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COUNTY OF SISKIYOU

Board of Supervisors

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November 12, 2013

Armand Gonzales, Project Lead
State Wildlife Action Plan
California Department of Fish and Wildlife
1416 Ninth Street, Suite 1341-B
Sacramento, CA 95814

RE: Siskiyou County Comments on State Wildlife Action Plan Update

Dear Mr. Gonzales:

The State Wildlife Action Plan (SWAP) is obviously a view taken from rarefied policy heights, designed to guide, but not dictate actions on the ground well into the future. In reviewing the related material, such as the Open Standards created by the Conservation Measures Partnership, it is clear that the SWAP is rooted in the visionary approach that characterizes all such initiatives influenced by international partnerships.

Local governments, on the other hand, are where the vision of the planners and the reality of the affected public collide. In this role, experience has revealed that by the time something gets down to our ground level, critical elements of the initial inspiring motivational rhetoric get lost in the shuffle. Consumed as we are by the fallout from such visionary exercises, and jaded by the process with its inevitable unintended consequences, it nonetheless behooves us to try to influence something like this whose effects may be years in the future and come home to roost in ways we cannot imagine.

When wildlife issues surface in Siskiyou County, almost without exception it occurs when wildlife-centric policy along with its attendant statute and regulation run up against strong local cultural and economic currents. Also of serious concern are the inroads these efforts often make upon fundamental principles many Americans hold dear. This is usually where the critical elements I spoke of get lost in the shuffle. The Open Standards for the Practice of Conservation, adopted by SWAP, refers to the Millennium Ecosystem Assessment for fostering what it calls "human wellbeing." It spells out 5 criteria for this essential ingredient in wildlife policy: 1) necessary material for a good life, 2) health, 3) good social relations, 4) security, and 5) freedom and choice.

If you ask people in Siskiyou County, or any rural county for that matter, if these five

criteria are hallmarks of state wildlife policy, the answer would be an emphatic, "No!" Particular acrimony would be reserved for the relatively low regard given to security, freedom and choice. Until such time as advocates for these three vital ingredients are given sufficient voice and effect in wildlife policy, the state will continue to spend inordinate time, money and effort in tragic combat with the very people upon whom they must inevitably rely upon to accomplish the goals of the SWAP.

Counties are best suited to play this advocacy role in wildlife policy. We are the level of government most accessible to the rural public where the vast majority of habitat issues arise. We run into our constituents daily at the market, the gas station, restaurants, school functions and church. Unlike state and federal agencies and legislators, we don't have the luxury that distance affords in isolating us from the frustration and ire of the voting public. Thus counties can serve as strong advocates for the public in developing the compromises requisite in 21st century wildlife policy.

We are not claiming that Siskiyou County or any county is qualified to manage wildlife. Rather, we **are** qualified to insure that the human element of the equation does not get lost in wildlife policy implementation. The SWAP should incorporate county input not as an illusory bone tossed to placate political formality, but as a substantive factor in assuring to the greatest degree possible that the goals of SWAP meet the standards of human well-being spoken of in its Open Standards policy.

As examples of the type of proactive role the county can play, I would like to offer two ongoing efforts in which Siskiyou County is actively involved and about which we have provided you with more detailed documentation. Our advocacy for an experiment in salmonid supplementation has yielded a previously unattainable level of cooperation between local farmers and ranchers, environmental NGOs, tribes and state and federal agencies. Along with the potential to advance techniques critical to maintaining and restoring sustainable populations of fish, this project has high potential to secure substantive public support and participation in vital habitat conservation and enhancement via what we hope will be a blueprint for the use of Safe Harbor Agreements for anadromous fish. If this effort is successful, much will be owed to the County's insistence that security, freedom and choice are given proper regard.

Siskiyou County has also taken the unprecedented step of developing its own Deer Plan. The partnership in this project consisted of the County Fish and Game Commission, California Department of Fish and Wildlife, US Forest Service, the Natural Resource Conservation Service, extremely knowledgeable and motivated local residents and elected County officials. As well as serving to greatly improve cooperation between federal land managers and CDF&W, the plan has led to the funding of research vital to sound deer management.

The SWAP obviously recognizes the difficulty of managing wildlife with an insufficient landbase under its direct management. Acquiring land or investing in conservation easements has proven problematic. Besides undermining county budgets by taking land out of economic production, off County property tax roles and having significant effects on local infrastructure, the state is millions of dollars behind in PILT monies of which Siskiyou County alone is owed more than $600,000. As well, funding for the

management of state lands is perennially short, not to mention fraught with politics and inefficiencies. With budgets tight for the foreseeable future and no end in sight for the sort of things confounding public land management, it would behoove the SWAP to discourage land and conservation easement acquisition, except as a last resort and only when there is strong County involvement and support for the proposal. It is much better practically as well as philosophically to invest resources in a vibrant private lands conservation program.

Finally, the County's input on a document constructed upon what is hoped to be universal idealism would not be complete without referencing some idealism of our own. Teddy Roosevelt, one of the most visionary and effective conservationists in history, had much to say about the interaction between environmental stewardship and fundamental American principles. He articulated many of his views on this subject in his speech at the Sorbonne in 1910, commonly referred to as his "Man in the Arena" speech. He urges us to remember, "...that the worth of the ideal must be largely determined by the success with which it can in practice be realized." And in pursuit of this, he reminds us to beware of the "man of fantastic vision who makes the impossible better forever the enemy of the possible good." Too often in California, passionately competing visions of an impossible better are dooming the possible good we could achieve. Siskiyou County and other rural counties in California are voices that need to have a strong and effective role in helping to resolve this conflict. The Department of Fish and Wildlife should incorporate this concept into the SWAP.

Thank you for the opportunity to comment.

Sincerely,

Michael N. Kobseff, District 3 Supervisor
County of Siskiyou

CC: Sen. Ted Gaines,
Assemblyman Brian Dahle
Chuck Bonham, Dept. Fish and Wildlife Director

Project Charter
Shasta River Coho Supplementation Partnership

A. General Description

Introduction - This Charter is adopted by the Shasta River Coho Supplementation Partnership to establish the expectations and commitment of the Core Partners (Siskiyou County, Siskiyou County Farm Bureau, California Trout, The Nature Conservancy) to the supplementation of coho salmon in the Shasta River watershed (Project). This Charter may be modified with the agreement of the Core Partners to adapt to new information and circumstances. While not specifically a party to this Charter, the Resources Agencies (California Department of Fish and Game, National Marine Fisheries Service) have indicated that they are supportive of the Project and this Charter.

Background – As elsewhere in the Klamath Basin, coho salmon (Oncorhynchus kisutch) populations in the Shasta Watershed have declined to critically low levels. They are currently listed as a "threatened" species under state and federal law. A variety of threats to their continued existence have been identified and significant efforts to eliminate or minimize those impacts have been undertaken; many of which are on-going.

The Core Partners have been working together to develop the Project since the spring of 2011. This Charter was drafted because the Core Partners recognize the need to more specifically define their purpose, goals and objectives as well as their relationships with each other in order to help ensure the success of the Project. They also recognize the importance of defining their relationships with the Resources Agencies and indicating their commitment to involve other stakeholders in the planning and implementation of the Project. The Partners feel strongly that establishing acceptable assurances for area land owners in regard to Endangers Species Act provisions is essential to the success of the Project.

The Core Partners have agreed with the Resources Agencies that the initial form of the supplementation, targeted for the winter of 2013, will be the relocation of up to fifty returning pairs of coho salmon that are collected at Iron Gate hatchery. It is understood that the fish will be a combination of natural and hatchery-origin coho that are in excess of the Hatchery's needs. The form of supplementation in subsequent years has not been determined and will be established as part of the Project.

Project Purpose - The Purpose of this Project is to initiate a supplementation program to help restore a self-sustaining population of coho salmon in the Shasta River in conjunction with other efforts to improve habitat conditions in the watershed.

Project Goals - To develop a coho supplementation program that:

1. Supports the recovery of a self-sustaining natural run of coho in the Shasta River.
2. Complies with all applicable local, state and federal legal requirements.

3. Provides landowners with acceptable assurances and protections against take of ESA listed species in the Shasta Watershed.
4. Includes outreach to and consideration of input from stakeholders.
5. Is sensitive to budget constraints and capitalizes on existing and future opportunities with a prudent and fiscally responsible approach.
6. Includes a well-planned and funded monitoring program that can adequately assess the degree of program success.
7. Includes an adaptive management component.
8. Includes clearly defined criteria for terminating supplementation activities.
9. Recognizes that ongoing improvements to habitat essential to improving the production and survival of coho salmon in the watershed.

B. Project Objectives

1. Establish a Project management structure that provides for shared responsibility among the Core Partners and efficient decision-making while providing reasonable opportunities for two-way communication with other stakeholders.
2. Utilize a Project Coordinator to staff and organize the effort and keep it moving forward on schedule.
3. Acquire all required permits and approvals for the Project.
4. Work with local governments, landowners and regulatory agencies to identify what assurances are needed by landowners to support the Project and support the actions required in order for the Resources Agencies to provide such assurances.
5. Collectively agree upon a supplementation strategy(s) that meets the Program Purpose, Goals and Objectives.
6. Develop a monitoring plan that will adequately assess the results of the selected supplementation strategy or strategies.
7. Develop a timeline to guide Project efforts.
8. Develop performance Project measures to help evaluate Project success.

C. Assumptions - This Charter is based upon the following shared assumptions of the Core Partners:

1. That the Core Partners are each committed to the Purpose, Goals and Objectives contained in this Charter.
2. That the Core Partners are committed to combining their efforts to implement the Project consistent with the Purpose, Goals and Objectives contained in this Charter.
3. That the Core Partners recognize that ongoing habitat improvements are essential to improving the production and survival of coho salmon in the watershed.
4. That the Core Partners believe that other stakeholders, including landowners in the watershed, will expect to be informed and consulted with as an essential part of the Project.
5. That the Resources Agencies are each committed to the Purpose, Goals and Objectives contained in this Charter. It is further assumed they will actively participate in and support the Project as defined in this Charter and they will commit to providing necessary staff time to the effort.

Additionally, it is assumed the Resources Agencies will manage the monitoring program in coordination with Humboldt State University (subject to FRGP grant approval).

6. That the Core Partners in conjunction with the Resources Agencies will coordinate to reasonably generate the resources (staff and funding) required to implement the Project.
7. That the Core Partners in conjunction with the Resources Agencies will coordinate to outreach to other stakeholders as part of the Project.
8. That the core partners understand and agree that without an adequate monitoring plan in place, supplementation will not occur.
9. That the core partners understand and agree that coho salmon broodstock availability from Iron Gate Hatchery used for Shasta River supplementation is secondary to the mitigation requirements of the Hatchery.

D. Project Scope

The Project includes the planning, permitting, implementation, monitoring and evaluation of the initial supplementation with the relocation of up to 50 adult spawners collected at Iron Gate Hatchery, which is targeted for the fall/winter of 2013. The Project also includes supplementation and monitoring in subsequent years. The method and source for supplementation in subsequent years will be determined by the Core Partners and the Resources Agencies in conjunction with input from other stakeholders as part of the Project.

E. Roles and Responsibilities

Core Partners - The Core Partners will actively participate in and support the project as defined in this Charter. They will commit substantial time on the part of a key staff member(s) to the effort. They will communicate openly, honestly and respectfully with each other, respect the perspectives of the other Partners and work together to resolve any issues that may arise. An individual Partner may contract for the services of the Project Coordinator and/or Project Facilitator with funds obtained by the Partnership in coordination with the other Core Partners.

Project Coordinator – The Project Coordinator will organize and assist the interactions of the Core Partners and the Resources Agencies and the development of Project plans and schedules as directed by the Core Partners. The Coordinator will be empowered to expect timely performance by the Core Partners and to act to promote their timely completion of assignments and meeting of other Partnership responsibilities.

Project Facilitator – The Project Facilitator may help to plan and directly manage meetings of the Core Partners and the Resources Agencies as well as outreach meetings with stakeholders as required when directed by the Core Partners.

F. Project Management

The Core Partners will reach consensus on all substantive decisions related to the Project. It is recognized that the agreement and support of the Resources Agencies will be a key consideration in all decisions made by the Partnership.

G. Milestones

Initial Supplementation – Supplementation Year 1

1. Project Charter adopted by the Core Partners with agreement of the Resources Agencies.
2. Project Coordinator retained.
3. Plan and timeline for the initial supplementation established.
4. Permitting requirements for the Project determined.
5. Funding acquired for the initial monitoring program.
6. Permits for the initial supplementation obtained.
7. Initial supplementation implemented.
8. Initial monitoring implemented.
9. Evaluation of initial monitoring input and lessons learned for adaptive management completed

ATTEST:
COLLEEN SETZER
County Clerk & Ex-Officio
Clerk of the Board
By: _____
Deputy

Subsequent Supplementation – Year 2 and beyond

Milestones will be established as part of the Project for supplementation following the initial year on the basis of the best information available at that time and adaptive management of the initial supplementation.

H. Core Partner Signatures

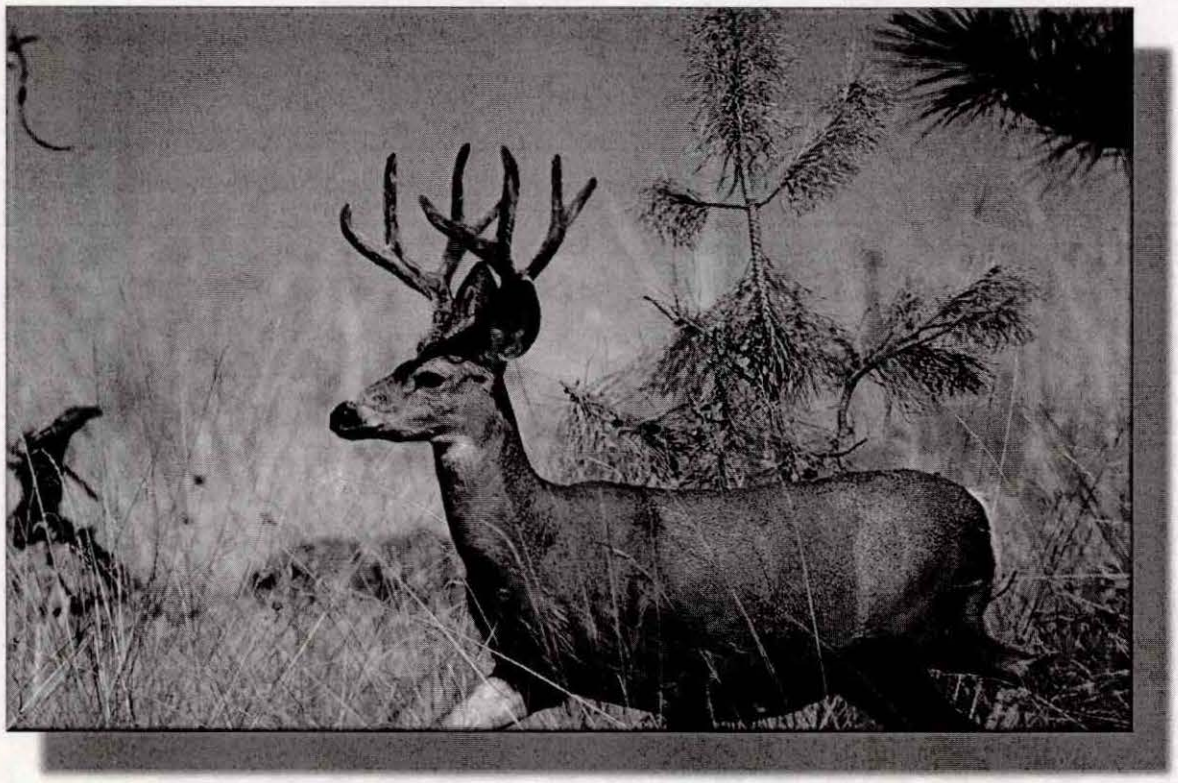
The signatures of the persons below document each of the Core Partner's support for this Charter. This Charter is not intended as a binding agreement, but rather a vision statement that will form the basis upon which the Core Partners will collaborate towards a shared objective. None of the Core Partners will rely on this Charter as a binding contract. Furthermore, notwithstanding the use of the word "partnership" in this Charter, no provision of this Charter shall be interpreted to impose a partnership relationship in either law or equity on any of the Core Partners.

Entity	Name/Position	Signature	Date
Siskiyou County	Grace Bennett, Board Chair	Grace Bennett	9/4/, 2012
Siskiyou County Farm Bureau	Jim Morris, Board Member		9-13, 2012
California Trout	Curtis Knight, Conservation Director		9/13, 2012
The Nature Conservancy	Gregg Werner, Sr. Project Director	Gregg Werner	9/19, 2012

AN ASSESSMENT OF DEER MANAGEMENT IN SISKIYOU COUNTY:

Recommendations for Management and Conservation

2009



Presented By:

THE SISKIYOU COUNTY DEER MANAGEMENT TECHNICAL WORKING GROUP

SPECIAL THANKS FOR THE CREATION AND DEVELOPMENT OF THE DOCUMENT GOES TO:

Team Members:

Jim Cook, (Siskiyou County Board of Supervisors)
Michael Kobseff, (Siskiyou County Board of Supervisors)
John Anderson, (Siskiyou County Fish and Game Commission)
Glenn McKinnon, (Siskiyou County Fish and Game Commission)

Technical Advisors:

John Schuyler, (United States Forest Service)
Richard Klug, (Biologist, Roseburg Forest Products)
Robert Schaefer, (CDF&G; Environmental Scientist)
William T. Arruda Jr, (CDF&G; Enforcement Captain)

SIGNATORIES

SIGNATURES	DATES
_____	_____
Chairman, Siskiyou County Fish and Game Commission	
_____	_____
Chairman, Siskiyou County Board of Supervisors	

SISKIYOU COUNTY DEER MANAGEMENT PLAN

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1). INTRODUCTION

1.1) DEVELOPMENTAL PROCESS AND HISTORY OF THE TECHNICAL WORKING GROUP:

In May of 2007, the Siskiyou County Board of Supervisors (SCBOS) authorized the Siskiyou County Fish and Game Commission (SCFGC) to develop a technical working group, identified as the Siskiyou County Deer Management Technical Working Group (SCDMTWG), to provide recommendations for the management of deer in Siskiyou County that could be presented to the California Department of Fish and Game (CDFG) for its consideration. This action was taken due to mounting frustrations with the CDFG and other State and Federal agencies' failure to address the perceived dramatic reduction of the deer populations in Siskiyou County.

The SCBOS and the SCFGC believes that the current Deer Management Plan being utilized by the CDFG is outdated and does not adequately address the current environmental conditions in Siskiyou County. Currently there are two CDFG Deer Management Plans that are in effect in one form or another. The first plan was developed by the CDFG in March of 1976. This Plan addresses the general management of deer populations throughout the State of California, without addressing the needs or requirements of specific herds or locations. The Klamath Deer Herd Plan was developed by the CDFG in December of 1989. This plan addresses the management of deer in most of Siskiyou County. The 1989 Plan addresses the management of deer in far greater detail than the 1976 Plan. However, this Plan was never approved for implementation by primarily managers responsible for the management of deer habitats.

1.2) MISSION AND PURPOSE STATEMENT:

The purpose and mission of the SCDMTWG is to develop recommendations for the management of deer in Siskiyou County that would gain the approval for implementation from the SCBOS, SCFGC, CDFG, California State Fish and Game Commission and other environmental agencies, such as the USDA Forest Service, and the Bureau of Land Management. It is also anticipated that the plan will have components that will address the concerns of private industrial timber companies and the local ranching communities and be incorporated into the private party's business management plans. The SCDMTWG was tasked with developing a plan that will address all current deer related concerns, issues and problems throughout Siskiyou County. This will be accomplished by a close review of past and current deer management plans and related data to identify what methodology, information and data is current and still useful and what methodology, information and data is no longer current nor useful to Siskiyou County's current environment.

1.3) MAKEUP OF THE SISKIYOU COUNTY DEER MANAGEMENT TECHNICAL WORKING GROUP:

In order to adequately address the many concerns relating to the management of deer in Siskiyou County, the SCBOS and SCFGC determined that the SCDMTWG would be comprised of members from all concerned groups to include the SCBOS, SCFGC, CDFG, USFS, the Private Timber Industry and the Private Ranching Industry.

To meet the requirements of the SCBOS and the SCFGC, the SCDMTWG is comprised of the following members: Jim Cook, (SCBOS); Michael Kobseff, (SCBOS); John Anderson, (SCFGC); Glenn McKinnon, (SCFGC); in addition to the working group members, the following individuals are technical advisors from allied agencies and local businesses: John Schuyler, (USFS); Richard Klug, (Biologist, Roseburg Forest Products);Robert Schaefer, (Environmental scientist CDFG) and William Arruda Jr., (Enforcement Captain, CDFG).

1.4) CURRENT DIFFERENCES IN DEER MANAGEMENT PHILOSOPHIES THROUGHOUT THE DIFFERENT ENVIORNMENTAL AGENCIES AND PRIVATE INDUSTRIES:

One of the major difficulties in assessing the management of deer are differences in management philosophies and operating methodology between the different State agencies, Federal agencies and private entities. The following is a short breakdown of the deer management philosophies within the different agencies/ industries operating throughout Siskiyou County.

California Department of Fish and Game:
The CDFG's main emphasis in the management of deer in Siskiyou County is based on the Deer Assessment Units (DAU's), and not by populations or individual herds. An obligation of CDFG is to encourage the conservation, restoration, maintenance, and utilization of California deer herds, however, this task has become increasingly more difficult in recent years. This is caused in part to the fact that CDFG does not own or control any large expanses of land in Siskiyou County. Therefore, the Department must try to seek cooperation with the land owners that control the land which supports the vast majority of these animals.

United State Forest Service (USFS):
The USFS is a Federal agency that controls the vast majority of open public land, approximately 2,385,000 acres, in Siskiyou County. Most of these lands are administered by the Klamath and Shasta-Trinity National Forests, with smaller amounts under the Six Rivers and Modoc National Forests. Unlike the CDFG, the USFS's main emphasis for their lands is multi-use, focusing mainly on sustainable vegetation management for a variety of objectives including forest health, fuels reduction, habitat maintenance and production of wood products. Portions of national forest lands are also grazed by permitted livestock. Deer and other species without special status (e.g., threatened, endangered or sensitive) are considered "species of opportunity", which simply put means the USFS will consider deer management in their vegetation management projects when it's consistent with stated objectives.

United States Bureau of Land Management (BLM):
The BLM is a Federal agency that controls widely scattered sections of land, approximately 85,000 acres, in Siskiyou County. Unlike the DFG, the BLM's main emphasis for their land usage is multi- purposed, focusing mainly on grazing and recreational opportunities. Currently BLM addresses deer management on their lands only at minimal levels through their Resource Management Plans.

United States Fish and Wildlife Service (FWS):
The FWS is a Federal agency that manages several wildlife refuges on 92,700 acres in Siskiyou County. Their stated mission focuses on waterfowl management and there are no management objectives specific to deer.

Private Timber Industries:
There are eight privately owned and managed timber companies operating throughout Siskiyou County. Together these companies control approximately 2,065,161 acres of land. While these companies are usually sympathetic to the needs of the deer populations, planning for and bearing the cost of deer management is not usually in the best interest of the company. The bottom line for the timber companies is that in order to aggressively manage deer and deer habitat on their lands it usually becomes an extremely costly and time consuming venture. Since timber companies work on a very narrow profit margin, any unnecessary costs are not usually well received and are avoided whenever possible.

Private Ranching/ Farming Industries:
There are 3,607 privately owned and managed ranches operating throughout Siskiyou County. Together these ranches control approximately 1,153,211 acres of land. While these ranches are usually sympathetic to the needs of the deer populations, planning for and bearing the cost of deer management is not usually in the best interest of the rancher or farmer. The bottom line for the ranches, like the timber companies, is to aggressively manage deer and deer habitat on their lands is usually an extremely costly and time consuming venture. Since these ranches work on a very narrow profit margin, any unnecessary costs are not usually well received and are avoided whenever possible.

1.5) PLANNED GOALS AND OBJECTIVES:

The SCBOS and the SCFGC are united with the same goals and objectives concerning the deer population in Siskiyou County. These organizations are committed to taking the appropriate actions to insure the reestablishment of a healthy deer population while maintaining or increasing the financial growth of the local communities within the region. They believe the simplest and most effective way to accomplish their objectives is through close cooperation between all concerned governmental agencies and private industries.

The Goals and Objectives of both the SCBOS and the SCFGC are as follows:

1). To increase and maintain the health and productivity of deer populations throughout Siskiyou County.

2). To promote the conservation, quality, and abundance of deer habitat throughout Siskiyou County.

3). To maintain deer hunting as a vital revenue source for Siskiyou County businesses.

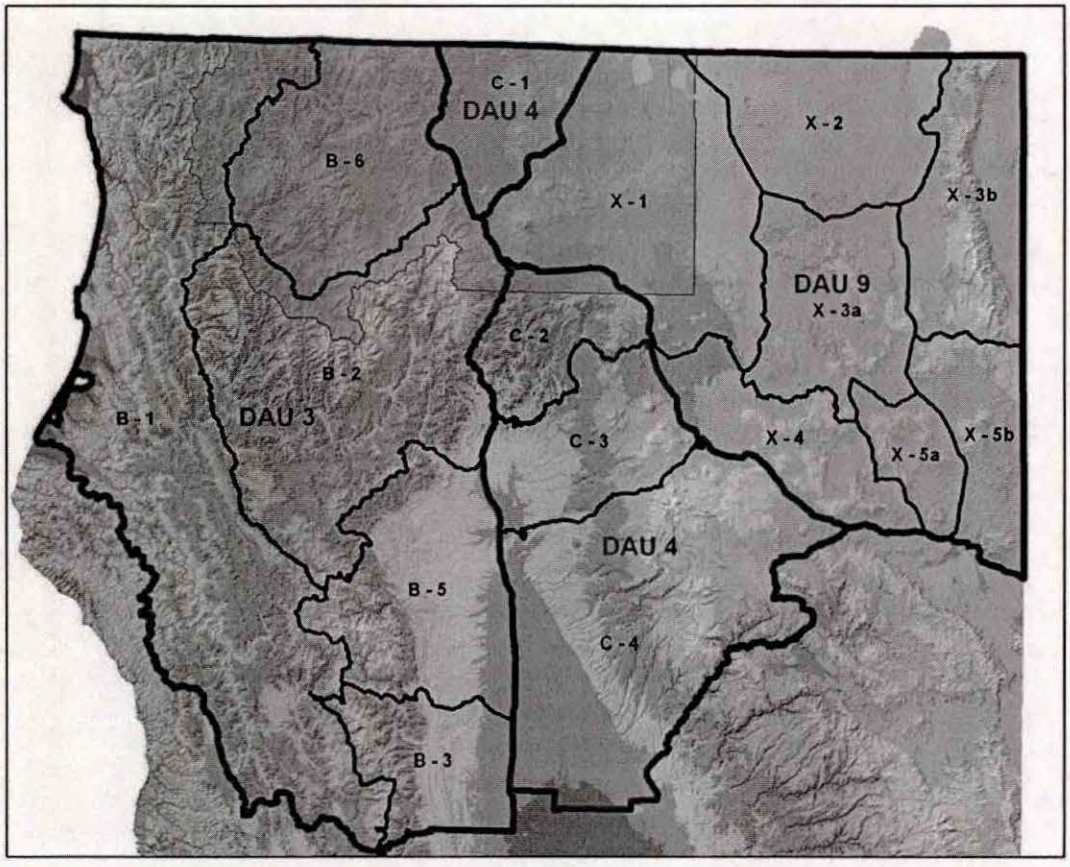
4). To make the management of deer in Siskiyou County a collaborative effort between concerned governmental agencies, private entities and non-profit organizations within the applicable laws and regulations of the State of California.

2). POPULATION MANAGEMENT

"Protectionists and anti-hunting groups want the population to be unhunted, while hunters believe the population can be harvested for recreational sport. This circumstance means that no longer can the efforts of the management agencies be directed at single goals (Dale McCullough 1982).

2.1) Deer Assessment Units:

In the 1990's, DFG established Deer Assessment Units (DAU's) for monitoring deer in California. DAU's are based on groups of deer that live in similar yet distinct habitat and environmental settings (CDFG 2006). Each DAU consists of multiple zones that can encompass many herds or populations over large geographic areas or ecological provinces. Monitoring deer at this scale assumes all populations within the DAU exist under similar environmental conditions, and are performing uniformly in reproductive potential and survival.



Map 1. Deer assessment units (red outlines) with respective deer zones (black outlines) in the CDFG Northern Region with Siskiyou County embossed in red.

2.2) DAU Harvest Strategies:

DAU 3 – B Zones

In 1992, a maximum opportunity harvest strategy was implemented for managing deer hunting in DAU 3 that provided 2-tags per year, an abundant "no-fill" tag quota (55,000 tags), a 5-week season length, and a merging of zone boundaries to provide unrestricted hunter distribution. This DAU is characterized by the CDFG Northern Region to provide a moderate quality hunting experience.

DAU 4 – C Zones

DAU 4 is managed for moderate opportunity and provides1-tag per year where the quota (~8500) can become filled. The quota may be adjusted annually based on DAU monitoring and harvest trends. Like DAU 3, zone boundaries are merged so that hunters are not restricted within the DAU. The Northern Region characterizes this DAU as a moderate quality hunting experience.

DAU 9 – X Zones

DAU 9 is managed for high quality hunting but with limited opportunity. These zones have high user demands for mule deer populations known for an older age class of males where a preference point lottery system distributes a limited amount of tags to successful applicants. Although deer are monitored at the DAU level, tag allocations are determined by individual X-zones where harvest success is the most important criteria for adjusting harvest allocations. In these zones, tag quotas are low, season lengths are short, and hunter distribution is restricted by zone boundary.

	Tag Quota	Tags Adjusted Annually	Quotas Fill Each Year	Tags Per Hunter	Season Length	Preference Point System	Hunter Distribution
DAU 3	55,000	No	No	2	5 week	No	Unrestricted
DAU 4	~8500	Yes	Yes	1	4 week	No	Unrestricted
DAU 9	~4000	Yes	Yes	1	2 week	Yes	By Zone

Table1. Represents management characteristics by DAU

2.3) Population Monitoring:

Vehicle Surveys: Vehicle surveys are the primary method for indexing deer populations in all DAU's for the Northern California. Composition ratios (*sex and age*) are collected

in the fall and population trends (*total deer observed*) in the spring. Most zones in each DAU have at least 2 winter range routes varying from ~10-25 miles.
Results from the last 10-years of spring vehicle surveys *(population trend)* are reported below in section 2.4.

Questionnaires : Hunter questionnaire is an additional method used to index deer populations in DAU 9. Since 2002, postcards have been mailed to hunters to report observations of total deer and bucks seen on opening day.

Aerial Surveys: Aerial surveys are not utilized in Siskiyou County for monitoring deer populations. However, in 2007 a standardized sampling approach was designed to conduct helicopter surveys in zones B6 and C1 for comparing results to vehicle surveys and to gain understanding on deer population density, structure, and distribution (Figure 2).

2.4) DAU Spring Vehicle Deer Surveys 1998-2008

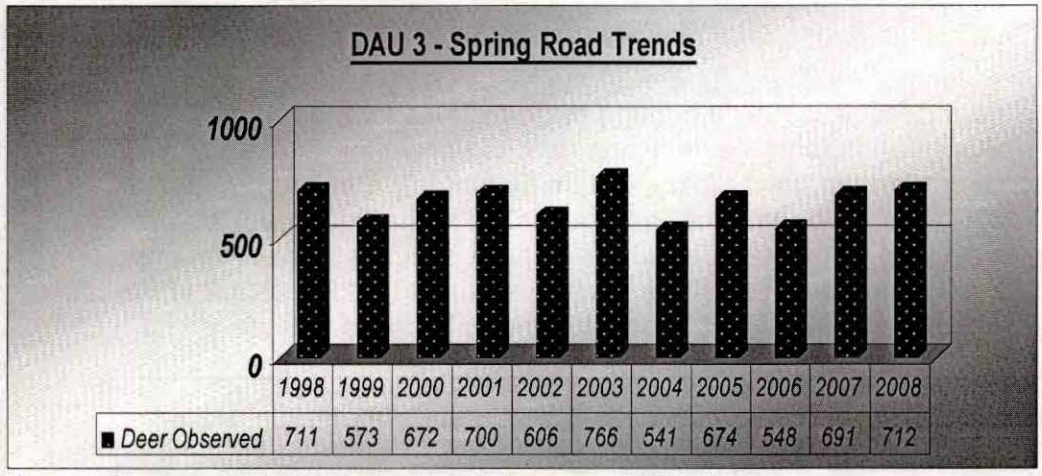


Figure 1. Represents DAU 3 Spring Vehicle Surveys, (1998-2008)

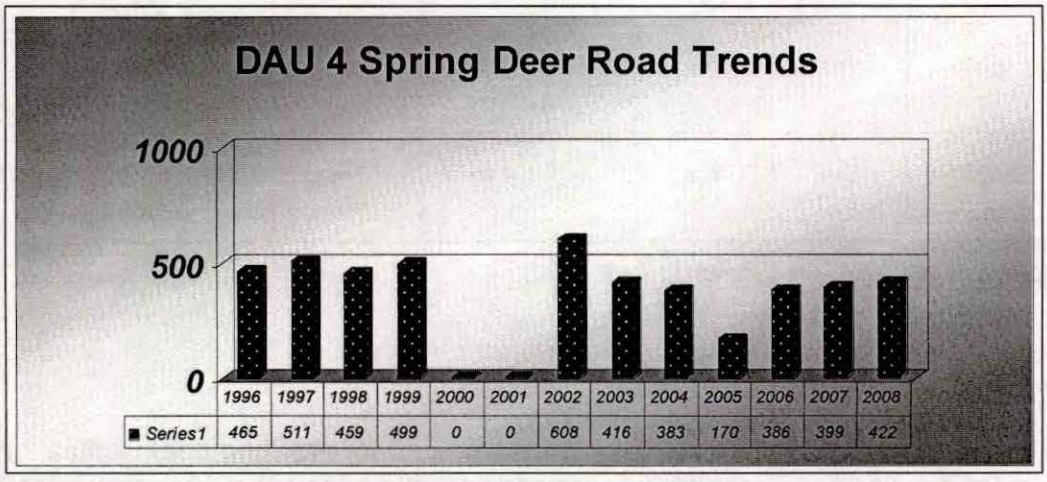


Figure 2. Represents DAU 4 Spring Vehicle Surveys, (1998-2008)

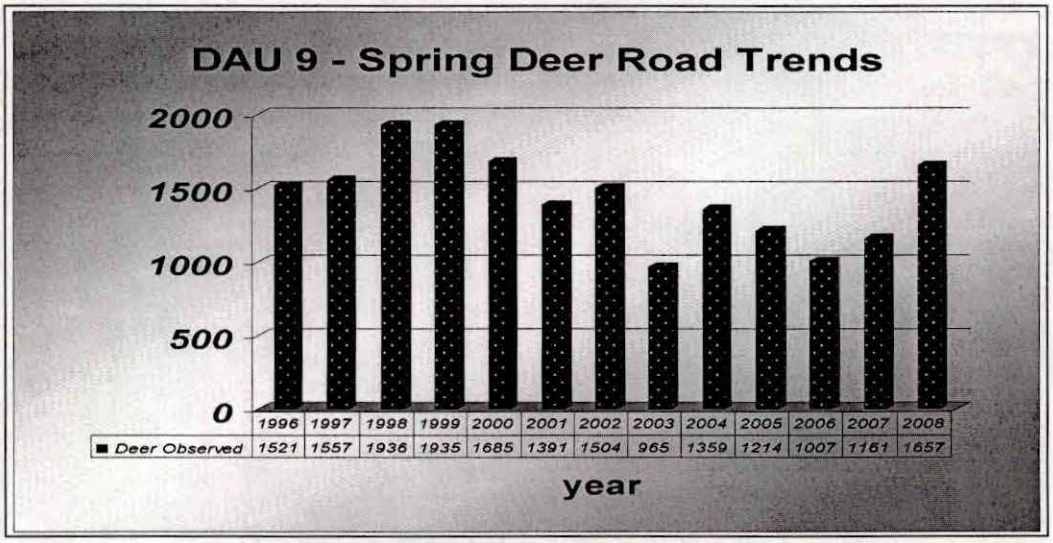


Figure 3. Represents DAU 9 Spring Vehicle Surveys, (1998-2008)

A Comparison of Survey Techniques for B6 and C1:

In 2007, helicopter surveys were conducted for age and sex composition on the B6 and C1 winter ranges. Polygons encompassing critical deer winter range were divided by quarter mile transects with 300 miles of transects surveyed per zone. These surveys provided a large and intensive sample of deer from the Scott Valley and Klamath winter ranges that had markedly different results from composition surveys conducted from vehicles in fall (Table 2; Figure 4 and 5).

	DAU 3 Road	C1 Road	X1 Road	B6 Heli	C1 Heli
# Vehicle Routes or Transect Miles	14	2	5	299 mi	303 mi
Total Deer Counted	514	144	330	890	758
Buck : Doe : Fawn	27:100:43	33:100:45	29:100:78	11:100:78	13:100:83

Table 2. Comparison of vehicle and helicopter deer composition surveys.

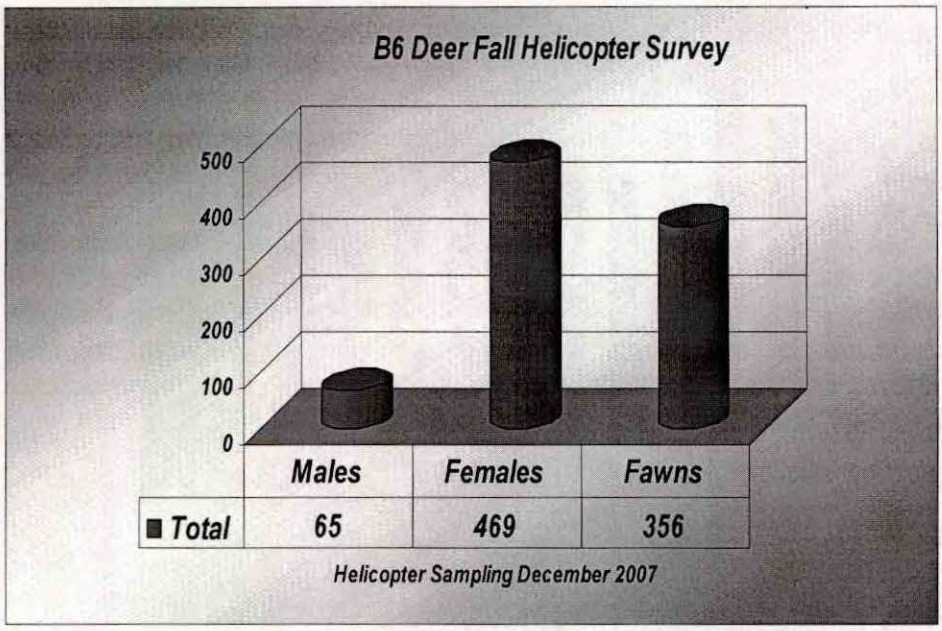


Figure 4. Males, females, and fawns observed in December 2007 on fall helicopter deer composition surveys in zone B-6.

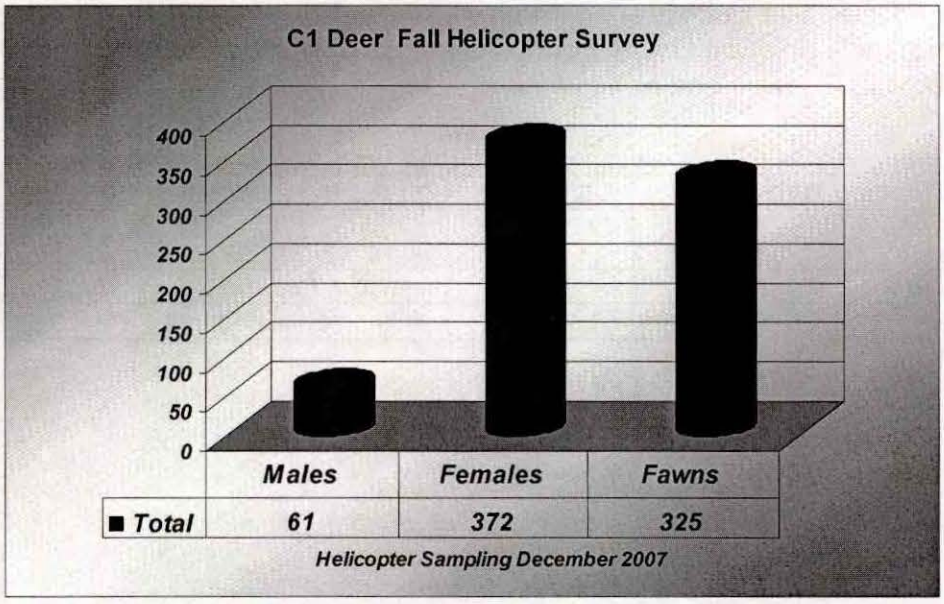


Figure 5. Males, females, and fawns observed in December 2007 during fall helicopter deer composition surveys in zone C-1.

2.5) Current Survey Techniques:

Wildlife managers require cost-effective and accurate methods for conducting population surveys in making wildlife management decisions (McCullough 1994). Reliable estimates of population size for deer is essential for assesing their status, understanding factors related to their persistence, and developing strategies for their conservation (Bleich et al. 2001). Survey techniques for assessing populations can vary in costs and accuracy; making the use of a particular survey technique dependent on the goals and needs of management.

Vehicle Surveys (Primary Technique):

Vehicle surveys are a cost efficient method for gathering population information, but rarely provide unbiased estimates because they are generally placed along ridges or valleys and avoid steep or wet areas (Garton et al. 2004). In principle, road surveys provide a population index, but in practice the weaknesses associated with observer and environmental variability far outweigh the advantages, making the quality of this index unreliable (Garton et al. 2004, Garton 2008). Spotlight surveys for monitoring age and sex ratios have been the most common use of this technique, but the biases associated with animal behavior, sexual segregation, the environment, and observers, provide uncertain results (McCullough 1982).

Hunter Questionnaires (DAU 9 only):

CDFG conducts hunter questionnaires or postcard surveys in DAU 9 to provide an index to deer population trends. Questionnaires are inexpensive and can play a vital role in helping wildlife managers gain a better understanding of people when managing a resource (Filion 1982, Garton 2008). However, there is an ever present danger when using this technique that it will be misused by researchers unfamiliar with underlying assumptions and potential biases (Garton 2004). Many forms of sampling and non-sampling bias can enter into questionnaire surveys. Without intensive follow up, the biases associated with the results can not be determined, making the accuracy of these surveys unknowable. Additionally, these indirect surveys become biased with repeatability, as the expectation of receiving the survey can influence results (Filion 1982, Garton 2008).

Aerial Surveys : Aerial surveys can provide direct density estimates for ungulates over large geographic areas (Potvin al. 2000). They are the most common method used for estimating the abundance of large mammal populations where visibility is not limited or can be corrected (Bleick 2000, Hefflefinger 2008). Observer and environmental bias can typically be reduced with aerial surveys with proper sampling design and intensity (Samuel et al. 1987; Minta and Mangel 1989, Graham 1989). The expense of these surveys can require a significant financial commitment by agencies, making them prohibitive when funding sources are not committed, or management goals do not require intensive monitoring. Aerial surveys impart conservation insights over large geographic areas that provide benefits in conservation planning and environmental impact assessments (Potvin et al. 2004).

2.6) DAU 3 Deer Harvest Trends:

In DAU 3, buck harvest has dramatically declined since the initiation of maximum opportunity harvest strategy in 1992 (Figure 6). In the first year of maximum opportunity strategy, buck harvest for Siskiyou County was the highest recorded in >30 years of reporting (Figure 7).

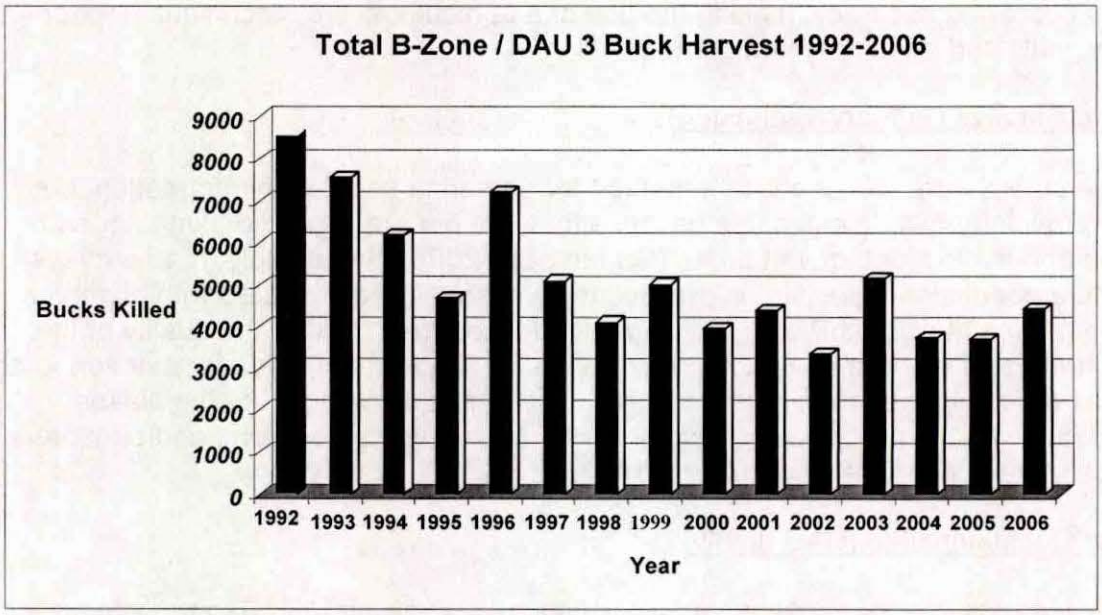


Figure 6. DAU 3 buck kill since the initiation of a maximum opportunity harvest strategy in 1992.

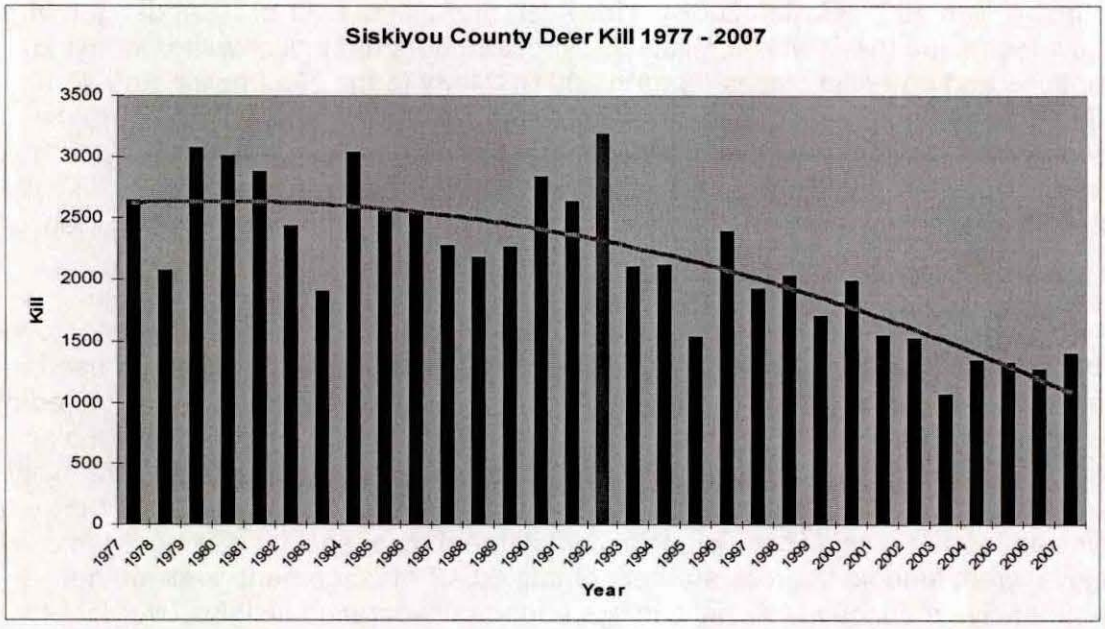


Figure 7. Siskiyou county deer kill from 1977-2007 with the year that a maximum opportunity harvest strategy was initiated in red.

2.7) Harvest and Population Goals:

Harvest and population goals have been set by the CDFG Northern Region for DAU 3, DAU 4, and the individual zones of DAU 9 to guide management (Table 3 below).

GOALS	DAU 3 (B-1-6)	DAU 4 (C-1)	DAU 9 (X-1)
Reported Hunter Success	12-15%	12-15%	15-20%
Post Season Buck Ratio	20-25	20-25	20-25
4 Point Buck in Harvest	10-25%	10-25%	15-20%

Table 3. CDFG Northern Region harvest and population goals

2.8) Reported Hunter Success:

DAU 3 (B1 – B6) – Reported harvest goals for this DAU are set at 12-15%. This goal has been reached three times, (Depicted in Green), in the last ten years.

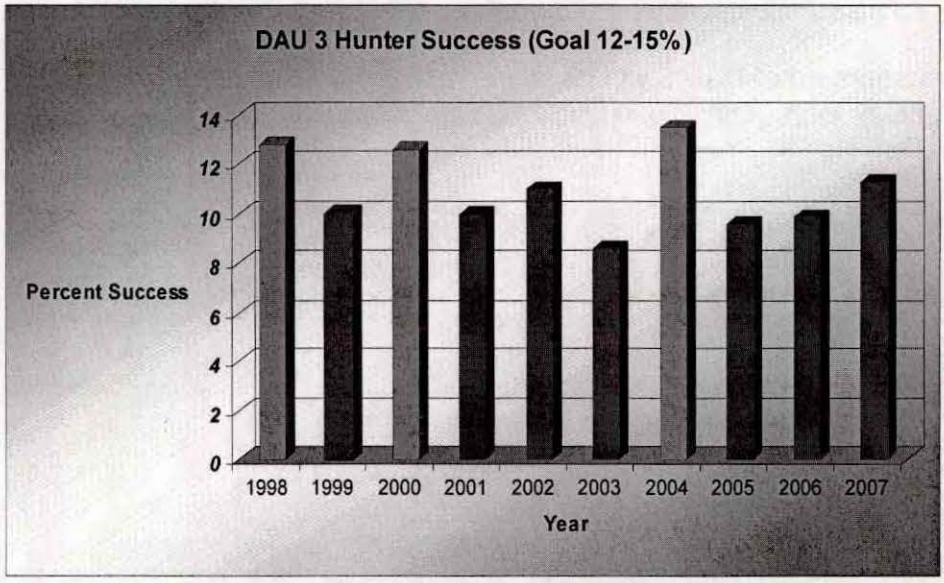


Figure 8. DAU 3 reported harvest hunter success goals (1998-2007)

DAU 4 (C-1) – Reported harvest goals for this DAU are set at 12-15%. This goal has been reached three times, (Depicted in Green), in the last ten years.

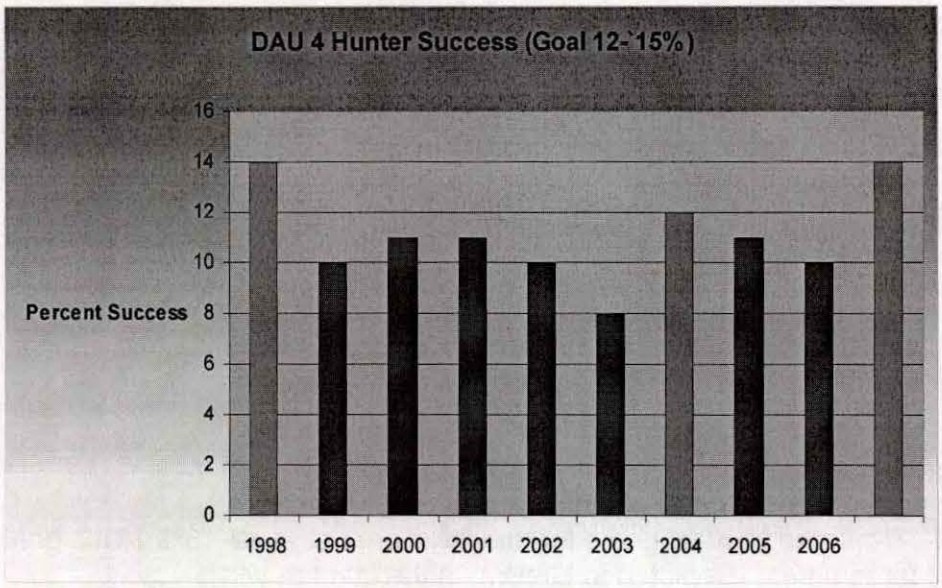


Figure 9. DAU 4 Harvest Hunter Success Goals, (1998-2007)

DAU 9 (X-1) – Management of DAU 9 (X1) is more intense, with changes recommended annually for meeting zone goals. Hunter success for X1 has met the goal seven times (Depicted in Green) in the last 10 years.

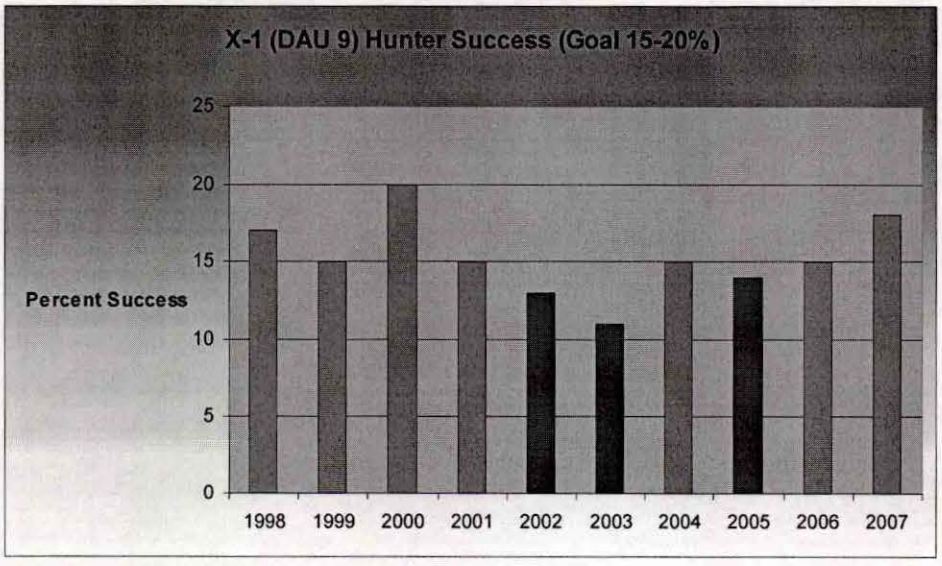


Figure 10. DAU 9 Harvest Hunter Success Goals, (1998-2007).

The following tables represent results and sample size for buck ratios determined from vehicle surveys, and 4-pt antler class in the harvest from 1997-2007. Red indicates years that goals have not been met.

DAU 3

	Bucks/100 Females	*N*
1997	18	452
1998	9	278
1999	16	609
2000	22	581
2001	24	762
2002	19	667
2003	30	555
2004	28	416
2005	25	334
2006	22	703
2007	27	614

Table 4.DAU 3 Buck to Doe Ratios

DAU 3	4-pt
1998	14
1999	13
2000	16
2001	16
2002	18
2003	18
2004	20
2005	23
2006	19
2007	19

DAU 4

	Bucks/100 Females	*N*
1997	17	412
1998	16	413
1999	18	448
2000	19	323
2001	13	376
2002	21	317
2003	13	431
2004	19	412
2005	31	111
2006	18	127
2007	21	571

Table 5.DAU 4 Buck to Doe Ratios

DAU 4	4-pt
1998	14
1999	14
2000	17
2001	17
2002	18
2003	18
2004	21
2005	17
2006	18
2007	20

DAU 9 (X1)

	Bucks/100 Females	*N*
1997	14	450
1998	15	209
1999	0	0
2000	17	364
2001	16	706
2002	18	358
2003	16	533
2004	22	133
2005	32	122
2006	22	213
2007	20	360

Table 6.DAU 9 Buck to Doe Ratios

X1	4-pt
1998	16
1999	20
2000	25
2001	15
2002	18
2003	20
2004	25
2005	25
2006	29
2007	29

2.9) Conclusions:

Survey Techniques:

Vehicles - spring vehicle surveys are used to provide an index to population growth or decline for deer. These surveys do not provide estimates of abundance or density where confidence levels can be calculated with precision. In interpreting vehicle trend count data for deer, it has never been validated that fluctuations in observed numbers of deer on key areas reflect fluctuations of similar magnitude over larger areas (Connolly 1981). An intensive study of deer in Utah revealed that vehicle trend counts were unreliable, and discarded as a management technique (Robinette et al. 1977). Due to limitations in making valid conclusions on population dynamics, vehicle surveys are unreliable for monitoring populations with accuracy.

Ratio Data:

Researchers found when conducting fall composition surveys for deer that a sample size of >300 does or >500 total deer were needed from a population of ~2000 animals before variation in the precision of the data could be reduced to acceptable levels (Bleich 1995). Vehicle surveys have provided small samples of deer relative to the estimated population size of DAU's, making the accuracy of this data unreliable (Figure 11).

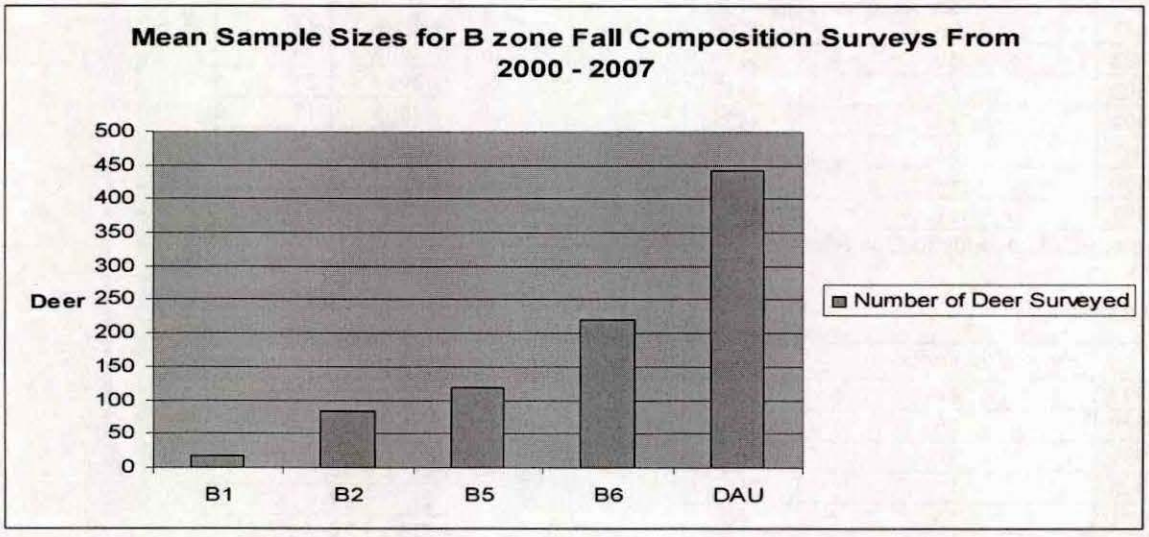


Figure 11. Mean sample sizes of deer for zones and DAU using road surveys for fall deer composition surveys from 2000-2007.

Monitoring Techniques and Harvest Strategy :

When deer populations are not intensely managed as in male-only harvest strategies, a retrospective analysis can be used from post-harvest data to monitor shifts in populations. This method uses changes in annual harvest levels, antler class characteristics, or age of harvested animals to follow trends in the male segment of the population. An assumption when retrospectively monitoring a male-only harvested

population is that the reproductive portion of the population is left intact and adequate numbers of males are retained for normal reproduction. This method is used in deer herds where only males are harvested, or populations are difficult to monitor.

Alternatively, when populations are intensely managed with harvest strategies that incorporate the removal of females, population objectives must be closely monitored so that the population is not over or under utilized. Unless the current male-only strategy is replaced with a linked-sex harvest for balancing population structure, the need to closely monitor populations with limited budgets may not be required, or determined a priority by the Department.

Meeting Goals for Populations and Harvest:

Harvest goals set by the Northern Region for monitoring the retention of bucks (fall buck ratios), hunter success, and antler class of the harvest, are meant to generally guide management decisions.

Buck Ratio Goals – Buck ratio objectives have been difficult to meet, and are even lower when results from helicopter surveys are considered. This may suggest that populations are not performing as expected, and that current management should be assessed or goals reevaluated.

Harvest Goals - Harvest success goals established by the Northern Region have been difficult to maintain in DAU 3 and 4. However, If the management philosophy is to maximize hunting opportunity in association with poor hunting success, these DAU's may be performing satisfactorily.

Antler Class – 4-pt bucks in the harvest are within range of the goals determined by the Northern Region. The range of percentages for meeting these goals (10-25%) makes the usefulness of this data primarily as a retrospective tool for following trends.

Trends in Males Based on Antler Class:

DAU 3 provides the largest random sample of post-harvest antler class data and can provide meaningful insights into the male segment of the population in Siskiyou County. Caughley (1974) pointed out when hunted populations are increasing, that due to the vulnerability of younger animals their presence in the harvest will also increase. Alternatively, when populations and the presence of younger animals are declining, the harvest of younger animals will also decline. During downward population cycles, Caughley (1974) also pointed out that older animals are harvested at higher rates due to their increasing presence in the population. A 10-year trend in the presence of mature and young bucks in the harvest suggest a declining trend in males for DAU 3 (Figure 8)

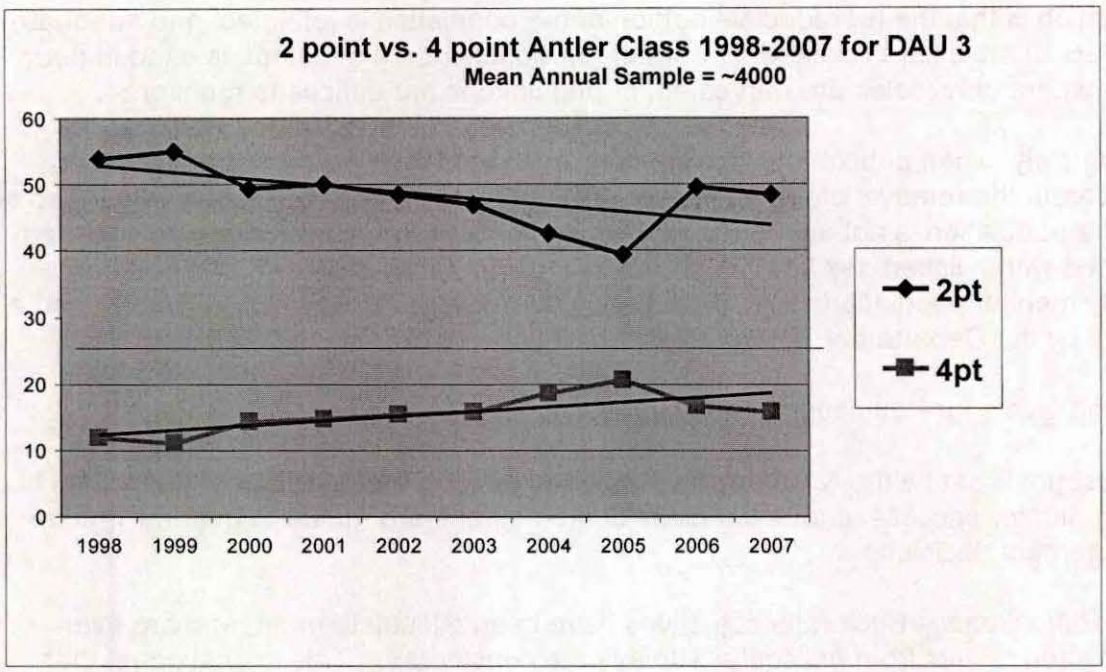


Figure12. Trends in the proportion of 2-pt and 4-pt bucks in the harvest from 1998 – 2007.

Habitats and Populations:

The most important factor influencing deer population levels is the quality of forage consumed (McCullough 1982). When habitat quality is poor and the nutritional carrying capacity is reduced, populations will decline while enduring increased susceptibility to natural mortality factors such as disease, severe weather, and predation (Kie 1988). The long term decline of California deer populations is ultimately the result of decreasing conditions in habitat quality and abundance (Longhurst 1952, Dasmann 1971, CDFG 1998, Schaefer et al. 2002, CDFG 2006).

Potential Evidence of a Decline in Males in Zone B-6:

Precipitation is a well known influence on harvest, with patterns in zone B-6 showing evidence of a causal relationship during the initial years of a maximum opportunity harvest strategy from1992 - 2003 (Figure 9). During these years a spike in harvest was associated with a spike in precipitation. However, since 2004 when rainfall was significantly higher there was little influence on the harvest. This is difficult to explain other than the availability of bucks has become increasingly limited.

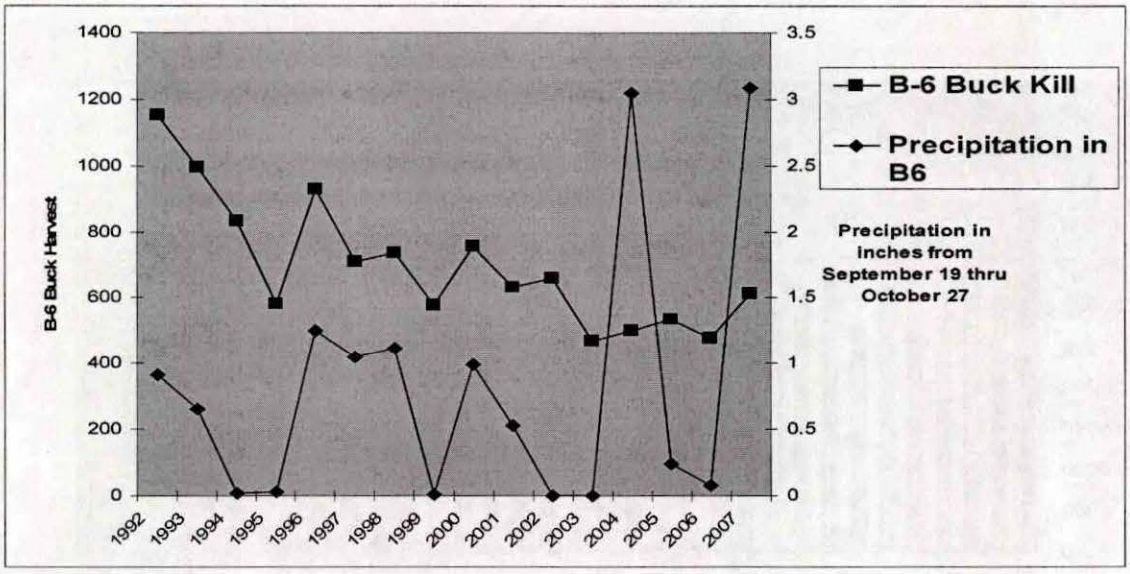


Figure 13. Buck kill for zone B-6 and rainfall totals during the B-6 hunt season taken from the Fort Jones Ranger Station for 1992 – 2007 (Western Regional Climate Center, Desert Research Institute, Reno NV.)

County and Statewide Harvest Trends:

Comparing county and statewide buck harvest levels may provide understanding on the local influences that current management is having on deer populations. The first year of maximizing opportunity in DAU 3 resulted in the 1992 spike of Siskiyou County buck harvest to a level not recorded in >40 years (Figure 14). Dissimilarly, harvest rates at the statewide level prior to 1992 were higher for most years, suggesting a unique and significant impact to male deer occurred with the initiation of a maximum opportunity harvest strategy in 1992 (Figure 15).

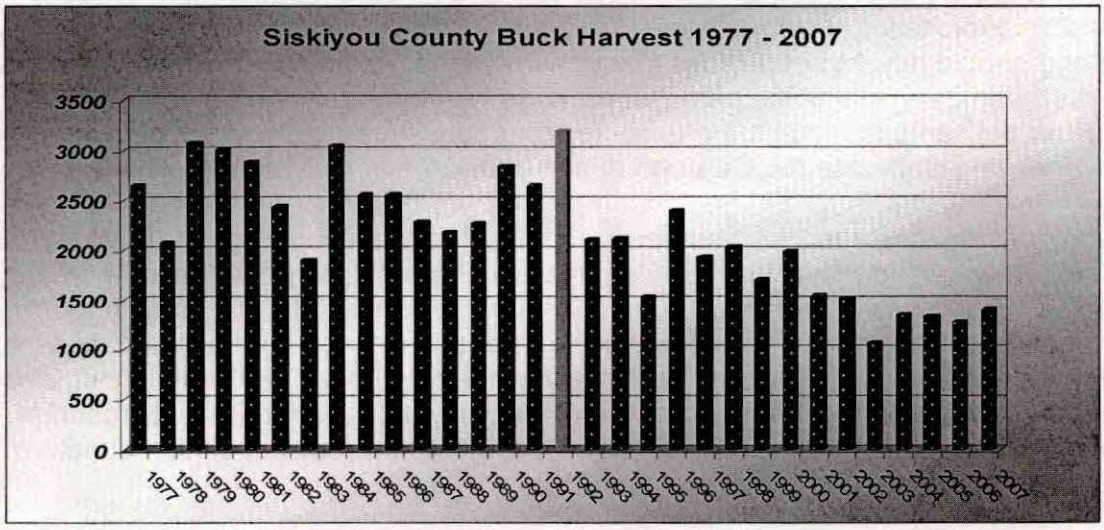


Figure 14. Siskiyou County Buck Harvest, (1997-2007). The green bars indicating the year (1992) that a maximum opportunity harvest strategy was initiated and the red bars indicating years when buck harvest was higher than in 1992.

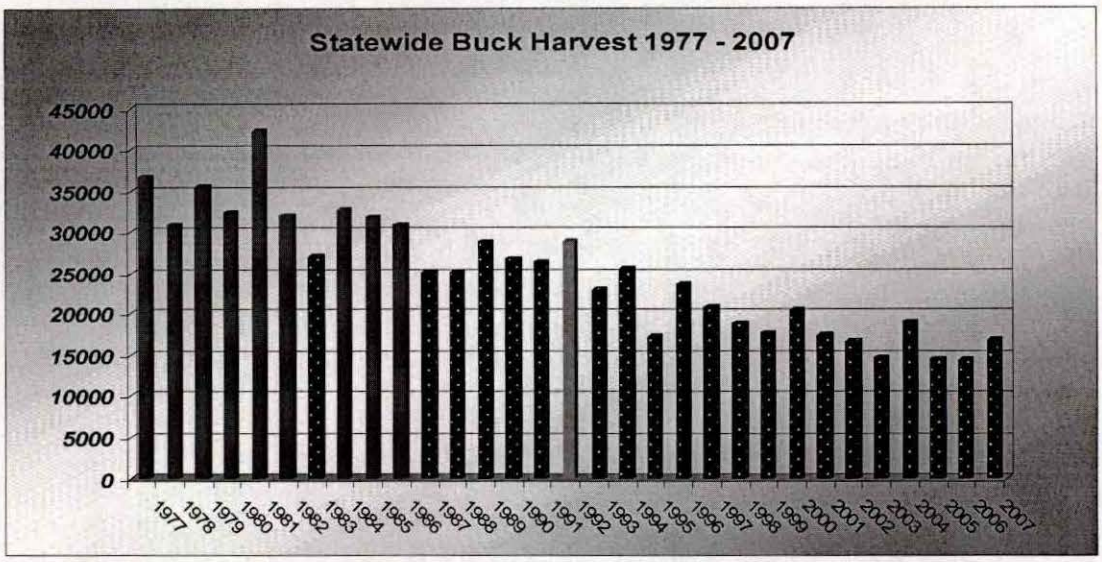


Figure 15. Statewide buck harvest,(1997-2007). The green bars indicating the year (1992) that a maximum opportunity harvest strategy was initiated with the red bars indicating years when buck harvest was higher than in 1992.

Current Population Structure:

Survey and retrospective data suggest that the presence of male deer in Siskiyou County has becoming increasingly limited. This is likely the result of a buck only harvest strategy and deteriorating habitat conditions, but the influences of increased and unrestricted hunter distribution since 1992 can not be ruled out as contributing to this decline. In California, since female harvest has been restricted by the SCBOS since the 1950's, an optimum yield management philosophy that balances population structure while increasing yields has not been utilized. Game management is based on sustainable exploitation theory or harvestable surplus (McCullough 1979, Connelly 1981) and should rely on populations stabilized at high levels of yield. The conservative harvest strategies typical of the past that promote high opportunity are becoming less feasible as big game managers are expected to produce greater harvests of animals from a declining land base (McCullough et al. 1990).

It was suggested long ago that deer herds should be managed in a continual state of eruption by harvesting males and females, therefore maximizing herd health and productivity (Lauckhart 1950). If maximum annual harvest is to be the management goal, manipulation of the population to achieve maximum turnover rate should take precedent over manipulations to achieve maximum size (Gross 1969). Until population management goals change for deer in Siskiyou County, and modernized approaches utilizing past and present research are employed, an imbalanced population structure and poor herd productivity can be expected.

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3). HABITAT MANAGEMENT (PUBLIC AND PRIVATE LANDS)

3.1) Deer Populations by Type of Area:

There is a lack of data on deer populations by type of area, stratified by land ownership or type of management objective. Through the implementation of this plan, opportunities to gather such data should be pursued whenever possible – further adding to our knowledge of the Siskiyou County deer herds.

3.2) Fire History:

The public wildlands of Siskiyou County are quite variable, ranging from dry grasslands and open oak woodlands at low elevations (or rain shadows) to dense stands of conifers and/or hardwoods at the higher elevations. To the east the vegetation pattern includes the dry sagebrush-steppe, with significant encroachments of western juniper. These entire ecosystems share one thing in common and that is that fire is a natural component of the ecosystem function. Fire is a source of disturbance in the ecosystem, helping to create and maintain a patchiness of vegetation across the landscape. Fire also helps create stand species composition and density. In some places, frequent fire influences results in open, park-like stands of late-successional forest and associated species. In other areas, fire results in earlier successional vegetation such as brush, oak and grass-dominated ecosystems. Before the fire suppression era, the forested areas probably experienced frequent, low-intensity fires every 8 to 25 years, with stand replacing, high intensity fires once every 200 to 350 years (Klamath National Forest, 2004). Fire exclusion and other management actions have resulted in considerable ecological changes to the Klamath Mountains. While the Southern Cascade region of Siskiyou County has also seen fire exclusion, it has seen more grazing and widespread logging. The ecological results of widespread efforts to restore ecological integrity and reduce fire severity with mechanical treatments and prescribed fire are being investigated. Studies, such as the Little Horse project may help provide long-term answers (Sugihara, 2006). The interruption of the natural fire process through fire suppression, in combination with some land management practices (timber harvest, grazing, development of a transportation network, etc) in some areas, has resulted in:

- Less frequent fires in many ecosystems, especially in the ponderosa and mixed conifer types.
- Larger, more intense wildfires.
- Accumulation of 'ladder" fuels making much of the forest subject to uncharacteristic stand-replacing wildfire,

The following table outlines the last twenty years of wildfire history on the Klamath National Forest, for fires that burned at least 10 acres. A map of these fires is also available for review. At the writing of this plan, 2008 is on a trajectory of having significant acreage burned by wildfires in western Siskiyou County

Year	Number of Fires	Acres Burned	Average Fire Size
1988	6	229	18
1989	2	91	46
1990	2	138	69
1991	0	0	0
1992	2	538	269
1993	0	0	0
1994	3	36,268	12,089
1995	2	2,098	1,049
1996	0	0	0
1997	0	0	0
1998	0	0	0
1999	2	2,024	1,012
2000	1	1,720	1,720
2001	4	9,730	2,433
2002	5	4,528	906
2003	5	357	71
2004	2	36	18
2005	1	3225	3225
2006	12	42,991	3,583
2007	13	17,227	1,325
2008	16	224,905	14,057

Table 1, Klamath National Forest Wildfire History, (1998-2008)

The effects of the fires are also quite variable. Typically, most fires are of mixed severity influenced by aspect, slope, slope position, weather, solar radiation, and the fuels composition. Thus, it is common to see fires can create a mosaic pattern on the landscape comprised of forested areas (with differing age classes), hardwood stands, and openings dominated by brush or grasses/forbs – with many of these features of benefit to deer by increasing the availability of forage. For example, portions of the Crapo Creek area which burned moderate to high intensity in 1987 are now occupied by basal sprouting hardwoods being utilized by deer (Cuenca 2009, pers comm). The following table shows the range of severities for the 2008 fires on the Klamath National Forest (Isbell 2009, pers comm):

No Change	Low Severity	Moderate Severity	High Severity
34 – 57%	32 – 43%	8 – 15%	3 – 10%

Table 2, Klamath National Forest Wildfire Burn Intensities, (2008)

3.3) Data on Summer/Winter Deer Ranges:

In 1998 the DFG mapped deer winter range across northern California. A GIS query, (CDFG Data Base), indicates that there are a total of 509,058 acres of winter range in Siskiyou County, with 219,786 acres of this range being located on national forest system lands. It is notable that winter range designation (Management Area 14) is not included in the Klamath National Forest Land and Resource Management Plan for the western side of the forest. However, during project level planning biologists on the west side of the Klamath NF are able to utilize vegetation spatial data to map, analyze, and propose treatments in deer winter range areas, although standards and guidelines required for deer management on winter ranges in the LRMP do not apply these areas.

3.4) Identify Public Land Usage/Deer Management:

Management of National Forest System lands are guided by a Land and Resource Management Plan, also known as the Forest Plan. These plans are prepared under the requirements of the National Forest Management Act of 1976. For Siskiyou County, there is a Forest Plan for the Klamath National Forest and similar plans for the Shasta-Trinity, Six Rivers and Modoc National Forests. Two significant events are worth noting. The first is that all of these Forest Plans incorporate the 1994 Record of Decision for *Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl,* otherwise know as the Northwest Forest Plan (NWFP). The NWFP places much more emphasis on management practices that maintain or create habitat for late successional species. The second event is the Healthy Forest Initiative of 2002, which in response to highly destructive wildfires recognized the need to reduce fuels – especially in the wildland urban interface. The HFI did not result in any direct changes to Forest Plans, but it did result in changes to funding and planning procedures for implementation of Forest Plans at the project level.

The purpose of the Forest Plan is best described by the following excerpt from Chapter 1 of the Klamath's plan (Klamath National Forest, 1994):

This National Forest Land and Resource Management Plan (Forest Plan) has been prepared to guide all natural resource management activities and establishes management standards and guidelines for the Klamath National Forest (Forest). It describes resource management practices, levels of resource production and management, and the availability and suitability of lands for resource management.

A goal of this Forest Plan is to integrate a mix of management activities that allow for the use, management and protection of Forest resources. Other goals are to meet the needs of guiding legislation and respond to local, regional and national issues.

To accomplish these goals, the proposed Forest Plan does the following:

- *Establishes the management direction and associated long-range goals and objectives (targets) for the Forest.*
- *Specifies the standards and the approximate timing and vicinity of the practices (land allocations) necessary to achieve that direction.*

- *Establishes the monitoring and evaluation requirements needed to ensure that the direction is carried out.*
- *Provides information for the development of program and budget proposals; and*
- *Provides a source of resource inventory data for Forest and Rangeland Renewable Resource Planning Act (RPA) assessments.*

This Plan contains management direction to guide the Forest for the next 10 to 15 years (the planning period). It also considered the long-range (50 years) Forest objectives and is consistent with meeting those objectives.

The Forest Plan goals and objectives are realized through the implementation of site-specific projects on the ground. As noted above, the NWFP resulted in significant changes as compared to Forest Service management prior to the early 1990's. Project level planning is conducted under the requirements of the National Environmental Policy Act (NEPA), and this is where goals and objectives are translated into on-the-ground results. These projects incorporate the following aspects of Forest Plan direction: Management Indicator Species, Standards and Guidelines, and monitoring requirements.

One aspect of management under the Forest Plan is the use of Management Indicator Species (MIS). MIS are identified in the Forest Plans of each national forest and are generally identified to represent habitat types that occur within the national forest boundary and/or because they are thought to be sensitive to National Forest System management activities. Black-tailed deer are one of six individual MIS, and was selected because of its association with early and mid-seral stage vegetation types. It is also an important game species (KNF 1994, pg. 3-8). In addition to individual species MIS, six multi-species assemblages were also selected as MIS. One of these assemblages--Hardwood Species—is used to highlight oaks, especially California black oak and Oregon white oak as important vegetation types and habitat components. Acorns provide an abundant and highly nutritious food source for many species, including deer.

Specific to the biological environment, the Forest Plan (Chapter 4) establishes the following with emphases (Klamath National Forest, 1994):

Manage to sustain healthy, resilient forest rangeland and aquatic ecosystems. Produce commodity outputs at levels that are consistent with managing those ecosystems.

Provide goods and services to the public in an environmentally sound fashion to meet the short- and long-term needs of the Nation.

Swiftly translate new knowledge on Forest relationships and functions, management strategies, and techniques into management actions where applicable to the Forest.

Promote the awareness and appreciation of wildlife, fish, and plant resources.

Cooperate with State, Federal, and local agencies during fish and wildlife habitat planning and improvement.

Biological Diversity
Manage for desired compositional, structural, and functional attributes of biologically diverse forest, rangeland, and aquatic ecosystems consistent with ecological processes in the province.

Recognize the importance of the interactions of ecosystems at the regional, landscape, and site levels.

Maintain diverse and productive wildlife, fish, and Sensitive plant habitats as an integral part of the ecosystem.

Manage for desired healthy, resilient populations commensurate with ecological processes (such as fire), while meeting the multiple use objectives. Strive to meet the 1990 RPA population targets for selected species.

Manage for a healthy forest, within the natural ecological processes of the Klamath Mountain Province.

Emphasize the maintenance or improvement of Endangered, Threatened and Sensitive (TE&S) species habitat, species associations habitat, and game species habitat. Use specific project direction found in the Recovery Plans for individual species to help recover the viability of species currently listed as Endangered and Threatened. Manage to provide "good" habitat conditions for these groups, if that habitat type is within the range of the natural ecosystem. *Coordinate habitat improvement activities with the California Department of Fish and Game (CDFG) to help meet the State's management plan goals for deer, pronghorn antelope, and other species.*

Develop and/or maintain unique wildlife habitats on the Forest, such as wetlands, meadows, rocky cliffs, etc.

The Forest Plan (Klamath National Forest, 1994) establishes standards and guidelines used during project planning. Since black-tailed deer are an emphasis species, the following are contained in the Plan:

Black-Tailed Deer
8-47 Design projects to improve, create or maintain a mix of forage and cover conditions that will maintain or increase deer populations. Use a range of management tools, including prescribed burning, thinning, and timber harvest to create openings for black tailed deer populations.

8-48 Provide high quality wintering, fawning/rearing and migration habitat where such habitat has been identified by the CDFG. Within wintering habitat, forage areas should simulate existing patches with distance to cover not exceeding 300 yards.

8-49 Emphasize projects that maintain the health and vigor of browse species and mast-producing oaks. Forage areas in fawning/rearing areas should be smaller openings, with the distance to cover not exceeding 150 yards.

8-50 Close roads when necessary to limit activities that inhibit deer use of quality foraging, fawning/rearing or wintering areas. Maintain or establish roadside screening along open roads in areas important for migration, fawning/rearing or concentrated seasonal use.

8-51 Manage key winter and spring use areas to provide good forage to cover habitat ratio.

The Shasta-Trinity Forest Plan (1995) has similar management direction, such as meeting the Forest's share of State deer herd plan habitat objectives, cooperation with state and local agencies, and taking advantage of opportunities to increase game species populations (including deer). For the recreation, lands, and range programs, the following standards and guidelines are also established (KNF 1994, pg 4-37 and 39) that pertain to hunting and deer habitat, respectively:

12-10 Discourage camping within 300 feet of critical wildlife and stock watering areas. During high recreational use periods, such as hunting season, camping facilities should be located away from water sources to allow wildlife and stock free access to the water.

17-3 Land adjustments typically fall into one of the following groups. Apply the following land ownership adjustment direction to each of the described situations: . . . 2) Special Management Areas - Lands recognized by the Forest as necessary to meet specific Forest resource objectives, such as RNAs, cultural management areas, SIAs, National Scenic Trails, TE&S species habitat, proposed WSRs, RRs, deer habitat, Retention visual quality areas and Partial Retention visual quality areas. Federal ownership of these lands should be retained and efforts to acquire private lands made as the opportunity and/or need occurs.

23-21 Balance the development of forage areas with the need to provide the appropriate forage/cover ratios for populations of deer, elk and other rangeland-dependent species.

The Forest Plans also include geographically defined Management Areas that further focus management activities. In the Klamath Forest Plan, Management Area 14 delineates winter range (for deer, elk and antelope) on the eastern portion of the Forest. Management Areas also include supplemental standards and guidelines.

And finally, the Forest Plan contains monitoring requirements. All of the standards and guidelines (including those mentioned above) are monitored as the Forest Plan is implemented through projects. Also connected to deer habitat management is the requirement to monitor changes in ecosystem diversity by tracking changes in seral/vegetation types by 1% or greater, and reporting these changes on a 5-year periodic basis (KNF 1994, pg 5-12).

3.5) Historic Vegetation Reference:

Studies and analysis of vegetation inventories are showing that there have been notable changes in vegetation composition and structure in the Klamath Mountains of western Siskiyou County (Creasy, 2008). The most significant event to vegetation change was the cessation of Native American burning (frequent low intensity fires) caused by European impact of the 1850's (gold rush) and after (localized town development and homesteading). Even though the Klamath National Forest was established in 1906,

active timber harvesting and significant fire suppression didn't begin until after World War II. Historic vegetative patterns were also influenced by timber harvest, grazing of livestock, and fire suppression. These activities began in the early 1900's resulting in an increase of mosaic vegetative patterns with small openings. These mosaic small openings were also not maintained with the significant onset of post-World War II fire suppression.

One method to determine the degree of vegetation change was the comparison of the 1930's Wieslander Vegetation Type Maps with current 2004 CALVEG data on the Klamath National Forest. The results of this study, (Creasy, 2008), includes:

- Significant increase in conifer-dominated acreage. The mixed conifer forest includes Douglas-fir, ponderosa pine, white fir, and incense-cedar.
- Significant decrease in hardwood forest acreage. Included in the hardwood cover type are canyon live oak, California black oak, Oregon white oak, madrone and tanoak.
- The historic ridge top location of hardwood stands probably had a dampening effect on wildfires at a landscape scale.

The above discussion is specific to just a couple of areas within Siskiyou County. Further research and compilation of vegetation changes may be useful to other vegetation communities, including bitter brush, quaking aspen, western juniper, perennial grasslands, and riparian areas.

In eastern Siskiyou County, which is in the southern Cascade geologic province, there have also been pronounced changes in vegetation over the past century. The notable changes include:

- Significant decrease in the quality and abundance bitter brush and shrub communities.
- A significant increase in western juniper into grasslands and shrub lands.
- A decline or loss of quaking aspen clones due to grazing practices and conifer encroachment.
- An increase in dense stands of young conifers due to early 1900 era railroad logging.
- A loss of historic vegetation patterns resulting from logging and grazing practices and fire suppression. The historic pattern included small to large openings, clumps of dense trees and more open stand conditions. Conifer and juniper encroachment have resulted in a loss of forage.

3.6) Methods to Increase Valuable Habitat in Siskiyou County

Since deer are considered an early successional species, disturbances that create younger habitats are typically beneficial to deer populations.

Fire (including both unplanned and prescribed) is the single largest disturbance on the landscape that creates and maintains early-seral vegetation. It also maintains special

habitats such as oak woodlands. See sections 3.2 and 3.5 for a discussion on fire history.

Another form of disturbance that pushes habitats toward early seral conditions is timber management. This is especially true of regeneration harvests when a significant (if not all) portion of the forest cover is removed and the site regenerated through planting or natural means. The site then typically responds with a flush of hardwood, brush, grasses and forbs – which dominate the site for 10 to 20 years until the trees are able to re-established and dominate the site. Partial harvest methodologies, including commercial thinning and removal of sub-merchantable trees, also help open up the understory vegetation to more light and moisture, typically producing additional forage. Other forms of management activities that can set-back succession and rejuvenate wildland vegetation include site preparation for reforestation, non-commercial timber stand improvements, and wildlife habitat manipulation. These other forms specifically include, but are not limited to:

- Mechanical mastication
- Animal mastication
- Thinning
- Brush cutting
- Brush piling
- Broadcast burning
- Pile burning
- Seeding

The ponderosa pine/bitterbrush vegetation type is a dominant plant association in eastern Siskiyou County that provides a good example of valuable habitat in need of management. This vegetation provides valuable deer forage. In general, bitterbrush occurrence is abundant in open ponderosa pine stands, but declines under closed canopies. Mature to decadent (older, less vigorous) bitterbrush occurs throughout much of the County. The majority of bitterbrush is mature to decadent due to lack of disturbance (i.e., fire, planting, mowing). Although bitterbrush is considered a long-lived shrub species, this perennial shrub has a life span of 90 to 162 years. Much of the bitterbrush in the County is already 80 to 90 years of age. Lack of disturbance would lead to the loss of bitterbrush due to plant senescence. Yet lack of management puts it at risk of severe wildfire which would likely result in widespread plant mortality. The challenge to management agencies is to rejuvenate sufficiently significantly large areas at the landscape scale with tools such as prescribed fire and mowing. The Round Valley project (Forest Service, 2009) assumed that bitterbrush would be lost to prescribed fire, so it calls for a mosaic burn pattern leaving 60% of the shrubs in a mid mature to mature age class. The prescribed fire could potentially mimic mowing by not consuming the entire plant, with some bitterbrush surviving due to a lower intensity burn. However, prescribed fire is such an imprecise tool in the management of bitterbrush that managers need to have pre and post monitoring plans for understanding the effects of prescribed fire, and reseeding contingencies in place to replace this valuable forage for deer and other shrub obligate wildlife species. Occasionally, there may be a short-term loss (10 to 30 years) of bitterbrush in burned areas, but these burned areas would also provide a seedbed for germination of seed especially where

there is higher fuels consumption by the fire (Diver, 1983). Mowing has proven to create increased forage due to twig and leaf regeneration, while research has shown this browse only lasts for a short period of time before declining (Kituku, 1993). Also, mowing does not change the age class off the shrubs.
For example, the Klamath Forest Plan set an output objective to treat 900 acres of big game habitat annually (KNF 1994, pg 4-13).

Road management and management of off-highway vehicles can have positive influences on the value of deer habitat conditions. Permanent and seasonal road closures can reduce overall and/or open road densities. Development of comprehensive travel management plans can help reduce the disturbance by OHV use to deer in key habitat areas (i.e., winter range, wet meadows, etc).

3.7) Update and Review Current Habitat Modeling Methods:

During Forest Service project level planning, habitat models are used to design and adjust proposed actions for the species of interest, including deer. Habitat models are also used to predict the effects of a given action and, if necessary, design mitigation measures to reduce any unwanted affects. For the Klamath National Forest, habitat model criteria are specified in an appendix to the Environmental Impact Statement to the Forest Plan. Since any model is at best an imprecise predictor limited by the data used and the model itself, it is very important that wildlife biologists also apply their professional knowledge in the use and interpretation of model results to project design. Sometimes other models, such as those created for managing elk habitats also provide useful results that can be used in the analysis of deer habitats.

3.8) Identify Current and Potential Funding Sources for Habitat Improvements and Data Collection:

For the Forest Service funding for project work can be placed into one of the following categories:

- Appropriated funds – these monies are allocated via congressional action and are usually available on an annual basis. One of the budget line items for the Forest Service is funds for fish and wildlife work (NFWF).
- Trust funds – these are monies collected from project contract receipts and then made available for post-project work. KV or Knudsen-Vandenberg funds are an example of trust funds that can be collected and used for wildlife habitat work.
- Reimbursable funds – these monies or resources are made available through agreements with partner organizations or agencies. These resources are typically available during the specified life of a grant or agreement.

Partners interested in wildlife habitat management have been able to bring funding to the Forest Service for on-the-ground projects. These additional funds are either "stand alone" in that they fully fund the work, or these are cost-share contributions that help the Forest Service leverage appropriated funds and make them go much farther. Organizations that have supported habitat work in Siskiyou County that directly or indirectly benefit deer include:

- California Deer Association
- Rocky Mt. Elk Foundation
- Mule Deer Foundation
- National Fish and Wildlife Foundation
- National Wild Turkey Federation
- Safari Club International
- County Fish and Game Commissions
- Quail Unlimited

3.9) Conclusions:

Management of national forest lands are guided by Forest Plans. The Northwest Forest Plan created a new focus on the management of late successional habitats, although management of early successional habitats is not excluded. The Forest Plans also include direction to manage deer habitat. The Healthy Forest Initiative facilitates the need for aggressive fuel treatments; which can rejuvenate browse or create earlier successional habitats. As an example, in 2008 the Klamath NF was able to implement 3,650 acres of timber stand improvement, 5,320 acres of wildlife habitat restoration/improvement, 330 acres of noxious weed treatment, 12,000 acres of fuels reduction, and 3,302 acres of commercial thinning.

Ecological studies are showing that our ecosystems are dynamic and have experienced profound changes in certain habitats due to fire suppression and other activities including timber harvest and livestock grazing. Many of the vegetative components being lost are also important deer habitat components. These habitat components can be created or maintained through management methods conducted by resource professionals, but there is a challenge to implement these methods on a sufficiently large enough scale. The trend of increasingly larger wildfires is having a positive impact on the creation of forage for deer, especially when the fire burns with differing intensities creating a mosaic pattern of vegetation. Fire is also being reintroduced to ecosystems by application of prescribed fire and "Fire Use for Resource Benefits," a tool for managing natural ignitions.

Land management agencies have realized that assistance from non-governmental partners can play a vital role in the funding and implementation of habitat enhancement projects. However, non-governmental organizations should not be relied upon if the goal is to restore deer habitat at the landscape scale that will affect deer at the population level.

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4). MORTALITY CONTROL

4.1) Introduction:

As with any population, fecundity, or birth rates, and mortality rates determine the size and age structure of a deer herd. Mortality is usually the easier of these two processes to measure and as such receives a significant amount of attention.

Several natural and unnatural processes contribute to the overall mortality of deer in Siskiyou County. Natural mortality sources include predation, disease, and starvation. Sources of unnatural mortality include hunting, road kill, and other human caused mortality. Often, even natural mortality may be brought about by unnatural causes. For instance, starvation may be increased during winter where critical winter range has been converted or subdivided by humans.

This section introduces the major causes of non-hunting mortality of deer in Siskiyou County.

4.2) Predation:

Predation is a natural ecosystem process that has evolved over thousands of years. The effects of predation on deer in Siskiyou County are not fully understood. This is mainly due to the lack of area specific data which prevents a full assessment of the impact predation plays on the overall herd. While it is generally thought that predators do not limit healthy ungulate populations, there is some research that indicates predation can prevent population recovery of ungulates if their numbers are suppressed for other reasons such as poor habitat conditions. Other studies have shown that poor, or unnatural, habitat conditions can lead to significant increases in predation rates.

Mountain lions, or cougars, are probably the best known predator of deer in Siskiyou County. There is a strong public perception that much of the problem with the deer herds in the county are because of cougar predation. At least some of this perception is almost certainly a ramification of rules and legislation that have prevented active management of cougars over the past several decades. Unfortunately there is no data available to draw inferences from on the impacts that cougars have on deer in Siskiyou County.

Other predators including bears, coyotes, bobcats and domestic dogs all play additional roles in the predator-prey relationship with black tailed deer. As black bear numbers have nearly tripled over the past two decades we can be reasonably certain that bear predation has also become more common. Unlike cougars, bears do not rely on deer as their primary food source and so, unlike cougars, bear numbers can continue to rise even as the deer population falls. Bears will generally take deer on an opportunistic basis, however there may be times and places, such as during fawning season, where bears target deer. Coyotes and bobcats, while occasionally able to take adult deer, prey almost exclusively on fawns, young deer, and otherwise weakened deer. Again, no data is available to quantify the impact of these predators on the local deer herds.

Several factors may have a cumulative and or additive effect on predation. Low buck to doe ratios may prevent all does from being bred at the same general time resulting in two or three pulses in fawning rather than one pulse. When all fawns are born at roughly the same time the predators are swamped and can only take a small percentage before the fawns are old and able to escape predators more easily.

Poor habitat conditions can also contribute to a longer fawning season. Poor habitat also causes deer to concentrate in the areas of the best habitat allowing predators to focus their efforts in these small concentrated areas greatly increasing their efficiency and impact to the overall herd.

A major obstacle in assessing the impact of predation (and any mortality factor) on Siskiyou County's deer herd is a significant lack of data. There simply is no data on the number of deer taken by predators, we do not know which predators have the most significant impact on deer, we do not know when predation is occurring, and we do not know where predation is being concentrated if it is. Without this type of data there is little that we can suggest to help alleviate a predation problem, if it in fact exists. Assuming that predation is occurring and may be a problem in Siskiyou County there may be ways to help alleviate the problem. We realize that predator control is probably not a viable option in this state but there are other ways to address a predation problem including improving escape habitat and to increase the distribution and abundance of high quality habitats to lower the deer density and thus reduce the efficiency of predators.

Impacts to deer from predation have not been assessed in Siskiyou County, but have been extensively studied in many other parts of California. In the eastern Sierras where 28 male deer and 141 females were monitored with telemetry for 39 months, mortality occurred in 38% (n = 51) of females and 48% (n = 13) of males (Bleich and Taylor 1998). Among male mortality in this study, hunters accounted for >60% (n = 8) of all deaths, with 34% (n = 4) attributed to mountain lions. Of the 34 females killed by predators nearly 90% were attributed to mountain lions. Of all mortality in this study, nearly 10% was caused by malnutrition. The authors suggested that in the unpredictable western Great Basin environment, that the potential for understanding if mountain lions were limiting deer populations required long term investigations.

In the San Bernardino Mountains of southern California, 34 mule deer and 24 mountain sheep were monitored with telemetry for 40 months. Mortality occurred in 50% (n = 17) of all deer and 46% (n = 11) of sheep, with mean annual survival estimated at >80% for deer. For mortalities in which a cause of death could be determined, mountain lions accounted for 55% (N = 5) of deer deaths, and 75% (n = 9) for sheep (Schaefer et al. 2000). The authors from this study recommended that when mountain lions threaten the persistence of mountain sheep, that the removal of mountain lions may be needed to maintain viable predator-prey systems.

In the central Sierras, Neal et al. (1987) placed telemetry collars on 90 mule deer fawns where 48% (n = 43) were killed by predators with mountain lions responsible for 46% (n = 20) of these deaths. Of 23 additional adult females collared in this study, mountain lions accounted for 21% (n = 5) of deaths. These authors suggested that although

predation was likely not responsible for the decline in deer, they may have been a contributing factor preventing population recovery.

Investigating the diet of predators is another method for assessing deer-predator relationships. In a study of selection of mule deer by mountain lions and coyotes on the east side of the Sierras, mule deer accounted for 73% of mountain lion diets, and 17% of coyote diets, with desert cottontails and black-tailed jackrabbits the primary species of small animals in the diet of mountain lions and coyotes (Pierce et al. 2000). In this study coyotes did not select for young deer, and female mountain lions with kittens were selective for young deer in late summer. On the west side of the Sierras in Fresno County, coyote diets were sampled on deer winter range in winter, on fawning grounds in spring, and during fall on deer transition range; where diet shifted from predominantly small mammals in spring to fruit in the fall, with deer representing a minor component of diet (Smith 1990). Contrary to these results, Salwasser (1974) found that fawn remains occurring in coyote scats were high (40-70%) during the fawning period for the same area, possibly due to higher densities of deer in the 1970's.

In Oregon's 2006 Cougar Management Plan, mountain lion densities are estimated in some areas to range from 7 to 13.9 cougars per 100 mi^2, with predation from mountain lions believed to be a major source of mortality in deer, and a contributing factor in regulating elk and mountain sheep populations (ODFG 2006). This plan also cites several studies in which it was estimated that cougars may kill an ungulate every 7-8 days depending on the season, gender, and reproductive status of female cougars (Connolly 1949 [in Anderson and Lindzey 2003], Hornocker 1970, Harrison 1990, Beier et al. 1995, Nowak 1999).

Knowledge that quantifies the predation of deer and densities of mountain lion populations is important for understanding the risk of predation to prey species, but a failure to recognize the effects of habitat carrying capacity makes it impossible to know if a bottom-up (predator-prey system driven by the quality of habitats) or top-down (prey numbers controlled by predation) process is at work. Whether predators are limiting deer populations cannot be determined without knowledge of nutritional carrying capacity. When a mountain lion predates a deer existing at or above habitat carrying capacity, its death is considered compensatory, meaning this animal would likely have died without predation due to the effects of over-population that are often difficult to see such as poor physical condition, starvation, disease, or the vulnerabilities to winter in undernourished populations. Simply documenting that predators are killing large numbers of prey is insufficient to infer that prey populations are being limited, and may lead to unnecessary control of predators (Bowyer et al. 2005).

In one of the most intensive long-term investigations of deer-predator ecology, researchers on the Round Valley winter range near Bishop California found that a lag time in reductions of mountain lions may have delayed the recovery of deer populations suffering from drought induced decreases in habitat quality. Ultimately, as patterns in rainfall and habitat carrying capacity improved, the physical condition and population levels of deer increased, and mountain lion densities declined (Figure 1) (Bowyer et al. 2005). Ballard et al. (2001) conducted an exhaustive review of deer-predator literature, and concluded that the results were confounded by a number of factors and that

relationships to forage carrying capacity was crucial to understanding the impacts of predation. Deer populations at or near carrying capacity did not respond to predator removal experiments. When deer populations appeared limited by predation and such populations were well below forage carrying capacity, deer mortality was significantly reduced when predator populations were reduced. Only 1 case, however, demonstrated that deer population increases resulted in larger harvests, although there were considerable data that indicated that wolf control resulted in larger harvests of moose and caribou. In Siskiyou County, it is likely that male-only harvest has allowed females to reach densities where the carrying capacity has been exceeded, and the recruitment of fawns is suppressed. Without knowledge of physical condition, reproductive performance, and relationships to nutritional carrying capacity, the impacts from predation on deer populations cannot be clarified.

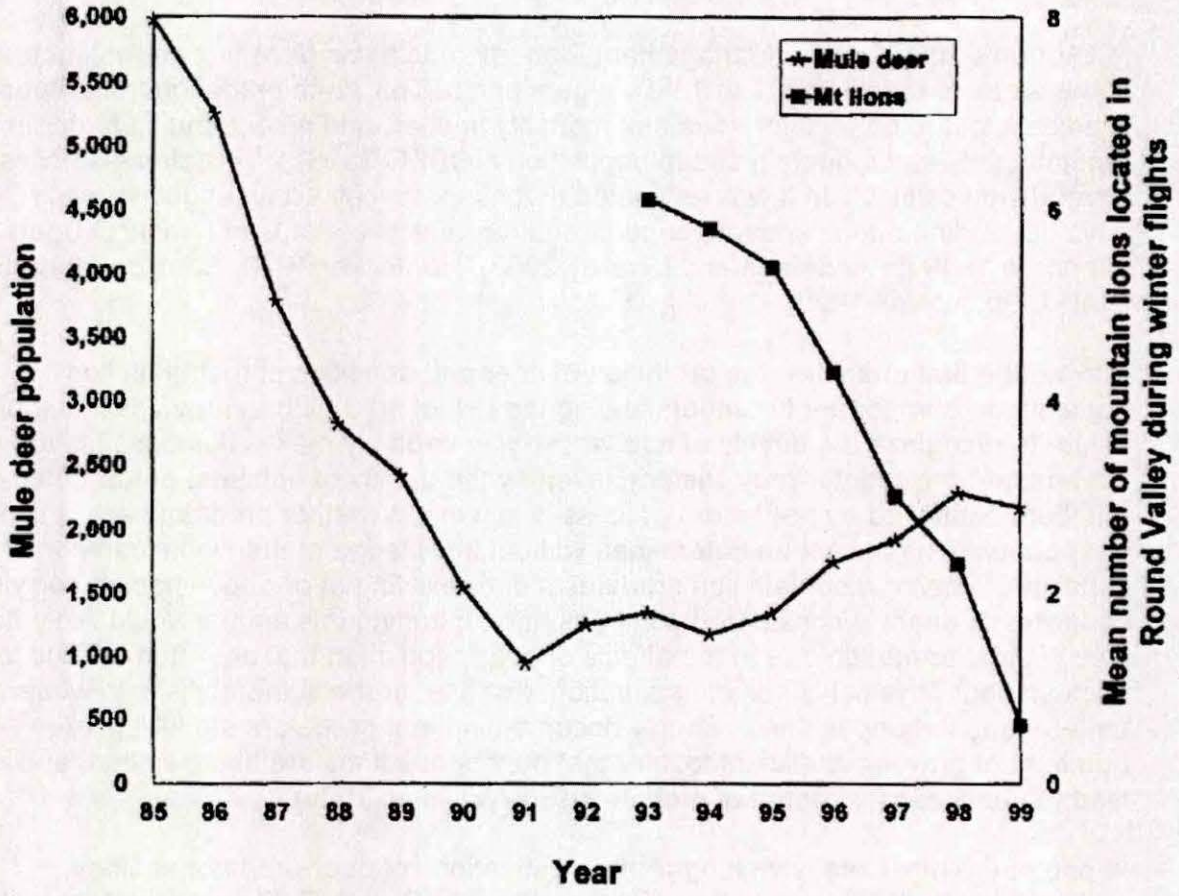

Figure 1. Mountain lion and mule deer population trends on the Round Valley deer winter range near Bishop, California (Ballard 2001b).

4.3) Predator-Prey Relationships:

The effects of predation on deer have been described since the early 1900's. On today's modern landscape predator-prey dynamics can be complicated to assess as human related impacts make these relationships difficult to quantify and interpret. Although there are predator removal studies that show relief to prey populations, there are also studies that show little influence by predators in regulating their prey. In more recent times, researchers have used computer modeling and other sophisticated analysis techniques to assess when deer populations are responding to the carrying capacity of their environment, or when mortality from predation is regulating deer populations below the capability of their habitats. A basic finding when reviewing the culmination of predator-prey research is that a deer herd's relation to habitat carrying capacity, weather, human-use patterns, number and types of predator and prey species, and habitat alterations all affect deer-predator relationships. A significant limitation in this body of work is the lack of long term investigations. Only by quantifying changes in predator-prey equilibriums over many years can causal relationships between predation impacts, deer population levels, and environmental trends be fully understood.

The co-evolution of predators and prey has been one of mutuality. A deer population free from predation would quickly surpass its carrying capacity, resulting in population crashes, significant habitat alterations, and low population densities. As deer provide an important food source for predators to survive, it is predators that protect deer from overexploitation and habitat destruction. Although predation may be a significant source of mortality for deer populations in Siskiyou County, without precise knowledge on mechanisms effecting population regulation, managers cannot differentiate between populations limited by habitats, human related impacts, or rates of predation.

4.4) Predators and Society:

Removing predators in an era of predator conservation is a complicated matter. Declining trends in the tradition of hunting finds <00.01% of Californians pursuing deer hunting as a sport. Even with detailed knowledge of predator-prey relationships, killing predators with the intent to increase the harvest of deer would surely bring public scrutiny, and lead to increased examination of hunting as a viable management option. The influence of public opinion on wildlife management has been realized before as when legislation to specially protect mountain lions, a species whose populations are not threatened or endangered in California, was largely based on public sentiment, rather than science based knowledge of population dynamics.

In a pluralistic society, there are conflicting demands placed upon the profession of wildlife management. Preservationists want populations to be un-hunted, while hunters believe populations can be harvested for recreational sport. In order to find common ground in the management of the States' wildlife resources, management philosophies that promote a common interest may bring unity to difficult issues. For example, a common objective shared by both sides of this paradigm is that all populations should be managed to be healthy, vigorous, and live within the carrying capacity of their environment. Therefore, it would seem that improving the management of deer

populations would be an important link to the conservation of mountain lions, where loss of landscape connectivity has threatened the genetic health of these large predators. By increasing productivity in deer populations, logic would indicate that the benefits to mountain lions may enhance opportunities for their dispersal, lessening impacts to gene flow in a fragmented environment. By attempting to find commonality in these difficult resource issues, society may begin to accept the need to manage predator and prey populations for their mutual benefits.

4.5) Diseases:

Diseases such as Deer Hair-loss Syndrome and Adenovirus Hemorrhagic Disease (AHD) are other forms of mortality affecting deer in Siskiyou County. Deer Hair-loss Syndrome has been identified as a source of mortality for deer in Northern California and Oregon. However, little is known about the prevalence of this disease in this area. AHD was first identified in California in 1994, but, its occurrence is poorly understood in Siskiyou County. Both of these diseases seem to affect fawns more so that adults potentially making accurate assessments of impacts difficult. Up to this date, there have been no confirmed cases of Chronic Wasting Disease in California or any neighboring states. Regulations are in place to prevent the introduction of this disease into the state.

4.6) Other Causes of Deer Mortality:

Several other factors have been identified as potentially having a significant impact on deer mortality in Siskiyou County. These include both legal and illegal take, road kill, disease, and agricultural practices. Legal and illegal take are addressed elsewhere in this document. Road kill is most likely a significant mortality factor at certain times of the year, in certain places. As the human population in the west and in Siskiyou County continues to grow mortality from road kill will probably be a more significant problem. Increased numbers of vehicles and higher speed limits pose a significant threat to deer, especially in the winter range.
In some areas such as the Scott Valley agricultural practices may increase fawn mortality. Alfalfa is a preferred source of food for deer in spring and summer and many does will fawn in close proximity to alfalfa operations. Newborn fawns are often left in uncut fields while the does are foraging nearby. In some cases these fawns are killed by haying equipment during the harvesting processes.

4.7) Highway Mortality Data:

Highway Mortality for deer has long been a topic of discussion in Siskiyou County. Until recently there wasn't comprehensive data that established trends or even estimated actual number of deer killed. In early 2002, the DFG in cooperation with Cal-Trans, California Highway Patrol (CHP) and members from other allied agencies, established a Northern California Road Mortality Team to study the effects of the deer mortality on the highway systems in Northern California, to include Siskiyou County. The main focuses of the team was to research the numbers of animal killed on a yearly basis, the major locations for the deer kills and what steps would be necessary to reduce these mortality rates.

To accomplish this, the team established a study period of approximately 18 months. Within this study period all observed individual deer kills on the highway systems in Northern California were forwarded to the local CHP Dispatch Center. The study area included the counties of; Modoc, Lassen, Shasta, Tehama, Siskiyou, Trinity, Del Norte and Humboldt. Within the study area was five local CHP Dispatch Centers. All five dispatch centers would gather information on road mortality and forwarded their findings to the Yreka CHP dispatch Center, who in turn consolidated the information into one report for the Mortality Team's review.

In order to facilitate the gathering of information on this broad of a scale cooperation was sought from both the private and public sector. Local and State enforcement agencies and road maintenance crews were asked to contact their local CHP Dispatch Center each and every time they encountered a dead animal on any state, county or city road in the study area. Soon the study became public knowledge and members of the public were also calling in with their reports. The Yreka CHP Dispatch Center would gather all reports and cross checked them for accuracy to insure that no animal was counted twice. The results of the study are listed in the below table.

The number of deer killed on Siskiyou county roadways reflect actual numbers that were reported to the CHP Dispatch Centers. Industry standards, (USFS personal communication), for road mortality is a 3-1 ratio, meaning for every one deer observed killed on the road two deer were hit and were able to migrate off the road to die in the outlying areas.

Highway System	**Number of Deer Killed**	**Projected 3 to1 Ratio Deer Killed**
I-5 Weed Airport to Shasta County Line	89	267
I-5 Easy Street to Weed Airport	35	105
I-5 Yreka to Hornbrook	109	327
I-5 Hornbrook to State Line	33	99
Hwy 3 Forest Mountain to Fort Jones	68	204
Hwy 3 Fort Jones to County Line	34	102
Copco Area	4	12
Dorris Area	3	9
Hwy 96 Yreka to County Line	28	84
Hwy 97 Weed to County Line (Excluding Dorris)	38	114
Hwy 89 to Hwy 299	19	57
Hwy 139 (All)	7	21
Hwy 263 Yreka to Hwy 96	5	15
TOTAL NUMBER OF DEER KILLED	**472**	**1416**

Table1. Road Mortality Data by Major Highway Systems, (2002-2004).

Several miles of fence barrier was erected in the Easy Street area of I-5 as a result of this study and the efforts of the Road Mortality Team. Additionally, projects were in the planning process for the Anderson Grade/ Yreka area of I-5 and Hwy 3 in Scott Valley. Unfortunately, due to budget cut resulting in position elimination and funding restrictions, within all agencies, the Mortality Team was disbanded on 2004 and no further planning or progress was conducted.

4.8) Conclusion

One of the more difficult aspects of deer management is to control the rates and types of mortality that impacts deer herds. Many different types of mortality, such as predation and diseases, are part of the natural occurring ecosystem process and their effects on the deer population are extremely difficult to gauge mainly due to the lack of valid data. Other types of deer mortality, such as legal and illegal hunting, road mortality and depredation, are usually caused by man's interactions with animals and are much easier to gauge and therefore much easier to control.

Regardless, mortality is a vital factor in describing the current and potential health of the deer population and should be considered when determining regulations that address the "take" of deer.

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5). LAW ENFORCEMENT

5.1) Updated Data on Illegal Activities:

The following information is based upon verified numbers of animals that were illegally taken during the last 3 year period (2007, 2006, and 2005) in Siskiyou County. This data only reflects the actual number of animals that were illegally taken, not the number violations related to legally taken deer. There were 24 total of verified illegally taken deer during this period.

For the basis of this report illegally taken animals are those that are; 1). taken without valid licenses or tags, 2). taken after or before legal hunting hours or 3). taken outside of the authorized season.

Deer Taken	Location	Year
1	Iron Gate/Copco	2007
3	Scott Valley	2007
1	Harris Springs	2007
2	Mt.Shasta	2007
2	Yreka	2007
2	Seiad Valley	2007
1	Salmon River	2007

Deer Taken	Location	Year
1	Scott Valley	2006
1	Iron Gate/Copco	2006
1	Happy Camp/Hwy 96	2006
1	Yreka	2006
3	Sawyers Bar	2006
1	Ball Mountain	2006
1	Oak Bottom	2006

Deer Taken	Location	Year
1	Happy Camp/Hwy 96	2005
1	Grenada	2005
1	Salmon River	2005
1	McCloud	2005
1	Scott Valley	2005

Table 1. Illegal deer kill data by location and year.

5.2) Updated Data on Illegal Deer Activities by Location (2005-2007):

Deer Taken	Location
5	Scott Valley
3	Yreka
2	Iron Gate/ Copco
2	Seiad Valley
2	Mt. Shasta
2	Salmon River
2	Happy Camp
1	Sawyers Bar
1	Harris Springs
1	Ball Mountain
1	Oak Bottom
1	Grenada
1	McCloud

Table 2. Illegal deer kill data by number and location.

5.3) Projected Losses Bases on 1 to 40 Study:

If applying the industry standard formula of 1 to 40, (CDFG Klamath Deer Herd Management Plan, 1989, meaning for every one deer discovered to be illegally taken there are 40 deer that were illegally taken and not discovered), the number of illegally taken deer in Siskiyou County over the three years period would be 960, or an average of 320 illegally taken deer per year.

These figures vary greatly from the actual and estimated illegally taken losses reported in the 1989 DF&G plan. In the 1989 report it was reported that during the 3 year period of 1981, 1982 and 1983, there was an actual total of 98 illegally taken deer. When using the 1 to 40 ratio formula, 3920 deer would be estimated to have been illegally taken during those three years or approximately 1300 per year.

There are many factors that could contribute to the difference in the numbers of actually taken deer between the two reference periods. Listed below are a few possibilities that may have caused this variation.

- Differences in what is considered to be illegally taken deer, from one author's report to the other.
- A decrease in available deer population.
- A decrease in Law Enforcement staffing at the local and State levels
- An increase in the availability in off-road/ 4-wheel drive vehicles, increasing the ability of the violators to evade Law Enforcement.
- An increase and improvement in the rural road system throughout Siskiyou County, increasing the ability of the violators to evade Law Enforcement.
- An increase in the level of advanced equipment that is available on the open market, i.e. night vision equipment, weapon flash suppressers, etc.
- Decrease in subsistence hunting vs. sport hunting.

5.4) Review of Past and Current Law Enforcement Staffing levels:

The staffing level for the Department of Fish and Game's Enforcement staff has varied greatly over the past 20 years. From the high of approximately 450+ sworn officer positions in the late 1980's to its current levels of approximately 370 sworn officers positions of which only 296 positions are currently filled.

In Siskiyou County the staffing levels have fluxuated only slightly over the past 20 years. During the mid to late 1980's, the DF&G Enforcement staff consisted of 1 Captain, 2 Lieutenants and 8 Field Wardens. Today, that level remains slightly less with 1 Captain, 2 Lieutenants and 7 Field Wardens. However, several positions were lost due to budget cuts, and only recently reinstated and moved to different locations in Siskiyou County. The decision to move the positions were based on several factors. The primary factor was the lack of volunteers to fill these remote positions, such as Happy Camp.

The major factor in addressing staffing levels for Warden's positions is not the actual number positions available, but the actual number of positions that are filled. Currently, only five of the seven positions allotted in Siskiyou County are filled. Of those five filled positions three of the Wardens have been in position for less than three years. Additionally, positions in remote areas such as Happy Camp have been difficult to fill and maintain over the past five years. This causes the neighboring Wardens to have to provide coverage out of their assigned sector. This also limits their ability to concentrate their efforts in any one specific area unless it is identified as a high violation area. This reduces the effectiveness of the patrol effort throughout the County.

The relationship between the number of wardens in the field and the number of illegally taken deer cases made is very evident during this study period. During the study year 2007 there were twelve cases made for the illegal take of deer, during that same period there were 1 Captain, 2 Lieutenants, and 6 Wardens working in Siskiyou County. During the study year 2006 there were seven cases for the illegal take of deer, during that same period there were 1 Captain, 1 Lieutenant, and 5 Wardens working in Siskiyou County. During the study year 2005 there were five cases for the illegal take of deer, during that same period there were 1 Captain, 1 Lieutenant, and 4-5 wardens working in Siskiyou County. This information supports the recognized fact that the fewer wardens that are working in an area, the fewer cases for illegally taken deer will be made.

5.5) Review of Legally vs. Illegally Taken Deer:

Table 3 listed below reflects the number of legally taken deer in Siskiyou County, regardless of zones during the study years, 2007, 2006 and 2005, (2004 is used as reference only). The table also reflects the numbers per antlered class and the percentage per antlered class.

	MISC BUCKS	2 POINT BUCKS		3 POINT BUCKS		4 POINT BUCKS		> 4 POINT BUCKS		
YEAR BUCKS KILLED	BUCKS KILLED	BUCKS KILLED	% OF BUCKS KILLED	BUCKS KILLED	% OF BUCKS KILLED	BUCKS KILLED	% OF BUCKS KILLED	BUCKS KILLED	% OF BUCKS KILLED	TOTAL BUCKS KILLED
2007	12	648	45.0%	461	32.0%	288	20.0%	32	2.2%	1,441
2006	2	616	48.3%	411	32.2%	203	15.9%	43	3.4%	1,275
2005	12	531	39.3%	466	35.0%	292	21.9%	30	2.3%	1,331
2004	*11*	*578*	*42.9%*	*452*	*33.5%*	*267*	*19.8%*	*40*	*3.0%*	*1,348*

Table 3. Siskiyou County legal deer kill data during reference period 2005-2007, (2004 Record kill data used as reference only).

Using the projected illegal kill data listed in above section. Table 4 listed below reflects the increased the number of deer taken in Siskiyou County and the ratio percentage of legally to illegally taken deer in the County.

YEAR	LEGALLY TAKEN DEER	ILLEGALLY TAKEN DEER (PROJECTED)	% LEGAL VS. ILLEGAL	% INDIVIDUAL VERIFIED CASES MADE FOR ILLEGAL KILLS	PROJECTED TOTAL DEER TAKEN BY HUNTING (PROJECTED)
2007	1,441	480 (12 X 40)	24.9%	.025% (12/480)	1921
2006	1,275	280 (7 X 40)	18.0%	.025% (7/280)	1555
2005	1,331	200 (5 X 40)	13.1%	.025% (5/200)	1531

Table 4. Siskiyou County illegal deer kill data during the reference period 2005-07.

Base upon current data for the study period, 13.1% to 24.9% of all deer taken by hunters were taken illegally. A further breakdown reveals that on average only .025% of all individuals who illegally took deer in Siskiyou are caught and prosecuted.

5.6) Steps to Reduce the Illegal Take of Deer:

Although the illegal take of deer will never be completely eliminated, there are steps that could help ensure a reduction of theses numbers:

- Increase in Warden positions in Siskiyou County (by a minimum of 3-4 positions).
- Increase in Public Awareness and Educations to the problems that result from the illegal take of deer and other species.
- School programs to help educate Siskiyou County youths of the problems caused by the illegal take of deer.
- An increase in fines for individuals caught or attempting to illegally take deer in Siskiyou County.
- Mandatory jail terms for individuals convicted of illegally taken deer.

- Forfeiture, by the Courts, of all equipment used in the act of illegally taken deer. (To include weapons, ammunition, vehicles, ATV's, vessels, etc.).
- Development of a local County operated CalTip type program, specifically for Siskiyou County.
- Restrictions placed on the type of equipment that is authorized in the legal hunting of deer.

5.7) Conclusion:

Law Enforcement activities remain the main deterrent against the illegal take of deer throughout Siskiyou County. As seen in the above listed data, 13.1% to 24.9% of all deer taken in Siskiyou County are taken illegally on a yearly basis, of which only .025% of the violators were caught and prosecuted. In order to help reestablish a healthy deer herd and population numbers in Siskiyou County these trends must be reversed. The number of illegally taken deer must be reduced and the number of violators caught must be increased. Law Enforcement alone cannot solve the problem. If the deer populations in Siskiyou County are to be restored and maintained at acceptable levels it will take a concerted effort by all parties involved.

6). RESOURCE CONFLICTS AND PRIORITIES

6.1) Conflicts:

Several conflicts exist between healthy deer herds and other land uses. Arguably the single greatest threat to Siskiyou County's deer herds is the loss of high quality habitat. Several areas of the county are experiencing significant amounts of development which may be having a negative impact on deer. Increasing development in the foothills of the Scott and Shasta Valleys has a direct impact on high quality wintering habitat.

A lack of timber harvest on National Forest lands may also be having a negative affect on deer. Since the listing of the Northern Spotted Owl under the federal Endangered Species act, timber harvest on the Klamath and Shasta-Trinity National Forests have declined 80 and 60%, respectively, compared to the period immediately preceding the NSO listing. Most of this decline occurred on the western portions of these Forests, while active vegetation management (thinning, fuels reduction, timber harvest, etc) has continued on the eastern portions of these Forests in the southern Cascades geographic province. Severe population declines on the eastern forest have largely been attributed to the deterioration of winter range shrub communities and increasing trends in canopy closure on summer habitats. The federal land management agencies have, essentially, been mandated to favor the development and management of late successional forests at the detriment of early successional species such as deer. However, wildfires may have the opposite effect and provide large areas of early successional habitat favored by deer, (refer to Section 3).

Private timberlands are frequently being managed using even-aged silvicultural methods which provide large acreages of young forests. However, other vegetative treatments such as herbicide applications can significantly reduce the amount of young forbes and brush found in these young forests. The conflict arises because without some sort of vegetation control, the re-establishment of young forests is very unreliable and may takes decades to accomplish While this may be good for deer it is in violation of the California Forest Practice Rules which require regeneration of young stands. It is also not economically viable for companies whose goal is to produce high volumes of high quality timber. The use of herbicides is the most effective and efficient way to ensure seedling survival.

Non-traditional crops may also pose a problem for deer. Grains and hay have traditionally been the primary agricultural products produced in Siskiyou County. Recently, however, there has been a shift away from these high quality deer forages to crops such as strawberries and lavender. The impact of this is not known.

6.2) Priorities:

Despite monitoring requirements within the PLM program there is little evidence that the program is actually helping deer populations. However, this probably isn't a large concern in Siskiyou County given since there is only one landowner currently enrolled in the program.

California's Private Land Management Program (PLM):
Loss of habitat is the single most important challenge facing wildlife populations and wildlife managers today. In response to this problem, the California Department of Fish and Game created the Private Lands Management (PLM) Program, which offers landowners economic incentives to manage their lands for the benefit of wildlife. Benefits to the landowner and wildlife resources are increased by allowing the landowner to maintain wildlife resources without an economic loss. Landowners who enroll in this "ranching for wildlife" program consult with biologists to make biologically sound habitat improvements that benefit wildlife, like providing water sources, planting native plants for food, and making brush piles for cover. In return for these habitat improvements, landowners can charge fees for wildlife viewing, hunting and fishing. This partnership between wildlife managers and private landowners helps conserve and maintain wildlife habitat in our state.

The PLM offers landowners the ability to set more liberal seasons. Some hunters oppose the PLM program because they don't see the more liberal seasons as fair (often hunting takes place during the rut or breeding season) and don't like the commercialization of the wildlife resources. They also view the PLM program as a loss of land that might otherwise be open to public hunting.

Alternatively, landowners prefer the PLM program because it gives them an economic incentive to manage their lands for wildlife. This economic benefit may make the difference between a rancher maintaining his ranch for livestock and wildlife or utilizing the land in less wildlife friendly manner.

6.3) Ways to Aviod Conflict:

There are several ways to identify and avoid conflicts. The first step is to identify the stakeholders most impacted by land management decisions. These include hunters, ranchers, timberland owners, public land agencies (USFS, BLM), concerned citizens and other public land users.

The second step is to identify the areas where conflicts will occur or are occurring. Once the conflicts are identified, various groups can work together to develop resolutions and compromises. Town hall meetings and public comment periods on draft management plans work well to identify stakeholders and their issues of concern.

Ultimately conflicts arise because of either philosophical differences or economic impacts. Other approaches can be taken when conflicts cannot be resolved by simple discussion. Tax credits are just one way to overcome conflicts created by economic concerns. For instance, if the County feels that ranchers should do more to promote deer on their property but the ranchers are unwilling to do so, the County may offer tax credits to landowners as an incentive to promote deer.

Conservation Easements are another tool that the County should promote to allow landowners to provide suitable wildlife habitat for the future. Conservation groups such

as the Rocky Mountain Elk Foundation are very good at helping landowners put together these easements and getting them funded. As mentioned earlier the single greatest threat to wildlife in general and deer in particular is the eventual loss of high quality habitats. Conservation easements are a very useful tool to help avoid future conflicts.

6.4) Conclusion:

Conflicts generally arise because of either philosophical differences or economic impacts. Several tools are available to help stakeholders understand and resolve many of these conflicts. Incentivizing land management practices that benefit deer is one of these valuable tools. Included in this approach are:

- Landowner tags
- The PLM Program
- Tax incentives
- Conservation easements
- Regulatory relief

7). PUBLIC EDUCATION AND INFORMATION

7.1) Different Forms of Media:

Ever since the introduction of the first deer management plan in 1950, it was understood that for a plan to work it would take the understanding and cooperation of not only the governmental agencies, but it would take the understanding and acceptance of the public at large. Unlike in the 1950's, where receiving news and information was basically limited to the local newspaper and a new invention called the television, today's electronic age of mass dissemination of news and information to the public is almost limitless. Listed below are several media formats that can be utilized by all concerned parties:

- Television (Local and Regional)
- Public Broadcasting Service (Radio and Television)
- Local Newspapers
- The Internet
- E-Mail
- Governmental Websites
- Private Deer Organizational Websites
- Flyers
- Town Hall Meetings
- Educational programs

All of these media format should be utilized to the fullest extent to educate the public on the importance of a good deer management plan. Without the public's input and acceptance even the best plan will be doomed for failure.

7.2) Outreach Programs:

In order for the any Deer Management Plan established for Siskiyou County to work effectively, governmental agencies must work hand-in-hand with private organizations to help educate the public on the need and implementation of a good Deer Management Plan. One of the most effective ways to accomplish this at the local levels is with a valid, well planned and well implemented Outreach Program. These programs should encompass every aspect of deer management and its importance in helping to keep the community's economic, social and environmental concerns in balance. Since no one aspect of the community is more important that the other, these programs should be diverse in nature and be able to adequately reach all members of the community. Listed below are just a few ideas that may be utilized effectively:

- Educational programs in Siskiyou County Schools that focus on:
    - K-6 grade levels
    - 7-9 grade levels
    - 10-12 grade level
    - College level

- Adult and Family Programs:
    - Town Hall Presentations
    - Exhibits at Local Fairs and County Events
    - Electronic Presentations placed on County, State and Federal agency websites.
- Governmental Agency Programs:
    - Flyers available at all governmental offices and facilities throughout Siskiyou County
    - Electronic Presentations placed on County, State and Federal agency websites.
- Radio, Television and Newspaper articles and ads that focus on the positive aspects of maintaining a healthy deer population throughout Siskiyou County, for current and future generations.

The implementation of these and other programs will greatly increase the success of managing deer by allowing the general population to fully understand the value of a healthy deer population and also the negative effects that an unhealthy deer population will have on the County.

7.3) Financial Benefits:

As with most issues concerning the positive or negative financial aspects of a subject such as this, it would be extremely difficult to define the actual dollar values that will be lost or gained without a major study being implemented. However, the goal of this section is to try to put the financial benefits to Siskiyou County from a healthy and robust deer population into a more understandable and logical prospective.

Siskiyou County is one of the three most northern counties in California. It has a population of approximately 45,091 residents and is the fifth largest county in California, by area. The average family income for Siskiyou County ranges roughly between $24,000.00 to $30,000.00 per year. Siskiyou County has approximately 25 moderate to large grocery stores and approximately 35 mini type markets. Throughout the County there are numerous gas stations, approximately 60 motel/ hotels and roughly 10 sporting goods stores. These businesses plus many more retail and service related businesses are all vying for a fair share of the average Siskiyou County family's income in order for them to stay in business. To most of these businesses, especially the smaller ones in the more remote areas of Siskiyou County, it is a daily struggle just to stay afloat. With the decline in the lumber, mining and ranching industries, much of Siskiyou County's income base has declined. Tourism is now one of the top ranked income generating industries in Siskiyou County. Included in this tourist trade is the out-of-area hunters and outdoor enthusiasts that come to enjoy the natural beauty of Siskiyou County's flora and fauna, as well as the opportunity to put a little extra meat on the table.

It is difficult to know the exact number of out-of-area hunters that come to Siskiyou County on a yearly basis to hunt deer and other wildlife. This is mainly due to how the State has setup the zoning system in many parts of California, including Siskiyou

County. For example, if a hunter bought a "B" Zone tag they are eligible to hunt in any of the six "B" Zones throughout Northern California. The tags are issued by zones and not by Counties. There are all or part of six different zones within Siskiyou County's borders: B-2, B-4, B-6, C-1, C-2 and X-1. Since a hunter holding a "B" Zone tag can hunt in any "B" Zone area, it is difficult to determine what specific "B" Zone area they will hunt in.

However, estimations can be made using the total number of tags sold for a specific zone and what percentage of that zone lies within Siskiyou County. The following is an example of the estimated data for the number of "B" Zone hunters within Siskiyou County. In 2006 there were 39,812 "B" Zone deer tags sold. There are 6 "B" Zones in California. Divided evenly that would be 6635 "B" Zone tags for each of the 6 "B" Zones. Siskiyou County has 100% of the B-6 Zone, approximately 50% of the B-4 Zone and approximately 25% of the B-2 Zone within its borders. A rough estimate of the "B" Zone tag holders hunting in Siskiyou County would be as follows: B-6 = 6635, B-4 = 3317 and B-2 = 1658. Therefore, the rough estimate would be of the 39,812 "B" Zone tags issued, 11,610 "B" Zone tags would be utilized in Siskiyou County. This would relate to roughly 15,860 deer hunters in Siskiyou County on a yearly basis if the same formula were used for all of the zones

What does this mean for the financial future of Siskiyou County? Estimating that only 35% of 15,860 hunters are from outside of Siskiyou County, then roughly 5,550 individuals enter Siskiyou County each year, for a period of up to 6 weeks, just for the opportunity to hunt deer. To put that in perspective, the City of Yreka, the largest city in Siskiyou County, boasts a population of only 7,290 people. In other words, during the deer seasons the County of Siskiyou increases its population by roughly 13%, or almost the same as the entire population of the County's largest city.

In 1997 Dr. Eric Loft, from the Wildlife Management Division of the California Department of Fish and Game, conducted an exhaustive study on the economic value that hunting brings to individual counties in California. He named this study the, *"Economic contribution of deer, pronghorn antelope and sage grouse hunting to Northern California and implications to the overall "value" of wildlife*". His study focused on the X-1 thru X-6 Zones and includes information for the archery, muzzleloader and rifle deer, antelope, and sage grouse hunts. His conclusion stated that on average each deer tag holder living within the boundaries of the specific tag zone spent $244.00 on the hunt and that on average each deer tag holder living outside the boundaries of the specific tag zone spent $176.00 on the hunt.

Using the estimated figures, listed above, for the number of County resident hunters and non-County hunters hunting deer in Siskiyou County and Dr. Loft's estimated expenditures spent per hunter, the economic value that deer hunting alone brings to Siskiyou County is as follows.

Non-Resident County Deer Hunters	5,550 X $176.00	$976,800.00
Resident County Deer Hunters	10,310 X $244.00	$2,515,640.00
TOTAL ESTIMATED ECOMONIC DOLLAR VALUE OF DEER HUNTING TO SISKIYOU COUNTY PER YEAR		**$3,492.440.00**

Table 1. Estimated dollar value of deer hunting to Siskiyou County.

7.4) Public Input:

In order for this Deer Management Plan to work it must have the support of the residents of Siskiyou County. As of today, there is not a consistent venue in which the public can address their concerns or issues and feel confident that their concerns are at least being considered. With today's technology there are numerous avenues or options that can be developed and utilized to aid the public in having their input heard by the governmental agencies that make the decisions concerning deer management. Listed below are a few suggested methods that may be utilized to possibly increase the public support for the Deer Management Plan.

- Establish an internet link on both the County and State agencies websites that allows for public input specifically concerning Deer Management policies and regulations.
- Establish Town Hall meetings specifically for the public's input to upcoming deer regulation changes and management.
- Develop a series of Suggestion Boxes at all concerned governmental agency and private industry offices that would allow for Siskiyou County residents to "drop-off" their suggestions.
- Work closely with Big Game organizations to collect input and support from their members.

7.5) Conclusion:

A successful deer management program must have the support of the local residents of the area in which the plan is operational. This can only be accomplished through very aggressive educational and informational programs that would afford the public input as to the direction the plan will take. Without the establishment of these types of "open" communication venues, local deer management plans, no matter how comprehensive they are, are bound to eventually falter or fail.

8). CONSERVATION PLANNING

8.1) Overview:

Siskiyou County is one of California's remaining resource jewels as it contains some of the most remote and pristine natural areas in the United States. The habitats and wildlife populations occurring in this County offer high quality recreational opportunities, bringing millions of dollars and significant employment opportunities annually. As California's population is projected to increase 50% by the year 2050 (>60 million), the natural resource values and recreational opportunities of Siskiyou County will become increasingly important as the primary source of economic contribution.

The high mountains of Siskiyou County provide diverse summering habitats for multiple species of wildlife. Due to this regions rugged terrain, extreme topography, and public land designations, these habitats are largely protected from urbanization and offer some of the most ecologically intact and productive wildlife habitats in California. Critical to the persistence of deer and many other species inhabiting these montane regions are the movement corridors and lower elevation winter ranges needed for their survival. These areas provide critical life history requirements for the sustainability of deer, but contain the highest densities of human encroachment, are largely privately owned, and are at significant risk from the impacts of urbanization.

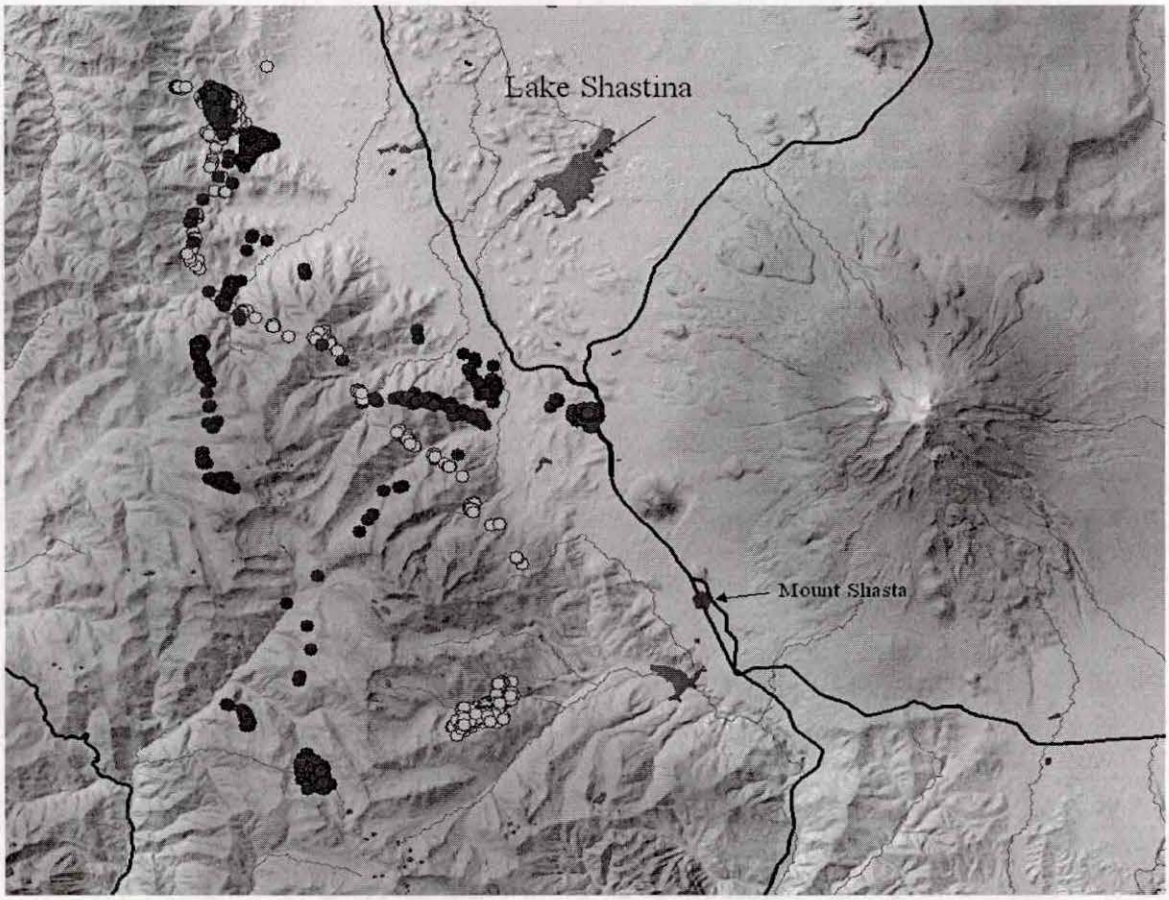
8.2) Prospective Conservation:

Ultimately, the greatest challenge facing Siskiyou County deer populations will be the level of priority and commitment placed upon the conservation of critical wintering habitats. In order to maintain a regions bio-diversity, it is critical to implement an integrated or landscape approach to conservation planning (Sauders et al. 1991). When landscapes become fragmented, and the dispersal of species is restricted, changes or barriers to natural movement patterns and reductions in genetic flow will diminish the viability of populations, causing irreversible impacts to health, reproduction, and ultimately survival (Saunders et al. 1991, Harrison and Bruna 1999). The impacts from urban fragmentation can not only alter the persistence of wildlife populations, but has caused extinctions in plant communities from habitat loss and isolation (Soule et al. 1992).

It is important when developing conservation strategies to understand that the encroachment of civilization occurs slowly over time. Because we are unable to sense slow changes and even more limited to interpret their cause and effect, the impacts of long term processes that slowly degrade habitats over decades are hidden and can result in irreversible impacts to wildlife (Magnuson 1990). The sustainability of deer and other wildlife populations will depend on a prospective or farsighted approach to conservation planning, and will have a direct consequence on the future of this regions deer populations, ecological viability, and recreational quality.

8.3) Corridors:

Many species use migratory strategies to persist; traveling great distances to occupy seasonal ranges for survival. Movement corridors are unique and essential features that provide landscape linkages for the re-colonization of habitats and mechanisms for species to respond or adapt to environmental stressors (Taylor et al. 1993). The ecological benefits of movement corridors are well documented, as they provide pathways to natural habitats, the preservation of genetic and landscape connectivity, and the maintenance of biodiversity. The identification and conservation of migratory corridors is fundamental to the farsighted protection of deer and many other species of plant and animal life in Siskiyou County.



Map 1. Illustrates movement corridors exceeding 30 linear miles documented with satellite telemetry for 3 female black tailed deer in Siskiyou County (CDFG 2008).

8.4) Conservation Science:

In recent years, conservation scientists have understood that the temporal-spatial needs of the large and highly mobile mammals provide broad-scale knowledge of an ecosystems function and structure; or a blueprint for conserving landscapes of high ecological value (Simberloff 1998, Caro and Odoherty 1999). The spatial needs of deer provide a conservation tool for identifying landscapes of key ecological value and developing strategies to protect the integrity and functionality of these regions. When

negatively impacting the habitat needs of deer, the viability of populations is reduced and a cascade of impacts is imparted to multiple less mobile species occurring sympatrically on these ranges for survival.

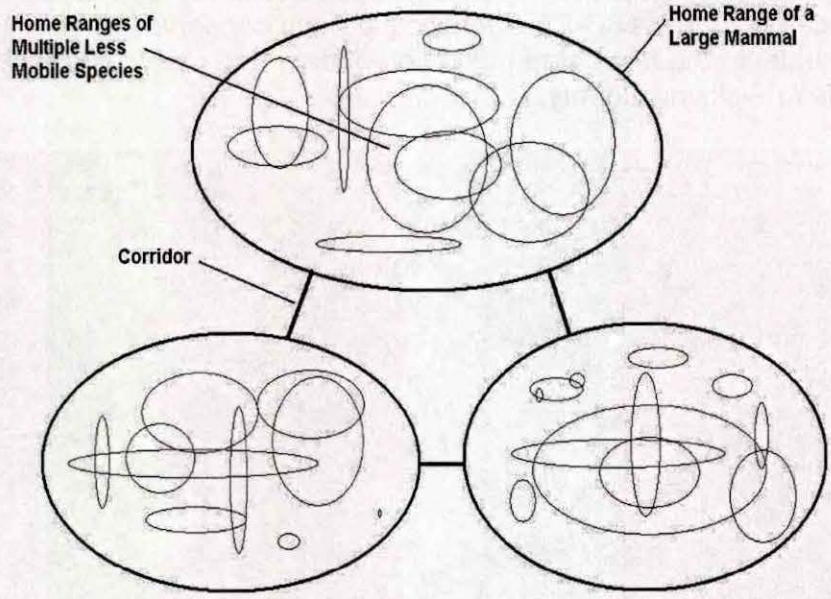


Figure 1. Illustrates the conservation concept of multiple less mobile species occurring sympatrically within the home range of a large mammal.

8.5) Siskiyou County General Plan:

The primary goal of the Land Use Element of Siskiyou County General Plan (1980) is stated as:

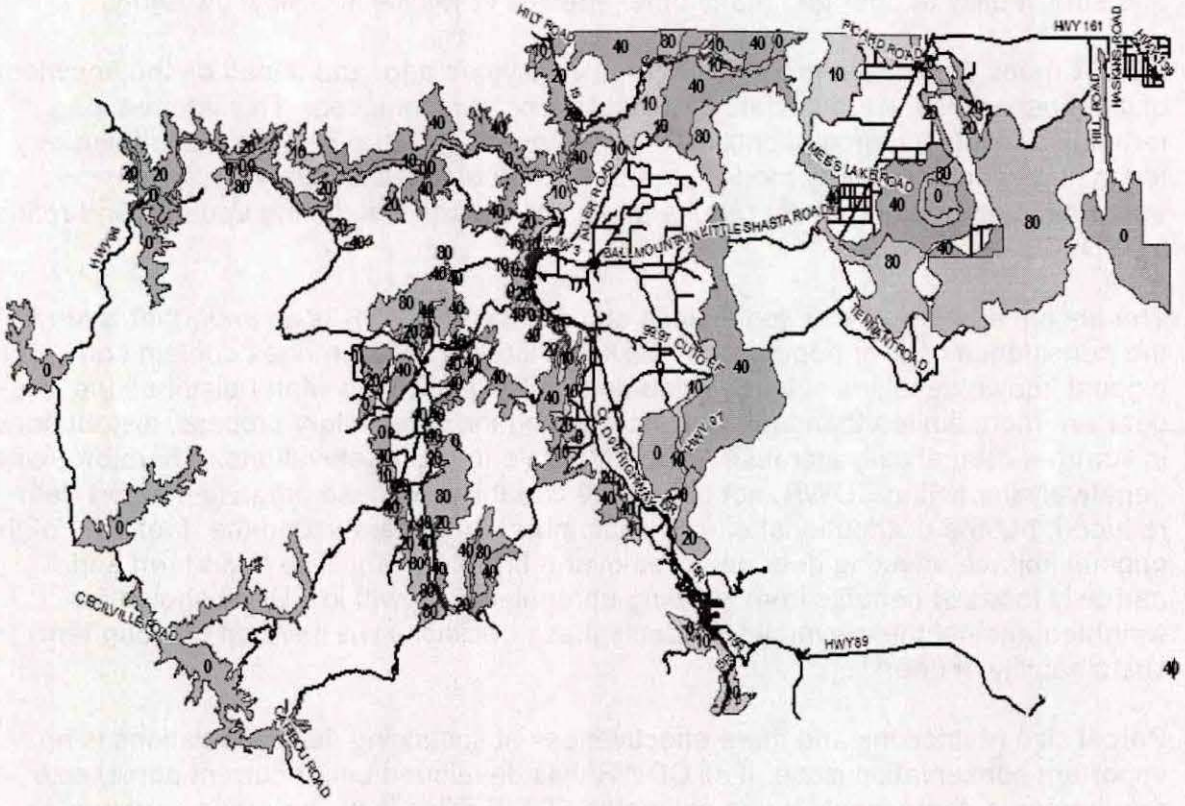
"To allow the physical environment to determine the appropriate future land use pattern that will develop in Siskiyou County. It means simply that future development should occur in areas which will be easiest to develop without entailing great public service costs, which will have the least negative environmental effect, and which will not displace or endanger the county's critical natural resources".

As lead agency, the County is required to consult with CDFG on projects effecting the environment under the California Environmental Quality Act. The Department has provided "critical deer winter range" (CDWR) designations and recommendations for avoiding or mitigating impacts to these areas. In order to protect CDWR from urbanization, the county has developed parcel size restrictions to avoid impacts to habitats. Table 1 represents a conservation tool for estimating reductions in deer carrying capacity for parcel sizes on critical deer winter range (Smith et al. 1989; CDFG 1994).

Parcel Size (acres)	Percent (%) Reduction in Carrying Capacity
5	100
10	60
20	30
40	15
80	8
160	4

Table 1. Represents estimated reductions in deer carrying capacity for parcel sizes on critical deer winter range.

Parcel size restrictions have been determined, in part, on the counties interpretation of the intensity of deer use on these ranges (Siskiyou County General Plan 1980). Requirements vary from 0 acres (unrestricted development) to 80 acres (parcels no smaller than 80 acres; typically agricultural lands) and have been developed to lessen impacts to deer populations from development. In some instances, resolutions adopted by the county have relaxed or removed parcel size requirements, and left significant portions of CDWR at risk from development (Siskiyou County 1984-86).



Map 2. Represents Siskiyou County critical deer winter ranges in color with parcel size designations.

8.6) Interpreting Critical Deer Winter Ranges:

CDWR's are unique and essential habitats located within the general winter ranges of deer, and are required during the harshest winters when deer are forced to the lowest elevations. CDWR's are utilized by deer annually, but the intensity of use can vary greatly from low to high densities depending on the severity of the winter. Some of these ranges can mistakenly be interpreted as of low value to deer due to low densities occurring during mild to normal winters. However, when a non-typical or significant winter weather event occurs, these areas become crucial for short time periods to the survival of local populations. Under current Siskiyou County planning guidelines, as CDWR is developed under the current parcel size requirements, there will still be a significant decline in the habitat capability of CDWR's in Siskiyou County.

8.7) Conclusion:

The use of CDWR's as a conservation tool is an accepted concept in the field of conservation science for illustrating the risk to habitats of high ecological value (Caro and Odoherty 1998). The spatial needs of deer provide a conservation foundation in which strategies can be developed for protecting key ecological systems such as large and small mammal ecology, landscape connectivity, predator-prey relationships, or mechanisms for plant species dispersal and survival. The farsighted protection of these critical ranges or "key ecological areas" is essential to preserving the habitat integrity and survivability of deer and many other species of wildlife in Siskiyou County.

CDWR maps were created by CDFG nearly 40 years ago, and based on the knowledge of local biologists, historical data, and old telemetry techniques. This information remains a reliable source of critical winter ranges, but with advances in bio-telemetry technologies, predictability modeling, and the use of satellite telemetry, the understanding of deer habitat requirements are continuously being updated and refined by CDFG.

The absence of parcel size restrictions on portions of CDWR is an important issue to the persistence of deer populations. Siskiyou County winter ranges contain some of the highest known densities of black tailed deer in California. As winter distributions for deer are more limited than any other time during their life history process, distributions in summer dramatically increase as deer migrate to higher elevations. Therefore, when negatively impacting CDWR, not only is the capability of these areas to support deer reduced, but the distributional effects on summer range far exceed the "footprint" of the original impact, effecting deer densities over a broad region. The short term and narrowly focused benefits from allowing unregulated growth in CDWR should be weighted against the irreversible impacts these decisions will have on the long term sustainability of deer.

Parcel size restrictions and there effectiveness at sustaining deer populations is an important conservation issue. If all CDWR was developed under current parcel size requirements, there would be an estimated 50% decline in winter range carrying capacity for deer. Parcel size designations were developed many years ago by the

county without the use of modern scientific techniques or research, and likely underestimated the cumulative impacts to CDWR and deer populations.
The enforcement of parcel size restrictions in CDWR is "where the rubber meets the road" in the planning process, and is critical to the conservation of these ranges. This multi-layered process from informing the public, consulting with CDFG, and making recommendations can be cumbersome to the public, and coordination difficult between the County and CDFG.

The persistence of deer in this region depends on the availability of migration corridors for reaching habitats critical to survival. The identification and conservation of corridors have not played a major role in natural resource planning for Siskiyou County, and should be part of a farsighted conservation effort for maintaining this regions deer population and ecological diversity.

Literature Cited for Section 8:

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9). REGULATION CHANGES

9.1) Introduction:

Periodic reviews of deer management are recommended in the 1976 document "A Plan for California Deer". This document is used by the CDFG as a framework to establish hunting seasons, bag limits, tag quotas and implement other management tools. The 1989 Klamath deer herd plan also identifies periodic reviews of management, but was not signed off by entities primarily responsible for the management of deer habitats. Elements in these prior documents indicate that they were not intended as rigid edict, but were instead to be flexible documents, taking into account the various facets of deer management listed in the plan.

Attitudes among hunters have changed notably within the past 16 years. Comments received by local DFG staff in Siskiyou County have indicated a broad dissatisfaction with current deer management. This dissatisfaction has been echoed by nearly all County Fish and Game commissions within the B zones, with the most common concerns over the maximum opportunity strategy implemented in 1992. This strategy provided a two tag option, unrestricted hunting access to all B-zones, and resulted in unprecedented hunting pressure in localized areas. The subsequent declines in harvest and deer densities that have coincided with the implementation of this strategy has provided momentum to formally recommend that CDFG move into a more proactive management role utilizing modernized approaches to the management and conservation of deer in Siskiyou County.

9.2) Primary Reasons for Change:

- Deer population levels have declined to extremely low densities.
- Buck ratios and harvest success have been consistently below CDFG Northern Region goals.
- Estimates of deer abundance or density are not conducted by CDFG in Siskiyou County, and current indexing techniques are unreliable.
- Numbers of deer harvested have dramatically declined.
- Unrestricted hunter distribution in DAU 3 and 4 have resulted in unprecedented hunting pressures and overcrowding in localized areas.
- Current strategies that provide unrestricted hunter distribution make it impossible to assess hunting effort and harvest impacts by zone.
- The current management strategy is resulting in imbalanced sex ratios and suppressed recruitment.
- The current management strategy may be affecting reproductive synchrony and performance in deer populations.

9.3) Primary Recommendations for B6 and C1:

1. Re-designate B-6 and C-1 zones as 1-tag zones where only a 1st tag drawing option is available.

2. Hunters who draw a B6 or C1 tag should be restricted to respective zone boundary.

3. Shorten the general season to two weeks (three weekends) and align all Siskiyou County hunt zones (B6, C1 and X1) to run concurrently.

Expected Benefits:

- Lessen impacts to the male portion of the population.
- Improved hunting quality by reducing hunter overcrowding in localized areas.
- A 1 tag zone eliminates successful hunters from the field, therefore improving hunting quality for remaining hunters.
- The potential Increase in the availability of males will shorten reproductive periods, improve juvenile recruitment, and increase population performance.
- Restricting hunters to respective zones will provide needed data for monitoring relationships between hunting effort and harvest success by zone.

9.4) Additional Late Season Primitive Hunt For B6 and C1

There are compelling reasons why an extremely limited late season muzzleloader/archery only hunt could be beneficial at this juncture of deer management in Siskiyou County. It would create impetus for a new "quality over quantity" philosophy, creating a heightened new interest in the one deer only concept within Siskiyou County. The hunt could be for 10 days in November when conditions are good for viewing and taking high quality bucks. We recommend that by offering a minimum number of tags (10-20 per zone) that the effects of this hunt on deer populations would be biologically insignificant. We anticipate this hunt would quickly become one of the highest sought after tags in California, and offer an extremely rare opportunity for harvesting trophy black tailed deer.

9.5) Create A Linked-Sex Experimental Zone.

We strongly recommend the initiation of a linked sex experimental zone for studying the potential for improving herd health, productivity, and hunting quality by balancing sex ratios through antlerless harvest. Years of male only harvest, maximum opportunity strategies, and declining habitat conditions have contributed to imbalanced sex ratios, poor population performance, and a decrease in the quality of hunting. Deer populations appear to be in a low density equilibrium, with females dominating the population structure and suppressing juvenile recruitment. The potential for improving deer population performance through a linked-sex harvest strategy should be studied by the CDFG in a 5-year investigation that would be highly controlled, have specific management goals and objectives, and contain a detailed study and monitoring plan where results could be presented annually to the BOS and the SCFGC.

9.6) Intent and Consequences of the Regulation Changes:

It is the intent of these recommendations to shift the management emphasis from a maximum opportunity harvest strategy to a philosophy of improving population yields and the quality of hunting. The proposed regulatory changes will result in changing zones within Siskiyou County to "one deer only" with shorter seasons and "tag specific" hunt zones. We suggest deer tags in these zones should be available only as a "1st Deer Tag Option" that is available only through the deer tag drawing. Any leftover tags could be distributed on a "first come, first serve" basis, but only with a 1st deer tag application. Those that are selected for these tags will be authorized to hunt only in that specific zone or hunt area. The only exception to this will be hunters that purchase a 2nd deer tag for a "B" zone other than zone B6, and will be able to hunt the small and remote, southwestern portion of the B-2 zone of Siskiyou County (most of the B-2 zone exists in Trinity County) or the smaller, western fringes of the B-1 zone (most of B-1 exists in Del Norte County).

The best available data for deer in zones B6 and C1 indicate that the availability of males and juvenile recruitment are suppressed. Reducing harvest pressure by shortening and aligning the season length may be beneficial to population dynamics by retaining more bucks for the reproductive period, improving population (sex ratio) structure, and increasing juvenile recruitment through shorter reproductive periods.

9.7) Conclusions:

Based on the best available biological data and other factors identified in this document, the Siskiyou County Deer Management Technical Team supports the above changes to take into effect for the 2010 regulation cycle.

10). SUMMARY OF RECOMMENDATIONS

Section 2: Population Management

- More effective methods that quantify deer densities with confidence or assess population trends with accuracy need to be developed for management and conservation.
- A linked-sex harvest strategy needs to be investigated for balancing population structure, improving herd health, and increasing population yields.
- When rigorous sampling techniques are not an option, trained volunteers should be used for conducting composition surveys from vehicles.
- Establish a Northern Region "Large Mammal Management and Conservation" coordinator.

Section 3: Habitat Management

- The USFS should develop a forest wide plan to specifically address the rejuvenation of habitats for deer.
- The USFS should delineate deer winter ranges forest wide.
- The USFS should develop a plan to specifically address the short and long term management of bitterbrush.
- The USFS needs to implement a reliable funding structure within forest funding allocations that identify deer habitat improvements as "essential" projects.
- The USFS should continue to facilitate partnerships with NGO's on habitat enhancement work.

Section 4: Mortality Control

- Reestablishment of the Road Mortality Team to facilitate the search for solutions on road mortality issues within Siskiyou County.
- CDFG should initiate an investigation of mountain lions to increase understanding of predator prey relationships, habitat usage near urbanized areas, disease characteristics, seasonal range use and movement corridors.
- Initiate a study on the density dependent characteristics of Siskiyou County deer populations.

Section 5: Law Enforcement

- Increase fines and penalties on "Illegal take of Deer" cases to include:
  - Fined the maximum dollar amount of allowed by law.
  - Mandatory financial restitution order paid for:
  - Cost of the complete investigation.
  - Cost of the animal/ animals
  - Cost of any damage done to property or lands
  - Cost of any storage or cutting of evidence meat
  - Automatic forfeiture of all related hunting equipment.
  - Automatic forfeiture of any related vehicles or vessels.
  - Forfeiture of ALL hunting privileges for a 3 year period for each individual violation.
  - Mandatory jail time per individual deer violation convictions.

- Increase of 3-4 Warden positions in Siskiyou County.

Section 6: Resource Conflicts and Priorities

- Encourage landowners to provide early seral habitats.

- Encourage the use of conservation easements to protect critical habitat.

- Encourage the retention and recruitment of oaks.

- Use Stakeholder meetings to help avoid conflicts.

Section 7: Public Education and Information

- Improved utilization of local media sources to help reconfirm the financial benefits of wildlife to Siskiyou County businesses.

- Development of a team that will have the responsibility to locate and utilize separate funding sources, County, State, Federal or private, that will allow for the development and implementation of educational programs within Siskiyou County schools.

- Continuation of the SCDMTWG to work with local governmental agencies, private organizations and businesses to enhance the relationships between the individuals groups, the public and the needs and concerns of Siskiyou County wildlife.

- Develop and implement a Siskiyou County "Cal-Tip" type program.

- Development of an educational and out-reach team, made-up of DFG and SCFGC and local volunteers, to implement suggestion outlined in Section 8.

Section 8: Conservation Planning

- Parcel size requirements within Critical Deer Wintering Range, (CDWR), should be assessed in consultation with CDFG for long term effectiveness in preserving the ecological integrity of habitats.

- As modern methods have increased capabilities for understanding and refining the habitat requirements of deer, systematic updates of critical habitat requirements for deer should be requested regularly from CDFG, and incorporated into the Land Use Element of the General Plan.

- The process and enforcement of parcel size requirements within CDWR should be evaluated for consistency, public understanding of the process, and the effectiveness of coordination between the county and CDFG.

Section 9: Regulation Changes

- Eliminate the 2nd deer tag option in zones B-6 and C-1.

- Shorten the general season to two weeks (three weekends) and align the hunting seasons in the X1, C1 and B6 zones to open and close at the same time.

- B6 and C1 zones should become closed zones where only tag holders can hunt inside zone boundaries.

- Retain the ability to hunt in both the general and archery hunting season in the B-6 Zone.

- CDFG should initiate an investigation of a linked-sex harvest management strategy.

- A highly limited late season primitive weapons hunt should offered in B6 and C1.

APPENDIX I

LIST OF MAPS, TABLES AND FIGURES

SECTION 1:

Maps: None

Tables: None

Figures: None

SECTION 2:

Maps: Map 1. Deer Assessment Units and Respective Deer Zones in the Northern Region.

Tables: Table1. Represents management characteristics by DAU

Table 2. Comparison of Road and Helicopter Deer Composition

Table 3. Harvest and Population Goals

Table 4.DAU 3 Buck to Doe Ratios

Table 5.DAU 4 Buck to Doe Ratios

Table 6.DAU 9 Buck to Doe Ratios

Figures: Figure 1. Represents DAU 3 Spring Vehicle Surveys, (1998-2008)

Figure 2. Represents DAU 4 Spring Vehicle Surveys, (1998-2008)

Figure 3. Represents DAU 9 Spring Vehicle Surveys, (1998-2008)

Figure 4. Males, females, and fawns observed in December 2007 on fall helicopter deer composition surveys in zone B-6.

Figure 5. Males, females, and fawns observed in December 2007 during fall helicopter deer composition surveys in zone C-1.

Figure 6. DAU 3 bucks kill since the initiation of maximum opportunity harvest strategy in 1992.

Figure 7. Siskiyou county deer kill from 1977-2007 with the year maximum opportunity harvest strategy was initiated in red.

Figure 8. DAU 3 Harvest Hunter Success Goals, (1998-2007)

Figure 9. DAU 4 Harvest Hunter Success Goals, (1998-2007)

Figure 10. DAU 9 Harvest Hunter Success Goals, (1998-2007).

Figure 11. Mean sample sizes of deer for zones and total DAU using road surveys for fall deer composition surveys from 2000-2007.

Figure12. Trends in the proportion of 2-pt and 4-pt bucks in the harvest from 1998 – 2007.

Figure 13. Buck kill for zone B-6 and rainfall totals during the B-6 hunt season taken from the Fort Jones Ranger Station for 1992 – 2007 (Western Regional Climate Center, Desert Research Institute, Reno NV.)

Figure 14. Siskiyou County Buck Harvest, (1997-2007). The green bars indicating the year (1992) that MOS was initiated and the red bars indicating years when buck harvest was higher than in 1992.

Figure 15. Statewide buck harvest,(1997-2007). The green bars indicating the year (1992) that MOS was initiated and the red bars indicating years when buck harvest was higher than in 1992.

SECTION 3:

Maps: None

Tables: Table 1, Klamath National Forest Wildfire History, (1998-2007)

Table 2, Klamath National Forest Wildfire Burn Severity, (2008)

Figures: None

SECTION 4:

Maps: None

Tables: Table1. Road Mortality Data by Major Highway Systems

Figures: Figure 1. Mountain lion and mule deer population trends on the Round Valley deer winter range near Bishop, California (Ballard 2001b).

SECTION 5:

Maps: None

Tables: Table 1. Illegal deer kill data by location and year.

Table 2. Illegal deer kill data by number and location.

Table 3. Siskiyou County legal deer kill data during reference period 2005-2007, (2004 Record kill data used as reference only).

Table 4. Siskiyou County illegal deer kill data during the reference period 2005-07.

Figures: None

SECTION 6:

Maps: None

Tables: None

Figures: None

SECTION 7:

Maps: None

Tables: Table 1. Estimated dollar value of deer hunting to Siskiyou County

Figures: None

SECTION 8:

Maps: Map 1. Illustrates movement corridors exceeding 30 linear miles documented with satellite telemetry for 3 female black tailed deer in Siskiyou County (CDFG 2008).

Map 2. Represents Siskiyou County critical deer winter ranges in color with parcel size designations.

Tables: Table 1. Represents estimated reductions in deer carrying capacity for parcel sizes on critical deer winter range.

Figures: Figure 1. Illustrates the conservation concept of multiple less mobile species occurring sympatrically within the home range of a large mammal.

SECTION 8

Maps: None

Tables: None

Figures: None

SECTION 10:

Maps: None

Tables: None

Figures: None

APPENDIX II

Vegetation Type Changes in the Klamath Mountains, 1930's to Present

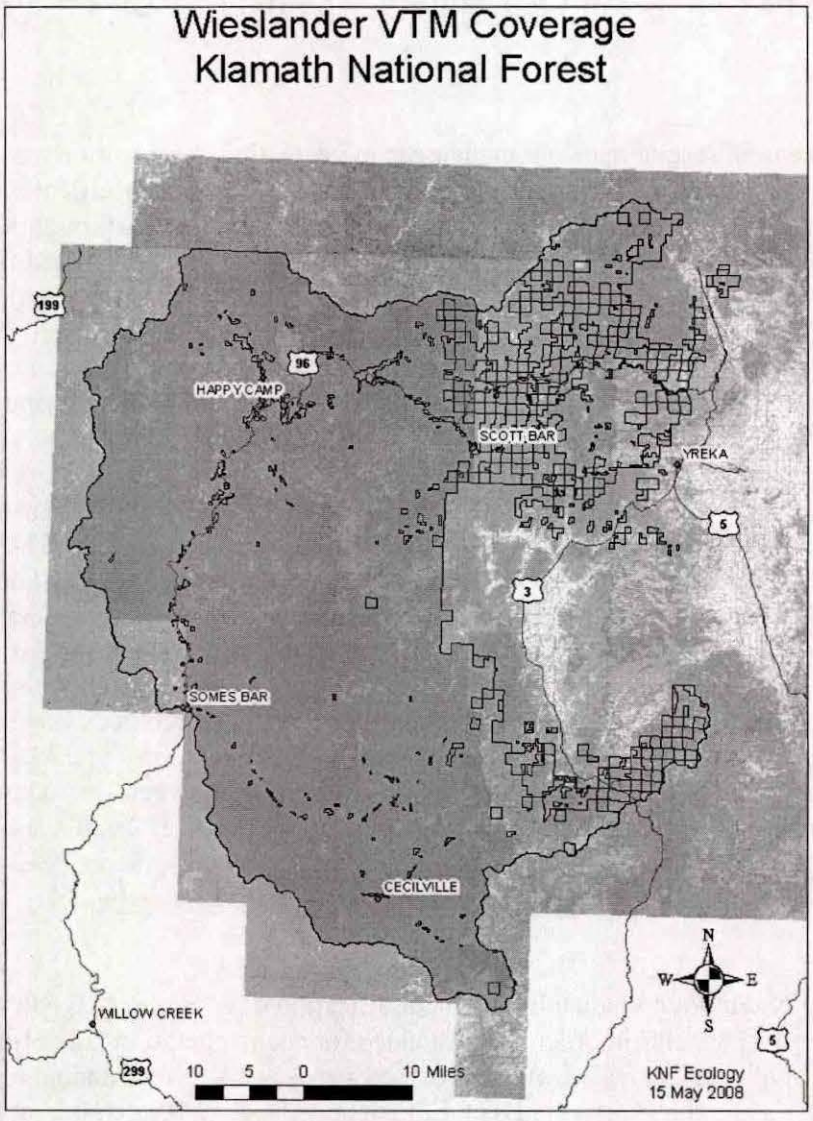
INTRODUCTION

There is much discussion in recent years about changes in vegetation composition and structure in the Klamath Mountains since the advent of the U.S. Forest Service and specifically with regards to the contribution of fire suppression to these perceived changes. Although Klamath National Forest was established in 1906, active timber management and mechanized fire suppression did not start until after World War II within the Klamath Mountains Section of KNF. The biggest human impacts to vegetation change after European contact (1850s) and prior to WWII were likely cessation of Native American burning practices, the gold rush period of the 1850s and to a lesser degree, localized effects of town development and homesteading. Of these changes in resource management, cessation of frequent low intensity fires by Native Americans in select habitats likely had the most profound effect on vegetation type changes prior to the late 1940s. Research (Skinner , Taylor) substantiates that the frequency of fire has greatly diminished since the late 1940s when active mechanized fire suppression started. These studies provide the basic data to built state and transition models used to generate Fire Regime Condition Class (FRCC) outputs. FRCC is typically a measure of departure of vegetation type and structure from historic reference conditions, but in California, departure from historic fire return intervals is also analyzed. How less frequent fire affects vegetation patch type and size has been investigated locally (Skinner, Murray), but little work has been done on changes of community types at landscape scales. Recently, the Wieslander Vegetation Type Map (VTM) has been made available in digital format through cooperative work between U.C. Davis and Klamath National Forest (KNF). The VTM was produced during the early 1930's and offers a unique opportunity to look at changes in vegetation types in GIS systems. More detailed information on the Wieslander Project can be found at http://vtm.berkeley.edu/.

METHODS

The VTM maps initially did not contain a link to a classification of community types. Instead the mappers listed up to 13 species in order of dominance for each vegetation patch (polygon) mapped. From this list of species, U.C. Davis developed a crosswalk to the Manual of California Vegetation (MCV) types and the California Dept. of Fish and Game, Wildlife Habitat Relations (WHR) types. From the MCV type and review of the original thirteen species, a new map attribute of Cover Type was developed. The mapped polygons were assigned to one of the following four cover types: Conifer, Hardwood, Shrub, or Herb. Comparisons were made in GIS between the VTM and the current existing vegetation maps (CALVEG) produced from 2004 imagery. CALVEG contains Regional Dominance Type and Cover Type attributes which then allows for change detection between 1930 and 2004. The extent of the analysis area or VTM coverage is displayed in Map1.

Map1. Extent of VTM coverage in blue.



Another method to look at change is to compare the VTM to the timber type map of 1994 which lists primary and secondary species for each polygon. This can be useful to look at changes in the most dominant species over time. Changes in presence of shade-intolerant species, such as deciduous oaks, can be compared more directly using this method.

RESULTS

Although the maps show a significant increase in conifer acres between 1930s and 2004, the decrease in hardwood acres is the most pronounced change Table 1, Charts 1 and 2).

Table 1.

Cover Type	VTM_acres	CALVEG_acres	Difference
Conifer	905,163	973,230	68,067
Hardwood	125,554	43,740	-81,814
Shrub	92,954	103,884	10,930
Herb	7,379	12,821	5,442

Chart 1.

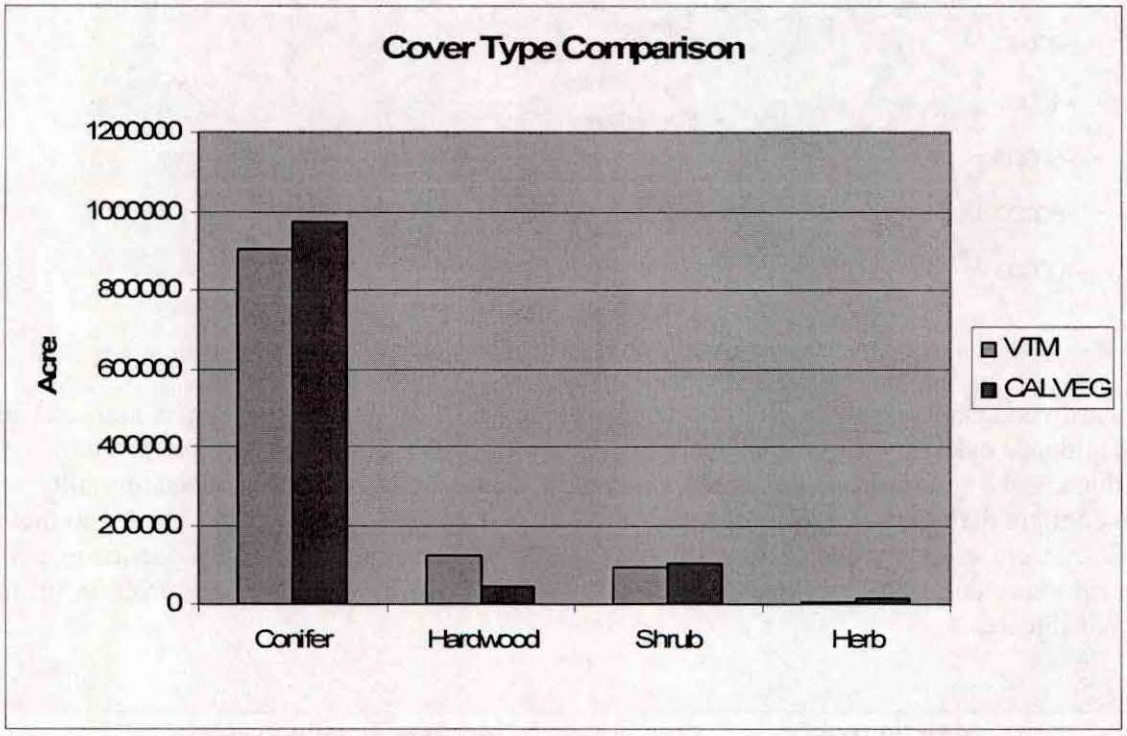
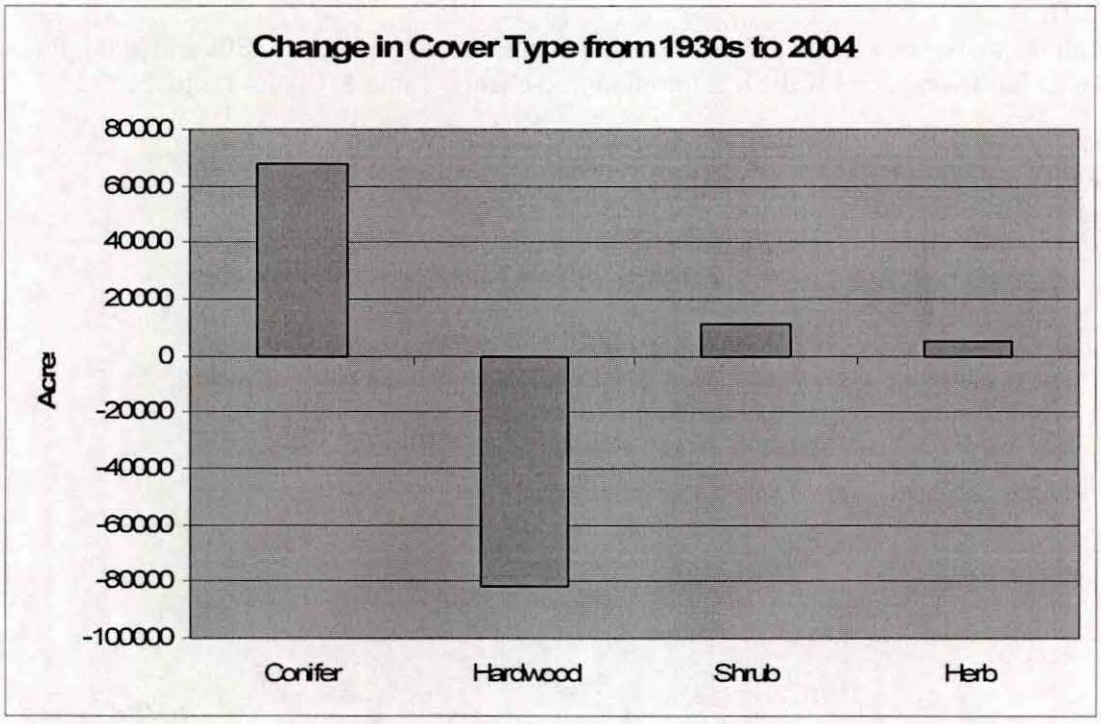


Chart 2.



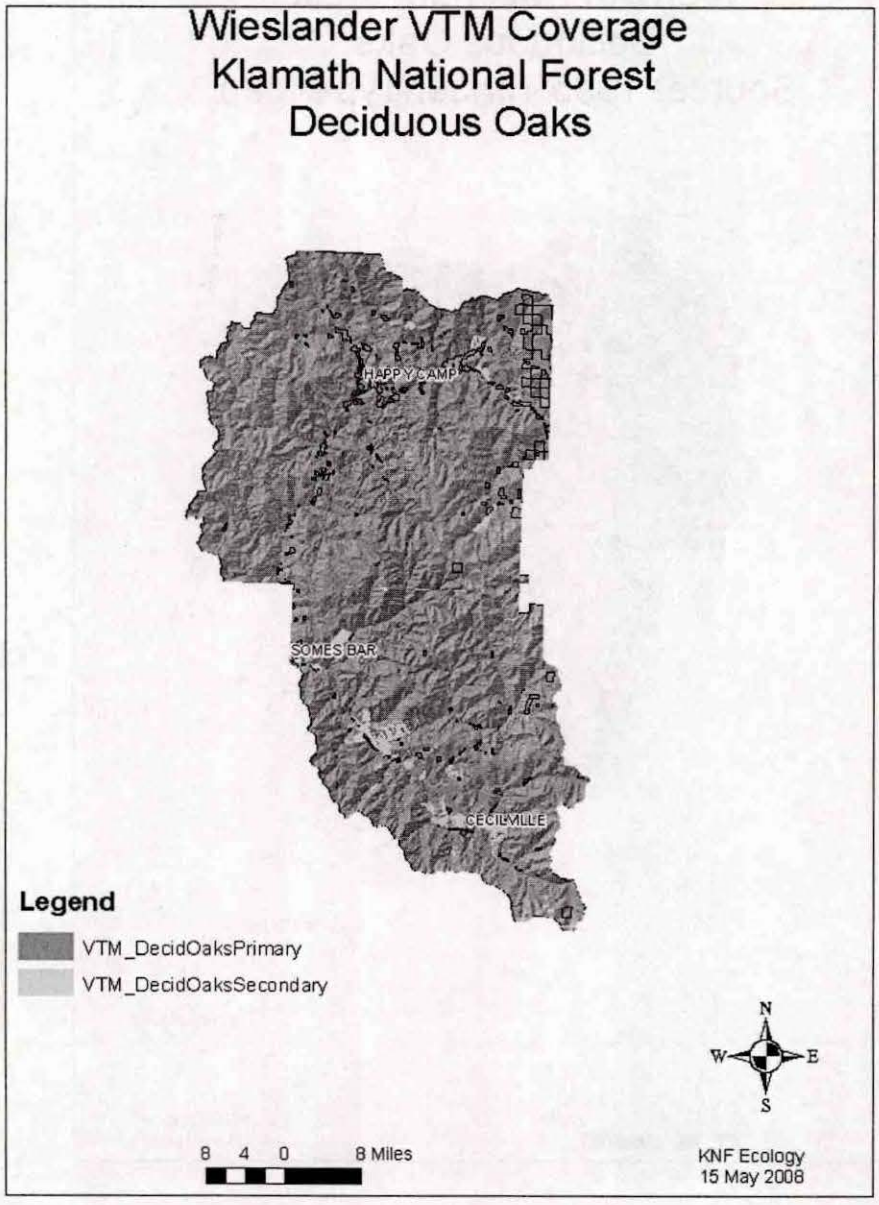
The hardwood category includes madrone, evergreen oaks (e.g. canyon live oak and tanoak) and the deciduous oaks (e.g. California black oak, Oregon white oak and Brewer's oak). The deciduous oaks and madrone are more vulnerable to competition or shade induced mortality from conifers than the evergreen oaks and, thus, one would expect even greater decline in these species. A closer look at the deciduous oak species shows an approximate 17% decline in acres of deciduous oaks as either primary or secondary species over the 60 year period from 1930s to 1995 (Table 2).

Table 2.

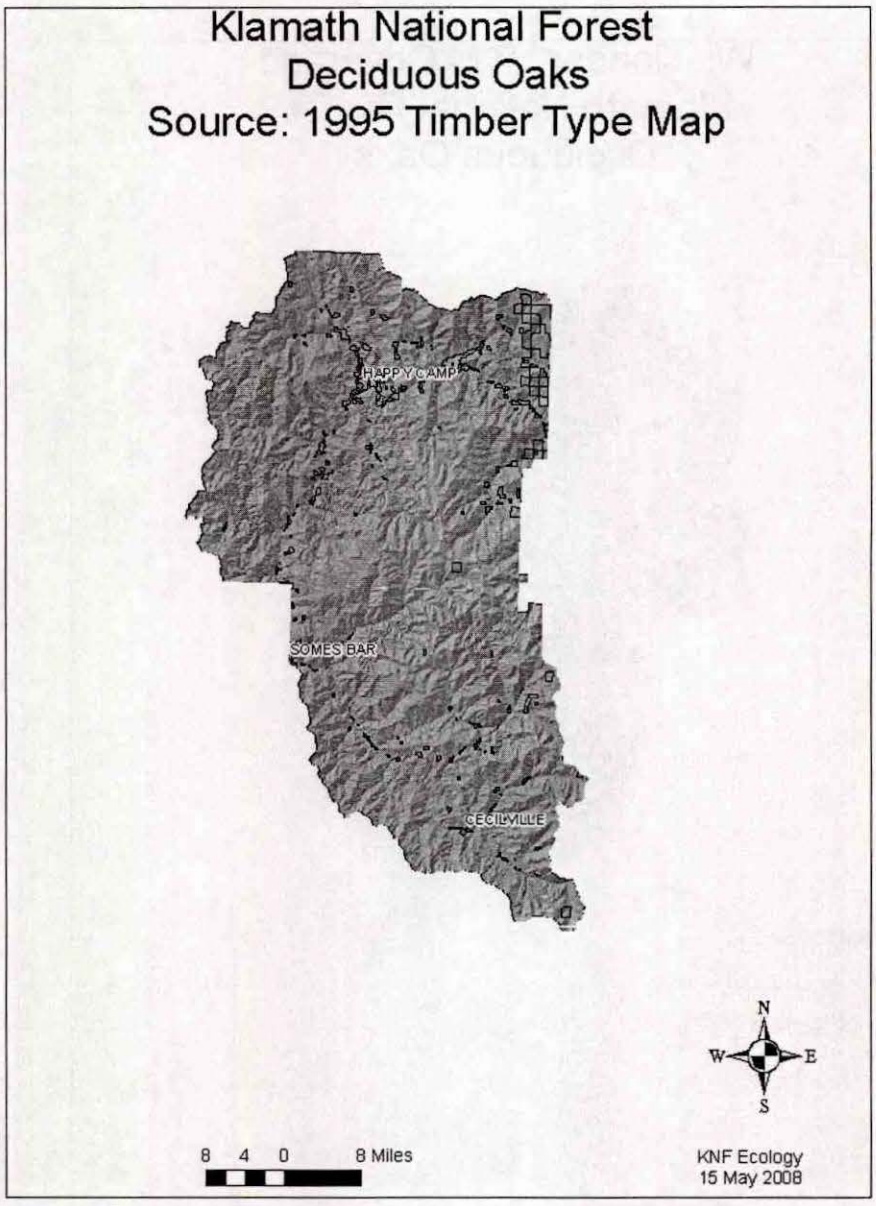
Map Source	Acres of Deciduous Oaks (primary and/or secondary species)
VTM (early 1930s)	82,139
1995 Timber Type	67,996

Maps 2 and 3 of deciduous oak distributions highlight the areas of greatest concentration in the study area.

Map 2.


Wieslander VTM Coverage
Klamath National Forest
Deciduous Oaks
HAPPY CAMP
SOMES BAR
CECILVILLE
Legend
VTM_DecidOaksPrimary
VTM_DecidOaksSecondary
N
W
E
S
8 4 0 8 Miles
KNF Ecology
15 May 2008

Map 3.



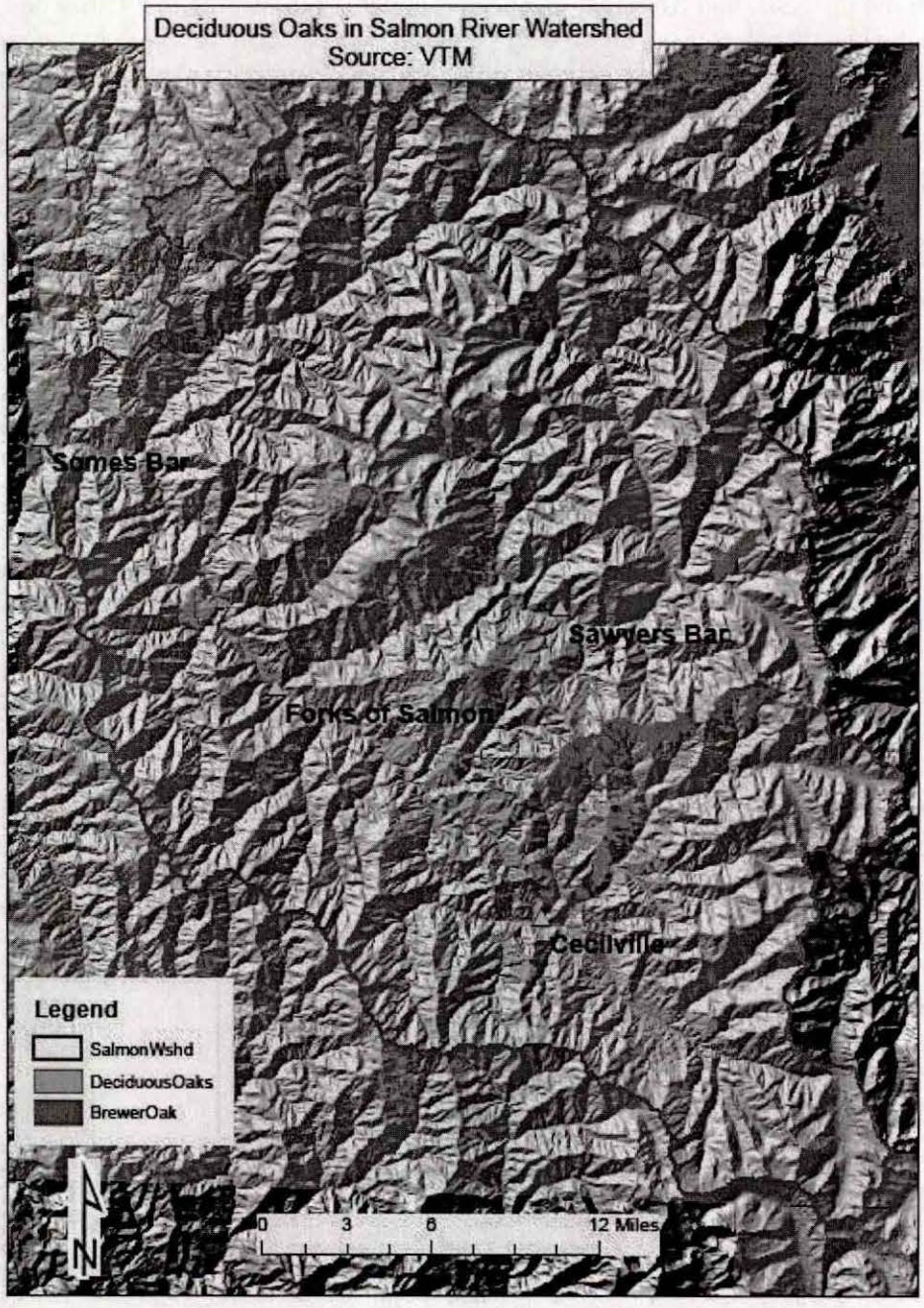
Although the 1995 map shows greater dispersal of the deciduous oak category the total acres is less.

DISCUSSION

Although care was taken to bring the maps to similar levels of classification for comparative analysis, the methods used in map production are not the same. It is best to look at the results as a general trend analysis, and from that perspective it is hard to dispute that hardwood forests, and especially deciduous oak forests, are in decline. Other site specific research in the region shares similar conclusions (de Rijke, Swetman,). Silvicultural records also show that during the 1970s and 1980s there was a concerted, but geographically limited, effort to remove black oaks by applying herbicides to the cambium. Besides the more obvious hardwood types that show up on maps, there are many parts of the region that are a mix of conifers and hardwood species where the hardwood component is not captured as well on maps. Many of these mixed forests are losing the hardwood component as conifers continue to densify. These hardwood components offer many advantages to the forest, including mast production, deep-soil cycling of nutrients and water, calcium rich nutrient input, mycorrhizal reservoirs following stand replacement fire, and cavity opportunities due to limb breakage and heart-rot characteristics. Deciduous oak woodlands have some of the highest plant species diversity of any plant communities in the region. These oaks also support rich assemblages of insects which in turn benefit many birds and small mammals.

Maintaining deciduous oaks on productive soils with rainfall adequate for conifer growth requires frequent low-intensity fire to maintain the stand. Fire frequencies of 3-5 years may be necessary to remove conifer seedlings with little damage to the residual oaks. Restoring oak woodlands, besides the many benefits to plant and animal diversity, offers opportunities to affect fire behavior at landscape scales as well. Hardwoods have shown repeatedly to have a damping effect on crown fires and strategic placement of oak woodland restoration projects could help achieve fireshed management goals as well. The location of the brewer oak stands in the VTM map for the Salmon River area illustrates this point well (Map 4). Many of these oak stands were located on ridge tops or upper one-third slope positions on southerly aspects, which makes them good candidate areas for strategically placed treatment units to affect fire spread.

Map 4.



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