



This is to certify that the

dissertation entitled

The Application of a Co-Evolutionary Perspective to the
Case of Deer Hunting Ethoses Within a Human Ecosystem

presented by

Thomas A. Andersen

has been accepted towards fulfillment
of the requirements for

Doctoral degree in Sociology


Major professor

Date 04-14-01

LIBRARY
Michigan State
University

PLACE IN RETURN BOX to remove this checkout from your record.
TO AVOID FINES return on or before date due.
MAY BE RECALLED with earlier due date if requested.

DATE DUE	DATE DUE	DATE DUE
NOV 07 2002	JUN 01 2007	
NOV 18 2009		
12 01 09		

**THE APPLICATION OF A CO-EVOLUTIONARY PERSPECTIVE
TO THE CASE OF DEER HUNTING ETHOSES
WITHIN A HUMAN ECOSYSTEM**

By

Thomas A. Andersen

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Sociology

2001

ABSTRACT

THE APPLICATION OF A CO-EVOLUTIONARY PERSPECTIVE TO THE CASE OF DEER HUNTING ETHOSES WITHIN A HUMAN ECOSYSTEM

By

Thomas A. Andersen

Hunting is an activity which: a) has played a central role in human biological and social evolution; b) intimately connects humans to the physical environment; and c) has been pursued by individuals residing in societies which span a diverse array of levels of technological development. Because of this, examination of this activity provides a particularly opportune window through which to view changing relationships between physical environments, technology, culture and social structure. In this dissertation I use co-evolutionary theory to identify the factors that constrained (or failed to constrain) the harvesting levels of deer hunters in the Michigan Great Lakes region across a thousand year period (11th-20th centuries).

Co-evolution refers to an evolutionary process based on the reciprocal responses of two (or more) closely interacting species. The “species” of central concern in this dissertation is that of hunting ethos. A hunting ethos is a changing complex of fundamental beliefs and values that underlies, permeates, and motivates major patterns of hunting thought and behavior. Three epochs exhibiting distinct sociocultural ecosystem dynamics, and distinct hunting ethoses, are identified: (1) sustainable harvesting among the indigenous Americans (11th-16th centuries); (2) invasion and succession by Euro-Americans, including two sub-epochs of invasion by, first, fur traders, and second, lumber harvesters (16th-19th centuries); and (3) an era of increased threat to the viability

of hunting as an activity which I label the “squeeze” (20th century). Hunting ethos in the first and third epochs encouraged hunter constraint, while hunting ethos in the second epoch legitimated hunter excess. I address the question of what kinds of factors gave rise to more sustainable hunting ethos by examining the relationship between hunting ethos and other species implicated in the activity of deer hunting, including deer, hunting technology, Native Americans, European fur-traders, Euro-American lumber harvesters, Euro-American settlers, industrial workers, and the state.

Copyright by
Thomas A. Andersen
2001

Dedicated to my mother,
Eleanor Ruth Knipp Andersen,
a constant source of inspiration.

ACKNOWLEDGMENTS

A successful dissertation project is really the joint product of innumerable people: professors, fellow graduate students, family and friends. All of these, and others, have helped me along the way, and I offer you all my appreciation.

Nevertheless, I owe many individuals a special thanks for their assistance and support. The chair of my dissertation guidance committee, Dr. Craig K. Harris, has provided continuous support and encouragement from the project's inception through its completion. His guidance, insights and experience were invaluable at all phases of the project: research questions, data gathering strategy, findings interpretation, and overall organization. He was more than willing to read and edit the many drafts I submitted over the years. Although, at times, the process seemed unending, he continued to help me to steadily advance toward a successful defense. At the same time, he allowed me enough latitude to pursue my research in a manner of personal discovery which has, I believe, given me a solid grounding in the research process.

I would like to thank Dr. Marilyn Aronoff who gave me much support and guidance early in my career as a graduate student. I especially remember her course in Community where I gained many fundamental sociological insights which later helped me interpret the findings of my dissertation. In addition, she provided crucial guidance in formulating my major research question preceding my research proposal defense. Namely: was I explicating a new paradigm as a fruitful research tool? Or was I using the paradigm

in an attempt to answer a concrete research question? I would also like to thank her for serving on my dissertation guidance committee and providing a valuable critique in that capacity for a final version of my dissertation.

I would like to thank Dr. Tom Connor who also gave me much support and guidance early in my career as a graduate student. I had the privilege of assisting Dr. Connor in his Marriage and Family Course where I had the opportunity to learn both teaching skills and subject content that I later applied in my own courses. Dr. Connor also served on my dissertation guidance committee. In fact, he graciously agreed to jump in at the last minute to fill a vacancy left by the departure of another professor shortly before my dissertation defense. Dr. Connor made several valuable suggestions in his critique that will definitely improve the final version of my dissertation.

I would like to thank Dr. Chris Vanderpool both for the opportunity to take his graduate courses and for serving on my dissertation guidance committee. Dr. Vanderpool was the Chair of the Sociology Department throughout most of my career as a graduate student. In this capacity he was always highly supportive of graduate students in general and of me in particular. The instances of this support are too numerous to mention, but are greatly appreciated. I also had the privilege of assisting Dr. Vanderpool in his Introduction to Sociology Course. I have used his instructional approach as a model for my own Introductory Sociology Courses. I especially want to acknowledge Dr. Vanderpool's reading of a pre-defense draft of my dissertation. This was an effort beyond the call of duty required of a non-chair dissertation guidance committee member. However, by doing this he helped resolve several critical theoretical issues thereby greatly

facilitating the actual dissertation defense.

Thanks are due to Dr. Peter K. Manning. I had the privilege of assisting Dr. Manning in his Criminology Course, which, again, I used as a model for my own teaching. Dr. Manning gave me valuable assistance with the completion of my Master's Degree and with the early development of my dissertation project. Dr. Manning originally served on my dissertation guidance committee and gave me many useful suggestions at my research proposal defense. Although Dr. Manning was not able to remain on my dissertation guidance committee until the final defense, his help is greatly appreciated.

A special thanks is also due to my very dear friend for most of my adult life, Robert Shaw. Robert did not specifically guide me on my dissertation in any official capacity. Nevertheless, his companionship on many a hunting venture, and his profound knowledge of, and love for, the study of history and the human condition has continued to stimulate my own interest in these areas through my involvement with academic sociology and history.

Lastly, a very special thanks goes to Dr. Valerie Gunter who never faltered in her conviction that I would, indeed, one day finish my dissertation. In addition to providing this much needed source of moral support (based on her experience of going through the same process) she devoted a considerable measure of her own time to editing the final drafts to the point where they actually made sense. Finally, as a token of her faith in me, she has recently done me the honor of becoming my wife.

TABLE OF CONTENTS

List of Tables.....	xvi
List of figures.....	xvii
CHAPTER	PAGE
I. Introduction.....	1
Organization of Study.....	9
II. Theory and Literature Review.....	11
Macro-Historical Theories.....	11
The Organic Models.....	12
Spencer.....	12
Parsons.....	14
The Materialist Models.....	17
Economic Determinism.....	17
Marx.....	17
Mannheim.....	18
Technological Determinism.....	20
Morgan.....	20
Lenski and Lenski.....	21
Environmental Determinism.....	23
Buckle.....	23
Steward.....	23

CHAPTER	PAGE
	The Idealist Models..... 25
	Levi-Strauss..... 25
	Berger and Luckmann..... 26
	Weber’s Materialist-Idealist Hybrid..... 27
	Relationship to Co-Evolutionary Theory..... 28
	Co-Evolutionary Theory..... 30
	Definition of “Species”..... 33
	Biological Versus Social Evolution..... 35
	General Dynamics of Evolutionary Change, Including Invasion and Succession..... 37
	Overview of Five Co-Evolutionary Studies..... 39
	Applications of Co-Evolutionary Theory to the Present Study..... 45
III.	Methods..... 47
	Data Sources..... 47
	Coding..... 54
	Data Analysis..... 57
	Reliability and Validity..... 61
IV.	Findings, Summary Overview..... 63

CHAPTER		PAGE
V.	Epoch I: Sustainable Harvesting Among the Indigenous Americans (11th-16th Centuries).....	66
	Species Identification and Description.....	66
	Species' Co-Evolutionary Interactions.....	69
	Constraints on Harvesting.....	72
	System Dynamics.....	73
VI.	Epoch II: Invasion and Succession in the 16th-19th Centuries.....	75
	Epoch II-A: First Contact and the European Fur Trade (1601- 1820).....	76
	Species Identification and Description.....	76
	Species' Co-Evolutionary Interactions.....	80
	Constraints on Harvesting.....	85
	System Dynamics.....	88
	Epoch II-B: The Lumber Industry (1821-1890).....	89
	Species Identification and Description.....	89
	Species' Co-Evolutionary Interactions.....	93

CHAPTER	PAGE
	Constraints on Harvesting..... 99
	System Dynamics..... 100
VII.	Epoch III: Transition to, and Contextualizations for the 20th Century..... 102
	Evidence of the “Squeeze”..... 104
	1909-1911..... 108
	1929-1931..... 112
	1949-1951..... 115
	1969-1971..... 120
	1989-1991..... 121
VIII.	Causes of the “Squeeze”..... 123
	Decrease in Hunter Opportunities..... 124
	Development..... 124
	Posting of Agricultural Land..... 128
	Pesticides and Pollution..... 130
	Increase in Hunter Pressures..... 133
	Population Characteristics..... 133
	Improvements in Transportation Technology..... 134
	1909-1911..... 134

CHAPTER	PAGE
1929-1931.....	135
1949-1951.....	137
1969-1971.....	137
1989-1991.....	139
Improvements in Hunting Technology.....	139
1909-1911.....	140
1929-1931.....	141
1949-1951.....	142
1969-1971.....	142
1989-1991.....	144
Opposition to Hunting.....	144
IX. Responses to the “Squeeze”.....	150
State Ownership and Game Management.....	150
Sports Hunting Ethos.....	152
Overview.....	154
Nature is Finite/Human Actions Can Imperil Nature.....	157
Condemnation of Market and Pot Hunters.....	161

CHAPTER	PAGE
Voluntary Harvesting Restrictions/Bag Not the Thing.....	162
Spiritual Renewal.....	164
Acceptance of Non-Kill Activities.....	166
Give Game a Fair Chance to Escape.....	168
Skill.....	169
Support for Game Laws.....	170
Practice Safety, Integrity, Generosity, Respect.....	171
Condemnation of Slob Hunters.....	174
X. Applications of the Co-Evolutionary Framework.....	176
20th Century Species' Co- Evolutionary Interactions.....	176
Constraints on Hunting: What Constitutes a "Good Sportsman"?.....	184
1909-1911.....	185
1929-1931.....	187
1949-1951.....	188
1969-1971.....	189

CHAPTER	PAGE
1989-1991.....	191
System Dynamics.....	193
XI. Discussion and Conclusions.....	196
Summary of Major Findings and Theoretical Contributions.....	196
Possible trajectories for further research.....	212
Bibliography.....	214
General References.....	221
Appendix A: List of Hunting and Related Journals from the Michigan State University Library.....	226
Appendix B: List of Hunting and Related Journals from <i>Standard Periodical Directory</i>.....	228
Appendix C: Indigenous Americans Prior to the 11th Century.....	229

LIST OF TABLES

TABLE		PAGE
3.1	Issues of <i>Field and Stream</i> Included in the Final Sample.....	53
4.1	Overview of Major Characteristics of Michigan Deer Hunting Sociocultural Ecosystem, Epochs I, I and III.....	65
7.1	Number of Deer Hunting Licenses Sold, Number of Deer Killed, and Kill-to- License Ratio, Firearm Season, Michigan, Selected Years.....	107
7.2	Types of Animals Depicted in Taxidermy Advertisements in <i>Field and Stream</i> , Selected Years.....	108
11.1	Detailed Overview of Major Characteristics of Michigan Deer Hunting Sociocultural Ecosystem, Epochs I, I and III.....	208-211

LIST OF FIGURES

FIGURE		PAGE
5.1	Ecological Interactions for Epoch I.....	70
6.1	Ecological Interactions for Epoch II-A.....	81
6.2	Ecological Interactions for Epoch II-B.....	94
10.1	Ecological Interactions for Epoch III.....	177

Chapter I.

Introduction.

“Cultural man has been on earth for some 2,000,000 years; for over 99 percent of this period he has lived as a hunter-gatherer” (Lee and Devore 1968:3). Hunting and gathering has been Homo sapiens’ longest and most successful form of adaptation.¹ It

¹ This dissertation makes the implicit assumption that the indigenous Native American societies of the Great Lakes area were in a state of ecological sustainability concerning the activity of deer hunting immediately preceding European contact. This requires some discussion. No assumption is made here that hunting gathering-horticultural societies are inherently sustainable (an assumption often made by current environmentalists). There is a distinction between what people do (behavior), and what they believe (culture). The major reason such societies generally seem to have a less destructive (unsustainable) impact on their physical environments than agricultural-industrial societies may well result from a combination of factors such as geographic isolation, small population, lithic technology, a particularly resilient environment, etc rather than an environmental-conservation ethos. However, they can, and often do, have significant impacts on their environment that can render them unsustainable in the long term.

On the other hand, hunter gathering-horticultural societies may indeed have an ethos that either manifestly or latently performs a conservation function which contributes to an essentially sustainable mode of adaptation. I argue here, and throughout this dissertation, that Native American Great Lakes societies did possess and practice such an ethos. For example; “most American Indians, lived in a world that was peopled not only by human persons, but by persons and personalities associated with all natural phenomena.....all other animals therefore had personalities and were thus as fully persons as other [sic] human beings.....The Cree and the animals they hunt belong to a single moral community whose members recognize and fulfil obligations towards each other (Milton 1996:127).” One of these obligation was to refrain from over-hunting beyond practical or reasonable need. The existence of this ethos is corroborated in my discussion of Martin (1979, 1976) in Chapter V. Further, I would direct the reader to my discussion of Neuman (1985), Cronon (1983), and Silver (1990) in Chapter II. These authors all discuss the environmental impact of Native American societies on their environments vis-a-vis the notion of sustainability. Finally, I would also direct the reader to Appendix C of this dissertation where a detailed discussion of the sustainability issue of Native Americans and their paleo ancestors is offered.

has exhibited remarkable stability and sustainability. It produced an important selection criteria by which human biology, psychology, and culture evolved.

To assert the biological unity of mankind is to affirm the importance of the hunting way of life. It is to claim that, however much conditions and customs may have varied locally, the main selection pressures that forged the species were the same. The biology, psychology, and customs that separate us from the apes -- all these we owe to the hunters of time past. (Washburn and Lancaster 1968:303).

Sanderson (1995a, 1995b) views agriculture and industrialization as transitory phases between hunting-gathering and some as yet unknown but stable and sustainable mode of adaptation. He defines such an adaptation as desirable. The present study seeks in some small measure to contribute to this goal via the belief that the evolution of such a society will be aided by increased knowledge of the hunting-gathering mode and its evolutionary descendants in the agricultural and industrial phases.

In a very real sense our intellect, interest, emotions, and basic social life -- all are evolutionary products of the success of the hunting adaptation... It is for this reason that the consideration of hunting is so important for the understanding of human evolution. (Lee and Devore 1968:3; see also Washburn and Lancaster 1968:293-294)

Hunting is not only an activity which has played a central role in human biological and social evolution, and which has been pursued by individuals residing in societies which span a diverse array of levels of technological development; it is also an activity which intimately connects humans to the physical environment. Taken together, these three factors make hunting a particularly valuable vantage point from which to examine

changing relationships between physical environments, technology, culture and social structure. Following on my previous comment that a goal of the present study is to contribute to Sanderson's vision of creating more sustainable forms of social organization, the three central questions I want to ask about hunting activity in this dissertation are: 1) What factors determine how many deer are harvested by any given society, at any given time? 2) What factors determine how many deer are harvested by any given society across time? 3) What factors relate the number of deer harvested to the level of sustainable harvest?

Consider some of the possible candidates at work for the first question: range and accuracy of hunting technology, economic motivations, cultural approvals and sanctions, and state regulation or facilitation. Different theoretical perspectives place causal primacy on various of these factors. Of particular importance is the division between what we might broadly classify as "materialist" versus "ideological" perspectives (see, for example, Franck 1984; McMurtry 1978).

Now consider the second central question: what factors determine how many deer are harvested across time? To answer this question we must address a broader theoretical issue: what factors account for social change in general? Again, an examination of extant social theories suggest a range possible candidates: evolutionary theory, equilibrium theory, conflict theory, and various rise and fall theories (Appelbaum 1970).

The first two questions draw attention to the contrast between social statics and social dynamics. While the first question, taken in isolation, addresses social statics, the

driving focus of this dissertation is a concern with social dynamics, a concern made obvious by my examination of a thousand-year history.²

The long term-focus of this dissertation is best addressed by a guiding imagery that conveys social dynamics (e.g. social evolution), rather than social statics (e.g. Duncan's 1964 P.O.E.T. model).³ In this work social evolution⁴ refers to a process whereby one sociocultural form is transformed into a qualitatively different sociocultural form and this transformation exhibits a certain directionality (Sanderson 1995b:56).

The specific evolutionary model I employ is that of co-evolutionary theory (Norgaard 1984a). Co-evolutionary theory contrasts with materialist and ideological models of social change in several ways. First, materialist and idealist approaches specify one prime mover that causally determines all other social arrangements, and is theorized to

² This dissertation utilizes a macro-historical approach. It is recognized that an analysis at this level inevitably sacrifices some degree of data precision when each time period is described.

³ The POET (population, organization, environment, and technology) paradigm of O. D. Duncan (1964) was among the first attempts in sociology since the Chicago School to integrate the environment as a theoretically meaningful concept. However, POET is more a heuristic device than an explanatory model and is therefore not discussed in this dissertation.

⁴ There is an ongoing debate among social thinkers on the nature of the degree, if any, of directionality or control that humans can put on social evolution. Some claim that this is an independent, and perhaps random, process with a "life of its own" so to speak and the belief that humans can exert any control is an illusion. Others claim that humans can substantially direct their own social evolution if only we can discover the dynamics. Indeed, this hope is what largely fueled the establishment of the discipline of sociology. Others, including this author, take a middle ground which sees the interplay between structure and agency as a co-evolutionary dialectical process with humans exerting some degree of control, usually with some unforeseen consequences, while the system also changes in response to its own internal dynamics somewhat independently of human will.

do so at all times and in all places. Three likely candidates emerge as causal determinants of the number of deer harvested from a materialist perspective: (1) the level of development of hunting technology; (2) the nature of harvesting incentives and disincentives that flow from a society's political-economic arrangements; and (3) demographic and environmental factors, such as the size and health of the deer population. One likely candidate emerges as a causal determinant of the number of deer harvested from an idealist perspective: that of hunting ethos, which refers to a changing complex of fundamental beliefs and values that underlies, permeates, and motivates major patterns of hunting thought and behavior.

While co-evolutionary theory enters material conditions as key explanatory factors in its causal models of human social life, and while it agrees that at particular points in time one factor may play a major determinant role in shaping a wide array of social arrangements, it does not privilege any factor as the universal prime mover. To understand the reason for this, we need to turn to a second key difference between co-evolutionary theory and materialist and idealist perspectives: while the latter emphasize linear, deterministic causal models (e.g., the base determines the superstructure), co-evolutionary theory emphasizes multiple and recursive causal connections among dynamic system elements interconnected through feedback mechanisms. Indeed, the very term co-evolutionary points to the importance of this feedback dynamic: it specifies that any system component develops in ways that are responsive to other system components. Additional distinctions between co-evolutionary theory and materialist and idealist approaches will be discussed in Chapter II.

Attention to feedback mechanisms is especially important to a consideration of system sustainability. Dominant or deterministic system components exert an influence over the entire system milieu, shaping it in ways that ensure the resource inputs necessary for that component's continual survival. Yet, if any of the components which provide the dominant component with resources is threatened, the viability of the entire system becomes threatened as well. Sustainable systems are thus ones where all the component elements benefit to at least some degree from the co-evolved relationships.

To illustrate the importance of feedback mechanisms to the activity of deer hunting, consider the following dilemma: improvements in hunting technology in terms of range and accuracy of weapons means that humans are technologically able to harvest an ever-increasing number of deer. Were "technological capacities" the sole determinant of harvesting levels, any technological innovation would threaten to increase efficiency to such an extent that the very viability of the deer population might be jeopardized. Hunting technology thus might play a deterministic role in the short run, but in the longer run its very success would undermine the conditions necessary for its continued survival. Karl Marx was well aware of this tendency for social systems to self-destruct when he noted that capitalism carries the seeds of its own destruction.

For technological innovation not to threaten sustainability deviation correcting feedback loops must be operating. A possible feedback mechanism would consist of growing awareness that the deer population is threatened. Alternative causal mechanisms might include a hunting ethos that condemns "greedy" hunters, and/or state regulation that limits the number of deer hunters can harvest in a season.

Specification of the interrelationships among system components within a co-evolutionary framework is aided by conceptualizing these components as “species.” One key advantage is that this helps to more firmly ground our thinking in organic system imagery. Several of the elements of co-evolutionary theory discussed thus far, such as adaptation and evolution, have already hinted at this organic underpinning. We can more fully develop the conceptual richness of co-evolutionary theory, however, by further teasing out the implications of the use of an organic model. This is especially important since mechanical systems (e.g., internal combustion engines, nuclear reactors) also make use of feedback mechanisms.

When we conceptualize system components as “species,” we can ask basic questions about the kinds of survival challenges living species confront, and the kinds of strategies they develop to meet these challenges. Three characteristics of living species are especially important to the analytic framework that will be employed in this dissertation. First, species require a continual source of resource inputs if they are to survive (reproduction). Second, species obtain these resources by adapting to their environmental milieu, including other species, the inorganic components of the physical environment, the operation of natural laws, etc (adaptation). Species can become extinct if the environment changes in such a way that their survival requirements are no longer forthcoming. Extinction is most likely in situations of sudden and/or severe environmental change; with more gradual change it is more likely that evolutionary processes will generate and select for traits that are adaptive to the new conditions. Third, species may enhance their chances of survival by locating and utilizing alternative sources of required

resource inputs, for example, by invading new territories (innovation). This third characteristic is especially important for distinguishing organic from mechanical systems, for it creates a disruptive potential not found in the latter kinds of systems.

Co-evolutionary theory thus allows us to add a number of subsidiary questions to the three central questions I want to ask about hunting activity in this dissertation which are: 1) What factors determine how many deer are harvested by any given society, at any given time? 2) What factors determine how many deer are harvested by any given society across time? 3) What factors relate the number of deer harvested to the level of sustainable harvest? These subsidiary questions include:

1. When we examine hunting practices across a range of various economic systems, and levels of technological development, do we find any factors that seem to play a determinant role in all social variations studied? Or, as co-evolutionary theory would lead us to expect, do different kinds of factors play a more prominent role in different times and places?
2. Can we find historical examples of hunting regimes that are sustainable and unsustainable? Do effective feedback mechanisms play a positive role in promoting sustainable systems?
3. How disruptive to established systems is the invasion of new species? What effect does invasion/succession dynamics have on short- and long-term sustainability?

The present study examines deer hunting in the Michigan Great Lakes' region over a thousand year period. Nine species interrelated through the activity of "deer hunting"

will be examined: (1) deer;⁵ (2) hunting ethos; (3) hunting technology; (4) the state; (5) Native Americans; (6) European fur traders; (7) Euro-American lumber harvesters; (8) farmers (Euro-American settlers/industrial agriculturalists); and (9) industrial workers.⁶ These final species serve as proxies for some of the factors considered key by materialists, allowing us to see the operation of different economic motivations and different human population characteristics and dynamics, such as population density.⁷

Organization of Study

Chapter II will present a more extensive review of literature and theory relevant to this study. It begins with an overview of other macro-historical social theories that have attempted to address the same kinds of questions as co-evolutionary theory, including works based on an organic model of human social life, as well as materialist and

⁵ Although all the native Great Lakes area deer belong to the species commonly referred to as whitetail by biological criteria, they can be divided into distinct categories based on their physical environment, food sources, and specific survival skills. Thus we can speak of urban, suburban, exurban, rural, and wilderness deer. Transplanting deer from one of these environments to another is problematic as the deer find it difficult, or sometimes impossible, to adjust. For example, urban and suburban deer often fall easy victim to predators they are completely unaware of when transplanted to rural and wilderness environments (Nelson 1998).

⁶ This species includes the bulk of the human population living in Michigan and integrated into its Epoch III (1890 - 2000) industrial and post-industrial political economy. Most of these individuals would be considered blue collar or working class. However, this term is not socioeconomic class-specific and also includes white collar and other management and professional strata. Thus it is really all inclusive as anyone can hunt deer.

⁷ Gender is not addressed as a salient issue in this dissertation. For Epoch I 1000 - 1600 and Epoch II 1601 - 1890, secondary data sources are utilized and gender is not generally specified although male domination of the dynamics is implied. For Epoch III 1891 - 2000, *Field and Stream* magazine is utilized as the major data source and, again, gender is not a focus or concern and male themes and imagery dominate the journal's content. Finally, it is strongly implied that males constitute the majority of the readership.

ideological models. Strengths and weaknesses of all these theories are identified. It is indicated how co-evolutionary theory seeks to make use of these strengths while overcoming some of the weaknesses through the development of a more synthetic model. The latter part of Chapter II presents a more extensive discussion of co-evolutionary theory, including a consideration of the similarities and differences between biological and social evolution and a summary of findings from five other authors who have utilized co-evolutionary theory in their research projects.

Chapter III presents the methods used in this research project. Topics addressed include data sources, coding, data analysis, and reliability and validity.

Chapters IV-X present the research findings. Chapter IV provides a summary of the material to follow, including a table which organizes the major highlights. These chapters are organized around three distinct ecological epochs; the means used to identify these epochs is discussed in Chapter Three. The first of these epochs, sustainable harvesting among the Native Americans, is discussed in Chapter V, while the second epoch, invasion and succession, is discussed in Chapter VI. The third epoch, the “squeeze,” occurred in the 20th century. Because of the wealth of material available for this period, this epoch is the most extensively developed of the three. Findings related to this period are presented in Chapters VII, VIII, IX, and X.

Chapter XI, discussions and conclusions, returns to the research questions listed above to consider how well co-evolutionary theory provided useful insights into helping us identify the factors that determine how many deer are harvested at any given time, and across time. Recommendations for future research are also addressed in this chapter.

Chapter II.

Theory and Literature Review.

The present chapter is divided into two major sections. The first section reviews social theories that were historical precursors of co-evolutionary theory. The second part of the chapter undertakes a more extensive discussion of the major concepts and assumptions of co-evolutionary theory.

Macro-Historical Theories

Co-evolutionary theory synthesizes ideas and insights from three other macro-historical perspectives: social theories that build on an organic model of human social life, social theories which highlight the important role of material conditions in shaping social life, and social theories which stress the influential role of language and beliefs. In this section I present a more detailed examination of these theories. My goal here is not to be exhaustive, but rather to identify two of the best known theorists working in each of the presented topical areas. In a few cases I add footnotes that briefly summarize the work of other leading theorists who have made important contributions to one of these topic areas. I also discuss the work of Max Weber, an early sociologist who sought to integrate materialist and idealist insights into a common theoretical framework. I end the section by considering the strengths and weaknesses of these theories, and identifying which aspects of these theories were borrowed by the co-evolutionists and integrated into their own theoretical programs.

The Organic Models

The present section discusses the works of two leading users of organic analogies:⁸

Herbert Spencer and Talcott Parsons.

Spencer

The best known of the early social evolutionary theories is that of British social philosopher Herbert Spencer (1820-1903). Spencer attempted to merge utilitarian individualism with an organic model of social system evolution. Drawing heavily from the burgeoning science of biology (especially evolution and natural selection) and physics of the 19th century, Spencer attempted to discover universal (first) principles of evolution and dissolution that applied to all phenomena, physical (inorganic), biological (organic), and social (superorganic). He believed that homogeneity in all three types of systems is inherently unstable. Homogeneity in any system cannot remain in a stable state because the different effects of local forces in inevitably dynamic environments upon its various parts must causes differences to arise in its future development (Timasheff 1957:32)

Social systems, Spencer argued, like organisms use processes of internal differentiation and integration to adapt to their environments. He believed that evolution always meant the progression from less to more differentiated and complex structures. As such, societal evolution is but one type of a more general evolutionary process in the

⁸ The organic analogy explains social systems in terms of biological organisms. Social systems are therefore cast as organic systems. An organic system may be defined as: “.....an entity made up of interdependent parts which are in balance with each other and create an integrated whole” (Abercrombie, Hill, and Turner 1986:85). Further, organic systems tend to become more complex and differentiated in terms of internal structure through evolutionary change.

cosmos. For Spencer, then, social evolution involved movement from simple and homogeneous societies to increasingly more differentiated and complex systems. For example, simple homogeneity in 'militant' society evolves into complex heterogeneity in industrial society (Turner and Beeghly 1981).

Spencer also believed that greater differentiation and complexity led to greater adaptive capacity for a society. Thus, evolution was equated with social progress. In fact, Spencer believed that humanity was predestined for progress. This understanding was built upon an explicit organic analogy which contained the following elements:

First, both society and organisms are distinguished from inorganic matter by visible growth during the greater part of their existence...Second, as both societies and organisms grow in size they also increase in complexity of structure... Third, in societies and organisms progressive differentiation of structure is accompanied by progressive differentiation of function... Fourth, evolution establishes for both societies and organisms differences in structure and function that make each other possible (Timasheff 1957:36).

However, Spencer noted that there were also significant differences between societies and organisms.

First, in an organism the parts form a concrete whole; in a society the parts are free and more or less dispersed. The second difference is that in an organism consciousness is concentrated in a small part of the aggregate; in a society it is diffused throughout the individual members. Third, in an organism the parts exist for the benefit of the whole; in a society the whole exist for the benefit of the individual (Timasheff 1957:36).

Spencer held that society was therefore not really an organism and that this was an analogy. Nevertheless, it was the essential regularity or systemic nature of societies that made Spencer believe that a “science” of society could be constructed. He felt that since social evolution was a “law” all societies were destined to follow a similar line of development. “Primitive” societies then, were in an earlier stage of social evolution and the evolutionary history of any society could be reconstructed by examining current societies that were in these earlier stages.

Spencer derived a political doctrine from this perspective which held that social planning, social welfare and state intervention only interfered with the natural process of social evolution and progress which guaranteed personal freedom in industrial society (utilitarian individualism). He is thus associated with the principle of “survival of the fittest” and Social Darwinism (Timasheff 1957).

Parsons

Talcott Parsons was the foremost U.S. sociologist of the middle 20th century. His goal was to formulate a conceptual structure for sociology that would integrate all the social sciences. He approached this by attempting to synthesize the analysis of individual action and the analysis of large and complex social systems. He called this synthesis “social action.” He felt that the relationship between actors and the features of their environment to which they give meaning, both natural and social, was the essential feature of social action. Further, other people (or the social) make up the most important segment of an actor’s environment. This suggests that social interaction, in which actors

must recognize the actions, wishes, goals, etc. of others, should be the focus (units of analysis) of sociological enquiry.

Parsons felt that norms and values were of critical importance because they regulate the behavior of actors and make them relatively predictable to each other. Socialization ensures that the more or less same normative system is instilled in the actors of any society. Parsons, then, theoretically treated personality and social systems as complementary, but in his analysis he usually treated the latter as determining the former.

Parson's work continued Spencer's organic analogy, but moved this into a static rather than a dynamic model. Parson's and other structural-functionalists view human societies as complex organizations composed of elements that are interconnected and interdependent. Each element influences all the others. Each element also has a function that helps to maintain and ensure the survival of the whole system. The existence of an element is explained when its function is identified.⁹

He posited that social systems have requirements resulting both from their relationship with their environment and the need to maintain internal order. There are four such fundamental requirements: adaptation (taking resources from the environment), goal attainment (setting goals for the system), integration (maintaining internal order), and

⁹ A recent revival of functionalism (neofunctionalism) can be seen in the works of Jeffrey Alexander (1985) and Niklas Luhmann (1989). The recency of this work precludes it from being an influence on the formation of co-evolutionary theory, particularly of key theorists such as Boulding (1961, 1953) and Norgaard (1981). However, the efforts of these theorists to move beyond some of the limitations of Parson's work may present useful avenues of possible integration for future work. In particular, Luhmann's attention to ecological conditions suggests possible lines of complementary development between neofunctionalism and evolutionary theory.

latency or pattern maintenance (the generation of sufficient motivation to perform tasks). In order to meet these fundamental requirements groups (sub-systems) of action (actors) form. However, each of these groups or sub-systems has the same four fundamental requirements and can redivide into lower-order groups or sub-systems. In theory there is no limit to the number of times lower-order groups or sub-systems can form. Hence, social evolution (systemic change) occurs through the altered patterns of interaction (differentiation) between actors necessitated by the fundamental requirements of systems.

Because all societies have ideological integrative mechanisms of common values and beliefs, they tend toward equilibrium (although they may never actually reach it). Perturbations in one element tend to bring about some adjustment in others to restore equilibrium. Social change is really movement from one state of equilibrium to another. Social change is therefore rare, but when change occurs it is usually beneficial.

The actual mechanism of internal social change is differentiation. He used social evolutionary theory to describe both the internal dynamics of, and the progressive changes in society resulting from, this differentiation (Parsons 1977).

Early social evolutionary theories, as exemplified above in the works of Spencer and Parsons have been subjected to significant criticisms. First, these early formulations contained the implicit notion of “progress” from inferior to superior, and final, social forms. Thus, they were guilty of ethnocentrism in that the industrial West was seen as the end stage of social evolution. All other societies were thus judged inferior to some degree.

Criticisms of the structural-functionalism of Talcott Parsons center on its over-emphasis on harmony and its underemphasis of competition and conflict. Its logic -- that all cultural and social traits have a positive function -- compel it to argue for preservation of the status quo. Its perspective is ahistoric, and it tends generally to ignore change. Its perspective is also ethnocentric, implying that simple societies are less adaptive and that complex societies are more adaptive.

The Materialist Models

In this section three types of material conditions that are seen by some theorists to play a determinant role in society are discussed. These material conditions are: economic institutions, level of technological development, and characteristics of the physical environment.

Economic Determinism

Marx

A contemporary of Herbert Spencer's, Karl Marx (1818-1883), together with his collaborator Frederick Engels (1820-1895), also advanced an evolutionary theory of social change. However, whereas Spencer looked for universal evolutionary laws applicable to the physical, biological, and social realms, Marx's focus was on the social realm. For Marx, humankind's ability to engage in meaningful social labor, facilitated by the related capacities of intelligence and creativity, marked a point of discontinuity with the natural world, organic and inorganic. The processes that drove forward social evolution were, for Marx, distinctly social in origin.

As might be suggested by Marx's attention to the importance of human labor power, Marx located the driving mechanism of social change squarely in the economic realm. The classic conflict theory (dialectical materialism)¹⁰ of Marx and Engels posits an economic infrastructure made up of: 1) the forces of production, which consist of the type of availability of natural resources, and the technology used to extract these resources and transform them into socially-desirable products; and 2) the relations of production, which consist of the economy and the system of ownership of the forces of production. It further posits a superstructure, which consists of the social forms along with ideology, beliefs, and values. Religion, government, education, and mass media. The deterministic nature of this theory can be seen in the postulate that changes in the economic base bring about changes in the superstructure. This struggle is made manifest in the industrial class struggles of bourgeoisie and proletariat, which lead inevitably to an end state of communism (Sanderson 1995a:72-74).

Mannheim

While the German sociologist Karl Mannheim (1893-1947) was influenced by a number of social theorists and philosophers, including Hegel and Weber, his early work in

¹⁰ "Materialism rejects idealistic explanations of social and other phenomena and suggest that *all* phenomena are material. The notion of dialectic expresses the view that development depends on the clash of contradictions and the creation of a new, more advanced synthesis out of these clashes. The dialectical process involves the three moments: thesis, antithesis, and synthesis. K. Marx used the notion to account for social and historical events, but Engels extended the scope of dialectical analysis so far as to establish it as a general law of development that applied equally in social, natural and intellectual spheres" (Abercrombie, Hill, and Turner 1986:69).

the sociology of knowledge was firmly grounded in a Marxian worldview. Following Marx, Mannheim took the position that:

[t]he ideologies of a given society in a given period bore some determinant relationship to the existing classes and to the objective conflict of interests among them... Depending on the position men occupy in the social structure and their consciousness of that position, they join together in groups and strive collectively either to change or preserve the conditions of their existence. (Zeitlin 1981:204,310)

Mannheim employs this deterministic approach in his analysis of German conservative thought in the aftermath of the most marked embodiment of Enlightenment ideals, the French Revolution. He argues that conservatism as political ideology must be regarded as more than mere tradition; it emerged as a coherent body of thought only as a reaction to the rationalization of the Enlightenment. In contrast to Enlightened thought, the conservatives stressed community rather than individualism, viewed society as an organic unified whole rather than as a contractual relationship among atomistic individuals, and stressed adherence to a traditional, divinely ordained social order over pursuit of “progress” stemming from the misguided notion that humankind could control its own destiny.

Because rationalism was linked with the emergent capitalist order, adherence to conservative ideology was found among those groups and classes which remained outside capitalist economic relations: peasants, the petite bourgeoisie, and the landed aristocracy. Furthermore, the particular class structure in Germany in the late 18th and early 19th centuries, a class structure characterized by a small and weak middle class, made the

conservative reaction unusually strong. It is for this reason that Germany exhibits the peculiar pattern of having the German state bureaucracy play the role of primary advocate of the kinds of economic reforms needed to facilitate capitalist development.

However, in his later work he came to feel that the assumption that social origins determined truth was incorrect. He rejected his earlier strict Marxian position which he now regarded as reducing all knowledge to class membership. Instead, he adopted a modified non-dogmatic Marxism and argued that a number of social groups or processes such as generation, sect, class, and competition could be correlated with forms of knowledge.

He became an advocate of the necessity of social reconstruction. Contemporary societies had become mass societies. These were characterized by disordered groups of atomized individuals without social ties. These societies had been produced by liberal capitalism and their repair required social planning. In this, Mannheim was a conservative. His solutions to the social problems of his time were geared toward the restoration of order and not on a Marxian search for justice or economic equality (Abercrombie, Hill, and Turner 1986:126).

Technological Determinism.

Morgan

The American anthropologist Lewis Henry Morgan (1818-1881) developed a theory of social evolution which “stressed the key significance of technological factors in society and its changes” (Timasheff 1957:49). He identified three major stages of human social evolution: savagery, barbarism, and civilization. The first two stages were further

divided into three substages. “Each stage and substage was assumed to have been initiated by a major technological innovation” (Timasheff 1957:49). Thus, for example, the invention of the bow and arrow ushered in the third substage of savagery. The technological innovation that allowed the shift from savagery to barbarism was that of pottery making. Domestication of animals ushered in the second sub-stage of barbarism, and the technology of melting and casting iron the third sub-stage. The technological innovation that marked the movement from barbarism to civilization was the development of the phonetic alphabet.

Morgan considered that “[e]ach of these stages of technological evolution...was correlated with characteristic developments in religions, the family, political organization, and property arrangements” (Timasheff 1957:49).

Lenski and Lenski

The contemporary American sociologist Gerhard Lenski, in collaboration with his wife Jean, has also advanced a theory of human social evolution driven by technological innovation. For the Lenskis, however, the determinant role is played by what they refer to as subsistence technology, that is, “[t]he technology that is used by the members of a society to obtain the basic necessities of life” (Lenski and Lenski 1987:433).

They distinguish nine major types of societies, listed in approximate chronological order of appearance (the corresponding subsistence technologies are described in parentheses in those cases where it may not be obvious): (1) hunting and gathering; (2) fishing; (3) simple horticultural (small garden plot agriculture using hoes and digging sticks); (4) herding (animal domestication); (5) advanced horticultural (hoe and digging

stick plus metallurgy); (6) simple agrarian (agriculture utilizing the plow); (7) maritime (sea-faring trade and commerce); (8) advanced agrarian (plow agriculture plus iron); and (9) industrial (extensive use of high intensity inanimate energy sources).

Subsistence technologies play a determinant role primarily through the level of production they make possible. The level of production, in turn, affects population size, the extent of the division of labor (by freeing up some people from agriculture), and the extent of urbanization. The dramatic effects of changes in subsistence technology can be seen in the movement from agriculture utilizing digging sticks to agriculture utilizing the plow. Horticultural societies faced two perennial problems, problems that in many areas resulted in the abandonment of plots after a few years' usage: loss of soil fertility, and the encroachment of weeds. The plow offered serious advancements in addressing these problems. Plows allowed for much deeper digging in the soil, thus disrupting the root systems of weeds. Plows also allowed a far more efficient use of fertilizers (animal manures, night soil) where an annually flooding river valley-delta was not available to provide this function. Agrarian societies thus were able to produce far more surplus wealth than horticultural societies, and in turn also displayed other differences, such as much greater population size, increased urbanization, and increased craft specialization.¹¹

¹¹ The work of Richard Adams (1975) shares some similarity with the Lenskis by hypothesizing that energy plays a key role in evolutionary change. Specifically, technological innovation allows for societal utilization of more energy, which in turn allows for more complexity. Tracing energy flows is essential in understanding biological and socio-cultural evolution. However, as essential as Adam's work is to this broader goal, the current work does not employ an energetics model. Instead, it focuses on other aspects of sociocultural evolution, with a particular concern with the relationship between technological change and cultural reaction.

Environmental Determinism

Buckle

According to Franck (1984:414), a “researcher may be called a determinist for stating, or more likely implying, that the physical environment is: (1) the only factor affecting behavior, or (2) more important than social and cultural factors.” An early advocate of this position was the British social commentator Henry T. Buckle (1821-1862). Like the Lenskis, Buckle also considered the development of surplus wealth crucial to social evolution; however, he attributed a far more central role to environmental factors in the development of this surplus. Thus, for example, climate and soil types favorable to agriculture were important. Climatic conditions also influenced the level of surplus wealth in another way: by determining how vigorously humans were willing to labor. Thus, “temperate climate invigorates, hot climate debilitates; in frigid areas desultory habits emerge” (Timasheff 1957:52).

Buckle also believed visual aspects of the physical environment influenced possibilities for social advancement: “if the natural environment is sublime or terrifying it overdevelops the imagination; if it is less formidable, intelligence prevails” (Timasheff 1957:52). It should be noted that England, with its temperate climate, reasonably productive soils, and “gentle” landscape is, according to Buckle’s theory, an environment particularly likely to encourage social advancement.

Steward

The cultural ecology of 20th century anthropologist Julian H. Steward shifted from the broad-stroke environmental causality of someone like Buckle to a narrow focus on

how specific environmental factors shaped particular social, technological, and other cultural elements.

Cultural ecology was based on the assumption that cultures have evolved within their local environments, and that a close analysis of the relationships between specific cultural institutions and their local environmental features will reveal how and why those institutions both originated and persisted. (Milton 1996:43)

Cultural ecology examines the way societies have adapted to the survival challenges presented by local environmental conditions (Netting 1986). Because of this, Steward also shares with the Lenskis a focus on the importance of subsistence technologies. In contrast to the Lenskis however, Steward seeks to demonstrate the ways in which the subsistence technologies which are employed are influenced by environmental conditions. "For instance, the organization of hunting activities will vary according to the characteristics of the quarry animals: whether they are small or large, sedentary or migratory, gregarious or solitary" (Milton 1996:43). For example, large animals encourage the development of cooperative hunting strategies, as was the case with ice-age mammoths. Steward's cultural ecology thus constitutes "...a strongly deterministic approach. He wished to reinstate the theory that the environment has a dynamic, creative role in shaping culture" (Milton 1996:44).¹²

¹² Other anthropologists whose work continues this material ecological tradition include Harris (1985, 1979, 1975) and Rappaport (1984). Harris, for example, demonstrates that environmental factors such as periodic droughts, lack of a suitable fuel substitute for dung, inefficiency of industrial traction for plowing on many small farms, and the consumption by cows of mostly non-human foods explains the evolution of a strong taboo against the slaughter of cows in India even in times of famine. He (together
(continued...)

The Idealist Models.

In this section I briefly overview the work of three social theorists who locate the most important determinants of human social life in the intangible realm of culture and knowledge.

Levi-Strauss

Idealist models focus on the primacy of ideas, values, and beliefs as antecedent in an explanation of any causal sequence. Human uniqueness is seen to lie in the ability to construct and attach symbolic meanings to human activity. Elaborate networks of ideas, values, and beliefs are thus created by people who use these mental constructs to guide their patterns of behavior. Variants in culture are then explained as the differences between these basic sets of ideas, values, and beliefs.

One of the best known idealist theories is structuralism, as advocated by British anthropologist Claude Levi-Strauss (1963). He posits that the human brain is structured to think in terms of binary opposites. In other words, a thing can only be conceived of in relation to its converse. It then follows that the primary organization of any society is constructed on the basis of the binary opposites that are most important to that society. This approach has been used to explain such diverse social phenomena as gender construction (Ortner 1974) and dietary preferences (e.g., domestic cattle/pet dogs) (Sahlins and Service 1976).

¹²(...continued)
with Rappaport) again demonstrates the deterministic nature of environmental factors by explaining why cultural artifacts such as “pig-hating” (Jewish and Moslem dietary laws) were shaped by the unsuitable pig-raising conditions of the middle East whereas “pig-loving” evolved among the Maring of New Guinea in an environment ideal for pig-raising.

Berger and Luckmann

Sociologists Peter Berger and Thomas Luckmann (1966) use the term “the social construction of reality” to convey their sense of the central role of culture in human social life.¹³ Like Levi-Strauss, Berger and Luckmann attribute this role to human physiological/cognitive features. Unlike Levi-Strass, the biological characteristic that enters into their theoretical models is not a brain hard-wired to think in binary opposites but rather a biological organism largely devoid of hardwiring. In particular, these authors point to the fact that humans, unlike other living organisms, do not come equipped with a repertoire of instinctual responses and survival strategies.

This “open-endedness” created enormous possibilities for flexibility and variation. For example, humans may all experience the biological drive of “hunger,” but since our resolution of that drive is not genetically fixed there are a multitude of ways in which we might meet this basic need. This includes variation not only in the kinds of food we eat, but also in how they are prepared; the kinds of vessels used to hold the food and the kinds of utensils (if any) used to carry the food to the mouth; the types of rituals that accompany food consumption; the degree of social importance attached to eating; the order (if any) in which food is consumed; and the cultural myths regarding the origins of particular foods.

¹³ It might be argued that Jurgen Habermas (1984) could be included with the idealist theorists due to his close association with the Frankfurt school’s effort to replace the emphasis on economics with culture in traditional Marxism. While Habermas’ work might not readily lend itself to integration with co-evolutionary theory, it does hold considerable promise in helping us achieve more sustainable social systems. His “ideal speech situation” which specifies fairness and communicative competence as underpinnings of democratic discourse have been developed by Renn, Weber, and Wiedemann (1995) as a basis for promoting citizen participation in environmental problem solving.

and

work

only

prod

of se

Wet

from

work

Germ

by a

cause

induc

becom

perm

Because humans instinctual/biological indeterminacy is combined with intelligence and creativity, humans have the capacity to generate stories to explain themselves and the world around them. Furthermore, since the knowledge humans need to survive comes only from their culture, not from their biological make-up, these cultural frames are the predominant determinant of what kinds of things people see in the world, and what kinds of sense they make of those things.

Descriptions of culture based on the constructivist model make no reference to anything outside themselves and their process of construction. They cannot draw in material from outside, since that material would not be recognized as anything until it has been constructed through the cognitive process.
(Milton 1996:52)

Weber's Materialist-Idealist Hybrid

Because co-evolutionary theory seeks to integrate materialist and idealist causal factors, it is useful to end our review of macro-historical social theories by discussing the works of one of the earliest sociologists who also attempted such an integration. The German sociologist Max Weber (1864-1920) sought to extend the Marxian conflict model by adding the struggle for ideological domination and the struggle for power to the basic cause of social change. Weber believed that struggle in the political arena between individuals and groups was fundamental to social life. This could be exclusive of economic gain and was often, therefore, an end in itself.

For Weber, such struggles were not confined to formal political organizations but permeated all other social groups as well. Additionally, Weber believed that people

St. J.

St. J.

St. J.

St. J.

St. J.

St. J.

St. J.

St. J.

St. J.

St. J.

St. J.

St. J.

St. J.

St. J.

St. J.

St. J.

St. J.

St. J.

St. J.

St. J.

St. J.

struggled to have their ideas accepted as official dogma (ethos) and that the struggle for ideological dominance often overlapped the struggle for political supremacy. Thus, ideas as well as material conditions can be antecedent in explaining causal linkages and the directionality of change.

The hybrid theory of Weber gets at the spirit of co-evolutionary theory. However, Weber was fairly limited in the types of material conditions he deemed important, paying little attention to technology and none to the environment. Co-evolutionary theory thus not only seeks a materialist-idealist hybrid, but considers all the material factors previously discussed to be important: economy, technology, and environment. The synthetic theory that is co-evolution thus might be summed up as a materialist-idealist hybrid couched within an organic systems analogy. A more extensive presentation of co-evolutionary theory follows.

Relationship to Co-Evolutionary Theory.

Co-evolutionary theory seeks to salvage ideas of value from the above theoretical works, while at the same time striving to overcome their weaknesses and limitations. The present section constitutes a critique of some of the shortcomings of these theories, as well as an identification of the ideas of value from them that are applied to the co-evolutionary framework.

Co-evolutionary theory converges with these early perspectives in its view of sociocultural evolution as a process of change whereby existing sociocultural forms (either systems of whole societies, whole societies, or any of their sub-parts) are transformed into new sociocultural forms. These transformations are qualitative and not just quantitative,

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

29

30

although qualitative transformations can result from the accumulation of quantitative changes. Further, while co-evolutionary theory sees these transformations as exhibiting a linear directionality, in contrast to the early theories co-evolutionary theory in no way equates this with “progress.” Nor is the direction and endpoint of the evolutionary process predetermined. Such directionality can therefore take many forms (Sanderson 1995b; Siegel 1984).

Co-evolutionary theory focuses on change, and, as previously noted, rejects ideas of “progress” and the superiority of Western culture. Yet co-evolutionary theory shares with functionalism an organic system analogy.¹⁴ Furthermore, as specified in Chapter I, a sustainable system is one where different species have co-evolved in ways that are mutually beneficial. Another way to say this is that in sustainable systems each system component performs a particular function that contributes to the survival of the whole.

At the same time, the differences between functionalism and co-evolutionary theory are crucial. By treating system components as species, and by focusing on species-environmental (including other species) relations, co-evolutionary theory suggests many possibilities for endogenous and exogenous sources of change not incorporated into structural-functionalism. Endogenous change can occur through species mutation, or from a species whose member’s own life processes change their environment in ways that make it increasingly less fit for their own habitation. Exogenous change can happen through the invasion of new species.

¹⁴ Indeed, for at least some co-evolutionary theorists this may be more than an analogy. In other words, society is not seen to be like an organism; it is an organism.

that

idea

area

with

regard

class

degree

value

the

real

value

Co-E

of so

occu

class

Se

indep

persp

an

separ

Materialist and idealist perspectives offer contending visions of the primary factors that drive social change. Each see significant shortcomings in the other's approach. Idealists criticize materialists for ignoring the importance of ideas, values, and beliefs as antecedent in an explanation of any causal sequence. However, idealism itself is subject to criticisms. Mainly, how do ideas originate, and how and why do ideas change?

Co-evolutionary theory's attention to the material conditions of life, especially regarding the nature, extent, and quality of environmental resources, gives it especially close ties with the materialist perspective. However, co-evolutionary theory is not a deterministic theory. From idealism it takes an appreciation of the importance of beliefs, values, and other cultural phenomena. Furthermore, co-evolutionary theory incorporates the likelihood that there are times and places where the key causal processes flow from the realm of ideas to the material world. For co-evolutionists, in other words, beliefs and values should be treated as something more than "epi-phenomenal."

Co-Evolutionary Theory

Sanderson (1995a:4-13) offers a comprehensive summary of the major principles of social evolutionary theory.¹⁵ He argues that social evolution involves processes that occur within social systems at all levels including dyads, age sets, kinship groups, social classes, complex organizations, societies, any of the institutional sectors of societies, and

¹⁵ Economist Kenneth Boulding (1978) and evolutionary anthropologists Marshall Sahlins and Elman Service (1976) have introduced dynamic interactive models with independent feedback loops. Boulding's work is centrally featured in the co-evolutionary perspective developed in this dissertation. Because of this, Boulding will be discussed in an integrated fashion with the co-evolutionary theorists rather than being presented in a separate section.

various types of intersocietal networks. This does not mean however, that world-historical transformations are the unfolding of predetermined patterns; that is, they are not developmentalist or teleological processes. Nevertheless, world history does reveal that there are social transformations and directional trends of sufficient generality that topologies of social forms can be fruitfully constructed. Also, although social differentiation is a basic evolutionary process much social evolution involves devolutionary phenomena. Hence social stasis, devolution, and extinction are also basic facts of world history that should not be ignored by evolutionary theory.

Social evolution is both analogous and disanalogous to biological evolution. The differences between them, however, are great enough to require that social evolution be studied as a process in its own right. Further, co-evolution must be acknowledged as a significant process in both biological and social evolution.

Social evolution is a process entirely separate from the psychological development of individuals. The principal causal factors in social evolution are the material conditions of human existence. Further, which of the material conditions of human existence, or combination of conditions, is most causally important varies from one historical period and evolutionary stage to another. However, allowance is made for “superstructural feedback.” No claim is being made that the material conditions of human existence totally determine the trajectories of social evolution. The causes of social evolution are themselves evolving phenomena.

Much social evolution results from adaptational processes. Adaptation is the process whereby social groups originate, inherit, or borrow social patterns in response to

various needs and/or wants (originating in either the physical or social environments). Such social patterns may or may not result in actual adaptedness in the long run, or they may prove to be beneficial to some and not to others. Therefore, although adaptational processes largely drive social evolution, no claim is made that adaptedness actually increases over time and hence, social evolution does not equate with social progress.

Humans are egoistic beings who are highly motivated to satisfy their own needs and wants. Acting in their own interests, they create social structures and systems. These structures and systems feedback on them and others in the sense that they create new sets of constraints within which human agency must operate. Social evolution represents the long-term consequences of the dialectical interplay between human agency and social structure and human agency is never something that occurs "freely." All purposive human action is constrained by the social structure that previous generations of actors have created through their agency.

Although individuals are the units of adaptation, they are not the units of social evolution. The units of social evolution are groups, structures, and systems at all levels of size and complexity. Social evolution can result from both endogenous and exogenous sources, and can assume either a gradualist or punctuationalist mode of change. Social evolutionary analysis requires the extended acquisition and synthesis of data from ethnographic, archaeological, historical, and sociological sources.

Co-evolution is a more comprehensive refinement of social evolutionary theory and it is used to guide this dissertation. Co-evolution is borrowed via economics from biology where it refers to an evolutionary process based on the reciprocal responses of

two closely interacting species. According to Norgaard (1994 1988, 1985, 1984a, 1984b, 1981) the concept of co-evolution is broad enough to encompass any on-going feedback between two evolving systems which includes the interaction and evolution of social and ecological systems. Change is viewed as a normal process in a co-evolutionary model and can originate in any sector of the sociocultural ecosystem. Knowledge, values, organization, technology, and resource systems are intertwined more or less symmetrically. No system dominates the others, and none provides a more obvious starting point for understanding the whole. Each system can only be understood in the context of the others (Duncan 1964).

Social evolution occurs at many levels of social organization: world system, inter-societal, intra-societal, complex organizational, small group, etc. This dissertation is concerned with change at the intra-societal level.

Below, I describe in more detail three aspects of this perspective: (1) definition of “species”; (2) biological versus social evolution; and (3) general dynamics of evolutionary change. I then briefly overview five published works that utilize a co-evolutionary framework. I conclude this chapter by showing the applications of co-evolutionary theory to the present study.

Definition of “Species”

The term “species” is a taxonomic classification defining subsets of elements conforming to a common definition, although the elements are not necessarily identical. These elements contain both a genotype, which contains the information necessary for their replication, and a phenotype, which is the physical manifestation of this information

as well as the carrier of the information to the next generation (Boulding 1978: 104-106). Species consist at any specific time of a population which is the number of elements meeting the definition. This may be one. Species occupy a niche, which is defined as all the conditions necessary for the existence of the species at a steady population level (carrying capacity) in a given ecosystem at a given point in time. Niches perform a set of functions for ecosystem maintenance and are interdependent within the ecosystem (Siegel 1984).

Boulding (1978:122) adequately states the case for conceptualizing human artifacts (both material and ideological) as ecological species:

Human artifacts are species just as much as biological artifacts. The automobile is just as much a species as the horse. Human artifacts enter into ecological relationships with each other and with biological artifacts. The automobile is competitive with the horse and has reduced its numbers; it is cooperative with gas stations and has increased their numbers. It is cooperative with the species of "human beings able to drive an automobile" and has increased the number of drivers. It is a predator with regard to oil supplies because it diminishes their quantity to the point where in a few decades both species face extinction.

Further, according to Edward B. Taylor (quoted in Boorstin 1983: 648):

To the ethnographer the bow and arrow is a species, the habit of flattening children's skulls is a species, the practice of reckoning numbers by tens is a species. The geographical distribution of these things, and their transmission from region to region, have to be studied as the naturalist studies the geography of his botanical and zoological species....just as the catalogue of all the

species of plants and animals of a district represents its flora and fauna, so the list of all the items of the general life of a people represents that whole which we call culture.

There are three kinds of species in sociocultural ecological systems: social, biotic, and abiotic. Social species can be divided into four phyla, demographic, organizational, technological, and ideological/cultural.

Biological Versus Social Evolution

Both biological and social evolution combine the subprocesses of continuity and change. In this dissertation, however, my primary focus is on change. Change in both cases is the result of innovation which produces variations within a population, and a mechanism of selection which will determine the differential fate of these variations. Evolution begins with changes in the records of experience (information) that are transferred from generation to generation through some encoded system. This information is crucial to the survival of a species because it tells the phenotype (individual) how to develop and behave. In the case of biological evolution this is accomplished by means of the genetic code embedded in DNA. In social evolution it is accomplished through symbol systems.

Despite these fundamental similarities, important differences also exist. The major difference between the two processes is the ability of the individual in social evolution to gain and transmit information through a process of learning. Biological evolution can only transmit information through physical reproduction. Since biological species cannot interbreed biological evolution tends to produce divergent paths of development, with

ever more diversified species analogous to a spreading tree. Social evolution transmits information through symbol systems, which makes it possible for societies, or smaller groups, to share information through a diffusion process within a single generation and often merge, forming fewer, but larger units. Thus, social evolution tends to be convergent (Sahlins and Service 1960), analogous to an inverted spreading tree.¹⁶

A corollary to this difference is that biological evolution does not extinguish previous species as it creates new ones whereas social evolution does tend to extinguish previous species. Further, because of the possibility of information sharing within generations as well as across generations, it is possible for social groups to make evolutionary leaps, totally skipping several developmental stages.

Another difference is that isolation tends to encourage speciation (relatively rapid evolutionary change) in biological evolution whereas it has the opposite result in social evolution. Social groups in isolation tend to have a slow rate of change. Finally, in both cases the process of evolution itself evolves, and it is through this process that both cases are directly related. A watershed in evolution occurred when biological evolution began with the most ancient self-replicating organic molecules (which were themselves the result of pre-biological abiotic evolution). Biological evolution proceeded through the cell, multicell organisms, plants, and mobile animals which had the sense organs and brains to begin to learn from direct experience which marks another watershed in evolutionary

¹⁶ Social evolution may also be parallel wherein two societies develop similar systems in isolation from each other, or divergent wherein two originally similar societies develop very different systems. However, convergent social evolution seems to be by far the most common form. For specific examples see Sanderson (1995b:57-58).

development. The next stage saw humans with the capacity to launch social evolution as a separate case in its own right. Thus, in a very real sense social evolution evolved out of biological evolution which evolved out of abiotic evolution (Lenski and Lenski 1987).

The General Dynamics of Evolutionary Change, Including Invasion and Succession

Ecosystems and their species may change gradually but continuously, which we call dynamic equilibrium, or rapidly and intermittently, which we call punctuated equilibrium. Whether change is slow or fast, evolution is the dynamic process. Evolution consists of some source(s) of variation and some mechanism(s) of selection (Siegel 1984: 27). For evolution to proceed then, there must be some variation (mutations) among individuals of the species of the ecosystem, and of the ecosystem as a whole. This may occur when the life processes of a species eventually so toxify its niche that continued existence in its present form is impossible. In this case, succession occurs when a new species, either introduced from another ecosystem, or a more fit mutant of an earlier species, out-competes a former species and occupies its niche. This may also occur when there is a perturbation of the ecosystem from an exogenous source, e.g. the introduction of an exotic species (invasion).

Freudenburg (1985:269-289) offers a general overview of the concepts of invasion and succession. He maintains, as do co-evolutionary theorists, that social change is a continuous process, not a series of discreet steps or stages. He acknowledges a key insight borrowed from plant ecology, that “.....plants react upon or change the habitat in which they grow.” He defines succession as the process whereby:

The association of organisms that inhabit a given site at one point--a given "community," in ecological terms--is gradually replaced by other organisms, which are then replaced by still others, in an orderly and directional process called succession. Unless the process is disturbed (e.g., by avalanche, fire, or bulldozer) it will eventually culminate in a stable or "climax community" (Freudenburg 1985:271).

Consistent with my formulation of abiotic, biotic and social artifacts as species, he maintains that the alphabet, the printing press, the newspaper, and the radio may be said to constitute a succession.

He distinguishes four types of succession based on a taxonomy of type of environment (biophysical and socio-cultural) and primary driving force (autogenic and allogenic). First, there is a biophysical environment wherein succession is brought about by autogenic (from within the community) forces. Second, there is a socio-cultural environment wherein succession is brought about by autogenic forces. In both of these cases, the life processes of the members of a species within the community impact the environment in such a way as to make their continued existence problematic, and a species currently resident within the community occupies its niche. Third, there is a biophysical environment wherein succession is brought about through allogenic (from outside the community) forces. Finally, there is a socio-cultural environment wherein succession is brought about by allogenic forces. In the latter two types of succession species from outside the community occupy the niche of a species that has made its environment uninhabitable for itself through the life processes of its members. It is thus appropriate to speak of these types of succession as "invasion and succession." A key point that he is making here is that in all four cases the actions of the original species may have been

highly adaptive or successful in the short term.. Thus, even success can lead eventually to succession.

His goal was to broaden sociology's use of all four types of succession in analysis. He maintains that since its first application by Chicago School theorists such as Robert Park and Ernest Burgess succession has only been cast as a case of a socio-cultural environment being invaded by allogenic species. He further posits that a successional process in a biophysical environment can impact the current socio-cultural environment occupying the same space. These concepts are all consistent with co-evolutionary theory and in my later analysis I will make use of all four types of succession.

Co-evolution occurs as an on-going systemic process whereby every species in an ecosystem is constantly impacting, and in turn being impacted by, every other species in the ecosystem. This process is likely to accelerate when the environment itself changes, for example, as the result of an introduction of an exotic species (Botkin 1990). The net result at any one time, then, is the survival of the fit in terms of adaptation. Co-evolution is non-directional in that the fit vs. the unfit is determined by the environment without any regard to any predetermined goal (Sanderson 1995a; Lenski 1975; Norgaard 1994, 1988, 1985, 1984a, 1984b, 1981). Thus, co-evolution does not provide precise predictability because of the inherent randomness of the evolutionary process (Botkin 1990).

Overview of Five Co-Evolutionary Studies

Co-evolutionary ecological analysis has recently been fruitfully applied to several cases by anthropologists and historians. I now briefly review five such studies.

This research strategy is similar to a study of California's fisheries by McEvoy (1986). His research question was: what is it that actually drives the development of public policy for natural resources and environment? In order to explore his question McEvoy concentrated on what economists call "the fisherman's problem" (or what Hardin (1968) called "the tragedy of the commons"). This is defined as: In a competitive economy, no market mechanisms ordinarily exist to reward individual forbearance in the use of shared resources. It fails, then, to regulate the resource.

McEvoy says that there is a typical pattern to unregulated fisheries the world over, which can be extended to apply to any unregulated natural resource. That is, pioneers show that a fishery is profitable, then labor and capital rush in and increase the take exponentially until the stock's ability to replenish itself is exhausted. Technical improvements are applied to sustain the take temporarily, but the stock is still reduced by an ever increasing input of capital and labor until ultimately it is no longer profitable and is abandoned.

In order to avoid this outcome California fisheries resource managers applied the maximum sustainable yield concept after the 1960s. This is defined as limiting the take to the amount that will allow enough remaining adults to breed in sufficient numbers to sustain the total population indefinitely. Previous thinking generally held that resources (e.g. ocean fisheries) were so vast that they were virtually inexhaustible, and that heretofore untapped resources were available. Thus, when a fishing ground became unproductive, fishers would just move on to another ground until the original ground replenished itself.

To regulate the take, then, made no sense for either the resource or the fishermen, because the industry was essentially self-regulating. This was completely in keeping with the dominant laissez-faire economic philosophy of the nineteenth century. It was, however, bad ecology because a species is symbiotically related in a process of co-evolution to all other species in the local ecosystem and depletion upsets the whole system so that recovery is problematic in that the total environment is altered and natural evolution is not likely to exactly repeat itself but, instead, to proceed unpredictably.

This lack of ecological understanding actually carried over into the maximum sustainable yield concept of the 1960s as if a species existed in isolation. Social systems and ecosystems are interactive and co-evolve. That is, nature is a dynamic and responsive entity and not a passive stage on which humans play out their history. The maximum sustainable yield concept fails to see this (Botkin 1990; Hardin 1968). Further, it may actually be at variance with one of the oldest functions of human social systems, that of balancing individual short-term gain with the long-range well-being of the community (Rappaport 1971).

All three processes, ecological, economic, and cultural, are themselves dynamic but they are still part of a larger dynamic whole. The product of their interaction is human history. When social policy proceeds on theoretical grounds as if there are fundamental dichotomies between these factors it ignores the ecological nature of human existence (Catton 1984), and the ensuing gap creates the fisherman's problem ("the tragedy of the commons").

Bunker's (1985) book on the history of extractive practices in the Amazon Basin is another application of co-evolutionary analysis. A species (humans in this case) impacts its abiotic and biotic environment in a certain way given the nature of sociocultural organization and technology and the environment is modified by this. The modified environment in turn impacts the species, thereby modifying the sociocultural organization and technology which, again, modifies the environment. This mutual process is ongoing. It is not strictly deterministic in that past interaction does not compel a particular future. Indeed, the future remains unpredictable and capable of infinite manifestations, but past interaction does preclude certain futures. If certain things are done today, then certain things are not possible tomorrow. Bunker illustrates this by documenting how large-scale extractive capitalist enterprises such as ranching, lumbering, and mining irreparably destroyed the complex and interdependent floral and faunal systems that have co-evolved on the fragile soils and in the rivers of the world's largest tropical forest.

He posits that natural energy transformation processes, whose usefulness can only be realized with future knowledge or technology, may be destroyed or reduced by human activity at one period. The cost, or loss of value to future generations, is not reduced by present ignorance. Over exploitation of particular plant or animal resources in response to external demand may reduce or eliminate a series of other species due to their complex, interdependent, and co-evolved relations. Future uses of resources, for which demand or need may emerge, will be limited by the resulting disruption of entire biotic chains that may also impoverish present economies which use these resources. He considers, then, the economic, the social, the political, the commercial, the infrastructural, and the

demographic as a system evolved out of the sequence of all prior systems as well as a complex, highly integrated whole system (Bunker 1985).

Neumann (1985) investigates the case of the passenger pigeon in the Eastern United States. He hypothesizes that the pigeon population was small, stable, and at carrying capacity in an ecosystem in dynamic equilibrium for at least 4500 years before the introduction of an exotic species, in the form of Europeans. As evidence for this he cites the lack of archaeological evidence at pre-historic campsites of pigeon bones. Further, he cites the early eighteenth century observers who describes the diet of Native Americans but rarely mentioned the pigeon.

He goes on to suggest that, for the pigeon, the impact of this exotic species altered the prevailing dynamic equilibrium in several ways. First, by decimating the Native American population through disease and war, a major competitor with the pigeon for tree nuts was eliminated. Second, many other competitors as well as natural predators of the pigeon were subjected to greater hunting pressure, thereby greatly reducing their numbers. Third, the destruction of forests and their replacement with crops increased the pigeon's food supply. The result was an explosion of the pigeon population, leading to the enormous flocks reported by many observers in the early nineteenth century. It was then erroneously inferred that the pigeons had existed in great numbers before European contact.

The huge population of passenger pigeons in turn reimpacted the Europeans through a co-evolutionary feedback mechanism by destroying their crops. The Europeans

responded by hunting the pigeon both for food and as a pest. Thus, Europeans evolved into pigeon competitors and predators, eventually annihilating the bird.

Cronon (1983) wrote an ecological history of the co-evolutionary changes introduced by Europeans in New England. His thesis was that the shift from Indian to European dominance in New England entailed important changes in the ways these people organized their lives. It also involved fundamental reorganizations in the region's plant and animal communities. Therefore, to the cultural consequences of European invasion, the "frontier experience" to historians, we must add the ecological consequences as well. These human/animals communities were connected by a system of complex relationships which require the tools of an ecologist as well as those of a historian to be properly understood.

He posits that all human groups change their environments to some extent and goes on to document the ecological consequences of the Native American subsistence strategy. He then shows how the adaptations made by the introduction of European subsistence patterns were constrained by these earlier forms. The steady substitution of European institutions, such as conceptualizing land as private property, fences, pasturing domestic livestock, hunting "pest" populations to extinction, deforestation, and plowing, reimpacted both the Native American and European populations in ways that further constrained still later changes in a classic demonstration of a co-evolutionary pattern.

Finally, Silver (1990) wrote a similar ecological history of the co-evolutionary changes introduced by Europeans in the southeastern forest of what would become the United States. He, however, tied the Native American, African slave, and European

settler populations into the emerging capitalist world economy of Wallerstein (1974). He says that this world system stressed private property, profit, and unrestricted capital accumulation. Resources became commodities destined to be traded for other commodities or for specie in this system. Like Cronon, he documents how the ecological adaptations made by these populations constrained future adaptations, but he also shows this in light of the export or exchange value of colonial products. The environment, impacted by earlier human populations, reimpacted these populations by determining what types of products could be commodified for entry into the global market. The selection and production of these commodities further impacted the environment which in turn constrained future adaptations etc.

Application of Co-Evolutionary Theory to the Present Study

Co-evolution, in the case analyzed by this dissertation, is a reciprocal process between social, biotic, and abiotic species within a sociocultural ecosystem. Human actions modified the ecosystem through the introduction of an exotic species. The responses of the other species within the ecosystem were causes for further human action and altered social organization. That is, the social, biotic, and abiotic species within the ecosystem interacted through numerous mechanisms such as positive and negative feedback loops.

In the present study, the following nine species are examined: deer, hunting ethoses, hunting technology, Native Americans, European fur traders, Euro-American lumber harvesters, farmers (Euro-American settlers/industrial agriculturalists), industrial workers, and the state. The three central questions I want to ask about hunting activity in

this dissertation are: 1) What factors determine how many deer are harvested by any given society, at any given time? 2) What factors determine how many deer are harvested by any given society across time? 3) What factors relate the number of deer harvested to the level of sustainable harvest?

Three subsidiary questions to this one, repeated here from Chapter I, are:

1. When we examine hunting practices across a range of various economic systems, and levels of technological development, do we find any factors that seem to play a determinant role in all social variations studied? Or, as co-evolutionary theory would lead us to expect, do different kinds of factors play a more prominent role in different times and places?
2. Can we find historical examples of hunting regimes that are sustainable and unsustainable? Do effective feedback mechanisms play a positive role in promoting sustainable systems?
3. How disruptive to established systems is the invasion of new species? What effect does invasion/succession dynamics have on short- and long-term sustainability?

Chapter III.

Methods.

In the present chapter I discuss the following four topics pertinent to the issue of the methods used in this research project: data sources, coding, data analysis, and reliability and validity.

Data Sources

Answering the questions posed in this dissertation requires that I acquire information on nine species -- deer, Native Americans, European fur traders, Euro-American lumber harvesters, farmers (Euro-American settlers/industrial agriculturalists), industrial workers, hunting ethoses, hunting technology, and the state -- over a thousand year time span, with respect to their activities in the Michigan Great Lakes region. Because previous archeological, anthropological, and historical studies have been conducted on these species, secondary source material provides the data base to the end of the 19th century. I identified relevant secondary material by assembling an extensive bibliography of anthropological and historical sources accepted by prominent scholars in the field. I employed a snowball sampling strategy, using citations in the bibliographies of the original purposively selected sources as a cross-reference for new sources. The single most important secondary source utilized for the pre-modern period is Calvin Martin's *The Keepers of the Game: Indian-Animal Relationships and the Fur Trade* (1979). This book is probably the foremost authoritative voice on the indigenous Great Lakes tribes' hunting practices prior to the arrival of the Europeans, as well as the ways in which those practices were disrupted by that arrival.

My own use of this secondary source material involved synthesizing information relevant to the questions posed in this research project, and re-analyzing earlier findings through a distinctly co-evolutionary framework. It is in these ways that my research moves beyond the information presented in the original documents.

For the late 19th-late 20th century period, I conducted original research on a popular mass media journal devoted to hunting and fishing issues. Secondary source material is also used to provide additional supporting evidence of particular interpretations of findings. Co-evolutionary theory posits that hunters are interconnected with other species implicated in the activity of “deer hunting.” As such, we would expect that hunters would have at least some knowledge of these interconnections, to have a keen interest in changes in the other species, and to ponder the nature and dynamics of the causal mechanisms. Periodicals directed toward hunters and fishers would seem a likely outlet for such collective reflection to occur.

A cursory examination of major hunting and fishing journals revealed that this expectation was borne out. Extensive information is usually provided on the species “hunting technology,” in the form of both advertisements and articles. Information is also provided on the health, size and accessibility of the prey species, and on state regulations governing the harvesting of that species. Articles, advertisements, and letters to the editor provide insight into the socioeconomic and demographic composition of hunters. Articles and editorials remind readers of the dominant hunting methods, laying out rules of ethical and appropriate hunting practices.

My search for appropriate mass media journals was conducted through Michigan State University Library's computerized Magic Catalogue system. My task was to conceptualize a population of journals from which to select a sample for the period 1891 to the present. The first priority was to provide a clear definition of the population. A journal must either fall into or out of the population. The population, then, consists of journals listed in the *Standard Periodical Directory* for the 20th century under the headings of: (1) Hunting & Fishing; (2) Environment and Ecology; (3) Sports and Sporting Goods; and (4) Outdoors. These headings in the *Standard Periodical Directory* yielded a list of 317 journals. From this list I omitted all journals that were: (1) specifically targeted to a geographic region other than Michigan (though journals targeted toward the entire United States were retained); (2) devoted to fishing; (3) devoted to hunting game other than deer; (4) mainly devoted to equipment advertisement; and (5) had small circulations (under 5,000). This left a subpopulation of 32 journals (see Appendixes A and B).

Having initially defined the population of journals I then needed to design a scheme for sampling from each of three levels: first, what journals to include in the sample; second, which issues of these journals to examine; and third, what content in the selected issues to read and analyze. With respect to the first task, I categorized the population into journals that were devoted to hunting, and the related subject areas of wildlife, firearms, archery, and environmentalism and conservation. I also determined if the journals were designed for a national (non-regional) audience, which of course includes Michigan, or specifically targeted to Michigan. I then employed a purposive sampling technique based

on the socioeconomic class orientation of the journal, appropriate subject area, geographic area, and circulation.

Since throughout much of the 20th century Michigan has been deeply steeped in the manufacturing side of industrial capitalism via the extensive presence of the auto industry, I wanted to choose a journal that was targeted toward the kind of audience that comprised the majority of Michigan residents. In other words, I wanted a journal with a primarily working class/lower middle class orientation. As a criteria for determining socioeconomic class orientation I used: typical expense of equipment advertised, educational level of vocabulary used, socioeconomic class position of characters appearing in articles, and ideological positions taken in editorials. Appendix A displays the journals I initially examined which were available for scrutinizing and categorizing at the Michigan State University Library.

The 14 journals listed in Appendix B appeared in the *Standard Periodical Directory* and would qualify by most of the above criteria for inclusions in the universe. That is, they are targeted to deer hunters, are either national (non-regional) or directed to Michigan, and have large circulations. However, they are not available at the Michigan State University Library, the Central Michigan Library, or the Library of Michigan in Lansing. Therefore, I was not able to categorize them as to their socioeconomic class orientation, and they were not included in the population of journals from which I drew the final one for analysis.

I scanned all the journals available at Michigan State University Library (see Appendix A) and categorized them as to their main subject area (i.e., hunting journals,

wildlife journals, environment and conservation journals, firearm journals, and archery journals), and the socioeconomic class they to which they were targeted. To do this I selected three or four issues, usually at least ten years apart, and went through each issue cover to cover. I noted who published each periodical and how often each issue was published. I obtained the circulation data for each journal from the *Ayer Directory*.

The next step was to select several journals from each subject category and scan every issue for a year, again at roughly ten or twenty year intervals. When a journal consisted mainly of a few large articles I recorded the frequency of appearance of articles under the following headings: cooking game, new hunting technology, hunting stories, aesthetic appeal of nature, thrilling stories, editorials, hunting techniques, humorous stories, tips on where to hunt, conservation, and ethics. When a journal consisted mainly of a large number of very small items I estimated the percentage of articles appearing under the previous headings. Finally, I scanned all articles that seemed to attempt to define, or to imply a definition, of hunting ethos.

As a result of this scanning process, I decided that *Field and Stream* would be the primary data source for the 20th century. There are several reasons for this. First, *Field and Stream* has been published throughout, and even prior to, the 20th century. Second, it has the largest circulation (2,007,234 in 1995) of all the journals that I included in the population for the 20th century. Third, it has a lower middle/working class orientation that seems to target and represent the majority of Michigan residents, as well as the bulk of American sport hunters. Finally, it is readily available at Michigan State University Library.

I next had to address the second sampling task, that of designing a method for selecting the issues from *Field and Stream* I would examine. First, I decided to sample at twenty year intervals, e.g. 1910, 1930, 1950, 1970, 1990. I argue that while there may be seasonal biases appearing in a journal within any given year (twelve issues), there is no reason to suspect that there are biases occurring in a twenty year cycle. For each central year I also selected the preceding and following year, e.g., 1909, 1910, and 1911. For the first year in each “cluster” I selected the issues from January, April, July, and October. For the second year I selected the issues from February, May, August, and November. For the third year I selected the issues from March, June, September and December. This sampling strategy allowed for possible season variations in topics covered, but avoided the idiosyncracies that might come from looking at only one year. A complete listing of the issues sampled is provided in Table 3.1.

Table 3.1. Issues of *Field and Stream* Included in Final Sample.

Cluster 1

1909 --	January, April, July, October
1910 --	February, May, August, November
1911 --	March, June, September, December

Cluster 2

1929 --	January, April, July, October
1930 --	February, May, August, November
1931 --	March, June, September, December

Cluster 3

1949 --	January, April, July, October
1950 --	February, May, August, November
1951 --	March, June, September, December

Cluster 4

1969 --	January, April, July, October
1970 --	February, May, August, November
1971 --	March, June, September, December

Cluster 5

1989 --	January, April, July, October
1990 --	February, May, August, November
1991 --	March, June, September, December

The third sampling task required a strategy for determining which features of the journal issues listed in Table 3.1 I would examine. The strategy I chose was that of a purposeful, saturation sampling technique. Because messages touching on the nine examined species can occur in all categories of journal content (e.g., letters to the editor, feature articles, editorials, advertisements), I examined each selected issue from cover to cover rather than restrict myself to a rigid, predetermined sampling scheme.

Coding

After the final material for inclusion as a data source for this study had been selected, the next step in the process was initial coding of this material. As I read the secondary sources and the sampled issues of *Field and Stream*, I took extensive notes on all nine of the species examined in this dissertation. The most pertinent information about the species “deer” was the size of the population, and whether this was increasing, decreasing, or remaining stable. Where available, information was also gathered about population density and distribution, overall health, and food and habitat preferences. To a much more limited extent, I also gathered information for other wild animal species in those cases where the fate of those species seemed similar to the deer. My analysis of *Field and Stream* coverage in particular contains references to many other wild species besides deer. Information on these additional species is utilized to the extent that it assists us in understanding what is going on with the deer population.

Most of the secondary source material on the Native Americans addressed a broader geographic region than just Michigan. Martin’s *The Keepers of the Game* (1979), for example, analyzed tribes indigenous to the entire Great Lakes region. However, as

Martin points out, these tribes were culturally very similar. However, in order to stress the more geographically expansive nature of my data source I use the term “Michigan Great Lakes region.” In examining the Native Americans, I was especially interested in identifying the economic motivations underlying the number of deer harvested. I also examined their hunting technology and hunting ethos, though these are discussed below as separate species.

The four species of European fur traders, Euro-American lumber harvesters, farmers (Euro-American settlers/industrial agriculturalists), and industrial workers were also examined with respect to the economic motivations that directed their actions which affected deer. Sometimes, this impact was direct in terms of actual harvesting of deer, and sometimes indirect in terms of alteration of habitat. Types of economic motivation for harvesting deer include subsistence and market profits. Profit also motivated economic activity which resulted in alterations of deer habitat (e.g., suburban housing developments). Market mechanisms can also indirectly impact motivations for hunting. For example, the availability of cheap alternative food sources makes subsistence hunting unnecessary, and cheap hunting technology puts hunting within the financial means of many as a recreational activity.

Another relevant characteristic of the four species just discussed is the population size of each and their geographic distribution. These demographic features affect how much these species threaten deer habitat, as well as how they interact with other species.

I also coded for the hunting technology and hunting ethoses of each of these four species. Hunting technology refers to all knowledge, strategies, weapons, and tools used

to kill deer. In this study, hunting technology is categorized into four general levels of technological development: neolithic, early industrial, mid-industrial, and advanced industrial. Where relevant, other types of technology which affect deer harvesting are also discussed. For example, improvements in transportation technology that can get urban hunters to rural or wilderness hunting grounds in less time, thus creating the potential for increased numbers of hunters and, therefore, deer harvests.

I have defined a hunting ethos as a changing complex of fundamental beliefs and values that underlies, permeates, and motivates major patterns of hunting thought and behavior. Hunting ethoses contain a number of key elements, including: 1) beliefs about the number of deer and other animals currently available; 2) beliefs about the generative source and regenerative capabilities of deer and other animals; 3) goals/purposes of hunting; and 4) legitimations for the killing of particular animals, at particular times, in particular quantities, and using particular methods. Hunting ethoses specify the nature of the moral relationships between hunter and prey (which may include the perception of no ethical obligations on the hunter's part), and specify unacceptable, or deviant, hunting practices.

The final species I coded for was the state. My interest in the state was limited to government actions that directly pertained to deer hunting. The state could affect the size of the deer population by: encouraging hunting; regulating (limiting) hunting; encouraging economic activities that increased, or decreased, deer habitat; preserving wilderness areas; supporting transportation infrastructure (e.g., roads, railroads); and regulating hunting technology.

Data Analysis

Data analysis required specifying the ways in which the nine species just described were interrelated. This was accomplished through the use of ethnographic content analysis (ECA). ECA proposes to combine several aspects of ethnographic methods with content analysis to produce a distinctive method of reflexive document analysis (Altheide 1987). This method is already used by historians, literary scholars, and social scientists engaged in documentary research.

ECA contrasts with quantitative content analysis (Holsti 1969). The latter attempts to measure objectively the frequency of appearance of predetermined symbols in documents (written or electronic). The importance of content (implied meaning) of the symbol is presumed to be positively correlated with the increased frequency of its appearance. The symbol is used as an operational definition of some conceptual dependent variable hypothesized by the researcher to be correlated with some other conceptual independent variable(s). An increase or decrease in the appearance of the symbol over a time period when the independent variable(s) is (are) known to have changed is then used to determine support or nonsupport of the hypothesized correlation.

This mode of analysis proceeds serially from category construction, to data collection, to analysis, to interpretation. Data collection admits only individual symbols and narrative interpretations are ignored. Thus, it allows no re-interpretation of data or theory once the process has been formalized. Its findings are presented in statistical and/or tabular form.

Unlike traditional content analysis, ECA is characterized by a high degree of interaction between the researcher, theory, data, and analysis. It specifically includes narrative interpretation in addition to symbol measurement and thus can offer description as well as statistical summaries. It is reflexive and circular. Its findings may be presented in both narrative and numerical form (Altheide 1987).

ECA is especially appropriate for the research reported in this dissertation because of its conceptual and analytical compatibility with co-evolution. Three sources of compatibility are especially important. First, both ECA and co-evolutionary theory encourage researchers to view the world through an interactive/reciprocal lens; the driving dynamic in both cases is a series of feedback mechanisms. In ECA, the feedback mechanism at work is that as new data is brought to light, more inclusive interpretations of data and theory become possible. This interaction process is constant and on-going throughout the entire research process.

A second source of compatibility is the broad “system” orientation of each. For ECA, human action carries definitions of “meaning” within the context of the web of all connected human action. Likewise, co-evolution seeks to situate species within webs of complex interrelationships.

A third source of compatibility is the relative “open-endedness” of both ECA and co-evolutionary theory. As was pointed out in Chapter II, co-evolutionary theory does not posit a particular predetermined end point toward which evolution proceeds. Rather, many potential paths of development are possible. Co-evolution theory, then, does not lend itself well to exact predictions about outcomes.

Likewise, the reflexive mindset of ECA encourages the researcher to remain open to new interpretations and theoretical shifts as the data collection process proceeds. Hence, ECA is geared to keep researchers alert for the unexpected, which co-evolutionary theory in turn suggests we are going to find at least some of the time.

In the present research project, development of more inclusive interpretations of data and theory involved identifying which species were present at particular points in time, how these were interrelated, and how and why the mix of species, and the nature of their interrelationships, changed over time. The reiterative, reflexive procedures of ECA aided this analysis in a number of ways.

First, it allowed me to identify different attributes displayed by the examined species. For example, by using ECA I was able to identify four different hunting ethos over the period studied: the animistic hunting ethos; the altered (antagonistic) animistic hunting ethos; the nature's bounty hunting ethos; and the sports hunting ethos.

After identifying unique attributes of particular species I examined the entire cluster of interrelated species to see if they marked a unique sociocultural ecosystem. For example, when we look at the mix of species present when the animistic hunting ethos was dominant, how much difference do they exhibit from the mix of species present when the nature's bounty ethos was dominant?

Using ECA to identify unique clusters of species allowed me to demarcate epochs characterized by unique combinations of hunting ethos, hunting technology, and human population groups and organizations. Three epoch periods, labeled to reflect the dominant ecological processes operative in each, were so identified. These are: 1) sustainable

harvesting among the Native Americans (11th-16th centuries); 2) invasion and succession (17th-19th centuries); and 3) the “squeeze” (20th century). The second sub-epoch was further divided into two sub-epochs, the invasion of European fur traders (1601-1820), and the invasion of the lumber industry (1821-1890). An overview of the major features of these epochs is provided in Chapter IV. Obviously, the beginning and cut-off dates for each epoch is only approximate.

Using the reflexive methods of ECA, the next step in developing more inclusive interpretations was to consider the system dynamics at work in each of these epochs, and to specify how these dynamics affected sustainability. For each of the species present in each epoch, I asked whether its relationship with other species helped, harmed, or was indifferent to its’ continued survival. Sustainable systems required positive, or a mixture of positive and indifferent, relationships. Unsustainable systems are characterized by at least some negative relationships. Especially important here, since I am examining a sociocultural system developed around deer hunting, is ecosystem relationships that were harmful for the deer population.

I next considered more carefully the types of constraints, if any, which were operating during each epoch and sub-epoch. Were societies always harvesting deer to the full extent of their technological capabilities? If not, what other kinds of factors were at work?

By using ECA, I was able to develop a richer understanding of the complex co-evolved relationships that characterized the Michigan deer hunting sociocultural

ecosystem in the 11th-20th centuries, the nature of system dynamics at work in each epoch, and the kinds of factors that produced system change.

Reliability and Validity

The goal of the data gathering, coding and analysis activities just described was to produce a reliable and valid descriptive and interpretive narrative of the co-evolution of nine species interrelated through the activity of deer hunting. To address questions of reliability and validity I must address the quality of the data sources used, as well as the rigor of my coding scheme and data analysis.

A potential problem with secondary sources is that they are based on evidence gathered in research projects over which subsequent users of the work have no control. Nor do they have the kind of direct, personal experience with the research project that would allow them to judge the quality of research conducted, and the defensibility of the interpretations that are made of the evidence. Several steps can be used to counter such problems, however. First, the peer review process theoretically provides an institutional means to guard against publication of fraudulent findings, poorly designed studies, or empirically unjustified interpretations of data. Second, peer review combined with achievement hierarchies makes it possible to identify the most well-regarded scholars working in a subject area. Because of intensive scrutiny of their works by others, it is less likely it will exhibit the kinds of problems just mentioned. Third, utilization of a number of secondary sources on a given subject matter allows for cross-checking of information, thus providing yet another means of quality control.

With respect to the popular journal *Field and Stream*, to achieve validity I needed to justify the claim that the content of that journal does reflect the current state of the examined species. I maintain there is a reciprocal (co-evolutionary) relationship between a journal's content and its readership. For example, messages touching on hunting ethos can be found in letters to the editor, editorials, selected fiction stories, selected true stories, selected equipment advertisement, and tips on hunting locations and techniques. These journals, devoted to hunting and aimed at a hunting audience, have the ability to influence the hunting ethos. However, the journals must be sensitive to the prevailing ethos as reflected in letters to the editor, increasing or decreasing circulation, increasing or decreasing advertising revenue, and the nature of stories submitted for publication. In order to survive in a competitive market, then, hunting journals are pressured to pander to the mean of the "typical" perceived hunter, and their content should therefore provide a valid measure of the species relevant to the hunter (e.g. state hunting regulations, hunting technology, hunting ethos). Reliability should be a function of the sampling technique itself, plus a clear description of the species whose presence and activities were coded for.

Chapter IV.

Findings, Summary Overview.

In the following six chapters I present my research findings. The findings are organized to reflect a shift in the dominant co-evolutionary dynamics at work in the Michigan deer hunting sociocultural ecosystem, as identified through my ethnographic content analysis. Three major epochs are identified:

Epoch I: Sustainable Harvesting (11th-16th Centuries): Prior to the arrival of the Europeans the indigenous American Great Lakes tribes had established a sustainable sociocultural ecosystem around the activity of deer hunting.

Epoch II: Invasion and Succession (16th-19th Centuries): Beginning with the arrival of Europeans in the New World in the late 15th century, through the late 19th century, the central co-evolutionary dynamic shifted to that of invasion and succession. Two sub-epochs are identified within the context of this larger dynamic:

Epoch II-A: -- the invasion of European fur traders (1601-1820).

Epoch II-B: -- the invasion of the lumber industry (1821-1890).

Epoch III: The Squeeze (20th Century): Increased pressures from a number of sources, including an expanding population, employment of ever more powerful and accurate hunting technology, and opposition to hunting from animal rights activists, combine to create a growing perception that the activity of “hunting” is under threat.

Epoch I is discussed in Chapter V, and Epoch II in Chapter VI. Epoch III is presented in Chapters VII-X. A more extensive coverage is made of this final Epoch because, as was discussed in the previous chapter, in the 20th century my data source switched to *Field and Stream* magazine. This magazine provides a particular richness of material that is conveyed through quotations used to illustrate the themes covered in these chapters.

For each epoch, I provide some general historical contextualization in terms of the major events which affect deer hunting. I describe each of the species present during that epoch, including human population groups and organizations, hunting technology, hunting ethos, and characteristics of the deer herd, especially in relation to its size. I identify the types of co-evolutionary interactions that exist between these species, and specify whether these interactions are beneficial, detrimental, or indifferent to the continued survival (and possibly growth) of each. I examine what factors, if any, encourage constraints on the number of deer that are harvested, with a particular focus on the role of ideology and technology. I end by discussing the overall system dynamics operating in each epoch, including a consideration of the long-term sustainability of the ecological relationships established during each of these periods. A summary of the major features of these factors for the three examined epochs is provided in Table 4.1.¹⁷ I turn now to a discussion of the first Epoch.

¹⁷ I present a somewhat more detailed version of this summary in Table 11.1 in Chapter XI.

Table 4.1. Overview of Major Characteristics of Michigan Deer Hunting Sociocultural Ecosystem, 11th-19th Century.

Deer	Population Stable	Population Decrease	Population Increase - Decrease	Population Increase-Stable
Hunting Technology	Neolithic	Early Industrial	Mid-Industrial	Advanced-Industrial
Hunting Ethoses	Animistic	Altered Antagonistic Animistic	Nature's Bounty	Sports
Native Americans	Population Stable-Dominant Species	Population Decrease	Population Decrease	Population Stable Political-Resurgence
European Fur Traders	None	Fur Trade Increases	Fur Trade Declines	Fur Trade Inconsequential
Euro-American Lumber Harvesters	None	Inconsequential	Lumber Harvesting Increases	Lumber Harvesting Declines to Modest level
Euro-American Settlers	None	Inconsequential	Agriculture Increases	Agriculture mechanized
Industrial Workers	None	None	Population Increases	Population Increases-Dominant Species
The State	None	French British U.S.	U.S. Michigan	U.S. Michigan Asserts Ownership of Wildlife
System Dynamics	Dynamic-Equilibrium	Invasion-Succession Punctuated-Equilibrium	Invasion-Succession Punctuated-Equilibrium	Dynamic-Equilibrium

Epoch I Epoch II-A Epoch II-B Epoch III
 1000 _____ 1600 _____ 1820 _____ 1890 _____ 2000

Chapter V.

Epoch I: Sustainable Harvesting Among the Indigenous Americans (11th-16th Centuries)

Prior to the arrival of the Europeans in the early 17th century, a sustainable deer hunting sociocultural ecosystem existed among the indigenous tribes of the Great Lakes region. In the present chapter I analyze this system using the concepts and precepts of co-evolutionary theory. I begin with a description of the species involved in deer hunting activity during this Epoch. Next, I illustrate the mutually beneficial nature of the relationships that existed among those species.

I follow this with a discussion of the types of constraints on the number of deer harvested that operated during this epoch, addressing the question of whether these were primarily of an ideological or technological nature. This question is important not only for assessing the usefulness of co-evolutionary explanations vis-a-vis linear, deterministic evolutionary explanations, but also because it provides insights into which kinds of species' invasions (e.g., new technologies, new ideologies) may be necessary to disrupt the existing system, and what particular forms such disruption might assume. I conclude by briefly explaining the system dynamics of this Epoch.

Species Identification and Description

There were four species present during this epoch that were interrelated with each other through the human activity of deer hunting. These species were: Native Americans, deer, a neolithic hunting technology, and an animistic hunting ethos. These Native Americans did not have a state and Europeans had not yet arrived.

Native Americans refer to the tribes of Eastern Canada and the Great Lakes region.¹⁸ These tribes were the Ojibwa, Cree, Montagnais-Naskapi, Huron, Potawatomi, and Micmac. The subsistence base of these tribes consisted of horticulture combined with hunting and gathering. The further north a tribe's territory, the greater the reliance on hunting over horticulture. Martin (1979:4-5) maintains that these tribes shared "a large degree of cultural uniformity...in late prehistoric-early contact times." That is, they had roughly the same neolithic technology, mythology, and animistic/shamanistic belief system.

The salient attribute of the deer species for purposes of this study is population size, and determinations of this must be conjectural. Deer favor a meadowland environment partially forested for protective cover, and partially open browse for food. Michigan was heavily forested at this time, but deer seem to have been plentiful enough to have been a staple meat item in the diet of Native Americans, as the archeological evidence attests (Nelson 1998).

The neolithic hunting technology consisted of stone and bone pointed projectiles. That is, spears and bows and arrows, and dead fall traps.

The hunting ethos was animistic. "Spirit bosses" were believed to control each species. The Native American's hunting ethos was enmeshed in their cosmology which held that the universe was a "society" rather than a "mechanism."

¹⁸ Unless otherwise indicated, the information reported in this and the following epoch comes from Calvin Martin's *Keepers of the Game* (1979), perhaps the most noted authoritative ethnohistorical work on Native American hunting practices during this period.

That is, it is composed of “beings” with spirits rather than “objects”Plants, animals, rocks, and stars are thus seen not as “objects” governed by laws of nature, but as “fellows” with whom the individual or band may have a more or less advantageous relationship (Wax 235; quoted in Martin 1979: 33-34).

Further, the Native American:

....considered the animal as an intelligent, conscious fellow member of the same spiritual kingdom. His own destiny was linked with that of animals by the Creator, and he felt that both he and his victims understood the roles which they played in the hunt--the animal, in other words, was resigned to its fate (Witthoft 1965; quoted in Martin 1979:116).

Hunting then, was not just a quest for an object (meat), but a reciprocal social activity between equal beings, with mutual obligations and privileges. Animals were believed to be psychologically identical to man. Animals, in this Native American cosmology, consciously surrendered themselves to the needy hunter. However, because animals and people did not speak the same language, social intercourse and communication was carried on between them via the spiritual realm. The institutionalized role of the shaman was crucial here. It was through the skill, knowledge and power of the shaman that the animal's “spirit bosses” could be supplicated, cajoled, or otherwise manipulated into offering game to the hunters (Martin 1979; Tanner 1976).

Spirit bosses were believed to control each species of animal. Correct ritual and seemingly innumerable taboos had to be observed in the killing and disposing of game or the boss spirits would be offended. Adherents of this cosmology also believed in the reincarnation of animals and therefore that the same animal could be taken and eaten over

and over again. That is, an animal was never really killed, it was just transformed from the material to the spiritual world from which it would be eventually reborn.

However, if the boss spirits were offended they could retaliate in several ways. They could render the hunter's methods and weapons ineffective, they could withhold game from the hunters, or they could inflict disease on humans. Accordingly, the Native Americans did not interpret an overkill of breeding stock in the modern, demographic mathematical sense of conservation, but as the vengeful action of boss spirits.¹⁹

Species' Co-Evolutionary Interactions

In this section I discuss the co-evolutionary interactions between the four species present during this epoch, indicating whether the relationships are beneficial, harmful or indifferent to the continued survival of each species. Graphic portrayal of these relationships is provided in Figure 5.1.

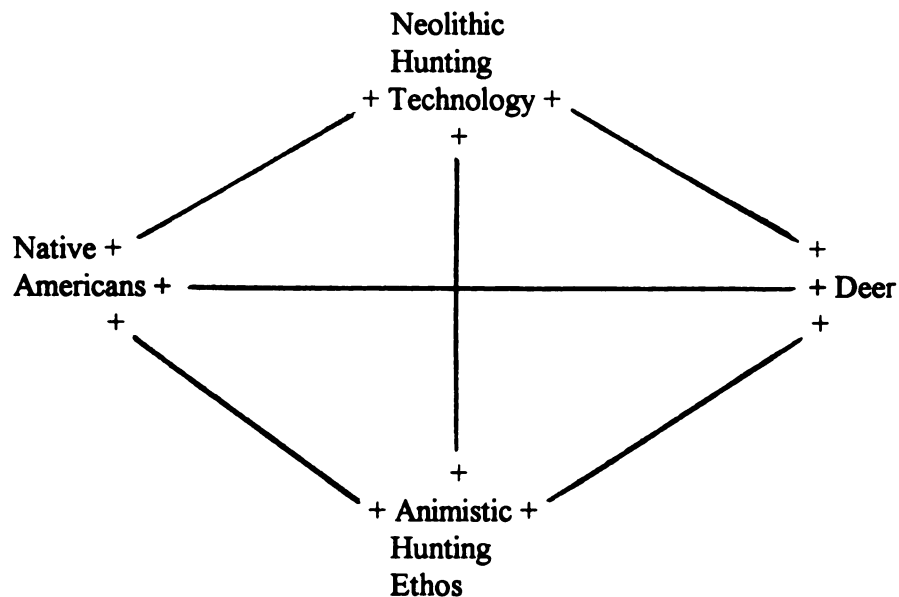
¹⁹ The belief concerning disease was widespread among Native Americans and seems to have had some basis in fact. Because they had only domesticated the dog they had escaped many of the diseases common to both humans and animals that plagued humans in Eurasia where a wide variety of animals had long been domesticated and lived in close proximity to humans. Nevertheless, there are several zoonotic diseases associated with North American wildlife. In some as yet unspecified way, Native Americans must have noticed and made the connection between animals and most of the pre-Columbian diseases which did afflict them. Such diseases, although correctly associated with wild animals, were rationalized as punishment for taboo infraction and their mode of contraction and transmission was totally misunderstood (Hallowell 1963, 1960; Ritzenthaler 1954; cited in Martin 1979:128-130).

Figure 5.1. Ecological Interactions for Epoch I 1000 - 1600

+ = beneficial effect

— = harmful effect

0 = neutral effect



-----Dynamic Equilibrium-----

Just as humans sometimes use dogs to assist in their hunting endeavors, so are hunting technology and hunting ethos “species” used in an analogous way by the Native Americans. Their instrumental use by the Native Americans demonstrates how these species *benefit* the continued survival of the indigenous tribes. The hunting technology provided the means to harvest deer, while the animistic hunting ethos imposed spiritual sanctions against overharvesting, thus contributing to the long-term protection of an important food source.²⁰

²⁰ I would refer the reader here to footnote 1, page 1, wherein I discuss the implication of Native Americans maintaining a sustainable deer harvesting system during
(continued...)

However, if we treat hunting technology and hunting ethos as “species” whose continued survival is always problematic, then we can see that these species equally *benefitted from* their relationship with the indigenous tribes. It was the Native American tribes that created, maintained, and reproduced the hunting technology; in the context of this region at this particular time, the technology’s survival was wholly dependent on the practices of the tribes. In like fashion, the animistic hunting ethos needed to be carried in the value system of the Native Americans in order to survive.

The interaction between the animistic hunting ethos and the neolithic hunting technology was also *mutually beneficial*. The interaction was necessary for the maintenance of both species in that the ethos legitimated developing and utilizing the technology while the technology enabled deer to be hunted successfully, thereby making the ethos possible, and necessary.

The long-term survival of the deer was also enhanced by their relationship with the Native Americans, a relationship largely mediated through the Native Americans’ employment of the animistic hunting ethos and neolithic hunting technology. From an ecological standpoint, long-term, stable predator-prey relationships (stable predation) are considered *beneficial for* the prey species taken as a whole. Limited harvesting helped to keep the population of the deer in check, thus reducing the likelihood of overpopulation and its associated problems, including starvation and the spread of diseases. The deer, of course, *benefitted* the other species by providing the reason for the existence of both the

²⁰(...continued)
Epoch I.

hunting technology and the hunting ethos while supplying the Native Americans with food and hides.

Constraints on Harvesting

A defining characteristic of co-evolutionary theory, in contrast to earlier, linear evolutionary theories, is the former's movement away from a mono-causal, or deterministic, explanatory framework. Rather than granting one particular type of species a universally privileged role in influencing other elements in the sociocultural-ecological system, co-evolutionary theory maintains that species continuously interact with, and react to, other species. While at particular points in time one species may play a particularly dominant role in influencing other elements of the system, co-evolutionary theory predicts that the "type" of species that plays this role will vary, sometimes being technological, sometimes environmental, sometimes ideological, and so on.

A technologically deterministic explanation of the stable predation of the deer herd encountered during this epoch would maintain that the only thing that truly constrained the number of deer harvested by the Native Americans was the relatively primitive nature of their hunting technology. In other words, this perspective posits that the Native Americans were harvesting to the full extent of their technological capabilities; it implies that were these tribes to develop or acquire improved hunting technology, that the number of animals they harvested would have increased accordingly.

Martin (1979), Cronon (1983), Neumann (1985), and Silver (1985) counter that, while Native American hunting technology may have imposed some limitations on the amount of game harvested, it was hardly the overriding limiting factor technological

determinism suggests. These authors argue that the Native Americans were not harvesting up to the full capabilities of their technology, that much more game could in fact have been taken than typically was. The primary limitation operating here was not that the Native Americans lacked the technical know-how to harvest more game, but that they lacked the desire to harvest more game.

Thus, the stable predation encountered in the Great Lakes region between 1000 A.D. and 1600 A.D. should not be attributed to the technological incompetence of the Native Americans, but rather to an ethos of voluntary restraint. “[T]he mind of the non-literate is mystical, or magical, in its identification of causation” (Levy-Bruhl 1923; quoted in Martin 1979:150). Waste (kill beyond immediate sustenance needs) of animals was one of the actions which would offend the boss spirits. The animistic hunting ethos provided a latent conservation function by limiting the harvesting of game and thus contributing to the long-term stability of the sociocultural ecosystem.²¹

System Dynamics

The co-evolving sociocultural ecosystem was in a state of dynamic equilibrium during Epoch I (see Figure 4.1). The term ‘dynamic’ is used to signify this was not a period marked by constant stability. Ecological studies have demonstrated, for example, that the size of wild populations do not remain uniform year after year. There were, therefore, certainly fluctuations in the size of the deer herd, depending on such conditions as severity of the winters, the population levels of natural predators, and the presence or absence of drought conditions. The number of deer harvested by the Native American

²¹ See footnote 1, page 1.

tribes would also have varied, depending on such factors as size of the Native American settlements and the relative availability of other food sources.

The fluctuations that did occur, however, remained in a range that was readily accommodated by the other co-evolving species. No interspecies relationships existed during this period that would have either encouraged sustained growth of one (or more) species, or that would have moved one (or more) species toward extinction (see Figure 5.1). This sociocultural ecosystem is thus one characterized by dynamic equilibrium, or long-term sustainability, of the overall system and of the component parts that comprise the system.²²

²² See footnote 1, page 1.

Chapter VI.

Epoch II: Invasion and Succession in the 16th-19th Centuries.

While Norse (and in all probability other European seafarers) had sailed to the Americas before Columbus, he made the permanent European “discovery” of them at the end of the 15th century. An ecological invasion soon followed that dramatically disrupted the co-evolved sociocultural and natural systems of North, Central, and South America, and the Caribbean Islands. Europeans’ initial interest in the Great Lakes region revolved around the fur-trade.²³ This trade was promoted by European states (French and British), which viewed its lucrative potential as a means to replenish national treasuries. Following the decline of the fur trade in the early 19th century, the Euro-Americans turned their interest to another abundant resource: Michigan’s extensive old-growth forests. This salient extractive industry was joined by activities such as mining, fishing, and farming.

In the present chapter I trace these two major waves of invasion and succession (fur trade, lumbering), identifying the exotic species each wave introduced to the Michigan Great Lakes region and the changes in the sociocultural ecosystem that resulted. Following the outline of the preceding chapter, I analyze the nature of the relationships that existed among the species, illustrating that while some of the species benefitted a great deal from the newly established relationship (at least in the short term), other species (especially deer and Native Americans) were harmed by them. I then demonstrate how

²³ Another venture that brought some Europeans into the area was the search for the mythical Northwest Passage, the hoped-for natural waterway connecting the Atlantic and Pacific Oceans.

both technological and ideological factors worked together to facilitate high levels of harvesting during both these sub-epochs, though the exact composition of the hunting ethos varied between the fur-trading and lumbering periods. I conclude my discussion of each sub-epoch with a consideration of the system dynamics, including a demonstration of their unsustainable nature.

Epoch II-A: First Contact and the European Fur Trade (1601- 1820).

It is believed that the Frenchman Etienne Brulle was the first European to reach the Great Lakes area, and that he probably did so somewhere between 1621 and 1623. The invasion-succession dynamic set in place by the intrusion of the fur trade that soon followed took several centuries to play itself out, beginning with a quite minimal European presence. However, as I demonstrate below, the traditional practices of the Native Americans were disrupted by the arrival of Europeans on the continent long before most Native Americans ever came into any actual physical contact with the Europeans. Following a classic invasion-succession model, the arrival of the earliest of the European species (in this case, micro-organisms) altered the sociocultural environment in ways that facilitated subsequent invasion by later waves of European species. I begin my analysis of this sub-epoch with an identification and description of the species present during this period, couching this discussion within the broader framework of the invasion-succession dynamics that were occurring.

Species Identification and Description

Epoch I marked a long period of relative stability regarding species composition of the sociocultural ecosystem. Epoch II-A is a period of punctuated equilibrium initiated by

the introduction into the sociocultural ecosystem of four exotic species: (1) European fur traders; (2) European diseases (Eurasian micro-organisms such as typhoid and influenza); (3) early industrial (European) hunting technology (firearms, steel traps, iron arrow points, and wire snares); and (4) the (European) state.

Initial contact between Europeans and Native North Americans began around 1500. First contact came from Spanish penetrations in the Caribbean and the Gulf of Mexico, and from the Northern European cod fishermen along the Atlantic coast adjacent to the Grand Banks. These early explorers and resource extractors brought with them microbial pathogens common in Eurasian populations, but which had not survived the filter of the ice age climate that the ancestors of Native Americans had passed through during the migration into the Americas across the Bering Strait. These diseases included: typhoid, diphtheria, colds, influenza, measles, chicken pox, whooping cough, tuberculosis, yellow fever, scarlet fever, and smallpox.

These microbes were transferred from European to Native American hosts at points of initial contact, but from there were rapidly spread into the interior as infected individuals came into contact with unexposed populations via warfare and pre-existing Native American trade routes. Because Native Americans had developed no resistance to these pathogens, they were especially vulnerable. Massive epidemics and pandemics decimated Native American populations before most had ever encountered any actual Europeans.

...Great epidemics and pandemics of these diseases are believed to have destroyed whole communities, depopulated whole regions, and vastly decreased the native population everywhere in the yet unexplored

at

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

interior of the continent. The early pandemics are believed to have run their course prior to 1600 [at least 20 to 30 30 years before the first European arrived in the Great Lakes region]. (Wittoft 1965:28; quoted in Martin 1979:43)

The impacts of the Eurasian micro-organisms on the Great Lakes tribes occurred not only at the biological and demographic levels, but at the cultural level as well. It is particularly at the cultural level that we see important invasion-succession dynamics play themselves out. To understand the reasons for this, we must look at Native American cultural interpretation of these epidemics and pandemics.

As was explained Chapter V, the Great Lakes tribes believed that animals could inflict disease on humans in retaliation for the violation of taboos or the neglect of important rituals. Since the diseases arrived ahead of contact with actual Europeans, and since the Native Americans had not changed their own hunting practices and rituals, they interpreted the severity of these diseases as an unwarranted attack upon humans by malicious animals. It was the animals who had reneged on the system of mutual obligation and rights that had sustained both humans and animals in the past. The animals had declared war on humans!

As the perceived impact of the animistic hunting ethos on the tribes' survival capabilities changed from beneficial to harmful, the tribes' commitment to the ethos, and the boss spirits implicated by that ethos, deteriorated. The weakened state of the animistic hunting ethos meant that a cultural niche was already partially opened when the Europeans arrived on the scene. The successful invasion of that niche by a new ethos was further facilitated by the Native Americans' perception of the apparently superior abilities of the newly arrived Europeans to combat the diseases ravaging the indigenous populations.

Bele

face

to th

tow

ind

tac

par

iter

Eu

ex

dis

for

so

Gr

to

Ar

Ar

as

Belief in the shamans' ability to placate the spirit bosses had rapidly deteriorated in the face of their glaring ineffectiveness. Europeans, however, were not nearly as susceptible to these diseases, and were thus perceived as having the more powerful religion.

There is another possible reason why Native Americans may have been drawn toward the Europeans: trade goods. The Europeans, standing on the brink of the industrial revolution, were able to manufacture a variety of goods of a quality beyond the technological skills of the Native Americans. Items made out of metal, including pots and pans, iron arrow heads, knives, and wire snares, were considered especially desirable items. More mundane items, such as blankets and beads, were also brought by the Europeans. These were exchanged with the Native tribes for animal pelts. However, the extent of Native Americans' desire for trade goods is in some measure of dispute, a point I discuss further in the section on "Constraints on Hunting".

The Europeans actively pursued their cultural invasion of the Great Lakes tribes for two primary reasons. First, the European fur traders, backed by the European state, sought to exploit the rich abundance of fur-bearing animals located in and around the Great Lakes region. Initially, however, the actual number of Europeans who immigrated to the region was quite small. The Europeans thus needed the cooperation of the Native Americans to successfully exploit the available resources.

Second, Jesuits who came to the region were interested in converting the Native American tribes to Christianity. In practice, these two goals were often closely interlinked, as the Jesuit missionaries also supported the fur trade.

As a result of these developments, “[f]ormer attitudes were replaced by a kind of mongrel outlook which combined some native traditions and beliefs with a European rationale and motivation”(Martin 1979:61). Native American beliefs that they were at war with the animals combined well with the wealth-maximizing strategy of the Europeans. Both justified the maximization of harvesting potential, and the use of whatever technology best promoted that goal.

Present after the playing-out of this invasion-succession process was a sociocultural ecosystem that contained the following species: Native Americans, deer, European fur traders, early industrial (European) hunting technology, the (European) state, and an altered (antagonist) animistic deer hunting ethos. I turn now to a discussion of the ecological interrelationships that had formed among this new mix of species.

Species’ Co-Evolutionary Interactions

The ecological interrelationships found among species in Epoch I were mutually beneficial to each interacting species, thus contributing to the long-term survival of that sociocultural ecosystem. As I detail below, a very different picture of species interrelationships develops as a result of European migration into the Great Lakes region. (For an overview of these relationships, see Figure 6.1). Since these changes were instigated by the in-migration of exotic species of European origin, I begin by identifying the implications of these relationships for these newly-arrived sociocultural ecosystem elements. I then proceed to address whether the inter-species relationships that developed in the context of invasion-succession dynamics were beneficial, harmful, or indifferent to the survival of hybrid species (e.g., the altered (antagonistic) animistic hunting ethos, and

N

E

F

-

-

-

M

A

A

(

A

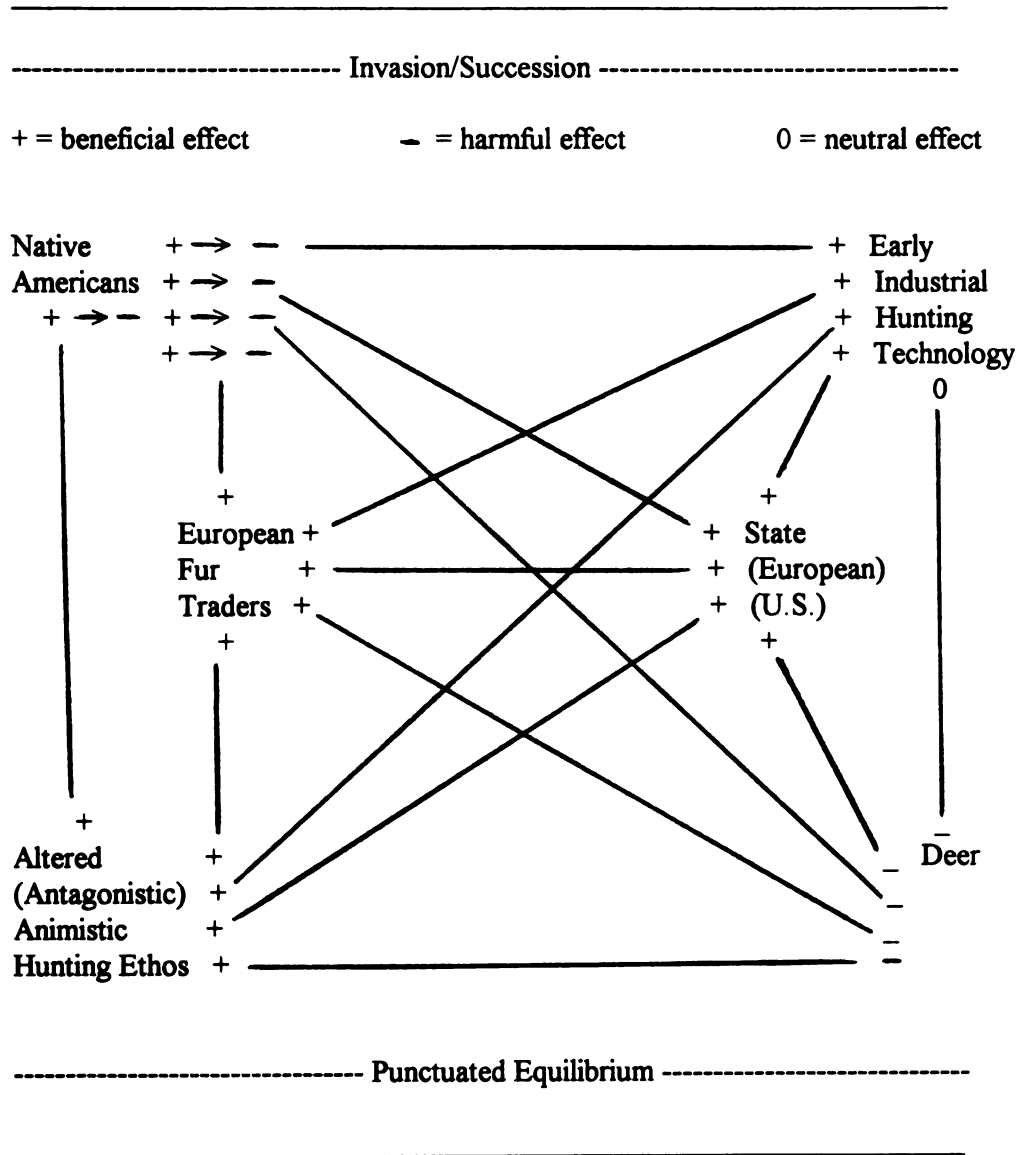
H

-

-

Native Americans), and to the deer. An overview of these relationships is provided in Figure 6.1.

Figure 6.1. Ecological Interactions for Epoch II-A 1601 - 1820



The European state (French, British) *benefitted from* the relationships it had with other species in the Epoch II deer hunting sociocultural ecosystem. The fur trade provided the state with wealth that contributed to its economic growth. Since the Native Americans participated in that trade, their relationship with the state was also beneficial for the state. The early industrial technology and the altered (antagonistic) hunting ethos helped to maximize the quantity of furs that was extracted from the region, and hence increased the level of wealth flowing to the states. The deer (and other furbearing animals) supported the fur trade by provided food and skins, and from which the state *benefitted*, as mentioned above.

The European fur traders also *benefitted from* the relationships they had established with the other sociocultural ecosystem elements. The traders depended on the state to facilitate access to the world market via its capacity to manage international relations. The traders also benefitted from their relationship with the Native Americans. The number of European fur trappers working the area was small, and they were furthermore working in a frontier wilderness area with which they had limited familiarity. Participation of the Native Americans in the fur trade thus greatly increased the quantity of furs that were extracted from the region. Early industrial hunting technology and the altered (antagonistic) hunting ethos also benefitted the fur traders by encouraging maximum extraction of deer and other fur-bearing mammals. The deer provided the fur traders with hides.

The early industrial hunting technology also *benefitted from* its relationships with most other species in the sociocultural ecosystem. This species' survival depended upon

its continued use by humans. The European fur traders directly facilitated this use, by providing a demand for deer hides that would be supplied by Native Americans utilizing the technology. The Native Americans utilized this technology to harvest the deer and other wild game. Since the fur trade was promoted by the state, state activities were also beneficial to the survival and possible growth of the early industrial hunting technology. The altered (antagonistic) animistic hunting ethos also benefitted the early industrial hunting technology in that any ethos that included either a manifest or latent conservation function (which this ethos did not) would have inhibited and therefore diminished the full use of this technology in.

The only species relationship that was *indifferent to* rather than beneficial for the survival of the early industrial hunting technology was that with the deer. As the early industrial hunting technology was developing globally and could be used against many kinds of wild game other than deer, as well as against humans, the presence of deer was probably not a substantial factor in the survival of this species.

The altered (antagonistic) animistic hunting ethos benefitted from its relationship with the early industrial hunting technology which facilitated its application, with the European fur traders who encouraged its application because it increased the supply of furs and hides, and with the (European) state, which supported the fur trade. It also benefitted from its relationship with the Native Americans, since its continued survival required its incorporation into their value system. However, to the extent this ethos helped to undermine the long-term survival of the Great Lakes tribes, this relationship was

not beneficial to either the ethos or the Native Americans. The deer, of course, were the reason for the existence of the ethos.

These relationships had a mixed impact on the Native Americans in the long term. The Native Americans were enriched by the acquisition of trade goods and technologies (including early industrial hunting technology) from the fur traders, which the (European) state facilitated by its support and encouragement of the fur trade. In the short term, both the altered (antagonistic) animistic hunting ethos and the early industrial hunting technology allowed the Native Americans to maximize the quantity of wealth they could receive from this trade, by maximizing the quantity of hides they brought to the fur traders. The deer provided the Native Americans with both meat and hides for sustenance and additional hides for the fur trade. In the longer term, however, these relationships undermined the Native Americans and helped facilitate the cultural and biological/demographic near genocide of these peoples. Indeed, by the end of this Epoch the Native Americans have been reduced to such an extent that they disappear as a species of any consequence in the deer hunting sociocultural ecosystem (see Table 4.1).

One reason for the Native Americans' demise becomes apparent when we consider the nature of these relationships for the deer population: they are all negative (see Figure 6.1). Every other species in this system encouraged or facilitated maximum extraction of deer and other animals. I turn now to an explicit consideration of the role of ideology, technology, and political economy in determining why few, if any factors, worked in this epoch to limit the quantity of deer harvested in an area.

Constraints on Harvesting

As the preceding discussion on this epoch should readily indicate, there were virtually no constraints on the quantity of deer and other animals harvested during this period. Ideological, technological, and political-economic factors all contributed to the over-harvesting that occurred at this time. The introduction of early industrial hunting technology *made possible* a vast increase in the number of animals that could be extracted, while the altered (antagonistic) animistic hunting ethos *legitimated* the employment of that technology to its fullest potential. The European State, as has been mentioned, supported the fur trade and encouraged the maximum harvest. Thus, political-economic factors underlie the fur companies' and the Jesuit missionaries' encouragement of Native Americans to over-hunt and over-trap for the fur-trade.

This was a capitalist and competitive enterprise exploiting a common resource and enmeshed in the world trade system (Wallerstein 1974). Competing fur companies and tribes created a cutthroat atmosphere in which the best advice was to "trap out and get out", which Native Americans did. This provides a classic example of the tragedy of the commons. As Martin (1979:61, 65) characterizes this epoch:

The most obvious change was the unrestrained slaughter of certain game. Lured by European commodities, equipped with European Technology, urged by European Traders, deprived of a sense of accountability for the land, and no longer inhibited by taboo, the Micmac began to overkill systematically those wildlife which had now become so profitable and even indispensable to his new way of life.

Still, while changes occurred in the technological, ideological, and political-economic realms during this epoch, it seems unlikely that either the technological or political-economic factors, had they been introduced in the absence of the Native Americans' partial abandonment of the animistic hunting ethos, would have been sufficient to encourage such wholehearted participation of the Native Americans in the fur trade. Jesuit Missionaries played a significant role here in the decline of the animistic hunting ethos.

Consider first the case of technology. Since Native American hunters and trappers were important providers of pelts to the fur trade during this Epoch, the European fur companies and the Jesuit missionaries had a vested interest in the tribes following the same strategy of adopting the most efficient extraction technology. However, as I have previously explained, in Epoch I the Native Americans were not extracting animals to the maximum capabilities of their indigenous hunting technologies. Given this, if the early industrial hunting technologies had arrived in the Great Lakes region unaccompanied by the European diseases and the cultural changes wrought by them, it seems unlikely that the Native Americans would have made extensive use of them, or employed them in the type of wholesale slaughter desired by the Europeans. As it was, however, by the time this hunting technology arrived in the region the Native Americans already perceived themselves to be at war with the animals. They were thus ideologically disposed to adopt the more efficient early industrial hunting technology, which would give them an advantage in this war, and to employ it to its maximum capabilities.

With respect to political-economic factors, when the Native Americans exchanged pelts for trade goods they participated, however remotely, in the world capitalist system. It is possible to argue that the Native Americans had a pre-existing, but unfulfilled, desire for increased material wealth, and as soon as the Europeans provided a means to meet that desire the indigenous tribes readily took advantage of it. To state it differently, once the Native Americans came into contact with the obvious superiority of the European system (at least as this related to the ability to supply material wants), the old ways would be readily abandoned, even if those old ways had continued to work perfectly fine for the Native Americans up to the point of actual physical contact with Europeans.

Martin (1979), however, rejects this traditional explanation that Native Americans possessed latent material consumptionist impulses which were activated by access to European hunting technology and European market goods. He argues instead that the material wants of the indigenous tribes were not originally insatiable, as Western economic theory posits. Indeed, aboriginal Native Americans were decidedly non-consumerist. Accumulating and displaying material wealth in order to gain prestige was foreign to their culture. Instead, they practiced a form of altruistic primitive communism. Wealth dispersion was the way to gain social esteem. Incidentally, Native Americans did not place near the value on furs that Europeans did, and thus felt themselves to be getting by far the better end of the bargain when they exchanged them for European trade goods.

It seems unlikely then, that in the absence of the breakdown of the animistic hunting ethos, that Native Americans would have started such severe over-harvesting of deer simply so that they could maximize the quantity of trade goods they were able to

secure. As it was, however, by the time Europeans and their trade goods arrived in the Great Lakes region the cosmology of the indigenous tribes was already in a state of decay. The Jesuits and fur traders took full advantage of this situation, facilitating the extinction of yet more elements of the Native American cosmology, and the successful invasion of European elements. The Jesuits, for example, undertook an avowed strategy of ridiculing the Native American's animism and related taboos while discrediting their shamans (Kurath 1959: 209-251; cited in Martin 1979:58). The fur traders encouraged the Native Americans' adoption of a more materialistic, and accumulative, mind-set.

System Dynamics

Ecologically, Epoch II-A was not sustainable. As is shown in Figure 6.1, the ecological relationships of this epoch carry a mix of positive, negative, and zero signs, thus showing that some of these relationships were detrimental to some of the species involved. The number of negative signs going into the species "deer" is particularly instructive, though not surprising given the preceding discussion of how technological, ideological, and political-economic factors made possible, legitimated, and encouraged maximum harvesting.

This epoch was thus characterized by punctuated equilibrium with a relatively rapidly changing sociocultural ecosystem. The overall trend of co-evolution here led to the extinction of the altered (antagonistic) animistic hunting ethos, the extinction of the European fur traders, and the near-extinction of the Native Americans and the deer.

The outcome of these system dynamics can be seen in the decline in the fur trade during the final decades of this epoch, as the westward advancing American frontier was

replacing the wilderness with agriculture. I turn now to a consideration of the implications of this transition for the mix of species present in the second sub-epoch of the invasion-succession period.

Epoch II-B: the Lumber Industry (1821-1890)

As the locus of the fur trade shifted further West, from Mackinaw, Michigan to St. Louis, Missouri (Dunbar and May 1995:143), a condition advantageous to new species' invasions was created. The invasions that occurred were facilitated by the opening of the Erie Canal in 1825, and the establishment of regular shipping lanes from Buffalo to Detroit and St. Joseph. These developments allowed for the profitable extraction of Michigan's vast forests, thus encouraging the in-migration of Euro-American lumber harvesters, as well as fishers, miners, and settlers into Michigan territory.

In the present section I explicate the invasion-succession dynamics of this second sub-epoch. I begin with an identification and description of the species present during this period. I next describe the co-evolutionary relationships among these species. I follow this with a discussion of the types of constraints on hunting that operated during Epoch II-B, then conclude with an overview of system dynamics.

Species Identification and Description

Epoch II-B was also a period of punctuated equilibrium. A number of exotic species invaded the Michigan area at this time.²⁴ These include: Euro-American lumber

²⁴ The dominant species of Epoch III, industrial workers, actually begin to appear as an early variant of Euro-American settlers during this sub-epoch. However, this species will not figure significantly in the interactive co-evolutionary process under discussion until Epoch III, so I will not include them in the present section.

harvesters (with Euro-American fishers and miners as a variant of this species), Euro-American settlers, the state (United States and Michigan Governments), a nature's bounty hunting ethos, and mid-industrial hunting technology (the defining attribute of which was the long range repeating firearm).²⁵

As previously discussed, the Native Americans, as an integral, co-evolving and interactive species went into a state of severe decline. By the 1880 census, the number of Native Americans in Michigan was down to 7,249 (Dunbar and May 1995: 150-152). This was partly due to the destruction of subsistence resources discussed in the preceding section, partly due to the fact that the death rate of Native Americans from diseases was still twice as high as for whites, and partly because by this time the Federal Indian policies had removed most remaining Native Americans West of the Mississippi (Dunbar and May 1995:150-152). However, since the tribal populations are not extinct, the later revival of this species is thus always possible.

Deer continued as part of the co-evolving ecosystem though, for reasons explained further below, their population size fluctuated over the course of this sub-epoch.

The U.S. state provided support for lumbering, mining, railroads, and settlement.

A considerable amount of land obtained for logging was purchased from the United States Government at \$1.25 an acre, the minimum price. After the Homestead Act was passed in 1862, lumber companies hired men to enter claims to 160 acres each, which were made available without cost under the law to bona fide settlers. Settlement was maintained long enough to allow the timber to be cut. Millions

²⁵ The long-range repeating rifle was, in turn, the product of a much larger process of world-wide industrial evolution not directly discussed in this dissertation. .

of acres of land were given to railroad companies to induce them to build lines into the northern country, and lumbermen often bought or leased tracts from these companies. (Dunbar and May 1995:345)

The success of the state's efforts can be readily seen in the ten-fold increase in human population in Michigan between 1820 and 1834.

[B]y the end of the 1820s, with the relinquishment of Indian claims to the lands in southern Michigan, the rapid progress of the surveys, the opening of land offices, and the improvement of transportation facilities, the way had been prepared for what shortly developed into one of the great land booms in all of American history as settlers poured into and across the lower third of Michigan's southern peninsula. (Dunbar and May 1995:162)

Lumberers, miners, and settlers/farmers all worked to clear the land of its natural forest cover. By the 1870s, Michigan was the leading lumber producer in the nation. Production peaked in 1888 at over 4 billion board feet (Sommers 1984). Early Euro-American miners possessed an attribute similar to that of lumberers. They smelted the ore down into pure ingots right at the mine site for easier shipping. This required huge amounts of hardwood to be harvested for the necessary charcoal (Sommers 1984:113).

"As the lumbering and mining industries grew... agriculture was introduced to provide food for the new arrivals" (Sommers 1984:105). Pursuit of agricultural activities also required either the cutting down of wooded areas, or the prevention of tree grow-back in areas de-wooded by lumberers or miners. The clear-cutting pursued by lumberers, miners, and (to a lesser extent) agriculturalists was so extensive that by 1910, the once-abundant forests had almost completely vanished according to Sommers (1984). An unintentional consequence of these activities is that they altered the environment in a way

that actually expanded the niche for deer, at least initially. This occurred by, first, opening the land and providing more food in the form of lumbering waste bush and shrub browse, and second, by diminishing the habitat of the deer's natural predators (e.g., wolves). Protection of deer was further facilitated by a deliberate policy of predator extermination (Neumann 1985). As a result, there was a rapid expansion of the deer population in the first half of Epoch II-B.

The decline of the Native Americans also meant a decline of the altered (antagonistic) animistic hunting ethos, which had been carried in the value system of the Great Lakes tribes. However, a new hunting ethos developed in the value system of the invading lumber harvesters, miners, and settlers/agriculturalists. This ethos was not premised on animal spirits, but did permit a deer harvest unlimited by methods, seasons, numbers, age, or sex. In other words, this ethos legitimated the taking of deer of either sex, at any time of year, and by any means.

This "Nature's Bounty" hunting ethos may have been selected for retention because the initial increase in the size of the deer herd meant there were no immediate repercussions for harvesting way beyond replacement levels. That excessive harvests could actually diminish the overall deer population remained largely unrecognized.

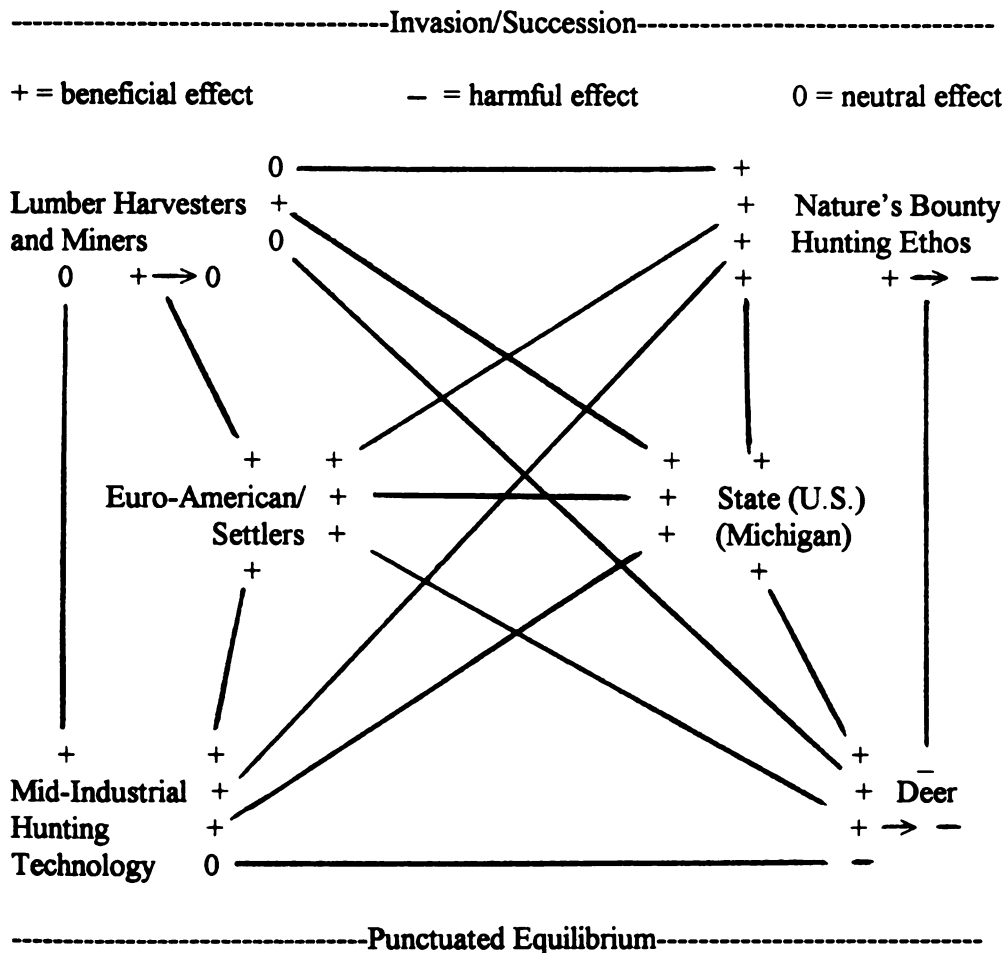
By the end of this sub-epoch, as a consequence of the unbridled implementation of this ethos, we find a serious depletion of the deer herd. This sub-epoch's brief period of abundance thus reverted to the scarcity condition encountered at the end of the fur-trading era. However, as this sub-epoch draws to a close the U.S. is in the process of entering the Progressive Era, a period of social reform characterized by considerable social movement

activity, including that of the Conservation Movement (Kline 2000). As a result of the confluence of these factors, by the end of this sub-epoch we see the state's first efforts at regulating and managing the deer herd. However, since this activity becomes more prevalent in the next Epoch I will wait to discuss it more fully in the following chapter.

Species' Co-Evolutionary Interactions

In the present section I address the extent to which the co-evolutionary relationships established between the species interrelated through the activity of deer hunting during Epoch II-B were beneficial, harmful, or indifferent to the survival of each species. I begin by examining those species who received the greatest benefit from their relationships with other species. I then move on to species with increasing numbers of indifferent and/or harmful relationships with other species. An overview of these relationships is provided in Figure 6.2.

Figure 6.2. Ecological Interactions for Epoch II-B 1821 - 1890



The state (U.S. and Michigan) *benefitted from* all the relationships it had established with the other elements of the sociocultural ecosystem. Euro-American lumberers and miners provided tax revenue to the state, both directly and, more importantly, indirectly through the settlement they facilitated. In general, the state grew in scope and power as the land was settled as a result of the activities of the logging and

agricultural industries. As the number of Euro-American settlers grew, they required ever greater government services and oversight.

The state also benefitted from the development of the nature's bounty ethos, as it provided an idealistic vision to potential settlers, thus encouraging migration and hence the "taming" of the frontier. The state received a similar benefit from the mid-industrial hunting technology, which allowed lumber harvesters, miners and settlers to obtain supplemental protein sources from hunting, as well as defend themselves from potentially dangerous predators, and from other humans. The benefit the state received from its relationship with the deer came primarily at the end of the sub-epoch, when it began to assert ownership of the deer herd and to implement deer-conservation policies designed to save them from extinction. Thus the state benefitted by the growth in the scope of its powers resulting from its assumption of a wildlife management role.

The Euro-American settlers also *benefitted from* all of their relationships with the other species. The state facilitated the growth of the settlers in several ways. The state obtained title to the land from the Native Americans in a series of treaties in the early 1800s. The state then saw to the pacification or removal of Native Americans to make way for lumbering, mining and agriculture. The state executed extensive detailed surveys of the land in preparation for sale. The state made this land available to these interests at cheap prices. The state's promotion of lumbering and mining contributed indirectly to the growth of settlement for agriculture. The state also promoted transportation networks such as railroads, ferries, shipping routes and ports, and roads which facilitated

agricultural settlement. Finally, the state established land-grant universities for the propagation of agriculture, forestry and mining.

The settlers also benefitted from the activities of the lumber harvesters. In addition to clearing the land, the logging companies built railroads into the interior of Michigan so they could harvest the lumber far away from the navigable rivers and streams. These railroads later facilitated the immigration of settlers as well as providing an outlet to markets for their surplus produce.

The settlers were not strictly dependent on either the mid-industrial hunting technology or the nature's bounty hunting ethos. However, both did allow them to supplement their diet with cheap protein obtained from the harvesting of wild animals and this contributed to their survival and growth.

The mid-industrial hunting technology also *benefitted from* its relationships with most other species in the sociocultural ecosystem. This species' survival depended upon its continued use by humans. The lumber harvesters indirectly facilitated this use, by creating environmental conditions which facilitated the growth of the deer herd and encouraged the in-migration of settlers/farmers. The settlers utilized this technology to harvest the deer and other wild game. Since both lumber harvesting and settling were promoted by the state, state activities were also beneficial to the survival and possible growth of the mid-industrial hunting technology. The nature's bounty hunting ethos also benefitted the mid-industrial hunting technology in that any ethos that included either a manifest or latent conservation function (which this ethos did not) would have inhibited and therefore diminished the full use of this technology in some way.

The only species relationship that was *indifferent to* rather than beneficial for the survival of the mid-industrial hunting technology was that with the deer. As the mid-industrial hunting technology was developing globally and could be used against many kinds of wild game other than deer, as well as against humans, the presence of deer was probably not a substantial factor in the survival of this species.

The nature bounty's hunting ethos also largely *benefitted from* its relationships with other species. The Euro-American lumber harvesters, facilitated by the state, contributed to the growth of this ethos by increasing the deer herd, creating the appearance of unlimited abundance. The ethos needed to be carried in the value system of the settlers in order to survive. The ethos also needed the mid-industrial hunting technology to survive. The technology facilitated the application of the ethos and thereby encouraged its adoption and retention.

The only relationship that was not completely beneficial to the survival of the nature bounty's ethos was, again, the one it had with the deer herd. Initially, this relationship was quite positive, since the large herd size created by the clearing of the forests gave the appearance of unlimited game, thus supporting and legitimating the ethos. However, obversely, as the size of the deer herd diminished to the point of endangerment the validity of that ethos was likewise called into question. It is hard to sustain a belief system in a bountiful supply of deer when there are only a handful to be found in a region.

The lumber harvesters had a *combination of positive and indifferent* relationships with other species. The state encouraged lumbering by making forest tracts available for cheap prices and by encouraging the railroads. The Euro-American settlers practiced

agriculture on cleared land, at least in part to feed the Euro-American lumber harvesters. This beneficial relationship with the settlers did not last: as explained in the section on “System Dynamics”, by the end of this sub-epoch the settlers had almost completely displaced the lumber harvesters. However, this demise was largely the result of activities on the part of the harvesters themselves. While the settlers benefitted from this development, they did not directly contribute to the decline of the lumber industry. At best, then, the relationship between lumber harvesters and settlers moves over the course of this epoch from beneficial to the survival of the harvesters to indifferent to their survival.

Likewise, the lumber harvesters were neither benefitted nor harmed by their relationship with the nature’s bounty hunting ethos, the mid-industrial hunting technology, or the deer. Deer and other wild game provided only a supplemental protein source for the camps, and hence neither the presence of wild game, nor the means (technology plus ethos) to successfully hunt it, were particularly instrumental in the survival of the lumber industry.

Once again, the deer herd is the most negatively affected component in the system, though in contrast to Epoch II-A here there are two species whose activities are beneficial to the deer herd’s survival and growth. The state indirectly helped expand the deer herd by its support of lumbering, mining, and agriculture in the first half of Epoch II-B. At the end of the sub-epoch it began to assert ownership of the deer herd and to implement deer conservation policies designed to save them from extinction. The deer also benefitted from

the activities of the lumber harvesters, whose clear-cutting activities unintentionally provided an ideal habitat for deer to flourish.

While the settlers also cleared the land, this beneficial contribution to the deer was offset by the settlers' use of deer as a supplemental protein source. While deer did not form a substantial part of the settlers' diet, their harvesting was at a sufficient level to contribute to the eventual depletion of the deer herd. In addition, since deer like to browse on many domestic crops, we can assume that many deer were shot as pests for this reason.

The mid-industrial hunting technology increased the probability of success on any given hunting expedition, and hence increased the quantity of deer harvested. Likewise, the nature's bounty hunting ethos justified the taking of any deer at any time. Both of these species were thus detrimental to the continued survival of the deer.

Constraints on Harvesting

The hunting ethos changed from Epoch II-A to Epoch II-B, from one where extensive harvest occurred because the Native Americans believed themselves to be at war with the animals to one where Euro-American settlers believed deer to be inexhaustible. Both ethoses, however, encouraged harvesting to the maximum extent of technological capabilities. During Epoch II-B, the nature's bounty ethos, co-evolving with mid-industrial hunting technology (e.g., the development and widespread use of long range repeating rifles) made large harvests of deer relatively easy as well as morally acceptable (McDowell 1987; Vanderpool 1994; Whitney 1987; McCay 1987; Nelson 1998; Waren 1997).

Martin (1979: 175) gives an example of the operation of the nature's bounty ethos in a state other than Michigan. He says this provides a "poignant testimony to the frontier syndrome that resources were limitless:"

In 1865, in his sixty-fourth year, one such frontier hero named John Hutchins of Manlius, New York unabashedly announced that he had "caught in traps, or otherwise destroyed ... 100 moose; 1000 deer; 10 caribou; 100 bears; 50 wolves; 500 foxes; 100 racoons; 25 wild cats; 100 lynx; 150 otter; 600 beaver; 400 fishers; and mink and martin by the thousands." (Newhouse 1894; quoted in Martin 1979: 175)

Toward the end of Epoch II we do see constraints on hunting emerge in the form of government regulation and game management (see Chapter VII). However, for the most part Epoch II can be characterized as one during which there are no constraints on hunting, or that the only constraints that did exist were technological (that is, people harvested to the extent they were able given the type of hunting technology they employed).

System Dynamics

The invasion-succession dynamics present during Epoch II-B yielded system dynamics of punctuated equilibrium (see Figure 6.2). This system was not, however, sustainable.

Consider first the lumber industry. Timber harvesting can only occur in the presence of trees of a substantial size to make their removal and transportation to market profitable. However, by 1900, the lands of the northern lower peninsula and the eastern

Upper peninsula were stripped of pines, and scores of lumber towns were dying according to Sommers (1984).

By the end of Epoch II-B we see the Euro-American settlers emerge as the dominant species in the sociocultural ecosystem while the Euro-American lumber harvesters become virtually extinct. In a classic invasion-succession pattern, the lumber harvesters rendered their own environment non-supportive to themselves through their life sustaining processes (exhausting the lumber by clear-cutting), and thereby prepared a suitable niche for their successor, settlers/agriculturalists.

As for the millions of acres of cutover lands that remained when the forests of Northern Michigan were gone, much energy was expended on into the early years of the twentieth century to promote agricultural development in these areas. (Dunbar and May 1995:350-351)

This system was also not sustainable for the deer herd (see Figure 6.2), whose population was severely depleted by the end of this epoch. The continued survival of the nature's bounty hunting ethos, which was predicated on large herd size, was also threatened. Soon after the end of this epoch it would be succeeded by the new conservation oriented sports ethos. The state was also rapidly evolving toward further ownership, and therefore a much greater role in management and control, over all natural resources including deer. Indeed, the unsustainable nature of this system was soon to be graphically demonstrated by its total reconfiguration over the space of a few short decades.

Chapter VII. Epoch III:

Transitions to, and Contextualizations for the 20th Century.

A final invasion dynamic occurred in the late 19th-early 20th centuries. Driven by the industrial transformation going on in the broader society, one species -- industrial workers -- expanded from a minor species to become the dominant species in the sociocultural ecosystem. Industrialization also invaded the agricultural sphere, causing settlers/farmers to mutate into industrial agriculturalists. The state also grew in size and function, which included assuming the ownership and management of “wildlife.”

The impetus toward continual technological innovation stemming from an industrialized and capitalistic economy made itself felt in hunting technology, which became increasingly advanced over the course of the 20th century. At the same time, by the latter half of the 19th century a new sports hunting ethos was beginning to challenge the nature’s bounty ethos. This ethos stressed the finiteness of nature, and presented “true sportsmen” as individuals who voluntarily practice conservation measures, including voluntary limitations on the number of game and fish taken. The development of this ethos was part and parcel of the broader conservation movement which occurred in the latter half of the 19th century, and reached its peak during the progressive era that marked the turn of the last century (Kline 2000).

The presence of these species--save one--was well established by the early 20th century. The one exception was the deer herd which, as explained in the previous chapter, had been seriously decimated in the 19th century. However, under the combined influence

of state management and hunter's adoption of the sports hunting ethos, the deer herd had made a significant comeback by the 1920s. The deer population continued at high levels for the remainder of the 20th century, and does so today, certainly surpassing its pre-European contact levels. This was the result not only of the two factors just mentioned, but also expansion of habitat created by agriculture.

Throughout the course of the 20th century, then, we see the following species interrelated through the activity of deer hunting: industrial workers, industrial agriculturalists, the state, advanced industrial hunting technology, the sports hunting ethos, and deer. The entire century was marked, however, by a sense of precariousness about this sociocultural ecosystem, a perception of the threat to hunting that I label the "squeeze." In the early part of the century, the endangered nature of the deer herd formed the foundation of this sense of threat. As the deer herd recovered, however, other factors came to contribute to a sense of "squeeze." Human population size increased; industrial workers had more leisure time in which to hunt, and more disposable income with which to buy the necessary transportation and hunting equipment; and innovation in hunting and transportation technology made this activity increasingly accessible. While the impact so far has probably been more psychological than actual, a growing anti-hunting sentiment also contributed to the overall sense of hunting as an endangered activity.

In the following section I provide evidence of this growing sense of the "squeeze," as recorded in the pages of *Field and Stream* magazine. I follow this with a chapter on the perceived causes of the "squeeze," again as these were developed in *Field and Stream*. In Chapter IX I discuss responses to the "squeeze," with a particular emphasis on the

sports hunting technology. In my final findings chapter, Chapter X, I analyze these 20th century developments in light of the co-evolutionary framework. I follow an organizational framework developed in the preceding epochs, including an examination of the co-evolutionary interactions among the species, the sources of constraints on hunting, and system dynamics.

The key contextual factor for the 20th century is that of industrialization and post-industrialization. Obviously, however, much else is going on during this period. The key historical events of each decade may be summarized as follows: 1900s — Progressivism; 1910s — World War I; 1920s -- prosperity; 1930s -- depression; 1940s -- World War II; 1950s -- prosperity and conservatism; 1960s -- social upheaval, including the beginnings of the contemporary environmental movement; 1970s -- recession; 1980s -- anti-government conservatism (Reaganism); 1990s -- prosperity. When relevant, the effect of these broad historical factors on deer hunting will be discussed in the chapters to follow. I turn now to an examination of evidence indicating the existence of the “squeeze.”

Evidence of the “Squeeze”

The nature’s bounty hunting ethos offered a view of unlimited nature, where there was always more than enough game and fish for all comers. As explained in Chapter VI, by the end of the 19th century depletion of some game species, as well as other natural resources such as forests, made the continuation of that belief less tenable. The 20th century was marked by a very different image, that of the increased difficulty and precariousness of hunting. In contrast to the preceding four centuries, the 20th century

was marked by an uneasy perception that there may not be enough hunting opportunities for everyone.

In the present section I provide evidence of the existence of the “squeeze,” as these were expressed in the pages of *Field and Stream* magazine. I organize my presentation of this chapter into the five examined periods (1909-1911; 1929-31; 1949-51; 1969-71; 1989-91), as there are some changes in *Field and Stream* coverage of the “squeeze” across this span of time. In particular, images suggestive of the “squeeze” are less frequently encountered during the first two periods than in the final three. The conditions indicative of the “squeeze” also become more expansive over time, limited largely to concerns about species depletion in the first two clusters, but expanding to include such concerns as habitat destruction, development, and pollution in the last three clusters.

In order to provide some indication of the analysis to follow, I begin with two sets of data which offer a general overview of the entire 20th century. Both data sets are intended to convey a sense of the “squeeze” in which hunters increasingly operated. The first data set contains deer kill to license sales ratios as reported by the Michigan Department of Natural Resources for selected years. As can be seen in Table 7.1, the number of deer killed in Michigan in 1978 (106,990) exceeded the number of deer killed in 1911 (12,000) by a factor of 8.9. This might suggest a situation of increased abundance and hunting success, until one considers that, over the same period, the number of license hunters increased by a factor of 31.6.

In terms of individual hunting success, this means that in 1911 slightly more than half of all individuals who bought deer hunting licenses bagged an animal. In 1978, approximately 1 out of 7 hunters who bought a license bagged a deer. There may be no better single indicator of the “squeeze” than this decreasing statistical probability of any individual hunter successfully bagging an animal.”

The second data set is a list of the animals pictured in taxidermy advertisements in *Field and Stream* in selected years throughout the 20th century (see Table 7.2). This list demonstrates a shift away from large trophy animals toward small game and deer. Smaller animals are more likely to survive the encroachment of humans in the form of industrial agriculture and suburbanization. Indeed, some animals, such as deer, have even flourished under these conditions. Accordingly, sportsmen do not have to travel to the vast expanses of wilderness in the West or in Alaska to hunt small game, deer, and to fish. I elaborate these developments further in the remainder of this Chapter.

Table 7.1. Number of Deer Hunting Licenses Sold, Number of Deer Killed, and Kill-to-License Ratio, Firearm Season, Michigan, Selected Years.

Year	License Sales	Deer Kill	Ratio
1911	22,280	12,000	1:1.86
1931	58,620	23,500	1:2.49
1943	219,494	50,890	1:4.31
1960	460,915	75,360	1:6.12
1978	704,040	106,990	1:6.58

Table 7.2. Types of Animals Depicted in Taxidermy Advertisements in *Field and Stream*, Selected Years.

Selected Years	Types of Animals Depicted
1929-1931	Elephant, Rhinoceros, Tiger, Black Panther, Grizzly Bear, Mountain Lion, Wolf, Moose, Bison, Deer, Duck, Squirrel, Small Bird
1949-1951	Eagle, Deer, Raccoon, Duck, Quail, Rabbit, Birds
1969-1970	Deer, Raccoon, Duck, Quail, Raccoon, Fish, Birds
1989-91	No taxidermy advertisements

1909-1911

A sense of “squeeze” is less fully developed during this period than it will be in subsequent years, and for the most part revolves around threats to wild game species. There are no doubt several reasons for this. First, this is the time when the new sports hunting ethos is battling for ascendancy with the nature’s bounty ethos. As will be discussed more extensively in Chapter IX, the sports hunting ethos contrasts with the nature’s bounty ethos by viewing natural resources as finite, and by understanding that human actions can imperil nature. Second, the effects of other causes of the “squeeze,” such as increased population size, improvements in transportation, and innovations in hunting technology (discussed in the following chapter) are at this point still relatively

minimal. As Tables 7.1 and 7.2 demonstrate, this is a time when over half of licensed hunters bag a deer, and when pursuit of large trophy animals is relatively common.

The transitory nature of this period is reflected in the pages of *Field and Stream*, some features of which fit in well with the nature's bounty ethos, and others of which reflect the emergent sports hunting ethos and the underlying sense of "squeeze." To provide a flavor of this, I will illustrate with several examples supportive of the nature bounty's ethos.

A 1909 story tells of a hunting competition between an Eastern Englishman with a shotgun and a western rancher with a rifle and his daughter. The idea is to see who can kill the most game.²⁶ This is meant to show humorous contrasts between the different hunting techniques, but it also illustrates the nature's bounty attitude towards wild animals. No justification for killing is offered, no need for food is suggested, nor is it felt necessary to mention if the carcasses were utilized in any way.

Other elements of the nature bounty's ethos can be seen in letters and features that define the 'bag' of a hunt as the main thing, and that all, or virtually all animals (regardless of sex, age, etc.) are considered "fair game." A 1909 letter to the editor enthusiastically describes a deer drive wherein the author shoots a big doe.²⁷ A picture of hunters

²⁶ F&S, 1909, Vol. 14, Oct., pp. 505-512.

²⁷ F&S, 1909, Vol. 13, Jan., p. 804.

returning to camp, which accompanies a story about deer hunting in Sonora, Mexico, is captioned: "Never Return Without a Deer."²⁸

Trophy hunting also receives coverage in the pages of *Field and Stream*. A 1911 story about moose hunting in Canada has a caption under the opening picture which says: "Keep after him till you get him -- it's the only way to get a good trophy."²⁹ In a story about caribou hunting on Terra Nova, the author gets a forty pointer and immediately wants to get a fifty pointer. Apparently only heads and hooves are taken for trophies, and skins for rugs, accepting in a blase fashion both greed and waste.³⁰ There are also stories about adventurous safaris in "exotic" places like Africa.³¹

While these images of plenty form a visible minority presence in the pages of *Field and Stream* during this period, they are nonetheless a minority. Set against them are the contrasting images of (to a lesser extent) the "squeeze," and (to a greater extent) the sports hunting ethos. As previously mentioned, at this stage images of "squeeze" come mostly in the form of concern about resource depletion. A 1911 editorial supports legislation prohibiting the sale of game to hotels, cafes, etc. The argument here is

²⁸ F&S, 1911, Vol. 16, Sept., p. 470.

²⁹ F&S, 1991, Vol. 16, Sept., p. 492.

³⁰ F&S, 1911, Vol. 16, Dec., p. 823.

³¹ E.g., F&S, 1911, Vol 16, Sept., pp. &A, 457-460.

accompanied by dire predictions of the imminent demise of game species, especially "... in the East, where wildlife is threatened with absolute extinction."³²

A 1910 letter to the editor calls for a ban on the hunting of gray squirrels. It maintains that the United States has a "...pitiful remnant of wildlife."³³ A 1911 article describes the present period as "...these days of steadily decreasing game supply..."³⁴

Another indication of the "squeeze" that will become a growing concern in later years, but is only briefly touched on at this time, is the issue of hunter safety. A 1911 editorial says that any hunter who shoots another hunter should have his license taken away forever.³⁵ A story published that same year recounts a hunting accident where a hunter shoots at movement in the brush and kills his friend.³⁶ Hunters are admonished not to shoot unless they can fully see their target. We would expect problems of this kind to increase in the context of greater hunter density, new technologies with greater range capacity, and diminished wilderness habitat. In previous centuries, when these conditions did not hold, hunting accidents were apparently infrequent enough to not even warrant attention.

Because the elements of the sports hunting ethos are not discussed until Chapter IX, the full extent of divergence of this period from the nature's bounty ethos is not yet

³² F&S, 1911, Vol. 16, Sept., p. 455.

³³ F&S, 1910, Vol. 15, Aug., pp. 349-350.

³⁴ F&S, 1911, Vol. 16, Sept., p. 467.

³⁵ F&S, 1911, Vol. 15, March, p. 1100.

³⁶ F&S, 1911, Vol. 16, Sept., p. 491.

apparent. However, as will be demonstrated in that chapter, these are the years when *Field and Stream* is devoting considerable page space to fleshing out this ethos, publishing articles that both lay it out in its entirety and that develop in more detail its particular attributes.

1929-1931

Images of the “squeeze” continue to be associated with resource depletion during this period. There is also a continuation of the remnants of the nature’s bounty ethos. This is less pronounced than in the previous cluster, however.

For example, a 1930 advertisement for Nova Scotia and Newfoundland says, “Don’t pity the ‘poor fish’ ...come and get ‘em! ... full bag...light heart... lenient game laws...big bag limit.”³⁷ Another advertisement for moose hunting reads, “New Brunswick for Record Heads.”³⁸ A 1929 article discusses the “kills” to “cartridges” ratio one should expect or aspire to. This article cites an English lord who killed 1070 “driven grouse” in a day, for a ratio of over 75%, and goes on to maintain that 50% is enough for wild birds.³⁹

The “Where to Go” section shows seven deer hanging from a deer pole in an advertisement for a hunting resort in New Mexico.⁴⁰ Many other advertisements in the “Where to Go” Sections offer specific resorts with the claim that fish and game are

³⁷ F&S, 1930, Vol. 35, Aug., p. 5.

³⁸ F&S, 1930, Vol. 35, Aug., p. 7.

³⁹ F&S, 1929, Vol. 34, Jan., pp. 46-50.

⁴⁰ F&S, 1931, Vol. 35, March, p. 5.

plentiful in their areas. Adventure stories about big-game safaris, typically in some “exotic” locale, are even more prevalent than they were in the 1909-1911 issues⁴¹

Despite their expressions of themes compatible with the nature bounty’s ethos, the proliferation of these adventure safari stories, and the fact that much of the remainder of nature bounty’s imagery is found in advertisement, may in itself be indicative of an increasing sense of “squeeze.” We would anticipate that resorts offering “successful” hunting and fishing expeditions would increase as success under non-resort conditions grows increasingly precarious. As can be seen in Table 7.1, at this period the ratio of deer kills to license sales in Michigan is 1:2.5. In other words, more (legitimate) hunters are leaving the woods without a deer than with one.

Likewise, stories about big game safaris may provide a vicarious thrill to many hunters who can’t afford to go to places like Africa, and maybe not even to resorts in the U.S., and who therefore increasingly find themselves limited to the kind of small game and deer left in the more populated regions (and even here, as just mentioned, success at getting “a bag” is less than certain). Stories about safaris may be so popular precisely because they describe a kind of hunting experience no longer available to most hunters.

At the same time, some explicit images evoking the sense of “squeeze” are also found. A 1930 article on fishing maintains that wilderness still exists in places like the

⁴¹ E.g., F&S, 1929, Vol. 34, Oct., p. 13; F&S, 1929, Vol. 34, July, pp. 104-108; F&S, 1929, Vol. 34, July, p. 40; F&S, 1930, Vol. 35, Nov., p. 38; F&S, 1930, Vol. 34, Feb., p. 16; F&S, 1929, Vol. 34, Oct., p. 86; F&S, Vol. 34, Feb., p. 22-23; F&S, 1929, Vol. 34, July, p. 113.

Adirondacks if one is willing to leave the highway and hike into the back country.⁴² A story about deer and bear hunting in New York suggests that back-packing into remote areas is best. In a particularly eloquent portrayal of the “squeeze,” the author describes hunting pressure in the easy-to-reach places:

...each late fall the grand army of deer-slayers, to be ordered about by guides and shiver on this or that runway with possibly a glimpse in two long weeks of one thin-horned yearling. We wanted to get away from all that cut-and-dried, humdrum, commercialized sort of hunting.⁴³

Another indication of the “squeeze” is attention to, and support of, stocking.⁴⁴ During these years (1929-1931) a feature on game breeding appears in every issue (this subject was not discussed in the 1909-1911 issues). A 1930 article on pheasants in Michigan asserts that mere protection is not enough; propagation is also necessary.⁴⁵ An article gives suggestions to clubs on how to raise money to purchase birds to stock.⁴⁶ One game breeding feature suggests many state departments are now involved as well as

⁴² F&S, 1930, Vol. 34, Feb., p. 24.

⁴³ F&S, 1931, Vol. 36, Sept., p. 26-27.

⁴⁴ Stocking also constitutes a response to the “squeeze.” However, since perceptions of the need to stock so closely implicate species’ depletion and/or declining hunter success rates, I will use indications of stocking frequency in this chapter as an indicator of the “squeeze.”

⁴⁵ F&S, 1930, Vol. 35, Aug., p. 34.

⁴⁶ F&S, 1930, Vol. 35, Nov., pp. 110-111.

private enterprises and individuals.⁴⁷ Another article mentions that private stocking has been common in Europe for some time.⁴⁸

1949-1951

Only a few references to the nature's bounty ethos continue at this time. A story about hunting birds in Africa says: "What son of a scatter-gun has never dreamed of a mythical kingdom where he could shoot birds to his heart's content, day in and day out -- where even the 25-duck limit of a bygone era is unheard of..."⁴⁹ In a story about a hunt in the remote Yukon, the author and his Indian guide shoot grizzly bear, black bear, and moose. Apparently, most of this meat is left to rot.⁵⁰

As both these examples illustrate, stories about big game hunting and adventurous safaris continue, and if anything are even more popular. Trophies are still held to be desirable. As previously mentioned, this development likely represents a response to the "squeeze," providing a vicarious thrill to hunters increasingly limited to deer and small game animals, and/or armchair "hunters" in an increasingly urbanized nation. Examples of these kinds of stories include accounts of: 1) an African hunt for a bull elephant with

⁴⁷ F&S, 1931, Vol. 36, Dec., pp. 92-95.

⁴⁸ F&S, 1929, Vol. 34, Jan., pp. 49-50.

⁴⁹ F&S, 1949, Vol. 54, July, p. 60.

⁵⁰ F&S, 1950, Vol. 55, p. 44.

trophy tusks;⁵¹ 2) a tiger hunt in India;⁵² 3) a jaguar hunt in Honduras;⁵³ 4) a grizzly bear hunt in the American West;⁵⁴ and 5) a polar bear hunt in Alaska.⁵⁵ The vicarious nature of these stories is explicitly acknowledged in a letter from an industrial worker who says he enjoys the stories about big game hunting in Alaska, Africa, etc. He also says that he knows neither he nor most of his fellow readers will ever be able to go to any of these exotic places.⁵⁶

Overall, the issues from this cluster definitely show an increase in the sense of threat or “squeeze” to hunting and fishing as a form of recreation. This occurs in both the quantity of explicit attention this receives, and in the broadening of threats beyond that of depletion of game species. Items now frequently appear which allude to the need to preserve hunting, and which bemoan crowded conditions. Also, there is an increased call for the preservation of wilderness areas. Vast wilderness spaces are no longer taken for granted.

By way of statistics, *Field and Stream* reports that a record number of hunting licenses were sold in fiscal year 1949 (ending June 30), totaling 12,758,698, with

⁵¹ F&S, 1949, Vol. 53, p. 64.

⁵² F&S, 1950, Vol. 55, Aug. 8.

⁵³ F&S, 1951, Vol. 55, Mar., p. 26.

⁵⁴ F&S, 1951, Vol. 55; Mar., p. 38.

⁵⁵ F&S, 1951, vol. 56, June, p. 26.

⁵⁶ F&S, 1950, Vol. 55, Aug. 8.

Michigan at the top with 977,879.⁵⁷ Elsewhere, it also reports that fishing licenses soared to 14,582,739, an increase of 1,962,275 over the previous year.⁵⁸ It is now routine to hunt in rural as opposed to wilderness areas, and to focus on deer and small game for fun and/or a meal. The cottontail rabbit is the number one United States game species, based on the number of hunters pursuing it.⁵⁹

An article on fishing begins by suggesting that fishing is also under population pressure. It says that whereas 20 years ago you had secluded fishing spots, now the anglers line up “shoulder to shoulder,” and “the pressure is on.” The author maintains that there are not enough fish and game animals to go around. “[W]e have just so much game; the more hunters there are the less game there is for each.”⁶⁰ A cartoon depicts the “opening day” of fishing season by showing a bridge that is ridiculously over-crowded with fishers.⁶¹

An article asks the question, “Where Can We Hunt?” It says, “duck hunters are growing tired of hunting for places to hunt.”⁶² A letter describes California as a place “...where there are more hunters and fishermen than game.”⁶³ Further, in reference to a

⁵⁷ F&S, 1950, Vol. 54, Feb., p. 32.

⁵⁸ F&S, 1949, Vol. 53, p. 32.

⁵⁹ F&S, 1949, Vol. 54, July, p. 32.

⁶⁰ F&S, 1949, Vol. 53, April, p. 60.

⁶¹ F&S, 1949, Vol. 53, April, p. 15.

⁶² F&S, 1949, Vol. 53, July, p. 53.

⁶³ F&S, 1949, Vol. 54, Oct., p. 17.

fishing location reported in an earlier *Field and Stream*, the letter writer laments, “I know if I ever can afford to go up there, it will be fished out by then.” In a story about geese hunting, the author talks about hoards of hunters ruining the hunt by overcrowding his favorite spots.⁶⁴

An article asks the question, “Less Game for More Hunters?” It starts with a real, but anonymous, letter to the editor:

Another season has passed, and I see by your columns that the usual excuses are being offered for the bad luck of hunters. Either bad weather, or too many leaves, or some such reason is always given for the poor bag brought in. The truth is that each year more and more hunters take less and less game. Many an old rabbit hunter the country over has given-up keeping hounds because there is nothing left for them to work on....In the Southern states fewer and fewer quail are shot by an increasing horde of hunters. Things have come to such a pass that an old-timer feels like a sucker when he buys a license. I think we had better all hang up our guns and call it a day.

Yours truly, Disgusted Hunter⁶⁵

Field and Stream goes on to assess the claims of this hunter. It offers the following statistics: 1936 -- 6,860,000 licenses sold; 1946 -- 12,067,000 sold, for a 76% increase. *Field and Stream* therefore admits that there are indeed more hunters. It also admits that the letter writer is correct for some species, which are now rare, endangered, or extinct. However, it goes on to argue that for some species, such as deer, bear, and

⁶⁴ F&S, 1951, Vol. 56, June, p. 55.

⁶⁵ F&S, 1950, Vol. 55, May, P. 50.

elk, the actual take was more than in 1936. For example, in 1936 280,000 deer were taken, while 680,000 deer were taken in 1946, for a 140% increase. This increase, in part, reflects the increase in the number of hunters, though at the same time the take per hunter was up which indicates that hunting is actually getting better.

Nevertheless, *Field and Stream* explicitly says that hunters are now close to the natural surplus of our game species, and that only habitat improvement will increase the supply. It says that stocking alone will not work because habitat has a carrying-capacity.

Field and Stream also admits in this article that the letter writer speaks for a vocal, but growing, minority of hunters. It says that their complaints could materialize into truth if precautions are not taken. Its general conclusion is that more game is taken each season, but less game is taken per hunter. If these trends continue, then bag per hunter will markedly decrease.

There is a much larger “Where to Go Section” than in the previous two clusters. This is likely indicative of fewer non-resort opportunities. There is an increased emphasis on fishing, and the acceptability of stocking, of both game and fish. A regular feature on game breeding for stocking purposes continues. Reasons for, and justifications of, stocking are provided in a 1949 article, which says that fishing pressure is so great on two of Oregon’s most popular lakes that stocking is the only way to provide fish for all the fishers.⁶⁶ Advertisements for private resorts routinely feature stocking as an inducement to customers.

⁶⁶ F&S, 1949, Vol. 54, July.

1969-1971

References to safari hunting have greatly diminished, but not disappeared.⁶⁷ Due to the combination of extensive hunting, population pressures, and habitat loss, the “squeeze” is likely making its presence felt by this time in such “exotic” locales as Africa and South America. Therefore, even big game hunting in these “distant” lands is becoming less and less available as a vicarious thrill to American hunters. I might also speculate here that the environmental movement may have delegitimated large, and possibly endangered, animal trophy hunting to some degree. Only these few lingering remnants of the nature’s bounty ethos remain.

On the other hand, there continues to be many explicit and implicit references to the “squeeze”. An editorial is critical of the National Park Service for indirectly contributing to the despoliation of our national parks by making them too accessible to too many people, for example, by building too many roads.⁶⁸ A letter to the editor laments the drastic decline in pheasants.⁶⁹

Virtually all items now appearing in *Field and Stream* that deal with hunting in any particular sense concern deer and small game that can be hunted locally in largely rural settings. For example, an article identifies the best places to hunt rabbits in the U.S. It says that rabbit hunting is so big because they are plentiful, good to eat, and widespread.

⁶⁷ E.g., F&S, 1969, Vol. 73, Jan., p. 48.

⁶⁸ F&S, 1971, Vol. 76, Sept., p. 8-10.

⁶⁹ F&S, 1969, Vol. 74, Oct., p. 4. The letter writer attributes this to the decline in the small family farm, but synthetic chemical pesticides is the more likely culprit.

In fact, it says that they are the most abundant of all United States game animals. Some states even have year-round seasons on rabbits.⁷⁰ Another article discusses hunting cottontail rabbits in the West.⁷¹ The October, 1974 issue of *Field and Stream* offers numerous features on deer and duck hunting.

Almost all resort advertisements now feature stocking, and there is the first mention of lottery hunting that I have seen which, again, is consistent with the “squeeze.” This occurs in reference to a javelina hunt in New Mexico. Licenses for this hunt were decided by a lottery. Only 100 permits were given based on a random drawing.⁷² As is portrayed in Table 7.1., which shows that at this time period only one licensed Michigan hunter out of seven successfully bags a deer, the clamor of unfulfilled hunters continues.

1989-1991

There are now no lingering articles on big game safari hunting, nor other references to the nature’s bounty ethos. However, there are many references to the “squeeze.” An article describing duck hunting in Argentina claims that United States ducks are “way down.”⁷³ Several letters praise a March article entitled “Obsession.” These claim that it is good to know that there is some unspoiled wilderness life on the

⁷⁰ F&S, 1969, vol. 73, p. 46.

⁷¹ F&S, 1969, Vol. 74, p. 50.

⁷² F&S, 1970, Vol. 75, May, p. 68.

⁷³ F&S, 1989, Vol. 93, Jan., p. 34.

planet.⁷⁴ An article casts Northern Canada as the “....land that just might be the last place on earth where you can truly be alone.”⁷⁵ Another article advises on how to avoid the “crowds” of hunters in pickups while antelope hunting.⁷⁶ A cartoon suggests a conflict between fly-fishers and rafters, as alternative users of rivers.⁷⁷

There continues to be increased concentration on small game, deer, and fishing. I found stories and articles featuring fishing themes running eight to three compared to hunting themes, and the hunting themes concentrating on rabbits, birds, and deer.

The “Where to Go Section” is also smaller. Most of the advertisements are for Canada, and many include a picture of a small sea plane. Almost all the advertisements for resorts in the United States are on private land with stocked game, which are touted as exempt from state game laws.

⁷⁴ F&S, 1991, Vol. 96, June, p. 8.

⁷⁵ F&S, 1991, Vol. 96, June.

⁷⁶ F&S, 1991, Vol. 96, Sept., p. 38.

⁷⁷ F&S, 1989, Vol. 93, April, p. 44.

Chapter VIII.

Causes of the “Squeeze.”

In the present chapter I discuss the causes of the “squeeze,” as these were identified in the pages of *Field and Stream* magazine. As has been previously discussed, the distinction between indicators of the existence of the “squeeze,” its causes, and the responses that developed to it is not always clear-cut. Therefore, indicators of the “squeeze’s” existence, as presented in the previous section, such as increased numbers of hunters and decreased wilderness habitat, also serve as proximate causes of the “squeeze.” In this chapter I develop a more complex understanding of these proximate causes, including an examination of the factors that were portrayed in *Field and Stream* as giving rise to them.

The major factors which combine to bring about the “squeeze” are the following:

- 1) development reduces habitat and game; 2) industrial pollution damages habitat and game; 3) population growth stresses habitat through encroachment, which reduces game; 4) increasing affluence of industrial workers increases hunting opportunities for more hunters, which stress game populations; 5) technological progress in transportation increases access to wilderness for industrial workers, which pressures game populations; and 6) innovations in hunting technology, which replace skill with technology, encourages greater hunter participation. In the discussion to follow, I group these factors under two more inclusive categories: decrease in hunting opportunities, and increase in hunting

pressures. This distinction is an analytic one, as each of these are intimately interrelated in the real world.

I end the chapter with a third factor whose effect on the feeling of “squeeze” has to this point probably been more psychological than actual: that of opposition to hunting. However, as the “squeeze” consists of general threats to the viability of hunting as an activity, direct opposition by anti-hunting forces certainly constitutes an important contributing factor.

Decrease in Hunter Opportunities.

Hunting has certain basic requirements: a physical space where hunters can go to hunt, with animals that live there, or migrate through there, that hunters are interested in hunting. In this section I consider three factors that threaten these requirements: development, the posting of private agricultural land, and pesticides and pollution.

Development

“Development” is a bit of a nebulous term, but I will use it here to refer to any use of land other than as habitat for wild game species, or any “improvements” in land (such as dam construction and transportation infrastructure) that are designed to facilitate economic activity. Development activities have proved more detrimental to some species than to others. For example, deer, raccoon, and coyotes have shown themselves to be quite adaptable around human habitation (e.g., Nelson 1998). On the other hand, animals that need considerable space, such as bison, or large predators that are a threat to humans and their livestock, such as mountain lions and bears, have fared less well. However, even in those cases where development has not directly threatened game populations, it has

reduced hunter opportunity through privatization of land. I discuss this problem in the following section.

Threats to species and their habitats, and the corresponding need to protect and preserve these, were important themes in the 1909-1911 issues of *Field and Stream*, and form the basis of a preservationist outlook apparent in that publication throughout the 20th century. Up until the 1960s, however, this outlook takes the form of what we might call pro-active conservation. For example, a 1950 article, representative of many others in that cluster, reports not only on the reclamation, but also on the actual creation of habitat for wildlife, especially water holes for ducks and fish.⁷⁸ Conservation may be the antithesis of development, but a broad-based criticism of development *per se* was not encountered in those issues examined for the first six decades of the 20th century.

This changes in the 1960s. There are no doubt several reasons for this. First, there is an intensification of other causes of the “squeeze”, discussed below. Second, the contemporary environmental movement is gaining momentum during this decade, bringing with it an increased upsurge in perceptions of an environment under threat from development activity (Kline 2000). Third, as was apparent in the pages of *Field and Stream* for the 1969-1971 cluster, there is an increased perception among sportsmen that the state is increasingly permeated by interests antithetical to conservationist interests.

For example, a 1969 editorial blasts the Highway Act of 1968 as an unholy deal between the Federal Government and the construction lobbyists akin to the relationship between the Federal Government and the United States Army Corps of Engineers. It says

⁷⁸ F&S, 1950, Vol. 54, Feb., p. 32.

highways will now be built that will ruin our remaining scenic and wild areas, and that billboards will continue to obscure natural beauty.⁷⁹ An editorial denounces pork-barrel highway construction as destructive of game habitat.⁸⁰ An editorial criticizes the Nixon Administration's failure to implement laws to remove highway billboards.⁸¹

In one issue, the editorial feature "Conservation" says that all congresspersons and senators claim to be strong conservationists, but that many of their records show that they vote in the interests of various industries who damage the environment. It goes on to call on conservation-minded people to throw the bums out and reward the true conservationists by re-electing them.⁸²

In another issue, the same editorial feature gives a general litany of current environmental abuses and blames our top elected officials for bowing to the interests of developers. In particular, it names Senator E. Dirksen and Senator E. Muskie.⁸³ A position article argues against the construction of two new dams.⁸⁴ An editorial reports on the excess dam-building activities of the United States Army Corps of Engineers.⁸⁵

⁷⁹ F&S, 1969, Vol. 73, Jan., p. 14.

⁸⁰ F&S, 1970, Vol. 75, Nov., p. 6.

⁸¹ F&S, 1971, Vol. 75, Mar., p. 60.

⁸² F&S, 1969, Vol. 73, April, pp. 46-48.

⁸³ F&S, 1969, Vol. 74, July, p. 21.

⁸⁴ F&S, 1969, Vol. 74, July, p. 51.

⁸⁵ F&S, 1970, Vol. 75, Nov., p. 6.

A 1970 article warns of the dangers to Alaskan wildlife of the proposed North Shore pipeline. It says that *Field and Stream* is not opposed to development as such, just thoughtless development that does not take wildlife into account.⁸⁶ Another article argues for restraining mining, logging, and the grazing of western public lands,⁸⁷ and an editorial is critical of strip mining as destructive of the environment.⁸⁸ Another editorial is critical of the United States Forest Service's plan to cut and sell Alaskan timber.⁸⁹ Yet another editorial is critical of a logging-development project in South Carolina.⁹⁰

A 1991 conservation editorial entitled "State of the World" says that the environment is getting worse, and that the promises of Congress and industry can not be trusted.⁹¹ In fact, most of the issues of this cluster have a conservation feature by George Reiger which blasts some federal policy or agency for mismanaging some fish or game resource, or their habitat.

As will become more apparent in the following chapter, the relation of "sportsmen" to the state is a complicated one. State assumption of game management played a critically important role in the recovery of such game species as deer. Furthermore, state management plans tend to support artificially high population levels of

⁸⁶ F&S, 1970, Vol. 74, Feb., pp. 12-24.

⁸⁷ F&S, 1970, Vol. 75, May, p. 42.

⁸⁸ F&S, 1971, Vol. 76, June, p. 8.

⁸⁹ F&S, 1971, Vol. 76, June, p. 124.

⁹⁰ F&S, 1971, Vol. 75, Mar., p. 16.

⁹¹ F&S, 1991, Vol. 96, June, p. 12.

popular game species, while licenses and prosecution of poachers discourage over-hunting. Support of game laws is an integral part of the sports hunting ethos that becomes dominant in the 20th century (see Chapter IX). Still, sportsmen support of state activities is far from unqualified, the relationship between the two an uneasy one.

Posting of Agricultural Land

As previously indicated, development *per se* has not been detrimental to all game species. It is now apparent that some species can flourish in the face of certain kinds of development, particularly when combined with state protections. Deer are one of those species that actually benefit from the conditions of development. Suburbanization and agricultural activities have both created a mix of wooded and open browse areas favored by deer. In addition, deer consume considerable quantities of agricultural produce such as corn and soybeans that are higher in protein than the foods that comprise their natural diets (Nelson 1998).

These factors, combined with state management plans, help to account for the phenomenal comeback of deer after the species' severe decimation in the late 19th century. The U.S. deer population at present is certainly higher than it was in pre-European times. However, for hunting to occur, it is not sufficient that there be many animals. It is also necessary that the deer-to-hunter ratio is relatively low, and that hunters are able to reach the deer. I discuss the deer-hunter ratio below; here, I turn my attention to the second problem.

While hunting is allowed on public land, the presence of such land is far from limitless. Furthermore, much of that land is concentrated in the West and in Alaska, in

precisely those locations where human population continues to be relatively sparse (at least relative to the rest of the country). There simply isn't enough easily accessible public lands to accommodate all the people interested in hunting.

Furthermore, because deer have proved so adaptable to human habitation, many deer are not even located in public wilderness areas, but rather inhabit suburbs, exburbs, and agricultural lands. Since these lands are privately owned, hunter access is not guaranteed.

The quest for access to privately owned rural lands has been a serious issue to hunters. By the early 20th century, industrial agriculturalists established the right to post their land against hunters. There is some contradiction to this, because farmers tend to view deer (at least in very abundant numbers) as pests who consume their crops. Therefore, it might seem they would welcome hunters who would aid in keeping this pest in check. Apparently, however, the behavior of hunters in terms of such actions as starting grass fires, leaving gates open, and knocking down fences, was seen to constitute an even greater source of annoyance than the deer. Probably what many industrial agriculturalists really desired was not a reactive solution of hunting, but a pro-active solution of great reductions in the size of the deer herd, a solution which went against the prevailing game-management goals.

By the 1949-1951 cluster I began to encounter admonitions to hunters to respect the interests of farmers and other land owners in order to reduce the amount of private land posted against trespassing and hunting. For example, one author says in a 1951 article:

Unfortunately the available quail are becoming less available for the average man with a gun. There were practically no posted lands when I was a nipper. Now nearly all populous game land is posted and protected, leased or owned by serious hunters.⁹²

In another example, an article entitled "It's Our Move," urges hunters to respect farmers' fences, livestock, crops, etc., so that they will not post their land against hunters.⁹³ A similar article discusses strategies to get landowners to lease their lands for hunting.⁹⁴

A 1990 letter upholding the right to own guns also suggests that access to land on which to hunt is a problem. The author says that the Wisconsin plan allowing land owners to lease hunting rights on their land is a possible solution. He says it beats droves of hunters knocking on doors and asking permission to hunt every fall. He mentions "...heavy pressure on the public hunting grounds..." and that access to private lands is needed.⁹⁵

Pesticides and Pollution

Yet another threat to continued hunting opportunities that emerged from the pages of *Field and Stream* magazine was the degradation of habitat through pesticides and other forms of pollution. Only one statement pertaining to pollution was encountered in the

⁹² F&S, 1951, Vol. 56, Dec., p. 111.

⁹³ F&S, 1949, Vol. 54, Oct., p. 32.

⁹⁴ F&S, 1949, Vol. 54, Oct., p. 32.

⁹⁵ F&S, 1990, Vol. 95, May, p. 6.

earliest cluster, and this was in the form of admonishment of what *not* to do: a sportsman “...is a man who would never pollute a stream; but, on the contrary, would use his every effort to prevent the pollution of our waters.”⁹⁶ However, this provides an indication that even at this early stage pollution was already being regarded as a potential problem in conservation efforts.

By the 1929-31 cluster, there is a clear recognition of the threat to habitat of massive industrial pollution. For example, a 1931 article entitled “Flowing Poison” decried industrial water pollution.⁹⁷ Concerns about pesticides begin to appear in the 1949-1951 cluster. A 1950 article suggests that DDT and other pesticides are responsible for diminished bird species such as quail.⁹⁸ This is again referenced in a report on the annual convention in Escanaba, Michigan of outdoor writers. This report calls attention to habitat damage in the Dakotas from “....the unwise use of powerful herbicides.”⁹⁹ Both of these items appear more than a decade before Rachel Carson’s *Silent Spring*.

This concern continues into the 1969-1971 cluster. A 1970 editorial maintains that state and federal Agriculture Departments push the use of hard pesticides that destroy wildlife.¹⁰⁰ Many letters to the editor favorably mention a previous *Field and Stream* article on the dangers of pesticides to both game and hunters, and the possible

⁹⁶ F&S, 1910, Vol. 15, May, p. 59.

⁹⁷ F&S, 1931, Vol. 36, June, pp. 34-35.

⁹⁸ F&S, 1950, Vol. 55, Nov., p. 23.

⁹⁹ F&S, 1951, Vol. 56, Sept., p. 53.

¹⁰⁰ F&S, 1970, Vol. 75, Aug., p. 200.

envi

Min

clust

pol

con

sug

fig

Ga

po

co

pr

fr

environmental damage from industrial chemicals.¹⁰¹ One of these letters is from the Minnesota Environmental Defense Council. Most of the letters from the 1969-1971 cluster praise *Field and Stream* for its numerous articles which are anti-development, anti-pollution, and anti-population growth.¹⁰²

Concerns about other forms of pollution also continue. A 1969 letter to the editor complains that pollution has ruined the fishing along the California coast.¹⁰³ Another letter suggests a pollution tax on industry.¹⁰⁴ A 1970 article applauds a citizen lawyer who fights water pollution single-handed.¹⁰⁵ Another article decries the raw sewage that it says Galveston is pouring into the ocean.¹⁰⁶

In the 1989-91 cluster, the crusade against industrial pollution abates. It is possible that the stricter laws and regulations that came in the wake of the success of the contemporary environmental movement decreased the quantity of pesticides and other pollutants being deposited into the environment, and that there was thus less of a threat from these by this period.

¹⁰¹ F&S, 1969, Vol. 73, Jan., p. 4.

¹⁰² E.g., F&S, 1970, Vol. 74, Feb., p. 4.

¹⁰³ F&S, 1969, Vol. 73, April, p. 6.

¹⁰⁴ F&S, 1969, Vol. 74, Oct., p. 4.

¹⁰⁵ F&S, 1970, Vol. 75, May, p. 12.

¹⁰⁶ F&S, 1970, Vol. 75, Aug., p. 6.

Increase In Hunter Pressures

The “squeeze” is characterized by not only fewer opportunities for hunting, but by more and more, better armed, and increasingly mobile, hunters pursuing a diminished number of hunting opportunities. In the present section I examine three factors that underlie this development: changes in population characteristics, improvements in transportation technology and improvements in hunting technology. Attention to technological innovation is one of the most extensively, and persistently, developed themes in *Field and Stream*. For that reason, and because changes in technology is such a central factor effecting the “squeeze,” I break the two sections (transportation technology and hunting technology) on technological improvements into the five time periods examined in this dissertation.

Population Characteristics

The quotations from *Field and Stream* given in chapter VII provide a good indication of the perception of increasing hunter pressures characteristic of the 20th century. Part of this increased pressure is the result of increased population size. However, other factors play a role as well. Industrialization creates a work force that is not dependent on hunting for subsistence, but produces many workers who desire a temporary “escape from” urban environments and noisy factories. Post war labor-management accord allows for the embourgeoisment of the industrial workers. This, combined with general economic prosperity, increase the vacation time of industrial workers, allowing more people the luxury of such leisure-time pursuits as hunting and fishing. Increased prosperity also means that more and more people can afford the

equipment needed to hunt and fish, as well as the travel expenses of getting to and from places where such activities can be pursued.

Explicit concern about population size *per se* appears in the 1969-1971 cluster, consistent with attention to problems of overpopulation in the broader society at that time. A 1971 editorial maintains that population must be controlled or no hunting and fishing opportunities will be left for our children despite any other programs.¹⁰⁷ A letter published that same year claims that there are 225 million people in the United States in 1971, and by 2000 we expect between 294 and 376 million.¹⁰⁸

Improvements In Transportation Technology

A true appreciation of increases in hunter pressure requires a consideration of the role of technological innovation. In the present section I consider improvements in technology that facilitated wilderness access for an increasingly prosperous workforce.

1909-1911

The importance of travel in the pursuit of hunting and fishing activities is seen in a regular *Field and Stream* of the time entitled "Where to Go." In one issue, this feature reports new opportunities for sportsmen provided by the building of new railroad lines.¹⁰⁹ The theme of a story is the use of automobiles on a fishing trip,¹¹⁰ and an article appears

¹⁰⁷ F&S, 1971, Vol. 76, June, pp. 20-22.

¹⁰⁸ F&S, 1971, Vol. 76, June, p. 6.

¹⁰⁹ F&S, 1909, Vol. 13, Jan., p. 794.

¹¹⁰ F&S, 1909, Vol. 13, April, p. 1011.

offering advice on buying a first motorboat.¹¹¹

Transportation and hunting are explicitly brought together in an article on the Campfire Club of America which describes the ideal automobile equipped for hunting. It includes scabbards for rifles that can be put in hand instantly by hunters in the car.¹¹²

While these articles provide indications of extremely important changes underway, and are early harbingers of more extensive attention to transportation innovations to follow, coverage at this time is still relatively modest compared with later clusters.

1929-1931

The major technological developments in the area of transportation at this time concern outboard motors for small trailerable boats, automobiles, and airplanes.

Concerning the deployment of the automobile throughout America at this time:

There were less than 6,771,000 passenger cars registered in the United States in 1919 as against 23,121,000 cars in 1929...In thousands of towns at the beginning of the decade [1920s] a single traffic officer at the junction of Main Street and Central Street had been sufficient for the control of traffic. By the end of the decade, what a difference! -- red and green lights, blinkers, one-way streets, boulevard stops, stringent and yet more stringent parking ordinances -- and still a shining flow of traffic that backed up for blocks along Main Street every Saturday and Sunday afternoon. Slowly but surely the age of steam was yielding to the gasoline age. (Allen 1931:162-164).

¹¹¹ F&S, 1909 Vol. 13, April, p. 1055

¹¹² F&S, 1910, Vol. 15, Aug., pp. 322-329. This is called "road hunting" today, and it is considered highly unsportslike as well as being illegal.

Outboard motors are prominently advertised throughout this cluster.¹¹³ For example, in the “Sportsman Afloat” section there are advertisements for the new type of inexpensive outboard runabouts for working people, mixed in with advertisements for sailing and motor yachts for the more affluent.¹¹⁴ Three months later, there is another large section devoted to advertising small boats and outboard motors for cruising, hunting, camping, and fishing.¹¹⁵ Yet more advertisements combine automobiles and boating, featuring trailered boats, folding boats, automobile mounts for carrying outboard motors, and special autobeds. The widespread deployment of the automobile makes fishing with such a small motorboat feasible.

This combination provides increased access to fishing opportunities for industrial workers. An article says, “transportation problems were the obstacle. Now all that is changed. The automobile and the automobile trailer have brought ‘store boats’ to many a delightful near-primitive sheet of water for the enjoyment of camping, fishing, and hunting parties.”¹¹⁶ In fact, by 1931 the “Boating Department” is almost exclusively devoted to small motorboats. There are still some hunting and fishing boats, but gone are the luxury sailing yachts.

¹¹³ Ole Evinrude claims to have produced the first successful outboard motor in 1910.

¹¹⁴ F&S, 1929, Vol. 34, April, pp.80-96.

¹¹⁵ F&S, 1929, Vol. 34, July, pp. 70-83.

¹¹⁶ F&S, 1929, Vol. 34, April, p. 88.

Tents and camping trailers for automobiles are also much advertised. A feature offers "Tips on Autocamping."¹¹⁷ An article reports "new roads and improved roads have opened up vast semi-primeval sections to the autocamper."¹¹⁸

Contributions of these developments to the "squeeze" can be seen in an editorial which decries the rise of automobile travel as allowing more hunters access to game. It maintains that bag limits and seasons will have to be reduced or there will be too much strain on the game. It also says that airplanes are becoming as bad as cars in getting hunters to the game, especially in Alaska.¹¹⁹

1949-1951

The marketing of small, cheap boats continues, while advertisements for expensive yachts seen in earlier years have gone. A significant new development is the introduction of 4-wheel drive vehicles, which offer almost unlimited off-road access to what wilderness remains open to the general public. An advertisement for a four-wheel drive Willys Jeep makes the pitch that this technology will increase access to the remote areas that lay beyond railroad, airline, and highway access.¹²⁰

1969-1971

Two new technical artifacts appear which both greatly increase access to nature for industrial workers: the all terrain vehicle (ATV), and the snowmobile. *Field and*

¹¹⁷ F&S, 1929, Vol. 34, Jan., pp. 76-77.

¹¹⁸ F&S, 1929, Vol. 34, July, p. 84.

¹¹⁹ F&S, 1929, Vol. 34, July, p. 19.

¹²⁰ F&S, 1950, Vol. 55, May, p. 5.

Stream now has two regular features devoted to these technologies: an “ATV Buyers Guide” and a “Snowmobile Buyers Guide.” A lengthy feature appears on the new all terrain vehicle. It specifically connects these to fishing and hunting by showing a man using one to access and fish a swamp, and another man carrying a deer out of a swamp with one.¹²¹

An advertisement says, “Answer the call of the wild in an Attex [ATV],”¹²² while another advertisement for an ATV also pitches wilderness access.¹²³ Yet another advertisement for an ATV shows a picture of a man hunting from one. It looks like he is using it as a duck blind, and the advertisement specifically says, “...hunt...the all terrain vehicle...”¹²⁴

An advertisement integrates snowmobile and fishing,¹²⁵ and another snowmobile advertisement says, “Take it from people who know, Ski-doo is the one you can fish on, hunt on, bank on!” It shows an Eskimo in the background, and says that the snowmobile has replaced the dog team.¹²⁶

¹²¹ F&S, 1970, Vol. 75, Aug., pp. 44-47.

¹²² F&S, 1969, Vol. 74, Oct., p. 117.

¹²³ F&S, 1970, Vol. 75, Aug., p. 63.

¹²⁴ F&S, 1969, Vol. 74, Oct., p. 124.

¹²⁵ F&S, 1970, Vol. 75, Nov., p. 36.

¹²⁶ F&S, 1969, Vol. 74, Oct., p. 133.

A new combination of technology is advertised: fly and rent. It pitches that if your vacation time is short, you can fly to the general area and then rent a motor home.¹²⁷

Other transportation and related technology advertised in the 1969-1971 cluster include: campers, pick-up trucks, trailers, outboard motors, electric trolling motors, small sailboats, jet skis, boat trailers, trail bikes, house boats, campers for the beds of pickup trucks, many types of RV and off-road vehicles, snowmobile boots, snowmobile suits, electric vests, and citizen-band radios.

1989-1991

Airplanes are frequently featured as providing access to what is left of vanishing wilderness, and available for the well-to-do. An issue cover picture has sports people disembarking with their outdoor gear from a seaplane on the shore of some remote lake in what looks like the Rocky Mountains.¹²⁸

Advertisements now offer fishing boats specialized as to species (e.g., “bass boats”). There are many advertisements for pick-up trucks and other four wheel drive vehicles for off-road vehicles. *Field and Stream* has a new feature entitled “Vehicles,” that deals with the selection and maintenance of vehicles connected with hunting and fishing.

Improvements In Hunting Technology

Hunting technology contributes to increased hunting pressure in two ways. First, higher-tech weapons have greater accuracy and range, thereby increasing the size of

¹²⁷ F&S, 1971, Vol. 76, June, p. 155.

¹²⁸ F&S, 1989, Vol. 93, Jan.

territory any individual can effectively hunt at a given time. Second, as will become more apparent in the examples provided below, much higher-tech weaponry and related paraphernalia are designed to make up for lack of personal skill. This means that many individuals who either don't have the time, or who will not take the time, to develop proficient skills in such hunt-related activities as tracking or target shooting, may nonetheless feel that the technology sufficiently counters their short-comings to an extent to at least make hunting worth their while. When rifles are sufficiently advanced (e.g. telescopic sights) that just about anyone can pick one up and make an accurate shot, many more people will attempt hunting. I turn now to a consideration of the kinds of innovations in hunting technology that were occurring over the course of the 20th century.

1910-1911

Technology evolves at an accelerated rate during this cluster. In fact, due to the increasing number of hunting and fishing devices coming onto the market *Field and Stream* finds it necessary to add a regular feature entitled "Tools of the Craft." These are outdoor products endorsed by *Field and Stream* but which may not necessarily also appear as paid advertisement. *Field and Stream* says that fifty years earlier a feature like this would have not been necessary.

An advertisement offers the "concentrator," which is an addition to shotgun shell wads that keeps the pellets together for longer range kills.¹²⁹ In another advertisement, a

¹²⁹ F&S, 1909, Vol. 13, April, p. 1096.

new rifle sight promises 35% more accuracy. It claims this will get you the game you now miss.¹³⁰

An advertisement appears for a light that is worn on the head like a miner so that both hands can be free for the gun during night hunting.¹³¹ An advertisement for a Stevens repeating shotgun makes this argument:

Ducks are fast, but the man with the Stevens repeating shotgun No. 520 in his hands need not care how fast they are flying. With this lightening-like repeater you can afford three misses and still have plenty of time to get three more shots in before the flight is over.¹³²

One of the major technological additions to hunting at this time is the transition from black to smokeless gunpowder. Advertisements stress the greater range and accuracy of this new ammunition.

1929-1931

An article applauds the constantly improving technology of ammunition. It traces the evolution from muzzle loading black-power weapons utilizing heavy soft lead bullets to modern smokeless nitro-powder cartridge repeaters with small bores, and faster metal jackets. It says that it is now easier and safer to kill the big animals.¹³³ Advertisements

¹³⁰ F&S, 1910, Vol. 15, May, p. 17A.

¹³¹ F&S, 1910, Vol. 15, Aug., 27A. This is called "shining" today, and it is considered highly unsportslike, as well as being illegal.

¹³² F&S, 1911, Vol. 16, Sept., p. 541.

¹³³ F&S, 1929, Vol. 34, July, pp. 104-108.

appear for gun sights and fishing lures, all with the promise of increasing the quantity of game or fish taken.

1949-1951

There is a noticeable increase in marketing of mechanical gadgets that substitute technological aids for personal skill. Many of these are no doubt war technology spin-offs. *Field and Stream* now has a regular feature offering classified advertisements for the exchange or sale of personal sporting equipment. This is, of course, the pre-electronic chip era, but there are plenty of mechanical gadgets advertised for fishing and hunting. Also, there are lots of optical (not chip, digital, or laser yet) gunsighting gadgets advertised. In 1949, *Field and Stream* published both an article on, and an advertisement for, spotting scopes. These are telescopes for finding distant big game before shooting them with yet another telescopic sight mounted on a high-powered rifle. The ubiquitous advertising pitch here is that these items will help you get fish and game.

1969-1971

A regular feature of this period is entitled "Shooting," and consists of technical articles on guns. In one issue this feature discusses "tracer" shotgun shells as an aid to trap-skeet shooting and to improve marksmanship for hunting.¹³⁴

An advertisement offers "Light-a-Lure," which is a chemical that makes any lure glow for an hour.¹³⁵ Another advertisement offers screw-in tree steps. It says that they

¹³⁴ F&S, 1969, Vol. 73, Jan., p. 85.

¹³⁵ F&S, 1969, Vol. 74, July, p. 79.

get you above the level where animals can scent you.¹³⁶ One clever item is a night-vision instrument advertised for boating, although its potential for night hunting is obvious. It is supposed to increase light 2000 times.¹³⁷

A “sound parabola” hooked up to a tape recorder is advertised. It looks like a small hand-held satellite dish. The idea is to pick-up and record distant animal sounds which can then be played back, fooling animals into thinking the sounds are emanating from where you are. It claims that this will allow you to call animals in really close so that you can “shoot great photos.” The potential applications for hunting are obvious, however.¹³⁸

An advertisement for an improved shotgun shell offers an interesting play on semantics. It is phrased as giving the hunter a “sporting” chance.¹³⁹ Another advertisement offers a “lite site” by Bushnell. This is an electronic instrument that lights up the cross hairs inside the scope for shots at dawn or dusk.¹⁴⁰

An advertisement also appears for an electronic gunsight. The sight projects the optical illusion to the shooter of a red dot where the bullet or shot pattern will be. This advertisement says the sight is designed to overcome shortcomings in personal skill. It claims hunters do not have to worry about practicing, because the sight does all the work.

¹³⁶ F&S, 1969, Vol. 74, Oct., p. 124.

¹³⁷ F&S, 1970, Vol. 74, Feb., p. 116.

¹³⁸ F&S, 1970, Vol. 75, Aug., p. 112.

¹³⁹ F&S, 1971, Vol. 76, Sept., p. 13.

¹⁴⁰ F&S, 1971, Vol. 76, Sept., p. 90.

Hunters can now have successful hunts without becoming a crack shot in the “old-fashion way.”¹⁴¹

1989-1991

Compound bows (an archery device somewhere between a traditional bow and a crossbow) appear with their accessories, tree stands and camouflage, which are compatible with baits, scents, calls and lures for the passively sitting, rather than the actively stalking, hunter. Compound bows shoot arrows, but feature a pulley system that greatly reduces the strength required for the archer holding the drawn bow while aiming, thereby producing a much more accurate shot over a much greater distance. Additionally, an array of high tech electronic and/or optical sights are available.

Another new piece of technology is the “Action Ear” (ear binoculars). This is a large headset type hearing amplifier so hunters can hear game before they see it.¹⁴² An article predicts that new computer programs will better the hunter’s understanding of ballistics in the future.¹⁴³

Opposition to Hunting

In the section on development, I indicated how, by the 1960s, hunters are very cognizant of other groups whose interests conflicted with their own. The final factor I will discuss as a contributor to the sense of “squeeze” continues with the same attention to the broader social system. However, where the threat to hunting by development activities is

¹⁴¹ F&S, 1971, Vol. 76, Sept., p. 67.

¹⁴² F&S, 1991, Vol. 95, Mar., p. 25.

¹⁴³ F&S, 1991, Vol. 96, Sept. p. 74.

an unintended consequence of those activities, in the present case disruption of hunting is the expressed and explicit target of anti-hunting groups.

Indications that hunting is, to at least some extent, under attack occurs in the earliest cluster. This is implied by an article which quotes Theodore Roosevelt as saying “Game butchery is as objectionable as any other form of wanton cruelty or barbarity, but to protest against all hunting of game is a sign of softness of head, and not soundness of heart.”¹⁴⁴ Also, a letter by an Episcopal clergy asks: “if it is a sin to hunt game, then why did God make different dogs with the propensities to chase different kinds of game animals?”¹⁴⁵

Evidence appears in the 1929-1931 cluster that suggests that opposition to both hunting and the private ownership of firearms is mounting. In an apparent response to this opposition, an editorial maintains that it is hunters’ money that maintains the game supply. That there is definitely some active criticism of hunting is implied when the author refers to these critics as “sentimentalists.” The editorial goes on to say that if the public outlaws hunting then the public should pay for game maintenance.¹⁴⁶

Another editorial reports that farmers and “super-sentimentalists -- sport prohibitionists” have joined forces to ban bob-white quail hunting in Ohio by declaring the

¹⁴⁴ F&S, 1910, Vol. 15, p. 693.

¹⁴⁵ F&S, 1909, Vol. 14, Oct., p. 537.

¹⁴⁶ F&S, 1929, Vol. 34, Jan., p. 9.

bird a non-game song bird.¹⁴⁷ A guest editorial by the Game and Fish Commissioner of Alabama berates the “horde of sentimentalists” who clamor for game sanctuaries of a “golf course” size where “picnickers” and “flower pickers” drive off most of the game and vermin kill the rest. He says hunters’ views and interests should be taken into account in wildlife policy.¹⁴⁸

Another editorial attacks a Republican Congressman who introduced a bill to outlaw hunting with rifles except in states where rifles and ammunition are manufactured. It warns of an influential minority who will one day eliminate hunting, fishing, and firearms if sportsmen are not vigilant. It labels members of this minority as “pacifist” who think killing is “wicked.”¹⁴⁹

There is a general absence of any articulated defensive positions for hunting or fishing in the 1949-1951 cluster. Apparently there is little perception of these sports activities being under any serious attack at this point. One exception appeared in a group of letters to the editor.¹⁵⁰ These letters were evenly divided between support and disagreement concerning an article (authored by a woman) printed in the previous issue entitled, “I Just Like to Kill Things.”¹⁵¹ The article claimed no excuse for hunting is necessary. The response letters both condemn and applaud her. The letters that

¹⁴⁷ F&S, 1931, Vol. 36, Dec., p. 17.

¹⁴⁸ F&S, 1931, Vol. 35, March, p. 17.

¹⁴⁹ F&S, 1929, Vol. 34, Jan., pp. 14-15, 63-64.

¹⁵⁰ F&S, 1949, Vol. 53, Jan., p. 10.

¹⁵¹ F&S, 1948, Vol. 53, Nov., p. 28.

condemns say that all true sportsmen favor the experience of being out-of-doors and just seeing game more than killing. They also say that the article will give ammunition to the “do gooders,” again implying that there must be some “do gooders” out there who are criticizing hunting and fishing.

By the 1969-1971 cluster, *Field and Stream* takes a strong defensive stand against what now appears to be a vigorous anti-hunting and anti-gun movement, and the general right to own a gun is upheld. A feature editorial “As Others Sees Us” presents a serious response to the perception of anti-gun, anti-hunting sentiment in the United States. It contains all the usual arguments: When we were a rural nation hunting was part of our every day life. Now we that we are an urban nation, many citizens “misunderstand” the nature of hunting. Guns are associated with crime and killing, so many citizens equate hunting with guns and crime as all one thing.¹⁵²

The editor goes on to suggest that Smokey the Bear and Bambi are fostering a “sentimentality” unfavorable to hunting. He points out that hunter license fees support game propagation. The editorial mentions the widespread “lack of objectivity” on the part of the non-hunters. It concludes with an old theme: that a few unsportsmanlike individuals ruin the image of hunting for all sportsmen.

Expressions of these themes continue into the 1989-1991 cluster. A cartoon shows a car driven by a woman which almost runs down two hunters, and which has a bumper

¹⁵² F&S, 1969, Vol. 73, April, p. 53.

sticker that says: "I brake for animals."¹⁵³ A membership recruitment advertisement for the NRA says that only they stand in the way of the anti-hunting movement (which, the organization claims, is gaining momentum), so you should join or lose the right to hunt.¹⁵⁴ Another advertisement announces the formation and incorporation of the United Conservation Alliance, or UCA, as an umbrella lobby-watchdog organization for all interested organizations who oppose the anti-hunting and animal-rights groups, and who are interested in conservation. This includes the Wildlife Management Group. They ask rather steep membership fees: \$1,000 to \$10,000 for voting organizations.¹⁵⁵

An item claims that anti-hunters intend to enter the woods disguised as hunters (but with a legal license). They plan to then disrupt the activities of the real hunters.¹⁵⁶

Field and Stream also responds to the animal-rights movement. An article appears entitled "Who Speaks for People?" This item offers a warning about the possible future success of the animal-rights movement. It calls these people such things as ignorant, uninformed, spiteful, and fiendish.¹⁵⁷ Another article appears with the subtitle: "Though trapping has come under attack, it remains the only way to control certain animals." The author does not call it a sport, but he does call it at least partially "recreational." He goes on to suggest that the "misinformed public" thinks that trapping is cruel and not

¹⁵³ F&S, 1989, Vol. 93, Jan., p. 96.

¹⁵⁴ F&S, 1990, Vol. 95, May, p. 77.

¹⁵⁵ F&S, 1991, Vol. 95, Mar., p. 5.

¹⁵⁶ F&S, 1991, Vol. 96, Sept., p. 5.

¹⁵⁷ F&S, 1991, Vol. 96, June, p. 48.

scientifically justified. He says that trappers are often poor and inarticulate and are unable to verbally defend themselves. Further, trappers need to supplement their income. He concludes by saying that the anti-trapping movement is gaining strength.¹⁵⁸

¹⁵⁸ F&S, 1989, Vol. 94, July, p. 15.

Chapter IX.

Responses to “The Squeeze”

In the present chapter I discuss the two most important responses to the “squeeze”: 1) state ownership of wildlife and its concurrent move into game management; and 2) the development of the sports hunting ethos. Far more extensive attention is given to the second response, for several reasons. First, the sports hunting ethos is a complex belief system with a number of interrelated attributes; adequate description of these simply takes some space and time. Second, the data source used in the analysis of this section of the dissertation -- *Field and Stream* magazine -- gave far more extensive coverage to the sports hunting ethos than to specifics of state involvement in deer hunting. Third, while every regulation and management decision has its own history, and is sometimes rife with conflict, for purposes of this dissertation what is most important is a general appreciation of the role of state game management.

State Ownership and Game Management

As was indicated in Chapter VI, the state began to assume the ownership of wildlife, and to regulate hunting and fishing through the imposition of laws and law violation punishment, by the latter part of the 19th century. By the early 20th century there is a proliferation of licenses issued by states for hunting and fishing activities. To provide some indication of the kinds of state activities that are occurring, and the importance of state management as a response to the “squeeze,” I use references from *Field and Stream* that allude to emerging laws and regulations.

The issues from the 1909-1911 period are riddled with articles in support of hunting and fishing licenses. An editorial argues in support of resident licenses, the purpose of which is to impose “.... a check upon the out-of-season hunter, the foreign laborer who fancies robin stew for his Sunday feast and the small boy who shoots at any and every wild creature for the mere joy of slaughter.”¹⁵⁹ A letter says it is a good law to impose an extra \$10.00 license fee on “unnaturalized, foreign-born hunters.” It says this has taken thousands of “irresponsible” gunners (boys and immigrants) out of the woods.¹⁶⁰

This cluster is also riddled with items supporting the state’s regulations on methods, seasons, bag limits, definitions of appropriate game species, etc. For example, a letter maintains that new and tighter game laws and enforcement are improving the game stock in Tennessee and Alabama.¹⁶¹ A letter suggests that sportsmen’s clubs offer cash rewards to anyone reporting fish and game law violations.¹⁶² Yet another letter approves of a New York law outlawing the sale of wild bird plumage.¹⁶³ An early editorial supports legislation prohibiting the sale of game to hotels, cafes, etc. in order to protect game species from extinction.¹⁶⁴

¹⁵⁹ F&S, 1909, Vol. 14, Oct., pp. 574-575.

¹⁶⁰ F&S, 1910, Vol. 14, Feb., pp. 954-955.

¹⁶¹ F&S, 1909, Vol. 13, Jan., p. 803.

¹⁶² F&S, 1909, Vol. 13, Jan., p. 806.

¹⁶³ F&S, 1910, Vol., p. 957.

¹⁶⁴ F&S, 1911, Vol. 16, Sept., p. 455.

There are also calls for state management of wildlife resources. An article on fish farming takes the position that the government should spend some public money on making sure fish remain abundant and easy to catch as a source of food for the population rather than spending lots of public money later on law enforcement, after "...generations of improvidence."¹⁶⁵

An article from the 1929-31 cluster reports that "Canada's National Parks act as a big game refuge to their surrounding hunting country."¹⁶⁶ It also says that most of the big game species that Canada has to offer can be seen and photographed in these parks, and that it took courage and foresight to establish these sanctuaries. As an aside, many references mention Pennsylvania's similar system of many no-shoot game refuges in bringing back populations of game animals.

However, as was discussed in the previous chapter, state game management is not without controversy. Furthermore, opposition to state involvement seems to grow over the course of the 20th century, at least partially fueled by perceptions that the state was increasingly aligned with groups whose interests were antithetical to those of hunters. The more general anti-government conservative backlash of the 1980s (the Reagan years) may also contribute to the growing criticism of the state.

Sports Hunting Ethos

Early in the 20th century, a number of articles are published that lay out the sports hunting ethos in its entirety. Below, I summarize two of these. I then present examples

¹⁶⁵ F&S, 1910, Vol. 15, Aug., pp. 347-348.

¹⁶⁶ F&S, 1930, Vol. 34, Feb., p. 26.

from *Field and Stream* of ten specific attributes of the sports hunting ethos: 1) nature is finite/human actions can imperil nature; 2) condemnation of market and pot hunters; 3) voluntary harvesting restrictions/bag not the thing; 4) the spiritual renewal value of nature; 5) the acceptance of non-kill activities; 6) give game a fair chance to escape; 7) develop personal skill; 8) support for game laws; 9) practice safety, integrity, generosity, respect; and 10) the condemnation of slob hunters.

The development of the sports hunting ethos was enmeshed in the conservation movement of the late 19th and early 20th centuries (Kline 2000), as well as the state's assumption of the ownership of wildlife and the regulation of hunting and fishing through the imposition of laws and law violation punishments. What is interesting, however, is the persistence of this ethos in the pages of *Field and Stream* magazine across all five periods studied, from the beginning to the end of the 20th century.

The majority of the above ten attributes appear throughout the 20th century and, therefore, providing examples of each from every examined cluster would prove rather redundant. Accordingly, except in a few cases where a more extensive discussion seems to be warranted, I limit myself to illustrative material from the first part and the last part of the 20th century. When possible, these examples are from the 1909-1911 and 1989-91 clusters. However, there are a few of these attributes that appear in only three or four of the examined clusters, and in those cases I provide examples from the next-nearest clusters (1929-31 and/or 1969-71).

In the chapter on co-evolutionary interactions, I discuss those attributes whose waxing and waning fortunes appear to be a response to activities of other species. While

the sports hunting ethos is hardly a static belief system, therefore, the extent of its continuity is rather remarkable. I turn now to a detailed examination of this ethos.

Overview

In the early part of the 20th century, *Field and Stream* provides several instances where authors and organization specifically list the attributes of the sports hunting ethos. Careful specification of the entire belief system was no doubt important, given its role as challenger to the nature's bounty ethos. Advocates of the sports hunting ethos were not just offering it as another alternative to the nature's bounty ethos to be considered; rather, they were out to eliminate the latter. They felt that the nature's bounty ethos' exuberant views on natural abundance threatened many wild species with extinction. To avoid such a disastrous fate, it was important that readers embrace the sports hunting ethos in its entirety, not just internalize an attribute or two. In addition, by presenting succinct summaries of the sports hunting ethos, readers were in a position to compare this ethos with that of the nature's bounty ethos. They could thus get a sense of their key points of difference and to draw conclusions about the likely consequences of the majority of hunters pursuing one ethos or the other.

At virtually every turn, this ethos contrasts markedly with the nature's bounty ethos described in Chapter VI. One example of a holistic presentation of the sports hunting ethos appeared in a technical article on fishing, which begins with a definition of the ideal sportsman:

The ideal sportsman is the man who does not judge the sport of his day by the number of fish he has caught. He does not allow poor luck to spoil his outing, or to disturb his temper. He belongs to

that ever-increasing class who enjoys a day off, whether they bag anything or not. He can see beauty and find interest in every flower and shrub along the stream and in every change of landscape on the mountainside. He would not think of stepping directly in front of another sportsman. He it is who willingly limits his bag to a few fish a day. He sees the funny side of the little mishaps which befall him in the woods and is capable of enjoying a joke at his own expense. He is the one who will give the novice real assistance, gladly opening his store of knowledge and experience for the benefit of his brother sportsman. He is a man who never would pollute a stream; but, on the contrary, would use his every effort to prevent the pollution of our waters. He will continuously and untiringly spread the gospel of true sportsmanship.¹⁶⁷

In another holistic summary, *Field and Stream* tells the history of the camp-fire club and claims to be the official organ of this group.¹⁶⁸ It says that the tradition of the camp-fire goes back to our [sic] Aryan ancestors in the Himalayan forests rubbing sticks together to produce a hearth fire (somehow camp fires are better if started in this fashion). Still, this is the idea of an unbroken connection to our origins, which is also offered as a similar justification for hunting. This club formed (ironically) in New York City, in the “shadow of Wall Street.” The requirements for membership are an interesting statement of conventional Protestant morality combined with the sports hunting ethos:

¹⁶⁷ F&S, 1910, Vol. 15, May, p. 59.

¹⁶⁸ F&S, 1910, Vol. 15, Nov., pp. 603-606.

Chapters less than 50 members.

Must have camped on the ground in a howling wilderness and killed or painted big game.

A hunter's plain and simple fare.

No suits, no alcohol, no profanity.

A camp-fire and feed once a fortnight.

Field and Stream approves of this creed, as well as agreeing with the Camp Fire

Club of America's twelve principles of sportsmanship:

- (1) The sale of game gives a vested economic interest to some to overkill and therefore there should be legislation to ban it.
- (2) Game should not be relied upon for the feeding of hired laborers.
- (3) The highest purpose which the killing of wild game and game fishes can hereafter be made to serve is in furnishing objects to overworked men for tramping and camping trips in the wilds; and the value of wild game as human food should no longer be regarded as an important factor in its pursuit.
- (4) Humans hold game in "trust" for future generations.
- (5) Sportsmen have a duty to contribute time and money to conservation.
- (6) Native Americans have no more right to exemption from game laws than white men.
- (7) A poacher is an undesirable citizen.
- (8) Killing is only one incident on a hunting trip and is not necessary for a successful trip.
- (9) The best hunter is one who finds game, kills little, and leaves no wounded animals behind.
- (10) Pursuing animals is more fun than killing them. The kill means the fun is over.

- (11) Killing a female hoofed animal is incompatible with sportsmanship.
- (12) A photograph of a wild animal in its natural habitat is preferable to a head trophy.¹⁶⁹

Having provided a general overview of the sports hunting ethos I turn now to a more in-depth exploration of its ten major attributes.

Nature is Finite/Human Actions Can Imperil Nature

In contrast to the nature bounty's ethos, the sports hunting ethos considers nature to be finite, and as such it can be imperiled by human action. In the early part of the 20th century, many articles, stories, features and other materials allude to depleted or vanishing natural resources. For example, one article warns that our forests will soon be gone if we don't practice conservation.¹⁷⁰ An editorial calls for a national (and Canadian) sportsmen's federation to promote conservation. It commends President Theodore Roosevelt for bringing the depletion of natural resources to the attention of the American public.¹⁷¹ Another editorial decries a Congress that panders to those who make a profit from natural resources and refers to the "fast-vanishing wildlife of the United States and Alaska."¹⁷²

These kinds of reference to the finiteness of nature in terms of explicit attention to tangible natural resources are not found in the issues of *Field and Stream* I examined from

¹⁶⁹ F&S, 1911, Vol. 16, June, pp. 125-126.

¹⁷⁰ F&S, 1909, Vol. 13, Jan., p. 777.

¹⁷¹ F&S, 1909, Vol. 14, July, pp. 271-273.

¹⁷² F&S, 1910, Vol. 15, Nov., p. 616.

the second half of the 20th century. One possible explanation is that while the late 19th and early 20th century emphasis of the depletion of forests and particular game species was no doubt important to challenging the nature's bounty ethos, by several decades into the 20th century this belief had become such a part of the "common sense" assumptions of (sports-minded) hunters that its specific explication was no longer necessary. Laws to protect these resources were also in place by this time, making the threat to their continuation a bit less immediate and pressing.

However, about the same time we see a decline in explicit references to the finiteness of tangible natural resources two new additional concerns suggesting the potential imperilment of nature by humans start to emerge: increased concern with industrial pollution, and an increased appreciation of the complexity of ecological understandings. Industrial pollution was presented in the previous chapters as one of the causes of the "squeeze"; as discussed there, references to this problem were first encountered in the 1929-31 cluster, and continues throughout the remainder of the 20th century. Pollution results when industrial waste byproducts are deposited into an environmental area at a quantity and rate that exceeds natural absorption and dispersal capabilities. However, the "waste absorption and dispersal capabilities of an ecosystem" is a less tangible natural resource than, say, trees or deer.

Complex ecological interrelationships are even more intangible, though appreciation of these slowly grows over the course of the 20th century. One good example of this change is in attitudes towards predators and vermin. In the early part of the 20th century, there is an unquestioned assumption that killing predators such as

wolves, bear, mountain lions, eagles and coyotes is necessary to protect game species. For example, in the early 20th century *Field and Stream* runs a regular feature entitled “Destroying Game’s Enemies.” In one issue, the feature advocates the killing of skunks, raccoons, opossums, hawks, owls, crows, etc. It maintains that it is not enough to get occasional vermin; all sportsmen must keep at it diligently.¹⁷³

In a 1930 issue, a report from the “Bulletin of the American Game Protection Association” gives many statistics on the economic harm done by predators.¹⁷⁴ A story makes reference to the fox as a “pest” that needs to be kept down.¹⁷⁵ An editorial informs us that California has an “official” cougar hunter who has killed 341 cougars for the state. It maintains that this has saved innumerable deer and other game animals.¹⁷⁶ A 1951 story calls coyotes “cagey scoundrels.”¹⁷⁷ A letter of that same year calls coyotes “...a bane to the stockman’s business and the nation’s meat supply,” and advocates eradicating them.¹⁷⁸

By the 1969-71 cluster, however, the tide of opinion on this issue has turned. An early precursor to the changes ahead is found in a 1931 article reporting on the Bulletin of the American Game Protection Association” tracing the overpopulation and subsequent crash of Kaibab Plateau (Grand Canyon) deer population to a ban on hunting and a

¹⁷³ F&S, 1909, Vol. 14, July, p. 273.

¹⁷⁴ F&S, 1930, Vol. 34, Feb., pp. 42-43.

¹⁷⁵ F&S, 1929, Vol. 34, July, pp. 40-41.

¹⁷⁶ F&S, 1929, Vol. 34, Jan., p. 9.

¹⁷⁷ F&S, 1951, Vol. 56, Sept., p. 34.

¹⁷⁸ F&S, 1951, Vol. 56, Dec., p. 8.

Federal policy of exterminating natural predators.¹⁷⁹ Without a solid understanding of the complex workings of any ecosystem, human action can imperil nature, even when the action that is undertaken is intended to be beneficial.

By 1969-71, the necessity of predators to the health of ecosystems becomes the dominant view in *Field and Stream*. For example, in 1969 a favorable review is given to a book that condemns our previous policy toward varmints. This book explicitly recognizes that predators serve a beneficial function to the health of the prey species¹⁸⁰ A 1970 article reports on deer hunting on Michigan's South Fox Island. This concerns an interesting ecological experiment where 17 deer were planted in 1962 and grew to between 300 and 400 in just seven years. The author says that this was due to the absence of any natural predators and no poachers. He concludes that this demonstrates the need for population control provided by predators, including humans.¹⁸¹ A short article published in 1989 also recognizes the beneficial role of predation in nature.¹⁸²

This view of nature as finite, fragile, and (potentially) imperiled underpins many other attributes of the sports hunting ethos. This may very well form the core belief of the ethos, with the other attributes forming pragmatic and ethical responses to this perceived ontological state. If hunters proceed on the assumption that nature is finite and act

¹⁷⁹ F&S, 1931, Vol. 36, Sept., pp. 8-9. Incidentally, this disaster was one of the events that made Aldo Leopold change his mind on the subject of predation, according to Wood (1997).

¹⁸⁰ F&S, 1969, Vol. 74, Oct., p. 26.

¹⁸¹ F&S, 1970, Vol. 75, Nov., p. 38.

¹⁸² F&S, 1989, Vol. 94, July, p. 72.

accordingly -- if they obey game laws, if they voluntarily limit their take -- then game can be managed in a way that maintains population levels over time. On the other hand, if the finiteness of nature is not respected, overhunting and population crash are likely. These outcomes may also happen if hunters and game managers do not take account of complex ecological relationships, as happened in places where lack of predators resulted in overpopulation of deer, also followed by population crash.

Condemnation of Market and Pot Hunters

Early 20th century condemnation of market (hunters seeking profits) and pot hunters (hunters seeking food) represents a direct confrontation with the nature's bounty hunting ethos. A 1909 letter to the editor blames pot hunters and market hunters for the depletion of game. It says that real sportsmen leave game for the next season's reproduction.¹⁸³ A 1910 letter maintains that the United States has a "...pitiful remnant of wild life" because it was all killed by market and pot hunters. It makes the significant argument that we do not need to kill *any* more wild animals for food because we have enough domestic food supplies. The author of the letter claims that this is in the interest of "...true sportsmanship."¹⁸⁴

Expression of this attribute is limited to the early 20th century. This is no doubt because the conditions they address decline markedly after this time. New government regulations and decline in game species make hunting for food -- either for self or market - - a less attractive option than in previous decades. These trends are further facilitated by

¹⁸³ F&S, 1909, Vol. 13, Jan., p. 811.

¹⁸⁴ F&S, 1910, Vol. 15, Aug., pp. 349-350.

increased urbanization, and increased integration of even hinterland regions into regional and national economies. As more and more people enter money economies, earning their living through wage labor and buying at least much of their food at markets, there is a corresponding decrease in the number of people who get much or all of their meat from subsistence hunting.

At the same time, condemnation of poachers remains a vibrant theme throughout the 20th century. Since subsistence hunters can also be poachers, there is some overlap here. However, these two attributes are not identical. The sports hunting ethos discourages hunting for subsistence and encourages non-kill activities. It encourages harvesting within regulation levels, within the appropriate season, culling only animals of appropriate age and sex, and taking no more than the maximum number of animals allowed by the law. This is considered “good sportsman” behavior, even if the meat is eaten (examples of this acceptance will be seen in discussions of additional attributes, below). At the other end of the spectrum, people may poach for reasons other than procuring meat for the family; for example, to “bag” a trophy animal. Condemnation of poaching will be discussed below in the sections on “support for game laws” and “slob hunters.”

Voluntary Harvesting Restrictions/Bag Not the Thing

As the emphasis shifts away from killing deer and other wild game for food and profit the nature’s bounty ethos of support for killing any animal at any time also loses its legitimacy. Instead, hunters and fishers are admonished to voluntarily restrain the number of animals they harvest, and taking even less than the maximum allowed by law is

considered virtuous. Under the sports hunting ethos, success of the hunt is no longer to be defined solely in terms of the number of animals “bagged.”

For example, a 1911 editorial position states: “NEVER KILL A DOE; AND NEVER SHOOT UNTIL YOU SEE THE ANTLERS.”¹⁸⁵ A 1929 story concludes, “Well, you’ve had a great day, haven’t you? More birds won’t add to it.”¹⁸⁶ Another 1929 story similarly concludes, “We had killed enough ducks to satisfy any man except a hog.”¹⁸⁷ A 1931 editorial says that it is a shame that states have to pass creel laws. It says that fishers should put fish back voluntarily, not keep even the legal limit. It explicitly calls those who keep the legal limit “fish hogs.”¹⁸⁸

The attribute of voluntary harvesting constraints, and the success of hunting trips stemming from factors other than the number of animals bagged, continues into the final cluster (1989-91). One story recounts the experience of a deer hunter and his wife who pass up many shots at lesser deer waiting to fill their licenses with ones that will provide a lot of meat. They end up not getting any but feel they are perfectly satisfied in that they were out-of-doors and saw so many deer.¹⁸⁹

¹⁸⁵ F&S, 1911; Vol. 15, March; p. 1036; emphasis in original.

¹⁸⁶ F&S, 1929, Vol. 34, Jan., p. 83.

¹⁸⁷ F&S, 1929, Vol. 34, Oct., p. 74.

¹⁸⁸ F&S, 1931, Vol. 36, June, p. 21.

¹⁸⁹ F&S, 1991, Vol. 96, Dec., p. 30.

A hunting story ends with:

At home a friend will ask, "Been bird hunting?"
You will say that you have, and when he ask,
'Have any luck?', you think of what you have
held in your heart instead of your hand, and
you tell him that you certainly did --without
a doubt.¹⁹⁰

An article about elk hunting ends with: "The kill... leaves an aftertaste of regret."¹⁹¹

Spiritual Renewal

If "the bag" is no longer seen as the primary motivation of hunting, then what is? In the sports hunting ethos, being outdoors, and the spiritual renewal to urban dwellers that is posited to accompany that, now take precedence over the actual killing of animals. In fact, hunting and fishing merely provide the "rationale" or "excuse" to return for a sojourn in nature and several other activities are held to accomplish the same objective and are judged as equally worthwhile. This is undoubtedly a reaction to the rapid industrialization and urbanization of the 20th century. A periodic return to nature was believed to be necessary to cleanse oneself of the contaminating influences of "big city" life.¹⁹²

¹⁹⁰ F&S, 1990, Vol. 95, Nov., p. 12.

¹⁹¹ F&S, 1990, Vol. 95, Nov., p. 106.

¹⁹² This is the dichotomization of wilderness and civilization seen in the wilderness management phase of American environmentalism which was dominant after World War II (Nash 1987). However, *Field and Stream* is touting this same attribute in 1909, during the progressive conservation movement, i.e., nature (as experienced by camping, hunting and fishing) as a sacred refuge to be visited during an escapist pilgrimage for spiritual (non-materialist) well-being (Ramachandra 1996:128-132).

The issues of *Field and Stream* examined for the 1909-1911 period are laced with short poems, stories, and advertisements extolling the spiritual benefits of nature. Most hunting and fishing stories end with descriptions of emotional contentment at the end of the day or trip. Many stories end with the sportsman sitting in front of a camp fire, full of fish or game, with good companions and telling stories. They have a full sense of contentment, righteousness, and balance. The motif of the “Call of the Wild” riddles these adventure stories. To be in the wilderness is to experience mystical pleasures and a renewal of spiritual values and self-awareness. Virtually all stories are followed by a poem extolling the spiritual value of nature.

For example, an editorial suggests a fishing trip in the mountains is a relaxing escape from business.¹⁹³ Another story tells of businessmen who go on a racoon hunt as an escape from the business world.¹⁹⁴ Another story praises “rural sounds” as distinguished from “urban noise” as contributing to the spiritual renewal value of nature.¹⁹⁵ An editorial argues that:

As a matter of fact, there is greater safety on
a Rocky Mountain trout stream than in the street
of an Eastern city -- no automobiles thundering
down upon you at crossings, no pickpockets to make
free with your watch and purse, no construction

¹⁹³ F&S, 1909, Vol. 13, April, p. 1083.

¹⁹⁴ F&S, 1909, Vol. 13, Jan., p. 755.

¹⁹⁵ F&S, 1910, Vol. 15, Nov., p. 659.

materials raining down from overhead, or banana
Peelings underfoot. Too much stress cannot be placed
Upon this fact.¹⁹⁶

This sports hunting ethos attribute of the spiritual renewal value for urban humans of intimate contact with nature provided by hunting and fishing continues into the final cluster (1989-91). A letter attempts to answer the question, “why do you hunt?....It’s not the need to kill, but the need to pursue that requires satisfying. It’s knowing that you are part of nature, not a removed observer.”¹⁹⁷ A hunting story tells of a Native American guide who instills some supposedly mystical meaning of hunting beyond killing to a customer who remembers it for the rest of his life. It has a flowery ending: “I’d feel it most intimately alone in the wilderness after I had hunted hard and fairly for something, whether or not I had killed it.”¹⁹⁸

Acceptance of Non-Kill Activities

As spiritual renewal gains an increasingly prominent place as the motivation for nature excursions, there is increased acceptance of engaging in outdoor activity that qualifies as sport, but either diminishes the degree of killing or does not require the killing of an animal at all. For example, several articles on wildlife photography appear in *Field and Stream* issues published during the 1909-1911 period. An article also appears which extolls the increasing popularity of smaller bore rifles and shotguns, which allow hunters to derive as much fun as possible from as little killing as possible. This article also

¹⁹⁶ F&S, 1909, Vol. 14, July, p. 280.

¹⁹⁷ F&S, 1989, Vol. 93, April, p. 10.

¹⁹⁸ F&S, 1989, Vol. 93, April, pp. 66-67.

suggests that it is all right to plan an outdoor activity such as camping, hiking, and canoeing, with hunting as an opportunistic side activity that could be pursued if one carried a small and light weapon.¹⁹⁹ Another article quotes Theodore Roosevelt's advice of "see more and kill less."²⁰⁰

The attribute of the acceptance of non-kill activities is still prominent in the fourth cluster (1969-71). For example, an advertisement offers a Honda trail bike as a desirable item for campers.²⁰¹ *Field and Stream* reviews favorable books about: tips on family camping, mountain climbing, and mobile home living.²⁰² An adventure story talks about snorkeling among whales and sharks.²⁰³ An article focuses on backpacking,²⁰⁴ another article advocates hiking and camping alone as the way to "see," not "hunt," more animals.²⁰⁵ Finally, an article appears on yet another alternative outdoor activity -- amateur archeology! Find ancient, colonial, and early American artifacts; "hunt" these, it says.²⁰⁶

¹⁹⁹ F&S, 1911, Vol. 16, Sept. 467.

²⁰⁰ F&S, 1919, Vol. 15, Aug. pp. 322-329.

²⁰¹ F&S, 1969, Vol. 73, April, p. 42.

²⁰² F&S, 1969, Vol. 73, April, p. 42-45.

²⁰³ F&S, 1969, Vol. 73, April, p. 76.

²⁰⁴ F&S, 1971, Vol. 76, June, p. 72.

²⁰⁵ F&S, 1969, Vol. 74, July, p. 46.

²⁰⁶ F&S, 1971, Vol. 76, June, pp. 78-79.

Give Game a Fair Chance to Escape

Another attribute of the sports hunting ethos is a natural outgrowth of this ethos' villianization of hunting done for subsistence or profit, and its emphasis on voluntary harvesting restraints and on motivations for hunting other than "the bag." This attribute I label "giving game a fair chance to escape." A 1909 feature story separates trout fishers into two classes: 1) boys who just want to catch fish, and 2) sportsmen who use the lightest tackle possible to give the fish the maximum opportunity to escape.²⁰⁷ An editorial in the same issue argued against the use of firearm silencers for "sportsmen who desire to give the game a fighting chance for life."²⁰⁸ A 1911 editorial quotes the Campfire Club of America, which "...specifies as unsportsmanlike the transgression of certain fundamental natural laws in the taking of game or fish. It proscribes weapons and tackle which take away the game's last chance."²⁰⁹ Another editorial says:

There are in this country and Canada today many hundreds of thousands of true sportsmen; who would scorn to take an unfair advantage of the wild things; whose conquest over the game he seeks is made by means which, at least, gives his quarry an equal chance in his native element, and who matches his skill, strength and cunning against the inherent instinct of the game for self-preservation.²¹⁰

²⁰⁷ F&S, 1909, Vol. 13, April, p. 1026.

²⁰⁸ F&S, 1909, Vol. 13, April, p. 1091.

²⁰⁹ F&S, 1911, Vol. 16, Dec., pp. 780-781.

²¹⁰ F&S, 1910, Vol. 15, Nov., p. 692. The exception to this general trend was the rabid war against predators and "vermin," discussed above in the section on "nature as (continued...)

The attribute of giving game a fair chance to escape continues into the final cluster. A 1991 article on dove hunting says doves will alight on dead leafless tree branches, thereby offering a potshot to the “unsportsmanlike.”²¹¹ The implication is that birds should be in flight before the sports hunter shoots at them.

Skill

Items also appear in *Field and Stream* that recognize and applaud the development and honing of the personal outdoor skills that are necessary for a successful hunt if one scrupulously subscribes to the limitations (especially over- reliance on hunting technology) imposed by the sports hunting ethos. As one author put it:

I would say that I know of no more fascinating sport than hunting the wild turkey. It is a sport where luck does not seem to play much of a part; for unless one knows something about the turkeys, their haunts, habits, etc., and is able to imitate their calls, it does not often happen that he will get a shot.²¹²

This emphasis on skill is still encountered in the fourth cluster (1969-71). For example, a story reports on hunting deer in southern Michigan. It says that the bucks there are very big and good to eat because of all the crops they consume, and that they are clever in avoiding humans because they live in such close proximity to civilization. The story centers around a farmer going after one particular big buck. It says that much

²¹⁰(...continued)
finite/ humans actions can imperil nature.”

²¹¹ F&S, 1991, Vol. 96, Sept., p. 46.

²¹² F&S, 1909, Vol. 14, Oct., p. 546.

scouting is necessary to learn the habits of a particular buck, and then predict when and where he will be so he can be ambushed. This implies that personal skill, rather than a reliance on technology, is still considered an attribute of the sports hunting ethos.

Support for Game Laws

As has been alluded to above, another key attribute of the sports hunting ethos is its admonishment that hunters support, and obey, game laws. The very purpose of these laws is to restrict which kinds of animals can be harvested, at what times, and under what conditions. The perception of need for some type of such external social control is probably not surprising, given that the sports hunting ethos is grounded in the assumption that nature is finite, and can be imperiled by careless and wasteful human actions.

For example, a 1910 story about caribou hunting in Newfoundland mentions taking salmon and trout for daily food but the author feels “honor bound” by his permit from the government to not take more than his legal limit.²¹³ An editorial published the same year lauds daily bag limits. It says such limits are no problem to those who are sportsmen by “instinct.”²¹⁴

At the same time, some uneasiness about the potentially abusive power of the state is also apparent throughout the 20th century. For example, a 1910 article on duck hunting in Alaska takes the position that a new law that defines the legal duck hunting season’s dates means that, if obeyed, hunters in the north would have no duck hunting because all the ducks would have migrated south by opening day. It then goes on to openly advocate

²¹³ F&S, 1910, vol. 14, Feb., p. 907.

²¹⁴ F&S, 1910, Vol. 14, Feb., pp. 966-967.

and report on instances of disobedience of this law: “So naturally the law is a dead letter and we make our own sportsman’s law.”²¹⁵

Support for game laws is thus a persistent theme, and in many ways forms a core element of the sports hunting ethos. For example, a 1931 feature reports on, and applauds, stiff fines and sentences for game law violations. It maintains that areas with lenient sentences have the most game law violations.²¹⁶ A 1951 article approves of various states enacting stiffer deer poaching penalties.²¹⁷ A 1951 editorial approves extra funding to enforce waterfowl regulation.²¹⁸ In the 1989-91 editions of *Field and Stream* there are many calls for even more restrictive seasons, methods, and bag limit laws. *Field and Stream* always cheers reports on fish and game law enforcement “crackdowns” when it reports them.²¹⁹ At the same time, this is the one attribute of the sports hunting ethos about which one also encounters considerable trepidation. I explore this further in Chapter X.

Practice Safety, Integrity, Generosity, Respect

Basic honesty, and concern for the welfare of others (especially other hunters) is also a feature of the sports hunting ethos. A 1909 letter maintains that the difference

²¹⁵ F&S, 1910, Vol. 15, April, pp. 298-302.

²¹⁶ F&S, 1931, Vol. 36, Sept., pp. 8-9.

²¹⁷ F&S, 1951, Vol. 56, Sept., p. 49.

²¹⁸ F&S, 1951, Vol. 56, Dec., p. 16.

²¹⁹ F&S, 1989, Vol. 94, July.

between “Sports” and “Sportsmen” is whether or not they lie about their fishing successes.²²⁰ Similarly, the Campfire Club offers badges for outdoor skills and says that sportsmen should never brag about their accomplishments unless they can produce the appropriate badge.²²¹

Good sportsmen are also concerned about the safety of others. A 1911 editorial says that any hunter who shoots another hunter should have his license taken away forever.²²² A 1911 story recounts a hunting accident where a hunter shoots at movement in the bush and kills his friend. Hunters are admonished not to shoot unless they can fully see their target.²²³

A 1949 article combines concerns with safety with two other elements subsumed under the general category of respect for others: 1) the importance of educating others; and 2) a fairly new emphasis on avoiding unnecessary suffering to animals (probably a response to anti-hunting activity, discussed above in Chapter VIII). It stresses five major responsibilities that should be taught to young hunters:

1. Hunt without injury to self or others.
2. Hunt without harm to property.
3. Hunt without harm to another’s sport.
4. Hunt without harm to the future game crop.

²²⁰ F&S, 1909, Vol. 14, Oct., pp. 551-552.

²²¹ F&S, 1910, Vol. 15, Aug., pp. 374-376.

²²² F&S, 1911, Vol. 15, Mar., p. 1100.

²²³ F&S, 1911, Vol. 16, Sept., p. 491.

5. Hunt without causing undue suffering to a living thing.²²⁴

Concerns about safety continue into the final cluster (1989-91). A number of letters appear both for and against a previous editorial calling for a prison sentence for any hunter who accidentally shoots someone.²²⁵ The gist here is that if hunters are seen as opposed to this they will be perceived as not concerned with the public's safety, a perception that will play into the hands of the anti-hunters.

The importance of educating youngsters also continues into the final cluster. One story reports on the passing of a family's hunting tradition from one generation to another in their deer camp in Wisconsin.²²⁶ Another story about training young boys to be sportsmen contains this: "It's important to help someone learn that hunting is both an art and a craft, and that the shot is often the least of it."²²⁷ A new feature, *Field and Stream Jr.*, is introduced for kids. The purpose of this feature is:

To pass on the sporting tradition -- and the importance of conservation, sporting ethics, and safety to the next generation of *Field and Stream* readers. This has been the core of this magazine's policy for ninety-six years.²²⁸

²²⁴ F&S, 1949, Vol. 54, Oct., p. 32.

²²⁵ F&S, 1991, Vol. 95, Mar.

²²⁶ F&S, 1990, Vol. 95, Nov., pp. 22-24.

²²⁷ F&S, 1989, Vol. 94, July, p. 13.

²²⁸ F&S, 1990, Vol. 95, Nov., p. 64.

A similar feature, “A Special Section for Young Sportsmen,” contains hunting and fishing technical tips, and interesting facts about wildlife.²²⁹

Condemnation of Slob Hunters

The antithesis of the “good sportsman” just described is the slob hunter. As previously indicated, this attribute has a tenuous relationship with the earlier mentioned attribute, condemnation of market and pot hunters. Indeed, we first encounter this attribute in the 1929-1931 cluster, the same period where we cease to see explicit reference to pot and market hunters. While there is overlap, however, the characteristics of “slob hunters” is sufficiently broad enough to distinguish this as a separate category. A person can be a “slob hunter” even if they are not hunting for either the pot or the market.

The earliest reference I detected on “slob hunters” was a 1931 feature reporting a legislative bungle by the Illinois State Legislature that opened up the season on pheasants and partridges without regard to sex or other restrictions. It says that when word got around about this thousands of “...bloodthirsty gun-toters from Chicago...” set out to slaughter the birds.²³⁰ Here we see the beginnings of a theme that will become much more developed in the following years: the division of hunters into ethical sportsmen and unethical shooters (slob hunters).

By 1949-51, this separation has become absolute, and well articulated. Furthermore, this dichotomy is accompanied by a full-scale crusade against slob hunters and poachers as threats to the sport. In a 1949 article, an Illinois forester estimates that of

²²⁹ F&S, 1991, Vol. 96, June, pp. 69-74.

²³⁰ F&S, 1931, Vol. 36, Dec., p. 9.

the people (mostly urban) using a state wilderness facility: 5% are outright vandals; 40% are heedlessly destructive; 45% are decent folk, but feel they have the right to do anything they want in a public facility; and 10% are quality conservationists who use the facility wisely and show respect to nature.²³¹ A 1950 letter complains that five years ago duck hunting in California was good sport. Now, the author says, too many unsportslike hunters row around shooting cripples and decoys and spoiling it for “true” hunters who have gone to the trouble of constructing a blind.²³²

Condemnation of slob hunters continues in the final cluster (1989-91), and there is an open admission concerning the proliferation of unethical hunters. There is general lamentation over this and there are many calls for raising the costs of hunting to weed out all those but the most dedicated.

There is a tendency to blame slob hunters for all the problems ethical sports hunters face. For example, a letter from a Federal Game Warden Director approves of a recent *Field and Stream* editorial which says that unethical slob hunters are the biggest threat to legitimate hunters. He says that weeding them out, or educating them, will be the major task of the 1990s if hunting is to survive.²³³

²³¹ F&S, 1949, Vol. 53, April, p. 32.

²³² F&S, 1950, Vol. 54, Feb., p. 15.

²³³ F&S, 1991, Vol. 95, Mar., p. 8-9.

Chapter X.

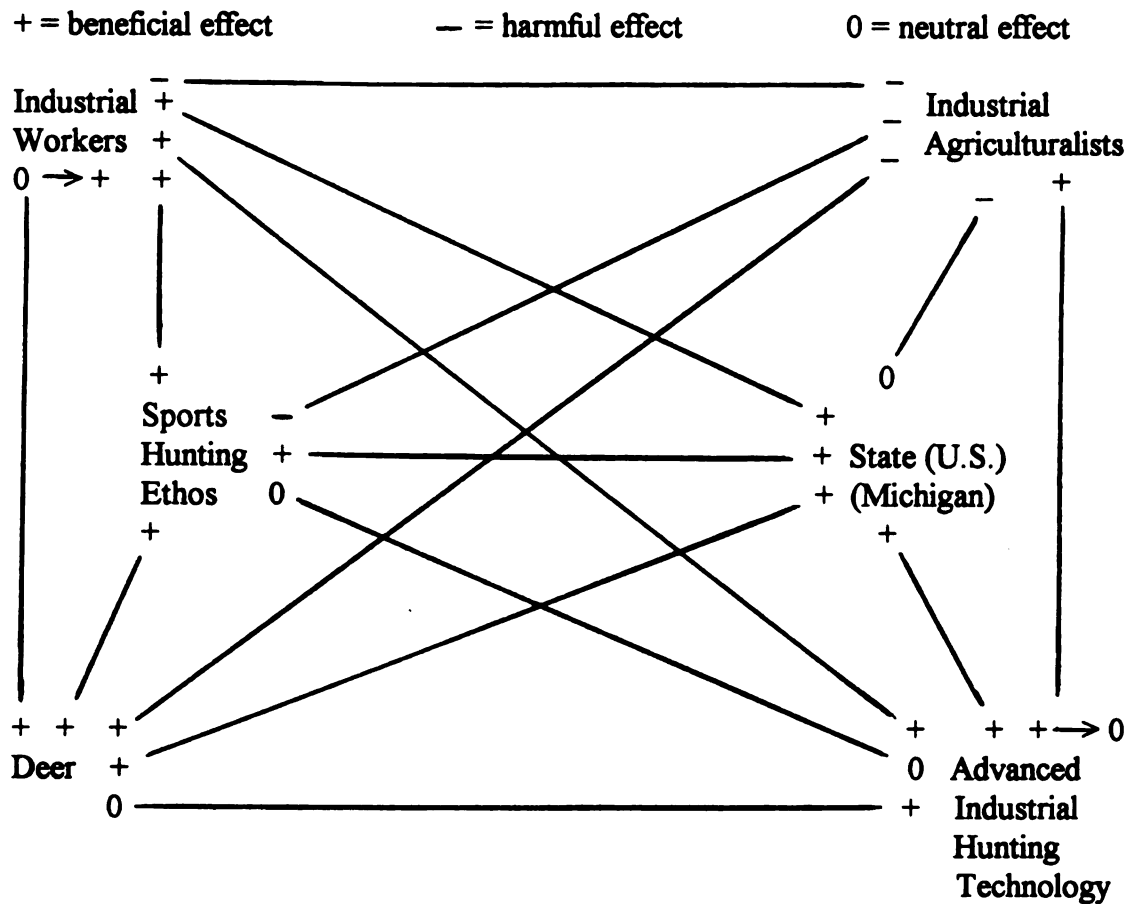
Application of the Co-Evolutionary Framework.

In the present chapter I turn my attention to using the co-evolutionary framework to analyze the 20th century deer hunting sociocultural ecosystem. Following an organizational format developed in Chapters V and VI, I address the following three topics: 1) 20th century species' co-evolutionary interactions; 2) constraints on hunting; and 3) system dynamics.

20th Century Co-Evolutionary Interactions

In the 20th century, six species are interrelated through the activity of deer hunting: deer, industrial workers (as hunters), industrial agriculturalists, Advanced industrial hunting technology, the sports hunting ethos, and the state. These species have all been discussed, some in considerable depth, in the preceding three chapters. In the present section I turn my attention to a more focused analysis of the relationship among these species. My concern is to address the extent to which these relationships are beneficial, detrimental, or indifferent to the continued survival (and perhaps growth) of the species involved. Graphic portrayal of these relationships is presented in Figure 10.1.

Figure 10.1. Ecological Interactions for Epoch III. 1891 - 2000



-----Movement Toward and Near Achievement of-----
 -----Dynamic Equilibrium-----

As can be seen in Figure 10.1, the majority of species' relationships that exist over the 20th century are beneficial to the continuation or even growth of the interacting species. I begin my discussion of these relationships by focusing on the one species which has consistently benefitted since its initial introduction in the 16th century: that of the state. In contrast to my format in Chapter VII, however, I turn next to the one species'

most at odds with the overall beneficial nature of these relationships: that of the industrial agriculturalists. I complete the section with a discussion of the remaining species: industrial workers, advanced industrial hunting technology, sports hunting ethos, and deer.

The state *benefitted from* its relationship with the deer herd. Although the state did not require the deer to exist, it nevertheless benefitted from them in a major way as it used the need for their protection and propagation as a legitimation for the accumulation of revenues, wildlife management functions, and thus the growth of state power.

The state also *benefitted from* its relationship with the industrial workers. The industrial workers provided license fees, taxes, and political support to the state for the protection, propagation, and management of the deer herd.

The state also *benefitted from* the existence of the sports hunting ethos. The ethos legitimated the state's game management activities. It further elicited a voluntary harvesting restraint on the part of the industrial workers, which contributed to the success of the state's management practices.

The state also *benefitted from* the advanced industrial hunting technology. The hunting technology enabled the industrial workers to participate in recreational hunting. This, in turn, necessitated the implementation of the state's wildlife management and hunting regulation policies which augmented the growth of state power.

The state's relationship with the industrial agriculturalists, at least as far as deer hunting was concerned, was one of, at best, *indifference*. Deer posed a threat to the crops of the industrial agriculturalists. The state, however, supported deer protection and propagation programs favored by the more numerous, and politically powerful, industrial

workers. Because the industrial agriculturalists were hostile on this issue, the state certainly did not benefit from its relationship with them.

While the industrial agriculturalists did not benefit the state, however, it is not clear they were powerful enough to do it much harm. By the 1920s, the state had implemented programs to respond to the crop losses of the industrial agriculturalists which were caused by the deer. For example, the state recognized and upheld the right of industrial agriculturalists to post their land against hunters. Also, the state recognized the nature of deer as pests and implemented various measures to address this problem. Special measures which developed over the course of the 20th century included: special permits that allowed farmers to shoot extra deer; the provision by the state of repellent technologies such as electric fences and automatic noise devices; and damage compensation payments to be financed by fees on hunting licenses and various taxes. While this probably reduced the hostility of the industrial agriculturalists, they probably would have been happier with a reduction in the size of the deer herd. At the same time, while these measures did increase state power, they also imposed financial costs on the state.

As the previous discussion indicates, the industrial agriculturalists were *harmed by* their relationship with the deer herd, which consumed their crops. Because the industrial workers supported the maintenance of a large deer herd to facilitate their hunting activities, the industrial agriculturalists were also *harmed by* their relationship with the industrial workers. Industrial workers also engaged industrial agriculturalists in an ongoing battle over the right to hunt on private land. With respect to the activity of deer

hunting, the industrial agriculturalists were also *harmed by* their relationship with the state. Via its management practices, the state supported a large deer herd.

On the whole, the industrial agriculturalists were *harmed by* the sports hunting ethos. Those attributes of the ethos which encouraged integrity and respect were beneficial to the extent they encouraged hunters not to trespass on private, posted land, and to not degrade agricultural lands which they did have access to. At the same time, the ethos' emphasis on voluntary harvesting restraints did little to reduce the size of the deer herd, which the industrial agriculturalists considered to be pests.

The only species that the industrial agriculturalists *benefitted from* was that of advanced industrial hunting technology. The greater range and accuracy of this hunting technology increased the number of deer that might conceivably be harvested by hunters.

The industrial workers *benefitted from* their relationship with the state, which protected, propagated, and managed the deer herd for the recreational hunting of the industrial workers. As the size of the industrial workforce grows, the importance of this relationship for the overall sociocultural ecosystem increases.

The industrial workers also *benefitted from* their relationship with the sports hunting ethos. The ethos legitimated the degree of restraint that the industrial workers had to exhibit in order to sustain the deer population and thus perpetuate hunting opportunities, and therefore themselves as hunters, over the long term.

The industrial workers also *benefitted from* their relationship with the industrial hunting technology. The technology was needed for them to hunt deer for recreation.

In the early part of the century, the industrial workers did not benefit from their relationship with the deer, as the herd size was still too small to allow for extensive hunting. However, after the 1920s, when population size had sufficiently recovered, the industrial workers *benefitted from* their relationship to the deer, which provided a recreational escape from industrial jobs and urban environments.

The only relationship that was *harmful to* the industrial workers was their relationship with the industrial agriculturalists. Especially important here is the industrial agriculturalists' posting of private agricultural land, which meant many prime deer hunting locations were closed to hunters.

The advanced industrial hunting technology *benefitted from* its relationship with the industrial workers. The advanced industrial technology needed the industrial workers as consumers to provide an economic demand for its continued development and production. With the increase in disposal wealth and leisure time of the industrial workers, this interaction increases in overall significance for the sociocultural system.

The advanced industrial hunting technology *benefitted from* its relationship with the industrial agriculturalists. The industrial agriculturalists needed to utilize the advanced industrial hunting technology in their attempt to reduce the deer (pests). This provided an economic demand for the production of the advanced industrial hunting technology. However, over the course of the 20th century, the decreasing ratio of industrial agriculturalists compared to industrial workers reduces the significance of this interaction for the sociocultural ecosystem.

The advanced industrial hunting technology *benefitted from* its relationship with the state. The state's wildlife management policies permitted hunting and legitimated the use of the hunting technology, thereby encouraging an economic demand for its production. For similar reasons, the advanced industrial hunting technology also *benefitted from* its relationship with the deer.

The relationship of the advanced industrial hunting technology to the sports hunting ethos was, at best, *indifference*. The hunting technology was not dependent on any particular ethos as its utility was compatible with many conceivable ethoses. In addition, as is explained further in the following section, the "voluntary restraint" attribute of the sports hunting ethos was somewhat at odds with the increased killing capacity of the advanced industrial hunting technology.

The sports hunting ethos *benefitted from* its relationship with the industrial workers. The ethos needed the industrial workers as a collective body of minds in which to reside. The sports hunting ethos also *benefitted from* its relationship to the state. The state benefitted the ethos by disseminating ideological support for it.

The sports hunting ethos also *benefitted from* the continued survival of the deer. The ethos required a viable deer population to provide the hunting opportunities that justified it in the collective minds of the industrial workers in which it resided.

The relation of the sports hunting ethos to the advanced industrial hunting technology is *mixed*. The ethos needed a hunting technology in order to be implemented. If there was no means of implementation, any ethos would be irrelevant and would cease to exist in the minds of everyone. At the same time, as discussed further below, the

advanced industrial hunting technology frequently moved in directions contrary to the conservation spirit of the sports hunting ethos.

The relation of the sports hunting ethos to the industrial agriculturalists is also *not beneficial*. The sports hunting ethos was selected for partially because it called for a large, protected deer population. This was at odds with the desires of the industrial agriculturalists for a greatly reduced deer population. However, the industrial agriculturalists are not powerful enough to cause the sports hunting ethos serious harm.

The deer, on the other hand, *benefitted from* their relationship with the industrial agriculturalists. By clearing land, the industrial agriculturalists increased amount of habitat preferred by deer. They also (unintentionally) provided an important food source for deer, one considerably higher in protein than natural browse (Nelson 1998).

The deer *benefitted from* the protective efforts of the state. The deer also *benefitted from* their relationship with the industrial workers. The industrial workers provided license fees, taxes to the state, and voluntary contributions to sports conservation organizations for the propagation and protection of the deer. Further, they provided political support to the state for these efforts. The deer also *benefitted from* the sports hunting ethos. The deer needed the ethos to recover from population depletion in the 19th century, and to ensure that such over-hunting did not occur again.

The relation of the deer to the advanced industrial hunting technology was *indifferent*. While the technology was used to prey upon the deer, the deer were not pushed toward extinction.

Constraints on Hunting: What Constitutes a “Good Sportsman”?

Throughout this dissertation I have addressed the question of what factors influence the quantity of deer harvested, with a particular focus on the role of technology and ideology. During Epoch I (sustainable harvesting among the indigenous Americans) ideology probably played a more pre-eminent role than technology, though both factors served to limit the number of deer that were harvested by the Native American tribes. In Epoch II (invasion and succession), ideology and technology reinforced each other. Both the altered (antagonistic) animistic hunting ethos, and the nature’s bounty ethos, legitimated harvesting to the maximum extent possible, while the early and mid-industrial hunting technology greatly increased the number of deer that could be harvested.

The best way to characterize the relation between ideology and technology in this final epoch (that of the “squeeze”) is that they are in a state of contradiction and conflict. The sports hunting ethos seeks to combat a situation of reduced hunting opportunities through an ideological framework that emphasizes hunter constraint. This can be seen in a number of key attributes of that ethos: that the bag is not the main thing, that hunting provides other values beside the kill itself (such as the spiritual renewal value of nature for an increasingly urban society), that pursuit of non-kill outdoor activities such as photography that are perfectly acceptable, that game should be given a fair chance to escape, and that the development of personal hunting skills is desirable.

On the other hand, the kinds of innovations in hunting technology discussed in Chapter VIII move in exactly the opposite direction of this ideology. High-powered rifles with long-range telescopic sights are hardly designed to “give game a fair chance.” Scents

whose expressed intent is to lure animals to hunters, or fish to fishing bait, provide compensation for in-depth personal knowledge of where in an ecosystem to locate desired animals at particular times. All these innovations suggest that “the bag,” far from being a relatively inconsequential component of hunting and fishing activity, remains for many people the primary motive.

These contradictions and conflicts were recognized and discussed in the pages of *Field and Stream* magazine. My purpose in this section is to review how these contradictions were perceived, and dealt with. To establish correspondence with Chapter VIII’s discussion of technological innovation, which was organized chronologically according to the five clusters examined for this dissertation, I follow the same format in this Chapter.

1909-1911

As was demonstrated in Chapter IX, this initial cluster is the period when the sports hunting ethos was being extensively articulated in the pages of *Field and Stream* magazine. Sometimes during these years, the question of whether a particular hunting or fishing technology is compatible with the sports hunting ethos is openly debated in letters to the editor. For example, a series of letters to the editor furiously debate the “live bait question.”²³⁴ One letter advocates a position in favor of artificial flies and spinners as legitimate for sport fishers. It says this saves work looking for live bait. A letter which follows with a counter position says “...a true angler, who fishes for sport and not to kill and waste, will use the natural means... by choosing live bait. I believe a true sportsman is

²³⁴ F&S, 1909, Vol. 14, July, pp. 267-268.

willing to give the fish a chance. With live bait he does this..." A further letter says, "I am quite willing to admit that fly fishing is the proper as well as the highest type of angling, and it yields the most sport." This letter calls artificial bait with a dozen hooks unsportsmanlike, but artificial baits with three or four hooks are all right.

In another series of exchanges, one letter to the editor condemns opalescent artificial fishing bait as unsportslike.²³⁵ Another letter answers that such bait is not as automatically successful as the first letter alleges, asserting that the writer of the first letter is just jealous of fishermen with greater skill and luck. *Field and Stream* adds that opalescent bait is not illegal, but that fishing after 9 p.m. is unsportsmanlike. This is because many fish feed at night.²³⁶

However, often these tensions are not openly acknowledged, and calls for supporting the sports hunting ethos exist uneasily alongside blatant displays of technological prowess. For example, an editorial calls for legislation to protect wild fowl from hunters in airplanes.²³⁷ Another issue features a cover painting of hunters doing exactly that: shooting geese while riding in an airplane! There are often such contradictions between ethical positions taken by *Field and Stream* and the products they allow to be advertised, which correspond to the contradictions between the sports hunting ethos and advancing technology.

²³⁵ F&S, 1911, Vol. 16, Dec., p. 861.

²³⁶ This perspective is completely reversed today, and night fishing is legal and often preferred precisely because many species do feed at night. At present, this is in no way considered unsportsmanlike.

²³⁷ F&S, 1910, Vol. 15, pg. 686.

1929-1931

During this time there are explicit references to technologies that violate the sports hunting ethos' attributes of "giving game a fair chance to escape," "voluntary harvesting restraints," and "the development of personal skill." For example, an advertisement says, "Rotten shot? Forget it!" It claims that the Wilbur gun sights will make up for your lack of skill,²³⁸ a pitch clearly advocating the substitution of technology for personal skill. Another gunsight advertisement by Lyman says that using it allows you to get "your limit of birds."²³⁹ This specifically contradicts the admonitions of the sports hunting ethos that to take the legal limit qualifies one as a "game hog." Similarly, an advertisement for Three-in-One oil for guns "Helps you bag the limit,"²⁴⁰ thus implying that bagging the limit is the goal of hunting. This again contradicts other messages we have seen that say a voluntary restraints in not bagging the full limit is an attribute of ethical sportsmanship.

The author of an editorial agrees with the law that forbids hunting from an airplane. He reports, "Recently the public press reported that a popular idol had killed an antelope from an airplane. It was gratifying to see his later denial." The author of the article then connects technology directly to the sports hunting ethos by saying, "It should be illegal to take advantage of any species of game."²⁴¹ This is one of the first explicit acknowledgments of the role of technology in the possible depletion of game species.

²³⁸ F&S, 1930, Vol. 35, Nov., p. 58.

²³⁹ F&S, Vol. 35, Vol., p. 70-71.

²⁴⁰ F&S, 1931, Vol. 36, Dec., p. 69.

²⁴¹ F&S, 1929, Vol. 34, July, p. 19.

Field and Stream offers mixed messages regarding the place of the new transportation technologies in hunting and fishing vis-a-vis the sports hunting ethos. A picture is offered with a caption explaining how anglers took an airplane to the coast, and then a motorboat to the fishing area where they caught a tarpon, and concludes, "How's this for modern fishing?"²⁴² A letter to the "Boating Department" asks if it is alright to motorboat to a duck hunting area. *Field and Stream* answers that, yes, it is alright.²⁴³ Apparently the current sports hunting ethos permits modern technology as an aid to getting to a sporting area. However, the actual use of technology in the act of taking a fish or game becomes fuzzy as to the ethos.

Further, *Field and Stream* sometimes takes a conservative position vis-a-vis technology when it sponsors a contest to see who can catch the biggest trout on a fly. Fishers wrote letters asking for the rule to be changed so that other types of bait could be used. *Field and Stream* answers, "[No, o]ur argument in favor of flies is based, we think, on good sportsmanship."²⁴⁴ Elsewhere, it seems that the natural vs. artificial bait debate is now largely absent. There is much artificial bait advertised in *Field and Stream*, and no mention appears that it is in any way unsportslike.

1949-1951

Despite numerous advertisements for mechanical hunting gadgets that substitute technology for personal skill, there are also contradictory negative references to "push-

²⁴² F&S, 1930, Vol. 34, Feb., p. 46.

²⁴³ F&S, 1930, Vol. 34, Feb., p. 58.

²⁴⁴ F&S, 1929, Vol. 34, July, p. 43.

button” hunters. Also, in contradiction to ever more efficient technology, there is an increased recognition of archery hunting.

Field and Stream still sponsors its annual Big Fish contest. Now, however, there are two divisions: one fly casting, the other open. Apparently artificial lures are now allowed in the contest, thus reversing the conservative position of flies only, taken twenty years earlier. It is not always just high-tech hunting aids that come under attack, however. For example, an article about hunting out of a blind says, “skulking behind bushes and trees hardly suits the character of an honest hunter.”²⁴⁵ Use of blinds and baiting receive far more extensive coverage in the final cluster.

1969-1971

There are many inconsistencies and contradictions in this cluster. The conflict between technology and many of the voluntary restraint attributes of the sports hunting ethos is now obvious. There is an explicitly acknowledged prohibition against using technology which makes the pursuit of fish and game “unfair” and, therefore, unsportslike. However, this appears in the same issues with many advertisements for high-tech space-age gizmos that do precisely that. For example, *Field and Stream* runs advertisements for scents for fish and aquacides to kill lake weeds.²⁴⁶ These claim to be “safe” for swimmers and fish. This is interesting in view of all the magazine’s messages specifically condemning herbicides and pesticides.

²⁴⁵ F&S, 1951, Vol. 56, Dec., p. 50.

²⁴⁶ E.g., F&S, 1970, Vol. 75, May, p. 150.

Many products (e.g., snowmobile suits, electric socks) advertised during this cluster are designed to increase material comfort while in the outdoors. This inevitably comprises the nature experience in terms of its spiritual renewal value, although no suggestion of such a conflict with that attribute of the sports hunting ethos is acknowledged. In addition, these kinds of products means hunters and fishers can stay in pursuit of game and fish for longer periods, a possibility antithetical to the sports hunting ethos of voluntary restraint.

An advertisement appears for an electronic gunsight that is the most blatant advertisement encountered during the course of this research in terms of coming right out and saying the purpose of this technology is to overcome shortcomings in personal skill. As was described in Chapter VIII, this sight projects the optical illusion of a red dot where the bullet or shot pattern will be. The advertisement says people no longer have to worry about practicing their shooting, because the sight does all the work.²⁴⁷ There are, however, many other examples of advertisement published during this period that convey similar themes.

The threat to the sports hunting ethos posed by this continued encroachment of technology as a substitute for personal skill is not completely lost on *Field and Stream*, even though they participate in the process through their advertising, stories, and other features. For example, a 1970 article makes fun of an imaginary futuristic mechanical hunting dog that is driven by a computer. This machine is incapable of making an error, or

²⁴⁷ F&S, 1971, Vol. 76, Sept., p. 67.

of not finding game, which virtually guarantees the hunter a bag, but of course which also takes all of the fun (uncertainty, and therefore sport) out of it.²⁴⁸

1989-1991

Many spoofs of high tech gadgets appear during this cluster, indicating an awareness of their contradiction with the sports hunting ethos. However, *Field and Stream* continues to run advertisements for these gadgets.

For example, a tongue-in-cheek article discusses the merits of the high tech combination of fishing reel and lure of the future. This device contains: a motorized remote control lure, a TV screen to watch the fish while recording it for later viewing, readouts on air and water temperature, wind direction, and phases of the moon. It also turns into a regular television if there are no fish. The price listed for this gadget in the article was \$7,100.²⁴⁹

Baiting, and apparently criticism of it, are increasingly referenced in the issues of this final cluster. A letter defends the practice of baiting deer in Wisconsin. The author says that only small amounts of bait are used, they don't get a deer every year, other deer which are not shot benefit from the free food, it is needed to get a good shot, and it is no different than using other techniques and technologies, such as scents, calls, telescopic sights, and bird dogs, all of which give hunters "advantage" over game.²⁵⁰ Another letter

²⁴⁸ F&S, 1970, Vol. 75, Aug., p. 50.

²⁴⁹ F&S, 1989, Vol. 94, Oct. p. 18. After having attended the Deer Hunting and Sportsmen's Show in Lansing, I was not sure at first that this was indeed a spoof.

²⁵⁰ F&S, 1989, Vol. 93, Jan., p. 8.

by a woman also defends Wisconsin deer baiting. She says bait is used to “see” deer as much as to shoot them.²⁵¹ This is the first time I have seen a defense of this practice, suggesting it has come under some level of attack.

A report appears on deer baiting in Michigan. This report claims the following statistics: Michigan hunters spends \$10 million per year on deer bait -- carrots, apples, sugar beets, and corn. In 1987, almost 1/3 of Michigan deer hunters (230,000) sat over 2 million bushels of bait, most of it on private or closed land. Twenty-one percent of the state deer harvest was taken over bait piles. A spokesperson for the Michigan Department of Natural Resources claims that baiting does not harm the deer herd, and that the public is about evenly divided between those who support the practice, those who oppose it, and those who don’t care. He says that if 51% ever come to oppose it, then it will be banned.

While hardly high-tech, the question of the acceptability of baiting as a “legitimate” sportslike practice well illustrates the contradictory relation between ideology and technology, and how the interaction between these two is impacted by the ever-tightening vice of the “squeeze”. As hunting success becomes a more iffy proposition, more and more hunters are likely to turn to technological assistance that will give them a better chance of “bagging” game. The use of these technological implements, in turn, further accelerates the “squeeze,” fueling the accelerated feedback loops. This dynamics will be further discussed in the following section.

²⁵¹ F&S, 1989, Vol. 93, Jan., pp. 8-9.

System Dynamics

Is the present hunting regime sustainable? Two factors point to that possibility. First, as was last encountered in the pre-European Native American Epoch, in the 20th century we once again find ourselves with a series of species relationships that appear positive or indifferent for virtually all species, including deer. The one exception is industrial agriculturalists, and even here the overall effect is equivocal. Farmers unintentionally increase deer habitat and food supply, and even though they would like a reduction in deer numbers their political power is not great enough to implement this desire. Hence, industrial agriculturists themselves are slightly damaged by the presence of the deer, at least in such high numbers. However, the activities of the industrial agriculturalists benefit other species in the system.

Second, the size of the deer population remains high, and indeed is certainly above what it was in the pre-European contact epoch. The fact that this species is not being depleted by present practices also suggests the possibilities for sustainability.

But there are other factors that suggest sources of strain that might become severe enough to bring about the downfall of the system. The deer hunting system of the 20th century is not one marked by massive invasion dynamics, and the disruption in species' make-up that often follows. Indeed, the fundamental mix of species remains fairly constant throughout the 20th century. Rather than massive dislocations what we have in the 20th century is an almost endless number of small perturbations that reverberate throughout the system in at least minor disruptive ways. These perturbations stem from a

system that provides multiple points of entry for many numerous new, and modifications of exiting, species.

One place where we see such multiple points of entry is in the political arena. In a democratic system, all types of folks can organize around all kinds of issues and push for policies supportive of their cause. Hunters have encountered an increasing amount of pressure from such groups, some of which (such as animal rights activists) explicitly organize to stop hunting, while others (such as developers) push for policies that are unintentionally antithetical to hunting interests.

Another way in which we see multiple points of entry is in innovations in hunting technology. A capitalist system thrives on technological innovation, and allows anyone who thinks he or she has a better mouse trap a chance to offer their product to consumers. Therefore, there is the potential for the introduction of numerous new types of hunting technology.

This characteristic of multiple points of entry contributes to the overall sense of “squeeze”. This includes more and more hunters pursuing game with increasingly efficient hunting technology, and also suggests a source of strain on the system. Indeed, the dynamic of the “squeeze” suggests the positive signs characteristic of species’ relationships in this epoch may not indicate sustainability, but rather excess growth that will eventually cause the system to reconfigure.

Another characteristic of this system is that of accelerated feedback loops. This occurs in part because of the oversight role of government agencies, whose job it is to continually gather information and respond to changes in indicators of system health. It

also occurs because of improvements in information and communication technology, which means all types of groups interested in any aspect of deer hunting or any related activity can instantaneously keep up with events, and plan immediate response strategies. These three system dynamics -- the “squeeze,” points of multiple entry, and accelerated feedback loops -- suggests a picture of a hunting regime on a potentially out-of-control treadmill.

Chapter XI.

Discussion and Conclusions.

In this, the concluding chapter of my dissertation, I summarize my major findings and theoretical contributions. I also suggest possible trajectories for further research.

Summary of Major Findings and Theoretical Contributions

The goal of this dissertation has been to contribute to our knowledge of how to create more sustainable forms of social organization. To accomplish this I have used co-evolutionary theory to analyze the interactions of nine biotic, abiotic and social elements, cast in an organic model as “species,” reciprocally interacting in a sociocultural ecosystem through the activity of deer hunting in the Great Lakes area for the past millennium.

These nine species were: (1) deer; (2) hunting ethoses; (3) hunting technology; (4) the state; (5) Native Americans; (6) European fur traders; (7) Euro-American lumber harvesters; (8) farmers (Euro-American settlers/industrial agriculturalists); and (9) industrial workers. The three central questions I wanted to ask about hunting activity in this dissertation are: 1) What factors determine how many deer are harvested by any given society, at any given time? 2) What factors determine how many deer are harvested by any given society across time? 3) What factors relate the number of deer harvested to the level of sustainable harvest? Additionally, I wished to explicate co-evolutionary theory as a superior explanatory synthesis of previous linear materialist deterministic and linear idealist deterministic models.

To explicate co-evolutionary theory I first examined several macro-historic theories which elaborated and developed organic models, linear materialistic deterministic models, and linear idealistic deterministic models. The works of Herbert Spencer and Talcott Parsons in the development of early organic models were discussed. I noted that linear deterministic materialistic models can be economic, technological, or environmental. As exemplars of economic determinism I discussed the contributions of Karl Marx and Karl Mannheim. As exemplars of technological determinism I looked at Lewis Henry Morgan and Gerhard and Jean Lenski. As exemplars of environmental determinism I examined the contributions of Henry T. Buckle and Julian H. Steward. I then contrasted these with the idealist models presented by Claude Levi-Strauss and Peter Burger and Thomas Luckmann. I concluded this literature review by considering the hybrid materialism-idealism model of Max Weber. All of the above models were necessary precursors for the development of co-evolutionary theory.

Next, I proceeded by outlining co-evolutionary theory. I did this in light of Sanderson's (1995a) summarization. This theoretical approach is then fleshed out by my definition of "species," a discussion of physical, biological, and social evolution, and an explanation of how co-evolutionary theory would be applied in the present study. Additionally, I provided examples of five co-evolutionary studies.

I then turned my attention to the methodological application of co-evolutionary theory to my own study of study of deer hunting in Michigan. Secondary source material was used to examine deer hunting from the 11th to the 19th centuries. For the 20th century, I wanted to examine a popular hunting and fishing magazine read by working

class and lower middle class individuals. After examining a number of possible candidates, I decided that *Field and Stream* would be the primary data source for the 20th century. This magazine provided a richness of material that was conveyed through quotations used to illustrate the themes covered in these chapters.

Data analysis required specifying the ways in which the nine species just described were interrelated. This was accomplished through the use of ethnographic content analysis (ECA). ECA proposes to combine several aspects of ethnographic methods with content analysis to produce a distinctive method of reflexive document analysis (Altheide 1987). As mentioned in Chapter III, this method is already used by historians, literary scholars, and social scientists engaged in documentary research.

Central to co-evolutionary theory is the concept of feedback mechanisms. That is, the action of any species impacts all the other species in the ecosystem in such a way as to stimulate responsive actions on their part. Those responses, in turn, reimpact the original acting species in a perpetual dynamic interplay which sometimes maintains the ecosystem and at other times causes the ecosystem to evolve into new forms. When this process works to maintain the ecosystem over long periods of time we refer to it as a “sustainable” system.

A central species in this sociocultural ecosystem has been deer hunting technology. Stable for most of the first part of the past millennium, it began to mutate ever more rapidly with the introduction of exotic variants in the early 17th century, thereby provoking responsive adaptive changes (punctuated equilibrium) in the other species which temporarily destroyed the sustainability (dynamic equilibrium) which had previously

existed. Co-evolutionary theory would predict that these responsive adaptive changes would operate as negative feedback loops, eventually mitigating the influence of new hunting technology if the ecosystem was to regain sustainability. The analysis presented in this dissertation demonstrates that the other species, especially the various hunting ethoses, operated in exactly this fashion.

My research findings reflected shifts in the dominant co-evolutionary dynamics at work in the Michigan deer hunting sociocultural ecosystem during the past millennium. These shifts were identified as three major epochs through my ethnographic content analysis:

Epoch I: Sustainable Harvesting (11th-16th Centuries): Prior to the arrival of the Europeans the indigenous American Great Lakes tribes had established a sustainable sociocultural ecosystem around the activity of deer hunting.

Epoch II: Invasion and Succession (16th-19th Centuries): Beginning with the permanent arrival of Europeans in the New World in the late 15th century, through the late 19th century, the central co-evolutionary dynamic shifted to that of invasion and succession. Two sub-epochs are identified within the context of this larger dynamic:

Epoch II-A: -- the invasion of European fur traders (1601-1820).

Epoch II-B: -- the invasion of Euro-American lumber harvesters (1821- 1890).

Epoch III: The Squeeze (20th Century): Increased pressures from a number of sources, including an expanding population, employment of ever more powerful and

accurate hunting technology, and opposition to hunting from animal rights activists, combine to create a growing perception that the activity of “hunting” is under threat.

For each epoch, I provided some general historical contextualization in terms of the major events which effect deer hunting. I described each of the species present during that epoch, including human population groups and organizations, hunting technology, hunting ethos, and characteristics of the deer herd, especially in relation to its size. I identified the types of co-evolutionary interactions that existed between these species, and specified whether these interactions were beneficial, detrimental, or indifferent to the continued survival (and possible growth) of each. I examined what factors, if any, encouraged constraints on the number of deer that were harvested, with a particular focus on the role of ideology and technology. These questions were important not only for assessing the usefulness of co-evolutionary explanations vis-a-vis linear, deterministic evolutionary explanations, but also because it provided insights into which kinds of species’ invasions (e.g., new technologies, new ideologies) may be necessary to disrupt an existing system, and what particular forms such disruption might assume. I ended by discussing the overall system dynamics operating in each epoch, including a consideration of the long-term sustainability of the ecological relationships established during each of these periods.

Prior to the arrival of the Europeans (Epoch I) in the early 17th century, a sustainable deer hunting sociocultural ecosystem existed among the indigenous tribes of the Great Lakes region (Figure 5.1). Europeans permanently “discovered” the Americas at the end of the 15th century. An ecological invasion soon followed that dramatically

disrupted the co-evolved sociocultural and natural systems of North, Central, and South America, and the Caribbean Islands. Europeans' initial interest in the Great Lakes region revolved around the fur-trade. This trade was promoted by European states (French and British), which viewed its lucrative potential as a means to replenish national treasuries. Following the decline of the fur trade in the early 19th century, the Euro-Americans turned their interest to another abundant resource: Michigan's extensive old-growth forests. This salient extractive industry was joined by the activities of mining, fishing, and farming.

During Epoch II (II-A and II-B) two major waves of invasion and succession by exotic species (European fur traders, Euro-American lumber harvesters), were introduced into the Michigan Great Lakes region, and changes in the sociocultural ecosystem resulted. I analyzed the nature of the relationships that existed among the species, illustrating that while some of the species benefitted a great deal from the newly established relationship (at least in the short term), other species (especially deer) were harmed by them (Figures 6.1 and 6.2). I then demonstrated how both technological and ideological factors worked together to facilitate high levels of deer harvesting during both of the sub-epochs, though the exact composition of the hunting ethos varied between the fur-trading and lumbering periods. I concluded my discussion of each sub-epoch with a consideration of the system dynamics, including a demonstration of their unsustainable nature.

A final round of system dynamics occurred in the late 19th-early 20th centuries (Epoch III.). Driven by the industrial transformation going on in the broader society, one species, industrial workers, expanded from a minor species to a prominent species in the

sociocultural ecosystem. Industrialization also invaded the agricultural sphere, causing settlers/farmers to mutate into industrial agriculturalists. The state also grew in size and function, which included assuming the ownership and management of “wildlife.”

The impetus toward continual technological innovation stemming from an industrialized and capitalistic economy made itself felt in hunting technology, which became increasingly advanced over the course of the century. At the same time, by the latter half of the 19th century a new sports hunting ethos was beginning to challenge the nature’s bounty ethos. This ethos stressed the finiteness of nature, and presented “true sportsmen” as individuals who voluntarily practiced conservation measures, including voluntary limitations on the number of game and fish taken. The development of this ethos was part and parcel of the broader conservation movement which occurred in the latter half of the 19th century, and reached its peak during the progressive era that marked the turn of the last century (Kline 2000).

The deer herd had been seriously decimated in the 19th century. However, under the combined influence of state management and hunters’ adoption of the sports hunting ethos, deer had made a significant comeback by the 1920s. The deer population has continued at high levels for the remainder of this century, certainly surpassing its pre-European contact levels. This was the result not only of the two factors just mentioned, but also expansion of habitat created by agriculture.

The key contextual factor for the 20th century is that of industrialization and post-industrialization. Obviously, however, much else is going on during this period. The key historical events of each decade may be summarized as follows: 1900s -- Progressivism;

1910s -- World War I; 1920s -- prosperity; 1930s -- depression; 1940s -- World War II; 1950s -- prosperity and conservatism; 1960s -- social upheaval, including the beginnings of the contemporary environmental movement; 1970s -- recession; 1980s -- anti-government conservatism (Reaganism); 1990s -- prosperity. When relevant, the effect of these broad historical factors on deer hunting were discussed.

Throughout the course of the 20th century the following species interrelated through the activity of deer hunting: industrial workers, industrial agriculturalists, the state, advanced industrial hunting technology, the sports hunting ethos, and deer. The entire century was marked, however, by a sense of precariousness about this sociocultural ecosystem, a perception of threat that I labeled the “squeeze.” In the early part of the century, the endangered nature of the deer herd formed the foundation of this sense of threat. As the deer herd recovered, however, other factors came to contribute to a sense of “squeeze.” Population size increased; industrial workers had more leisure time in which to hunt, and more disposal income with which to buy the necessary transportation and hunting equipment; and innovation in hunting and transportation technology made this activity increasingly accessible. While the impact so far has probably been more psychological than actual, a growing anti-hunting sentiment also contributed to the overall sense of hunting as an endangered activity.

I provided evidence of this growing sense of the “squeeze,” as these were recorded in the pages of *Field and Stream* magazine. I followed this with a discussion on the perceived causes of the “squeeze,” again as these were developed in *Field and Stream* in light of the co-evolutionary framework.

The distinction between indicators of the existence of the “squeeze,” its causes, and the responses that developed to it is not always clear-cut. Indicators of the “squeeze’s” existence, such as increased numbers of hunters and decreased wilderness habitat, also serve as proximate causes of the “squeeze.” I had to develop a more complex understanding of these proximate causes, including an examination of the factors that were portrayed in *Field and Stream* as giving rise to them.

The major factors which combine to bring about the “squeeze” are the following:

- 1) development reduces habitat and game; 2) industrial pollution damages habitat and game; 3) population growth stresses habitat through encroachment, which reduces game; 4) increasing affluence of industrial workers increases hunting opportunities for more hunters, which stress game populations; 5) technological progress in transportation increases access to wilderness for industrial workers, which pressures game populations; and 6) innovations in hunting technology, which replace skill with technology, encourages greater hunter participation.

In the discussion that followed, I grouped these factors under two more inclusive categories: decrease in hunter opportunities, and increase in hunter pressures. Again, this distinction is an analytic one, as each of these are intimately interrelated in the real world.

I ended the chapter with a third factor whose effect on the feeling of “squeeze” has to this point probably been more psychological than actual: that of ideological opposition to hunting. However, as the “squeeze” consists of general threats to the viability of hunting as an activity, direct opposition by anti-hunting forces certainly constitutes an important contributing factor.

Finally, I discussed the two most important responses to the “squeeze”: 1) state ownership of wildlife and its concurrent move into game management; and 2) the development of the sports hunting ethos. I gave far more extensive attention to the second response, for several reasons. First, the sports hunting ethos is a complex belief system with a number of interrelated attributes; adequate description of these simply takes some space and time. Second, the data source used in the analysis of this section of the dissertation, *Field and Stream* magazine, gave far more extensive coverage to the sports hunting ethos than to specifics of state involvement in deer hunting. Third, while every regulation and management decision has its own history, and is sometimes rife with conflict, for purposes of this dissertation what is most important is a general appreciation of the role of state game management.

My three central questions, suggested three subsidiary questions:

1. When we examine hunting practices across a range of various economic systems, and levels of technological development, do we find any factors that seem to play a determinant role in all social variations studied? Or, as co-evolutionary theory would lead us to expect, do different kinds of factors play a more prominent role in different times and places?
2. Can we find historical examples of hunting regimes that are sustainable and unsustainable? Do effective feedback mechanisms play a positive role in promoting sustainable systems?
3. How disruptive to established systems is the invasion of new species? What effect does invasion/succession dynamics have on short- and long-term sustainability?

The answer to the first subsidiary question is that we do indeed see that the species comprising the sociocultural ecosystem both co-evolve over time and sometimes extinct and that various factors do assume more prominent or less prominent roles in different times and places as co-evolutionary theory would lead us to expect. For example, during the epoch of sustainable harvesting among the Native Americans, ideology in the form of an animistic hunting ethos, played a predominant role in determining the number of deer harvested. During Epoch II, deer were harvested to the fullest extent of the technological capabilities, in accordance with capitalistic profit motives and the absence of any constraining ideology. Feedback about environmental conditions, in this case the extinction threat to the deer population, facilitated the rise of the sports hunting ethos. In the 20th century information about the deer population is explicitly incorporated into the development of game management policies, while both ideology (sports hunting ethos) and hunting technology influence the amount of deer harvested, though often in tension with each other. Hence, the limited focus of the Macro-Historical theories discussed in Chapter II. which stressed the causal role of just ideological factors, or just environmental conditions, or just the role of technology, or just the role of political economy are inadequate to explaining all these hunting regimes. Co-evolutionary theory provides a superior model because it provides an analytic role for all of these factors as well as the recognition that at certain times and places one or several of these factors will be causally dominant.

The answer to the second subsidiary question is that we saw one sustainable hunting regime in the sociocultural systems operant in epoch I and a near sustainable

hunting regime operant in epoch III. Further, as I described in the text and presented in Figures 5.1, the interrelationships for epoch I involve benefits for all relevant species in my model and in Figure 10.1 the interrelationships for epoch III are mostly beneficial (a small number are indifferent or negative) for most of the relevant species in my model. Again, this is what co-evolutionary theory would lead us to expect.

We saw two unsustainable hunting regimes in the sociocultural ecosystems operant in epochs II-A and II-B. In both of these epochs the lack of effective feedback mechanisms failed to limit the deer harvest and threatened the deer with extinction. This lack is manifest in the absence of an effective hunting ethos in either system that would have provided the negative feedback mechanism needed to limit the harvest.

The answer to the third subsidiary question is that the invasion of new species was highly disruptive to the established sociocultural ecosystem, which was initially in a state of dynamic equilibrium, by initiating the invasion/succession process. For the short-term (epochs II-A and II-B) the effect was to perturb the system in such a way as to stimulate the co-evolution (punctuated equilibrium), both of the individual species, and the sociocultural ecosystem as a whole. The hunting regimes of these epochs were not sustainable as both were characterized by over-harvest. The long-term effect of the invasion of new species was a reconfiguration of the sociocultural ecosystem comprising both exotic and mutated variants of indigenous species, moving toward a return to a substantially sustainable (dynamic equilibrium) hunting regime in epoch III. A summary of the major dynamics for the three examined epochs is provided in Table 11.1.

Table 11.1. Detailed Overview of Major Characteristics of Michigan Deer Hunting Sociocultural Ecosystem, 11th-19th Century.

Epoch	Contextualization	Human Population Groups and Organizations - Including the State
I (1000 AD-1600 AD)	Pre-European Contact	Native American Tribes (Ojibwa, Cree, Montagnais-Naskapi, Huron, Potawatomi, and Micmac)
II-A (1601 AD-1820 AD)	European Fur Trading	Native American Tribes (Ojibwa, Cree, Montagnais-Naskapi, Huron, Potawatomi, and Micmac) European Fur Traders
	Jesuit Missionaries	European State (French, British) U.S. State
II-B (1821 AD-1890 AD)	Lumber Harvesting	Euro-American Lumber Harvesters Euro-American Miners Euro-American Settlers American State
III (1891 AD-present)	Industrial Era	Industrial Workers Industrial-present Agriculturalists American State

Table 11.1. (Con't).

Epoch	Hunting Technology	Hunting Ethos
I (1000 AD- 1600 AD)	neolithic (stone and bone spears and bows and arrows, dead fall traps)	<i>Animistic</i> : hunting a reciprocal activity between equal beings, with mutual obligations and privileges.
II-A 1601 AD- 1820 AD)	early industrial, European (steel traps, flint lock rifle, iron arrow points)	<i>Altered</i> <i>(Antagonistic)</i> <i>Animistic</i> : Native Americans perceive animals to be at war with them.
II-B (1821 AD- 1 AD)	mid-industrial (long-range repeating firearms)	<i>Nature 's Bounty</i> : Deer plentiful; unrestrained harvesting could occur without threatening species' survival.
III 1891 AD- present	advanced-industrial (high-powered rifles)	<i>Sports Hunting</i> : good sportsmen voluntarily limit take; give game a fair chance to escape

Table 11.1. (Con't).

Epoch	Types of Co-Evolutionary Interactions Between Species	Constraints on Hunting
I (1000 AD-1600 AD)	mutually beneficial	spiritual
II-A 1601 AD-1820AD)	mutually beneficial beneficial for one; indifferent for another beneficial for one; harmful for another beneficial for one; mixed for another mutually harmful	few to none; over-hunting and over-trapping encouraged
II-B 1821 AD-1890 AD)	mutually beneficial beneficial for one; indifferent for another beneficial for one; harmful for another beneficial for one; mixed for another mutually harmful	few; no recognition that over- harvesting was possible
III (1891 AD-present	mutually beneficial beneficial for one; indifferent for another beneficial for one; mixed for another	contradictory: ideology encourages constraint, while technology allows excess

Table 11.1. (Con't).

Epoch	Changes in Size of Deer Herd	System Dynamics
I (1000 AD- 1600 AD)	Population Relatively Constraint	Dynamic Equilibrium
II-A (1601 AD- 1820AD)	Population Decrease	Invasion/Succession Punctuated Equilibrium
II-B 1821 AD- 1890 AD)	Population Increase Followed by Population Decrease	Invasion/Succession Punctuated Equilibrium
III (1891 AD- present	Population Increase	Squeeze Points of Multiple Entry Accelerated Feedback

Possible Trajectories for Further Research

In this dissertation I have used ethnographic content analysis to analyze the co-evolution of a sociocultural ecosystem over a thousand year period focusing on nine major species. I feel that co-evolutionary theory was shown to have been a fruitful perspective for this task. Of course, innumerable other species also inhabited this ecosystem. They too, co-evolved through their interrelations with the nine species of this dissertation as well as with each other and the physical environment. Any partial replication of this study could alter the relevant species mix in many ways. A new set of species could be subjected to an ethnographic analysis of the same sociocultural ecosystem guided by co-evolutionary theory and a comparison made as to the similarity of findings. This, of course, could also be applied to other sociocultural ecosystems. Two levels of inquiry are at work in these kinds of studies. First, a meaningful description of the co-evolving system and, second, a further exemplification of co-evolutionary theory as a conceptual analytical tool.

In the process of attempting to answer current questions, research projects such as dissertations commonly pose new questions. In addition to specific applications, the major question for the social sciences suggested by this dissertation is: Does the melding of ethnographic content analysis with co-evolutionary theory open up new and exciting possibilities for insightful descriptive studies of sociocultural ecosystems over both the short and long term?

In a broader sense, research questions are suggested in the areas of: To what extent do hunters actually adhere or deviate from the sports hunting ethos? What are the

current political struggles among the relevant “species” (e.g. hunting technology manufacturers and professional wildlife managers)? How can issues of race, class, and gender be more fully incorporated into co-evolutionary models?

BIBLIOGRAPHY

- Abercrombie, Nicholas, Stephen Hill, and Bryan S Turner
1986 *The Penguin Dictionary of Sociology*. New York: Penguin.
- Adams, Richard N
1975 *Energy and Structure: A Theory of Social Power*. Austin: University of Texas Press.
- Alexander, Jeffrey C. (ed.)
1985 *Neofunctionalism*. Newbury Park: Sage.
- Allen, Frederick Lewis
1931 *Only Yesterday*. New York: Harper & Roe.
- Altheide, David L.
1987 *Ethnographic Content Analysis*. *Qualitative Sociology*. Vol. 10, No. 1:65-77.
- Applebaum, Richard P.
1970 *Theories of Social Change*. Boston: Houghton Mifflin.
- Berger, Peter L. and Thomas Luckmann
1966 *The Social Construction of Reality*. New York: Doubleday.
- Boorstin, Daniel J.
1983 *The Discoverers*. New York: Vintage Books.
- Botkin, Daniel B.
1990 *Discordant Harmonies*. New York: Oxford University Press.
- Boulding, Kenneth E.
1978 *Ecodynamics: a New Theory of Societal Evolution*. Beverly Hills: Sage Publications.
- 1961 *The Image*. Ann Arbor: The University of Michigan Press.
- 1953 *Toward a General Theory of Growth*. *The Canadian Journal of Economics and Political Science*. Vol. XIX, No. 3.
- Bunker, Stephen G.
1985 *Underdeveloping the Amazon: Extraction, Unequal Exchange, and the Failure of the Modern State*. Urbana: University of Illinois Press.

- Catton, William R. Jr.
 1984 Human Ecology and Social Policy. in Social Human Ecology. M. Micklin and H. Choldin (eds.), Boulder: Westview Press.
- Cronon, William
 1983 Changes in the Land: Indians, colonists, and the Ecology of New England. New York: Hill and Wang.
- Dunbar, Willis F. and George S. May
 1995 Michigan: A History of the Wolverine State. Grand Rapids: William B. Eerdmans Publishing Co.
- Duncan, O.D.
 1964 "Social Organization and the Ecosystem. in Handbook of Modern Sociology. Robert E.L. Faris (ed.), Chicago: Rand McNally.
- Franck, Karen A.
 1984 Exorcizing the Ghost of Physical Determinism. Environment and Behavior Vol. 16 No. 4, July 411-435.
- Freudenburg, William R.
 1985 Succession and Success: A New Look at an Old Concept. Sociological Spectrum, 5:269-289.
- Habermas, Jurgen
 1984 The Theory of Communicative Action (Vols. 1 and 2). Boston: Beacon Press.
- Hallowell, Irving
 1963 "Ojibwa World View and Disease," in Man's Image in Medicine and Anthropology, Monograph 4, Iago Galdston (ed.), New York: International Universities Press.
- 1960 Ojibwa Ontology, Behavior, and World View. in Culture and History. Stanley Diamond (ed.), New York: Columbia University Press.
- Hardin, Garrett
 1968 "The Tragedy of the Commons." Science, 162: 1243-8

Harris, Marvin

1985 Culture, People, Nature: An Introduction to General Anthropology. Fourth Edition, New York: Harper & Row.

1979 Cultural Materialism: The Struggle for a Science of Culture. New York: Random House.

1975 Cows, Pigs, Wars and Witches: The Riddles of Culture. New York: Vintage Books.

Holsti, Ole R.

1969 Content Analysis for the Social Sciences and Humanities. Reading: Addison-Wesley.

Kline, Benjamin

2000 First Along the River. San Francisco: Acada Books.

Kurath, Gertrude P.

1959 "Blackrobe and Shaman: The Christianization of Michigan Algonquians," Papers of the Michigan Academy of Science, Arts and Letters 44, 1958 meeting (1959): 209-215.

Lee, Richard B. and Irven DeVore

1968 Problems in the Study of Hunters and Gathers. in Man the Hunter. Lee and DeVore (eds.), Chicago: Aldine Publishing Co.

Lenski, Gerhard E. and Jean Lenski

1987 Human Societies: An Introduction to Macrosociology. New York: McGraw-Hill.

Lenski, Gerhard E.

1975 Social Structure in Evolutionary Perspective. in Approaches to the Study of Social Structure. Peter M Blau (ed.), London: Collier Macmillan Press.

Levi-Strauss, Claude

1963 Structural Anthropology. New York: Doubleday.

Levy-Bruhl

1923 Primitive Mentality. Translated by Lilian A. Clare, 1966 Boston: Beacon Press.

Luhmann, Niklas

1989 Ecological Communication. Chicago: University of Chicago Press.

Martin, Calvin

1979 *The Keepers of the Game: Indian-Animal Relationships and the Fur Trade.* Berkeley; University of California Press.

1976 "The Ecological Effects of Indian-White Relations: Major Euroamerican influences," in the *Hand Book of North American Indians.* W.C. Sturtevant (ed.), Vol. 4 Washington D.C.: Smithsonian Institution.

Martin, Paul S.

1967 "Prehistoric Overkill," in *Pleistocene Extinctions: The Search for a Cause.* P.S. Martin and H.E. Wright, Jr. (eds.), *Proceedings of the Seventh Congress of the International Association for Quaternary Research*, Vol. 6 New Haven: Yale University Press.

McCay, Bonnie J.

1987 *The Culture of the Commoners: Historical Observations on Old and New World Fisheries.* in *The Question of the Commons: the Culture and Ecology of Communal Resources.* McCay and Acheson (eds.), Tucson: University of Arizona Press.

McDowell, N.R., (ed.)

1987 *Michigan's Conservation Story: the Early Days.* Michigan Natural Resources Magazine May-June. Volume 56, No. 3.

McEvoy, Arthur F.

1986 *The Fisherman's Problem.* New York: Cambridge.

McMurtry, John

1978 *The Structure of Marx's World-View.* Princeton: Princeton University Press.

Milton, Kay

1996 *Environmentalism and Cultural Theory.* New York: Routledge.

Nash, Roderick

1987 "Aldo Leopold and the Limits of American Liberalism." in *Aldo Leopold: The Man and his Legacy*, Thomas Tanner (ed.), Ankeny, Iowa: Soil Conservation Society of America.

Nelson, Richard

1998 *Heart and Blood: Living with Deer in America.* New York: Alfred A. Knopf.

Netting, Robert M.

1986 Cultural Ecology. Prospect Heights: Waveland Press.

Neumann, Thomas W.

1985 Human-Wildlife Competition and the Passenger Pigeon: Population Growth from System Destabilization. Human Ecology, Vol. 13 NO. 4.

Newhouse, S. et al.

1894 The Trapper's guide, 9th ed., rev. New York: Forest and Stream publishing Co.

Norgaard, Richard B.

1994 Development Betrayed: The End of Progress and a Co- Evolutionary Revisioning of the Future. New York: Routledge.

1988 Sustainable Development: A Co-Evolutionary View. Futures. Volume 20, Number 6, December.

1985 Environmental Economics: An Evolutionary Critique and a Plea for Pluralism. Journal of Environmental Economics and Management. Volume 12, Number 4, December.

1984a Coevolutionary Agricultural Development. Economic Development and Cultural Change. Volume 32, Number 3, April.

1984b Coevolutionary Development Potential. Land Economics. Volume 60, Number 2, May.

1981 Sociosystem and Ecosystem Coevolution in the Amazon. Journal of Environmental Economics and Management. Vol. 8, No. 3, September.

Ortner, Sherry

1974 Is Female to Male as Nature to Culture? in Woman culture and Society. M. Z. Rosaldo and L. Lamphere (eds.), Stanford: Stanford University Press.

Parsons, Talcott

1977 The Evolution of Societies. J. Toby (ed.), Englewood Cliffs: Prentice-Hall.

Ramachandra, Guha

1996 Two Phases of American Environmentalism: A Critical History. in Decolonizing Knowledge. A. Marglin and S. Marglin (eds.), Oxford: Clarendon Press 110-141.

- Rappaport, Roy A.
 1984 *Pigs for the Ancestors: Ritual in the Ecology of a New Guinea People*. New Haven: Yale University Press.
- 1971 "The Sacred in Human Evolution." *Annual Review of Ecology and Systematics*, 2: 23-44.
- Renn, Ortin, Thomas Weber and Peter Wiedemann
 1995 *Fairness and Competence in Citizen Participation: Evaluating Models for Environmental Discourse*. Boston: Kluwer Academic Publishers.
- Sahlins, Marshall and Elman R. Service
 1976 *Culture and Practical Reason*. Chicago: University of Chicago Press.
- 1960 "Evolution: Specific and General. in *Evolution and Culture*. Sahlins and Services (eds.), Ann Arbor: University of Michigan Press.
- Sanderson, Stephen K.
 1995a *Social Transformations: A General Theory of Historical Development*. Williston: Blackwell.
- 1995b *Macrosociology: An Introduction to Human Societies*. Third Edition. New York: Harper Collins College Publishers.
- Siegel, Paul M.
 1984 *Human Ecology and Ecology*. in *Sociological Human Ecology*. M. Micklin and H. Choldin (eds.), Boulder: Westview Press.
- Silver, Timothy.
 1990 *A New Face on the Countryside - Indians, Colonists, and Slaves in South Atlantic Forest, 1500 - 1800* New York: Cambridge University Press.
- Sommers, Lawrence M.
 1984 *Michigan*. Boulder: Westview Press.
- Tanner, Adrian
 1976 "Brining Home Animals: Religious Ideology and Mode of Production of the Mistassini Cree Hunters" Ph.D. Dissertation, University of Toronto.
- Timasheff, Nicholas S.
 1957 *Sociological Theory Its Nature and Growth*. New York: Random House.
- Turner, J.H. and L. Beeghley
 1981 *The Emergence of Sociological Theory*. Homewood: Dorsey Press.

Vanderpool, Chris (Lead Author)

1994 Integrated Natural Resources Systems. (Michigan).

Wallerstein, Immanuel

1974 The Modern World System: Capitalist agriculture and the Origins of the European World-Economy in the Sixteenth Century. New York: Academic Press.

Waren, Louis

1997 The Hunter's Game: Poachers and Conservationists in Twentieth-Century America. New Haven: Yale University Press.

Washburn, S.L. and C.S. Lancaster

1968 The Evolution of Hunting. in Man the Hunter. R.D. Lee and I. Devore (eds.), Chicago: Alsine Pub. Co.

Wax, Murray

---- "Religion and Magic," pp. 225-242 in Introduction to Cultural Anthropology, ed. Clifton.

Whitney, Gordon G.

1987 An Ecological History of the Great Lakes Forest of Michigan. Journal of Ecology 75:667-684.

Witthoft, John

1965 "Indian Prehistory of Pennsylvania" (Harrisburg Pennsylvania Historical and Museum Commission).

Wood, Forrest Jr.

1997 The Delights and Dilemmas of Hunting: The hunting versus Anti-Hunting Debate. Lanham: University Press of America, Inc.

Zeitlin, Irving M.

1981 Ideology and the Development of Sociological Theory. Englewood Cliffs: Prentice-Hall.

General References

Allen, Frederick Lewis

1940 *Since Yesterday*. New York: Harper & Brothers.

Andreski, Stanislaw

1965 *The Uses of Comparative Sociology*. Berkeley: University of California Press.

Babbie, Earl R.

1979 *The Practice of Social Research*. Belmont: Wadsworth.

Bean, Michael J.

1983 *The Evolution of National Wildlife Law*. New York: Praeger.

Bell, Michael M.

1998 *An Invitation to Environmental Sociology*. Thousand Oaks: Pine Forge.

Bennett, John W.

1975 "Ecosystem Analogies in Cultural Ecology." in *Population, Ecology and Social Evolution*. Steven Polgar (ed.), The Hague: Mouton.

Berkes, Fikret

1987 *Common-Property Resource Management and Cree Indian Fisheries in Subarctic Canada*. in *The Question of the Commons: the Culture and Ecology of Communal Resources*. McCay and Acheson (eds.), Tucson: University of Arizona Press.

Blum, Fred H.

1953 *Toward a Democratic Work Process*. New York: Harper.

Boudon, Raymond and Francois Bourricaud

1989 *History and Sociology*. in *A Critical Dictionary of Sociology*. Chicago: The University of Chicago Press.

Brightman, Robert A.

1987 *Conservation and Resource Depletion: the Case of the Boreal Algonquians*. in *The Question of the Commons: the Culture and Ecology of Communal Resources*. McCay and Acheson (eds.), Tucson: University of Arizona Press.

- Calloway, Colin G.
1987 *Crown and Calumet: British-Indian Relations, 1783-1815*. Norman and London: University of Oklahoma Press.
- Canan, Penelope
1996 "Bringing Nature Back In: The Challenge of Environmental Sociology." *Sociological Inquiry*, Vol. 66 No. 1:27-37.
- Carneiro, R.L.
1970 A Theory of the Origin of the State. *Science* 169:733-38.
- Carson, Rachel
1962 *Silent Spring*. Boston: Houghton Mifflin.
- Ciriacy-Wantrup, S.V. and Richard C. Bishop
1975 "Common Property as a Concept in Natural Resource Policy." *Natural Resources Journal*. Vol. 15.
- Cohen, R., and J.W. VanStone
1964 *Dependency and Self-Sufficiency in Chipewyan Stories*. Contributions to Anthropology. Ottawa: Department of the Secretary of State.
- Dietz, Thomas and Tom R. Burns
1992 *Human Agency and the Evolutionary Dynamics of Culture*. *Acta Sociologica* 35:187-200.
- Dietz, Thomas. Tom R. Burns and Frederick H. Buttel
1989 *Evolutionary Theory in Sociology: An Examination of current thinking*. Northern Virginia Survey Research Laboratory of George Mason University and the Swedish Collegium for advanced study in the social sciences.
- Dryzek, John S.
1990 *Discursive Democracy: Politics, Policy, and Political Science*. New York: Cambridge University Press.
- 1987 *Rational Ecology: Environment and Political Economy*. New York: B. Blackwell.
- *Ecology and Discursive Democracy: Beyond Liberal Capitalism and the Administrative State*. *Capitalism Nature Socialism: A Journal of Socialist Ecology*.

- Dunning, R.W.
1959 *Social and Economic Change Among the Northern Ojibwa*. London: Oxford University Press.
- Eitzen, Stanley and Maxine Baca Zinn
1997 *Social Problems*. Boston: Allyn and Bacon.
- Elias, Norbert
1982 *The Civilization Process: State Formation and Civilization*. Vol 2. Oxford: Basil Brown.
- Evans, P.B., D. Rueschemeyer and Th. Skocpol (eds.),
1985 *Bringing the State Back In*. New York: Cambridge.
- Goldthorpe, John H.
1991 *The Uses of History in Sociology; Reflections on some Recent Tendencies*. *British Journal of Sociology*. Vol 42 No 2:211-230.
- Hames, Raymond
1987 *Game Conservation or Efficient Hunting*. in *The Question of the Commons: the Culture and Ecology of Communal Resources*. McCay and Acheson (eds.), Tucson: University of Arizona Press.
- Kiser, Edgar and Michael Hechter
1991 *The Role of General Theory in Comparative-Historical Sociology*. *American Journal of Sociology* Vol 97 No 1:1-30.
- Landes, Ruth
1968 *Ojibwa Religion and the Midewiwin*. Milwaukee: The University of Wisconsin Press.
- Manning, Peter K.
1991 *Sacred Ecology*. A Paper at Michigan State University.
- McCay, Bonnie J. and James M. Acheson
1987 *Human Ecology of the Commons*. in *The Question of the Commons: the Culture and Ecology of Communal Resources*. McCay and Acheson (eds.), Tucson: University of Arizona Press.
- McGuire, Edna and Thomas B. Portwood
1961 *Our Free Nation*. New York: Macmillan.

Olsen, Marvin E.

1993 Components of Socioecological Organization: Tools, Resources, Energy, and Power. in *Advances in Human Ecology Vol 2*. Lee Freese (ed.), London: JAI Press.

1993 A Socioecological Perspective on Social Evolution. in *Advances in Human Ecology Vol 2*. Lee Freese (ed.), London: JAI Press.

Pacelle, Wayne

1998 Forging a New Wildlife Paradigm: Integrating Animal Protection Values. *Human Dimensions of Wildlife*. Summer. Vol. 3 Number 2 pp. 42-50.

Polgar, Steven

1975 Population, Evolution, and Theoretical Paradigms. in *Population, Ecology, and Social Evolution*. Chicago: Mouton Publishers.

Radin, Paul

1914 Some Myths and Tales of the Ojibwa of Southeastern Ontario. Ottawa: Government Printing Bureau.

Ritzenthaler, Robert E.

1953 "Chippewa Preoccupation with Health: Change in a Traditional Attitude Resulting from Modern Health Problems," *Bulletin of the Public Museum of the City of Milwaukee* 19 (December): 243-244.

Ritzer, George

1993 *The McDonaldization of Society*. Thousand Oaks: Pine Forge Press.

Ryel, L.A., C.L. Bennett Jr., M.L. Moss and D.G. Parks

1980 Michigan Department of Natural Resources. *A History of Deer Hunting in Michigan*. Wildlife Division Report No. 2868 September.

Schnaiberg, A. and K. Gould

1994 *Environment and Society: the Enduring conflict*. New York: St. Martin's Press.

Skocpol, Theda and Edwin Amenta

1986 State and Social Policies. *Annual Review of Sociology*. Vol 12:131-57.

1984 *Vision and Method in Historical Sociology*. Th. Skocpol (ed.), Cambridge: Cambridge University Press.

- Steward, Julian Haynes, and Robert F. Murphy
 1977 Tappers and Trappers: Parallel Processes in Acculturation. in Essays on Social Transformation. J.H. Steward (ed.), Urbana: University of Illinois Press.
- Stinchcombe, Arthur L.
 1978 Theoretical Methods in Social History. New York: Academic Press.
- Struever, Stuart
 1965 Middle Woodland Culture History in the Great Lakes Riverine Area. American Antiquity Vol 31:211-223.
- Sutton, David B. and N. Paul Harmon
 1973 Ecology: Selected Concepts. New York: John Wiley & Sons.
- Thomas, George M. and John Meyer
 1984 The Expansion of the State. Annual Review of Sociology. Vol 10:461-82.
- Tober, James A.
 1981 Who Owns the Wildlife? The Political Economy of Conservation in Nineteenth Century America. Westport Ct: Greenwood Publishing.
- Webb, Eugene, et al.
 1966 Unobtrusive Measures: Nonreactive Research in the Social Sciences. Chicago: Rand McNally.
- Weber, Max
 1978 Economy and Society. Guenther Roth & Claus Wittich (eds.), Berkeley: University of California Press.
- Wilensky, Harold L.
 1964 Mass Society and Mass Culture: Interdependence or Independence?" American Sociological Review 29:173-197.
- Wilson, Bryan R.
 1985 Morality in the Evolution of the Modern Social System. The British Journal of Sociology. Vol 36 No 3:315-332.

APPENDIX A. LIST OF HUNTING AND RELATED JOURNALS FROM MICHIGAN STATE UNIVERSITY LIBRARY

Hunting Journals:	Dates	Socioeconomic Class	Circulation
<i>Field & Stream</i>	1895-1996	Lower Middle Class	2,007,234 in 1995
<i>Forest & Stream</i>	1907-1930	Upper Middle Class	103,631 in 1930
<i>Fur-Fish & Game</i>	1925-1996	Middle class	110,530 in 1995
<i>Outdoor Life</i>	1898-1996	Middle Class	1,500.000 in 1995

Wildlife Journals:	Dates	Socioeconomic Class	Circulation
<i>American Wildlife</i>	1936-1941	Middle Class	Not Available
<i>Modern Game Breeding</i>	1921-1963	Middle Class	Not Available
<i>Michigan Natural Resources</i>	1931-1996	Middle Class	120,000 in 1995
<i>Wildlife Society Bulletin</i>	1973-1996	Middle Class	6000 in 1995
<i>Audubon</i>	1899-1996	Upper Middle Class	475,000 in 1995

Environmental and Conservation Journals:			
	Dates	Socioeconomic Class	Circulation
<i>Outdoor America</i>	1922-1996	Upper Middle Class	58,000 in 1995
<i>Conservationist</i>	1946-1996	Middle Class	180,000 in 1995
<i>Defenders of Wildlife</i>	1930-1996	Upper Middle Class	75,000 in 1995
<i>Michigan Out-of-Doors</i>	1947-1996	Lower Middle Class	132,000 in 1995

Firearm Journals:	Dates	Socioeconomic Class	Circulation
<i>Rod & Gun</i>	1936-1973	Lower Middle Class	44,028 in 1972
<i>American Rifleman</i>	1885-1996	Lower Middle Class	1,821,784 in 1995
<i>Gun Annual</i>	1943-1996	Lower Middle Class	Not Available

Archery Journals:	Dates	Socioeconomic Class	Circulation
<i>Bowhunting World</i>	1956-1995	Middle Class	130,000 in 1995
<i>Archery</i>	1952-1972	Middle Class	7,200 in 1962

**APPENDIX B. LIST OF HUNTING AND RELATED JOURNALS FROM THE
STANDARD PERIODICAL DIRECTORY**

Journal	Circulation
<i>American Bowhunter</i>	48,000
<i>American Hunter</i>	1,576,275
<i>Aqua-Field Bowhunting guide</i>	145,000
<i>Bow & Arrow Hunting</i>	129,000
<i>Bowhunter</i>	184,000
<i>Buckmaster's Whitetail Magazine</i>	151,000
<i>Deer & Deer Hunting</i>	220,000
<i>Deer Hunting in North America</i>	124,500
<i>Hunting Annual</i>	170,000
<i>Hunting Magazine</i>	300,000
<i>North American Hunter</i>	566,000
<i>North American Whitetail</i>	170,807
<i>Petersen's Hunting</i>	325,000
<i>Sports Afield Deer</i>	250,000

APPENDIX C. INDIGENOUS AMERICANS PRIOR TO THE 11TH CENTURY

Native Americans did not suddenly appear in the year 1000 of course. They had been here for several thousand years existing as hunter gathers and horticulturists. Therefore, it should be worthwhile to set the stage, so to speak, by speculating briefly on what species probably existed, interacted and co-evolved here before evolving into the first epoch of my proposed scheme. I will identify them as: (1) paleo ancestors (of Native Americans), (2) the big game hunting ethos, (3) big game animals (the only variable attribute of this species is population size as will also be the case with deer in later epochs), and (4) paleolithic hunting technology.

Paleo ancestors certainly had evolved some hunting ethos. What such ethos might have been however, is a matter of archeological speculation because:

as Marshall Sahlins pointed out, nowhere today
do we find hunters living in a world of hunters
.....Since all hunting societies have suffered
to some extent from contact, we may never be able
to prove conclusively that one form or another
was typical of the past in any specific case
(Lee and Devore 1968: 4,8).

There are two competing schools of thought on what the possible nature of such hunting ethos might have been. First, that cognitive, socially organized, and technology producing humans were super predators. Evidence for this consist of the correlation in the archeological record of the extinction, all over the globe, of large land mammals in an area and the dispersion of humans into that area. Further, many sites exist, such as Olsen-Chubbock in Colorado, at which large herds of herbivores, in this case bison, were driven over precipices to their deaths. The idea here is that humans were able to drive, with fire

or otherwise, or run down, surround, or ambush and stab to death with stone tipped spears, javelins, and arrows (this last is conjectural in that the time of the first use of archery by Paleo Americans is unclear) the largest land mammals and, in fact, preferred to do so. Archeologists call this the “big game tradition” and, according to this school of thought, humans were so adept at it that they extincted many species such as the North American mammoths and mastodons (Martin 1967: 75-120).

The co-evolutionary interactions, according to this school of thought would be as follows: First, Three exotic species in the form of humans, a big game hunting ethos (of which the interpretation of the archeological records implies that no voluntary restraining component with either a manifest or a latent conservation function was operative), and a paleolithic hunting technology including fire drives and stone pointed weapons were introduced into an ecosystem wherein big game animals supposedly occupied a niche in an ecosystem characterized by a stable state of dynamic equilibrium. As the big game animals on which the ethos depended were extincted, the big game tradition, as a hunting ethos, also extincted, which was long gone from the Great Lakes region by the year 1000. The paleo ancestors evolved into, and were succeeded by, Native Americans. The paleo hunting technology evolved into, and was succeeded by, hunting technology suited to smaller game such as deer (now almost certainly involving archery).

The interaction between the “big game tradition as ethos” and the big game animals was unstable predation in that the ethos as the parasite lived off the host game animals until it killed (extincted) them. In turn, this ethos was then reimpacted by the extinction of the big game animals with its own extinction.

The interaction between the paleo hunting technology and the paleo ancestors was mutualism in that the paleo ancestors invented and refined the technology thereby contributing to its maintenance and growth while the paleo hunting technology fed the paleo ancestors contributing to their maintenance and growth, at least for awhile.

The interaction between the big game hunting ethos and paleo hunting technology was mutualism. The interaction was necessary for the maintenance of both species in that the ethos legitimated developing and utilizing the technology while the technology enabled big game to be hunted successfully, thereby making the ethos possible.

The interaction between the paleo ancestors and the big game hunting ethos was also mutualistic. Each species benefitted from the interaction, and each species was dependent upon it. The ethos facilitated the production of subsistence for the paleo ancestors and the paleo ancestors maintained the big game hunting ethos as part of their nonmaterial culture.

The interaction between the paleo hunting technology and big game animals was unstable predation. The paleo hunting technology fed off (was made necessary by the availability of) the big game animals and diminished them to extinction. The interaction between the paleo ancestors and the big game animals was also unstable predation for the same reasons.

This analysis, although speculative, is entirely consistent with co-evolutionary theory. Once the process of punctuated equilibrium was begun, in this case through the introduction of exotic species, every species impacted every other species, and was in turn reimpacted, until the ecosystem again returned to a state of stable dynamic equilibrium

incorporating the exotic species. This was a classic case of ecosystemic change (invasion and succession) wherein species render their own environment unlivable to themselves through their own daily life processes and thereby prepare a niche for their successors.

The second school of thought holds that the paleo ancestors of Native Americans existed in a state of balanced predator-prey interaction with the species they preyed upon. Proponents of this school point out that the evidence for regular fire drives by humans is entirely conjectural. The presence of ancient charcoal does prove that there was fire, but there is no way to conclusively prove that any fire was cultural and not natural (lightening). Further, although the mammoths and mastodons did extinct, bison, which was the major game at 25 out of 34 known drive sites in North America, did not extinct. Also, in Europe, paleo drive sites are more common than in North America and there were far fewer mammalian extinctions there. It has been demonstrated in such places as the Masai Amboseli Reserve in Kenya that large herbivores such as elephants overgraze and destroy vegetation faster than it can be regenerated leading to their own starvation even when all natural predators besides humans are protected. This suggests that human predation successfully maintained a balance of nature for several thousand years (Botkin 1990, Washburn and Lancaster 1968: 295). Finally, known extinctions are blamed primarily on climatic changes which destroyed the habitats and ecological niches following the retreat of the glaciers rather than by over-predaceous humans.

I suggest the possibility, although I do not necessarily imply with any degree of certainty, the existence of hunting ethoses which contained some form of voluntary

restraint. This would have had a latent conservation effect which would have been adaptive and, therefore, provided for long periods of dynamic equilibrium.

What environmental and economic conditions would select for a hunting ethos of voluntary restraint? Recent anthropological thinking has revised its earlier categorization of hunters-gatherers as living a precarious Hobbesian existence constantly perched on the edge of starvation. Ethnographic reconstructions of hunter-gathering levels of affluence are now much more generous. Serious ethnography did not begin until the nineteenth century when all of the most hospitable environments on the globe were occupied by agricultural or industrial societies. Thus, only hunter-gatherers in harsh marginal environments were left to study. It is now theorized that hunter-gatherers living in benign environments rich in resources enjoyed a dependable and adequate supply of necessities. “....we suspect that the ancient hunter living in much better environments would have enjoyed an even more substantial food supply” (Lee and Devore 1968: 6).

With nature seen as a vast storehouse of food, there is then no necessity to take all that it is possible to take. With crude and ineffective methods of preservation, it is easier to allow nature to store food alive and only take game when hunger demands it. This is important in considering the plausibility of an ethos of voluntary restraint. If hunter-gatherers were always on the brink of starvation, constant hunger would have impelled them to always exploit any opportunity to take game and an ethos of voluntary restraint would have been maladaptive.

This school of thought is also compatible with co-evolutionary theory. I argue that here the four pre-epoch I species would be the paleo ancestors, game animals, paleo

hunting technology, and a hunting ethos which contained a significant degree of voluntary restraint. This sociocultural ecosystem represented a state of dynamic equilibrium substantially similar to that postulated for epoch I.

The ecological interactions would have been as follows: The interaction between the paleo ancestors and the paleo hunting technology was mutualism. The paleo ancestors needed the paleo hunting technology to obtain subsistence, the paleo hunting technology depended upon being valued by the paleo ancestors for its maintenance. The interaction between the hunting ethos containing a significant degree of voluntary restraint and the game animals was stable predation. The interaction between the paleo hunting technology and the hunting ethos was mutualism. The interaction between the paleo hunting technology and the game animals was stable predation. The interaction between the paleo ancestors and the game animals was also stable predation. The interaction between the paleo ancestors and the hunting ethos was mutualism.

The significant difference between these two schools of thought is the parasitic nature of the interactions between some of the species in the first school of thought which would have been unsustainable and therefore would have led eventually to their succession by other species. In the second school of thought the interaction between these species is dynamic equilibrium characterized by mutualism and stable predation and the year 1000 represents an arbitrary point in time with which to begin epoch I. In other words, the sociocultural ecosystem of 1000 in the Great Lakes region had been one of dynamic equilibrium for some time prior to this date.

Nevertheless, ancient hunting ethoses in the Great Lakes region must remain speculative. Perhaps Martin (1979: 183) sums it up best:

We are at this stage therefore incapable of determining whether the Paleoindian progenitor of the modern Indian functioned as a conservationist of game resources, and we shall never know what went on in his head.

MICHIGAN STATE LIBRARIES



3 1293 02199 0308