



**Meeting Report  
Wolf-Ungulate Stakeholder Subgroup  
October 21, 2013**

CDFW Wildlife Branch Conference Room  
1812 9<sup>th</sup> Street,  
Sacramento, CA 95811



**California Department of Fish and Wildlife**

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## **1.0 Introduction**

On October 21, 2013 the Wolf-Ungulate Interactions Subgroup (WUIS) of the California Wolf Stakeholder Working Group (SWG) convened for the first time in Sacramento. The WUIS was formed during the August 29, 2013 general SWG meeting to help the Department develop a consensus-driven framework of management strategies for addressing potential wolf impacts on California's native ungulate populations. This framework may then become incorporated into the draft wolf management plan. The purpose of the October WUIS meeting was to create a foundation for consensus building through a discussion of eight items proposed as the topics for a wolf-ungulate interactions chapter in the wolf management plan.

## **2.0 Meeting Objectives and Mechanics**

The meeting was conducted in the conference room at the California Department of Fish and Wildlife's (CDFW) Wildlife Branch in Sacramento.

The stated purpose of the meeting was to:

Hold a group discussion of what we hope to accomplish.

Objectives of the meeting as initially planned were:

1. Introductions (including what you bring to this dialogue)
2. Purpose
3. Methods (a discussion of how we can reach an endpoint and accomplish objectives)
4. Discussion of considerations for a Wolf-Ungulate section in a planning document
5. Planning (develop a work plan strategy, including resources needed, products, and timeframes)
6. Next steps (scheduling, commitments)

The meeting was attended in person by five stakeholders and seven CDFW staff, with one stakeholder and one CDFW staff attending via conference line. Appendix A provides a list of participants, their affiliations, and their contact information.

The meeting began with introductions led by Wildlife Branch Chief Dr. Eric Loft, who serves as chair of the Wolf-Ungulate Subgroup. Dr. Loft then asked Ms. Karen Kovacs to present the purpose of the meeting as stated on the Agenda (Appendix B), and to provide tips on how the other wolf subgroup meetings had been conducted.

The bulk of the meeting consisted of discussing the eight elements contained within the draft "Wolf/Ungulate Interactions" document (Appendix C) which had been provided to

the members of the subgroup for their consideration prior to the meeting. These elements were intended to provide a basis for discussing potential headings and subheadings for inclusion in the wolf/ungulate interactions chapter of the California Wolf Management Plan. The meeting concluded with a brief discussion of Agenda Item #5: Planning, and potential dates for scheduling the next meeting for this subgroup.

### **3.0 Meeting Outputs**

#### **Wolf/Ungulate Interactions: Considerations in developing a section for the California Wolf Plan.**

After introductions, Ms. Kovacs, who serves as overall lead for the California wolf management planning effort, began by describing the structure of the Wolf-Livestock Subgroup (WLIS) meeting which had been held in Sacramento in September, 2013. In preparation for that meeting, a list of considerations for discussion was sent to the WLIS members, and the goal of the meeting was to discuss those elements and provide the Department with feedback on whether all the relevant topics had been covered for the chapter. Similarly, discussion topics as developed by Dr. Loft, Ms. Kovacs, and other CDFW staff, were provided to the WUIS in advance of the meeting. Eight elements were derived in part from other states' plans, and customized for California. Mr. Loft proposed that the group discuss each element and brainstorm the range of options we should pursue within the plan. Following is a summary of comments and suggestions made by the stakeholders, and related comments by CDFW staff.

**Element #1: Describe the current setting: ungulate abundance and distribution; wildlife habitat requirements and preferences of ungulates; current goals and objectives for elk and deer in potential wolf range.**

#### **WUIS comments for #1:**

- Suggest that we decide on a minimum ungulate population by zone, and we manage wolves to keep them from reducing ungulates to below that objective
- In developing objectives for ungulates it's important to recognize that California is different than other states that have larger deer and elk populations
- I hope the deer and elk management plans will actually ratchet up the goals for populations; with an additional predator, our inability to manage mountain lions, and with fewer bears being taken due to the ban on hunting with dogs, the pressure on ungulates will be higher
- If we're saying we want more elk and deer for predators, including for our members, we've got the conflict with the private owners who don't want all those

ungulates around; in a way we're going to have a conflict with people and they'll want depredation permits

- We should include ungulate distribution on public and private lands; when elk use private lands wolves will follow
- Will we identify winter versus summer range for ungulates?
- The Department has said that elk are expanding somewhat in the Sierra; will a wolf pack in the Sierra create a block to that movement?
- Competition with livestock for grazing on public lands is missing from deer and elk population goals
- To the extent that livestock grazing affects deer and elk habitat, how can you not talk about that additional impact to the habitat there; an overgrazed area can't grow elk; they have to be tied together
- I think there are areas where we could have more elk if we changed the grazing practice
- Do the deer and elk plans address federal public land management?
- We should discuss who will pay for any habitat restoration work (supporters of wolf re-establishment should help fund)
- When was the last elk reintroduction?
- I think the causes of deer mortality in the absence of wolves is a really important issue and should constitute the meat of this section; compensatory versus additive mortality is a critical issue
- If we want to estimate the extent of wolf-caused mortality on ungulates we need to know the extent of ungulate mortalities from other causes such as winter-kill; do we have that information?
- Is there a critical number of ungulates that determines if wolf mortality is additive versus compensatory?
- The status review is coming up due; when do you plan to take it to the Commission?

### **CDFW Comments for #1:**

Dr. Loft stressed that the plan should argue for habitat restoration and enhancement for wolf prey, as well as how that will be funded. Additionally, it will be important to consider how to allocate the elk and deer resources between the various predator species, and the human consumers of ungulates. Ms. Kovacs pointed out that it will be important to tease the predator effects on ungulates apart from habitat conditions and weather events that affect ungulates. Information from other states may provide some information in that regard. Mr. Craig Stowers, CDFW Game Program Manager, suggested that, due to the large amount of ungulate habitat in federal ownership,

representatives from the U.S.D.A. Forest Service (USFS) and the Bureau of Land Management (BLM) should be part of this conversation.

In response to comments stressing the importance of impacts of livestock on native ungulates, Dr. Loft suggested that those issues would be most appropriately addressed in the management plans for deer and elk. However, he agreed that there may be factors such as livestock impacts on habitat that may influence native ungulate abundance and distribution that would be appropriate to address in the wolf plan. He also explained that there will be a section in the wolf plan that explains how public land agencies, both state and federal, will address the needs of wolves. As explained by Mr. Stowers, there are very broad goals agreed on between CDFW and federal land agencies with respect to native ungulate management which don't necessarily address impacts from livestock. Further, the Department will need to spend significant time working with the federal agencies to refocus efforts on native ungulate management, especially with the inclusion of wolves in the equation. Ms. Kovacs recommended that we are specific in the plan as to when livestock are and are not in competition with native ungulates; e.g. there are livestock practices that are used specifically to enhance habitat for deer.

To address the concerns that several stakeholders posed regarding increasing the numbers of native ungulates to accommodate wolves (i.e. concerns this may create with landowners who already experience elk conflicts), Dr. Loft explained that he modeled his proposed chapter on wolf-ungulate interactions like an environmental document. It addresses the current setting for ungulates, what needs wolves have, what needs ungulates have, and how wolves and ungulates interact. By also including these potential conflicts, we hope be able to find an appropriate ungulate abundance that allows us to meet the needs of their predators while minimizing such impacts.

Dr. Loft concluded this section by explaining to the group that although to date we have primarily discussed wolf issues in northern California, the plan will also address potential wolf reestablishment in southern California from the Mexican wolf population in the southwest.

**Element # 2: Describe the estimated requirements of a wolf (wolf pack and population) for prey and specifically for ungulate prey base.**

Dr. Loft began this section by explaining that models have been developed that roughly estimate the amount of biomass wolves require, and if we consider that, based on the estimated deer or elk populations in California, we may be able to estimate what level of

wolf abundance we can sustain. We will focus more on deer because we predict that wolves will rely more on deer than elk in California.

**WUIS comments for #2:**

- Roughly what are the numbers you saw in those models for wolf requirements?
- If ungulate is their main diet, are there studies showing the percentage of what other foods they eat?
- In high bear density it's probably more the norm for bears to steal from lions
- Do wolves leave part of their prey and come back later?
- Can they make it without ungulates?

**CDFW Comments for #2:**

Dr. Loft assured the group that the Department will look to see how other states had made this estimation. Ms. Kovacs suspected that energetic requirements for wolves would vary by time of year, size of the pack, and other factors. Ms. Kovacs also explained that the extent to which other prey items are used by wolves depends on their availability and the time of year, but that the energy needs of wolves is great enough that small prey cannot represent a substantial proportion of their diet. Ungulates are definitely wolves' primary prey.

**Element #3: Summarize the known science of wolf interactions with elk including information on elk population effects (including predation effect and habitat selection by elk if any)**

**Element #4: Summarize the known science of wolf interactions with deer including information on deer population effects (including predation effect and habitat selection by deer if any).**

Comments and questions related to Elements #3 and #4 were discussed together since they address the same topic but for deer versus elk. As Dr. Loft pointed out, the information provided in this section will come primarily from a review of published literature since there is no such information available for California. It will be important to capture the dynamics where deer are the primary prey, the differences between white-tail and mule deer, and the effect of not having other large herbivores as other areas with wolves do.

**WUIS comments for #3 and #4:**

- Obviously ID and MT are collecting this data but California is different; eastern Oregon is great but there are 30,000 elk there; will you highlight those differences? We don't really know what will happen with our low numbers here.
- I'd hate to use a Yellowstone example in California
- I would think a pack of wolves would be more effective at taking down prey than a mountain lion
- The only thing that is reasonably certain is there will be an additional impact on our deer and elk
- If compensatory we have no problem but if additive we have huge problems
- Do the other states show numbers went up when wolves moved in?

#### **CDFW Comments for #3 and #4:**

To respond to the concern about California's uniqueness in terms of low ungulate abundances, Dr. Loft suggested that if the Department is able to find data from areas in the west where there are low elk numbers but wolves have established, we may be able to predict what the dynamics will look like in California; perhaps Washington has some information. Mr. Stowers did suggest that some wolf-caribou systems may serve as a surrogate for the potential wolf-mule deer system in California because of caribou's migratory habits. Dr. Loft stressed that whatever we use as a model, we will have to highlight the uncertainty we have as a result of the unique prey base for wolves that occurs in California; and that we must also capture information on pronghorn and bighorn interactions with wolves.

Mr. Stowers disagreed with the comment that the reestablishment of wolves will certainly lead to additional impacts on deer and elk. He suggested the possibility that wolves may impact the predator guild such that the lion and/or bear populations, and hence their impact on ungulates, is reduced. In other words, wolves' impacts on ungulates might prove to be at least partly compensatory rather than additive.

#### **Element #5: Capture direct and indirect effects of wolves on ungulates and vice versa.**

Dr. Loft prefaced this section by stating that number 5 is getting at trying to describe the interactions that occur: the direct effect is that ungulates are killed to provide food for a wolf; the indirect effects include how wolves may affect the herds and other predators; and then the opposite which is what effects the ungulates may have on wolves.

#### **WUIS comments for #5:**



- Would this section also include benefits? If it's true they take the weakest, oldest, that could have a direct or indirect impact on the ungulates
- I understand the livestock concerns but would farmers with crops want predators to help them keep the ungulates out of their fields?
- Yreka has the biggest deer density right now because of the hunt
- There are studies about the movements of herds and elk during hunting season; it's been looked at
- Sounds like number 5 will be a long conversation that will entail a lot of issues so it seems like we could agree that it should be in the chapter with a future discussion of what's in that section

#### **CDFW Comments for #5:**

Ms. Kovacs related a news story she caught recently in which elk in Idaho were coming into town to avoid wolves and causing issues for property owners. She suggested that this type of indirect effect might be something to include in this section.

With regard to the question about predators helping farmers, Dr. Loft clarified that most of the problems with native ungulates on farms is when deer and elk break down fences and consume alfalfa or grains that are being grown for winter livestock forage. Because of the potential risks to workers and residents, it is unlikely that predators would be welcome on these farms.

#### **Element #6: Predict, based on hypothetical wolf numbers (follow Oregon trends in number of packs and how many wolves/pack), an estimated effect on deer and elk populations for California.**

As Dr. Loft explained, the reason for following Oregon's trend is that California is more similar to Oregon than to the Rocky Mountains, and because of their proximity to California. However, as with Elements #3 and #4, this section will contain hypothetical estimates or a range of options since we have no data from California from which to predict this effect.

#### **WUIS comments for #6:**

- How will you estimate elk populations and deer populations and how will you determine wolf numbers?
- A lot of this is based on an estimate of elk population numbers; we've struggled with the ability to do surveys

- If I understand from reading some of the other documents, the only wolf numbers we get to count are the ones we see; which obviously doesn't represent the wolf population in the wild; why don't you count only the elk you see?
- There's a huge difference between counting 30 to 50 wolves than 10,000 elk or thousands of deer
- It's harder to count a small population than a large population; you can get closer statistically to a larger population than a smaller population
- If I said there are 2000 elk in Modoc, that's an estimate; will we then say a certain number of wolves are ok hypothetically?
- I know this is the wolf-ungulate group but it's the balance of the whole ecological picture, not just what's going to happen to tags; that's important but I think ecological health has got to be part of the big picture not just how many I can take this year
- How will we know how many wolves are here? You could have 10 wolves in California right now.
- In Washington and Oregon they have a pretty good idea of the general wolf population; although there may be more we have a pretty good idea of where the packs are and have been able to monitor them pretty well
- How will the Department pay for the research and monitoring?
- We'd like to have the Department consider on three levels: can we occupy all suitable elk habitat with elk; do we have sustainable populations in all those areas; can we provide a recreational opportunity called hunting?
- Key word: recreation; there are a lot of us who want to have elk back where they were not necessarily to hunt them with firearms but with cameras
- We would be happy to help the Department increase its knowledge of populations of elk in California
- I don't think that wolf populations should have any effect on the allocations of deer or elk tags; any negative effect anyway; I don't think we should suffer because wolves move into California

### **CDFW Comments for #6:**

Questions about how the deer, elk, and wolf populations will be estimated were addressed primarily by Dr. Loft; Mr. Stowers; and Mr. Steve Torres, CDFW Wildlife Investigations Lab Program Manager. As it is done in other states, wolves are censused directly or by track counts, and an estimate is provided. In California, deer are surveyed, and CDFW does not apply a visibility factor, so we do not account for animals that we don't see. Then for the population model we incorporate harvest data which provides us with a population estimate. It will be important to recognize that in the absence of direct observations of wolf effects in California, this will be a modeling

exercise and the estimates will be hypothetical. We do know that we need to strengthen the quality of our current data on elk and deer in California. In modeling effects on a population, we look at the actual effects on elk and deer. One way to do that is to get cause specific mortality, and mix that with the population trajectory for deer and elk. Rather than absolute numbers on deer and elk you get an index to how their population is doing. You then determine survivorship and mortality factors. There is an opportunity before wolves arrive in California to get baseline information on some key herds that might be the easy ones to monitor or that we have good data history on. We should consider collecting some data at a higher resolution that address questions of cause-specific mortality, survivorship, etc. Addressing this issue may best fit into the section on information needs and research. As far as monitoring wolves, Oregon has made an effort to collar at least one animal per pack so each pack is actively and consistently monitored. We will have to engage with Oregon about their methods, but they are able to provide a minimum known number of wolves. With respect to how this research would be funded, Ms. Kovacs told the group about a bill that passed in Washington for \$1.5 million which is a %10 tax on vanity plates.

**Element #7: Describe potential management actions/strategies to manage wolf population and wolf population objectives, given deer and elk goals and objectives.**

**WUIS comments for #7:**

- If wolves come on the scene and deer continue to decline, at what point do we say we should reduce the tags, not because of wolf predation but we would have done it whether they were here or not?
- We raise a lot of money through CDA that doesn't all have a direct effect on deer (e.g. habitat work that benefits other wildlife); if we see that wolves come into California (and it reduces hunter opportunity) it could hurt other wildlife through our funding as our members say "I can't get a tag I'm not going to donate anymore"
- Get some accurate deer numbers, have a corresponding number of tags; if you cut the number of tags for say, Zone X6B in Plumas Co. after wolves move in, then you open a season on wolves in Plumas Co. and attempt to get the deer numbers back up
- If we don't say that when wolves get to some number we'll start controlling them, how else will we determine that habitat was the issue and that's why the herds are declining? That will be an endless and circular argument.
- If we can improve habitat so there's enough to feed the wolves, and provide hunters at least the same opportunities, that would be my desired future

condition; would a more aggressive reintroduction effort by the Dept. to move elk into new areas be the answer to that?

- In some discussions there's been a hope that nonlethal measures will be considered
- We haven't yet determined what a sustainable population (of wolves) is; it would be helpful to have an idea of what that is; not sure if I can determine a trigger until I am more aware of the habitat and prey numbers
- Not having seen it, what is our deer objective?
- My answer would be removal by lethal means; because if we remove them by nonlethal means that means that we would be putting them somewhere else
- There are humane issues with killing wolves and disrupting their social hierarchy and their family structure and what happens when you kill an alpha; when we do have that discussion as far as the different measures from managing populations? we have to look at all options
- If we have areas where deer are too many that needed the herds reduced I would say yes (to translocation) but realistically we don't have any of those

#### **CDFW Comments for #7:**

In this section, stakeholders were asked to suggest different strategies the Department should consider for managing the future wolf population in California. It will be important to consider strategies for wolf management in light of both possible effects on ungulates: that ungulate numbers may decline with wolf reestablishment, and that they may increase as well. Dr. Loft explained that, to the Department wolf management means actively keeping the population in balance with the available prey and other uses. He asked the group to consider what triggers would cause their organizations to urge the Department to take some wolf management actions, recognizing that each group may have different triggers, and the options being lethal removal, translocation, or no action. Ms. Kovacs asked stakeholders to consider whether wolf translocation to reduce additive prey mortality in one area and help achieve goals for wolf establishment in another area would be acceptable.

Traditionally the Department has tried to identify what factors are currently limiting ungulate populations from increasing. In California for deer it's been large-scale, long-term habitat degradation from fire suppression and logging practices; in some cases new diseases, and/or a change from migratory to resident in some Sierra populations. It will be important to recognize that data collected to inform our decisions, such as predation rates and ungulate mortality factors, obtained in one area of California may be different for another area.

It is also important to remember that the ideal of restoring ecological systems with predators and prey in balance may not be attainable. Our ecological systems are highly disturbed, and we don't know what other stressors there are. As a consequence, wolves may have a greater effect on the prey populations in some areas, so we should consider wolf removal as an option if necessary. One potential effect is a change in the buck/doe ratio. Since wolves do not primarily hunt bucks, but deer tags issued in California are for bucks only, a change in the buck/doe ratio may enable us to sustain current hunting levels. Ms. Kovacs suggested that the 1998 Report to the Fish and Game Commission on Mule and Black-tailed Deer Habitats and Populations in California may provide further insight into this topic, and she promised to send it to WUIS members.

### **Element #8: Monitoring or research needs.**

#### **WUIS comments for #8:**

- Are there any federal grants that could help on some costs?
- Would there be a better chance of the grants being awarded if the feds keeps the wolf listed or if it's delisted?
- I was wondering if the deer and elk management plans analyze and look at competition with cattle
- With the Mexican gray wolf, are there any correlations between what's going on there with ungulate interactions that would benefit us knowing about?
- Are there any other areas on the planet where the climate is somewhat the same where there might be some information?
- We talk a lot about non-lethal in terms of management and it is more expensive. At what point can you no longer afford to take on those kinds of management activities? We need good economic assessment in the wolf plan. If the wolf folks are going to advocate for nonlethal and we agree that that's what we want to try we should know what the costs of such actions are.

#### **CDFW Comments for #8:**

Dr. Loft explained that there are several opportunities for grant funding because the Department will be trying to establish capacity for wolves in California. Funding research should therefore not be as much an obstacle as the lack of manpower in the Department for accomplishing the needed research. He also agreed with the assessment that we want to stress collaboration with the federal land management agencies in the wolf plan, in particular because of the importance of assessing ungulate habitat as it relates to capacity to support wolves. Ms. Kovacs told the group about a

survey by California Cattlemen's Association to collect baseline information on existing depredation rates on livestock. Such data will allow for the possibility of determining changes in depredation rates once wolves return to California. Such baseline information will be critical to have for both livestock and native ungulate effects to satisfy requirements under the California Environmental Quality Act, as instructed by the Department's legal counsel.

In response to the question about information on Mexican wolf and wild ungulate interactions, Ms. Kovacs said she has yet to fully explore the information available. Relative to other areas with similar climates to California, Spain is a likely consideration. However, because humans have been on the landscape longer there than in California, their native ungulate population is severely altered, and livestock conflicts are great.

Finally, in response to inquiries about the cost of non-lethal management of wolves and at what point the Department can no longer afford to use them, Dr. Loft stated that he did not have an answer to that question, but that we do a lot in the Department we're not funded to do because society expects it of us. Ms. Kovacs agreed though, that it will be important to try and document the direct and indirect costs of the various wolf management strategies.

### **Summary and Wrap-up**

Dr. Loft stressed that today's meeting was just the first step toward fleshing out the Wolf-Ungulate chapter of the wolf plan. Using today's discussion, Wildlife Branch staff will begin drafting the chapter with deadlines provided by Ms. Kovacs. Our strategy will be to identify what resources we will need, come up with a more specific description of the product, and what the timeframe for completion will be.

One stakeholder inquired about the dates for release of the draft deer and elk management plans, which may contain information that is helpful toward drafting the wolf-ungulate chapter of the wolf plan. Mr. Stowers suggested that the individual unit management plans may contain sufficient information to support those efforts with the wolf plan. Ms. Kovacs offered that the Department will incorporate information from today's meeting and the deer and elk plans into the beginnings of a draft wolf-ungulate chapter for subgroup members to review before the next meeting.

The group did not settle on a date for the next meeting, so Dr. Loft will continue to work on that effort.

## **Action Items**

1. Send out 1998 deer report
2. Draft the Wolf-Ungulate chapter
3. Draft timeframe for completion of the draft chapter
4. Schedule the next wolf-ungulate subgroup meeting

## APPENDIX A. WORKSHOP PARTICIPANTS

Name	Affiliation	Email
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## **APPENDIX B.**

### PROPOSED AGENDA

California Department of Fish and Wildlife

Wolf-Ungulate Subgroup

9:00-12:30 October 21, 2013

Wildlife Conference Room- 1812 Ninth St., Sacramento

(Brick building, enter from alley)

Call in number: 877-214-5010

Participant Code: 585148

1. Introductions (including what you bring to this dialogue).
2. Purpose (a group discussion of what we want to accomplish).
3. Methods (a discussion of how we can reach an endpoint and accomplish objectives).
4. Discussion of Considerations for a Wolf-Ungulate Section in a planning document.
5. Planning (develop a workplan strategy, including resources needed, products and timeframes).
6. Next steps (scheduling, commitments).

## APPENDIX C.

### DRAFT—Wolf/Ungulate Interactions

#### Considerations in developing a section for the California Wolf Plan (Oct. 2013)

Steps to evaluate interactions and impacts (these might be sections of a document):

- 1) Describe the current setting- Ungulate abundance and distribution (we assume the habitat setting is covered in another chapter). What are the wildlife habitat requirements and preferences of ungulates. What are the current goals and objectives for elk and deer in potential wolf range.**
  - a. Habitat descriptions for north state (for gray wolf) and south state (for Mexican wolf) will be described in the wolf conservation chapter
  - b. Use elk and deer management plans
  - c. We should include in this section what we currently know about ungulate mortality in CA in the absence of wolves; i.e. what percentage of ungulate mortality is the result of predation, weather, habitat conditions, etc.?
  - d. We should discuss to what extent pronghorn and bighorn may be in the wolf diet.
  - e. Prelim. ungulate density maps for the status review effort
- 2) Describe the estimated requirements of a wolf (wolf pack/population) for prey and specifically ungulate prey base.**
  - a. Discuss if/how wolves switch to alternative prey as (if) the principal prey declines in abundance.
  - b. Seek models from other states for making this estimate.
- 3) Summarize the known science of wolf interactions with elk including information on elk population effects. (this would include predation effect, but also effect on habitat selection by elk if any).**

- 4) Summarize the known science of wolf interactions with deer including information on deer population effects. (this would include predation effect, but also effect on habitat selection by deer, if any).**
- a. Important to highlight the difference between white-tailed and mule deer behavior where research is on white-tailed (i.e., when referencing papers on wolf/deer interactions from other locations, note where those studies are on white-tails because of the differences in white-tail and mule deer behaviors).
  - b. Include information on Mexican wolf/deer interactions.
- 5) Capture direct effects and also indirect effects of wolves on ungulates and vice-versa.**
- 6) Predict, based on hypothetical wolf numbers (follow Oregon trends in number of packs and how many wolves/pack), an estimated effect on deer and elk populations for CA.**
- a. Discuss what trends Oregon and Washington have observed in their herds, plus the other factors that may play a role in the observed trends. Should we look at other states (confounding of hunted populations)?
- 7) Describe potential management actions/strategies to manage wolf population and wolf population objective, given deer and elk goals and objectives.**
- a. Describe trade-offs of providing ungulate prey to wolves versus to hunting opportunity and other predators.

## **8) Monitoring or research needs.**

- a. Get a better handle on the herd populations now so that we can make better statements later about what is causing any changes we observe (costs?).
- b. Whatever metrics are used should match what we use in the elk and deer management plans
- c. Relationship to other states work.
- d. Additional applied research needs on ungulates that are due to the needs of developing a wolf plan.