Summary Sheet

Meeting dates: June 26, 2020

Agenda item: A. Wolf Rulemaking Petition - Decision

Presenter(s): Donny Martorello, Ph.D., Wolf Policy Lead, Wildlife Program

Background summary:

The Commission will consider a petition for rulemaking, pursuant to RCW 34.05.330, received on May 11, 2020 from the Center for Biological Diversity, Cascadia Wildlands, Western Environmental Law Center, (hereafter, referred to as petitioners). The petition requests that the Commission create rules governing the use of lethal and non-lethal deterrents to address wolf-livestock conflict to stop repeated depredations of livestock by wolves. The petitioners assert the Department resorts to lethal removals too often and their proposed rules require more emphasis on non-lethal deterrents. They assert their proposed rules will provide certainty, transparency, and accountability in wolf management decisions.

There are several documents that provide direction and/or guidance to the Department and Director on managing wolf-livestock conflict, including various laws (RCW Title 77) and rules (WAC Title 220), Washington's Gray Wolf Conservation and Management Plan (herein Wolf Plan, which was adopted by the Commission in 2011), the Commission's policy statement, "Wolves in Washington," and the Department's 2017 Wolf-livestock interaction protocol.

The first wolf pack was documented in Washington in 2008. As of December 31, 2019, WDFW counted a minimum of 108 wolves in 21 packs, and the Confederate Tribes of the Colville Reservation (CTCR) reported 37 wolves in five packs. The two counts combined represent the highest levels reported since wolves were essentially eliminated from the state in the 1930s.

Throughout North America, wolf-livestock conflict is one of the major issues in wolf recovery, and as such, was carefully considered by the Department during the development of the state's Wolf Plan and the implementation of that plan. Below is a snapshot of the Department's approach for managing wolf-livestock conflict:

- Created a Wildlife Conflict Section in the Department's Wildlife Program,
- Hired and strategically deployed sixteen Wildlife Conflict Specialists to work with livestock producers to reduce conflict proactively,
- Developed rules and secured funding for a compensation program for direct or indirect wolf related damages to livestock,
- Established a citizen-based Livestock Damage Board to review livestock producer claims for indirect losses due to wolves,
- Hired three wolf biologists to monitor the wolf population, capture and collar wolves, and estimate the size of Washington's wolf population,
- Developed a sustained funding source (~800K/year) for implementing the Wolf Plan,
- Developed a cost-share agreement program (15-40 participants annually) with livestock producers to implement non-lethal techniques to help avoid conflicts with wolves,
- Developed a WDFW contract range rider program (with 10-14 contractors) to monitor livestock on landscapes with dispersed grazing and to look proactively for wolf signs,
- Developed a composting facility for livestock carcasses,

- Developed a citizen-based Wolf Advisory Group (WAG) to help the Department implement the Wolf Plan while meeting the needs of our diverse stakeholders,
- Developed a rule allowing citizens to kill a wolf caught in the act of attacking their domestic animals (outside of the Federally listed area of Washington),
- Provided two reports to the Commission on the latest scientific findings associated with non-lethal and lethal tools for addressing wolf-livestock conflict,
- Provided printed and online information/education materials on non-lethal tools to address wolf-livestock conflict,
- Established a protocol (currently in the process of its third revisions with Wolf Advisory Group) which provides guidance for when the Department would consider lethal actions to stop repeated depredations by wolves,
- Worked with the Commission to establish a wolf committee,
- Worked with livestock producers throughout the year on ways to reduce wolf-livestock conflict with proactive non-lethal tools,
- Deployed non-lethal materials/devices (fladry, Fox-lights, radio activated guard boxes, etc.) strategically around the state,
- Worked with Legislature and Washington State Department of Agriculture to develop a grant program for deployment of non-lethal tools,
- Initiated a periodic status review for wolves in Washington, and
- Initiated the SEPA and EIS process for establishing a post-recovery wolf conservation and management plan.

Following all applicable laws and rules, and the guidance of the Wolf Plan and Protocol, the Department focuses on the proactive use of non-lethal deterrents to minimize wolf-livestock conflict and considers lethal removal as a last resort when those tools have failed. The Department's spending reflects that commitment, with more than 80% of the wolf budget for wolf-livestock conflict spent on non-lethal approaches.

In terms of the process leading up to this petition, the Petitioners filed a petition for rule-making in July 2013 to codify the Wolf Plan and then withdrew it after discussions with the Department. The withdrawal was predicated on the Department working with the WAG to develop rules to address key issues in the Wolf Plan. The Department did work on those issues for several months with the WAG and after the May 2014 meeting and was preparing to file the Department's proposal.

Prior to the filing, we received several communications from WAG members and a couple of the petitioners expressing concern about the process leading to the development and the draft proposal itself. They asked the Department to consider using a mediated process to develop a rule proposal for Commission consideration. The Department also received a letter from several legislators requesting consideration of a mediated process.

During this same timeframe, the Department received a second petition (June 2014) from the petitioners. With the concerns that had been expressed, the Department postponed filing a rule proposal (CR102) until after the Commission considers that petition. The Commission denied the June 2014 petition (much of this narrative is from the Departments summary sheet from the 2014 Commission meeting).

In late 2014, the Department contracted with Human-Wildlife Conflict Collaboration to do an assessment of the social conflict around the subject. In March 2015, Mrs. Francine Madden,

with HWCC, completed her report that discussed in detail the levels of conflict in Washington around this subject and strategies to transform the conflict into opportunities for social change. In spring 2015, the Department contract with HWCC and Mrs. Madden for strategic guidance, to facilitate the WAG process, and increase the Department's capacity to resolve deep rooted and identity-based conflict.

Through that process, the Department has seen progress. Although the subject matter is still just as challenging, the investment in developing lasting relationships with stakeholders and communities has helped people stay at the table and communicate on very difficult issues. Using the conflict transformation process, in May 2016, the WAG reached consensus on a recommendation for a protocol as guidance for the Director's in decision making around lethal removal of wolves. This was considered unattainable by many just two years prior. The group again reached sufficient consensus on a revised Wolf-livestock interactions protocol and recommended it to the Director in May 2017. The 2017 protocol is still in use as guidance for the Director's decision making for addressing wolf-livestock conflict. The WAG is currently in the process of revising the 2017 protocol.

Staff recommendation:

The Department recommends that the Commission deny the petition. This recommendation is based on:

- Determining the need to use lethal control to stop repeated depredations is a complicated issue that is highly situation-dependent,
- Limiting the flexibility articulated in the Wolf Conservation and Management Plan by fixing criteria in rule reduces the ability to address each case-specific wolf-livestock conflict,
- Proposed rule language as written has problems,
- This issue of wolf management and removals involves internal department actions, and internal practices are not legally required to be set out in rule, nor is it normal to set the same out in rule,
- The Department's WAG process involves significantly more public and community involvement and interaction than would occur through a single rulemaking hearing, and
- If the proposed rule was adopted, WDFW would need to hire a significant number of additional Wildlife Conflict Specialists. This is not feasible given the State's current budgetary uncertainty.

Policy issue(s) and expected outcome:

This decision involves a group's petition to begin development of rules to guide the management of wolf-livestock conflict through non-lethal and lethal removal tools.

Fiscal impacts of agency implementation:

No fiscal impacts if petition is denied. The Department anticipates that adapting the proposed rule as presented by the petitioners would have a fiscal impact, which is undetermined at this time, for the staff resources to implement the rule.

Public involvement process used and what you learned:

A general public opinion survey completed in 2014 indicates 63% of the public support and 28% oppose lethal removal of wolves when necessary to address livestock losses. The survey

results are available at: https://wdfw.wa.gov/publications/01594

The Wolf Advisory Group has met numerous times from May 2015 to present to discuss non-lethal and lethal tools to address wolf-livestock conflict and recommended a guidance protocol to the Director in 2016 and a revised protocol in 2017. The Wolf Advisory Group is currently working on another revised protocol. All of those meetings (except a portion of the first meeting in May 2015) have been open to the public, and the advisory group meetings included a public testimony period.

Action requested and/or proposed next steps:

The Department recommends that the petition be denied. The Department would like to continue to work with the Wolf Advisory Group, stakeholders, and communities through a collaborative process to address wolf-livestock conflict.

Draft motion language:

Motion: I move to deny the petition to codify the proposed rule.

Is there a "second"?

If so, then motion maker discusses basis for motion; other Commissioners discuss views on motion; amendments, if any, proposed and addressed

Post decision communications plan:

WDFW staff will contact the petitioners and we will respond formally in writing regarding the Commission's decision.

WDFW responses/reactions to Petitioner's letter

Petition	**WDFW Response/reaction**
Over the years, the state has developed a wolf-livestock interaction protocol that sets the policy the Department purports to follow when deciding whether to kill wolves following conflicts with livestock.	Thank you for sharing your perspective. The term "policy" has many possible interpretations. The protocol is not policy in the mandatory sense, it is a non-binding guidance document.
The protocol fails to include enforceable requirements for livestock operators to use non-lethal conflict-deterrent measures.	Thank you for sharing your perspective. The Department does not believe it is in a position to force or regulate livestock husbandry practices, especially because many involve direct interaction with the livestock producer's personal property – their livestock. We do not believe forcing compliance leads to success. Our landscape is now shared by wolves and livestock, and our wolf plan supports coexistence, with a sustainable wolf population and strong economic vitality of the local livestock community. It will take our diverse communities working together in a collaborative process, rather than force, to achieve that future.
By using the current process, the citizens of Washington have been shut out of how the decision to kill wolves is reached.	Thank you for sharing your perspective. The public was not shut out of the Department's wolf management planning process that led to the development of lethal removal decision-making. All WAG meetings for developing the 2017 protocol were open to the public, the guiding documents (i.e., wolf plan and protocol) lay out the general considerations for decision making before conflict actually occurs, the Department notifies public of all wolf depredations on livestock, and records from decisioning making are available to the public via the public disclosure request process. In addition, the Wolf Plan underwent extensive public process and that public process included considerations of how lethal control would be used was a wolf management tool was part of that process. In the Plan, it was determined that WDFW would engage in case-specific analysis for each lethal control decision and multiple factors for that analysis are laid out in the Plan. The Protocol was developed under and is consistent with the Plan. WDFW is preparing a post-recovery wolf management plan, and WDFW sought public comment on that as well.
The protocol does not require that livestock operators use non-lethal deterrents that are appropriate for their specific circumstances. The Department instead treats the policy of having two non-lethal	Thank you for sharing your perspective. The Department does not believe it is in a position to force or regulate livestock husbandry practices, especially because many involve direct interaction with the livestock producer's personal property—their livestock. We do not believe forcing compliance leads to success. Our landscape is now shared by wolves and

deterrents in place, as outlined in the protocol, as boxes that must be checked in order to kill wolves, without giving any weight to the efficacy of the deterrents for the given situation. Non-lethal deterrents should be specifically tailored to factors such as the nature of the livestock operation in question, the specific landscape and habitat related to that operation and the time of year.	livestock, and our wolf plan supports coexistence, with a sustainable wolf population and strong economic vitality of the local livestock community. It will take our diverse communities working together in a collaborative process, rather than force, to achieve that future. The protocol does give weight to which non-lethal deterrents are in place, and states they need to be appropriate for the livestock operation and in place a sufficient amount of time to have an effect. Also, it would not be practical to develop in a rule requirements for what non-lethal deterrents would be appropriately tailored to any particular landscape. Determining which non-lethal deterrents are best suited for a particular livestock operation is a very fact-specific analysis not appropriate for rulemaking (which sets forth generally applicable requirements). Further, it may change rapidly with the behavior of wolves and/or livestock on the landscape and could become outdated faster than any rulemaking process could address.
The protocol gives no direction for a situation in which a livestock operator refuses to use nonlethal measures or such measures do not seem to be working in a certain area.	Thank you for sharing your perspective. The protocol does provide the guidance for this situation, stating, "If proactive deterrence measures are not in place a sufficient amount of time prior to the wolf depredations the Department will only consider lethal removal at a higher number of wolf depredation events and after deterrence measures have been tried and failed at resolving the conflict."
Chronic conflict areas have been a consistent issue in Washington. The proposed rule language seeks to provide proactive measures to undertake within these areas. Requiring these enhanced measures will not only assure the public that the Department is not simply repeating the same actions over and over again expecting different results, but will instead require proper analysis of the specific situation to determine a best path forward.	Thank you for sharing your perspective. The current draft protocol is considering this issue and potential paths forward. The level of lethal removals undertaken by the Department thus far have been less than the levels anticipated in the 2011 Wolf Plan, and wolf populations in northeastern Washington continue to increase. Through adaptive management, the Department is continually evaluating its management process and looking to improve future outcomes. Also, the Wolf Plan recognizes that wolf-livestock conflict is expected to increase as the wolf population increases. In Eastern Washington, the wolf population has tripled the recovery level for that region established in the Wolf Plan and all of the chronic conflict areas are in Eastern Washington.
Petitioners suggest this rule language with the knowledge that the WAG is currently undergoing a process to revise the protocol in hopes of having	Thank you for sharing your perspective. The Department believes it is unrealistic to think adopting the proposed rule will result in a significant change in wolf depredation on livestock thereby precluding the use of lethal removal. Even if the Department refused to authorize lethal removals, livestock owners will assert a

an updated document for the 2020 grazing season. There have been several iterations of a protocol, all devised by the WAG, and all with the same result. Every grazing season the state kills endangered wolves, in some cases wiping out entire packs, and public outrage ensues. It's time to break this cycle and the way to do that is through wildlife management rules developed through a transparent, unbiased public rulemaking process	constitutional right to kill wolves caught attacking their cattle. *See State v. Vander Houwen*, 163 Wn.2d 25, 177 P.3d 93 (2008) (landowners have a constitutional right to defend their property against destructive wildlife, but their actions must be "reasonably necessary"). Lethal removal is one of the available tools to address conflicts with wild predators. Also, the Wolf Plan recognizes that wolf-livestock conflict is expected to increase as the wolf population increases. In Eastern Washington, the wolf population has tripled the recovery level for that region established in the Wolf Plan and all of the chronic conflict areas are in Eastern Washington. Each lethal removal decision involves an evaluation of unique facts, and the Wolf Plan and Protocol recognize the need to engage in case-specific analysis. WDFW does not believe that adopting a rule like the ones proposed by Petitioners would reduce uncertainty or the public outcry that arise in the process of making management decisions about lethal control.
Petitioners do not agree with killing wolves except in defense of human life or safety, do not support killing wolves for conflict with livestock and do not support any killing of wolves on public land.	Thank you for sharing your perspective.
Petitioners reference several published articles	There is an ongoing robust debate about lethal control in both wildlife management and social science publications. The 2011 Wolf Plan examined much of this literature and established a management regime that includes lethal control as a wolf-livestock conflict management tool, but WDFW staff constantly monitor the development of science on these issues. Please find attached an annotated bibliography of studies that WDFW staff believe are especially informative for the F&W Commission's consideration. In addition, Commissioners who are new to the Commission may want to review WDFW's staff presentation to the Commission given on Feb. 10, 2017 (https://wdfw.wa.gov/about/commission/meetings/2017/february-10-2017-meeting-agenda) which provided an overview of wolf management science (also see attached bibliography).

WDFW Commission meeting February 10-11, 2017

Very little scientific literature has analyzed the actual effectiveness of lethal removal on wolves, but many of the publications that advocacy groups use to show support for it not working are primarily demographic studies or human dimension studies (i.e. opinion surveys) that may or may not have some application when removal efforts are undertaken. Below is a short list of the primary papers that are routinely used to demonstrate support for or against lethal removal. Another big aspect that needs to be discussed is the social tolerance aspect of wolf management (which is not necessarily captured in the below literature because it is so diverse, but it is discussed in some of them).

Lethal Removal Literature Cited

Bangs, E., M. Jimenez, C. Niemeyer, J. Fontaine, M. Collinge, R. Krischke, L. Handegard, J. Shivik, C. Sime, S. Nadeau, C. Mack, D. Smith, V. Asher, and S. Stone. 2006. Non-lethal and lethal tools to manage wolf-livestock conflict in the northwestern United States. Proc. 22nd Vertebr. Pest Conf pp: 7-16.

Bangs, E., M. Jimenez, C. Sime, S. Nadeau, and C. Mack. 2009. The art of wolf restoration in the northwestern United States: where to now? Pp. 95-116 in M. Musiani, L. Boitani, and P.C. Paquet, editors. A new era for wolves and people: wolf recovery, human attitudes, and policy. University of Calgary Press, Calgary, Alberta, Canada.

Borg, B.L., S.M. Brainerd, T.J. Meier, and L.R. Prugh. 2014. Impacts of breeder loss on social structure, reproduction and population growth in a social canid. Journal of Animal Ecology; DOI: 10.1111/1365-2656.12256.

Bradley, E.H., H.S. Robinson, E.E. Bangs, K. Kunkel, M.D. Jimenez, J.A. Gude, and T. Grimm. 2015. Effects of wolf removal on livestock depredation recurrence and wolf recovery in Montana, Idaho, and Wyoming. The Journal of Wildlife Management; DOI: 10.1002/jwmg.948.

Brainerd, S.M., A. Henrik, E.E. Bangs, E.H. Bradley, J.A. Fontaine, W. Hall, Y. Iliopoulos, M.D. Jimenez, E.A. Jozwiak, O. Liberg, C.M. Mack, T.J. Meier, C.C. Niemeyer, H.C. Pedersen, H. Sand, R.N. Schultz, D.W. Smith, P. Wabakken, and A.P. Wydeven. 2008. The effects of breeder loss on wolves. Journal of Wildlife Management 72:89-98.

Fuller, T.K., L.D. Mech, and J.F. Cochrane. 2003. Wolf population dynamics. Pp. 161-191 in L.D. Mech and L. Boitani, editors. Wolves: behavior, ecology, and conservation. University of Chicago Press, Chicago, IL, USA. **NOTE: did not provide copy of chapter because it was assumed most people have this book (section on mortality is most relevant).**

Guillaume, C., and A. Treves. 2016. Blood does not buy good will: allowing culling increases poaching of a large carnivore. Proc. R. Soc. B 20152939. http://dx.doi.org/10.1098/rspb.2015.2939.

Haber, G.C. 1995. Biological, conservation, and ethical implications of exploiting and controlling wolves. Conservation Biology 10:1068-1081.

Harper, E.K., W.J. Paul, L.D. Mech, and S. Weisberg. 2008. Effectiveness of lethal, directed wolf-depredation control in Minnesota. Journal of Wildlife Management 72:778-784.

Miller, J.R.B., K.J. Stoner, M.R. Cejtin, T.K. Meyer, A.D. Middleton, and O.J. Schmitz. 2016. Effectiveness of contemporary techniques for reducing livestock depredations by large carnivores. Wildlife Society Bulletin: DOI: 10.1002/wsb.720.

Musiani, M., T. Muhly, C. Cormack Gates, C. Callaghan, M.E. Smith, and E. Tosoni. 2005. Seasonality and reoccurrence of depredation and wolf control in western North America. Wildlife Society Bulletin 33:876-887.

Olson, E.R., J.L. Stenglin, V. Shelley, A.R. Rissman, C. Brown-Nunez, Z. Voyles, A. Wydeven, and T. Van Deelen. 2014. Pendulum swings in wolf management led to conflict, illegal kills, and a legislated wolf hunt. Conservation Letters DOI: 10.1111/conl.12141.

Poudyal, N., N. Baral, and S.T. Asah. 2016. Wolf lethal control and livestock depredations: counter-evidence from respecified models. PLoS ONE 11:e0148743. Doi:10.1371.

Treves, A., M. Krofel, and J. McManus. 2016. Predator control should not be a shot in the dark. Frontiers in Ecology 14:380-388.

U.S. Fish and Wildlife Service, Idaho Department of Fish and Game, Montana Fish, Wildlife & Parks, Wyoming Game and Fish Department, Nez Perce Tribe, National Park Service, Blackfeet Nation, Confederated Salish and Kootenai Tribes, Wind River Tribes, Confederated Colville Tribes, Spokane Tribe of Indians, Washington Department of Fish and Wildlife, Oregon Department of Fish and Wildlife, Utah Department of Natural Resources, and USDA Wildlife Services. 2016. Northern Rocky Mountain Wolf Recovery Program 2015 Interagency Annual Report. M.D. Jimenez and S.A. Becker, eds. USFWS, Ecological Services, 585 Shepard Way, Helena, Montana, 59601. **NOTE: annual reports with associated information and tables can be found at https://www.fws.gov/mountain-prairie/es/grayWolf.php and select "Annual Reports..." then the years you want.**

Wielgus, R.B., and K.A. Peebles. 2014. Effects of wolf mortality on livestock depredations. PLoS ONE 9: e113505. doi:10.1371/journal.pone.

Summary Sheet

Meeting dates: August 10-11, 2018

Agenda item: Annual Wolf Update – Briefing
(Commission Request)

Presenter(s): Donny Martorello, Ph.D., Wolf Policy Lead
Scott McCorquodale, Ph.D., Wildlife Regional Program Manager
Trent Roussin, Wolf Biologist
Candace Bennett, Wildlife Conflict Specialist

Background summary:

The Department will provide a briefing to the Fish and Wildlife Commission that will include portions from three Commission blue sheet requests related to wolf conservation and management. Per the requests, the briefing will include:

1. The initiation of State Environmental Policy Act (SEPA) process for considering wolf translocation to enhance the recovery of wolves in Washington (Commissioner Kehne's March 16 blue sheet request).
2. WDFW wolf accounting expenditures since 2011 (Commissioner Baker's March 17, 2018 blue sheet request).
3. The roles and responsibilities among WDFW, the Fish and Wildlife Commission, and the Wolf Advisory Group on the process and development of a Wolf Conservation and Management Plan for when wolves successful reach recovery objectives and are delisted (Commissioner Baker's April 13, 2018 blue sheet request), and
4. A review of the science presentation WDFW presented to Wolf Advisory Group during their April 2018 meeting (Commissioner Baker's April 13, 2018 blue sheet request)

The other portions of Commissioner Kehne's blue sheet on March 16 will be presented to the Commission later in the year through the periodic status review.

Staff recommendation:
Briefing only

Policy issue(s) and expected outcome:

- None

Fiscal impacts of agency implementation:
Briefing only

Public involvement process used and what you learned:
Briefing only

Action requested and/or proposed next steps:
Briefing only

Draft motion language:

Briefing only

Post decision communications plan:

Briefing only

Form revised 2-15-18

Agenda Item 7

Wolf Update

Washington Department of FISH and WILDLIFE

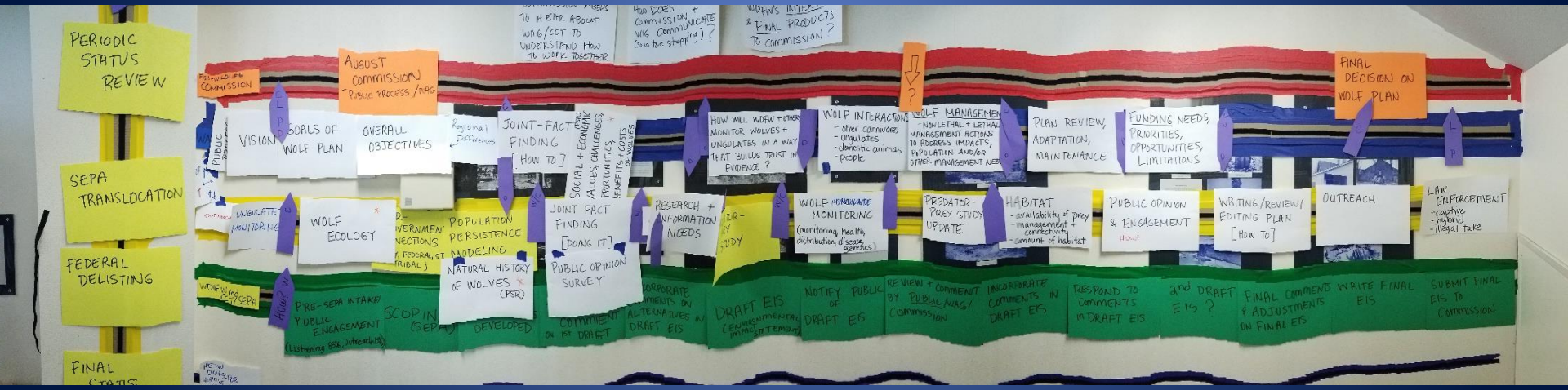
Donny Martorello, Wolf Policy Lead

Overview

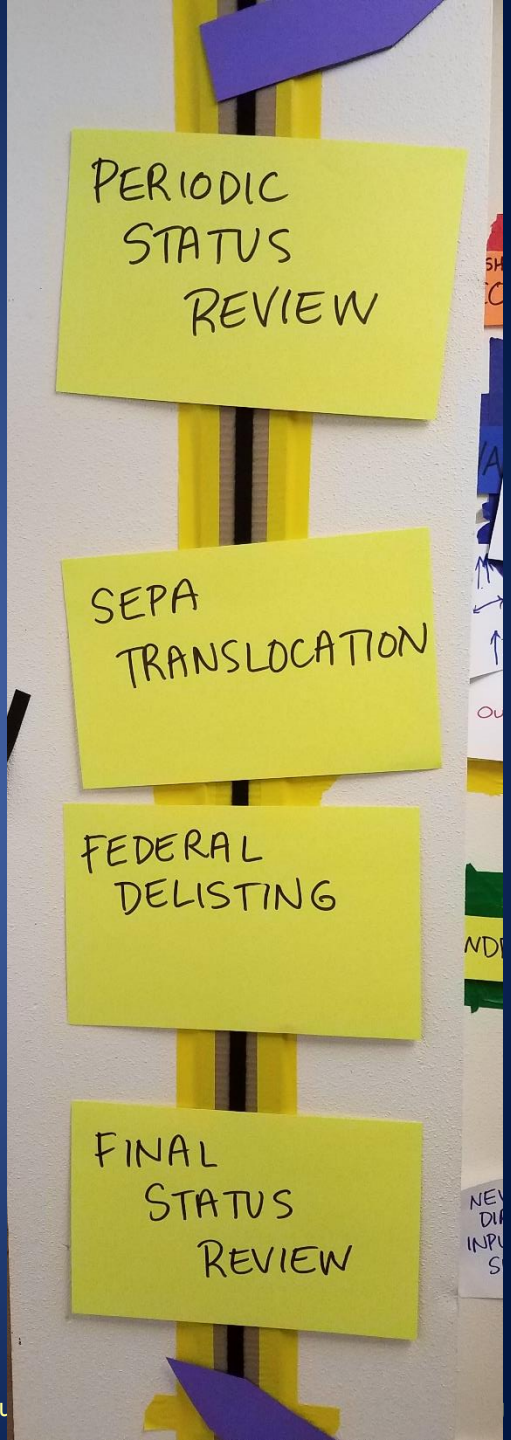
- Current activities and updates
- Planning process for considering wolf translocation
- Roles and responsibilities among WDFW, the Fish and Wildlife Commission, and the Wolf Advisory Group on the process and development of a post-delisting Wolf Conservation and Management Plan
- Science Presentation

July 10-11 WAG Meeting

Draft path for development of post-delisting wolf conservation and management plan

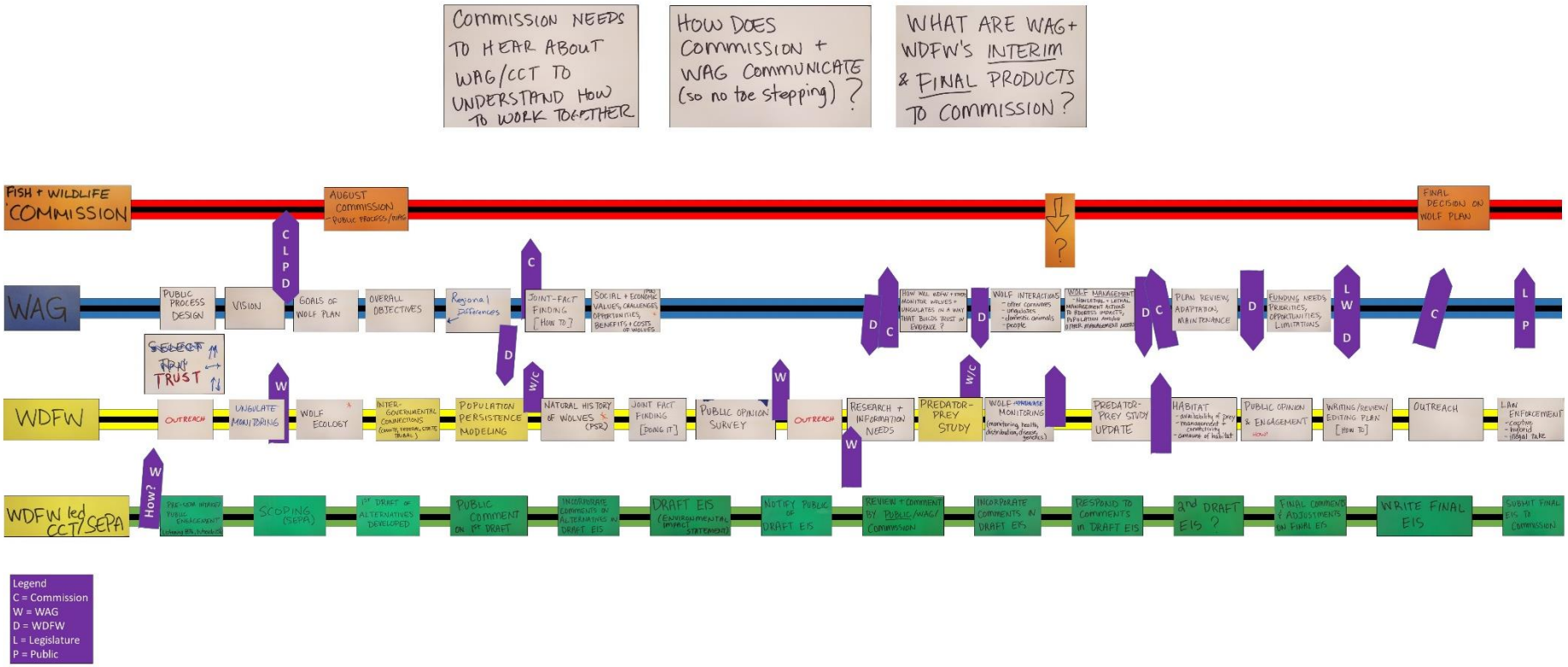


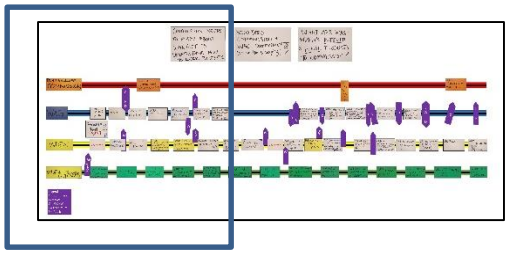
SEPA Processes



July 10-11 WAG Meeting

Draft path for development of post-delisting wolf conservation and management plan





COMMISSION NEEDS TO HEAR ABOUT WAG/CCT TO UNDERSTAND HOW TO WORK TOGETHER

FISH + WILDLIFE COMMISSION

AUGUST COMMISSION – PUBLIC PROCESS/WAG

C L P D

WAG

PUBLIC PROCESS DESIGN

VISION

GOALS OF WOLF PLAN

OVERALL OBJECTIVES

Regional Differences

C

JOINT-FACT FINDING [HOW TO]

SOCIAL + ECONO VALUES, CHALLENG OPPORTUNITIES, BENEFITS + COST OF WOLVE

D

SELECT TRUST

W

WDFW

OUTREACH

UNGULATE MONITORING

WOLF ECOLOGY

INTER-GOVERNMENTAL CONNECTIONS (COUNTY, FEDERAL, STATE, TRIBAL)

POPULATION PERSISTENCE MODELING

W/C

NATURAL HISTORY OF WOLVES (PSR)

JOINT FIN [D

How? W

WDFW led CCT/SEPA

PRE-SEPA INPUT/ PUBLIC ENGAGEMENT

SCOPING (SEPA)

1ST DRAFT OF ALTERNATIVES DEVELOPED

PUBLIC COMMENT ON 1ST DRAFT

INCORPORATE COMMENTS ON ALTERNATIVES IN DRAFT EIS

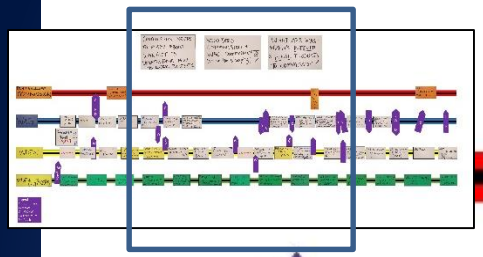
Inform

sentation

COMMISSION NEEDS TO HEAR ABOUT WAG/CCT TO UNDERSTAND HOW TO WORK TOGETHER

HOW DOES COMMISSION + WAG COMMUNICATE (so no toe stepping)?

WHAT ARE WAG+ WDFW's INTERIM & FINAL PRODUCTS TO COMMISSION?



C

Regional Differences

JOINT-FACT FINDING [HOW TO]

SOCIAL + ECONOMIC (PSR) VALUES, CHALLENGES, OPPORTUNITIES, BENEFITS + COSTS OF WOLVES

D

C

HOW WILL WDFW + OTHERS MONITOR WOLVES + UNGULATES IN A WAY THAT BUILDS TRUST IN EVIDENCE?

D

WOLF INTERACTIONS
- other carnivores
- ungulates
- domestic animals
- people

?

D

W/C

POPULATION PERSISTENCE MODELING

NATURAL HISTORY OF WOLVES (PSR)

JOINT FACT FINDING [DOING IT]

PUBLIC OPINION SURVEY

W

OUTREACH

W

RESEARCH + INFORMATION NEEDS

W/C

PREDATOR-PREY STUDY

WOLF MONITORING (monitoring, health, distribution, disease, genetics)

PUBLIC COMMENT ON 1ST DRAFT

INCORPORATE COMMENTS ON ALTERNATIVES IN DRAFT EIS

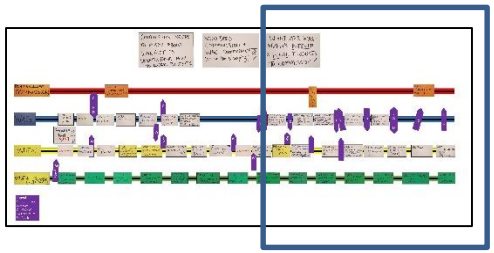
DRAFT EIS (ENVIRONMENTAL IMPACT STATEMENT)

NOTIFY PUBLIC OF DRAFT EIS

REVIEW + COMMENT BY PUBLIC/WAG/ COMMISSION

INCORPORATE COMMENTS IN DRAFT EIS

WHAT ARE WAG+ WDFW'S INTERIM & FINAL PRODUCTS TO COMMISSION?



FINAL DECISION ON WOLF PLAN

?

C

HOW WILL WDFW + OTHERS MONITOR WOLVES + UNGULATES IN A WAY THAT BUILDS TRUST IN EVIDENCE?

D

WOLF INTERACTIONS
- other carnivores
- ungulates
- domestic animals
- people

WOLF MANAGEMENT
- NON LETHAL + LETHAL MANAGEMENT ACTIONS TO ADDRESS IMPACTS, POPULATION AND/OR OTHER MANAGEMENT NEEDS

D C

PLAN REVIEW, ADAPTATION, MAINTENANCE

D

FUNDING NEEDS, PRIORITIES, OPPORTUNITIES, LIMITATIONS

L W D

C

L P

W/C

CH + ATION EDS

PREDATOR-PREY STUDY

WOLF MONITORING (monitoring, health, distribution, disease, genetics)

PREDATOR-PREY STUDY UPDATE

HABITAT
- availability of prey
- management + connectivity
- amount of habitat

PUBLIC OPINION & ENGAGEMENT
HOW?

WRITING/REVIEW/EDITING PLAN [HOW TO]

OUTREACH

LAW ENFORCEMENT
- captive
- hybrid
- illegal take

IEW + COMMENT PUBLIC/WAG/ MMISSION

INCORPORATE COMMENTS IN DRAFT EIS

RESPOND TO COMMENTS IN DRAFT EIS

2nd DRAFT EIS?

FINAL COMMENTS & ADJUSTMENTS ON FINAL EIS

WRITE FINAL EIS

SUBMIT FINAL EIS TO COMMISSION

March 2018 Wolf Advisory Group Literature Review

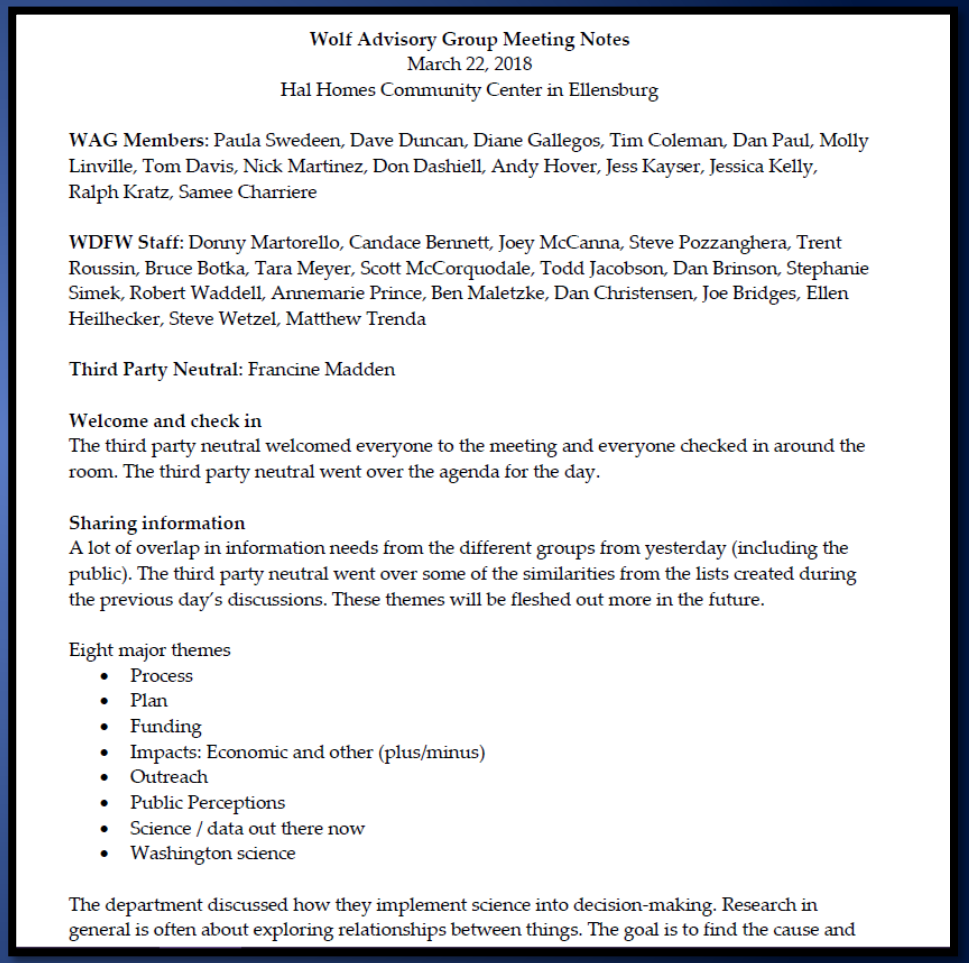
Scott McCorquodale, R3 Wildlife Program Manager
Ben Maletzke, Statewide Wolf Specialist
Candace Bennett, Wildlife Conflict Specialist
Wildlife Program

Overview

- WAG – Introduction to the Literature
  - Preparation for WAG meeting
  - WAG meeting recap
  - Introduction
- Concepts from WAG meeting
  - Carrying capacity
  - Density dependence
  - Additive versus compensatory mortality

Overview

- Materials provided
  - March 2018 WAG meeting minutes
  - Literature reviewed spreadsheet



Wolf Advisory Group Meeting Notes
March 22, 2018
Hal Homes Community Center in Ellensburg

WAG Members: Paula Swedeen, Dave Duncan, Diane Gallegos, Tim Coleman, Dan Paul, Molly Linville, Tom Davis, Nick Martinez, Don Dashiell, Andy Hover, Jess Kayser, Jessica Kelly, Ralph Kratz, Samee Charriere

WDFW Staff: Donny Martorello, Candace Bennett, Joey McCanna, Steve Pozzanghera, Trent Roussin, Bruce Botka, Tara Meyer, Scott McCorquodale, Todd Jacobson, Dan Brinson, Stephanie Simek, Robert Waddell, Annemarie Prince, Ben Maletzke, Dan Christensen, Joe Bridges, Ellen Heilhecker, Steve Wetzel, Matthew Trenda

Third Party Neutral: Francine Madden

Welcome and check in
The third party neutral welcomed everyone to the meeting and everyone checked in around the room. The third party neutral went over the agenda for the day.

Sharing information
A lot of overlap in information needs from the different groups from yesterday (including the public). The third party neutral went over some of the similarities from the lists created during the previous day's discussions. These themes will be fleshed out more in the future.

Eight major themes
- Process
- Plan
- Funding
- Impacts: Economic and other (plus/minus)
- Outreach
- Public Perceptions
- Science / data out there now
- Washington science

The department discussed how they implement science into decision-making. Research in general is often about exploring relationships between things. The goal is to find the cause and

Preparation for the WAG Meeting
Introduction to the Literature

- Questions
  - WAG members
  - WDFW staff feedback
- Consolidated to four topics
  - Wolf population dynamics
  - Predator-prey dynamics
  - Ungulate populations
  - Conservation Conflict Transformation

Authors	Title	Year	Journal	Volume	Issue	pages	article type	research location	subject	notes
S Hinchliffe, and RA McDonald	Conflict as invasive species management	2017	Front Ecol Environ	15	3	133-141	review	worldwide	CCT	Introduction of a different conflict curve. A type of CCT approach to addressing conflict.
de Coning, C	From peacebuilding to sustaining peace: implications of complexity for resilience and sustainability	2016	Resilience: International Policies, Practices, and Discourses	-	-	2169-3293		worldwide	CCT	application of complexity theory on peacebuilding field. Describes complexity theory.
ndenaruwandere, T. et al	Combining internal and external motivations in multi-actor governance arrangements for biodiversity and ecosystem services	2016	Environmental Science and Policy	58		1-10'	survey	EU	CCT	Moral of the article: building successful process includes: inclusive decision making, core staff of the institve, a supportive process to encourage autonomous competencies.
Dickman, AJ	Complexities of conflict: the importance of considering social factors for effectively resolving human-wildlife conflict	2010	Animal Conservation	13		458-466	review	worldwide	CCT	Use of a multidisciplinary participants thoughts to address socio-economic. Ecological, and cultural conditions surrounding conflicts for long term success of decisions.
i, C. Sandstrom, and G. Bostedt	The problem of spatial scale when studying the human dimension of a natural resource conflict: humans and wolves in Sweden	2006	The International Journal of Biodiversity Science and Management	2	4	343-349	case study	Sweden	CCT	Looked at how different survey methods on peoples opinions could be missing a key component of feedback. Compared different survey methods of opinions.
Atran, D. Medin, and K. Shikaki.	Sacred bonds on rational resolution of violent political conflict	2007	PNAS	104	18	7357-7360	primary	middle east	CCT	When people categorize an activity as a sacred value, cost-benefit bargining can backfire. Must look at identity conflicts to have a successful process.
Hill. CM	Perspectives of "conflict" at the wildlife-agriculture boundary: 10 years on	2015	Human Dimensions of Wildlife	20	4	396-301		worldwide	CCT	Labels on the situation can cause more issues and mask important areas that ued to be addressed (eg, not calling HWC) and human-animal relationships are not just physical, they are also influenced by spiritual or religion.
Madden, F.	Creating Coexistence between humans and wildlife: global perspectives on local efforts to address human-wildlife conflict	204	Human Dimensions of Wildlife	9		247-257	workshop summary	worldwide	CCT	Summary of an IUCN workshop. Defined lessons learned and next steps to expand CCT.
dden, F and B. McQuinn	Conservation blind spot: The case for conflict transformation in wildlife conservation	2014	Biological Conservation	178		97-106	case study	worldwide	CCT	Use CCT.
ken, V. Shelley, AR Rivenaes, C. Browne-es, AP Wyderen, and T Van Deelen	Pendelum swings in wolf management led to conflict, illegal kills, and a legislated wolf hunt	2015	Conservation Letters	8	5	351-360	case study	Wisconsin	CCT	Public support of lethal removal of wolves is directly related to the perceived wolf population numbers and risk
a, W. Bennett, A Dickman, G Holmes, J n, DW Macdonald, G Marvin, S Redpath, C >Zubzi, and A Zimmerman	An interdisciplinary review of current and future approaches to improving human-predator relations	2016	Conservation Biology	31	3	513-523	review	worldwide	CCT	Moving forward, research must be multidisciplinary to collaborate on planning, method selection/development, analysis along with use of human-animal geographies to look at how they interact over time, and use of multiple ethologies for improved human-predator relations.
Essen, E and HP Hansen	How stakeholder co-management reproduces conservation conflicts: revealing rationality problems of Sweden wolf conservation	2015	Conservation and Society	13	4	332-344	case study	Sweden	CCT	Explored use of consensus in wildlife conflict.
asson, HN Kalvetun, MN Peterson, and TR Peterson	The radicalisation of rural resistance: how hunting counterpublics in the Nordic countries contribute to illegal hunting	2014	Journal of Rural Studies			01-11	case study	Nordic	CCT	explored why hunters in Nordic countries become wolf poachers. If you do not challenge the dominate ethos (environmentalism) then illegal hunting (up to message killing) will happen.
Wilson, EH Bradley, JA Gude RM Inman, s, AA Nelson, MS Ross, and TD Smucker	Wolf-Livestock Conflict and the Effects of Management	2018	Journal of Wildlife Management	Early view		primary	Montana	Livestock	Impacts of Hunting (and various other things) on livestock conflict
Cooley, B.T. Maletzke, and R.B. Wielgus	Forecasting cattle depredation risk by recolonizing gray wolves	2018	Wildlife Biology	2018	1	1-13	research	ID. MT. WA	Livestock	
ne, MR Conte, JK Nesse, AD Middleton	Effectiveness of contemporary techniques for reducing								Livestock	

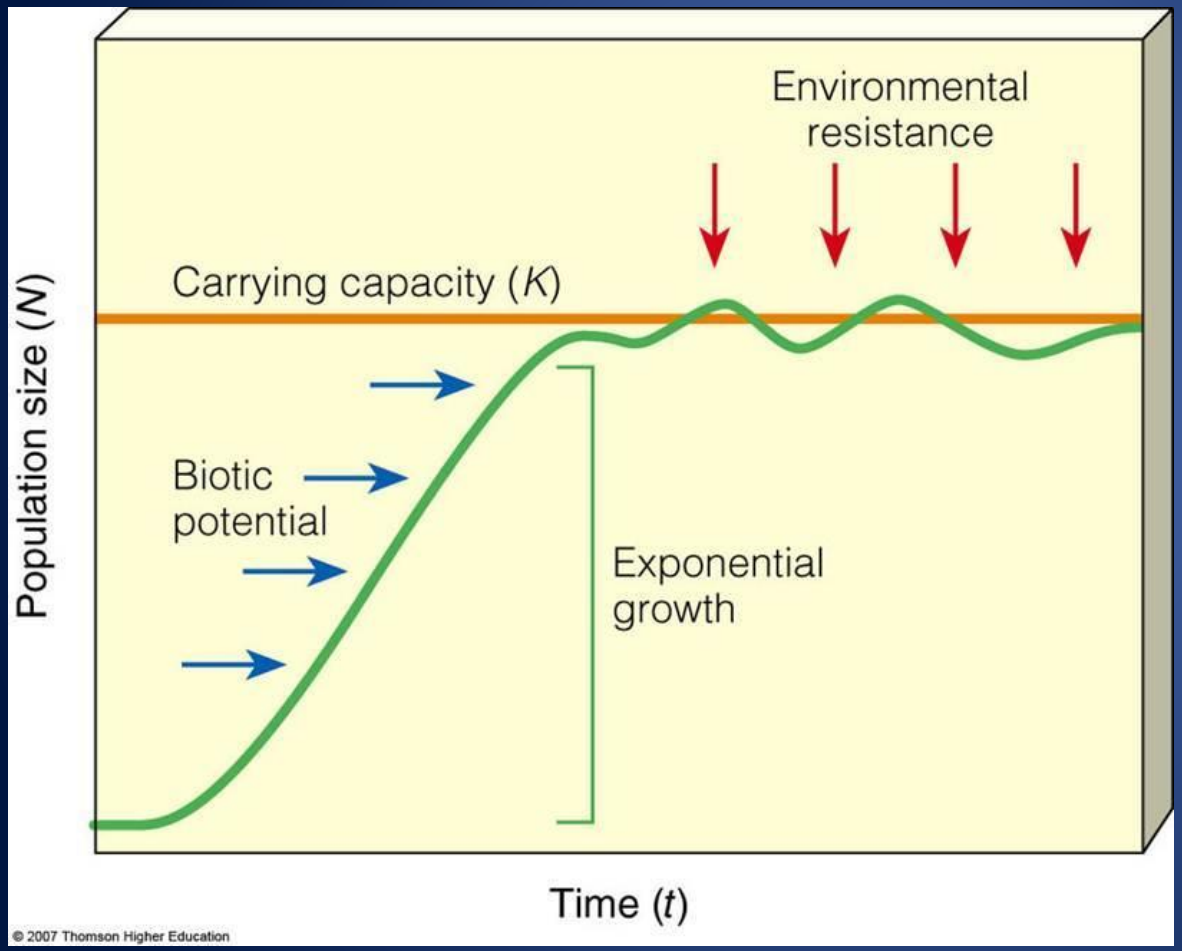
Preparation for WAG Meeting
Introduction to the Literature

- Acknowledgments
  - A broad array of relevant resources available
  - First attempt to inform, not path forward
  - Science is often used selectively to support differing perspectives
  - Differences between popular articles/opinions and peer-reviewed literature
  - Few studies examine management actions

WAG – Introduction to the Literature

March 2018 Meeting Recap

Concepts from WAG Meeting
Carrying Capacity



Factors can limit the population

Factors are influencing but not limiting population growth

Concepts from WAG Meeting
Density Dependence

- A factor that acts in proportion to the density of animals.
- Density Dependence influences the population as it reaches Carrying Capacity (K).

  - Dependent factors
    - Availability of Forage, Predation, Intraspecific competition, Territoriality, Disease, Emigration

  - Independent factors
    - Severe Winter/Deep Snow/ Ice on Snow, Extended Cold, Drought, Human Impacts (-)
    - Mild Winter, Rains, Habitat Enhancements, etc. (+)

Concepts from WAG Meeting
Density Dependence

- Populations below Carrying Capacity (K):
  - Individuals in good body condition
  - Environmental stresses may have less impacts

- Populations near Carrying Capacity (K):
  - Larger proportion of individuals may be in poor body condition
  - More susceptible to limiting factors
    - severe winter, drought, disease, predation, catastrophic events, etc.

Concepts from WAG Meeting
Additive vs. Compensatory Mortality

- **Additive Mortality** – When an animal dies from cause A, had that not happened, they would very likely persisted in the population and contributed to population growth.
- **Compensatory Mortality** – One kind of mortality largely replaces another kind of mortality.

Example: N Yellowstone Elk Numbers

Wolves Reintroduced

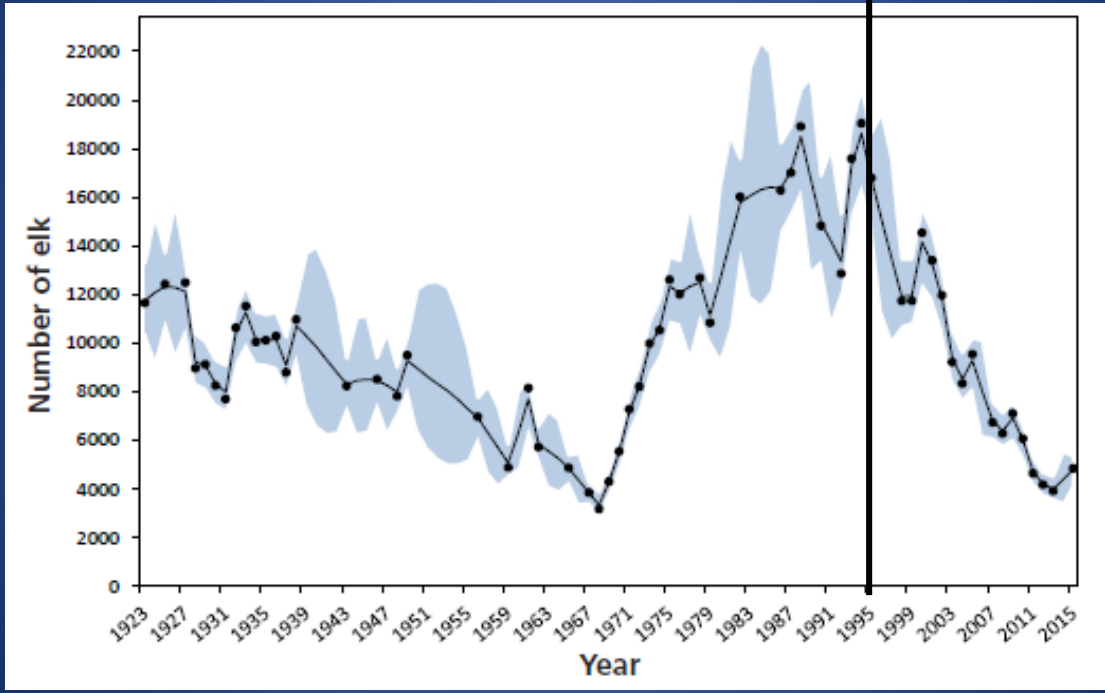


Figure 1. Counts (circles) and fitted trend line for abundance of the northern Yellowstone elk herd, 1923-2015. Shaded area indicates uncertainty about the trend. Data are from the Northern Yellowstone Cooperative Wildlife Working Group.

MacNulty et al. 2016

Example: N Yellowstone Elk Hunter Harvest

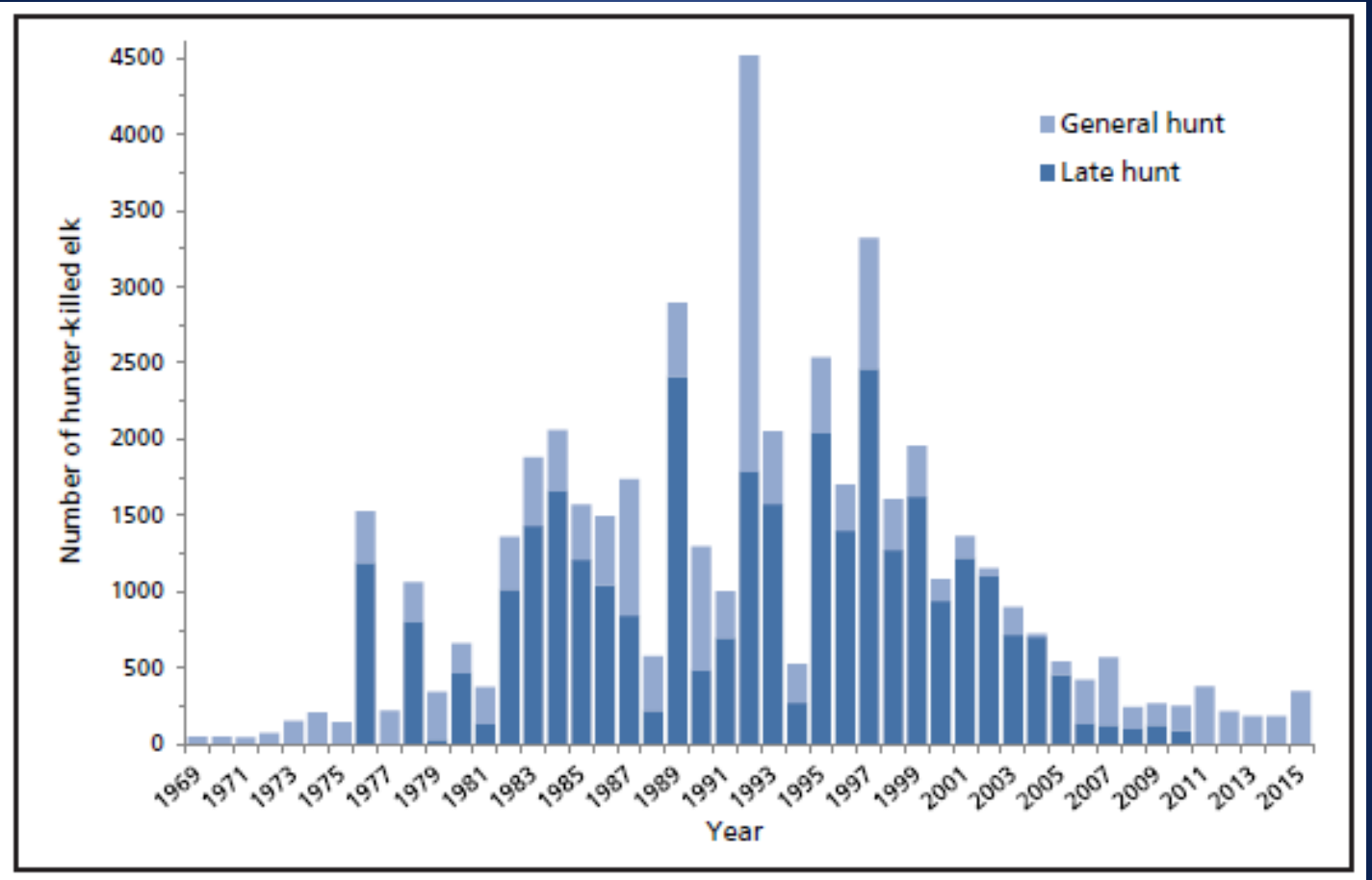


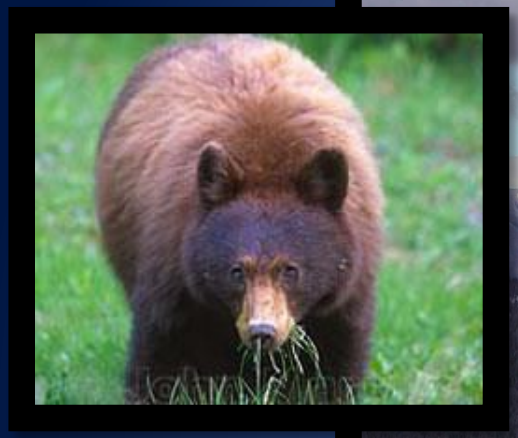
Figure 4. Annual number of northern Yellowstone male and female elk harvested by hunters in Montana Hunting District 313 (north of the park boundary) during the natural regulation era, 1969-2015. The final late season hunt occurred during the winter 2009-2010. Data are from Lemke et al. (1998), Vucetich et al. (2005), and Loveless (2015).

MacNulty et al. 2016

Summary

- The systems have varying levels of complexity
- This complexity strongly affects case study outcomes
- Science often evolves
- Wildlife management includes people and wildlife

Questions?



Summary

Meeting date:	February 10-11, 2017
Agenda item:	Wolf Science - Briefing
Presenter(s):	Donny Martorello, Wolf Policy Lead; Scott Becker, Wolf Specialist; Candace Bennet, Wildlife Conflict Specialist; Tara Meyer, Private Lands and Wildlife Conflict Supervisor;

Background summary:

The Department believes it is important to discuss this body of wolf science with the Fish and Wildlife Commission and public to increase the awareness of the scientific information available and increase transparency on how science informs the Department.

Department biologists will provide an overview of relevant or recently published peer-reviewed manuscripts related to wolf management. They will emphasis the lethal removal of wolves to address wolf-livestock conflict. The presenters will discuss body of science, strengths and weaknesses from the department's perspective, and the role that this science plays in our decision making.

This information will also be discussed with the Department's Wolf Advisory Group, as they begin their review the Department's protocol for lethal removal of wolves.

Policy issue(s) you are bringing to the Commission for consideration:

N/A

Public involvement process used and what you learned:

N/A

Action requested:

N/A

Draft motion language:

N/A

Justification for Commission action:

N/A

Communications Plan:

N/A

Wolf Science Panel

Lethal removal of wolves to minimize wolf-livestock conflict

Donny Martorello, Wolf Policy Lead
Scott Becker, Wolf Specialist
Candace Bennett, Wildlife Conflict Specialist
Tara Meyer, Private Lands and Wildlife Conflict Supervisor
Ellen Heilhecker, Wildlife Conflict Specialist
Stephanie Simek, Carnivore Section Manager

Washington Department of FISH and WILDLIFE

Purpose of Presentation

- Discuss the role of science in wolf policy and management
- Reliable knowledge
- Inference
- Recent publications and “body of science”
- Management implications

Role of Science

WDFW reviews science constantly

- Hypothesis testing, repeatable
- Science not truth, informs decision making
- "Grey-science"
- Body of knowledge vs single publications
- Decisions aren't always based solely on science

Reliable Knowledge

Which studies are the most informative?

Least

Most

1. Evaluate subpopulation trends
2. Investigate demographics of species
3. Apply treatment to population and measured response
4. Treatment and control design, randomly apply treatment, then replicate

Inference

- Environmental conditions
- Changing conditions in time and space
- Other species in system
- Confounding factors
- Power, precision, and accuracy of statistical tests

Publications

1. Borg, B.L., S.M. Brainerd, T.J. Meier, and L.R. Prugh. 2014. Impacts of breeder loss on social structure, reproduction and population growth in a social canid. Journal of Animal Ecology; DOI: 10.1111/1365-2656.12256.

2. Bradley, E.H., H.S. Robinson, E.E. Bangs, K. Kunkel, M.D. Jimenez, J.A. Gude, and T. Grimm. 2015. Effects of wolf removal on livestock depredation recurrence and wolf recovery in Montana, Idaho, and Wyoming. The Journal of Wildlife Management; DOI: 10.1002/jwmg.948.

3. Brainerd, S.M., A. Henrik, E.E. Bangs, E.H. Bradley, J.A. Fontaine, W. Hall, Y. Iliopoulos, M.D. Jimenez, E.A. Jozwiak, O. Liberg, C.M. Mack, T.J. Meier, C.C. Niemeyer, H.C. Pedersen, H. Sand, R.N. Schultz, D.W. Smith, P. Wabakken, and A.P. Wydeven. 2008. The effects of breeder loss on wolves. Journal of Wildlife Management 72:89-98.

4. Chapron, G., and A. Treves. 2016. Blood does not buy good will: allowing culling increases poaching of a large carnivore. Proc. R. Soc. B 20152939. http://dx.doi.org/10.1098/rspb.2015.2939.

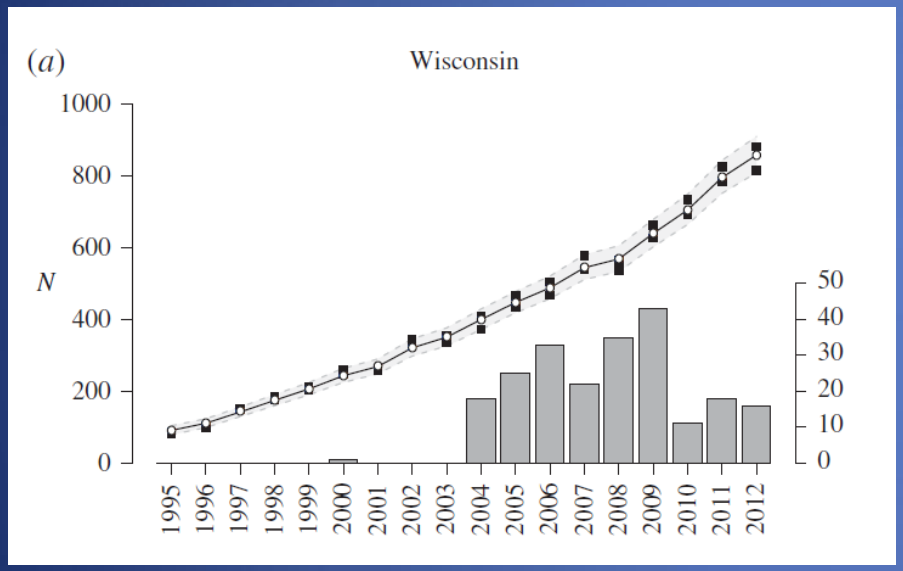
5. Olson, E.R., J.L. Stenglin, V. Shelley, A.R. Rissman, C. Brown-Nunez, Z. Voyles, A. Wydeven, and T. Van Deelen. 2014. Pendulum swings in wolf management led to conflict, illegal kills, and a legislated wolf hunt. Conservation Letters DOI: 10.1111/conl.12141.

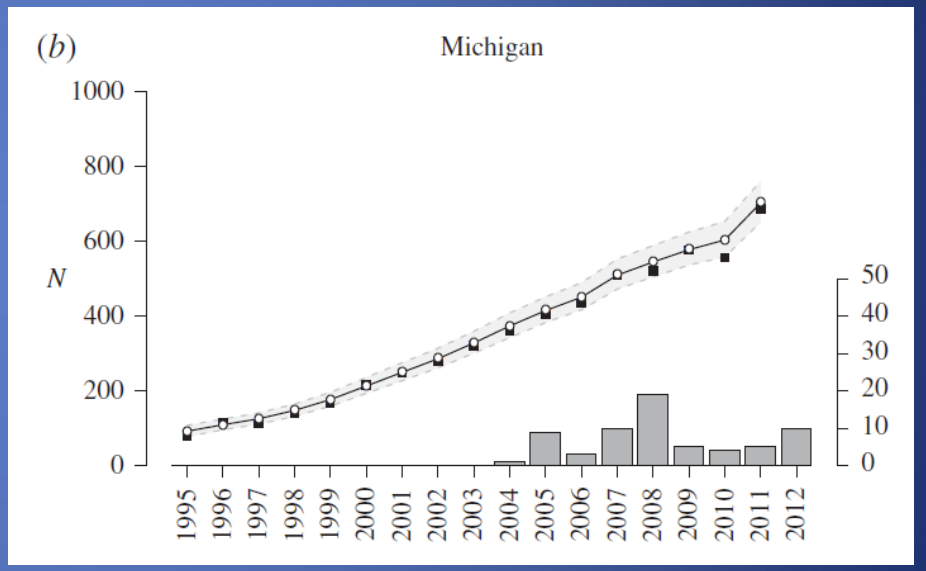
6. Treves, A., M. Krofel, and J. McManus. 2016. Predator control should not be a shot in the dark. Frontiers in Ecology 14:380-388.

7. U.S. Fish and Wildlife Service, Idaho Department of Fish and Game, Montana Fish, Wildlife & Parks, Wyoming Game and Fish Department, Nez Perce Tribe, National Park Service, Blackfeet Nation, Confederated Salish and Kootenai Tribes, Wind River Tribes, Confederated Colville Tribes, Spokane Tribe of Indians, Washington Department of Fish and Wildlife, Oregon Department of Fish and Wildlife, Utah Department of Natural Resources, and USDA Wildlife Services. 2016. Northern Rocky Mountain Wolf Recovery Program 2015 Interagency Annual Report. M.D. Jimenez and S.A. Becker, eds. USFWS, Ecological Services, 585 Shepard Way, Helena, Montana, 59601. NOTE: annual reports with associated information and tables can be found at https://www.fws.gov/mountain-prairie/es/grayWolf.php and select “Annual Reports...” then the years you want.

Chapron, G., and A. Treves. 2016. Blood does not buy good will: allowing culling increases poaching of a large carnivore. Proc. R. Soc. B 20152939. http://dx.doi.org/10.1098/rspb.2015.2939.

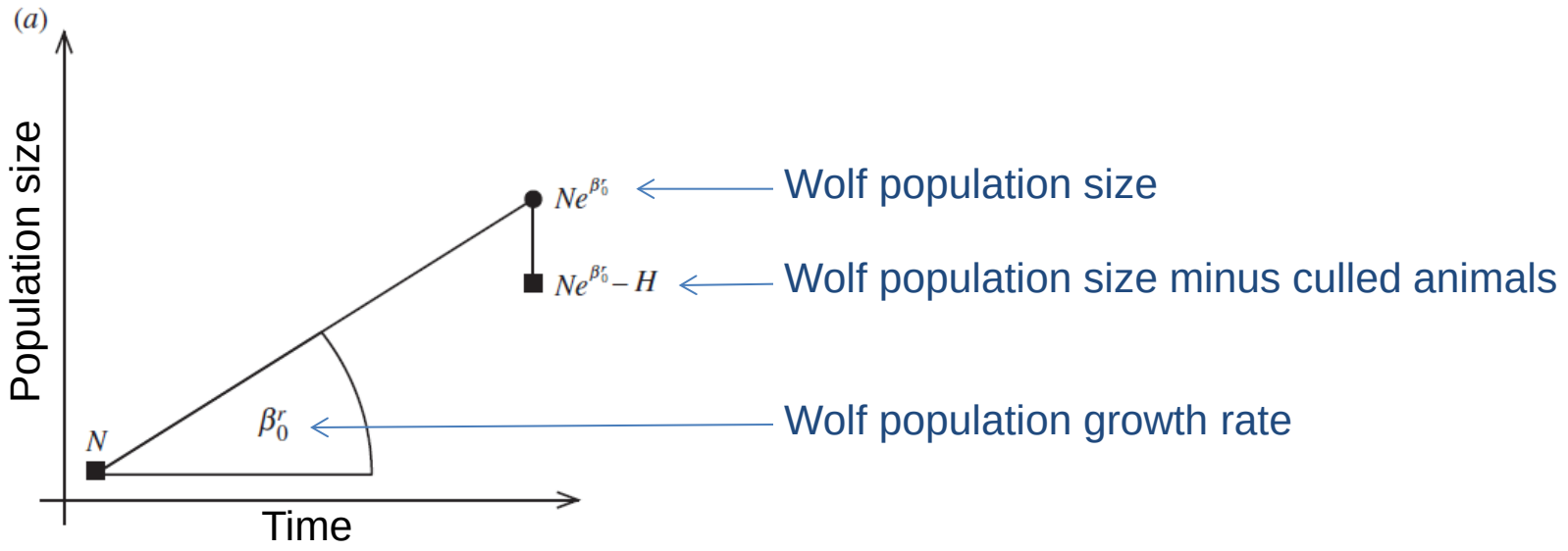
Hypothesis: Liberalizing wolf culling will reduce poaching and improve population status of wolves





Wolf population history in Wisconsin and Michigan. The black squares are FWS population counts (scale on left axis, minimum and maximum for Wisconsin, minimum for Michigan), the grey area is the 95% credible interval of the fitted population model, the histogram shows the number of wolves culled (scale on right axis).

Conceptual model of how culling policy signal influences growth rate



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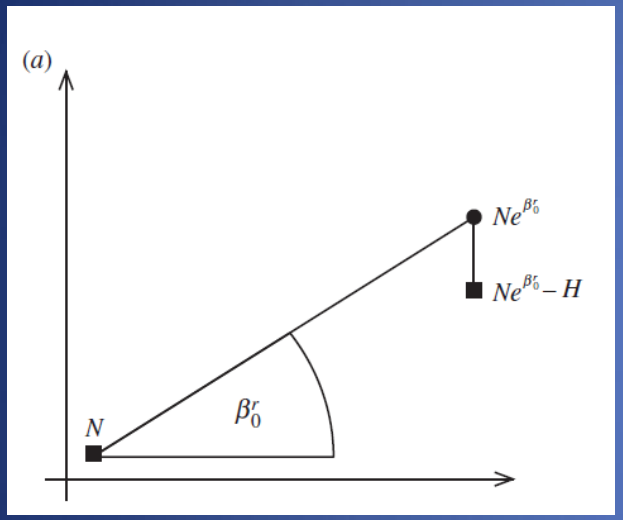
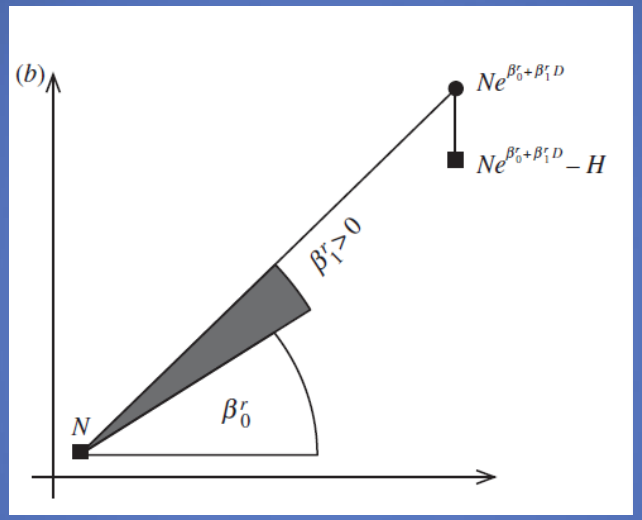
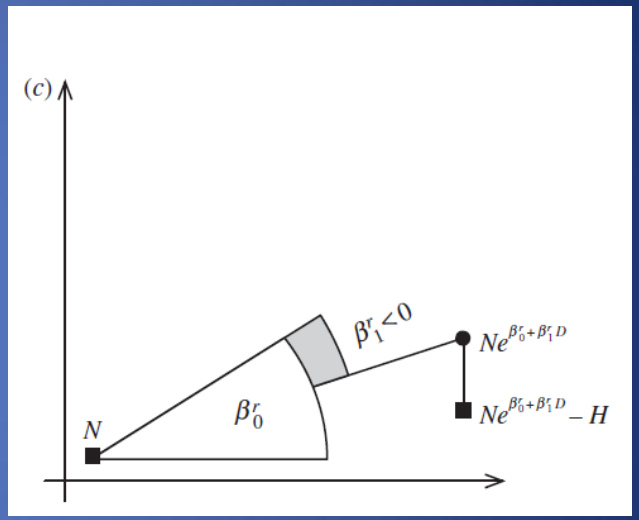


From one time step to the next (horizontal axis), a population has a potential growth rate which does not account for the animals culled.



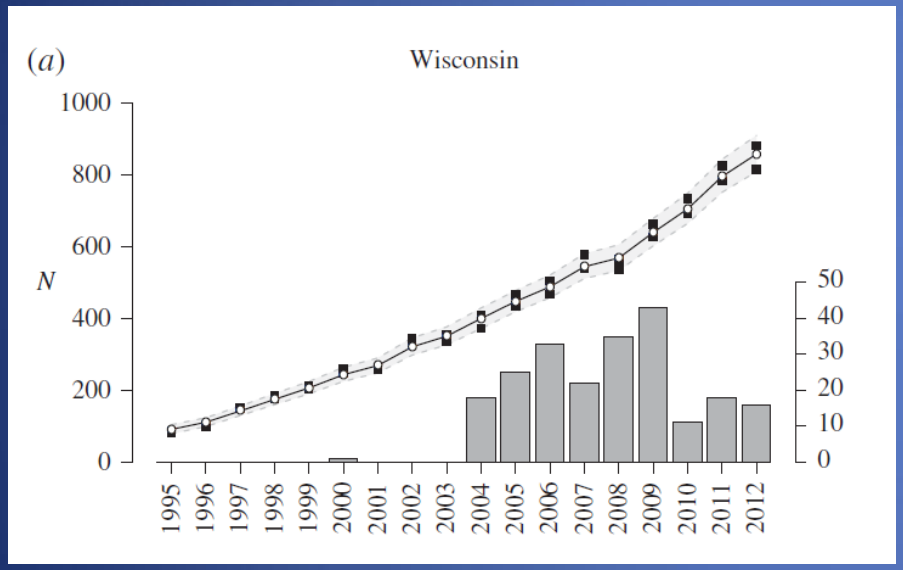
With a culling policy signal lasting duration D (proportion of a year), the potential growth rate increases through a decrease of poaching.

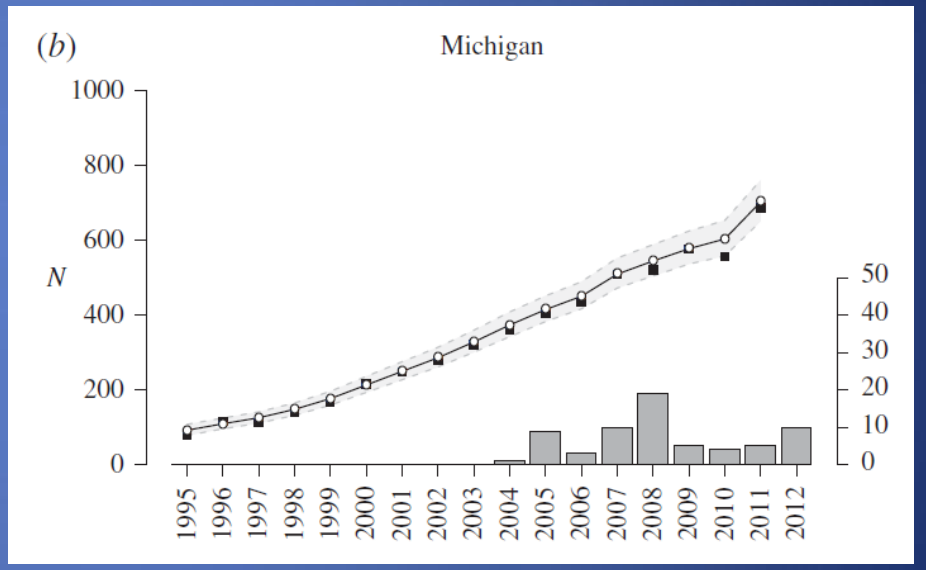


With a culling policy signal lasting duration D (proportion of a year), the potential growth rate decreases through a increase of poaching.

Hypothesis: Liberalizing wolf culling will reduce poaching and improve population status of wolves

→ Outcome: Liberalizing wolf culling did not reduce poaching and improve population status of wolves.





Growth rate change:

- No signal: 0.16 (95%CI: 0.12-0.20)
- Culling signal: 0.12 (95%CI: 0.07-0.19)

Growth rate change:

- No signal: 0.14 (95%CI: 0.10-0.18)
- Culling signal: 0.10 (95%CI: 0.05-0.17)

Comments on Study

- Limitations of retrospective study design
- Model is correlation, assumption that poaching is causal mechanism
- Assumption on no confounding factors, interactions, or time lags associated with social response (i.e., poaching)
- Assumption with census reliability

Management Implications

- Need greater understanding on variables that influence social tolerance
- Assess goal of lethal removal

Treves, A., M. Krofel, and J. McManus. 2016. Predator control should not be a shot in the dark. Frontiers in Ecology 14:380-388.

- Objective: Review studies evaluating functional effectiveness of intervention (non-lethal or lethal methods) to protect livestock from wild predators.

- Compare studies to "gold standard" of scientific inference
  - Random assignment to control and treatment groups with experiential design

- "Silver standard"
  - Non-random assignment
  - Quasi-experimental test with haphazard assignment of treatments

- Inclusion for quantitative summary
  - Peer-reviewed
  - English and Slovenian
  - Used experimental or quasi-experimental control with design for strong inference
  - Occurred in working livestock operations with free-ranging, native carnivores
  - Verified livestock losses

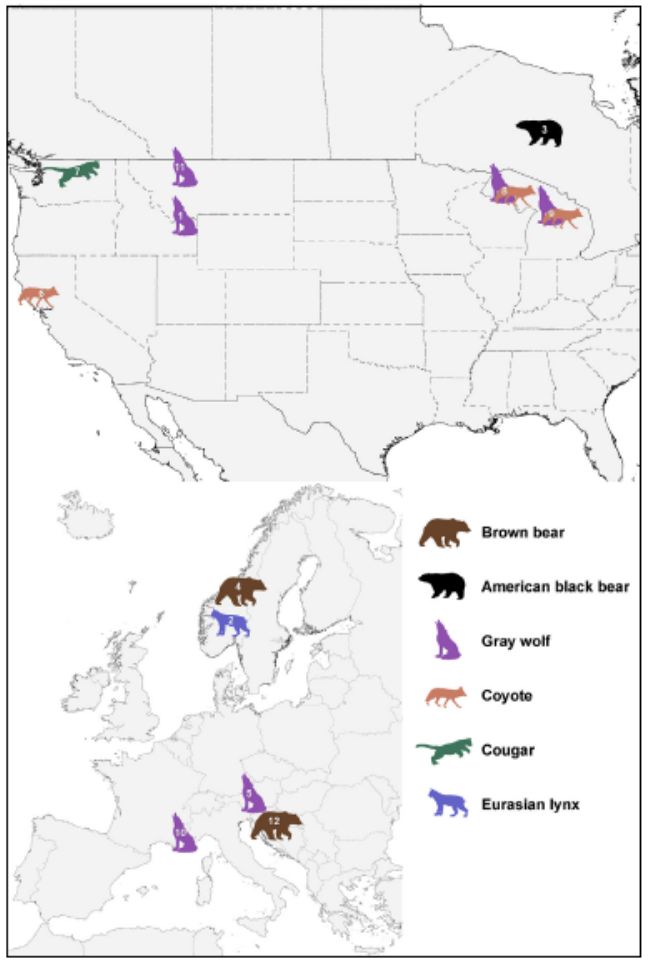


Figure 1. The geographic distribution of tests of lethal and non-lethal methods providing reliable inference about functional effectiveness in preventing carnivore predation on livestock from North American and European livestock farms. Numbers correspond to those in Table 1.

Results

- 12 tests meet gold or silver standard
- Lethal methods – 7 tests met silver standard
  - 2/7 reduced livestock losses from predation
  - 3/7 effect to livestock losses from predation
  - 2/7 increased livestock losses from predation
- Non-lethal methods – 5 tests met
  - 4/5 preventative effects
  - 1/4 preventative effects for 1 species, but another

Table 1. Tests of interventions to prevent carnivore predation on livestock that met review criteria

	Observed changes (if any) in livestock predation		
	Decrease	*No difference*	*Increase*
Lethal methods	Quasi-experimental tests of culling gray wolves (1) and culling, hunting, and poaching Eurasian lynx (2)	Quasi-experimental tests of hunting black bears (3*), hunting and culling brown bears (4), and culling and hunting gray wolves (5)	Quasi-experimental tests of culling coyotes (6) and hunting cougars (7**)
Non-lethal methods	Random assignment test of fladry on gray wolves (8), random assignment test of LGDs on gray wolves and coyotes (9), quasi-experimental tests of LGDs and night enclosures on gray wolves (10), and fladry on gray wolves (11)	Random assignment test of fladry on coyotes (8), quasi-experimental tests of diversionary feeding on brown bears (12)	

Notes: *Some complaints related to livestock predation but some related to property damage. **A quasi-experimental two-county comparison was reported in Peebles *et al.* (2013), based partly on the work of Cooley *et al.* (2009a,b). Sources of evidence are listed by number: 1 = Bradley *et al.* (2015); 2 = Herfindal *et al.* (2005); 3 = Obbard *et al.* (2014) see their Table S1 for use of moving averages; 4 = Sagør *et al.* (1997); 5 = Krofel *et al.* (2011) reanalyzed as after–before measures of livestock losses (WebPanel 1); 6 = Conner *et al.* (1998); 7 = Peebles *et al.* (2013) and Cooley *et al.* (2009a,b) treated as a single test for the two-county comparison, not the state-wide analysis; 8 = Davidson-Nelson and Gehring (2010); 9 = Gehring *et al.* (2010a,b); 10 = Espuno *et al.* (2004); 11 = Musiani *et al.* (2003); 12 = Kavčič *et al.* (2013). LGDs = livestock-guarding dogs. We excluded two studies that used time lags but not BACI designs to infer changes in livestock losses over time (eg Wielgus and Peebles 2014; Fernández-Gil *et al.* 2016).

Review Summary

- Most (10/12) tests did not meet gold standard
- More non-lethal tests were found effective at preventing depredations compared lethal tests
- No lethal tests met gold standard
- Two non-lethal tests provided strong inference
  - Fladry
  - Livestock guarding dogs

Comments on Study

- Good review from multi-species multi-ecosystem perspective
- Highlights importance of study design and study inference

Management Implications

- More research needed on effectiveness of non-lethal and lethal tools
- Importance of specifically stating objective of intervention
  - Is goal to minimize probability of reoccurring depredations today or in the future?

Brainerd et al. (2008)

Pooled worldwide available data

Borg et al. (2015)

Alaska long-term study (1986-2012)

Brainerd et al. (2008)

Pooled worldwide available data

Borg et al. (2015)

Alaska long-term study (1986-2012)

How loss / removal of breeders impacted wolf…

- Pup survival
- Reproduction
- Pack integrity/territoriality
- Population growth

Brainerd et al. (2008)

Pooled worldwide available data

Borg et al. (2015)

Alaska long-term study (1986-2012)

How loss / removal of breeders impacted wolf…

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Depending on…

- female, male or both
- Age of pups
- Size of pack / # of adults
- Isolation vs connectivity to other packs
- Size of surrounding wolf population
- Recolonizing vs saturated

Brainerd et al. (2008)

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Borg et al. (2015)

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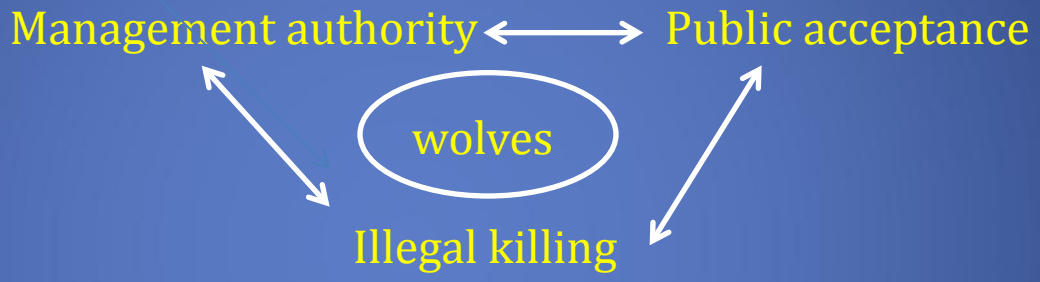
"Breeder mortality and pack dissolution had no significant effects on immediate or longer term population dynamics. …At the population level socially complex species may be resilient to disruption and harvest through strong compensatory mechanisms." (Borg et al. 2015)

Olson et al. (2014)

Wolf recolonization and Endangered Species Act (ESA) status in Wisconsin

Olson et al. (2014)

Wolf recolonization and Endangered Species Act (ESA) status in Wisconsin

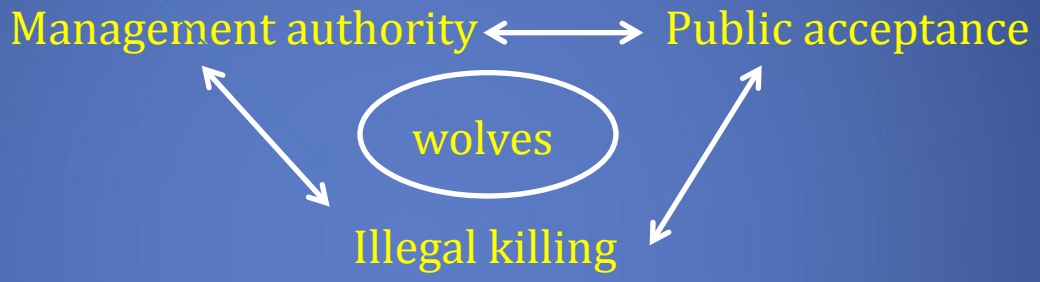


Wolf ESA status swings -> inconsistent management authority

- Local public support for wolves declined
- "backlash" of increased illegal kills and a legislatively mandated wolf hunt

Olson et al. (2014)

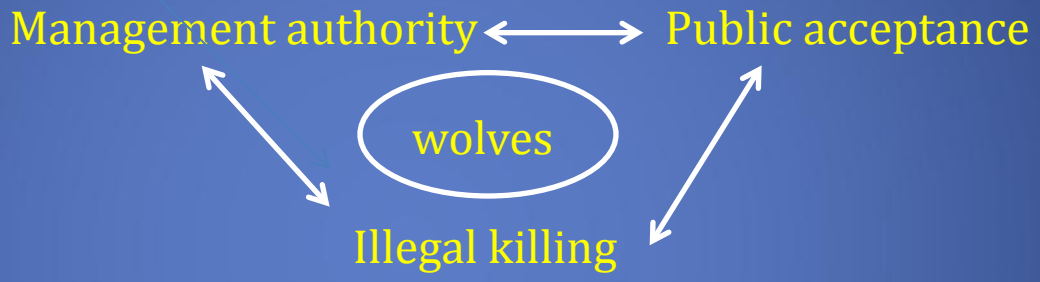
Wolf recolonization and Endangered Species Act (ESA) status in Wisconsin



- Wolf ESA status swings -> inconsistent management authority
  - Local public support for wolves declined
  - "backlash" of increased illegal kills and a legislatively mandated wolf hunt
- Consistent and responsible depredation management programs (or incremental delisting transition from federal to state) may reduce illegal killing

Olson et al. (2014)

Wolf recolonization and Endangered Species Act (ESA) status in Wisconsin



- Wolf ESA status swings -> inconsistent management authority
  - Local public support for wolves declined
  - "backlash" of increased illegal kills and a legislatively mandated wolf hunt
- Consistent and responsible depredation management programs (or incremental delisting transition from federal to state) may reduce illegal killing
- "…consider local perceptions of wildlife and … seek ways to empower non-consumptive users by providing more opportunities to participate…" (Olson et al. 2014)

Citations

Borg, B.L., Brainerd, S.M., Meier, T.J. and Prugh, L.R. 2015. *Impacts of breeder loss on social structure, reproduction and population growth in a social canid*. Journal of Animal Ecology, 84: 177–187.

Brainerd, S.M., Andrén, H., Bangs, E.E., Bradley, E.H., Fontaine, J.A., Hall, W., Iliopoulos, Y., Jimenez, M.D., Jozwiak, E.A., Liberg, O., Mack, C.M., Meier, T.J., Niemeyer, C.C., Pedersen, H.C., Sand, H., Schultz, R.N., Smith, D.W., Wabakken, P. and Wydeven, A.P. 2008. *The Effects of Breeder Loss on Wolves*. The Journal of Wildlife Management, 72: 89–98.

Olson, E.R., Stenglein, J.L., Shelley, V., Rissman, A.R., Browne-Nuñez, C., Voyles, Z., Wydeven, A. P. and Van Deelen, T. 2014. *Pendulum Swings in Wolf Management Led to Conflict, Illegal Kills, and a Legislated Wolf Hunt*. Conservation Letters, 8: 351–360.

Bradley, E. H., H.S. Robinson, E.E. Bangs, K. Kunkel, M.J. Jimenez, J.A. Gude, and T. Grimm. 2015. *Effects of wolf removal on livestock depredation recurrence and wolf recovery in Montana. Journal of Wildlife Management* 79:1337-1346

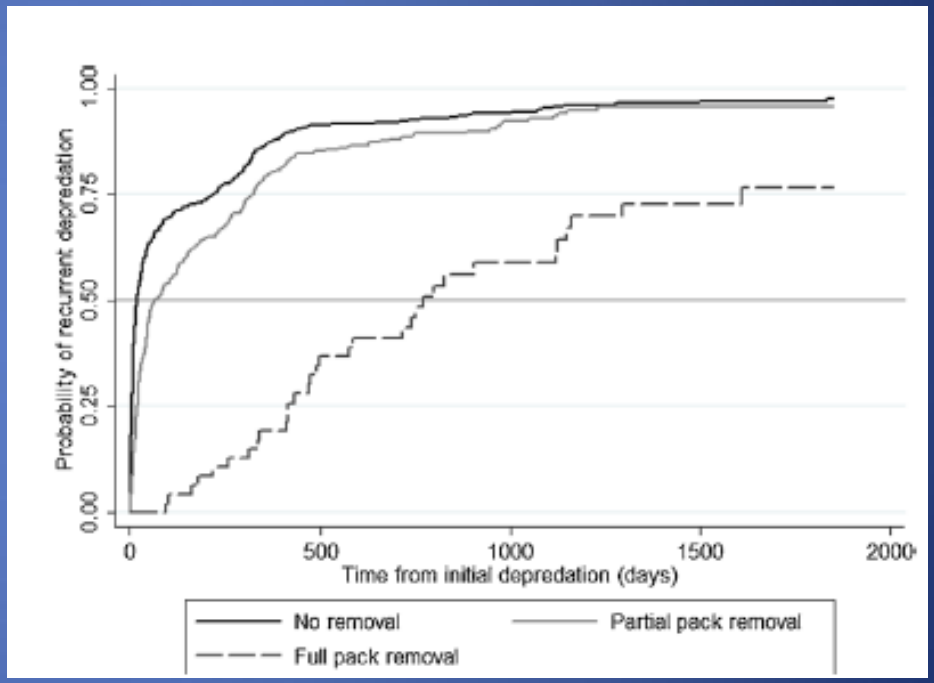
Objective 1: Evaluate the effects of three management responses to confirmed wolf depredations.

Significant in reducing recurrent depredations:

- Partial pack removal within 14 days
- Full pack removal the most effective

No difference found in reducing recurrent depredations:

- Season of removal
- Livestock involved



Bradley, E. H., H.S. Robinson, E.E. Bangs, K. Kunkel, M.J. Jimenez, J.A. Gude, and T. Grimm. 2015. *Effects of wolf removal on livestock depredation recurrence and wolf recovery in Montana. Journal of Wildlife Management* 79:1337-1346

Objective 2: Evaluate partial pack removals independently

Significant in reducing recurrent depredations:

- Larger pack sizes

No difference found in recurrent depredations of partial pack:

- when the breeding female
- ≥1 year old male removed.

Management action	Hazard ratio	SE	Z	P
Breeding F removed	0.6428	0.2214	−1.28	0.200
≥1-yr-old M removed	1.000	0.1828	0.00	0.998
Pack size following action	1.087	0.0353	2.59	0.010

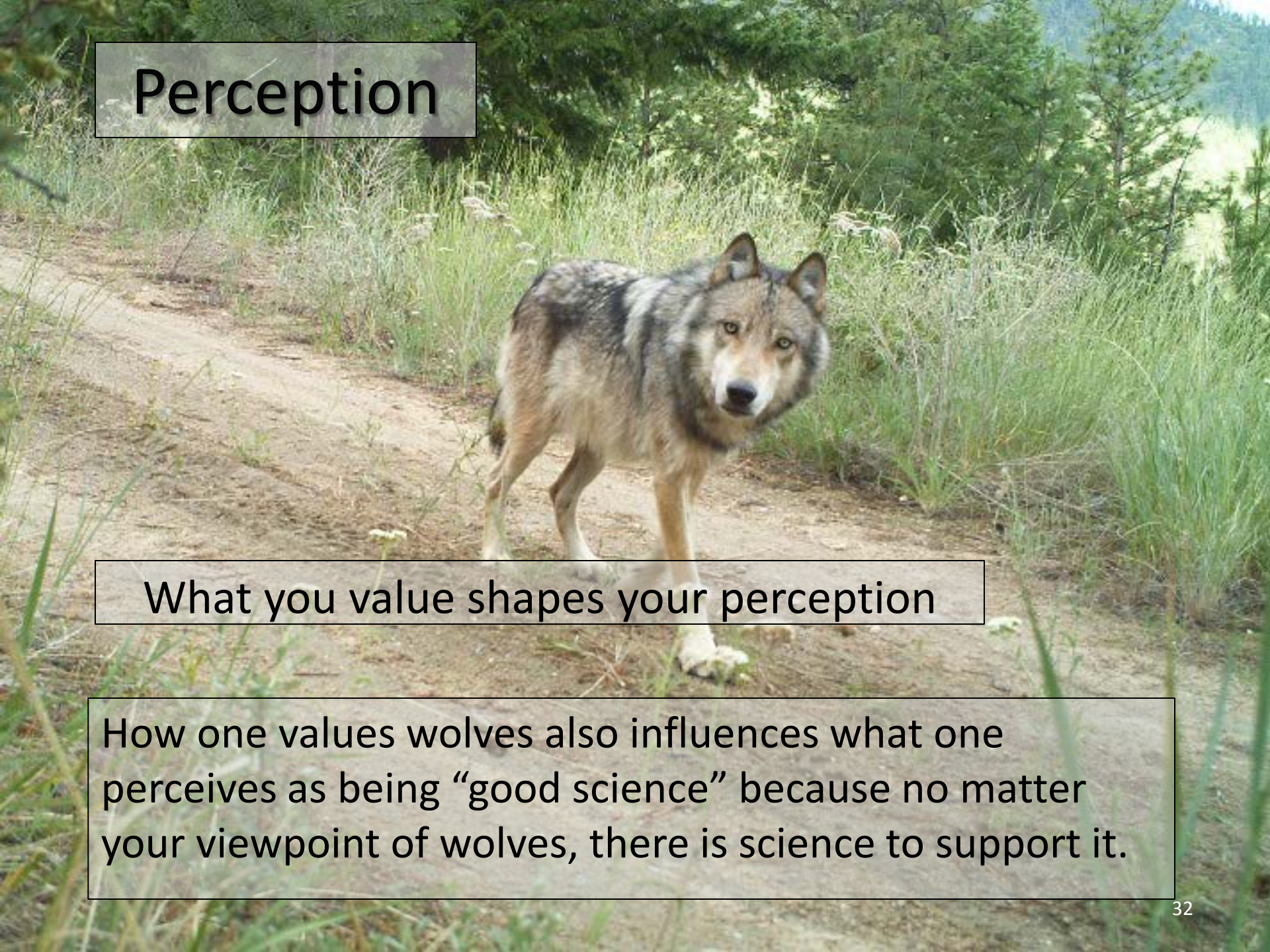
Management Implications

- Bradley et al. 2015 recommended swifter response after a confirmed depredation to reduce recurrent depredations
- Recovery may be compromised for the following year after a heavy removal

Perception

Definition: the way you think about or understand someone or something

Perception



What you value shapes your perception

How one values wolves also influences what one perceives as being “good science” because no matter your viewpoint of wolves, there is science to support it.

Differing Perceptions

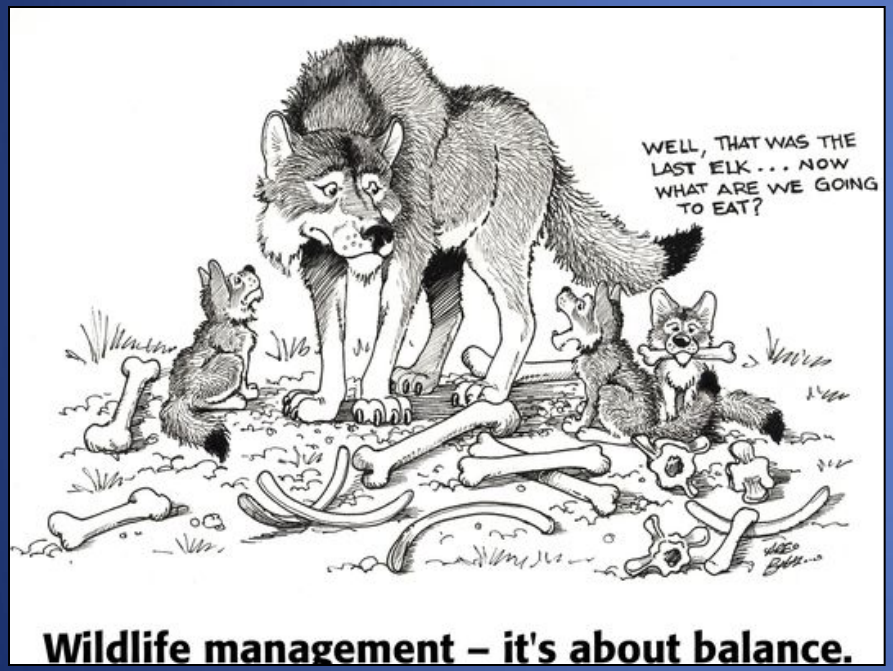
- Positive = perceived benefits
- Negative = perceived costs

- Perceptions become part of how an individual identifies themselves
- Attempts at persuasion are interpreted as personal attacks
- Individual identity also becomes a group identity (us versus them)

Where Do Wolf Managers Fit Into Equation?

- Basic goal of wolf recovery and management
  - How do we fit wolves into as many places as possible while minimizing conflict?
- Balancing opposing views while making management decisions based upon the best available science will always be the most challenging part of the job
  - If you're doing it right, no one will be happy!!!!
- As managers, we must try to:
  - Acknowledge viewpoints, but not become drawn in
  - Be the voice of reason
  - Be as objective as possible
  - Normalize the wolf

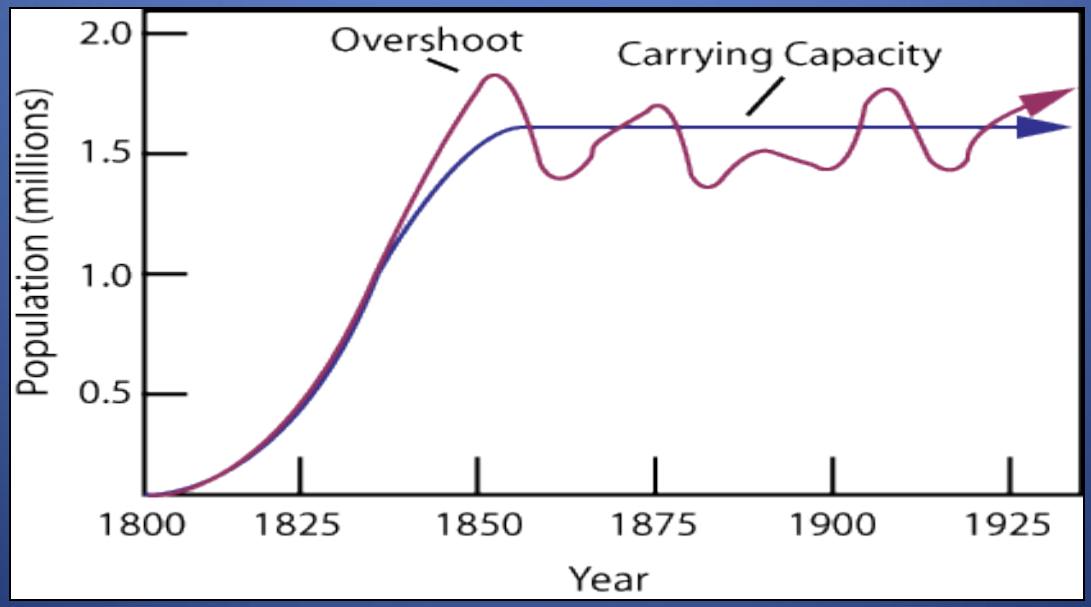
Wildlife Management 101



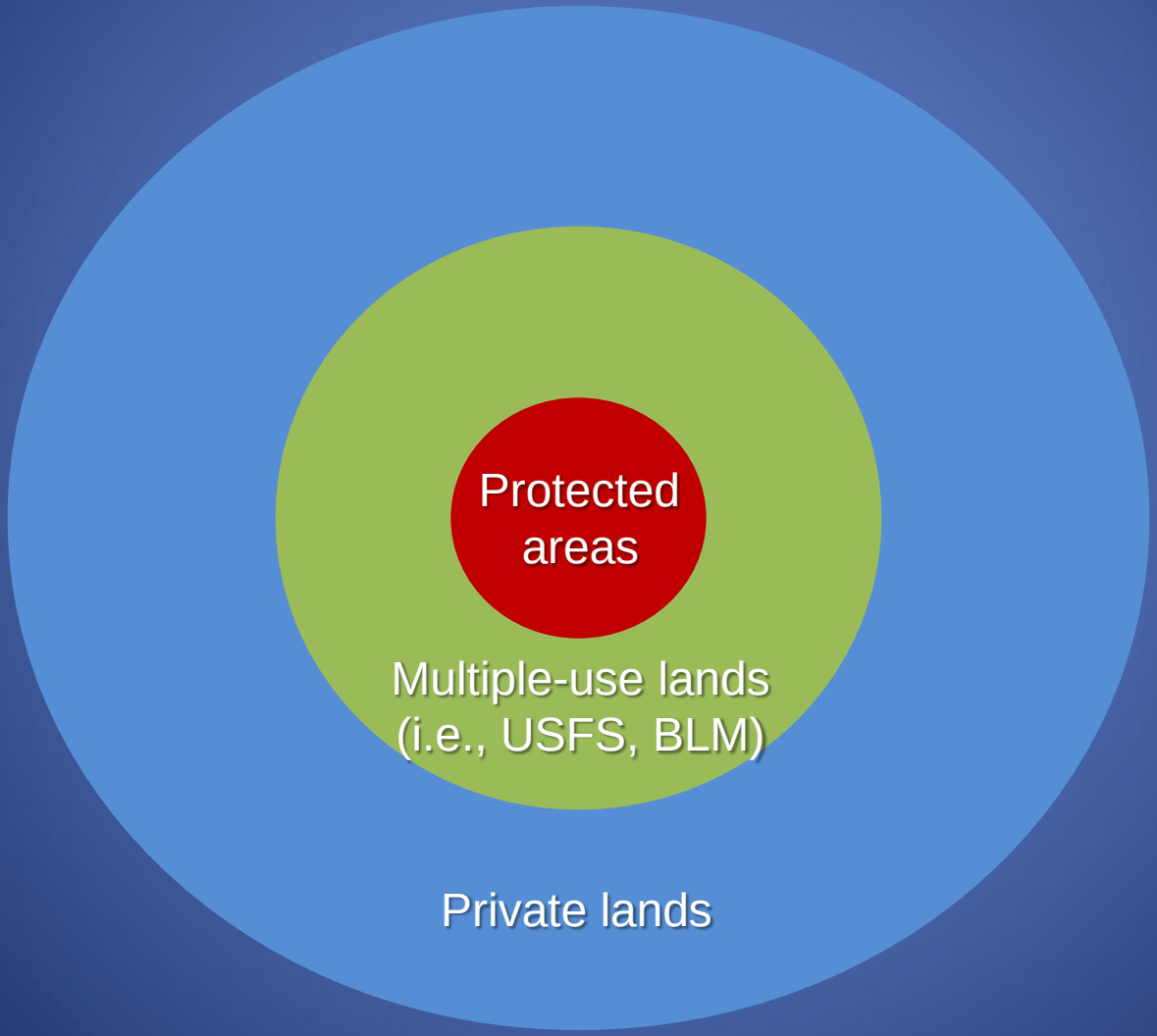
- Wildlife management is the art of balancing biological vs. social carrying capacity to achieve management and/or recovery objectives

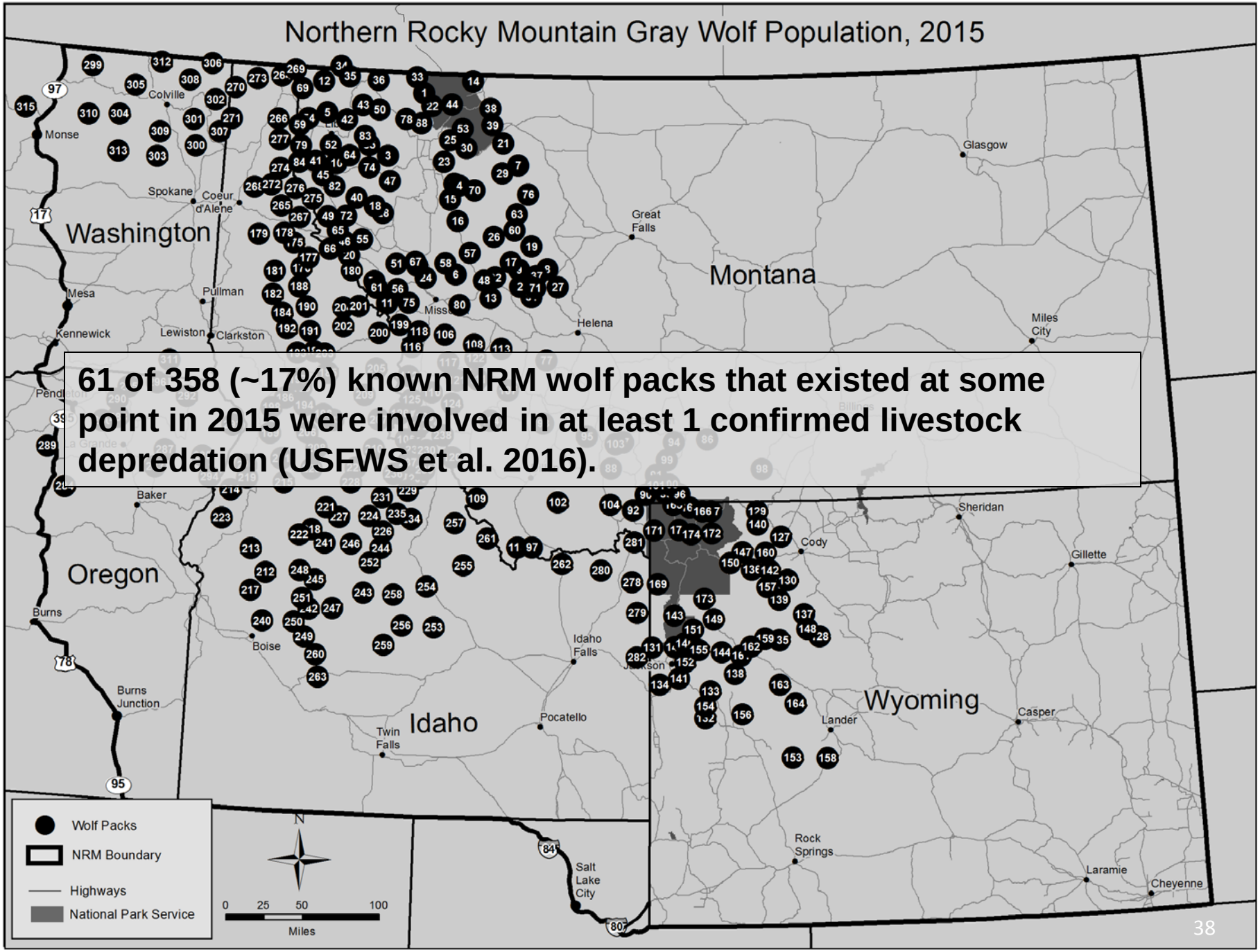
Biological vs. Social 'K'

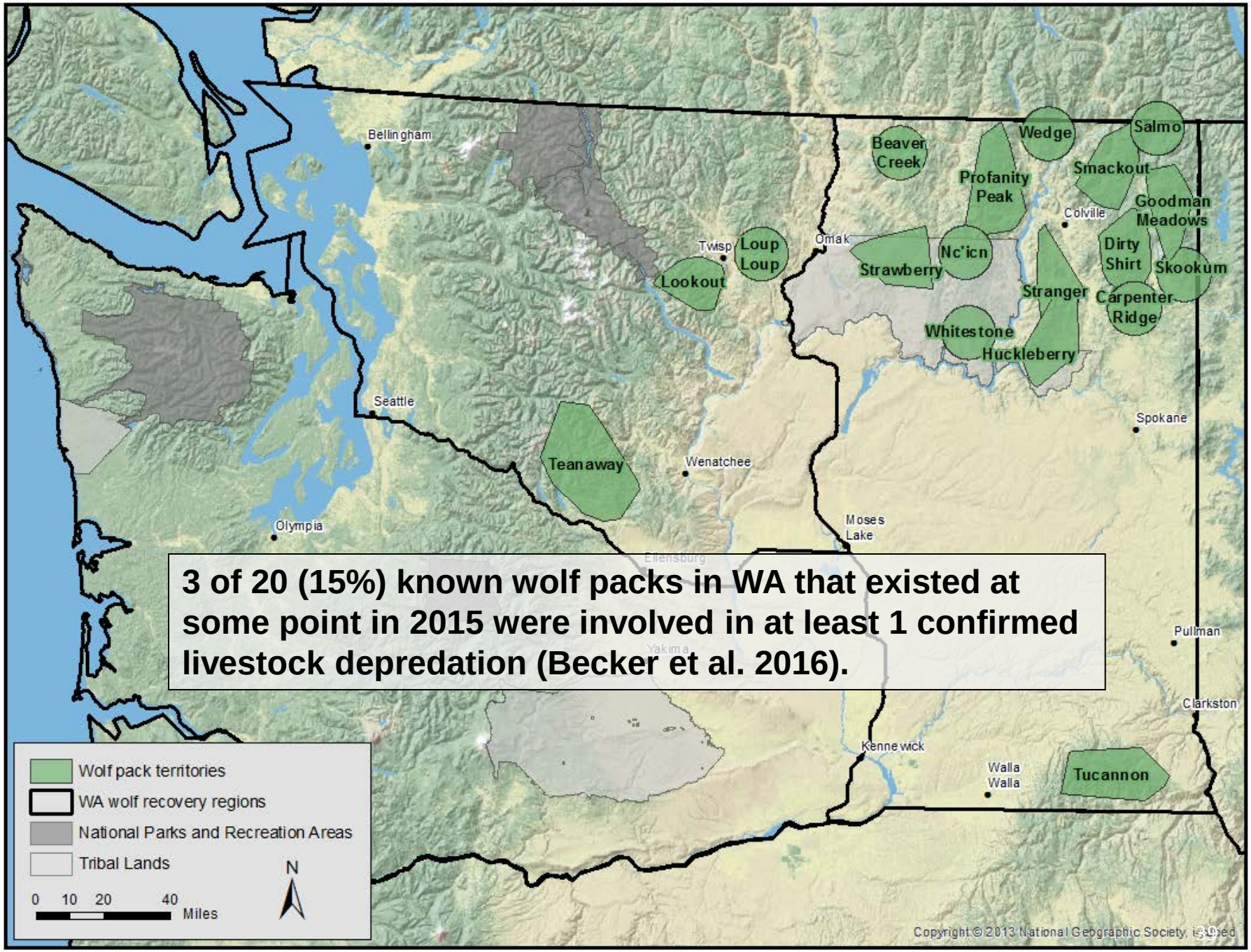
- Biological carrying capacity
  - How many animals can the habitat support?
- Social carrying capacity
  - Where will humans allow animals to exist on landscape?
  - Minimizing conflict
  - Social tolerance



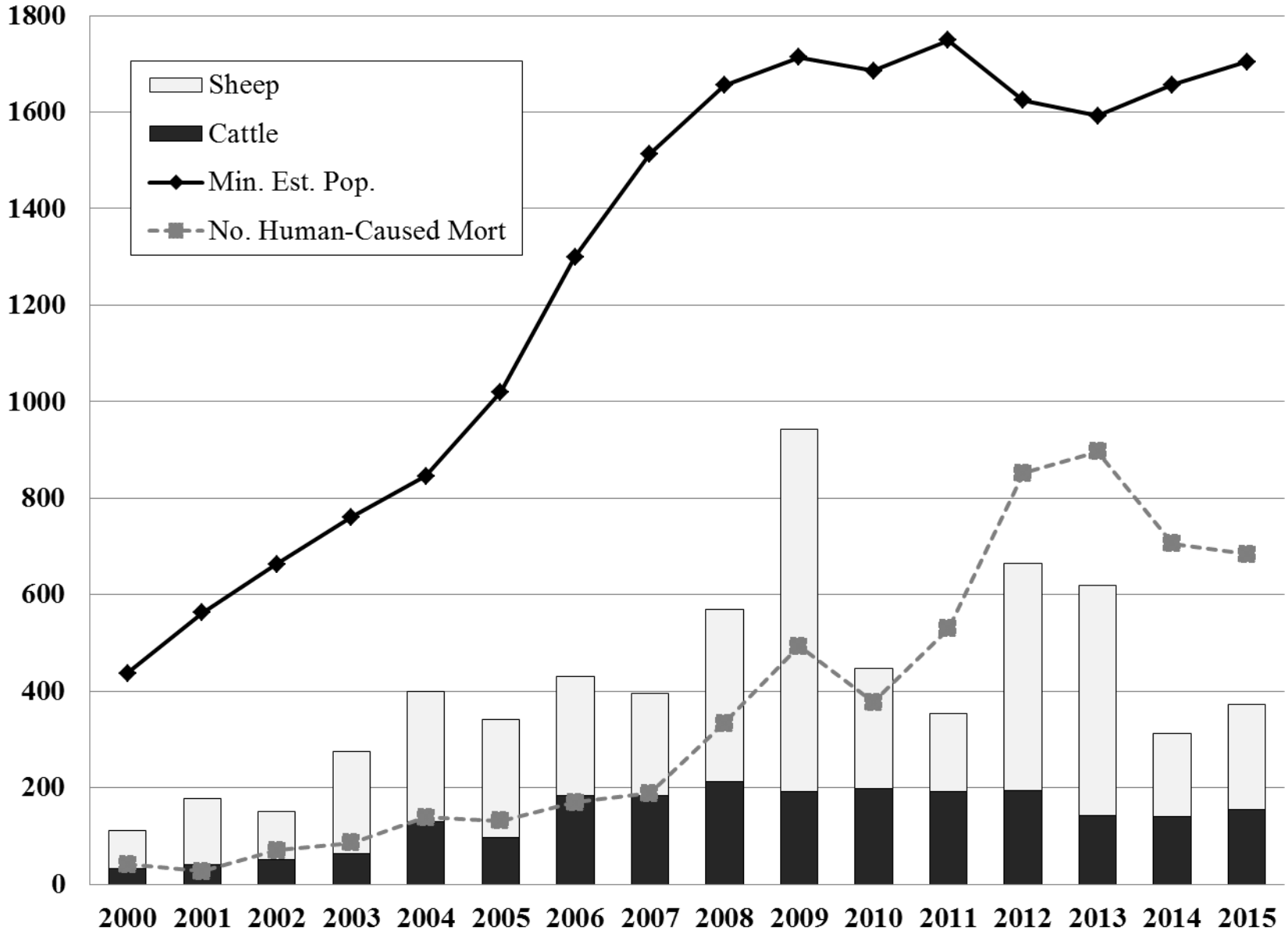
Wolf Social 'K' and Management



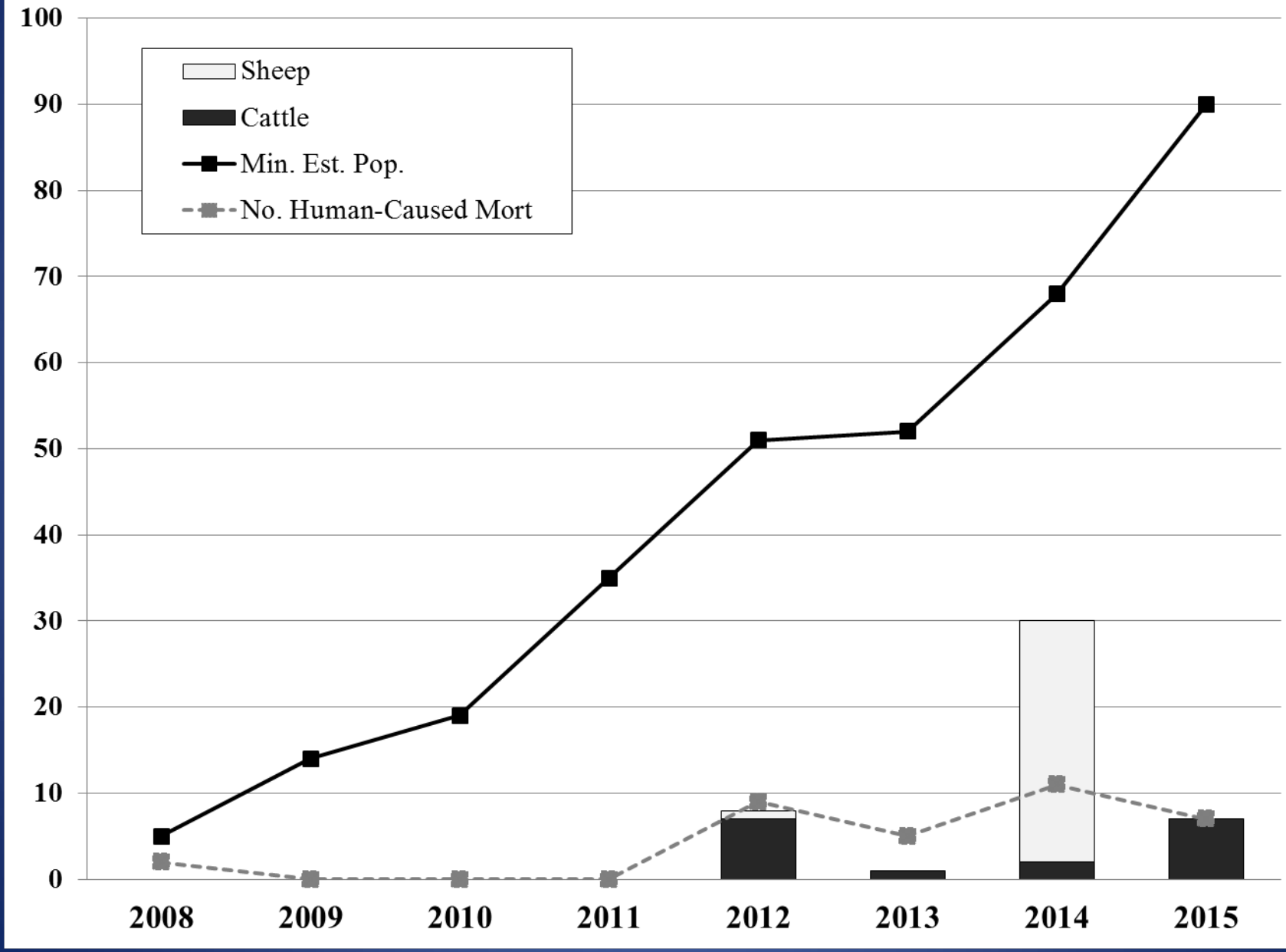

Northern Rocky Mountain Gray Wolf Population, 2015
61 of 358 (~17%) known NRM wolf packs that existed at some point in 2015 were involved in at least 1 confirmed livestock depredation (USFWS et al. 2016).
Wolf Packs
NRM Boundary
Highways
National Park Service
N
0 25 50 100
Miles
Washington
Oregon
Idaho
Montana
Wyoming
Spokane
Coeur d'Alene
Pullman
Lewiston
Clarkston
Colville
Monse
Mesa
Kennewick
Baker
Burns
Burns Junction
Boise
Twin Falls
Pocatello
Idaho Falls
Great Falls
Helena
Glasgow
Miles City
Sheridan
Cody
Gillette
Casper
Lander
Rock Springs
Laramie
Cheyenne
Salt Lake City


Bellingham
Seattle
Olympia
Wenatchee
Moses Lake
Spokane
Pullman
Clarkston
Kennewick
Walla Walla
Colville
Omak
Twisp
Ellensburg
Yakima
Beaver Creek
Wedge
Salmo
Smackout
Profanity Peak
Goodman Meadows
Dirty Shirt
Skookum
Carpenter Ridge
Nc'icn
Strawberry
Loup Loup
Lookout
Stranger
Whitestone
Huckleberry
Teanaway
Tucannon
3 of 20 (15%) known wolf packs in WA that existed at some point in 2015 were involved in at least 1 confirmed livestock depredation (Becker et al. 2016).
Wolf pack territories
WA wolf recovery regions
National Parks and Recreation Areas
Tribal Lands
0 10 20 40
Miles
N
Copyright © 2013 National Geographic Society, i-cubed

NRM Trends


1800
1600
1400
1200
1000
800
600
400
200
0
Sheep
Cattle
Min. Est. Pop.
No. Human-Caused Mort
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

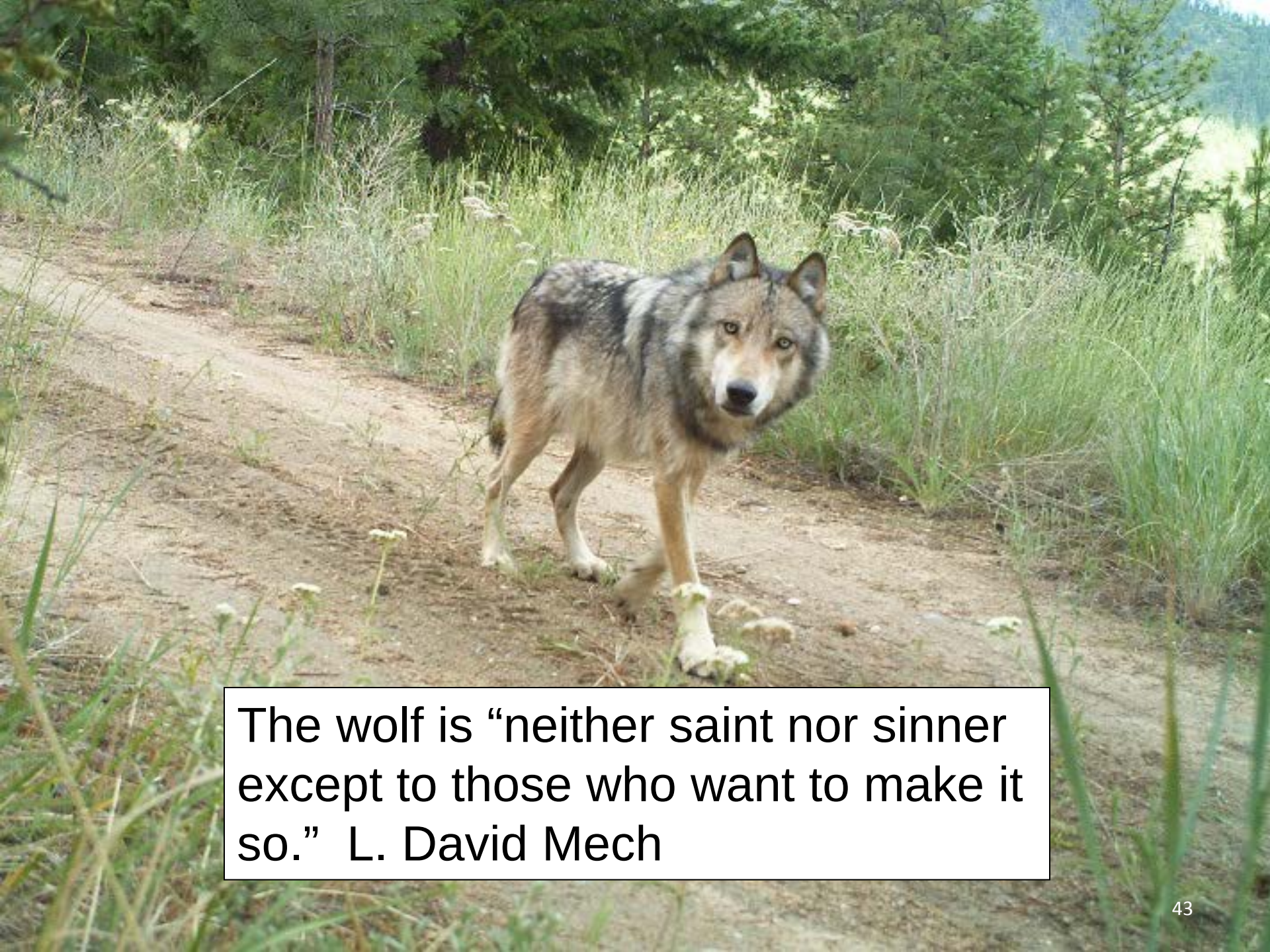
WA Trends


100
90
80
70
60
50
40
30
20
10
0
Sheep
Cattle
Min. Est. Pop.
No. Human-Caused Mort
2008
2009
2010
2011
2012
2013
2014
2015

Managing Gray Wolves

- Continue to normalize them – manage wolves as you would any other species
  - Just because a wolf did something does not make it a bigger deal than another critter doing it
- Manage the population, not the individual
  - Continue reviewing and contributing to best available science
  - Develop and implement consistent management strategies for the species

consistency → credibility → respect → trust



The wolf is “neither saint nor sinner except to those who want to make it so.” L. David Mech