf depredations on livestock by non-lethal means. This goal led to the creation of the Bailey Wildlife Foundation Proactive Carnivore Conservation Fund in 1998, which supports the use of non-lethal deterrents and preventative animal husbandry practices, including guard dogs, electric night pens, fladry, task-specific range riders, a volunteer program called "Wolf Guardians," and other methods. Many of these deterrents were developed in partnership with tribal and federal agencies.

Working with landowners, resource managers, and others to prevent or reduce predator problems has important conservation benefits. The single leading cause of wolf mortality in the northern Rockies and the American Southwest is government lethal control actions to stop

livestock losses. Reducing conflicts can help protect wolves from being unnecessarily killed. Additionally, addressing these conflicts and implementing solutions creates opportunities for collaboration, which can help relieve social tension and encourage behavioural changes toward achieving co-existence.

A recent example of the effective nature of this program began in the spring of 2003 when ranchers in Clayton, Idaho, contacted wildlife agencies and Defenders of Wildlife for assistance in avoiding wolf predation on newborn calves. The ranchers were aware of the presence of the Buffalo Ridge pack's den near their grazing pastures. Pack members were frequenting the area to eat young fish released by Idaho Fish and Game in the creeks adjacent to the pastures. Many of these young fish were dying and the wolves learned they were a new source of protein. However, the ranchers expected the wolves would begin killing their young calves once the cattle were moved into these pastures for grazing. Several agencies, including the Nez Perce tribal wolf program, the USFWS, USDA–WS, the Salmon Challis and the Sawtooth National Forests, all contributed to purchasing hay and providing alternative grazing for the cattle until the wolf pups matured and the pack moved to a more remote rendezvous site. In subsequent years, the rancher replaced cows and young calves with older cattle that were less vulnerable to predation and used fladry to help deter wolves from the pastures. This project became the first test site for "turbo-fladry," which incorporated solar electric fencing in its design. Researchers placed the turbo-fladry around a pond that attracted wolves to nightly fishing raids in its shallow waters. The wolves did not cross the turbo-fladry while it was installed but instead circled around the outside perimeter, apparently afraid to cross the barrier. This test also led to the first development of turbo-fladry as a night corral for sheep.

The success of the project hinged on the willingness of the ranchers to adopt using non-lethal methods, and from 2003 through 2006 not a single calf was killed by wolves and the pack remained intact. Not every situation will be resolved using non-lethal methods, but this one occurred in a community where a sign posted in a window of its major store read: "Kill all the Goddamn Wolves and all the people who brought them here."

The sign was later removed and communication improved between ranchers, wolf managers, and conservationists, demonstrating that the spirit of these collaborative efforts can help reduce local animosity over wolves by allowing individual stakeholders to help manage the process. Success at maintaining and restoring healthy wolf populations across the American West and elsewhere will be directly comparative to reducing conflict in situations like this.

CRITERIA FOR NON-LETHAL, PROACTIVE PROJECTS

Over the course of the program, we have conducted a wide range of proactive and non-lethal wolf projects throughout the region, including several range rider projects in Montana (riders on horseback that patrol cattle grazing areas and implement non-lethal methods to help prevent wolves from preying on livestock); turbo-fladry development in central Idaho, grazing allotment retirement near Yellowstone National Park; supplementing livestock guard dogs on Idaho's Boise, Payette and Sawtooth National Forests; and building predator-proof fencing for llama protection near Missoula, Montana, and sheep enclosures in the Paradise Valley in Montana. From these efforts, we developed a list of general guidelines to help prioritize potential projects. In brief, project development should include consideration of location, level of cooperation, feasibility, agreements, evaluation, and limitations.

Location

It is important to determine that the proposed project area is adjacent to or directly provides suitable wolf habitat or involves areas where other wolves will continue to attempt re-establishment if removed. Additionally, the project area should have an existing or strong potential of depredation conflicts due to the regular legal presence of livestock. Local attitudes toward wolves should be included in the overall evaluation process for potential

projects. If the local opposition has hampered important wolf conservation efforts in the area, it indicates a possible opportunity for constructive communication and conflict management and should be considered a higher priority. Even a small investment, like installing a temporary electric fencing system, can produce large benefits in local goodwill toward the species because the livestock owner and other members of the community are more cooperative when they feel their concerns are validated, especially when the measures implemented to address those concerns are clearly effective.

Cooperation

The attitude of the livestock owner and managers are highly important to a successful project. However, even the most ardent anti-wolf ranchers have made significant changes to prevent conflicts with wolves, so while they may be cooperative, their attitudes toward wolves may not change. They must, however, be either practising or willing to implement proper animal husbandry techniques that discourage predators, such as removing sick or injured animals or properly disposing of carcasses. When appropriate, the livestock owner should share the costs of expenses as this increases their personal investment in the project's success. This could include time and private resources in addition to, or instead of, financial contributions.

Feasibility

When assessing the project, appropriate non-lethal techniques should be reasonably applicable to the situation (e.g., range riders, livestock guard dogs, wolf deterrent fencing, fladry, Radio-Activated Guard (RAG) boxes, non-lethal munitions, etc). Project assessment should include the number, age, and type of livestock, the season(s), the availability of human presence and the size of the area to be protected. For example, fencing priority should be given to night corrals and smaller-scale projects that offer greater protection to livestock. Proposals to construct fences around large multi-acre settings would seldom be adopted as most would be prohibitively expensive. Livestock guard dogs should only be provided if they are kept in groups of two or more in order to help protect the dogs from being

killed by wolves. The initial costs and maintenance are important factors to determine in advance. Projects should be practical, ideally allowing for neighbouring ranches to duplicate methods in order to widen protection from depredations. Project staff in direct communication with livestock owners should also be skilled in social conflict management and reconciliatory communication to avoid escalating the conflicts.

Agreements

When possible, a signed agreement outlining the expectations, cost estimates, and responsibilities of each cooperator should be established at the beginning of projects. These agreements should include the livestock owner's commitment for evaluation of the project, the anticipated timeline, division of labour, and an estimate of labour, equipment, and materials before the project begins. Our agreements are typically based on continued use of non-lethal methods, and funding can be withdrawn upon the use of lethal control of wolves.

Evaluation

Some projects can provide research opportunities and, when possible, should incorporate some level of evaluation during and after the project, which includes the livestock producer's comments regarding any concerns, challenges, benefits, and suggestions for improvement. It is also important to record failures as they can help improve future projects by increasing overall understanding of why some methods fare better than others in certain circumstances.

Limitations

Wolves can become habituated to almost any non-lethal method or tool. It is very important that non-lethal projects be adaptive according to the length of exposure to wolves. For example, projects relying on livestock guarding dogs have alternately used electrified fladry with successful short-term success. Other limitations include cost, project maintenance

and supervision, negative impacts to neighbouring ranches, illegal killing of wolves, and more.

FUTURE OF WOLVES

In the last ten years, wolf numbers in the northern Rockies region have grown from 132 to more than a thousand animals, surpassing original recovery population goals (USFWS et al. 2005a). This growth clearly demonstrates the biological success of the wolf reintroduction program. It also shows the willingness of wolf opponents to adopt new methods and strategies to co-exist with wolves under the current federal management rules, a significant social achievement for the program. An essential component to this achievement is enhancing tolerance toward wolves, which in the northern Rockies, has at least partially been accomplished by paying compensation for livestock losses. Successful compensation programs must be structured to be viable in the long-term, reliably funded, and protected from fraud and must engage the cooperation of livestock owners and wildlife managers. The states of Montana and Idaho are developing state-managed wolf compensation programs that will reimburse livestock owners for wolf-related losses, once wolves are delisted from federal management. As the states move forward with their programs, Defenders of Wildlife will focus on increasing the non-lethal, proactive deterrents that help reduce or avoid conflict between wolves and livestock owners. Additionally, livestock owners and conservationists are finding more ways to collaboratively address conflicts, which decreases conflicts and reduces polarization. Several western ranchers are now serving on a newly created Livestock Producers Advisory Council to help evaluate Defenders of Wildlife's compensation and proactive programs. As Lane Adamson, Montana Ranchlands Group director and founding council member, stated: "The collaborative process works and can help those with divergent opinions resolve misunderstandings without damaging the value of one another as human beings.... The direction we are pursuing now regarding living with wolves is a great place to start this effort."

As envisioned back in 1985, the northern Rockies wolf compensation program has improved local tolerance toward wolves by shifting part of the economic responsibility from livestock producers to the public that supports wolf restoration. Before the USFWS removes wolves from federal protection, the agency must consider how social tolerance can be best retained under state wildlife management programs. The fate of wolves in the region will be largely dependent on the adequacy of state wolf-management plans to guarantee long-term protection for the species in balance with the interests of local residents.

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GRAND CANYON
WILDLANDS
COUNCIL

January 8, 2010

Washington Department of Fish and Wildlife
SEPA Desk
600 Capitol Way N.
Olympia, WA 98501-1091
SEPAdesk2@dfw.wa.gov.

Re: Comments on the Final Draft Wolf Conservation and Management Plan for Washington and Draft Environmental Impact Statement

Dear Sir or Madam:

Grand Canyon Wildlands Council (GCWC) is a conservation organization dedicated to protecting and restoring wild nature. We are particularly interested in large carnivore recovery as an essential component of the broader ecological restoration strategy. While Washington lies outside of our immediate area of concern, the southern Colorado Plateau, we are also interested in the practical issues of interagency efforts to restore ecologically critical, albeit often politically controversial, wildlife to their historic range. We respectfully submit the following comments on the Final Draft Wolf Conservation and Management Plan for Washington and Draft Environmental Impact Statement (DEIS).

In summary, GCWC maintains that the target Numbers for Conservation and Recovery of Wolves Are too low. We support translocation with a focus on the Olympic Peninsula and Mount Saint Helens as the primary and initial sites for translocation. We also support the designation of 4 recovery zones, including the Pacific Coastal zone with its own recovery goal. Finally, we feel that the target number of 15 breeding pairs for delisting of the gray wolf will not meet the goal of the plan to establish a viable wolf population in Washington State.

Minimum Viable Populations (MVP)

Recovery criteria for depleted species or populations normally are based on demographic measures, the goal being to maintain enough individuals over a sufficiently large area to assure a socially tolerable risk of future extinction (Estes et al. 2010). Demographic considerations include distribution and range, population age and sex structure, metapopulation structure and dynamics, genetic variability, unforeseen or anticipated future risks, and temporal trends in these various metrics (Morris & Doak 2002; Estes et al. 2010). A Minimum Viable Population (MVP) size

was originally defined as the smallest number of individuals required for an isolated population to persist at some predefined high probability through time (Shaffer 1981).

The minimum viable population (MVP) concept has been used to set goals for species at risk of extirpation or extinction, under the Endangered Species Act (ESA). The USDA Forest Service has applied MVP to meet the diversity provision of the 1976 National Forest Management Act. Recently, the US Fish and Wildlife Service used wolf (*Canis lupus*) population numbers and distribution to delist this keystone species in the northern Rockies, shifting management to the states, which employ an MVP model (Eisenberg et al. 2010). Such demographically based recovery criteria may be insufficient to restore the functional roles of strongly interacting species (Estes et al. 2010).

Strongly Interactive Species (SIS)

Species influence their ecosystems through such well-known processes as competition, predation, mutualism, and the alteration of physical habitat. These influences may be so strong in some cases as to alter landscapes and associated patterns of biodiversity. Species capable of exerting such ecosystem-level influences have been referred to as keystone (Paine 1969) and foundation species (Dayton 1972), ecosystem engineers (Jones et al. 1994), strongly interactive species (Soulé et al. 2003, 2005), and various other descriptors that imply functional importance. A species is strongly interactive when its absence or effective absence leads to significant changes in some feature of its ecosystem (Soulé et al. 2003). Such changes include structural or compositional modifications, alterations in the import or export of nutrients, loss of resilience to disturbance, and decreases in native species diversity (Soulé et al. 2003).

Strongly interactive species, as demonstrated by the recent relevant literature, warrants a level of consideration not reflected in current land management. The concept of a minimum viable population has been used traditionally to set target populations under the ESA. By these measures, it has been argued that the wolf in the northern Rocky Mountains is fully recovered. In the broader interests of biodiversity conservation, recovery criteria for functionally important species should not only assure demographic viability but also an "ecologically effective population size" (Soulé et al. 2003, 2005). We advocate that an ecologically effective population of wolves, defined as a population capable of triggering trophic cascades and maintaining a more biologically diverse ecosystem phase state, may be a more scientifically sound approach (Soulé et al. 2003, 2005; Estes et al. 2010; Eisenberg and Ripple 2009).

Ecologically Effective Populations

Where the density of strongly interactive species falls below some threshold, species diversity may decrease, triggering ecological chain reactions, or "trophic cascade," ending with degraded or simplified ecosystems (Estes and Palmisano 1974; Jones et al. 1998; Crooks and Soulé 1999; Terborgh et al. 1999; Jackson et al. 2001; Terborgh et al. 2001; Soulé et al 2003,2005; Estes et al. IN PRESS).

A top carnivore population is ecologically effective when it, in combination with its associated large predator guild, is capable of triggering trophic cascades. More precisely, the ecologically effective population of a top predator, acting in conjunction with other members of the large carnivore guild, is of sufficient density to maintain higher native species biodiversity through all trophic levels than would exist if the top carnivore were absent or present at lower than ecologically effective population densities (Eisenberg and Ripple 2009).

Trophic cascades require a strongly interacting species (i.e., a top carnivore) that influences the abundance and behavior of its primary prey (large herbivores), thereby indirectly affecting their temporal and spatial patterns of herbivory. In the case of the gray wolf (Canis lupus), this dynamic can shift an ecosystem from a state characterized by intensely browsed plant communities, to one in which native plants can thrive and reproduce, thus providing sustainable habitats for terrestrial, as well as aquatic, wildlife species (Beschta 2005; Ripple and Beschta 2003, 2005; McLaren and Peterson 1994; Ripple and Larsen 2000; Beschta and Ripple 2008; Hebblewhite et al. 2005; Estes and Palmisano 1974).

Numerous studies indicate that ecosystems can be profoundly altered by uncontrolled ungulate populations after large carnivores are removed or reduced below ecologically effective densities (Ripple and Beschta 2003, 2005, 2006; Beschta 2005; McLaren and Peterson 1994; Ripple and Larsen 2000; Hebblewhite et al. 2005; Beschta and Ripple 2006, 2007, 2008; Rooney and Waller 2003; Estes et al. 2010). The rarity or absence of strongly interactive species such as large carnivores leaves a functional void that can trigger linked changes leading to degraded or simplified ecosystems.

Recovery criteria for depleted species or populations normally are based on demographic measures, the goal being to maintain enough individuals over a sufficiently large area to assure a socially tolerable risk of future extinction (Estes et al. 2010). Demographic considerations include distribution and range, population age and sex structure, metapopulation structure and dynamics, genetic variability, unforeseen or anticipated future risks, and temporal trends in these various metrics (Morris & Doak 2002; Estes et al. 2010). Although always necessary, demographically based recovery criteria alone may be insufficient to restore the functional roles of strongly interacting species if demographic recovery occurs at a population size below that required for the species' functional role in the ecosystem to be realized (Soulé et al. 2003, 2005; Estes et al. 2010).

Establishing recovery criteria on the basis of ecological effectiveness calls for information that is fundamentally different from that required by the more traditional demographic approach (Estes et al. 2010). The development of such criteria requires identification of the key interaction web pathways through which the species influences its associated ecosystem; an understanding of the functional relationship between these influences and the species' population size; the establishment of a state or range of states of these influences that constitute recovery; and the development of a quantitative criterion for classifying a given

region as recovered (Estes et al. 2010).

Currently, the USFWS, the USDA Forest Service, and state wildlife agencies take an MVP approach to wolf recovery, which does not address the question of whether using demographic criteria for delisting will lead to restoration of ecological interactions involving keystone species, i.e., ecosystem recovery (Eisenberg et al. IN PRESS). Washington State's Draft Wolf Conservation and Management Plan provides a notable exception and states that "gray wolves affect ecosystem components through a variety of direct and indirect processes," and "regulation of large herbivore abundance by wolves can alter vegetation patterns . . . thereby potentially affecting many wildlife species residing in an ecosystem" (WDFW 2009).

Metric for Ecologically Effective Populations

The first step in developing a recovery criterion on the basis of ecological effectiveness is settling on a metric (Estes et al. 2010 Robert Beschta, personal communication). Since ecosystems are inherently complex and often difficult to define, and because wide-ranging species, such as wolves and cougars, typically occur in multiple habitat types, defining a conservation metric for ecologically effective populations raises a number of questions (Estes et al. 2010; Lawrence Stevens, personal communication):

- On which trophic linkages should managers base recovery criteria?
- Should recovery criteria be based on a simple ecosystem metric (e.g., presence or absence) or a more complex one, involving all or some combination of the known effects of the target species?
- If the effect of the target species on its ecosystem is a dosage-dependent (graded) response, what level does the manager choose to meet the recovery criteria?
- Since ecosystems respond to many interacting variables and drivers, including bottom-up, top-down, and lateral forcing processes, how does the manager determine when the ecosystem is within the desired functioning conditions?

Estes et al. (2010) suggest that many of these questions and potential difficulties are resolved by focusing the recovery criterion on those interaction-web processes that are most closely linked with the target species. For example, measurements of vegetation might provide a useful adjunct to population assessments in determining whether or not gray wolves should be considered recovered in the Greater Yellowstone Ecosystem because wolves prey on elk and other large ungulates, which in turn reduce the impacts of browsing on some perennial plant species (Ripple and Larsen 2002; Ripple & Beschta 2003; 2004, 2006; Beschta 2005; Beschta and Ripple 2006, 2007, 2008; Lawrence Stevens, personal communication).

While scientists urge focusing on recovery criterion for those interaction-web processes that are most closely linked with the target species, they also caution that ecological effectiveness should not be limited to strong interactors (Estes et al. 2010 The loss of both strong and weak interactors can destabilize complex food webs

(O'Gorman & Emmerson 2009). Ecologically based recovery criteria may not be necessary for all species. However, those authors warn that, since the ecological roles of most species are poorly understood, a precautionary approach warrants development of maintenance and recovery strategies that assume all species are functionally important until shown otherwise (Estes et al. 2010; Hey 1992; Kuhlmann 1997; Raffensperger and Tickner 1999).

A precautionary wildlands management approach recognizes that wild conditions more closely approximate the complex context in which native species evolved, much more so than any conditions that we can create through piecemeal, invasive management (Alverson et al. 1994, Noss 1995). Given the complexity of ecosystems, some researchers (Lawrence Stevens, personal communication) suggest that the most expeditious recovery criterion approach may be to:

- Identify trophic linkages that appear to be most effective
  Select criteria (e.g., presence/absence) to determine the presence and functionality of those linkages
- Monitor to ensure that basic native trophic connections are occurring, and
- Allow natural ecosystem processes to determine the ecosystem's evolutionary trajectory.
- Protecting and restoring natural processes (biotic and abiotic) and elements (or parts) to the best of our ability on a landscape scale provides a logical, precautionary approach for conserving native biodiversity

Examples of landscape scale, simple (absence/presence) metrics include:

- Are large, native predators present and consuming appropriate prey?
- Are food sources for native herbivores present in natural patterns of abundance and distribution?
- Are decomposers fulfilling their ecological role in the ecosystem?
  Is the natural disturbance regime functioning?

Ecologically Effective Population Management Goals

Recovery criteria for depleted species or populations normally are based on demographic measures that may be insufficient to restore the functional roles of strongly interacting species (Estes et al. IN PRESS). The implementation of SIS goals should result in protection and restoration of all native strongly interactive species in ecologically effective populations throughout a significant portion of their historic range:

Goal One: Extensive Geographic Persistence of Strongly Interactive Species.
Conservation plans and objectives (design, management and recovery) should provide for the maintenance, recovery, or restoration of species interactions in as many places as feasible both within the historic range of strongly interactive species or in other sites where the consideration of climate change and other factors is appropriate (Soulé et al. 2003:1239). This goal calls for broad geographic maintenance and restoration of critical interactions and extensive geographic persistence of strongly interactive species (Soulé et al 2003:1239).

Goal Two: Ecological Effectiveness Within Ecosystems, Communities, or Landscapes. Conservation plans should contain a requirement for ecologically effective populations densities; these are densities that maintain critical interactions and help ensure against ecosystem degradation. This goal replaces the de facto non-ecological practice of minimum viable populations (Soulé et al. 2003:1239).

Target Populations

While GCWC appreciates the effort of the WDFW to put together the draft plan, we believe the target population provided for in the final draft plan for reclassification and delisting will not guarantee the long-term survival of the state's wolf population and should be increased for the following reasons:

1. Target Wolf Numbers Are Inconsistent with USFWS's Recommendations: The US Fish and Wildlife Service (USFWS) stated on page 37 of Alternative 2 that "Thirty or more breeding pairs comprising some 300+ wolves . . . . should have a high probability of long-term persistence. . . ." Furthermore, p. 38 of Alternative 2 quotes experts that concluded that viability would be "enhanced by higher (500 or more wolves) rather than lower population levels (300) and longer (more than 3 years) rather than shorter (3 years) demonstrated time frames . . . the higher its probability of population viability will be."

2. Target Wolf Numbers Are Inconsistent with Wolf Biologists' Recommendations: A previous draft of the plan pointed out that many scientists with experience in wolf recovery do not believe that the current target population will lead to a viable population. The May 2, 2008 draft sets out the breeding pair levels as they are currently represented by the WWG. However, on page 41, it states, "Based on input from wolf biologists in Idaho and Montana, these numbers may be too low to maintain a viable population in the state." In order to maintain a viable population and avoid the possibility of re-listing that may occur under the current targets, the population numbers should be increased. As stated on p. 60 of Alternative 2, "After delisting occurs, it is in the best interest of wolves and the citizens of Washington that the state take whatever management steps are necessary to safeguard the species from a population decline that would necessitate relisting." Drastic steps will not be necessary if the state ultimately sets population goals that are higher and therefore less likely to experience a decline once delisted (i.e., an ecologically effective population level).

3, Target Wolf Numbers Are Not Based on Science: We are also concerned that the WDFW is releasing the Draft Environmental Impact Statement (DEIS) with Alternative 2 as the Preferred Alternative while conducting a double blind peer review. It is likely the blind peer review will lead to several suggested changes that should be strongly considered by the WDFW before releasing the final plan. Releasing the DEIS before considering the comments of the blind peer reviewers suggests the plan may not be based on science and that the blind peer review has limited purpose. Since the target population numbers are not based on science it will most likely fail to meet the stated goal of restoring a viable wolf population. As stated in Alternative 2, Appendix E, p. 204, the WDFW used their understanding of

biology to come up with starting numbers of 15 breeding pairs to transition from threatened to sensitive. The Wolf Working Group apparently decided to disregard WDFW's suggestion to use "scientifically based estimates of the wolf numbers needed for recovery" (Alternative 2, Appendix E, p. 204). It is difficult to understand how the number recommended by WDFW scientists for transitioning from threatened to sensitive subsequently became the target for completely removing all protections for wolves without any scientific justification. We are concerned that if the goal of this plan is to reach a viable wolf population, 15 breeding pairs is unlikely to lead to a successful recovery.

Finally, on p.15 of the DEIS, "Based on scientific information about wolf population viability and initial scientific peer review of the conservation/recovery objectives proposed in the draft plan, the targets of 6, 12, and 15 successful breeding pairs for downlisting and delisting that are used in Alternatives 1, 2 and 3 are considered minimal or barely adequate for achieving population viability and recovery." The goal of maintaining a viable population does not seem to be well served by a population deemed "minimal or barely adequate." Again, we urge establishing the recovery goal of ecologically effective population of gray wolves throughout a significant portion of its historic range.

Target Wolf Numbers Dependent on Unreliable Linked Populations: The target numbers depend on maintaining connectivity to the broader wolf population of neighboring states (Alternative 2, p.10). Washington is bordered by the Pacific Ocean and Oregon, in addition to British Columbia and Idaho. While British Columbia and Idaho may be able to contribute wolves to the recovery in Washington, Oregon has a very limited population and is unlikely to contribute a large number of individuals or breeding pairs. Furthermore, in Idaho, hunting of wolves is now permitted, which will further reduce the numbers of wolves available to enhance populations in Washington. Unlike British Columbia, Idaho, Montana, and Wyoming, which all have large populations of wolves that have the ability to move from state to state, Washington is dependent on wolves coming from just two of these states to form the entire viable population. It has been over two decades since wolves first began to return to the western U.S. and yet Washington currently holds only two confirmed breeding packs. If Washington hopes to establish and maintain a viable population, it is questionable whether the state can "be dependent on maintaining its connectivity to the broader regional wolf metapopulation" (Alternative 2, p. 10), when it has only resulted in a maximum of three packs in a period of 22 years. As a result, the plan should have a higher target number of breeding pairs if the state's aim is to maintain a viable wolf population.

Range of Alternatives is Not Sufficient: We appreciate the 4 alternatives described in the DEIS. However, an additional alternative, or two, that provided different target breeding pair numbers and the effect on the state and the environment of these different numbers should have been included in the DEIS. We hope the final environmental impact statement will select such an alternative based on the interest expressed at several of the public hearings and in written comments articulating support for higher numbers of breeding pairs before delisting.

Reintroduction Should Be Considered: GRCA believes the option of reintroduction of wolves into Washington State should have been considered during development of the Wolf Conservation and Management Plan for Washington. We also support translocation as an important part of the Wolf Conservation and Management Plan and appreciate its inclusion in the final draft.

National Parks

We strongly believe that it is vital to identify the Olympic Peninsula and Mount St. Helens as two of the primary, preferred, and initial sites for translocation/reintroduction. Historical analysis (Alternative 2, p. 17) shows that excellent wolf habitat on the Olympic Peninsula allowed wolves to persist as late as the 1950's, long after all other wolves in the state had been removed. For this and the reasons set out below, NPCA believes the Olympic Peninsula should be one of the primary translocation/reintroduction areas.

As Alternative 2, Appendix B, p. 199 states, "large contiguous blocks of public land . . . not only play an important role in sustaining a viable wolf population, but are also areas with comparatively lower levels of wolf/human conflicts." The Olympic Peninsula, especially in the area of Olympic National Park and Olympic National Forest, provide an obvious, suitable large contiguous block of public. The Olympic Peninsula, with only 17.4 % of all the land on used for cattle, sheep, horses, goats, lamas, and/or farmland (Alternative 2, p.140), is much lower than any other area of the state. The plan also states that "areas with abundant deer, elk . . . reduced livestock use, and few potential human conflicts offer the best chance for recovery success. These locations include national forests, national parks, wilderness areas . . . and areas with low densities of open roads." This description on p. 40 of the plan perfectly corresponds to the characteristics of the Olympic Peninsula. From Olympic National Park and Olympic National Forest to the limited livestock activities on the peninsula, this area should be one of the preferred translocation sites. The Olympic Peninsula was also identified as an area of "potential wolf habitat" on p. 41 of the plan. Finally, the map on page 42, figure 4, of the plan graphically shows the large contiguous blocks of land that is the Olympic Peninsula. The attached map shows areas of the state with large contiguous areas of land, which are appropriate wolf habitat (Contiguity of Suitable Wolf Habitat). According to this map, derived from figure 4, the Mount St Helens area and the Olympic peninsula are the best areas of the state for reestablishing wolf populations. Finally, Olympic National Park was identified by a 1980's National Park Service (NPS) study as the second best park for wolf reintroduction (after Yellowstone) and the US Forest Service completed a favorable feasibility study in 1999.

Abundant Ungulate Prey: The Olympic Peninsula also serves as excellent habitat for wolves due to abundant ungulate prey. Alternative 2, Appendix B, p. 199 put the availability of prey as important as large contiguous blocks of public land. The Olympic Peninsula not only has an abundance of prey, but has many areas of "lower elevations and gentle terrain where prey are more abundant, particularly in winter" (Alternative 2, p. 28). The lower elevation areas of the Olympic Peninsula tend to get

less snow than many other areas of the state at the same elevation and are home to large populations of deer and elk. The plan also states on p.79 that 62% of the state's population of elk occurs west of the Cascade crest. According to WDFW statistics, the Olympic Peninsula is second in greatest abundance of elk only to Mount St. Helens by an estimated 3380 individuals. However, these numbers completely exclude elk located on tribal and NPS lands on the peninsula. On the Olympic Peninsula, tribal and NPS lands comprise more than 50% of the land mass and likely contain a very large population of elk – estimated on p. 83 of the plan to be 3060 (in Olympic National Park alone). This does not include any elk residing in the large areas of tribal land. Therefore, the estimated elk population on the Olympic Peninsula is nearly as abundant as at Mount St. Helens and therefore an appropriate area for translocation.

Failure in Natural Dispersion:
Scientists believe that the Olympic Mountains in pre-settlement times comprised part of a larger cougar (and other large carnivore) population extending through the Cascade Mountains and beyond (Beier 2009:184). Since the conversion of much of the lower peninsula to farms and urban development, including major highways such as Interstate 5, has significantly fragmented the landscape and effectively isolated Olympic NP's cougar population. The Olympic range is now about 115 km from the nearest large block of prime cougar (and wolf) habitat in the South Cascades (Beier 2009:184).

As Alternative 2, Executive Summary, states on p. 10, "Translocation may be used to establish and expand wolf populations in regions that wolves have failed to reach though natural dispersal." The Olympic Peninsula will be very difficult for wolves to reach through natural dispersion. Assuming the majority of wolves come from the east, to reach the Olympic Peninsula they must overcome the natural barrier of the Puget Sound or the manmade barrier of Interstate 5. These 2 barriers disconnect the Olympic Peninsula from the rest of the state and will likely take decades for wolves to reach this prime habitat naturally. In the meantime, the ecosystem of the Olympic Peninsula will continue to be damaged by the effects of an incomplete food chain.

Singleton and colleagues speculated that the current "landscape is an effective barrier for lynx, wolverine, wolves, and grizzly bears." The same landscape patterns may also limit but probably do not preclude cougar movement (Beier 2009:184). Elk and deer are common through most of this 115-km-long area. We strongly urge WDFW and the National Park Service to initiate connectivity evaluations, including modeling, and develop potential mitigations to restore landscape connectivity across this region.

Health of the Olympic Ecosystem: As Alternative 2 states on p. 14, wolves play "an important ecological role in maintaining native ecosystem functions and processes." This is particularly relevant to the Olympic Peninsula. As the final draft plan points out on p. 96, research from Beschta and Ripple (2008) demonstrate that the lack of wolves on the Olympic Peninsula has led to overgrazing of riparian vegetation by elk along the Hoh River. The recovery of an ecologically effective population of wolves

undoubtedly greatly facilitate ecological restoration within Olympic National Park and Olympic National Forest.

Cultural Importance of Wolves: As stated in Alternative 2 on p. 18, wolves play an important role in the creation stories of many Native American tribes, including those that live on the Olympic Peninsula including the Quinault, Quileute, Makah, and S'Klallam. The tie between Native American tribes and wolves is likely more important on the Olympic Peninsula than anywhere else in the state and should be taken into consideration when looking at translocation.

Olympic Meets Reasons Used for Focusing on Southern Cascade Mountains for Translocation: In Alternative 2, Appendix E, on page 207, the draft plan lists the reasons earlier discussions focused on the southern Cascade Mountains as the primary site for translocation. The Olympic Peninsula also contains these characteristics. According to the final draft plan, the southern Cascades:

- "Contain about half of Washington's elk population and large continuous blocks of public land. Consequently, there is abundant natural prey for wolves combined with potentially lower levels of conflict with livestock when compared to areas with extensive private landholdings." The Olympic Peninsula has nearly the same number of elk as the Mount St. Helens herd when the number of elk within Olympic National Park is included. This still does not include elk residing on tribal land, which is extensive on the Olympic Peninsula. In terms of large continuous blocks of public land, well over half of the Olympic Peninsula is made up of public land that includes Olympic National Park and Olympic National Forest. There is very little grazing and very little private landholdings in this area.
- Are "distant from colonizing areas in Idaho and British Columbia, and there are more potential barriers to overcome for successful natural dispersal. However, once wolves are reestablished in the southern Cascades, extensive contiguous forested public lands will facilitate natural dispersal with this area." The Olympic Peninsula is also very far from colonizing areas and has many barriers, including Interstate 5 and Puget Sound. Again, the Olympic Peninsula has very extensive forested public lands for dispersal on the Peninsula.
- Include an elk herd, "which is the largest herd in the state, [and] are currently experiencing problems due to advanced forest succession. Wolf recovery in the southern Cascades could help restore and contribute to ecological balance and integrity in these types of situations." The Mount St. Helens elk herd is only slightly larger than the Olympic Peninsula herd. The elk in Olympic, why not facing the same problems as the Mount St. Helens herd, are causing problems with the ecological health of the Peninsula, especially in riparian areas along the Hoh River. Furthermore, overpopulation of coyotes has led to a decrease in the population of endemic Olympic marmots. Wolves are the only historic species not found on the Olympic Peninsula and would help return balance to this extremely important ecosystem.

In conclusion, the Olympic Peninsula is one of the best areas in the state for translocation due to its excellent habitat and low probability of conflict with humans or livestock. The return of wolves would greatly aid the health of the Olympic Peninsula ecosystem.

Recovery Goals Should Be Established for Pacific Coast Region: We support Alternative 3 of the DEIS which includes a fourth recovery region, the Pacific Coastal Region, as recommended by initial peer reviewers. As a separate region with different habitat, landscapes, and barriers to dispersal, specific recovery goals are needed for this region to ensure reaching the objective of having returning wolves distributed in a significant portion of the species' former range in Washington. Establishing this region would also accelerate the return of wolves to the Olympic Peninsula. We support Alternative 3 due, among other reasons, to its inclusion of the Pacific Coastal recovery zone.

In summary, GCWC supports the recovery of viable, ecologically effective populations of wolves in Washington. To reach the stated goal of a population distributed in a signification portion of the species' former range, and to meet the Park Service's non-impairment obligatins, the Olympic Peninsula should be one of the primary relocation sites and have its own recovery region. Besides the many barriers wolves must cross to reach the peninsula naturally, the superb habitat and low possibility of wolf/human conflict make the Olympic Peninsula one of the best relocation sites in the state.

We appreciate your consideration of our comments and look forward to reviewing the final plan.

Sincerely,

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References:

Beier, Paul. 1993. Determining Minimum Habitat Areas and Habitat Corridors for Cougars. *Conservation Biology* 7:94-108.

Beier, Paul. 2009. A Focal Species for Conservation Planning. Pages 177-189. In

Hornocker, Maurice, and Sharon Negri. 2009. *Cougar Ecology and Conservation.* Chicago and London: University of Chicago Press. 306 pages.

Beschta, Robert L. 2005. Reduced Cottonwood Recruitment Following Extirpation of Wolves in Yellowstone's Northern Range. Ecology 86:391-403.

Beschta, Robert L, and William J. Ripple. 2006. River Channel Dynamics Following Extirpation of Wolves in Northwestern Yellowstone National Park, USA. *Earth Surface Processes and Landforms* 31:1525-1539.

Beschta, Robert L, and William J. Ripple. 2007. Wolves, Elk, and Aspen in Winter Range of Jasper National Park, Canada. Canadian Journal of Forest Research-Revue Canadienne De Recherche Forestiere 37:1873-1885.

Beschta, Robert L., and William J. Ripple. 2008. Wolves, Trophic Cascades, and Rivers in Olympic National Park, USA. *Ecohydrology* 1:118-130. Published online in Wiley InterScience (www.interscience.wiley.com <http://www.interscience.wiley.com>) DOI: 10.1002/eco.12.

Crooks, K.R., and Michael Soulé. 1999, Mesopredator Release and Avifaunal Extinctions in a Fragmented System. *Nature* 400:563-566.

Dayton, P.K. 1972. Toward an Understanding of Community Resilience and the Potential Effects of Enrichment to the Benthos at McMurdo Sound, Antarctica. Pages 81-96 in B.C. Parker, editor. Proceedings of the Colloquium on Conservation Problems in Antarctica. Allen Press, Lawrence, Kansas.

Eisenberg, Cristina. 2010. The Wolf's Tooth: *Keystone Predators, Trophic Cascades, and Biodiversity.* Washington; Covelo, CA; London: Island Press. 246 pages.

Eisenberg, Cristina, William Ripple. 2009. Trophic Cascades Involving Humans, Wolves, Elk, and Aspen: Defining an Ecologically Effective Wolf Population. Page 176. *In* Defenders of Wildlife, Carnivores 2009: Carnivore Conservation in a Changing World. Program and Book of Abstracts. Denver, CO, November 15-18, 2009. 292 pp.

Eisenberg, Cristina, Norman Johnson, Hal Salwasser, and Jerry Franklin. IN PRESS. Ecologically Effective Populations and Trophic Cascades: The Potential for Wolf Recovery to Shift Conservation Policy.

Estes, J.A. and J.F. Palmisano. 1974. Sea Otters: Their Role in Structuring Communities. *Science* 185:1058-1060.

Estes, James A., M. Tim Tinker, and James L. Bodkin. 2010. Using Ecological Function to Develop Recovery Criteria for Depleted Species: Sea Otters and Kelp Forests in the Aleutian Archipelago. *Conservation Biology* [in press].

Hebblewhite, M., C.A. White, C.G. Nietvelt, J.A. McKenzie, T.E. Hurd, J.M. Fryrxell, S.E. Bayley, and P.C. Paquet. 2005. Human Activity Mediates a Trophic Cascade Caused by Wolves. *Ecology* 86:2135-2144.

Hey, Ellen. 1992. The Precautionary Concepts in Environmental Policy and Law: Institutionalizing Caution. *Georgetown International Environmental Law Review.* 4:303.

Jackson, J.B.C. et al. 2001. Historical Overfishing and the Recent Collapse of Coastal Ecosystems. *Science* 293:629-638.

Kuhlmann, Walter. 1997. Can the Precautionary Principle Protect Us From Imperial Ecology? *Wild Earth* 7(3):67-71.

Morris, W., and D.F.Doak. 2002. *Quantitative Conservation Biology: Theory and Practice of Population Viability Analysis.* Sinauer Associates, Sunderland, Massachusetts.

Noss, Reed F. 1995. *Maintaining Ecological Integrity in Representative Reserve Networks.* World Wildlife Fund Canada/United States Discussion Paper. 77 pages.

Noss, Reed F. 1995/96. Science Grounding Strategy: Conservation Biology in Wildlands Work. *Wild Earth* 5(4):17-19.

O'Gorman, E.J., and M.C. Emmerson. 2009. Perturbations to Trophic Interactions and the Stability of Complex Food Webs. *Proceedings of the National Academy of Sciences* 106:13393-13398.

Paine, R.T. 1992. Food-web Analysis Through Field Measurement of Per Capita Interaction Strength. *Nature* 355:73-75.

Power, M.E., D. Tilman, J.A. Estes, B.A. Menge, W.J. Bond, L.S. Mills, G. Daily, J.C. Castilla, J. Lubchenco, and R.T. Paine. 1996. Challenges in the Quest for Keystones. *BioScience* 46:609-620.

Raffensperger, Carolyn, and Joel Tickner (eds.). 1999. *Protecting Public Health and the Environment: Implementing the Precautionary Principle.* Washington, D.C.; Covelo, CA: Island Press. 385 pages.

Ripple, W.J. R.L Beschta. 2003. Wolf Reintroduction, Predation Risk, and Cottonwood Recovery in Yellowstone National Park. *Forest Ecology and Management* 184:299-313.

Ripple, William J, and Robert L. Beschta. 2004. Wolves, Elk, Willows and Trophic Cascades in the Upper Gallatin Range of Southwestern Montana, USA. *Forest Ecology and Management* 200: 161-181.

Ripple, William J, and Robert L. Beschta. 2006. Linking Cougar Decline, Trophic Cascade, and Catastrophic Regime Shift in Zion National Park. *Biological Conservation* 133: 397-408.

Ripple, William J, and Robert L. Beschta. 2007. Hardwood Tree Decline Following Large Carnivore Loss on the Great Plains, USA. *Frontiers In Ecology and Environment* 5:241-246.

Ripple, William J, and Robert L. Beschta. 2008. Trophic Cascades Involving Cougar, Mule Deer, and Black Oaks In Yosemite National Park. *Biological Conservation* 141:1249-1256.

Ripple, W.J., and E.J. Larsen, 2002. Historic Aspen Recruitment, Elk, and Wolves in Northern Yellowstone National Park, USA. *Biological Conservation* 95:361-370.

Shaffer, Mark L. 1981. Minimum Population Sizes for Species Conservation. *BioScience*, 31(2):131-134 (article consists of 4 pages). Stable URL: http://www.jstor.org/stable/1308256

Singleton, P.H., J.F. Lehmkuhl, and W. Gaines. 2001. Large-Scale Carnivore Habitat Connectivity in Washington. In *Proceedings of International Conference on Ecology and Transportation*, 583-594. Raleigh, NC: Center for Transportation and the Environment, North Caroline State University.

Soulé, M.E. 1987. *Viable Populations for Conservation*. Cambridge University Press, Cambridge, United Kingdom.

Soulé, Michael E., and John Terborgh. 1999. *Continental Conservation: Scientific Foundations of Regional Reserve Networks*. Washington, D.C.; Covelo, CA: Island Press. 227 pages.

Soulé, Michael, James A. Estes, Joel Berger, and Carlos Martinez Del Rios. 2003. Ecological Effectiveness: Conservation Goals for Interactive Species. *Conservation Biology*. 17(5): 1238-1250.

Soulé, Michael E., James A. Estes, Brian Miller, and Douglas L. Honnold. 2005. Strongly Interactive Species: Conservation, Policy, Management, and Ethics. *BioScience* 55(2):168-176.

Terborgh, John, James Estes, Paul Paquet, Katherine Ralls, Diane Boyd-Heger, Brian Miller, and Reed Noss. 1999. The Role of Top Carnivores in Regulating Terrestrial Ecosystems. *Wild Earth* 9(2):42-56.

Terborgh, J., J.A. Estes, P.C. Paquet, K. Ralls, D. Boyd-Heger, B. Miller, and R. Noss. 1999. Role of Top Carnivores in Regulating Terrestrial Ecosystems. Pages 39-64 in M.E. Soule´ and J. Terborgh, editors. *Continental Conservation: Design and Management Principles for Long-term, Regional Conservation Networks.* Island Press,

Washington, D.C.

Terbough, J. et al. 2001. Ecological Meltdown in Predator Free Forest Fragments. *Science* 294:1923-1925.

WDFW. 2008. Draft Wolf Conservation and Management Plan for Washington. Available from: http://wdfw.wa.gov/wildlife/management/gray_wolf/draft_plan/05oct2009_draft_plan_deis.pdf. Accessed 7 November 2010.

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HABITAT PROGRAM

National Wildlife Federation and Washington Wildlife Federation
Public Comments
WDFW Draft Wolf Conservation and Management Plan
January 2009

Responsible Official: Teresa A. Eturaspe
SEPA/NEPA Coordinator
Washington Dept. of Fish and Wildlife
600 Capitol Way North
Olympia, WA 98501-1091

Dear Ms. Eturaspe,

The National Wildlife Federation (NWF) is the nation's largest conservation organization with approximately 4 million members and supporters nationwide, 100,000 in Washington State, and 46 affiliate organizations. Washington Wildlife Federation (WWF) is NWF's Washington State affiliate, working with sportsmen for two decades to conserve natural resources in Washington. NWF has been heavily involved in recovery efforts for many species including wolves in the Northern Rockies and Midwest and grizzly bear recovery in the northern Rockies. NWF was a litigant in the case that successfully challenged an overly large Distinct Population Segment finding for delisting wolves in the Midwest. However, NWF and WWF generally supports delisting of species, including wolves, when recovery targets are met. In court, NWF supported the successful Fish and Wildlife Service effort to restore wolves to Yellowstone and central Idaho as experimental nonessential populations. NWF has been involved in the development of state wolf management plans in both the northern Rockies and in the Midwest. NWF legal team also supported the effort to delist grizzly bears in Yellowstone once recovery targets were achieved.

We are impressed by the effort made by the Washington Department of Wildlife to develop a wolf management plan for Washington State. Experience has shown that wolves in increasing numbers will continue to return through natural dispersal to areas in Washington from which they were extirpated. Therefore it is appropriate and proactive for Washington to have a management plan in place to deal with existing wolves as well as for the inevitability that there will be more wolves in the future. Pretending that this isn't the case (e.g. Alternative 4) will only postpone the resolution of problems posed by a recovering population and will not benefit wolves, conservationists, hunters, or people who would prefer to ignore the fact that wolves are re-colonizing the state.

The near elimination of wolves from the U.S. south of Canada was misguided and the recovery efforts represent a success story for conservation under the federal Endangered Species Act of a sometimes problematic and controversial large carnivore that requires large landscapes. There are few species that inspire both such excessive admiration and loathing by different groups. NWF

advocates for conservation of all wildlife species, but recognizes that conservation efforts must be accomplished within a political and social framework that minimizes adverse consequences experienced by groups such as livestock owners. This means that there is no likelihood or need to recover wolves throughout their entire historical range and successful conservation must focus on areas that are both biologically and socially appropriate for wolves. We believe the draft Management Plan is well-designed to address wolf recovery in Washington in a way that both acknowledges the problems that will develop and lays out an approach for minimizing these problems. Specifically, we believe that the sections describing the impacts of wolves on game populations are accurate.

Chapter 14 does a good job of identifying and addressing the potential problems associated with wolves, but devotes only a single paragraph to positive impacts. We acknowledge that these positive benefits are hard to quantify and that wildlife tourism is addressed somewhat (page 164). However, we are surprised that more emphasis wasn't placed on these positive aspects in this plan and earlier in the plan. In Alaska, for example, it was estimated that visitors were willing to pay $309 for a hypothetical trip to see a pack of wolves and that the gross economic value of a wolf viewing trip was $671 (Miller et al. 1998. Ursus 10:357-376). Also, the discussion of the ecological importance of reestablishing top carnivores in the section on ecosystem response (page 96) barely mentions the recent literature on trophic cascades that demonstrate the ecological importance of reestablishing wolves and other top predators on ecosystems. These deficiencies do not have to be remedied to have a functional management plan, but it is worth noting that in our view the positive aspects from reestablishment of viable wolf populations in Washington are generally underrepresented in this draft.

The National Wildlife Federation and Washington Wildlife Federation believe that Alternative 3 is the most appropriate of the alternatives provided, however we acknowledge that the working group's preferred Alternative 2 might accomplish the plan's objectives. Alternative 3 in our view is more likely to accomplish these objectives. The minority report alternative would not accomplish the objective of establishing a viable wolf population in the state. We offer the following comments on specific aspects of the plan.

NWF and WWF believe that it is appropriate to have a separate recovery region for the Pacific Coast as outlined in Alternative 3. The fracture zone at the base of the Olympic Peninsula will make it difficult for wolves to naturally re-colonize the Olympic Peninsula which is likely good habitat for them. This area is appropriate for wolves because it includes a large National Park with abundant wild ungulates where wolves will improve ecosystem function and add to visitor enjoyment, and is a place with relatively low potential for conflicts with livestock producers.

We observe that Director Koenings took the option of reintroducing wolves from outside of the state into Washington off the table for the working group. Correspondingly, none of the alternatives include this and all depend on naturally dispersing wolves and possible translocations of such dispersing wolves into vacant recovery areas. This may or may not accomplish Washington's objective of establishing a viable population within the state as this approach may provide too narrow a genetic basis for Washington's wolf population. Periodic introduction of wolves (and wolf genes) from distant areas may be necessary to assure genetic heterogeneity and demographic vigor. Monitoring of genetic characteristics of Washington's wolves, as suggested in the research section, is a necessary tool that would help determine if such extra-state introductions were needed.

On a related point, although NWF supports the option of translocating natural dispersing wolves to vacant habitats, it would be appropriate to include a time period to start such translocations within the state if natural dispersal failed to result in populations in the recovery areas.

The downlisting and delisting thresholds mentioned in this plan apply only to Washington's endangered species statute and not to the federal Endangered Species Act. We were initially confused about this in our review of the documents and recommend that it be explicitly recognized in several places in the cover letter, in the executive summary, and in the introduction and in the caption headings for the table of alternatives that these criteria apply only to the Washington statute and not to the Federal ESA. It obviously is outside of the scope of the State of Washington's authority to establish delisting or downlisting criteria for a federally listed species. Before these wolves could actually be fully managed by the State of Washington like other resident wildlife species, they would have to be delisted within a Distinct Population Segment recognized by the Fish and Wildlife Service. It would help inform the citizens of Washington about this critical point if this point was made more explicitly and clearly.

Furthermore, the suggestion that 15 breeding pairs is sufficient to establish a viable population is questionable. For a state as large as Washington, this number may not provide enough opportunities for long-term reproduction success. NWF would recommend a higher number.

Given the legal barriers that need to be overcome to getting wolves successfully delisted in the northern Rockies and in the Midwest, it is to be expected that some groups will litigate to prevent federal delisting regardless of how appropriate the state's targets might be. Therefore, it is misleading for this plan to suggest that wolves could actually be delisted once the identified demographic targets are achieved without court delays.

NWF and WWF supports the language on landscape connectivity, which is necessary to maintain healthy wolf populations.

Non-lethal harassment using rubber bullets and other methods is unlikely to be effective. Provisions for lethal control by livestock owners under specified conditions (repeated depredations) are important as proposed, as are provisions allowing lethal take in the act of attacking livestock. Allowing lethal control in the case of dogs being attacked is appropriate only when there are enough wolves to downlist to sensitive. Although there may be some exceptions, we do not believe it is appropriate to allow lethal control of wolves attacking dogs on public lands even when wolves are delisted under Washington law. More flexibility in terms of controlling wolves attacking dogs on private lands is appropriate. We hope these comments are helpful and, again, we congratulate the Department of Fish and Wildlife for developing a proactive and comprehensive and appropriate wolf management plan.

Best regards,

Jim Adams
Regional Executive Director
National Wildlife Federation

Sterling Miller, Ph.D.
Senior Wildlife Biologist
National Wildlife Federation

Mark Quinn
President
Washington Wildlife Federation

From: Jennifer Schwartz
To: SEPADesk2 (DFW);
cc: "Greg Dyson";
Subject: WA Wolf Plan Comments
Date: Friday, January 08, 2010 1:26:35 PM
Attachments: WA.WolfPlan.Comments.pdf

Please find attached comments from the Hells Canyon Preservation Council regarding the Wolf Conservation and Management Plan DEIS.

Sincerely,

Jennifer Schwartz

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HELLS CANYON PRESERVATION COUNCIL

January 8, 2010

Responsible Official: Teresa A. Eturaspe
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Re: "Wolf Conservation and Management Plan DEIS"

Dear Coordinator Teresa A. Eturaspe,

The Hells Canyon Preservation Council (HCPC) enthusiastically supports the restoration of wolves in Washington and the development of a protective state management plan. HCPC played a key role in developing the Oregon Wolf Management Plan with one of our staff on the Advisory Committee. We firmly stand behind the Oregon Plan as a model wolf management plan that other states can look to for guidance. HCPC is a non-profit conservation organization based in La Grande, OR with approximately 1,000 members, including many in Washington. HCPC's mission is to protect and restore the inspiring wildlands, pure waters, unique habitats and biodiversity of the Hells Canyon-Wallowa and Blue Mountain Ecosystems through advocacy, education and collaboration, advancing science-based policy and protective land management. HCPC actively participates in decision-making processes affecting regional wolf management.

HCPC strongly supports WA's goal to restore wolves to their native habitat and overall we find that the DEIS developed by the state is both comprehensive and balanced in nature. We also applaud the state's implementation of a stakeholder process to assist in the development of this plan. The plan addresses possible translocation of wolves as a conservation tool, education and outreach of citizens, proactive measures for reducing conflicts and provides for a compensation program. Important non-lethal management methods would be emphasized, especially while wolf numbers are low.

For the following reasons we share the same concerns expressed by the Defenders of Wildlife:

Our primary concerns with the 4 alternatives set by the state are 1) the low number of wolves (15 breeding pairs) as the criteria for delisting; 2) the preferred Alternative 2's limitation of only 3 recovery regions which doesn't include the Pacific Coast, a highly important region for wolves; 3) the restriction limiting wolf restoration only to wolves

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that disperse on their own into the state, which may hinder wolf recovery and the genetic health of the population; 4) allowing livestock owners or their representatives to kill wolves for taking livestock or the public to kill wolves for attacking domestic dogs (which appears to include hunting dogs) while wolf numbers are exceedingly low; and 5) a failure to fully recognize the suitability of the Olympic Peninsula as wolf habitat and provide for their restoration there.

The plan offers no scientific justification for delisting wolves at 15 breeding pairs. The final plan should include a scientific analysis of wolf population goals needed to secure a self-sustaining, healthy wolf population that will have a high probability of thriving into the foreseeable future (>100 years) identified as a primary goal of this DEIS (see above). The plan should also secure a wolf recovery area in the Pacific Coast/Olympic National Park region which offers the lowest livestock conflicts of all the regions while providing important suitable habitat where wolves were originally established as a native species before their extirpation. Additionally, the state cannot rely on regular dispersal of wolves from Idaho, Montana or Canada to provide for a genetically viable wolf population at such low numbers but should adopt a plan for augmenting the wolf population if natural dispersal fails to occur before an adequate threshold of wolves is established in the state.

HCPC has the following concerns with the four alternatives identified in the DEIS:

Alternative 1:

This alternative has a lower standard for protection and restoration of wolves in the state and a more aggressive lethal control strategy. It would implement lethal control options at earlier listing statuses than the other alternatives, allowing livestock owners or their representatives to kill wolves for taking livestock and the public to kill wolves for attacking domestic dogs. The permission to conduct lethal control without agency supervision invites abuse and misuse of these actions. For example, if dead or dying livestock are present, this can entice wolves to prey on livestock. Domestic hunting dogs could also attract wolves, especially while defending wolf pups at their den or rendezvous sites, allowing dog owners to kill wolves even though the wolves were provoked to attack. Until wolves reach a minimum threshold population that secures their full recovery, only wildlife agencies should be allowed to determine if and when wolves are lethally controlled.

This alternative also sets a lower standard for geographic distribution of recovery objectives of only 2 breeding pairs in eastern Washington, 2 in the northern Cascades, 2 in the southern Cascades, and 9 breeding pairs added anywhere in these three region. Under this scenario, the state downlisting and delisting of the species could occur with the majority of animals present in only one or two recovery regions, significantly reducing the chances for full wolf recovery in the state.

In regard to compensation for livestock losses, this alternative pays full value for confirmed wolf depredations and half of the full value for probable losses that occur only on private lands. (Table 1, page 21.) While this system may better protect the

compensation program from fraud or misuse, the limitation may be too rigid to achieve the major benefits of a compensation program, which are to reduce the cost of wolf restoration to livestock owners and to promote greater tolerance for wolves in agricultural communities. "Full value" is not defined under this DEIS and could include value for breeding, pregnancies, animal losses covered by insurance, registered animals costing in excess of thousands of dollars, sentimental value, etc. The state would likely be unable to cover the costs of a compensation program if these values are not defined or limited.

Related to compensation, this alternative does allow WDFW to work with livestock operators to provide technical assistance to implement proactive measures to reduce conflicts with wolves. However, unlike Alternatives 2 and 3, WDFW would rely on existing staff adding to their current duties instead of hiring wolf specialists to focus on implementing proactive measures. This alternative would not likely provide enough support to achieve the DEIS goal to "Manage wolf-livestock conflicts in a way that minimizes livestock losses, while at the same time not negatively impacting the recovery or long-term perpetuation of a sustainable wolf population."

Under this alternative, once there are 12 breeding pairs of wolves in the state, they could be moved or killed if wolf predation is considered a limiting factor for elk herds that are below objectives as set by the state. Limiting factors are not adequately defined under this plan but any reduction of wolf numbers at this low population level could be detrimental to the re-establishment of wolves in the state. This alternative does not place additional emphasis on improving ungulate management to support wolf restoration efforts.

Unlike Alternative 3, this alternative does not place a high priority on public outreach and education even though the DEIS states "Several aspects of the plan are critical to its success… Because human tolerance has been and remains the primary limiting factor for wolf survival, tolerance and acceptance must be adequately addressed for citizens who will be directly affected by the presence of wolves. This makes technical assistance, compensation, and outreach some of the highest priorities for wolf conservation. An active outreach and education program must offer guidance and information about living with wolves and about rules and regulations related to management. Recovery of wolves means recognizing them as a native species of Washington, with legal, social, cultural, and biological value, and an important ecological role in maintaining native ecosystem functions and processes." (Washington Wolf DEIS Chapter 1, page 14) Public outreach and education are crucial to the success of any wolf management program and must be supported as a high priority activity under the final plan.

For the reasons stated above, HCPC opposes this alternative.

Alternative 2 (The State's Preferred Alternative):

Alternative 2 was selected by the state (though not the wolf advisory committee) as the preferred alternative because the State believes it meets the goals and objectives for

establishing a long-term viable wolf population in Washington while addressing wolf-livestock conflicts and interactions between wolves and ungulates. However, Alternative 2 sets a more moderate geographic distribution of conservation/recovery objectives for downlisting and delisting, with an emphasis on adequate numbers being present in the Southern Cascades/Northwest Coast recovery region. Specifically, before delisting can occur, this alternative requires 2 breeding pairs in eastern Washington, 2 in the north Cascades, 5 in the southern Cascades/northwest coast and 6 more anywhere in the state.

HCPC supports many of the concepts and goals established in this alternative, which includes a range of proactive, non-lethal and lethal control options for addressing livestock conflicts. However, we oppose Alternative 2 overall because it falls short of establishing wolves in a fourth Pacific Coast recovery region to achieve delisting and it allows livestock owners or their representatives to kill wolves for taking livestock or the public to kill wolves for attacking domestic dogs while wolf numbers are below 15 breeding pairs. Until wolves reach a minimum threshold population that secures their recovery, and that has yet to be substantiated, only wildlife agencies should be allowed to determine if and when wolves are lethally controlled.

In regard to compensation for livestock losses, paying twice the value of confirmed livestock losses on grazing sites of 100 or more acres may address some livestock owner's concerns about being unpaid for missing livestock. However, it will also reduce the incentive for livestock owners to adopt reasonable, proactive deterrents and livestock husbandry methods because some will consider getting twice the value for dead livestock as an economic benefit to their operation. This will be especially true in cases where livestock losses are most easily confirmed such as a large pasture. The state could find itself paying for substantially more dead livestock than it would if it instead encouraged effective nonlethal preventative methods, which reduce livestock losses and better prepares livestock owners to adapt to the return of wolves. Again, "full value" is not defined under this DEIS and could include value for breeding, pregnancies, animal losses covered by insurance, registered animals costing in excess of thousands of dollars, sentimental value, etc. The state would likely be unable to cover the costs of a compensation program if these values are not defined or limited.

HCPC supports Alternative 2 and 3's actions to hire wolf specialists whose duties would include providing technical assistance to livestock operators to implement proactive, nonlethal measures to reduce conflicts with wolves. Some of the most effective methods include: removal of dead or dying livestock, increased human supervision of livestock when possible, using livestock guarding dogs during certain times of the year, installing different types of fencing and lighting, and using a variety of scare devices. The effectiveness of these deterrents is highly dependent on a number of factors, including type, number, and age of livestock, grazing and pasture conditions, and season. However, we encourage the State to provide not only information and training, but when appropriate, to also supply or loan equipment like fladry, turbofladry, lighting sensors, alarm systems, monitoring devices, and other practical tools to ranchers who are in high priority wolf conservation areas. The wolf specialists should also work with other wolf managers and researchers to determine which methods are most effective in reducing

livestock losses to wolves as this information is vitally important for national and international wolf conservation programs.

Under Alternative 2, once wolves are delisted with 15 breeding pairs in the state, they may be moved or killed if research indicates that wolves are a "limiting factor" for "at-risk" ungulate populations. Neither "limiting factor" nor "at-risk" are adequately defined. However, this alterative does allow the state to manage ungulate hunting to benefit wolf restoration efforts.

Unlike Alternative 3, this alternative does not place a high priority on public outreach and education even though the DEIS states "Several aspects of the plan are critical to its success… Because human tolerance has been and remains the primary limiting factor for wolf survival, tolerance and acceptance must be adequately addressed for citizens who will be directly affected by the presence of wolves. This makes technical assistance, compensation, and outreach some of the highest priorities for wolf conservation… An active outreach and education program must offer guidance and information about living with wolves and about rules and regulations related to management. Recovery of wolves means recognizing them as a native species of Washington, with legal, social, cultural, and biological value, and an important ecological role in maintaining native ecosystem functions and processes" (Washington Wolf DEIS Chapter 1, page 14). Public outreach and education are crucial to the success of any wolf management program and must be supported as a high priority activity under the final plan.

Alternative 3:

HCPC supports this alternative over the others because it places the greatest emphasis on protection and restoration of wolves in Washington and is "predicted to have a higher probability of achieving and maintaining a long-term viable wolf population in Washington compared to the other alternatives." It sets a higher standard for the geographic distribution of conservation/recovery objectives for downlisting and delisting wolves, including a requirement that they be present in a fourth recovery region – the Pacific Coast Recovery Region – before the species can be downlisted and delisted. Specifically, this alternative requires 3 breeding pairs in eastern Washington, 3 in the north Cascades, 3 in the southern Cascades, 3 in the Pacific coastal range, and 3 more anywhere in the state. This alternative is the most restrictive on when management tools for addressing livestock conflicts can be implemented, which needs to be modified to better meet wolf conservation goals (see below) and it also recommends the most liberal compensation package for documented cases of confirmed and probable depredation.

While Alternative 3 is the most likely to secure a healthy, statewide wolf population that includes the Pacific Coast and Olympic National Park region, it still allows livestock owners or their representatives to kill wolves for taking livestock and the public to kill wolves for attacking domestic dogs while wolf numbers are below 15 breeding pairs. As explained above in Alternative 1, HCPC opposes allowing such liberal control authority until wolves reach a minimum threshold population that secures their recovery. Prior to

this recovery standard being met, only wildlife agencies should be allowed to determine if and when wolves are lethally controlled.

In regard to compensation for livestock losses, paying twice the value of all confirmed and probable livestock losses on private and public land may address some livestock owner's concerns for being unpaid for missing livestock. While there is good evidence that compensation can prevent a decrease in livestock operators' tolerance for wolves (Musiani et al 2009), there is no evidence among compensation studies that using a multiplier for losses increases public tolerance for wolves. However, paying for values above known and documented losses may reduce the incentive for livestock owners to adopt reasonable, proactive deterrents and livestock husbandry methods because some will consider getting twice the value for dead livestock as an economic benefit to their operation. The State could find itself paying for substantially more dead livestock than it would if it instead encouraged effective nonlethal preventative methods, which reduce livestock losses and better prepares livestock owners to adapt to the return of wolves. Again, "full value" is not defined under this DEIS and could include value for breeding, pregnancies, animal losses covered by insurance, registered animals costing in excess of thousands of dollars, sentimental value, etc. The State would likely be unable to cover the costs of a compensation program if these values are not defined or limited.

HCPC supports Alternative 2 and 3's actions to hire wolf specialists whose duties would include providing technical assistance to livestock operators to implement proactive, nonlethal measures to reduce conflicts with wolves. Some of the most effective methods include: removal of dead or dying livestock, increased human supervision of livestock when possible, using livestock guarding dogs during certain times of the year, installing different types of fencing and lighting, and using a variety of scare devices. The effectiveness of these deterrents is highly dependent on a number of factors, including type, number, and age of livestock, grazing and pasture conditions, and season. However, counter to its enhanced recovery goals, Alternative 3 does not allow livestock operators to use nonlethal injurious harassment (e.g. rubber bullets, cracker shells, electrical fencing, etc) to deter wolves from preying on livestock until wolves are downlisted to "sensitive" status. This restriction may well have a reverse impact by increasing wolf depredation conflicts and result in more lethal control of wolves, which could have been avoided by using these tools. This restriction should be removed and the State should provide permits and training for ranchers to use these methods when needed to reduce wolf and livestock losses.

We encourage the State to provide not only information and training, but when appropriate, to also supply or loan equipment like fladry, turbofladry, lighting sensors, alarm systems, and other practical tools to ranchers who are in high priority wolf conservation areas. The wolf specialists should also work with other wolf managers and researchers to determine which methods are most effective in reducing livestock losses to wolves as this information is vitally important for national and international wolf conservation programs.

Under this alternative, once wolves are delisted with 15 breeding pairs in the state, they may be moved or killed if research indicates that wolves are a "limiting factor" for "at-risk" ungulate populations. Neither "limiting factor" nor "at-risk" are adequately defined. The alternative restricts hunting harvest of ungulates to benefit wolves in each recovery area. If those restrictions are taken too far, it may have the reverse effect of reducing public tolerance for wolves, especially among hunters, which could undermine wolf conservation efforts.

This alternative places the highest priority on public education and outreach. As these tools are imperative to the success of any wolf management program, this aspect of Alternative 3 is better aligned than the other alternatives to ensure that the State's wolf conservation goals are achieved: "Develop public understanding of the conservation and management needs of wolves in Washington, thereby promoting the public's coexistence with the species."

Alternative 4 – No Action (Current Management):

This alternative emphasizes protection and restoration of wolves using existing programs, but does not develop a conservation and management plan for the Washington. As a result, wolves would continue to be listed as endangered until a state recovery plan was completed that established recovery objectives. Limited management options would be used to address conflicts, and compensation provided for livestock depredation would be through the Defenders of Wildlife program until the Washington State legislature's wolf compensation program (SHB 1778 effective July 1, 2010) replaces Defenders' wolf compensation program. With wolves now returning to Washington State, this alternative would put state officials in a reactive rather than proactive management scenario. A solid wolf management plan is needed now to ensure the future of wolves in the state.

Additional Concerns and Suggestions

These alternatives are all limited to the establishment of 15 breeding pairs or less to delist wolves in Washington State yet there is no evidence that 15 breeding pairs will secure recovery or even allow for an interconnected, viable wolf population. The final plan should include a scientific analysis of wolf population goals needed to secure a self-sustaining, healthy wolf population that will have a high probability of thriving into the foreseeable future (>100 years) identified as a primary goal of this DEIS.

None of these four alternatives allow for reintroduction of wolves to the state under any scenario, which could lead to genetic malformations in the wolf population unless the current wolf numbers are supplemented by more dispersing, genetically diverse wolves that successfully breed with the existing wolves or their offspring. The Isle Royale wolf population has been used as an example for those claiming that small, isolated wolf populations are not affected by genetic issues. New findings from Isle Royale show the importance of genetic connectivity to the health of wolf populations. Scientists who have been conducting long-term studies on these wolves have recently documented that 58 percent of Isle Royale's wolves have suffered spinal malformations due to extreme

inbreeding (Raikkonen et al 2009). These malformations can cause rear leg pain and weakness and even paralysis. Given that wolves rely on their ability to run and chase to survive, this is clearly a concern for wolf populations managed at or starting from such low population levels as those in Washington state.

The State is also relying exclusively on dispersing wolves from Idaho, Montana and Canada to provide adequate wolf recolonization and genetic diversity for its founding wolf population. However, wolves in Idaho and Montana have been recently delisted and under the current federal wolf delisting plan, these states are allowed to reduce the regional wolf population from an estimated 2,000 wolves to 450 or fewer. If the northern Rockies wolf population is reduced that dramatically, wolf subpopulations could become isolated from one another preventing them from breeding with other subpopulations or dispersing to states like Washington and Oregon. As such, augmentation of the state's wolf population should be added to the final EIS as a tool to ensure genetic health of the wolves, especially while wolf numbers remain low. Augmentation should also be considered when determining which type of wolves would best be suited for the state's diverse landscapes. For example, wolves from the coastal range of British Columbia would likely be the best suited for Washington's Pacific coastal range because of the similar habitat and prey base in these areas.

The use of lethal control of wolves should not be allowed until after all reasonable, nonlethal methods have been exhausted. In the northern Rockies, that provision was included in the original wolf reintroduction EIS and had stronger emphasis when there were 6 or fewer breeding pairs in each recovery area. Lethal control was also prevented when there were attractants present that enticed wolves to prey on livestock (e.g. the presence of dead or dying livestock). By adding these provisions to Washington's wolf plan, the State will be better prepared to achieve its stated goals:
1) Restore the wolf population in Washington to a self-sustaining size and geographic distribution that will result in wolves having a high probability of persisting in the state through the foreseeable future (>100 years).
2) Manage wolf-livestock conflicts in a way that minimizes livestock losses, while at the same time not negatively impacting the recovery or long-term perpetuation of a sustainable wolf population.

Thank you for the opportunity to participate in this planning process and for your review of these comments.

Sincerely,

s/ Jennifer Schwartz, Staff Attorney/Campaign Director

Hells Canyon Preservation Council
PO Box 2768
La Grande, OR 97850
541-963-3950 x23
jennifer@hellscanyon.org

15

From:	Peter Morrison
To:	SEPADesk2 (DFW);
cc:	Kim Romain Bondi; David Stokes;
Subject:	Wolf Recovery Plan comments from Pacific Biodiversity Institute
Date:	Thursday, January 07, 2010 2:20:36 PM
Attachments:	WolfRecoveryPlanComments-PBI2010jan7.pdf

Attached are our comments on the Wolf Recovery Plan as a PDF document. We are also mailing an identical set of comments.

Sincerely,

Peter Morrison
Executive Director
Pacific Biodiversity Institute
www.pacificbio.org
PO Box 298
Winthrop, WA 98862 USA
509-996-2490
pm@pacificbio.org

Pacific Biodiversity Institute

Conserving our rich biological heritage with science and compassion for people and nature

January 5, 2010

Pacific Biodiversity Institute would like to express their preference for Alternative 3 as the most beneficial management plan for wolves, and the highest likelihood of maintaining long-term viability for wolf populations in Washington State. This Alternative supports the highest distribution of wolves in each recovery region prior to down listings (with exception to the Southern Cascades), however we feel this still may not adequately facilitate viable wolf populations in our State. While Alternative 3 has an additional recovery region in the Pacific Coast that may hold up recovery efforts in the state, the use of wolf translocations is mentioned similarly in both Alternatives 2 and 3, and therefore would likely be used to initiate recovery of the Pacific Coast in either scenario. Alternative 3 highlights prioritization of education and outreach by wolf specialists. It requires the highest compensation for wolf-livestock depredation on all lands. It also limits lethal control of wolves in ungulate-conflict and livestock-conflict management to state and federal staff, not to livestock owners (in most cases). Alternative 3 also restricts the management of wolves after de-listing to non-lethal methods in instances where ungulate populations are at-risk.

Praise goes out to WDFW in their efforts to formulate this Wolf Conservation Plan and Draft EIS over the last two years. We realize that setting up a diverse assemblage of people in the Wolf Working Group and conducting lengthy discussions of how to move forward with wolf recovery in Washington State took perseverance. Thank you for prioritizing wolves in our state; PBI looks forward to the day when wolves are recovered as an integral part of the ecosystem, restoring balance to the ecology of the northwest.

Thank you for taking the time to consider these comments on the following pages.

Sincerely,

Kim Romain-Bondi
Senior Wildlife Biologist

Peter Morrison
Executive Director

PO Box 298, Winthrop, WA 98862 ❖ 509.996.2490
printed on 100% post consumer recycled paper

Pacific Biodiversity Institute's Comments on Washington State Draft Environmental Impact Statement (DEIS) and Wolf Conservation and Management Plan

Chapter 3

Distribution Requirements for Down listing and Delisting (Pg. 26, lines 8-9, DEIS Oct. 2009): There is a typo which reads, "For Alternative *3*, the conservation/recovery objectives for down listing and delisting are…", which I believe should read, "For Alternative *2*, the conservation/recovery objectives for down listing and delisting are…"

Distribution Requirements for Down listing and Delisting (page 26, lines 10-20, DEIS Oct. 2009): Alternative 2 states, "From endangered to threatened: 6 successful breeding pairs (BP) present for 3 consecutive years, with at least 2 successful BP in each of the three recovery regions". Down listing to sensitive status is listed as 12 successful BP in the state (2 in Eastern WA, 2 in Northern Cascades, 5 in Southern Cascades/Northwest Coast, and 3 anywhere in the state). Delisting of the wolves would occur when 15 successful breeding pairs are documented in the state (2 in Eastern WA, 2 in Northern Cascades, 5 in Southern Cascades/Northwest Coast, and 6 anywhere in the state).

> **Comment on Recovery Objectives:** Population ecologists recommend managing for at least 30 breeding pairs (300-500 individuals) for large carnivore population persistence. Long-term population viability is compromised when lesser numbers of breeding pairs are subject to environmental and demographic stochastic events. Why is Washington not following USFWS 2008 recommendations of 30 breeding pairs, and at least 300 wolves for delisting and recovery of wolves in the state? The delisting to threatened status at 6 successful breeding pairs in the state of Washington, and the recovery and delisting goals of 15 breeding pairs in Washington State is a huge compromise, and "are considered minimal or barely adequate for achieving population viability and recovery" (pg 15, lines 16-17, DEIS Oct. 2009).
>
> This compromise is further undermined with the delisting of wolves to occur when benchmark numbers such as 2 to 3 breeding pairs (minimum of 20 to 30 individual animals) are distributed in the northern and eastern recovery regions (in addition to the 5 breeding pairs in the Southern Cascade region). While initial wolf recovery population numbers are small in Washington, wolves must be able to withstand fluctuations in abundance and recruitment associated with variation in food supplies, predation, disease, and habitat quality, let alone human persecution and depredation control issues. The wolf working group recognized this weakness by writing "…the Southern Cascades and Pacific Coast recovery regions are the most distant from colonizing sources with greater hurdles to successful natural dispersal…" (pg. 206, lines 22-23, DEIS Oct. 2009). Immigration and emigration between these recovery regions may be limited for these few numbers of animals, based on somewhat restricted travel corridors for large carnivores in Washington State. Let's give wolves a fair shot at recovery by setting fair target numbers on endangered to threatened, or listed to delisted statuses.

Chapter 4

Human-Caused mortality (pg 42, lines 1-2, DEIS Oct. 2009): "The conservation and management strategies of Alternative 2 would likely result in intermediate levels of human-caused mortality in wolves".

> **Comment on Human-Caused mortality:** It seems we should strive for low to moderate levels of human-caused mortality for our carnivore populations, not intermediate levels which could potentially be avoided with non-lethal methods and education. Prioritization of education and outreach is critical to recovery of species, especially when discussing human-caused mortality issues.

Lethal control of wolves by livestock owners (pg 19, Table 1, DEIS Oct. 2009): "Lethal control by livestock owners (including family members and authorized employees) of wolves involved in repeated

livestock depredations… Allowed with an issued permit on private lands and public grazing allotments they own or lease when wolves reach Sensitive status."

> **Comment on lethal take of wolves by livestock owners**: Disagree that during the sensitive phase of wolf delisting, any livestock operators or permittees, even with an agency permit, should be allowed to perform lethal take of wolves during depredation events. This activity should be done solely by state and federal agencies until the delisting phase, when wolves are no longer protected by the Endangered Species Act. Only then should any acts such as permitted lethal take by the public for depredation be considered. This would avoid any confusion of the wolves listing status, as well permitted versus unpermitted "take" by the public. Training both large- and small-sized private landowners with livestock, and public land livestock lessees how to effectively use non-lethal methods of harassment for protection is critical for all phases of wolf recovery, but lethal take of wolves should only be conducted by State and Federal staff under the conditions mentioned in the DEIS (pg 67, lines 11-17), and should not be allowed by the public during any listed phase of wolf recovery in Washington State.

Lethal take in the act of attacking livestock (Summary of Significant Changes to the Wolf Plan from Peer Review, Aug 3, 2009): "Under use of lethal take of wolves in the act of attacking (biting, wounding, or killing; not just chasing or pursuing), this provision is now allowed at all distances, not just within 150 yards of a residence. Clarification is added that only livestock owners (including family members and authorized employees) can use this activity with their livestock on private land they own or lease during endangered, threatened, and sensitive phases, and on private and public land they own or lease during the delisted phase". As stated in the DEIS Oct. 2009 (page 67, line 19-22): "This provision will allow lethal take of wolves "in the act" of attacking livestock (defined as biting, wounding, or killing; not just chasing or pursuing) by livestock owners, family members, and authorized employees on private land they own or lease after wolves reach threatened status".

> **Comment on lethal take of attacking wolves**: Disagree that livestock owners have authorization to conduct lethal take of wolves during any event, even during an attack. This clause could likely be abused and used irrespective of the situation. Wildlife officers and agency staff could be called on the scene as witnesses if and when these situations arise. Non-lethal harassment techniques are likely to be just as effective in scaring an animal off an attack on livestock or other domestic animals.

<u>Chapter 7</u>

Wolf-domestic dog conflict Section D (page 101, lines 34-36, DEIS Oct. 2009): Private citizens will be allowed to kill a wolf that is "in the act" of attacking (defined as biting, wounding, or killing; not just chasing or pursuing) domestic dogs on private and public land when wolves are sensitive and delisted".

> **Comment on wolf-domestic dog conflict Section D**: Disagree that private citizens should be allowed the authority to kill a wolf that is attacking a domestic dog, *especially* on public lands. Dogs should be leashed or under voice command by their owner at all times, again, *especially* on public lands. To reinforce the need for dog owners to be diligent of the whereabouts of their pets, the DEIS (2009) states on page 100, line 45-46, "None of the dogs killed in these states through 2006 were accompanied by their owners at the time of attack" (USFWS 2007b). The state should not prioritize domestic dogs on public lands over our wild canines. Especially since the number of dog incidence in Idaho, Montana, and Wyoming are a small fraction of the confirmed domestic animal losses from wolf predation (Table 4 pg. 58, Public Review Draft SEIS Plan; Pg. 147-148, Figure 14c and Table 6, DEIS Oct. 2009).

Chapter 12

Cross Border Habitat Linkages (Pg. 122, lines 15-19, DEIS Oct. 2009): "Maintain and restore habitat connectivity for wolves in Washington. Safe passage within and between habitat areas is vital for allowing wolves to recolonize unoccupied habitat and for promoting genetic and demographic exchange between subpopulations". (pg 27, lines 1-4, DEIS Oct. 2009): "On a regional scale, maintaining cross-border habitat linkages between Washington and Idaho, British Columbia, and Oregon is vital to the reestablishment and long-term viability of a wolf population in Washington".

> **Comment on cross-border habitat linkages**: The recovery plan (for Alternative 2 and 3) needs to build in a more complete connectivity and linkage plan, to geographically address the habitat linkages as well as the genetic linkages associated with wolves within Washington State and neighboring Oregon, Idaho, and British Columbia. This would allow NGO's and government agencies to concentrate and expand connectivity and habitat protection efforts. The plan identifies "areas of greatest importance for restoring or maintaining connectivity between regions of suitable wolf habitat" (Pg. 122, lines 25-32, DEIS Oct. 2009). The DEIS however does not mention areas of greatest habitat protection value where wolves establish themselves on their own, if the pack does not fall within one of the prioritized areas.

Translocations for management (Pg. 26, lines 23-24, DEIS Oct. 2009) "Under this alternative [2], translocation would be used if wolves fail to reach one or more recovery regions through natural dispersal". (Pg. 112, lines 28-30, DEIS Oct. 2009) "If wolves have exceeded recovery objectives in some recovery regions and not others, then the process will be initiated to evaluate potential translocation of wolves to areas not achieving recovery objectives."

> **Comment on translocations for management**: While translocations for management of wolves are beneficial, the recovery goals for each region again may compromise the success of wolves in the state. For example, say the Northern Cascades meets their recovery objectives (2 breeding pairs). Excess wolves in this region may then be moved to other recovery regions to fulfill their recovery objectives. This type of management action would be premature based on the few wolves actually inhabiting the recovery region, but is allowed and potentially promoted by the DEIS.

Translocations for genetic diversity (Pg. 3, Summary of Significant Changes to the Wolf Plan from Peer Review, Aug 3, 2009): "allowing occasional translocations of individual wolves to enhance the genetic diversity of isolated populations confirmed to have low diversity". I believe the management strategy of translocations to maintain genetic diversity is added into the DEIS, however I could not find it.

> **Comment on Translocations for genetic diversity**: It is good foresight to consider this option of translocations for genetic diversity into our Washington Wolf Recovery Management Plan. This is especially important if wolf populations stay small in the for longer than the predicted timeframe, or if the wolves are unable to use the predicted travel corridors efficiently or effectively. This objective also allows for future discussions with Oregon, Idaho, and British Columbia the ability to maintain the genetic integrity of wolf populations throughout the entire northwest.

From: Jim Davis
To: SEPADesk2 (DFW);
Subject: Comments on Wolf Conservation and Management Plan
Date: Monday, December 28, 2009 8:30:55 AM
Attachments: WDFW Wolf Conservation and Management Plan - Chapter 3 - EIS Science Alternative.pdf
N3C Comment on WDFW Wolf Conservation Plan - December 2009.doc

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Please see attached a comment letter and attachment associated with the DEIS for the Washington State Wolf Conservation and Management Plan. I have also forwarded this comment letter and attachment to WDFW via postal mail.

North Cascades Conservation Council
Founded in 1957
SEATTLE, WASHINGTON
Post Office Box 95980, University Station
Seattle, Washington 98145-2980

RECEIVED
DEC 29 2009
HABITAT PROGRAM

Washington Department of Fish and Wildlife
Attn: Teresa A. Eturaspe
SEPA Responsible Official, SEPA Desk
600 Capitol Way N.
Olympia, WA 98501-1091

December 28, 2009

Re: Gray Wolf Management Policy, Draft EIS

Dear Ms. Eturaspe,

Thank you for this opportunity to comment on the four alternatives of the Washington State Wolf Conservation and Management Plan that are being considered as part of the SEPA process being managed by the Washington Department of Fish and Wildlife (WDFW). The following comments from the North Cascades Conservation Council are focused on the scientific basis, or lack thereof, for the wolf population conservation goals that are provided in Alternatives One, Two, and Three of the Draft Environmental Impact Statement (DEIS).

What does science have to say about setting viable conservation goals in endangered species recovery, especially for wide ranging large predator species such as wolves? Conservation goals for wolves must be set at sufficient numbers of individuals to ensure that a permanently viable population is reestablished. A viable wolf population must be able to survive fluctuations in abundance associated with prey availability, disease, and habitat quality. A long-term viable wolf population must also include sufficient numbers of individuals to maintain genetic diversity and avoid inbreeding.

Endangered species research has shown that a minimum viable wolf population is much larger than the "15 breeding pairs" conservation goal included in Alternatives One, Two, and Three of the DEIS. Rules of thumb developed from research studies indicate a genetically-effective population size of 50 breeding pairs (or about 500 individuals in the case of wolves) prevents unacceptable inbreeding and short-term loss of viability. A population size of 500 breeding pairs (or about 5,000 individual wolves) would ensure overall long-term genetic variability. Dr. David Reed at the University of Mississippi has estimated a minimum viable population for wolves as 6,332 individuals.

A wolf meta-population can be comprised of several smaller sub-populations in distinct geographic areas that are linked through wolf dispersal and consequent gene flow. Wolf meta-populations can occur at the regional, state, or local level. The amount of gene flow between populations depends on the extent of barriers to dispersal. However, dispersal and consequent connectivity between populations also depends on the level of wolf habitat saturation in a geographic area. Wolf behavior studies have shown that significant long distance dispersal to other geographic areas (i.e., other wolf populations) is likely to occur only if the local prey base is fully exploited and/or other habitat features become limiting for the local wolf population.

At this time, adequate scientific information is not available to determine whether wolves in Washington State will have to survive as a stand alone meta-population or whether there will be sufficient genetic exchange between Washington State's wolf population and other populations in the Rocky Mountain States or British Columbia. Without documented genetic exchange, Washington's wolves can not be considered a subpopulation of these larger Rocky Mountain or British Columbia meta-populations. WDFW can not just assume that Washington's population will be part of a much larger wolf meta-population. In fact, the opposite is more likely the case. For example, natural connectivity (i.e., genetic exchange) between the Yellowstone and other Rocky Mountain wolf populations is not expected by biologists. Under the current US Fish and Wildlife Service plan for Northern Rocky Mountain wolves, dispersal will be "facilitated" through capturing and moving wolves. Adequate connectivity is even less likely between the Rocky Mountains and the Cascades, where most of Washington's wolves will reside.

Given these scientific uncertainties, the number of wolves necessary for ensuring the recovery of Washington State's wolf population is impossible to determine at this time. Substantial state specific information on wolves will be needed to set conservation goals. Information is lacking for Washington wolves on pack sizes and predator-prey relationships. Rates of dispersal and estimates of connectivity between Washington and adjoining states/provinces are currently unknown. This information will be essential to determine whether wolves in Washington are part of a sub-population or must survive as a stand alone meta-population. Connectivity between fragmented wolf habitats within Washington State is even less understood. Only limited information is available for determining wolf carrying capacities in geographic areas of the state and thus the "pressures" on wolves to move to other portions of the state. Ultimately, we may even need to recognize several meta-populations within Washington State.

Clearly, additional research is needed to establish scientifically-based conservation goals for Washington State wolves. Instead of prematurely setting conservation goals thru a negotiation between stakeholder positions (i.e., the current process being used to develop the Washington State Wolf Conservation and Management Plan), WDFW should work with research institutions to collect information on wolf biology, habitat connectivity, and carrying capacity that is relevant to the long-term recovery of Washington State wolves.

Given these concerns about the lack of science in setting conservation goals, the North Cascades Conservation Council currently supports Alternative 4 from among the very limited alternatives that are provided in the DEIS. We believe strongly that Alternatives One, Two, and Three do not adequately represent a range of viable recovery options for Washington State wolves. They all include the same conservation goal of 15 breeding pairs. Without an adequate scientific basis, all three of these alternatives must be rejected as currently written.

We suggest that a new alternative be considered that replaces the stakeholder developed conservation goals with plan language that outlines a research strategy for acquiring the necessary scientific information to set biologically viable wolf conservation goals. We have attached a "science alternative" that we respectively request be considered with the other four alternatives in the current DEIS process. This "science alternative" consists of revised language for Chapter Three of the Washington State Wolf Conservation and Management Plan that calls for adequate scientific research on Washington State's wolves.

Thank you for considering these comments.

Sincerely,

Marc Bardsley

Marc Bardsley
President

Additional Science Alternative

3. WOLF CONSERVATION

The conservation chapter of a recovery plan identifies strategies needed to reestablish a naturally reproducing and viable population of an endangered species distributed in a significant portion of the species' former range in Washington. WAC 232.12.297 (Endangered, threatened, and sensitive wildlife species classification; Appendix A) defines the process by which "listing, management, recovery, and delisting of species can be achieved." The process requires the preparation of a recovery plan for species listed as endangered or threatened. When adequate scientific information is available, recovery plans include target population objectives, criteria for reclassification, and an implementation plan for reaching population objectives. When adequate scientific information is not available, recovery plans must lay out a strategy for obtaining, evaluating, and utilizing the scientific information that is needed to set population objectives, develop criteria for reclassification, and specify an implementation plan for reaching population objectives. Given the lack of adequate scientific information on wolves in Washington State, this chapter of the recovery plan focuses on the information that is needed to develop a scientifically-based plan.

Section A of this chapter provides the currently available scientific information for conservation planning and genetic/population viability analysis as related to the reestablishment of sustainable wolf populations. Section B identifies four recovery regions in the state and indicates intervening areas where connectivity may become an issue. Section C establishes breeding pairs as the appropriate unit of measurement for wolf population viability in Washington State. Section D identifies scientific information that is needed to set population objectives for wolves in Washington State as a whole and in individual recovery areas within the state. Section D also outlines scientific information that is needed to assess the connectivity between these defined recovery areas and to determine the wolf carrying capacity of each recovery area. Section E describes important conservation tools that will be needed to achieve recovery and delisting in Washington State.

A. Scientific Basis for Conservation Planning

Genetic Diversity

An underlying tenet of endangered species recovery is that populations need to be functionally connected so that genetic material can be exchanged. In isolation, no population of wolves is expected to maintain its genetic viability (Fritts and Carbyn 1995, vonHoldt et al. 2008). Loss of genetic variation can pose a conservation threat to wolves by causing decreased reproductive rates, reduced disease resistance, and other problems. These can, in turn, hinder the long-term recovery of populations regardless of other factors such as habitat and prey availability. Inbreeding depression has been suggested as the cause of reproductive problems (e.g., reduced sperm quality, decreased litter size, reduced pup survival) and other problems (congenital backbone deformities) noted in several small wolf populations (Wayne and Vilà 2003, Liberg et al. 2005, Asa et al. 2007, Fredrickson et al. 2007, Räikkönen et al. 2009). Nevertheless, many existing wolf populations have persisted for decades or centuries with low genetic diversity (Fritts and Carbyn 1995, Boitani 2003). As a result, wolf populations are broadly considered to be more threatened by issues relating to excessive human-caused mortality than by genetic concerns (Boitani 2003).

Although wolves display a number of behaviors that help them avoid inbreeding (Chapter 2, Section C), isolated populations that remain small in size and range can experience reductions in genetic diversity because members have few opportunities for mating with unrelated individuals. Wolf

populations feature effective population sizes (i.e., the average number of individuals in a population that breed and successfully pass their genes to succeeding generations; *Ne*) that are much smaller than the total size of populations (*Nc*) (Aspi et al. 2006). This means that retaining adequate numbers of successfully breeding adults is particularly important in preserving the long-term genetic viability of wolf populations.

Analyses by vonHoldt et al. (2008) suggested that isolated populations maintaining at least 10 breeding pairs and at least 100 wolves will lose genetic variation and become inbred over the long term. Bensch et al. (2006) reported that an isolated wolf population in Scandinavia that grew from a founding breeding pair and one subsequent immigrant to about 140 wolves during a 21-year period lost genetic diversity at a rate of 2% per generation (i.e., about every 4 years). Other small wolf populations also possess reduced levels of genetic variability (Peterson et al. 1998, Wayne and Vilà 2003, Fredrickson et al. 2007). Based on the genetic traits of wolves at Yellowstone National Park, vonHoldt et al. (2008) predicted that without immigration, inbreeding depression would cause the park's population of about 170 animals to experience an increase in pup mortality from an average of 23 to 40% within 60 years.

To preserve the genetic health of isolated wolf populations, vonHoldt et al. (2008) suggested that conservation efforts should discourage actions that interfere with pack formation and retention. For example, intense control actions that result in the frequent removal of breeding pairs or severe disruption of pack stability may lead to high breeder turnover and the possibility of reduced genetic exchange through fewer mating choices with unrelated individuals. Genetic concerns in wolf populations can be alleviated by management actions such as increased protection, restoration of habitat, and augmentation of populations through translocation (vonHoldt et al. 2008, Kojola et al. 2009, USFWS 2009). The addition of even a single breeding immigrant can dramatically increase the genetic variability of isolated populations (Vilà et al. 2003). Translocations reestablishing new populations should emphasize adequate numbers of founders so that these populations start with significant genetic diversity.

Current wolf populations in the northern Rocky Mountain States are characterized by high levels of genetic variability (Forbes and Boyd 1996, 1997, vonHoldt et al. 2008), meaning that wolves arriving in Washington from this source should possess adequate genetic diversity. Intermixing with individuals descended from British Columbia populations will likely contribute additional diversity to the Washington population.

Distribution

One of the criteria for removing a species from state listed status in Washington is that it must occupy a significant portion of its original geographic range. A "significant portion of the species' historical range" is defined under WAC 232-12-297, section 2.9, as that portion of a species' range likely to be essential to the long-term survival of the population in Washington.

Historically, wolf distribution in Washington included much of the state. During the 70 or so years that wolves have been essentially absent from Washington, humans have significantly altered the landscape throughout the state. Habitat once occupied by wolves has been reduced by development and land conversion, with many areas now existing as fragments rather than as large contiguous blocks. Road densities have increased dramatically and the human population has grown to more than six million people.

Although these changes have reduced the amount of habitat now available to wolves, large areas of Washington continue to have low human densities and are potentially suitable for the species. As a habitat generalist, wolves are capable of living in a variety of ecosystems having adequate prey and sufficient human tolerance. Based on data from Idaho, Montana, and Wyoming, researchers have found that suitable wolf habitat and probability of occupancy are best defined by the extent of public lands with mountainous forested landscapes and abundant year-round natural prey (especially elk), low road densities, reduced presence of sheep and other livestock, low agricultural use, and low human densities (Carroll et al. 2003, 2006, Oakleaf et al. 2006, USFWS 2009). Wolves are expected to persist in habitats with similar characteristics in Washington. Areas with abundant deer, elk, and moose, reduced livestock use, and few potential human conflicts offer the best chance for recovery success. These locations include national forests, national parks, wilderness areas, national recreation areas, designated roadless areas on public lands, and areas with low densities of open roads. In some areas, wolves are expected to follow their prey to lower elevations during the winter.

Four recent modeling studies have identified sizeable portions of Washington as being potentially suitable habitat for wolves. These models are most useful for understanding the relative proportions and distributions of various habitat characteristics related to wolf survival rather than as absolute predictors of areas that will be occupied by wolves (USFWS 2008a). B. Maletzky (unpubl. data) used the parameters (i.e., prey density, forest cover, human density, and sheep allotments) of Oakleaf et al. (2006) and determined that potential suitable habitat occurs in many parts of the state excluding the Columbia Basin and most Puget Trough lowlands (Figure 4). Larsen and Ripple (2006) obtained similar results using prey density and the extent of human presence, forest cover, and public lands as parameters, but projected more suitable habitat in the North Cascades (Figure 5). Carroll et al. (2006) mapped much of western and northeastern Washington as being suitable habitat based on vegetation type (used as a measure of prey abundance) and terrain (Figure 6). Lastly, Carroll's (2007, unpubl. data) model predicted wolf distribution and demography in Washington, as derived from (1) GIS data for vegetative productivity; (2) GIS data for road density and type together with human population density and distribution, which were used as a measure of wolf mortality (livestock density was not incorporated); and (3) data on habitat linkages with neighboring states and British Columbia. This work identified areas of potential wolf habitat similar to those indicated by the other studies, including the Cascades, northeastern Washington, the Olympic Peninsula, and the Blue Mountains (Figure 7). However, most of the habitat within these areas, especially in the North Cascades and northeastern Washington, was considered to be lesser quality "sink" habitat, where resident wolf populations would have difficulty persisting without ongoing immigration from neighboring "source" populations. Sink habitat is nonetheless considered vital in enhancing regional population viability by facilitating dispersal between source populations. Sink habitats are defined as lesser quality areas where resident populations (sink populations) have difficulty sustaining themselves without continual immigration. In comparison, source habitats are higher quality habitats that support growing populations (source populations) and produce dispersing young. Source habitats therefore play a pivotal role in sustaining viable populations.

Model predictions (Carroll et al. 2003, 2006, Larsen and Ripple 2006, Oakleaf et al. 2006, Carroll 2007, unpubl. data; B. Maletzky, unpubl. data) and observations from Idaho, Montana, and Wyoming during the past 20 years (Bangs et al. 2004, USFWS et al. 2009) indicate that non-forested rangeland and croplands associated with intensive agricultural use are not suitable habitats for wolves. This unsuitability is due to high rates of wolf mortality, high densities of livestock compared to wild ungulates, chronic conflict with livestock and pets, local cultural intolerance of large predators, and wolf behavioral characteristics that make them vulnerable to human-caused mortality in open landscapes (USFWS 2008a). Consequently, although a few wolves could potentially occupy

the Columbia Basin, the likelihood of them persisting and establishing a viable breeding population is low. Lowland areas of the Puget Trough are similarly not expected to support wolves because of the high human densities, lack of available prey, and reduced forest cover found there.

It is not possible at this time to predict the eventual distribution of wolves in Washington or the carrying capacity of landscapes to support them. However, future radio-tracking of a suitable number of wolves reoccupying the state will make it possible to measure a variety of important biological parameters, including habitat selection and territory sizes. This information can be used to estimate carrying capacity and will help establish a range of wolf numbers that different regions of Washington may be able to support based on prey abundance and distribution, human population densities, livestock allotments, and extent of forested habitat.

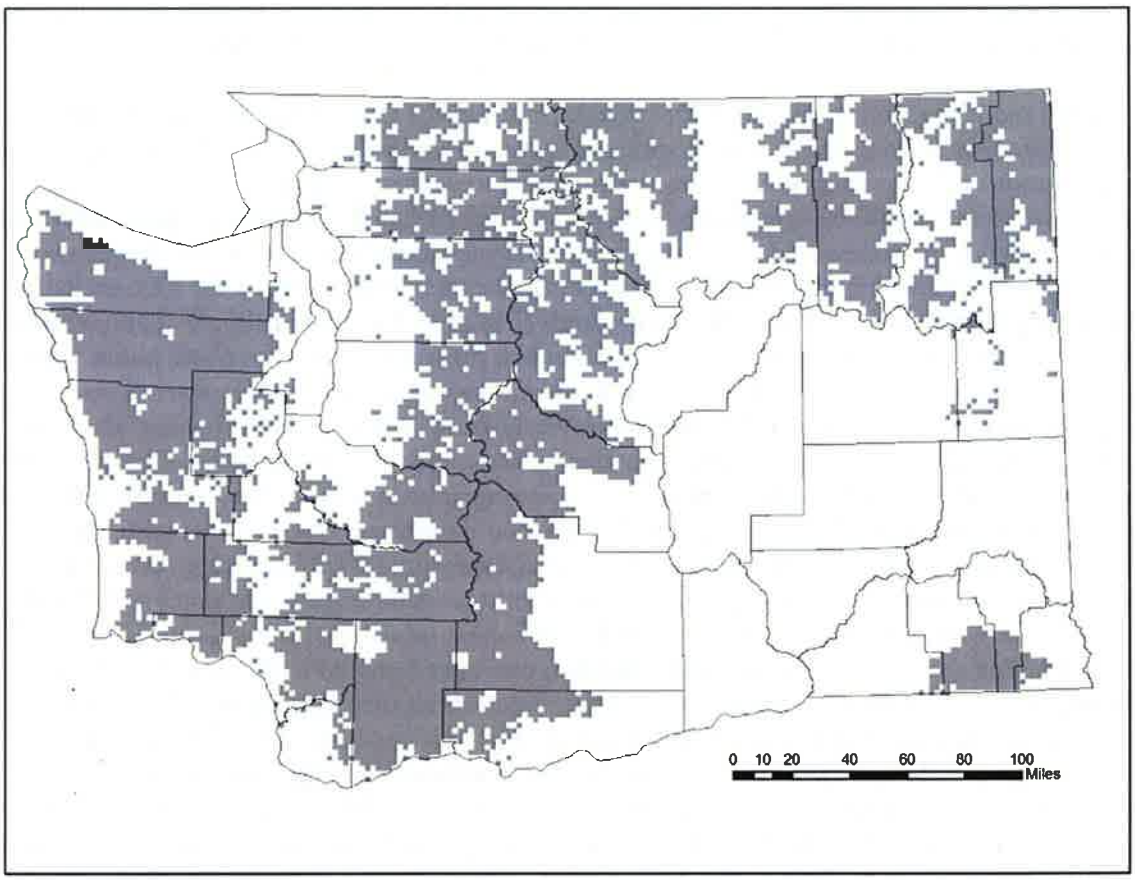

Figure 4. Estimated suitable wolf habitat in Washington (gray shading), where suitability is defined by those lands that equal or exceed a 50% probability of occurrence as predicted by Oakleaf et al. (2006). Analyses were conducted by B. Maletzky.

Additional Science Alternative

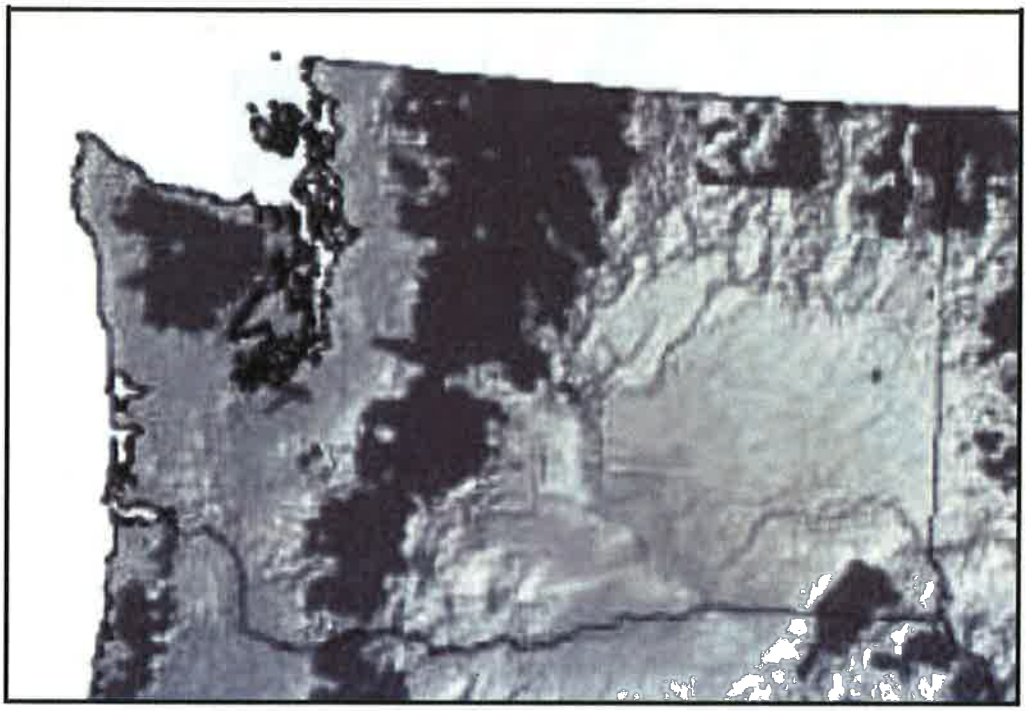

Figure 5. Estimated suitable wolf habitat in Washington (dark gray shading), where suitability is defined by those lands that equal or exceed a 50% probability of occurrence as predicted by Larsen and Ripple (2006).

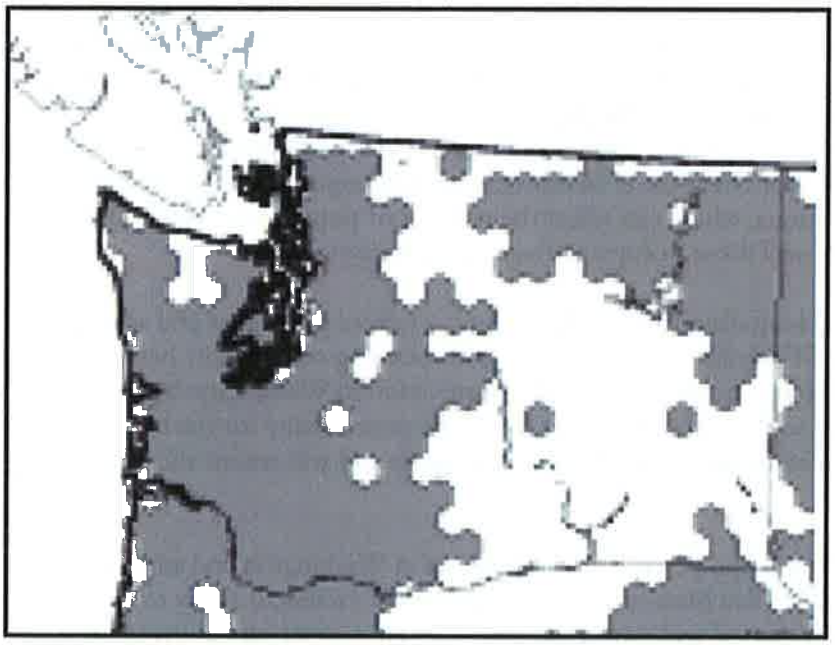

Figure 6. Estimated suitable wolf habitat in Washington (gray shading), as illustrated in Carroll et al. (2006).

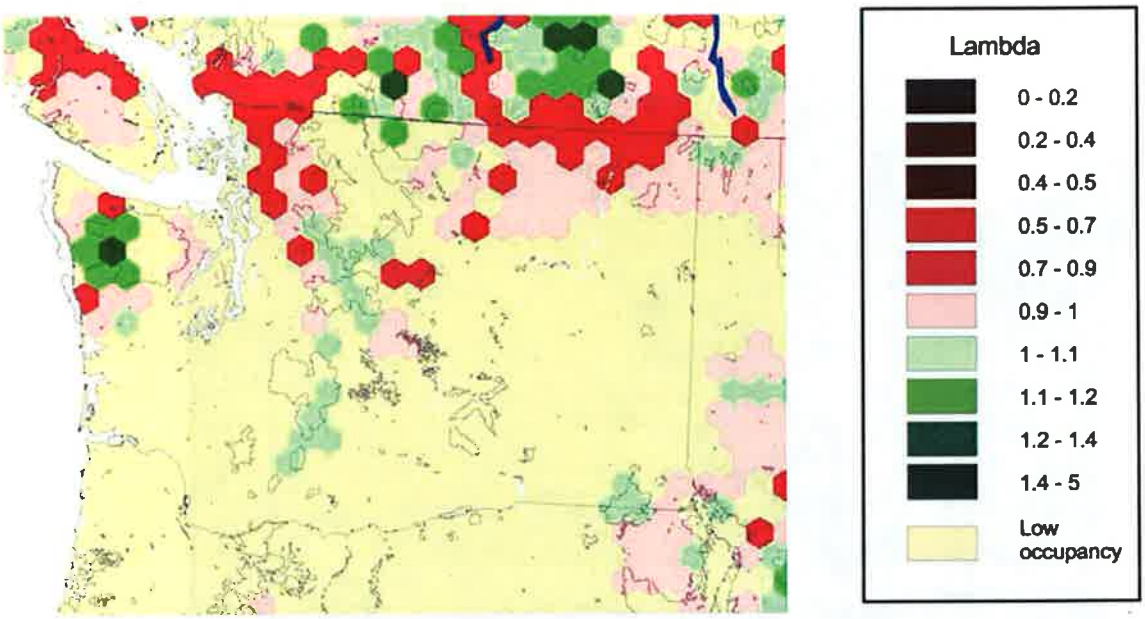

Figure 7. Potential wolf distribution and demography in Washington and surrounding areas, as predicted by Carroll (2007). Areas with predicted population growth rates (lambda, □) of less than 1.0 (shown in shades of red to black) are characterized by negative growth and are considered "sink" habitats, whereas those with predicted growth rates of more than 1.0 (shown in shades of green) show positive growth and are considered "source habitats." Areas with a predicted probability of occupancy of less than 25% are shown as "low occupancy".

Landscape Connectivity and Dispersal

Some landscape features allow easy passage by wildlife species, whereas others such as unsuitable natural habitats, rugged topography, human development, and major highways may act as barriers that constrain, prevent, or redirect movements (Singleton et al. 2002). Landscape features can therefore influence: (1) levels of gene flow among populations; (2) rates of dispersal to unoccupied areas with suitable habitat, which can affect the establishment of new populations; and (3) rates of immigration into existing populations, which can affect the viability of populations, especially those with low survival or productivity and those occupying fragmented habitats.

Wolves are capable of dispersing long distances rapidly through a variety of habitats and select mates to maximize genetic diversity (USFWS 2008a). Nevertheless, maintaining connectivity between blocks of potentially suitable habitat is important to wolf conservation in Washington because of the fragmented condition of habitats in the state. Managing landscape permeability for the benefit of wolves will speed recolonization and progress toward recovery goals and will reduce the need for costly translocation efforts.

Singleton et al. (2002) analyzed landscape permeability for wolves in Washington and adjoining areas of Idaho and British Columbia (the Blue Mountains and Oregon were excluded). They reported that landscapes in the Cascades, north-central and northeastern Washington, and parts of the interior lowlands of British Columbia were broadly conducive for travel by wolves. However, five zones within the region were identified as impediments to movement, with the upper Columbia (Lake Roosevelt)-Pend Oreille valleys being the least permeable of these, followed by Snoqualmie Pass,

Stevens Pass-Lake Chelan, the Fraser-Coquihalla region of British Columbia, and the Okanogan Valley. These zones generally represent developed valley bottoms with discontinuous forest cover, sizeable human populations, and high road densities, or reservoirs. Singleton et al. (2002) also showed a broad band of south-central British Columbia extending north from a line between about Osoyoos and Grand Forks as being of lower permeability for wolves, meaning that wolves attempting to move between eastern Washington and the Washington Cascades could find better travel conditions in the northern tier of Washington than in a sizeable portion of southernmost British Columbia.

Singleton et al.'s (2002) conclusions are generally supported by the work of others who have modeled potential wolf habitat in Washington (Carroll et al. 2006, Larsen and Ripple 2006; Carroll 2007, unpubl. data; B. Maletzky, unpubl. data). These studies variously showed the Okanogan, upper Columbia, and Pend Oreille valleys, Snoqualmie Pass, and high elevation areas of the North Cascades as being potential gaps in the distribution of wolves in eastern Washington (Figures 4-7) that would have to be crossed by individuals dispersing between major blocks of suitable habitat. Two additional areas, the I-5 corridor through Lewis and Cowlitz counties and the Chehalis River valley through Grays Harbor County, represent potential barriers to dispersal in western Washington. In contrast to Singleton et al. (2002), Carroll's (2007, unpubl. data) results suggested that southernmost British Columbia may hold better dispersal habitat (as indicated by the presence of "source" habitat) for wolves than northern Washington (Figure 7).

Maintaining cross-border habitat linkages between Washington and Idaho, British Columbia, and Oregon is vital to the reestablishment and long-term viability of a wolf population in Washington (Carroll 2007). Proximity to wolf populations in Idaho and Montana, which numbered a combined 1,343 animals in 2008 (USFWS et al. 2009), and good habitat connectivity along the northeastern Washington-northwestern Idaho border (Singleton et al. 2002; Carroll et al. 2006; Oakleaf et al. 2006; Carroll 2007, unpubl. data) provides a high probability that dispersing wolves will periodically enter Washington as long as this source population remains large. Cross-boundary habitat linkages also exist with British Columbia and Oregon and will benefit wolf recolonization in Washington.

However, the wolf populations in Idaho and British Columbia may not contribute substantially to overall recovery of wolves in Washington. Barriers between Northeast Washington and the North Cascades (i.e., Okanogan, upper Columbia, and Pend Oreille valleys) may prevent wolves from Idaho colonizing Western Washington. Barriers between the North Cascades of British Columbia, where only a very small wolf population survives, and central and coastal British Columbia may limit recolonization from larger British Columbia wolf populations. The very low wolf population in Oregon is unlikely to contribute substantially, if at all, to recolonization of wolves in Washington.

Further, both of these jurisdictions currently have much smaller wolf populations in areas bordering Washington and therefore will likely be the source of fewer animals entering the state. Current management programs that significantly reduce wolf numbers in Idaho and Montana through regulated public hunting or other large-scale control actions will likely reduce rates of dispersal into Washington. Such activities will create vacancies within existing packs as well as areas of suitable habitat devoid of resident wolf packs, which will probably intercept some dispersing wolves before they travel to more distant areas such as Washington. Over time, better knowledge of dispersal and immigration rates into Washington will emerge. Establishment of a source population of wolves within Washington will reduce the dependence on dispersal from outside the state.

Additional Science Alternative

Comparisons between the Northern Rocky Mountain States and Washington for Wolves

During scientific peer review of this plan, several knowledgeable experts on wolves in the northern Rocky Mountain States commented that wolf restoration in Washington may resemble that which occurred in northwestern Montana from 1979 until well into the 1990s. In contrast to central Idaho and the greater Yellowstone area, both northwestern Montana and Washington lack large core refugia of secure habitat with large numbers of overwintering wild prey and few livestock (USFWS 2009). Instead, northwestern Montana and Washington feature much more fragmented habitat and a mix of public and private ownership; northwestern Montana also has large holdings of livestock, a natural prey base comprised mainly of deer, and less overall public support for wolf recovery. Because of this combination of characteristics, the wolf population in northwestern Montana grew relatively slowly in numbers and distribution (Bangs et al. 1998). After the first two wolves were recorded in 1979, the first documented breeding pair did not occur until 1986 and the region did not attain six successful breeding pairs until 1995. Wolf numbers were dampened during this period by wolf-livestock conflicts resulting in significant lethal control, deaths from cars and trains, illegal human-caused mortality, declining ungulate density due to severe winter weather, disease, and an apparently slow rate of immigration from nearby areas of Alberta and British Columbia, where management appeared to be aggressive enough that fewer wolves than expected dispersed into Montana (Bangs et al. 1998, Sime et al. 2007; C. Sime, pers. comm.).

Additionally, Glacier National Park and large adjoining wilderness areas to the south failed to function as core secure habitat for wolves because their high elevations and harsh winters do not allow significant numbers of ungulates to overwinter (D. Smith, pers. comm.). Wolves in northwestern Montana had among the lowest average pack sizes and population growth rates in the northern Rocky Mountain states through 2005 (Mitchell et al. 2008). Despite these troubles, the population showed stronger growth during the 1990s and 2000s, with immigration from central Idaho helping supplement the population after about 2002. Because of the proportionally greater level of conflicts with humans, management of wolves in northwestern Montana has required greater agency intervention and cost than wolf restoration efforts in the greater Yellowstone area, central Idaho, and the Great Lakes states (E. Bangs, pers. comm.).

Overall Wolf Population Viability

Conservation/recovery objectives for downlisting and delisting a species need to be set at sufficient numbers of individuals and levels of geographic distribution to ensure that a permanently viable population is reestablished. For the purposes of this document, a "viable" population is one that is able to sustain its size, distribution, and genetic variation in the long term without significant intervention requiring human conservation actions. Such populations must also be able to withstand fluctuations in abundance and recruitment associated with variation in food supplies, predation, disease, and habitat quality. Long-term persistence of a wolf population in Washington will depend on other factors, including proximity and connectivity to source populations (outside and potentially within the state), competing carnivore populations, the extent of conflicts with livestock production, and overall social tolerance by people.

MVP (minimum viable population) analyses that take into account genetics suggest MVPs much larger than current recovery goals in the Northern Rocky Mountains (Franklin 1980). Rules of thumb include the rule that a N_e (genetically-effective population size) of 50 (or about 500 individual wolves) prevents unacceptable inbreeding and short-term loss of viability, while a N_e of 500 (or

about 5000 individual wolves) ensures overall long-term genetic variability (Carroll unpubl.). Reed et al. (2004) estimated a genetic MVP for wolves as 6332 individuals.

However, the number of individuals needed to maintain the long-term viability of wolf populations is widely debated. In 1994, the U.S. Fish and Wildlife Service's assessment of a self-sustaining population of wolves in the Northern Rocky Mountains concluded that *"Thirty or more breeding pairs comprising some 300+ wolves in a metapopulation (a population that exists as partially isolated sets of subpopulations) with genetic exchange between subpopulations should have a high probability of long-term persistence because such a population would contain enough individuals in successfully reproducing packs distributed over distinct but somewhat connected large areas to be viable for the long-term (USFWS 1994). A population at or above this size would contain at least 30 successfully reproducing packs and ample individuals to ensure long-term population viability. In addition, the metapopulation configuration and distribution throughout secure suitable habitat would ensure that each core recovery area would include a recovered population distributed over a large enough area to provide resilience to natural or human-caused events that may temporarily affect one core recovery area. No wolf population of this size and distribution has gone extinct in recent history unless it was deliberately eradicated by humans (Boitani 2003)"* (USFWS 2008a).

The USFWS (1987) goal for wolf conservation in the Northern Rocky Mountains is problematic for several reasons (Carroll unpubl.). The total population goal of 300, or a Ne of about 30, is far below minimum viable populations in the thousands suggested by genetic studies (Reed et al. 2004, Traill et al. 2007). In justifying the 1987 recovery goal, Fritts and Carbyn (1995) assert that genetically-based MVPs in the thousands have limited relevance to wolf recovery, because smaller populations (e.g., Isle Royale) are extant, and no one protected area can support thousands of large carnivores. But this argument ignores issues as to acceptable level of risk and the appropriate time horizon for evaluating recovery goals. A small wolf population may have a better than 50% chance of persisting for 60 years (the length of time that the Isle Royale wolves have persisted), but not meet ESA mandates for greater long-term certainty of persistence (e.g., 95% over 200 years) (Carroll unpubl.).

Additionally, the 1987 wolf conservation goals for the Northern Rocky Mountain wolf population required continued genetically-effective dispersal among populations in the three Northern Rocky Mountain states and Canada (Carroll unpubl.). Recent studies have found that such dispersal is difficult to achieve until high population levels (even higher than currently seen in Idaho and Yellowstone) facilitate occupation of stepping-stone sink habitat and force high levels of dispersal (Von Holdt et al. 2007).

At present, the number of wolves necessary for ensuring the recovery of Washington's population is difficult to determine. Specific information for Washington is lacking on wolf population dynamics, pack densities, predator-prey relationships, immigration rates, and other relevant biological factors for the state. Such data exist for wolves in other states (e.g., Montana, Idaho, Wisconsin), but may not be adequate for establishing objectives for Washington because of differences in habitat quality, prey species, prey availability, human densities, and perhaps other important factors. Therefore, establishment of conservation/recovery objectives through a formal population viability analysis (PVA) is unlikely to provide meaningful results at this time. Additional research is needed to establish conservation/recovery objectives for Washington State wolves.

B. Defined Wolf Recovery Areas in Washington State

There are four defined wolf recovery areas in Washington State that are separated by significant areas of marginal wolf habitat or manmade barriers to dispersal. These regions include the Eastern

Washington Region, Northern Cascades Region, Southern Cascades Region, and Pacific Coast Region (Figure 8). The western boundary of the Eastern Washington Region follows Highways 97, 17, and 395 and matches the line used by the U.S. Fish and Wildlife Service to demarcate the western edge of the Northern Rocky Mountain distinct population segment for gray wolves in Washington (USFWS 2009).

As indicated above, some research has been conducted examining the connectivity between these areas for wolves. The actual level of connectivity between these regions is currently unknown and could be very limited. The Eastern Washington Region is separated from the North Cascades and South Cascades Regions by the Okanogan Valley, Columbia River Basin, Columbia Valley, and Pend Oreille Valley. The North and South Cascades Regions are separated by the heavily used Highway 90 corridor. The Pacific Region is separated from the North and South Cascades Regions by the highly populated Puget Sound trough and the heavily used Highway 5 corridor.

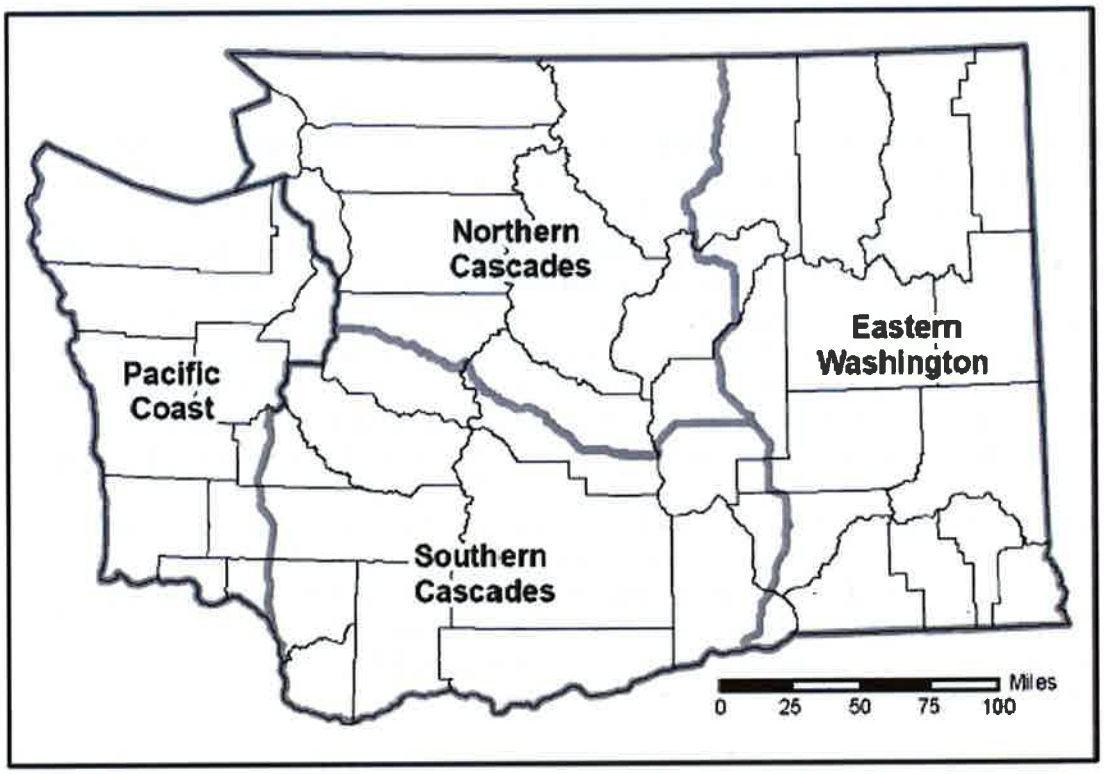

Figure 8. Four gray wolf recovery regions in Washington: Eastern Washington Region, Northern Cascades Region, Southern Cascades Region, and Pacific Coast Region.

C. Use of Successful Breeding Pairs as Unit of Measurement for Washington State

Use of "successful breeding pairs" as the unit of measurement to assess wolf population viability is consistent with the recovery plan for the Northern Rocky Mountain distinct wolf population segment. Conservation/recovery objectives in Washington State will be based on the number of successful breeding pairs in each recovery area rather than the number of packs or individuals. Successful breeding pairs will be used as the unit of measurement because the term provides a higher level of certainty in assessing population status and documenting reproduction. The U.S. Fish

and Wildlife Service used successful breeding pairs as their recovery measure "because wolf populations are maintained by packs that successfully raise pups" 1994, Mitchell et al. 2008).

A successful breeding pair of wolves is defined as an adult male and an adult female with at least two pups surviving to December 31 in a given year. (This term was formerly known simply as "breeding pair," but Mitchell et al. [2008] recommended use of "successful breeding pair" as a more precise term to indicate that successful rearing of young had occurred.) Success of breeding pairs will be measured in winter because most wolf mortality occurs from spring through fall, and winter is the beginning of the annual courtship and breeding season (USFWS 2008a). In Washington, verification of successful breeding pairs will be done by WDFW using established protocols.

D. Scientific Information Needed for Wolf Conservation in Washington

Ideally, it would be possible to set specific conservation goals for wolves in Washington State. However, as indicated above, it is very difficult to establish scientifically-based conservation goals at the current time due to a lack of scientific consensus at the national level on a minimum viable population of wolves and inadequate scientific information on wolves at the state level. Setting provisional conservation goals for Washington State wolves will not provide legitimacy for delisting wolves and could prematurely subject the Washington wolf population to aggressive management (e.g., control activities and designation of wolves as a big game animal). Setting conservation goals based on consensus among stakeholder groups in Washington is not an appropriate or feasible strategy for wolf recovery in Washington.

Washington State could tier its wolf conservation goals off of those established for wolves in the Northern Rocky Mountain Region. However, there has been significant scientific disagreement on the viability of conservation goals established for wolves in the Northern Rocky Mountain Region. The goals established for wolves in the Northern Rocky Mountain Region may not withstand legal challenges and should not be adopted in Washington State without a stronger scientific justification.

Washington State must wait to establish specific wolf conservation goals until a scientific consensus is reached at the national level on a minimum viable population for wolves. Opinions on what constitutes a viable wolf population now range from a low of about 30 breeding pairs to multiple hundreds of breeding pairs. Without a solid scientific consensus, Washington risks setting conservation goals that are wholly inadequate for wolf recovery in the state.

Applying national consensus guidelines on viable wolf populations to Washington State will depend on whether the Washington State wolf population is recognized as a separate population or as part of a larger meta-population. Given the substantial connectivity barriers between Washington and adjoining states/provinces, we can not assume that Washington State wolves are part of a larger meta-population until scientific research documents adequate connectivity. Also, further research will be needed to determine whether habitat connectivity between wolf recovery areas within Washington State is adequate to consider Washington State wolves as one meta-population or as multiple isolated populations.

A more complete understanding of wolf carrying capacity within Washington will also be needed to appropriately apply the consensus guidelines to Washington State. Scientific information will be needed on the wolf carrying capacity of all wolf recovery areas in the state. Past research has indicated that wolf dispersal behavior depends on habitat saturation in the source area. If local conservation goals are set below the carrying capacity of each recovery area, wolves will not move

across barriers to other recovery areas and connectivity will be undermined. Without habitat saturation, wolves in Washington will exist in small and isolated populations, not in a larger meta-population with adequate gene flow and long-term population viability.

E. Conservation Tools Needed for Recovery and Delisting of Wolves in Washington

A variety of management tools will be considered to meet conservation/recovery objectives while wolves remain state listed in Washington. Two of these, translocation and relocation, are described below. Other tools are discussed in later chapters and include, for example, proactive measures to assist livestock producers in reducing wolf-livestock conflicts, compensation programs for wolf-related livestock losses and deterrence methods, and various harassment options and forms of limited lethal control (all discussed in Chapter 4). Emphasis must also be placed on prevention of illegal killing of wolves, management of prey populations and their habitat, preservation and enhancement of habitat connectivity for wolves, management of human safety concerns and wolf-pet conflicts, implementation of a comprehensive outreach and education program, and research (all in Chapter 12).

Translocation of Wolves

Wolves will be allowed to expand into unoccupied suitable habitat across ownerships and administrative designations in the state. Natural dispersal is expected to be the primary means for wolves to disperse across Washington and recolonize new areas of the state. It is recognized, however, that there may be bottlenecks inhibiting natural dispersal and establishment of wolf packs, particularly for wolves attempting to disperse across the existing mix of private and public lands between northeastern Washington and the northern Cascades and from the southern Cascades to the Pacific Coast due to distance, human-caused mortality, or other potential bottlenecks to natural dispersal. Singleton et al. (2002) evaluated landscape permeability for wolves in Washington and suggested that even the two areas likely representing the greatest impediments to wolf dispersal (i.e., the upper Columbia-Pend Oreille Rivers and Snoqualmie Pass) were nevertheless probably permeable for wolves. The first area colonized by breeding wolves in Washington was in the North Cascades. Based on the current proximity of wolf packs in neighboring states and British Columbia, the northeastern and southeastern corners of Washington and the North Cascades and Pasayten Wilderness will likely be the next areas occupied by wolves. The southern Cascades and western Washington will take longer to recolonize through natural dispersal. The overall timeframe for wolves to disperse into Washington and reestablish a viable population is difficult to predict, but it is likely to be slow (Carroll 2007) and could take several decades.

Translocation (moving wolves from one part of Washington to another) is included in this plan as a tool that can be used to establish and expand populations in regions that wolves have failed to reach through natural dispersal. It can also be used to augment small populations and to increase the genetic diversity of isolated populations. Wolves will only be translocated out of a recovery region if the region exceeds delisting objectives and removal will not cause the region's population to fall below delisting objectives. Translocation to reestablish new populations will follow a public review process through the State Environmental Policy Act (SEPA) or National Environmental Policy Act (NEPA). State wildlife biologists will coordinate with other land management agencies whose lands will receive the translocated wolves. It is recognized that if wolves are still federally listed in portions of Washington when translocation is proposed, collaborative discussions with the U.S. Fish and

Wildlife Service will be needed to implement translocations (E. E. Bangs, pers. comm.). Actions associated with translocation are described more fully in Chapter 12, Task 3.

Potential benefits of translocation are that it will: (1) hasten reestablishment of successful breeding pairs in areas that may support a source population, thereby helping to ensure and maintain viable populations in the species' historic range; and (2) lead to greater management flexibility in addressing conflicts and lower overall costs of recovery if delisting objectives are achieved more quickly.

If translocation is considered to achieve delisting objectives in a recovery region that wolves have failed to reoccupy, a planning process to determine feasibility and develop an implementation plan will be initiated. These steps are described in Chapter 12, Task 3. Pending adequate funding, a feasibility assessment/implementation plan will be prepared to determine if sufficient suitable habitat and prey are available to support wolves at potential translocation sites in regions without successful breeding pairs. If these conditions are met, implementation planning will then follow and give detailed information on the translocation methods to be used and selection of a release site. Public review of the translocation will occur under SEPA or NEPA, depending on land ownership. Coordination with federal and other state agencies, tribal governments, landowners, and non-governmental organizations will also take place throughout the process. If adequate funding is available, the translocation will then occur followed by post-release monitoring to evaluate success of the project. Two areas were identified where natural dispersal and recolonization may be slow or difficult: the southern Cascade Mountain range, which the Wolf Working Group discussions recommended for consideration as a recipient region (Appendix G); and the Olympic Peninsula and Willapa Hills, which scientific peer reviewers also recommended.

WDFW may also conduct translocations as a genetic management tool to increase the viability of isolated wolf populations featuring low genetic diversity (Kojola et al. 2009, USFWS 2009). In this situation, individual wolves will be occasionally captured in Washington and moved to an affected population to facilitate genetic exchange. Because wolves already inhabit the release area, this activity will not require a feasibility assessment or reviews under SEPA or NEPA.

Relocation of Wolves

Relocation is possible management tool and has the primary objective of removing particular wolves from conflict situations. Relocation differs from translocation in that it allows wolf managers to immediately resolve a localized conflict, potential conflict, or other situation. Relocation does not require a public review process and is not used to facilitate dispersal. Examples of when relocation might occur are when a wolf or wolves become involved in a situation, such as depredation on livestock, or are present in an area that could result in conflict with humans or harm to the wolf. Relocated wolves will be transported and released into suitable remote habitat on public land, generally within the same recovery region, in consultation with appropriate land managers. Relocated individuals will be released in areas unoccupied by existing wolf packs.

Relocation was used extensively by the USFWS as a non-lethal solution to mitigate livestock damage in the early phases of wolf recovery in the northern Rocky Mountain states, but gradually became less practical as the number of potential release sites declined with expansion of the region's wolf population (Bangs et al. 1998, Bradley et al. 2005). Bradley et al.'s (2005) evaluation of the technique revealed some important drawbacks with its use. These included (1) a lower average annual rate of survival among relocated wolves (60%) than non-relocated wolves (73%), (2) the failure of most

(67%) relocated wolves to ever join or form a pack, (3) a strong tendency among relocated wolves to depart their release site, including 20% that returned distances of 46-197 miles to their original capture location, and (4) 18% of relocated wolves that resumed depredation of livestock near their release site. Selection of release sites strongly affected survival of relocated individuals, with survival being greatest in the high quality habitat of central Idaho and lowest in the more human-influenced landscapes of northwestern Montana. Soft releases showed some promise in reducing homing behavior among relocated wolves. Bradley et al. (2005) concluded that relocating wolves was most effective during the early stages of population recovery.

✓

18

From: Peter Bahls
To: SEPADesk2 (DFW);
Subject: Wolf Mgt Plan
Date: Monday, December 28, 2009 9:43:49 AM
Attachments: Peter Bahls.vcf

Please choose Alternative 3 for the final plan to create a Pacific Coast recovery region. I would like to see wolves translocated to the Olympic Peninsula and established here before they can be removed from the endangered species protections.

Peter Bahls, Director
Northwest Watershed Institute
3407 Eddy Street
Port Townsend, WA 98368

tel. 360-385-6786
fax.360-385-2839

www.nwwatershed.org

From: Tim McNulty
To: SEPADesk2 (DFW);
cc: 1 McNulty;
Subject: Comment on Draft Wolf Conservation and Managment Plan for WA
Date: Thursday, January 07, 2010 11:14:52 AM

Olympic Park Associates
12730 - 9th Avenue NW
Seattle, WA 98177

January 5, 2010

Teresa Eturaspe
SEPA Responsible Official
Habitat Program
Washington Department of Fish and Wildlife
600 Capital Way North
Olympia, WA 98501-1091

RE: Wolf Conservation and Management Plan for Washington DEIS

Olympic Park Associates (OPA) is a 60 year-old conservation organization that has a longtime interest in protecting and restoring the ecological integrity of Olympic National Park (ONP) and the Olympic Peninsula.

Our representatives attended scoping meetings and public meetings on the draft plan and offered comments at those venues. Our comments below pertain to the DEIS cited above.

OPA fully supports the plan's goal of ensuring the reestablishment of a self-sustaining population of gray wolves in Washington and encouraging social tolerance for the species. However, we do not feel that your preferred alternative (Alternative 2) will accomplish either of these objectives. Upon analysis, we find that the plan's preferred alternative is not based on the best science and it offers little hope for achieving sustainable populations of wolves in our state. We favor the approach offered in Alternative 3 with the following added points. Because our specific interest is the Olympic Peninsula, we will frame our comments from the perspective of wolf recovery in the Olympics.

Ruling out reintroduction is a serious flaw in the plan.

One of the plan's two main sideboards is flawed: The plan rules out

reintroduction to supplement wolf numbers in Washington. This is a fundamental mistake. Reintroduction has proven to be key in restoring wolves to Yellowstone National Park, the northern Rocky Mountains, and other areas. It is a tool too important to be scuttled in Washington state. Further, OPA contends that the Washington Department of Fish and Wildlife does not have the authority to prohibit wolf reintroduction in Olympic National Park or other national parks in Washington. That is certainly beyond the scope of this plan.

In 1999 the U.S. Fish and Wildlife service published a feasibility study for reintroducing wolves to Olympic National Park. The study concluded that restoring wolves to Olympic is both feasible and beneficial to the ecosystem, and that minimal conflicts with humans would result. The study identified Olympic National Park as the best potential habitat for wolves in the state. (An earlier National Park Service study identified Olympic as the second best site for wolf relocation in the NPS system, after Yellowstone.) The USFWS feasibility study also concluded that reintroduction was necessary for restoring wolves to ONP, and that natural migration of wolves into the Olympics from elsewhere in Washington would not occur. Your DEIS concurs with that finding.

Rather than dismissing reintroduction, the final plan should embrace it as the only means to meet the plan's stated goal of reestablishing a naturally reproducing and viable wolf population distributed in a a significant portion of its former range in Washington.

<u>Combining Pacific Coast and South Cascade recovery regions a mistake</u>.

Given the unlikelihood of wolves crossing the Interstate 5 population corridor, the recovery regions described in your preferred alternative are without scientific justification. The preferred alternative unexplainably combines the Pacific Coast and South Cascade regions into a single recovery area. There is no justification given for this. As is clear in the plan, "connectivity" would not occur in this scenario. In fact, the Olympic Peninsula would be isolated from wolf recovery in Washington and effectively blocked from natural migration. With its high elk populations (8,670 for the peninsula plus 3,000 for ONP), excellent habitat, and distance from population centers, the west side of the Olympic Peninsula is a prime locale for wolf recovery. And as your source map shows, it could be an important source area for supplementing wolf recovery elsewhere in Washington. The preferred alternative not only fails to

acknowledge or make use of this. It, in fact, prevents it.

In order to insure viable wolf recovery for Washington, the final plan should restore a separate recovery area for the Pacific coast. .

Translocation is key to the Olympic Peninsula and to statewide wolf recovery.

The Olympic Peninsula should be identified as a primary preferred and initial site for trasnslocation from other areas of the state to take advantage of the area's outstanding habitat and low probability of wolf-human conflicts. A recovery goal should be established for the Pacific Coast region separate from the South Cascades, which offers different habitat characteristics and does not face the connectivity challenges of the Peninsula.

Target numbers for wolf recovery are too low.

The USFWS feasibility study for wolf reintroduction to the Olympics concluded that Olympic National Park and Olympic National Forest could support up to 56 wolves distributed in five packs. Based on these numbers, your target population of 15 breeding pairs needed to transition from threatened to sensitive status seems extremely low. The plan's target number are also inconsistent with USFWS recommendations statewide (a range of 500 on the high end and 300 on the low end). **Clearly, further research and analysis is needed before a target population can be established for delisting wolves in Washington.**

Benefits of wolf recovery to the Olympic Peninsula.

The benefits of wolf recovery to the Olympic Peninsula are many. With the recent reintroduction of the fisher, the wolf is the only species missing from Olympic National Park, a World Heritage Site and Biosphere Reserve that experiences an annual visitation of 4 million. Wolf predation would strengthen the Roosevelt elk population in the Olympics and likely redistribute elk browsing patterns, benefiting riparian forest development and aquatic habitats, as a recent study suggests. Wolves would also have a tempering affect on burgeoning coyote populations in ONP, which have had adverse impacts on the park's endemic marmots. And wolves in the park would have minimum conflicts with humans. In contrast, the presence of wolves would be a draw to park visitors and and an economic boon to surrounding communities. Wolf-inspired tourism to Yellowstone

produces economic benefits to surrounding communities estimated at $35 million dollars annually.

Non-lethal methods for resolving wolf-human conflicts.

OPA favors non-lethal methods, including translocation, in dealing with "problem wolves" that interfere with livestock operations. Legal and illegal shooting are anathema to recovering wolves in Washington. We support the compensation program to reimburse ranchers for stock killed by wolves as described in the current plan.

Olympic National Park offers the best habitat, the largest unmanaged elk population, and the lowest probability of wolf-human conflicts in the state. Returning the park's keystone predator -- the only species missing from Olympic -- would benefit the entire ecosystem, from endemic Olympic marmots to streamside forests. And the presence of wolves would bring lasting economic benefits to surrounding Olympic Peninsula communities.

Wolves need the Olympics, and the Olympics need wolves. Please select Alternative 3 in your final plan with the above recommendations. Thank you for this opportunity to comment.

Sincerely,

Tim McNulty
Olympic Park Associates

✓ 28

From: Tom Pratum
To: SEPADesk2 (DFW);
Subject: Draft Wolf Management Plan DEIS Comment
Date: Friday, January 08, 2010 9:33:21 AM
Attachments: WolfManagementPlanDEISJan10.pdf

Please accept the attached comment.

North Cascades Audubon Society

North Cascades Audubon Society

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Tom Pratum

Steve Irving

January 7, 2010

WDFW SEPA Desk
600 Capitol Way N.
Olympia, WA 98501-1091

Re: Draft Wolf Management Plan DEIS

We are writing today to comment on Washington State's Draft Conservation and Management Plan for Wolves.

We believe that in order to function, ecosystems need to be complete. The top predator has been missing too long in Washington. The wolf is important to deer and elk populations and the larger ecosystem. The Department of Fish and Wildlife should manage the wolf population as a part of a healthy environment for Washington State.

Given the alternatives presented we support Alternative 3.

We are first glad to be commenting on a document that talks about how many breeding pairs of wolves must exist before delisting. We are of the opinion that more breeding pairs, but more importantly, more enclaves of wolves should be established before we start any discussion on delisting wolves. A necessary part of reestablishing a healthy population of wolves in Washington is to make sure that sufficient wildlife corridors are established and maintained to allow wolves to move between Okanogan, the Olympic Peninsula, the Blue Mountains, the southern Cascades, the Canadian border, and Pend Oreille County.

To speed up the process of reintroducing wolves to all the places that could support them in Washington we support the use of translocation of wolves and we ask that a funding of that program be established within WDFW.

We do not support the "caught in the act" provision as a way to kill wolves while wolves are in the endangered and threatened recovery status. The use of translocation and compensating livestock owners for their loss is a better way to ensure wolf recovery than a plan which has been abused in the other states it has been used. Livestock on public land should not be given any protection as they are more the intruders than the wolves. Funding for the compensation could be obtained from the *Defenders of Wildlife* or like organizations, or possibly governmental entities.

We are thrilled that Washington has wolves returning to it and hope that the recovery plan is successful.

Thank you for your consideration.

Sincerely,

Steve Irving
Conservation Committee, North Cascades Audubon Society
shirvings@yahoo.com

✓ 28

From:	Susan
To:	SEPADesk2 (DFW);
cc:	Sam Merrill; Donna Nickerson;
Subject:	WDFW Wolf Conservation and Management Plan DEIS Comments
Date:	Thursday, January 07, 2010 8:23:20 PM
Attachments:	Wolf Cons Mgmt Plan Comments_BlackHillsAudubonSociety.pdf

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The attached document contains comments on the Wolf Conservation and Management Plan DEIS. These are submitted by Black Hills Audubon Society.

Susan Markey

Black Hills Audubon Society

A Washington State Chapter of the National Audubon Society
(360) 352-7299 www.blackhills-audubon.org
P.O. Box 2524, Olympia, WA 98507

Black Hills Audubon Society is a volunteer, non-profit group whose 1,100 members in Thurston, Mason, and Lewis Counties are concerned about wildlife, their habitats, and natural history.

7 January 2010

Teresa A Eturaspe, SEPA/NEPA Coordinator
Washington Department of Fish and Wildlife
600 Capitol Way North
Olympia, WA 98501-1091

Dear Ms. Eturaspe:

This letter contains comments on the **Wolf Conservation and Management Plan DEIS.**

Black Hills Audubon Society, an 1100-member organization in Thurston, Lewis, and Mason counties, supports the protection and effective restoration of wolf populations in Washington. Our members value fully functioning ecosystems for Washington's natural habitat areas, and healthy populations of breeding wolves are critical pieces of those ecosystems.

Generally, we support Alternative 3. This alternative provides the most assurance of wolf reproduction and survival, and it provides much flexibility in meeting population goals and in translocation of animals. The following would strengthen the plan:

1) Exclude the provision that allows livestock owners to kill wolves while the wolf is at the endangered or threatened listing status. Instead, the state should increase non-lethal deterrent methods and provide fair compensation for livestock damage.
2) Create separate recovery objectives for the Olympic Peninsula because of the unique and natural condition of much of the region.

In addition, WDFW should use the best scientific study results to establish the number of breeding pairs needed before delisting happens. Fifteen pairs may be insufficient, given that restoration in Washington will depend only on natural migration.

Wolf management should continue to be a collaborative effort, as established by the Wolf Working Group. We support the agency's continued use of a sensible and science-based approach as it works for restoration of an important species.

Thank you for the opportunity to comment on this plan.

Respectfully,

Sam Merrill

Sam Merrill, President
Black Hills Audubon Society

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35417 N. Dalton Road
Deer Park, WA 99006

January 4, 2010

SEPA Desk
Department of Fish and Wildlife
600 Capitol Way N.
Olympia, WA 98501-1091

Electronic and U. S. Mail

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HABITAT PROGRAM

Re: Wolf Management Plan Comments

Ladies and Gentlemen:

Please include these comments under the above-named proposed Management Plan.

Spokane Audubon Society appreciates the collaborative approach pursued by the Wolf Working Group. And although strong opinions exist, we believe a practical, science-based approach will result in the greatest support from Washington's citizens. Accordingly, we support a sound science-based plan to assist wolves return to their vital ecological role in our state. Robust predator populations keep the balance, we value them and their positive effect on ecosystems and support their recovery within our state's wildlife and habitat.

We support increasing the number of established breeding pairs before a delisting is proposed, or providing a stronger evaluation of the state's habitat connectivity to other regions and details on how connectivity will be improved over time. We understand that a significant number of scientific reviewers believe the Department's numbers for delisting were low, especially since the plan relies on natural migration from areas outside the state for recovery.

We support providing separate population recovery objectives for the Olympic Peninsula and Pacific Coast where high quality wolf habitat and increased public support justify having its own recovery objectives.

We support eliminating the "caught in the act" killing provision for livestock owners at the endangered and threatened phases of recovery. Given the history of poaching in this state and the high potential for misuse, this provision could seriously hamper recovery efforts. Investing in non-lethal deterrent methods and providing livestock owners with a fair compensation package are more effective approaches at the early stages of wolf recovery.

We support translocating wolves as a strategy to speed recovery by establishing implementation mechanisms and providing a funding schedule in the plan.

Please also consider the potential economic benefits of re-established wolf populations. Gateway Yellowstone communities have received over $35 million annually from wolf-related tourism, a University of Montana study reports. Similar tourism related business might also be possible in Washington State.

Thank you for considering these comments.

Very truly yours,

SPOKANE AUDUBON SOCIETY

By Mary Jokela
Conservation Chair