



Principles of Wildlife Conservation

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Principles of Wildlife Conservation was developed at Chemeketa Community College, Salem, Oregon. Materials were prepared by Rick O'Hara, Ph.D., Lead Program Developer for NCSR. O'Hara holds a Ph.D. in *Ecology/Population Biology* from Oregon State University, and M.Sci. and B.S. in *Zoology* from Michigan State University.

Technology education programs in which this course is incorporated are described fully in the Center's report entitled, "Visions for Natural Resource Education and Ecosystem Science for the 21st Century." Copies are available free of charge.

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Course materials will also be posted on our website:

www.ncsr.org

Please feel free to comment or provide input.

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BI 251 Principles of Wildlife Conservation COURSE OUTLINE

INTRODUCTION

Principles of Wildlife Conservation is a course that was developed to fulfill requirements in the curriculum of Forest Resource Technology students at Chemeketa Community College in Salem, Oregon. It is an introductory course that presents a diversity of issues relating to wildlife conservation and management and is open to the general student population. To a large degree, BI 251 is modeled after an existing course called *Principles of Wildlife Conservation* (FW 251), a core course for students majoring in any area of Fisheries and Wildlife and Natural Resources at Oregon State University.

REFERENCES

Scalet, C.G., L.D. Flake, and D.W. Willis. *Introduction to Wildlife and Fisheries: An Integrated Approach*. 1996. W.H. Freeman Company. ISBN: 0-7167-2816-8 (soft cover)

Leopold, Aldo. *A Sand County Almanac*. 1949. Oxford University Press. ISBN 0-19-505928-X.

COURSE DESCRIPTION

BI 251 Principles of Wildlife Conservation provides an introduction to the principles and practices of wildlife conservation and management. This lecture-only course covers the history of wildlife conservation, basic ecological concepts, human impacts on wildlife and habitat, social and economic issues relating to wildlife management, and management objectives and strategies for fisheries and wildlife populations. The course has no prerequisites.

COURSE OBJECTIVES

Upon successful completion of the course, students should be able to:

1. Describe the values of wildlife from both a human and an ecological perspective.
2. Relate and apply various ecological concepts and principles to problems in wildlife management and conservation.
3. Explain and analyze parameters of animal population structure and dynamics.
4. Discuss general methods of estimating population abundance, growth, and survivorship.
5. Relate basic concepts of population genetics to the viability and persistence of animal populations.
6. Explain and evaluate how aspects of the behavior and physiology of a species play a role in wildlife management plans.
7. List and explain the major physical and biological components of habitats that are important to wildlife populations.
8. Describe how human activities impact wildlife habitat.
9. Contrast various management goals and relate them to appropriate management plans.
10. Explain how the concept of ecosystem management relates to wildlife conservation and management.
11. Explain the role of various regulations and issues (social, economic, ethical, and ecological) in the management and conservation of animals.

STUDENT ASSESSMENT

Grades are based on a points system with approximate breakdown as follows:

Mid-Term	100 points
Final	114 points
Internet Search essay	30 points
<i>Sand County Almanac</i> essay	50 points
Endangered species essay	50 points
Total	<hr/> 344 points

TOPICS

- I. Introduction to Wildlife and Fisheries Conservation
 - A. Some basic terminology: perspectives and uses
 - B. History of wildlife management in the U.S.
 - C. Reasons for managing and conserving wildlife populations
 - D. Past successes and failures in wildlife management
 - E. Wildlife management and conservation biology as professions

- II. Human Attitudes and Perceptions About Wildlife, Human Management
 - A. The users of wildlife
 - B. Values and ethics regarding wildlife
 - C. Assessing public attitudes
 - D. Social and economic issues

- III. Basic Ecological Concepts
 - A. Populations, communities, and ecosystems
 - B. Energy flow, trophic levels, and food webs
 - C. Succession
 - D. Niche, habitat, and environment
 - E. Dispersion patterns
 - F. Competition and predation

- IV. Population Structure and Dynamics
 - A. Births, deaths, and survivorship
 - B. Demography
 - C. Population growth and regulation
 - D. Estimating abundance, growth, and survivorship

- V. Wildlife Habitat
 - A. Habitat components necessary to sustain wildlife
 - B. Habitat assessment, management, and conservation

- VI. Human Impacts on Wildlife Habitat
 - A. Causes of habitat degradation, destruction, and fragmentation
 - B. Consequences of habitat degradation, destruction, and fragmentation

VII. Applications of Genetics in Wildlife Conservation

- A. The population gene pool
- B. Genetic variability, population size, and rates of extinction
- C. Species introductions and translocations
- D. Endangered species management
- E. Wildlife crime-solving (wildlife forensics)

VIII. Managing Fisheries and Wildlife Populations for Harvest

- A. Goals and objectives of harvest
- B. Possible effects of harvest on population growth
- C. Adaptive management

IX. Endangered Species Management

- A. The Endangered Species Act of 1973
- B. The listing process
- C. Reasons species become listed
- D. Management strategies

X. Managing for Biodiversity

- A. Genetic, species, and ecosystem diversity
- B. Species extinction rates
- C. How to manage for biodiversity

XI. Ecosystem Management

- A. Historical perspectives
- B. Objectives of ecosystem management
- C. Applications to wildlife conservation

XII. Special Problems Relating to Wildlife Conservation

- A. Exotic Species
- B. Predator Control
- C. Animal Damage



NOTES FOR INSTRUCTORS

Major topics for this course are arranged in a sequence that was convenient and logical from my viewpoint. This will certainly not be true for all others intending to teach such a course. A rearrangement of the ordering of these topics, or the inclusion of others not covered here, can be accomplished quite easily with minimal editing of existing content.

For each major topic, *Readings*, *Class Sessions*, and *References* are listed. A brief explanation of each of these is given below:

Readings: A listing of chapters that cover that particular topic in the text by Scalet, Flake, and Willis.

Class sessions: These are an approximate number of 50-minute class periods spent on that section.

References: Abbreviated citations are listed at the end of each topic. Complete citations for these are given in the *List of Recommended References* (at the end of this text). Most of these references are general in that they serve as a good introduction to the particular topic and include examples and references of a more specific nature.

NOTE: *For complete reference citations, see final pages of this packet.*



American-Indian Perspectives

A special section is included, developed by the Center's tribal partners. Also, available free of charge from the Center, is a publication titled, "American-Indian Perspectives: Nature, Natural Resources and Natural Resources Education."



Introduction to Wildlife and Fisheries Conservation

READINGS *and* CLASS SESSIONS

Scalet *et al.* (1996): Chapters 1, 18; 3 to 4 Class Sessions

Introduction to Wildlife and Fisheries Conservation

A. Course objectives and grading, etc.

B. Course Overview: content is roughly divided into five broad areas:

1. History, terminology, and professions
2. Social, economic, political, and legal issues relating to wildlife conservation and management
3. Human impacts on wildlife and habitat
4. Basic ecology and the science of wildlife conservation and management
5. The application of science and management principles to problems and issues

C. Terminology and Perspectives

NOTE: *Prior to this discussion, I ask students to write down their own definitions. I summarize the class results and this provides a nice lead-in to the topic.*

1. What is wildlife? Historical, legal, management, and conservation perspectives about wildlife.
2. What is meant by the term “management” with respect to wildlife?
3. What is “conservation?”
4. Compare and contrast the fields of conservation biology and wildlife management. To what degree do they overlap?

NOTE: *There are some other terms in Chap. 1 of Scalet et al. that can be briefly discussed to add to this topic.*

D. The Professions of Wildlife Management, Wildlife Conservation, Wildlife Ecology, Wildlife Biology, Fisheries, etc.

NOTE: *We discuss the wide range of jobs available. I bring in some recent job announcements. For areas of education specialization I use, as an example, Oregon State University's undergraduate and graduate catalog.*

1. Jobs and areas of specialization
2. What kind of education and course work is required to be wildlife professional?
3. How is the profession changing with respect to duties, responsibilities, and educational background? For example, see Munson-McGee and Thompson, 1995

E. The History of Wildlife Conservation and Management in the United States

NOTE: *As a foundation for this discussion, I use Shaw's (1985, chap. 1) treatment of the topic and include some other examples.*

1. Era of Abundance (1600–1849)
2. Era of Exploitation (1850–1899)
3. Era of Protection (1900–1929)
4. Era of Game Management (1930–1965)
5. Era of Environmental Management (1966–present)

F. Some Notable Conservationists

1. John Muir
2. Gifford Pinchot
3. Theodore Roosevelt
4. Aldo Leopold
5. J.N. "Ding" Darling

REFERENCES

Babbitt (1995); Bolen and Robinson (1995): Chaps. 1, 2, 3; Caughley and Sinclair (1994): Chap. 1; Cox (1997): Chaps. 1 and 2; Hunter (1990): Chap.1; Hunter (1996): Chaps. 1; Munson-McGee and Thompson (1995); Shaw (1995): Chap. 1



Attitudes and Perceptions About Wildlife and Human Management

READINGS *and* CLASS SESSIONS

Scalet *et al.* (1996): Chaps. 16, 17; 2 Class Sessions

Human Attitudes and Perceptions About Wildlife, and Human Management

A. Users of Wildlife

1. Direct vs. Indirect
2. Consumptive vs. Nonconsumptive

B. Human Values and Ethics Regarding Wildlife

1. Positive values
 - Recreational
 - Ecological
 - Educational/Scientific
 - Utilitarian
 - Esthetic
 - Economic/Commercial
2. Negative values
 - Disease transmission
 - Crop, livestock, property damage
3. Ethical considerations in wildlife and conservation
4. The importance of considering public attitudes, values, and beliefs to the successful implementation of wildlife management/conservation programs
5. The legal status of wildlife: *Who owns wildlife?*

- C. Assessing Public Attitudes and Perceptions Regarding Wildlife (see also Kellert)
- D. Human Management: Some General Purposes and Designs of Wildlife and Fishery Regulation

REFERENCES

Bolen and Robinson (1995): Chap. 22; Cox (1997): Chap. 28; Hunter (1996): Chaps. 15,16;
Kellert (1976); Kellert (1980); Perlman and Adelson (1997): Chap. 3; Primack (1993):
Chaps. 8,9.



Basic Ecological Concepts

READINGS *and* CLASS SESSIONS

Scalet *et al.* (1996) Chap. 2; 3-4 Class Sessions

Basic Ecological Concepts

A. What is “Ecology”?

NOTES: *I draw an animal on the chalkboard and ask the class to cite examples of factors that impact the population. I illustrate the effects of these factors with arrows. The chalkboard is soon filled with environmental factors and arrows. The points of this are to: 1) Illustrate the complexity and unpredictability of ecological interactions; 2) show the difficulty of attempting to understand all such interactions for a species; and 3) the role that careful science must play in assessing, predicting, and understanding the significance of such interactions.*

B. Some Biotic and Abiotic Factors that Affect Animal Populations

C. Levels of Ecological Organization: Individuals, Populations, Metapopulations, Communities, and Ecosystems

D. Biogeochemical/Nutrient Cycling Through Ecosystems

E. Energy Flow Through Ecosystems

1. Trophic levels: Producers, consumers, and decomposers
2. Food webs
3. Pyramids of energy and energy transfer
4. Effects of keystone species or ecological dominants (and their removal) on community structure

F. Ecological Succession

1. Species (and life history stages) tend to be adapted to seral stages

2. Early to mid-successional species

- ◆ tend to tolerate disturbance better than late successional species
- ◆ includes many game species
- ◆ includes many exotic species

3. Late successional species

- ◆ are less tolerant of disturbance
- ◆ includes many threatened and endangered species

4. Wildlife management may require manipulation of successional stages (e.g., by fire, grazing, planting, herbicides, logging practices, etc.)

G. Competition

1. Define
2. Contrast of interspecific and intraspecific competition
3. Examples of competition and resources competed for
4. Applied aspects of competition in management and conservation
 - a) exotic species introductions
 - b) competition among domesticated species and wildlife
 - c) endangered species management
 - d) alternation of competitive interactions when habitats are disturbed or modified

H. Predator/Prey Interactions

REFERENCES*

Bolen and Robinson (1995): Chap. 5; Cox (1997): Chap. 3; Hunter (1996): Chap. 12;

Primack (1993): Chap 2

* *See also any introductory ecology texts.*



Population Structure and Dynamics

READINGS *and* CLASS SESSIONS

Scalet *et al.* (1996) Chaps. 3, 9; 1 to 2 Class Sessions

Population Structure and Dynamics

A. Population Structure

1. Size, density, and spacing
2. Age structure
3. Sex ratio and mating system

B. Population Dynamics

1. Factors that influence population size and composition over time
 - a) Natality and recruitment as influenced by fecundity and age at first reproduction
 - b) Mortality and survivorship curves
 - c) Age structure
 - d) Effects of sex ratio on population growth
 - e) Dispersal
2. Characteristics of population growth
 - a) Exponential growth
 - b) Logistic growth and carrying capacity (K)
 - c) Density dependence and density independence

C. Population Estimation

1. Examples of techniques and under what circumstances they are useful
2. Trade-offs between accuracy and precision, and cost and effort

REFERENCES

Shaw (1985): Chaps. 3, 4; plus introductory ecology texts.



Wildlife Habitat

READINGS *and* CLASS SESSIONS

Scalet *et al.* (1996) Chaps. 12, 13; 2 Class Sessions

Wildlife Habitat

A. Components of Habitat Necessary to Sustain Wildlife

1. Food: Quantity and quality
2. Cover: From weather extremes and predators
3. Water: Quality and availability
4. Space: Home range, territoriality, body size, and other factors affecting space requirements

B. Habitat Sampling and Assessment

1. Reasons why habitat assessment is necessary in wildlife and fishery management
 - a) What will the habitat support in terms of species numbers, density?
 - b) In what ways is the habitat limiting to wildlife populations?
 - c) Why are species numbers increasing, decreasing?
 - d) What needs to be done to increase or decrease species numbers?
 - e) If the habitat is modified—what will the impact be on wildlife?
2. How is habitat assessed, and what is sampled and measured?
3. Habitat suitability index (HSI) models as developed by USWFS
4. Landscape-level Assessment
 - a) High altitude photography, satellite imagery
 - b) GIS
 - c) Gap Analysis

REFERENCES

Hunter (1996): Chap. 12; Oregon's Living Landscape (1998); Shaw (1985): Chap. 2



Human Impacts on Wildlife Habitat

READINGS *and* CLASS SESSIONS

Scalet *et al.* (1996) Chap. 14; 1 Class Session

Human Impacts on Wildlife Habitat

- A. Atmospheric
 - 1. Acid deposition
 - 2. Greenhouse gases and global warming
 - 3. Ozone depletion

- B. Water Pollution
 - 1. Waste from sewage, livestock
 - 2. Sedimentation
 - 3. Chemicals: industrial, agricultural

- C. Urbanization

- D. Agriculture

- E. Habitat Fragmentation

- F. Habitat degradation, the commons, and the takings issue

- G. Habitat Management

REFERENCES

Hunter (1996): Chaps. 8, 9; Primack (1993): Chap.6



Applications of Genetics in Wildlife Conservation

READINGS *and* CLASS SESSIONS

Scalet *et al.* (1996): Chap. 4; 2 Class Sessions

Applications of Genetics in Wildlife Conservation

A. Background in Population Genetics

1. Populations and gene pools
2. Environments selected for particular gene variants and gene combinations
3. Genetic variability/diversity within and among populations of a species

B. Some Applications

1. Species introductions, reintroductions, translocations, fish hatcheries
 - a) Compatibility between genetic background of source populations and the new environment
 - b) Precautions taken such that the genetic integrity of existing populations is not contaminated and hybridization is not an issue
 - c) Are numbers of breeding individuals and genetic variability sufficient?
2. Endangered species management and small population sizes
 - a) Relationship between population size and risk of extinction
 - b) Loss of genetic variability
 - c) Inbreeding and effects on:
 1. resistance to disease, parasites
 2. fertility
 3. offspring mortality
 4. population growth
 - d) Susceptibility to chance environmental/demographic changes
 - e) At what population size should a species receive protection?
 - f) Captive breeding programs
 - g) Recognition of distinct populations segments (DPS) and evolutionarily significant units (ESUs) by the Endangered Species Act

3. Protection of biodiversity
4. Wildlife crime solving, law enforcement
5. Tracking wildlife using DNA

REFERENCES

Cox (1997): Chap. 25; Hunter (1996): Chap. 5; Levy (1999); Primack (1993): Chap. 11;
Soule and Mills (1998)



Managing Fisheries and Wildlife Populations for Harvest

READINGS *and* CLASS SESSIONS

Scalet *et al.* (1996): Chap. 3; 2 Class Sessions

Managing Fisheries and Wildlife Populations for Harvest

A. Goals and Objectives

1. Harvest: Food and recreational
2. Management: Acceptably high yields and long term sustainability

B. Mortality from Harvest Can Be “Compensatory” or “Additive”

C. Harvest Can Increase the Growth Rate of a Population

1. Revisit the logistic growth model: Density dependence and inversity
2. Maximum Sustained Yield (MSY)

D. How Should MSY be Applied?

1. Fixed quotas
2. Fixed harvest effort
3. Optimum sustained yield

E. Adaptive (Experimental) Management: A Science-Based Approach to Plan, Test, Monitor, and Modify Management Programs

REFERENCES

Caughley and Sinclair (1994): Chaps. 13, 16; Cox (1997): Chap. 24; Shaw (1985): Chap. 7



Endangered Species Management

READINGS *and* CLASS SESSIONS

Scalet *et al.* (1996): Chap. 11; 2-3 Class Sessions

Endangered Species Management

A. Legislation: *The Endangered Species Act of 1973*

1. Why was it enacted?
2. What species does it cover?
3. What is the extent of protection for listed species and their habitat?
4. Threatened versus endangered species
5. Authorities responsible for listing species: The U.S. Fish and Wildlife Service and National Marine Fisheries Service
6. How do species become listed?
 - a) A "Petition" is submitted.
 - b) Species becomes a candidate and is prioritized.
 - c) Species is proposed for listing; published in Federal Register.
 - d) Final ruling is made.
 - e) Recovery plan is developed and implemented.

B. Habitat Conservation Plans

C. The Extent to Which Endangered Species are Found on Private Lands as Opposed to Federal, State, and Tribal Lands

D. Most Common Reasons Species Become Listed

1. Habitat loss, destruction, and fragmentation
2. Exotic species introduction
3. Fire suppression
4. Pollution
5. Overexploitation

E. To What Extent Has the ESA been Successful at Bringing Back Species from the Brink of Extinction? Why has it not Been More Successful?

F. Management Strategies for Species Recovery

1. Active management (captive propagation, reintroduction and translocation, exotic species control, and predator control)
2. Habitat preservation
3. Habitat restoration
4. Species by species approach versus ecosystem management
5. The application of population viability analysis (PVA) and minimum viable population (MVP) size
6. What species characteristics make some more vulnerable to extinction than others?

REFERENCES

Allendorf et al. (1997); Bolen and Robinson (1995): Chap.19; Cox (1997): Chap. 26;
Hunter (1996): Chaps. 7, 14; Mann and Plummer (1999 b); Primack (1993): Chaps. 5, 12,
17, 18; Shaw (1985): Chap.8; Wilcove et al. (1998)



Managing for Biodiversity

READINGS *and* CLASS SESSIONS

Scalet et al. (1996): Chap.11; 2 Class Sessions

Managing for Biodiversity

A. Definition and Hierarchy of Levels

1. Genetic diversity
 - a) within a population
 - b) among different populations of a species
 - c) among different species
2. Species diversity
3. Community and ecosystem diversity

B. Biodiversity Hotspots and Estimates of Biodiversity

C. Extinction Rates of Species

1. Patterns of extinction and speciation throughout earth's history
2. Known species extinctions and rate at which these are increasing
3. Estimates of unknown species extinctions: Contrast with estimates of species population extinctions

D. The Use of Species-Area Relationships

1. To estimate rates of loss of biodiversity
2. To predict the number or percent of species that can be supported (or lost) in habitats of a particular size

E. Habitat Fragmentation and Biodiversity

1. Causes
2. Consequences to wildlife
 - a) Loss of Habitat
 - b) Limits placed on dispersal, colonization
 - c) Reduces and scatters resources
 - d) Results in small, distinct populations
 - e) Increases the amount of edge relative to interior habitat—"edge effects"

F. Management Applications

1. On a local scale
 - a) Environmental heterogeneity—physical and biotic
 - b) Resource abundance, variety, and distribution
 - c) Periodic disturbance, variety of successional stage
 - d) Intact, complex food webs
2. Setting aside preserves, protected areas, wilderness areas, national parks, and wildlife refuges
3. The science of designing preserves to maximize biodiversity
 - a) Size considerations
 - b) Shape and edge
 - c) Buffers
 - d) Corridors and connectivity
4. Indicator, umbrella, focal species
5. Ecosystem management

REFERENCES

Cox (1997): Chaps. 4, 5, 13, 27; Hunter (1990): Chaps. 4-8, Appendix 1; Hunter (1996): Chaps. 2, 3, 14; Primack (1993): Chaps 4, 14, 15



Ecosystem Management

READINGS *and* CLASS SESSIONS

Scalet et al. (1996): None; 1 Class Session

Ecosystem Management

- A. The Historical Evolution from the Single Species Management Approach to Ecosystem Management on Federal Lands
 1. Single species approaches: lack of success, inefficiency as listed species ballooned, unpopular
 2. ESA statement of purpose includes “ecosystem conservation”
 3. National Forest Management Act 1976
 4. Clinton Forest Plan 1993
 5. Adoption of ecosystem management by federal agencies (Forest Service, BLM, etc.)

- B. Description of Objectives of Ecosystem Management and Applications to Wildlife Conservation
 1. Practices and policies that maintain structure and function (integrity) of ecosystems
 2. Maintaining the “integrity” of ecosystems involves and intends to:
 - a) maintain viable populations of native species that are of particular interest
 - b) maintain viable populations of unknown species that are integral components of ecosystems (biodiversity)
 - c) maintain ecological processes
 - d) maintain a representation of natural ecosystem types and associated communities
 - e) manage large tracts of land over long periods of time
 - f) resource use and extraction must be sustainable, within the above constraints

REFERENCES

Carey and Curtis (1996); Grumbine (1997); Hunter (1996): Chap. 11; Shaw (1985):
Chap.8; *see also NCSR's Environmental Science I, II, and III.*



Special Problems Relating to Wildlife Conservation

READINGS *and* CLASS SESSIONS

Scalet et al (1996): Chap. 10; 1-2 Class Sessions

Special Problems Relating to Wildlife Conservation

A. Exotic Species

1. Extent of problem and impacts on wildlife and habitat
2. How exotics come to be introduced and reasons why they become successful
3. Legislation and methods of prevention and control

B. Predator Control

1. Reasons predators have been controlled or eliminated: historical and current
2. Impacts of predator removal on wildlife communities
3. Efforts to reintroduce predators
4. Public views and concerns

C. Animal Damage

1. Types of damage caused by wildlife
 - a) Property
 - b) Risk to human health and safety
 - c) Agriculture
 - d) To recovery efforts for endangered species
 - e) As a public nuisance
2. Who deals with these concerns? Role of federal and state agencies, including Animal Damage Control
3. Management options
 - a) Exclusion
 - b) Habitat modification
 - c) Population reduction
 - d) "Scare tactics"

REFERENCES

Bolen and Robinson (1995): Chap.9; Caughley and Sinclair (1994): Chap. 17; Cox (1997): Chaps. 14, 20; Hunter (1996): Chap.10; Primack (1993): Chap. 7; Shaw (1985): Chap.9



American-Indian Perspectives Wildlife

Produced by tribal partners of NCSR

Objectives

To provide socio-cultural-religious viewpoints while presenting background in political and legal aspects of American-Indian rights in relation to wildlife and wildlife resources.

To stimulate discussion and critical thinking, and to enhance students' understanding of biodiversity and wildlife issues.

INTRODUCTION

Instructors are encouraged to have the students read suggested materials, and information and description of laws that follows. This section provides brief background information and an overview of different laws, policies, and activities that have affected American-Indian rights and relationships with natural resources.

Students should read and discuss the following:

Views on wildlife and nature:

The quote from an old Teton Sioux (1911) in McLuhan's *Touch the Earth* (Page 18).

Legal views:

Jaimes, Annette. *The State of Native America*; Boston: South End Press, 1992: Chapter III. *Self-Determination and Subordination: The Past, Present, and Future of American Indian Governance*, by Rebecca Robbins; and Chapter V, *The Earth Is Our Mother: Struggles for American-Indian Land and Liberation in the Contemporary United States*, by Ward Churchill.

CULTURAL AND RELIGIOUS SIGNIFICANCE

There is ample evidence and documentation in the disciplines of history and anthropology to demonstrate the fact that American-Indian people had a holistic perspective, unique

understanding, and a special relationship with Nature; and particularly, with the ecosystems indigenous to their aboriginal territory. This perspective and relationship was based on a policy of reverence (Park 1936, Bean 1976, Lake-Thom, 1997), and American Indians lived with “their relations” under a system of natural laws.

The natural “law of reciprocity” was important in many Indian societies. It stated that one cannot take something from the land without its permission, and without giving something in return. As a result, American-Indian people offered tobacco, herbs, food, and sometimes even beads (a form of Indian money) in exchange for taking the life of a living thing (McLujan, 1971). For example, after taking the life of an animal, such as a deer or elk, a hunter would promise not to waste any part of its body.

Indian people also performed ceremonies and sacred dances as a way to give something back to Nature. Such activities offered prayer, and served as a form of thanks giving to both the Great Creator, and all of creation. It was through such beliefs, religious ceremonies, and spiritual practices that they sustained and managed their ecosystems and natural resources. They therefore lived in harmony with Nature and developed cultural systems that promoted balance—they did not perceive Nature as something to be conquered, tamed, or exploited.

Indians were critical and self-disciplined when it came to practicing conservation during times of drought, famine, and natural disasters. For example, they did not take all the berries, roots and plants, fish and game, or other food and subsistence sources during lean seasonal times. They always made sure that some of the resources were left and available for other creatures in the environment. They stored food and resources for anticipated hard times without depleting natural systems. Native people in general, including the local tribal groups, were very knowledgeable about diversity and all things in their ecosystem—the very essence of their survival depended upon it.

Quail, grouse, and ducks were primarily hunted as a supplemental food source, and the feathers were used in dance and ceremonial regalia. Smaller birds were highly prized for their feathers and not eaten. Larger predatory birds such as Ravens, Hawks, and Eagles were highly prized as sources of physical and spiritual powers, and feathers from these birds were used for making shafts on arrows.

The majority of smaller animals such as mink, otter, pine marten, fisher, raccoon, and bobcat were trapped, but not eaten; hides were tanned and used for arrow quivers and dance regalia. Larger animals such as deer and elk were considered a primary food source, while bear and mountain lion were not; often these larger animals were also considered sacred.

Deer and Elk were highly prized and were used for food, cooked fresh over a fire or boiled in watertight baskets. Strips of meat were often smoked and dried in a smokehouse with the use of alder or oak wood, and made into jerky. Hides were tanned by scraping them clean, washing them with a tanning solution made from soap root or alum root, and drying them. Then they were scraped and oiled into smoothness with Deer or Elk brains. Sometimes the hides were tanned with the hair remaining intact for blankets. Buckskin was used, of course, for clothing, moccasins, and ceremonial regalia. The sinew located in the backstrap and legs of the animal was used to make bow string and for sewing string on clothing and footgear. Tiny bones located on the bottom part of the animal's legs were used for needles in sewing; while other kinds of medium sized bones were used for awls and piercing instruments. The horns were used as tools, converted into weapons such as knives or knife handles, and were used in ceremonial regalia headdresses. Elk antlers in particular were used for making splitting mauls, or they were carved into money purses, or converted into tools for digging and pounding.

Coyote, Wolves, and Mountain lions were mainly used as power objects and ceremonial regalia. Some tribal groups ate mountain lion meat, others did not; none ate coyote or wolf. Tanned hides with the hair still on would be used for winter clothing, or as part of dance regalia.

SOCIAL, POLITICAL, AND LEGAL ASPECTS

At a conference in 1975 entitled *Natural Resources and American-Indian Culture* held at Humboldt State University (CA), an elderly Yurok medicine man spoke, making the following points regarding wildlife and ecosystems (paraphrased and rendered):

“Under the Great Creator’s Law, we (Indian people) have the right to hunt, to fish, to gather our foods, to gather our herbs, to use what you [Western culture] call natural resources; and we have the aboriginal and sovereign right to conduct our sacred dances and ceremonies. Without the use of the natural resources we cannot conduct our sacred dances, rituals, ceremonies, religion, or healing. We are dependent upon each other; we need the natural resources, and according to natural law, they need our prayers and ceremonies in order to live and grow. This aboriginal right was recognized and agreed upon by so-called treaties with the United States who claimed that man’s laws shall not be higher than God’s Laws.

“But since [Western culture/society] came to our land and environment, they have not honored the treaties made with Native tribes—they stole our land and natural resources, forced us to live on reservations and smaller portions of land called rancherias, and then they made up their own laws which in turn made us cede more land and natural resources. They made laws that forbid us to hunt, fish, or gather our foods and medicines. Year after

year they have tried to starve us off by stopping our traditional way of subsistence. They even made laws and arrested us for doing our religious ceremonies. Now they arrest our people if we hunt, fish, gather materials, or even pray at ancient sacred sites that are considered off the reservation.

“In the meantime, they have logged all the forests, destroyed most of the plants and herbs, polluted the creeks and rivers, killed all the fish and their spawning grounds; and almost wiped out the birds and animals. They have violated the natural laws and the Great Creator’s Laws ... I would suggest that [Western culture/people] start by following the natural laws, and by keeping your honor with the rights and laws you made with our Indian people, and use your education and technology to clean up your mess.... Your problem is now with the Great Creator—He is the One who created Nature, the Earth, and what you now call ‘natural resources.’”

The situation involving Native Americans and natural resources is very complex; the subject matter is too extensive to cover in a short period of time. There is, however, some basic information that can be shared to increase your sensitivity and awareness of this complexity. Long before the beginning of the U.S. republic, control of land and the resources within it was a source of conflict between the Euro-Americans and indigenous nations. In fact, going back a few hundred years in history, one can find evidence in both the Articles of Confederation and the Constitution of the United States certain clauses that dealt specifically with the Native tribes/nations and their land base territories. Tribes were recognized as foreign powers to the federal government. The 1789 *Northwest Ordinance* clearly states:

“The utmost good faith shall always be observed towards the Indian; their land property shall never be taken from them without their consent; and in their property, rights, and liberty, they shall never be invaded or disturbed—but laws founded in justice and humanity shall from time to time be made, for wrongs being done to them, and for preserving peace and friendship with them.”

As a consequence, U.S. relations with Native Nations were legally restricted in precisely the same way that relations with European countries, to the level of interchange between the federal executive and various indigenous governments. It was essentially a government to government relationship reflected in the 370 plus treaties made with Indian tribes/nations (mainly between the years 1778 and 1871). Unfortunately for indigenous people, the majority of those treaties were not honored by the U.S. government, as demonstrated by the U.S. Senate in many efforts to overturn them.

The following pages describe various pieces of legislation that define the relationship between the U.S. government and American Indians. They may be used as handouts for students.
