THE EFFECT OF ECOSYSTEM CONSCIOUSNESS ON OVERPOPULATION AWARENESS – A CASE STUDY

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Approval of the Dissertation

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Doctor of Philosophy in Psychology

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Abstract

THE EFFECT OF ECOSYSTEM CONSCIOUSNESS ON OVERPOPULATION AWARENESS – A CASE STUDY

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The purpose of this research was to investigate how knowledge of **biological ecosystems** affects individual recognition of humanity as part of and subject to the laws of nature. This dissertation interrogated the question of how awareness of the impact of **human overpopulation** on the environment was perceived by research participants. That expanding human population growth, and its inherent consumption patterns, is a root cause of virtually every human-related **environmental threat** is documented in the existing literature but awareness and accountability for this remain limited. Using **ecopsychology** and **analytical psychology** as a theoretical framework, this multiple case study investigated how and whether environmental awareness might be impacted by personal knowledge of how ecosystems function in nature.

A multiple case study design was used to interview 10 adults on their perspectives of the environmental impact of human population growth. The participants were purposefully selected creating two five-person groups. Group S had life-science academic training and work experience; Group NS had none. A researcher-generated instrument of 30 open-ended questions, with recorded interviews were used to ascertain participant understanding of ecological laws and

population biology concepts and how they might relate to personal worldviews on the cause(s) of environmental issues.

Thematic analysis was used to code data and identify response patterns. Findings suggested participants with working knowledge of ecosystems demonstrated more extensive understanding of the impact of human actions, including population growth, on the environment. Although widespread awareness existed in both groups that human alienation from nature is prevalent and is having environmental consequences, Group S subjects more often recognized the systemic environmental effects of human activity. They were inclined to advocate for individual responsibility and consciousness-raising.

Support for core concepts of ecopsychology is suggested by the findings. Strengthening the human-nature bond to one of inclusiveness using experiential education is a viable option to promote greater ecological awareness and personal accountability. Additional data-driven research is needed to investigate the effects of life science literacy and holistic systems thinking on pro-environmental awareness.

Acknowledgments

This dissertation journey was one requiring much effort and steadfastness, and it represented a significant part in the fulfillment of a long-term personal dream – to bring my education to a postdoctoral level on a subject that is very important to me. There are those who helped and supported me along the way, and I want to express my appreciation to them here.

I would like to recognize and thank my chair, Alan Vaughan, and the committee members, Bob McAndrews and Marc Pilisuk, for their guidance and support. They were available and kind and offered both creative ideas and encouragement. I was fortunate to have them as my committee. I also want to express my gratitude to the ten individuals who agreed to be interviewed for this study. They shared their thoughts and feelings with me, and I was continually amazed at their insights and wisdom.

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Finally, I wish to acknowledge my dear husband, Al, for his love and help over the last 40 years, especially during this journey. Sharing my passion for education, he was my unrelenting cheerleader – always willing to listen, offer encouragement, insights, and suggestions. He never let me get discouraged - using his great sense of humor and tough love to keep me going. He supported my dream, as he always does, to help me grow as a person.

Table of Contents

List of Tables viii

CHAPTER 1: INTRODUCTION 1

Purpose 2

Background 3

Rationale 6

Research Question 6

Researcher 6

CHAPTER 2: REVIEW OF THE LITERATURE 8

Overpopulation as an Environmental Issue 8

Awareness of Overpopulation 27

Barriers to Awareness 32

Knowledge Barriers 33

Social Barriers 38

Individual and Psychological Barriers 43

Theoretical Models 52

Interventions: Past and Future 52

Ecopsychology 53

Ecopsychological Perspectives on Ecological Threat 60

Historical Perspective of Jung's Interest in Overpopulation as an Environmental Problem Found His Collective Works and Other Sources 65

Post-Jungian Interest and Scholarship on Overpopulation and Ecological Problems 71

Core Concepts in Analytical Theory and Jung's Writing Important to Ecological Study 74

Summary 86

CHAPTER 3: METHODOLOGY 89

Research Method and Rationale 89

Participant Selection and Demographics 91

Data Collection Methods 94

Data Analysis 94

Research Ethics 96

Limitations and Research Issues 97

Summary 97

CHAPTER 4: FINDINGS 98

Summary of Themes 98

Summary of Individual Findings 99

Case Study Profiles 101

Discussion of Individual Findings 115

Identified Patterns or Themes 127

Summary 129

CHAPTER 5: DISCUSSION 130

Findings in Context to Existing Literature 130

Conclusions and Recommendations 134

Limitations and Delimitations 135

Researcher Reflections and Summary 136

REFERENCES 138

APPENDICES 147

Appendix A. World Populations and Regions 147

Appendix B. Top 20 Largest Countries by Population as of October 31, 2016 148

Appendix C. World Population Growth J-curve 149

Appendix D. Study Participant Demographics 150

Appendix E. Saybrook University Informed Consent Form 151

Appendix F. Interview Questions 153

Appendix G. Interview List of Environmental Issues 155

LIST OF TABLES

Table 1: Participant Sample Demographic Information 93

LIST OF FIGURES

Figure 1A: World Populations and Regions 147

Figure 2A: Top 20 Largest Countries by Population as of October 31, 2016 148

Figure 3A: World Population Growth J-curve..... 149

Figure 4A: Study Participant Demographics 150

CHAPTER 1: INTRODUCTION

This research study is a result of my lifelong interest in the exquisite natural environment that has served as a home and resource for us as a species throughout our history. Intuitively, I have always sensed that the complexity and the endurance of life were possible when supported by a balanced ecological system. It is through an infinite number of diverse small parts, each performing but not exceeding its individual role, that the whole is maintained and able to survive.

Although many species have fallen fate to the effects of damaging the system that sustains them, humans seem to be unique in their ability to consciously consider their thoughts and behaviors. From a distant perspective, the lack of a coherent effort on our part to live in harmony with the rest of nature seems unimaginably short-sighted and completely counterproductive to our survival. Despite many warnings along the way, ranging from cultural myths to scientific data, that we are consuming and populating far beyond sustainability levels, we have been largely unable to develop the awareness and make the changes needed to live as integrated parts of a world system with ecological limits.

This project is also an outgrowth of the training and knowledge I have been grateful to receive in the biological and behavioral sciences. It is through these lenses that I have developed a worldview that sees life as an ecological tapestry in which all parts must be respected. I believe using psychology in conjunction with ecology to realize ourselves as parts of, not separate from, the natural world, can only help awaken us to a higher consciousness of who we really are. Because I believe strongly in the principles of ecosystems as synonymous with the principles of life, my interest was in beginning an investigation into how an understanding of these principles might affect one's perceptions of the environmental challenges we face. Interviewing a small group of individuals trained and experienced in one of the biological

sciences, and a second group who was not, allowed me to consider the similarities and differences this type of education might make.

This chapter begins with a statement of purpose for this multiple case study supported by a description of relevant background information. The rationale for this research and the resulting research question are presented as well. Researcher information and identified limitations and delimitations are discussed. Subsequent chapters present an in-depth review of the literature including definitions of key terms, a detailed description of the methodology and design, findings of the study, and a concluding discussion.

Purpose

The purpose of this qualitative research is to explore how a worldview shaped by training and experience in the biological life systems impacts awareness of overpopulation as an urgent environmental concern. Despite the amplifying effect that rapid and doubling human population growth has on virtually every human-related environmental threat, discussions on the subject have been strikingly absent, both in public arenas and in academic literature.

Failure to address this even while solutions are within our grasp has been attributed to a massive number of psychological and social barriers to awareness, not a lack of scientific knowledge. Mainstream psychology with its almost exclusive focus on personality, and not on person-in-environment, has been ineffective in offering a theoretical framework for study. As a new subfield, *ecopsychology* takes a holistic perspective that understanding at a systemic level is necessary to transform one's perspective of the self and one's place in the world (Merritt, 2012b). Ecopsychology shares core concepts with both analytic theory and ecosystem theory. All of these view the world as a living system that relies on diversity and balance to maintain

resilience. If the parts of the system are not mutually beneficial in interdependent relationships, the system will not be sustained.

This research investigates a sample of persons who have a background in understanding how natural ecosystems work as well as a sample who do not have this background to determine if these differing perspectives affect ability to comprehend the environment threats directly related to a species whose consumption and proliferation patterns are seriously taxing the planet. This could contribute to general knowledge about the effects of a living system perspective. Secondly, ecopsychology is seeking to develop and refine its purpose, to move beyond its countercultural, Romantic, and experiential beginnings into an academically focused psychology with empirically-based research (Snell, Simmonds, & Webster, 2011). With its emphasis on the more subjective aspects of human relationships with the natural environment, ecopsychology is well suited to qualitative research and the scholarship of teaching This study aims to contribute to these goals.

Background

Anthropologists believe that the ancestors of *Homo sapiens* may have walked the Earth as early as several million years ago while modern Homo sapiens may have appeared about 50,000 B.C. (Haub, 2011). According to the Population Reference Bureau (2015), world population was around 5 million in 8000 B.C., the dawn of agriculture. In the 8,000-year period until 1 A.D., world population grew slowly to 300 million people, reaching only 500 million by 1650 A.D. By 1800, however, after the start of the Industrial Revolution, living standards changed and population numbers began to skyrocket, climbing from 760 million in 1750 to one billion around 1800 (Haub, 2011).

Since that time, world population has grown explosively, especially in less developed countries, doubling again and again. Due to the nature of exponential growth accelerated by more changes leading to longer life spans and lower death rates, the world population has exploded, with each addition of another billion people occurring in progressively shorter times. A billion people were added between 1960 and 1975; a second billion between 1975 and 1987. The current population of 7.4 billion has increased by a billion people just since 2004 and is projected to reach 9.7 billion by 2050 A.D. (Population Reference Bureau, 2015).

In a landmark warning, more than 20 years ago, the Union of Concerned Scientists, an international group of 1700 of the world's leading scientists, many Nobel laureates in their fields, issued a public statement entitled "The World Scientists' Warning to Humanity" (Union of Concerned Scientists, 1992). The report expressed their explicit concern that human beings were on a collision course with the natural world and if many current human practices were not fundamentally and urgently changed, the living world would be irreparably altered and unable to sustain life in the world as we know it.

In addition to listing the atmosphere, water resources, oceans, soil, forests, and living species as areas under critical stress, the warning statement identified the unrestrained world population growth as an underlying cause in all of the world's impending ecological disasters. In their recommendations to humanity, the scientists urged the immediate stabilization of population growth to prevent the catastrophic results of exceeding the earth's finite limits (Union of Concerned Scientists, 1992). Since that time, many other groups of scientists have issued reports to try to bring attention to the mounting evidence that the world's ecosystems are coming under greater and greater stress.

Despite predictions about the dire effects of unrestrained growth on the world ecosystem by Paul Ehrlich and others, the human population has continued to grow at an accelerated rate in virtually every part of the world (Ehrlich, 2011). Tragically, after a brief time in the public arena in the 1960s, the subject of overpopulation as an environmental concern all but disappeared from the press and academia. It is theorized that the subject of overpopulation, as an easily misunderstood and emotionally charged subject involving sex, reproduction, religion, culture, human inequities, and freedom, is so sensitive and overwhelming that it is subject to being ignored (Campbell, 2012).

There is a growing realization that the failure of any significant behavioral response to the population crisis as well as other environmental issues has its roots in human emotional and psychological factors, including political and economic ones (Metzner, 1999). In addition, many writers in the field recognize that the efforts of mainstream psychology with its individualistic and capitalistic perspectives have failed to suggest solutions for greater awareness and change.

What is especially ironic about overpopulation is that, unlike many of the issues that confront us, solutions to this problem are already within our abilities. Martin Luther King (1966) was a strong supporter of population control efforts and stated:

> Unlike plagues of the dark ages or contemporary diseases we do not yet understand, the modern plague of overpopulation is soluble by means we have already discovered and with resources we possess. What is lacking is not sufficient knowledge of the solution but universal consciousness of the gravity of the problem and education of the billions who are its victims and the will to change. (Quotes)

Framed in Jungian core concepts and analytical theory, ecopsychology is uniquely situated to offer help to humanity to move towards this universal consciousness. Ecopsychology, as a developing field, focuses on resolving the alienation of humans from the nonhuman world and even nature itself. Writers and psychologists in the field view re-education of humans to see

themselves as part of the world ecosystem, and therefore responsible to it and for it, as the only viable way to produce transcending awareness.

Rationale

My rationale for conducting this study stemmed from my personal concern with what I perceive to be an understudied and poorly understood source of environmental damage: human population growth and its effect on the Earth's ecosystems. Despite the efforts of the biological sciences and the environmental psychologies, public consciousness and knowledge about the impact of human-related activities on the environment remain low.

Ecopsychology, as an emerging field, takes its approach at a different level. Using a foundation of analytical theory core concepts, ecopsychology focuses efforts on a conscious-raising process where humans will see themselves as part of a larger world system, one to which they are obligated and responsible. I believe the holistic concepts common to this discipline and the ecological principles of ecosystems could be contributory to greater understanding of the environmental issues. My rationale for this research was to determine how knowledge and experience in the life sciences might affect awareness and understanding about human-related environmental threat, especially human population growth.

Research Question

Based on my interest and rationale, my research question was formulated as follows: *How is awareness of human population growth as an underlying environmental threat affected by understanding of the holistic principles of ecosystems?*

Researcher

As is generally acknowledged in qualitative research, the skills and perspective of the researcher affect the study in various ways (Braun & Clarke, 2006; Creswell, 2013; Robson,

2011). I would like to disclose my own background as it relates to the conduction of this study. I have an undergraduate degree in biology and have had over 30 years of experience in biologically-related fields. During these experiences, I acquired a thorough and working knowledge of biological life systems and ecosystem functioning. In addition, I am a long-time member of numerous ecology-related organizations and stay informed on current environmental issues. I also have a master's degree in social work and have practiced in this field for approximately 10 years with a diverse client base. In this work, I learned interviewing techniques and good listening skills. My present efforts in studying psychology reflect my interest in the human psyche and soul. Each of the elements of this background offer something that I was able to use in this work.

At the same time, I acknowledge that these same experiences could bias my judgment regarding the questioning of interviewees and interpretation of findings. To address bias that I might have, I tried to construct questions that were non-biased and asked the same questions to two different groups of interviewees. In interpreting the results, I performed an extensive analysis of responses that considered all responses, not just averages. Finally, I engaged in critical self-reflection by journaling and discussing my approach with a colleague.

CHAPTER 2: REVIEW OF THE LITERATURE

In order to develop a rationale for this study, it was necessary to review the published literature for what is known about the topic of human overpopulation as a global environmental and social problem. The review examined the psychological literature to identify reasons for the known gaps between knowledge of an ecological threat and failure to act in proenvironmental ways. Literature studying the barriers to awareness of overpopulation as a common denominator to many human-related ecological problems, and the reasons for scarcity of the subject as a topic of discussion and research were also included as part of this review.

A review of the literature describing the course of ecopsychology as an evolving field was also performed. Because of the incorporation of many analytical theory core concepts into ecopsychology, Jungian and post-Jungian literature is an integral part of the literature. Holistic principles common to both analytical thought and laws of ecosystems were identified.

Overpopulation as an Environmental Issue

Definitions

The term *overpopulation*, as it is generally used, refers to the situation occurring when the needs of the group members living in an area that they depend on to provide essential resources exceed that area's ability to provide these resources and to replenish itself. There must be a balance between the two entities for the system to remain in equilibrium and support the population on a sustained basis.

In order to define *human overpopulation*, scientific attempts to quantify the impact of human activities on the whole ecosystem have been made. Ecologists have developed the terms *ecological footprint* and *biocapacity* to describe the two sides of the balance sheet (Global Footprint Network, 2003). Biocapacity is the ability of earth areas to be biologically productive

as well as handle the waste generated. Areas that are barren, lack fresh water, stripped of resources or built-up are not described as having this capacity. The ecological footprint of an individual, a nation, or humanity is derived by comparing the demand that a species places on nature's resources to its ability to supply that demand. Measurements like this are inexact at best and subject to criticism by those demanding exactness. However, in systems as complex as human activities, trends are sometimes more important than precise measurements. The trends of increased consumption by more people and the progressive depletion of resources are undeniable. In one study examining data since 1961, Toth and Szigetti (2015) compared population growth rates, gross domestic products (GDP), and ecological footprints (EF) of different countries and the world and found that while world population tripled between 1950-2006, GDP, as an indicator of consumption, increased nine-fold. In addition to monitoring the individual and collective footprints, which are rightly focused on consumption, ecologists remind us that the footprint of any individual can never be zero as every individual is a consumer. Another term used in calculating human population and consumption impact is *earth overshoot.* According to scientists at the Global Footprint Network (GFN) (2003), in the mid-1970s, a critical threshold was crossed where human consumption began outstripping what the Earth could provide. The overshoot model uses a budget analogy to illustrate the growing deficit of our ecological spending and the data collected tells us that it would take 1.5 Earths to provide the current level of demand for its resources and services. This deficit is maintained by liquidating Earth's resources. GFN (2003), representing 62 countries, calculated a calendar date each year when humanity has used up the resources it takes the Earth a full year to regenerate. This date, called Earth Overshoot Day, has moved from early October in 2000 to August 13th in 2015.

Global Demography and Trends

Although concern about overpopulation is ancient, for most of history human population increases have always been kept in relative balance by corresponding death rates (Population Reference Bureau, 2015). Beginning approximately in the 18th century, however, advances in industrialization, agricultural technologies, and disease control have gradually lowered death rates worldwide, while birth rates remained nearly the same overall. At the same time the population was growing, resource consumption in industrialized nations began to skyrocket.

Population growth trends and demographic data are compiled by a number of organizations. Data extracted from the recently published 2015 report, *2015 Revision of World Population Prospects*, are presented in a table format in Appendix A (Zlotnik, 2015). In this report, the United Nations (U.N.) revised its future world population projections upward and higher than previously predicted. Now, according to its projections, the current world population of 7.3 billion is expected to reach 8.5 billion by 2030, 9.7 billion by 2050, and 11.2 billion by 2100. The table in Appendix A also shows the higher population densities occurring in the developing countries and especially the least developed countries. These trends are expected to continue while populations of developed countries expected to remain at a more consistent level. A breakdown of population and population predictions by continent shows the greatest growth rates continuing in Africa and Asia.

Population growth by countries is also tracked by world population organizations, often with a live feed. Appendix B lists the 20 top largest countries by population growth. (worldometers reference??) In 2015, China, India, and the United States were the world's most populous nations. Growth between 2015 and 2050 is expected to be most concentrated in nine countries: India, Nigeria, Pakistan, Democratic Republic of the Congo, Ethiopia, Tanzania, the

United States, Indonesia, and Uganda (Mirkin, 2014). China's population growth rate is predicted to slow, removing it from the list of fastest growing countries. The rapidly changing positions of the most populous countries reflect the widespread nature of population growth.

The current U.N. report (as cited in Mirkin, 2014) represents a significant shift from its previous reports on the issue of global population. Higher than expected growth prompted the U.N. to alter its degree of concern and focus on human population growth as a primary environmental concern. At the beginning of the new millennium, the U.N. released a list of millenniu*m development goals* (MDGs) in September 2001. These were eight critical areas that needed to be addressed by 2015; all of these targets were adopted by all 189 member states (Redding, 2007). The MDGs included areas such as eliminating poverty, reducing child mortality, and empowering women. Despite its integral relationship with the stated goals, reducing population growth was not even mentioned as part of the agenda. Critics and analysts of the MDGs speculated that feminist and human-rights factions centered on women's rights worked actively to prevent talk of stopping growth or reducing average family size (Foreman, 2012). Ironically, many feminists and social activists have served to undermine population stabilization efforts by negatively associating it with reproductive health and ethical violations (Weeden & Palomba, 2012).

The report also released data confirming the continuation of long-term global population demographic trends. Although fertility rates are in decline in some developed countries, this is most often off-set by a decrease in mortality, altering the balance between births and deaths that is necessary for a population to stabilize. In these countries, those aged 60 or above are often the fastest-growing demographic segment. In the least developed countries without basic services,

including family planning and women's rights, there has been a larger than expected increase in the number of unanticipated births.

Another continuing trend described in the U.N. report (as cited in Mirkin, 2014) is the world's increased urbanization. The more than half of the world population currently living in urban areas is expected to rise to two-thirds by mid-century, most of which will be concentrated in the poorer countries. In addition, the amount and patterns of immigration from less to more stable countries are expected to increase as people are displaced or relocate. For example, political upheavals in the Middle East, Africa, and South Asia are reshaping migration trends in Europe. Writing for the Council for Foreign Relations, Park (2015) stated that the International Organization for Migration has estimated that more than 464,000 migrants and refugees have crossed into Greece and Italy by sea in the first nine months of 2015, creating a crisis in the social systems of the receiving countries. Due to the population numbers of the migrating countries, this crisis is expected to continue without resolution.

In the report conclusion, the U.N. warned that these population dynamics will have *developmental consequences*. Most of the direct consequences described such as provision of housing, education, medical care, and food and water, involve inadequate or unequal resources for larger numbers of people. More indirect consequences of the increased population trends include effects to the labor force, human rights, immigration pressures, and failed government states.

Overpopulation Impact

In the 2000 U.S. Geological Survey, released by the U.S. Department of the Interior, geological scientists outlined 10 global challenges documented by research that had been directly linked to human population activity (Groat, 2000). These included: inadequate and contaminated

water, hazardous weather, uncontrolled urban growth, emerging diseases, invasive species, adverse climate change, exceeded natural material lifecycle, obsolete infrastructure, damaged oceans, and poor air quality. The growth of global population was cited in this report as the underlying cause impacting all these environmental threats.

Perception of the scope of population's impact is affected by the false debate over whether overpopulation or overconsumption is the real problem. Crist & Cafaro (2012) stated the reality clearly, "The ecological crisis is the consequence of the consumption patterns of a huge and growing human population" (p. 5). In a game of projection and blame, little attention has been given to the fact that both *the rich* and *the poor* have different kinds of environmental impact. One view contends that overconsumption in the global North is largely responsible for the biosphere's degradation, and certainly the destructive reach of high consumption patterns is global in scope. The exclusive focus on this ideology masks the detrimental effects of population growth itself, especially in the global South where population is growing most rapidly. The destructive reach of the poor tends to be more local in its effect. Deforestation, rampant extermination of animals, overgrazing, overfishing, unchecked pollution, and birth rates are a few of the environmental issues related to mass numbers of people consuming (Crist & Cafaro, 2012). While it is important to recognize and reduce consumption, it does not negate the impact of population as a multiplier of consumption (Campbell, 2012).

The explosion of humanity's numbers dramatically affects many other nonhuman species as well. Recent quantitative research studies at Brown University concluded current extinction rates are 1,000 times higher than natural background rates of extinction, and future rates are likely to be 10,000 times higher (De Vos, Joppa, Gittleman, Stephens, & Pimm, 2015). Environmental changes due to human actions are considered the major source of these patterns.

Endangered species biologist Wintrop Staples III is among those questioning the anthropomorphic perspective of seeing the Earth as a resource only for humanity without acknowledging other species' right to exist (Staples & Cafaro, 2012).

Scientific Evidence

Most of the evidence that overpopulation exists is documented in the scientific literature of the physical sciences. Research consistently supports the view that the world is overpopulated and that humankind as a species has dangerously overconsumed natural resources to the extent that other parts of the ecosystem are affected. In November 1992, a scientific statement from 1,700 of the world's leading scientists, including many Nobel laureates, issued a landmark public statement (World Scientists' Warning) to humanity that the current course, if unchecked, places the living world as we know it and the survival of human society and plant and animal kingdoms at risk (Union of Concerned Scientists, 1992).

Since then, other groups of scientists have continued to try to deliver the message to the world that the Earth's ecosystems are being stressed to the point that a *state shift* is imminent. State shifts are biological events that occur when ecological systems reach critical transitions caused by threshold effects (Barnosky et al., 2012). In 2012, Barnosky and other integrative biologists published another alert that these shifts are known to shift abruptly and irreversibly and have global-scale impact. The scientists urgently suggest concentrating all efforts on the true root causes of the mounting ecological crises: human population growth and consumption rate.

Most recently, the World Wide Fund for Nature (WWF) (2016) published their *Living Planet Report 2016* with the most comprehensive analysis to date on biodiversity loss. The data indicates that the world is on track to lose two-thirds of its wild animals by 2020. According to

the report, this is part of a mass extinction of the natural world caused by the destruction of wild habitats, hunting, and pollution related to population pressure. In the report, WWF Director General Marco Lambertini (2016) spoke to this relationship when he stated:

> The evidence has never been stronger and our understanding has never been clearer. Not only are we able to track the exponential increase in human pressure and the constant degradation of natural systems, but we also now better understand the interdependencies of earth's life support systems and their limits. Lose biodiversity and the natural world including the life support systems as we know them will collapse. We depend on nature for the air we breathe, water we drink, the food and materials we use and the economy we rely on, and not least, for our health, inspiration and happiness. (p. 6)

Physicist Kuo (2012) has published more than 70 articles in international research physics professional journals explaining why overpopulation is the source of other global problems. In her field, she has explained that there is evidence to show that food and water resources are already insufficient to meet the needs of the present global population of seven billion. To illustrate the unsustainable path of resource usage, Kuo explained that, according to the World Water Council, more than 11 million people have died from drought alone since 1900, 1.1 billion people lack access to safe drinking water, and more than one billion are going hungry across the world today. These conditions are most pervasive in the countries where the population is densest and resources are limited. Rapidly increasingly consumption by industrial nations is an inseparable twin to the increasing population dilemma. As an energy systems specialist, Kuo has explained that for a continuous growth system based on capitalism to function, the system must use more and more energy and resources, continually expanding its markets by persuading more and more customers that they need more and more products and services. When this model is occurring in a bounded system, like the Earth, the growth cannot grow indefinitely.

Evolutionary Trends

Evolutionary scientists have also studied the increase in human population growth. In their research, Toth and Szigeti (2015) calculated humanity's ecological footprint from 10,000 B.C. until 1960 using historical statistics to correlate growth rates using per capita GDP with ecological footprint (EF). By all indicators, growth patterns have dominated not only since the Industrial Revolution but also throughout humanity's development. Interestingly, however, they found that rates of growth and environmental degradation, although both trending upward, were not always linear with population numbers. Asymmetric jumps and leaps in the GDP/EF ratio during economic paradigms legitimizing growth, especially from the late 18th century, led the researchers to conclude that population growth is a less important driver of EF than consumption.

Offering another evolutionary perspective, Woolfson (1999) studied the past thousand years of human development and believes that human worldviews have created the ecological problems, and only changes in worldview can restore what has been lost. He concluded that humankind is at an evolutionary crossroads for human survival and changes in societal world views, value systems, and beliefs could likely lead to human long-term survival. Woolfson noted that the emerging worldview must recognize and incorporate that man's human nature is both good and evil, man is the guardian of nature, man is motivated by self-interest as well as altruism, man is a part of life, not separate from it, and earth's resources are limited and finite. Woolfson's research does not address suggestions for changing world views.

Other researchers have proposed ways that human population growth and technology, in addition to altering global ecology, is affecting future evolutionary trajectories. Evolutionary change accelerated by human-induced growth patterns is being observed in other species around

us, especially disease organisms and pests. With the ability to evolve and mutate quickly, bacteria, viruses, and other microorganisms adapt to the use of drugs and chemicals in such a way as to render the substances ineffective. The effects of this change can be seen economically as well in exposure to uncontrollable outbreaks of pests or disease. Palumbi (2001) theorized that larger numbers of humans, especially living in crowded conditions, are significantly affecting the natural selection process of evolution. David Attenborough (2013), a naturalist and wildlife commentator, has been harsh in his words for humanity's oversized effect on other species that have less ability to adapt, thereby affecting evolution: "We are a plague on the Earth and either we limit population growth or the natural world will do it for us, and the natural world is doing it for us right now" (p.1). Attenborough cited climate changes and drug-resistant diseases as examples.

Other writers see the extinction of the human species as consistent with the laws of nature. In her book, *The Sixth Extinction*, Kolbert (2014) described her work with eminent scientists who are tracking humanity's transformation of our globe. She described a clear pattern of mass extinctions throughout the earth's history where the diversity of life on earth suddenly and dramatically contracted. Each time, massive weather or geological events triggered extinctions that destroyed 60-70 percent or more of the living species. During the end-Permian event, about 250 million years ago, more than 90 percent of marine, insect, and ancestors of mammals perished through an inability to adapt to the changed conditions.

This time the catalyst for the mass extinction is the human race with its pollution, predation, and habitat destruction, and scientists are already monitoring its course by rapid extinction of other species (Kolbert, 2014). Though the present rate of biodiversity loss is far below these numbers, scientists estimate the present extinction rate in the tropics to be about

10,000 times greater than the naturally occurring rate. If die-offs continue at this rate, some scientists estimate the current extinction event could reach previous magnitudes in 240 to 540 years. In the case of the human species, Kolbert wrote, the path to extinction is fast-forwarded by our restlessness, intellect, and appetites, but it is an inevitable path.

Political Influence

Anthropologists and archaeologists who have studied the success and failures of past civilizations have contributed to the current study of overpopulation and overconsumption. The evidence of what has happened to previous societies when presented with environmental challenges can be instructive. In his book, *Collapse*, Diamond (2005) stated that when civilizations fall, they share a sharp and sudden curve of decline. He found in his research that a society's demise may begin only a decade or two after it reaches its peak population and power. He suggested the full-fledged collapses of the Anasazi and Cahokia in the United States, the Maya cities in Central America, Moche and Tiwanaku societies in South America, Mycenean Greece and Minoan Crete in Europe, Great Zimbabwe in Africa, Angkor Wat and the Harappan Indus Valley cities in Asia, and Easter Island in the Pacific Ocean were due at least in part to a fatal inability to deal with environmental crises. Diamond (2005) listed deforestation, soil and water problems, overhunting and overfishing, human population growth, and increased per-capita impact as some of the factors involved.

In many cases, Diamond (2005) believed the society's demise was accelerated when the leaders of these civilizations failed to practice long-term thinking and make courageous decisions even after problems had become perceptible. When driven by personal interests over courage, the leaders became more and more myopic and moved to crisis-management of small problems, while simultaneously overlooking the larger picture until it was past the point of no return.

Other scientists in this field questioning the reasons for these collapsed societies have identified resource overshoot by the population and demands by the elite that exceeded peasant tolerance or capacity to produce (Tainter, 2006).

Political historians have observed the impact of overpopulation and overconsumption on a society as well. Public policy researcher Goldstone (2006) noted that there are numerous examples in history where increased crowding and lack of resources were the cause of population-related conflict. The need for *lebensraum* or *living space* was a justification for Adolf Hitler's expansion campaign, which resonated with the growing and resource-deprived German population. Japan, an island nation with high population density and limited resources, adopted a strong history of imperialism, such as invading China and other parts of the Pacific, as a result of its need for additional resources (Redding, 2007).

In recent years, the term *fragile/failed states* has been used by the World Bank and other international organizations to describe those countries that lack the capacity or the will to deliver core state functions (Redding, 2007). These states are said to have similar problems and common among nearly all failed political states is high population growth. In 2007, the World Bank listed 34 countries as fragile states with an average total fertility rate (TFR) of 5.1 percent. Many such as Afghanistan, Angola, Burundi, Chad, D. R. Congo, and Sierra Leone have a TFR of more than 6.5 percent. Fragile states also tend to have younger populations, and political stability is at risk when population growth creates a spike in the number of young adults who lack jobs and cannot meet their basic needs. Globalization has increasingly created a world where stable countries are no longer isolated from unstable neighbors, and conflict can easily spread across borders, threatening global security.

Foreman (2015) confronted some of the political issues that perpetuate population problems in his book, *Man Swarm*. He believed, despite the far-ranging political ramifications of overpopulation, it is a subject that many politicians avoid discussing. Politicians from both sides of the political spectrum ignore overpopulation to pander to their bases, avoid cries of discrimination by failing to consider immigration patterns, and retreat from ideas that certain religious and cultural beliefs may be incongruous with our survival as a species.

Population itself can become a political issue. Governments may support higher birth rates as a means of accessing more land, political power, or votes. Religious and cultural institutions can also have an agenda in promoting more population growth in a world that is already bursting at the seams. In his book, *Countdown,* Weisman (2013) stated, "Like Yasser Arafat's womb-weapon and the overbreeding of Israel's *haredim*, the Church has a fundamental vested interest in bodies" (p.133).

Economic Influence

The population dynamics of a single country can vary independently of global population dynamics. A nation's population size must also be considered in relation to its environmental impact. Although the fertility rate in the United States is lower than many countries, the average rate of 2.06 births per woman plus a high level of migration to the United States make it the third most populous country in the world (Bish, 2012). What is perhaps more significant is the excessive ecological footprint of America. Bish (2012) described the endless growth economy that has been packaged and exported throughout the world by the United States. This brand of capitalism relies on greater and continuous consumption and produces unsustainable amounts of waste.

The capitalist economy is fueled by population growth. In order to maintain its existence, production is dependent on the demand of more consumers needing more things and services to be produced by more people involved in the production process. It is intrinsic to the contemporary brand of capitalism to promote rapid population growth, both by increasing births and encouraging immigration. Throughout the world, transnational corporate powers subscribing to this economic system support that which promotes increased marketability. Environmental and moral concerns for the earth and other people become collateral damage in this pursuit.

Population Organizations

An increasing number of governmental and private non-governmental organizations (NGOs) have come on-line to study and report on population issues. The U.S. Census Bureau is a leading source of U.S. and international population statistics and research (U.S. Department of the Census, 2015). Current and past population numbers are maintained along with breakdowns into many demographically distinct characteristics. The site also posts population projections up until 2050 based on historical trends. The United Nations (U.N.) global website has much less extensive population data, possibly reflecting the degree of attention the organization gives to the issue. It is telling that in September 2001, when the U.N. adopted its MDGs, outlining critical areas to be addressed in the upcoming millennium, population growth was not included (Redding, 2007).

The Population Institute (PI) is an example of a very active international non-profit organization studying population. Their focus is on gender equality and family planning promotion. The Institute conducts research on the known effects of overpopulation and writes literature targeted towards increasing awareness in policy makers and journalists. By monitoring

trends, the researchers there have observed the ability of some countries to lower their rapidly rising population growth. Tunisia, Egypt, Indonesia, and Mexico are some of the successful countries that by implementing family planning as a routine part of health care have stabilized their populations and seen increased stability and economic security as a result (Redding, 2007).

PI also corrects and revises earlier models as new data are received. For example, earlier predictive models anticipating a decrease in African fertility rates have been discredited by a large increase in the continent's population (Fischetti, 2014). PI and others like it also report on literacy rates, poverty levels, and maternal and infant mortality in countries with different rates of population growth.

Other researchers use statistics for predictive purposes. With the population level growing by 1.3 percent per year and industrial activity by 3 percent, Barter (2000) is a researcher agreeing with World Bank projections for the future. He considered that, despite lower fertility levels in a few countries, global human population will increase by another 50 percent in the next 40 years. Each nation is making its own contribution to the problem. Although birth rates in the United States fell for several years, population growth now soars by three million a year, due mainly to immigration and the higher birth rates of immigrants. All nations are increasing their economic activity while China and India are joining the United States as the major industrial polluters. If this path continues, Barter has predicted a catastrophic nuclear-age war will be inevitable. He believes there is ample historical precedent that the *politics of envy* will continue to grow among the have-nots, some of which have the means and the desire to destroy those who have what they envy.

Leading conservationist and global visionary at the Rewilding Institute, Dave Foreman (2015) cast a dim look at the effects to the world order that overpopulation of the human species

is having on Earth's wildlife. He has taken a cautiously optimistic view that humans will be resourceful enough to reverse this world order as more and more understanding develops. Despite the unknowability of the future, I believe that the direr predictions and the historical data based on trending are more likely than those requiring leaps of faith.

The United States

I want to devote a section of this chapter specifically on the United States to focus on its unique problems. Though far from true for everyone, many people in the United States have enough to eat and a place to live. Other than traffic and crowded stores, overpopulation seems more like a concern for other countries. I have spoken with many people in this country who respond to a question about overpopulation with a comment like, "A lot of third world countries have that issue but it's not something we have to worry about here." The United States is unique in its pattern of continued population growth. Demographically, the nation's population has grown from 76 million in 1900 to 325 million in 2014, making it the third most populous country in the world after China and India. In 2000, 40 percent of that growth consisted of post-1900 immigrants and their descendants. (Population Reference Bureau, 2015).

Lindsey Grant, former Deputy Assistant Secretary of State for Environment and Population Affairs and a foreign-service officer to China, has written extensively about how the population growth rate in the United States will drive its future. He explained that the United States, being sparsely populated until well into the twentieth century, had more space to absorb the damage of population and consumption (Grant, 1996). Looking at three vital areas, Grant (1996) explained why the American position of confidence may be short-lived. Whereas U.S. agriculture is still self-sufficient in meeting its own needs, its continued role as the residual granary for the world for the near future is less assured. The amount of arable land per American

is on the decline, being lost to development; grain yields have been stagnant for more than a decade requiring more chemical fertilization; top soil is being lost to erosion at a deficit; and sustainable farming practices are unrewarded, favoring gross output of monocultures and subsidies. U.S. supplies of water are diminishing with drought and greater use, especially in the agricultural states of California and the plains (World Water Council, 2012). Finally, the United States is the world's major consumer of fossil fuels. Oil, gas, and coal are non-renewable energy sources, and the government struggles to develop alternate and sustainable sources.

With an increasing population, U.S. society and its infrastructure are under increased stress. The costs of needed infrastructure repair related to usage in this country are estimated to be more than three trillion dollars (Grant, 1996). As urban areas grow, competition for housing and services grow, and these conditions are frequently in decline. We console ourselves about joblessness by watching the government's unemployment rate but this number does not begin to tell the whole story. This percentage measures only active job applicants, not the discouraged job-seekers who have stopped looking. People who have become alienated or defeated may not appear in the unemployment rolls but may appear on the crime rolls instead. The costs in ruined lives are incalculable. Grant (1996) also observed that when the push for productivity is being driven upward but demand does not meet supply, more people lose their jobs. This pattern results in the familiar unstable economic pattern of the rich-getting-richer, the poor-getting-poorer, and the middle class feeling increasingly strained.

Opposing Viewpoints on Overpopulation

There are, of course, opposing opinions not only on the risk of overpopulation itself but on what should or can be done. The two major dissenting viewpoints that I found in the literature were from (a) a religious perspective and (b) a technological perspective.

Austin Ruse is the president of the Center for Family and Human Rights, a research organization dedicated to the defense of the family at international institutions, monitoring of socially radical policies at the U.N., and fidelity to the teachings of the Catholic Church. Ruse has written on a variety of social topics, including his belief that overpopulation is a myth. He maintains there is plenty of food and resources for the world's population and that the overpopulation myth was created by those who would selectively promote one race over another and coerce birth control or abortion. He has said that world population is in decline and the real danger is in the aging of populations. Ruse has conducted no research of which I am aware but has stated that his theory can be tested by looking outside an airplane window when one is flying: "What you will see is a remarkably empty planet straining to be made a garden by more of us" (as cited in Balkin, 2005, p.31). As a scientific observer, I am only able to assume that these are the views of a person so enmeshed in his beliefs that objectivity is lost. Certainly, there have been those who agree with overpopulation as a problem that have drawn erroneous conclusions and proposed unethical solutions but the evidence is overwhelming that the environment is being destroyed by the overburdening of its resources. Humans are unique in many ways, but they do not defy the laws of nature.

The American Enterprise Institute (AEI) is a center-right pro-business think tank whose research is dedicated to issues of government, politics, economics, and social welfare. One of the AEI scholars, Nicholas Eberstadt (2007) shared his viewpoint by writing that scientific discoveries and technological developments will allow human beings to solve the problem of overpopulation. He denied that the idea of exceeding the Earth's carrying capacity will be a problem for humans because humans are unlike all other species and can use their problem-solving techniques to escape the fates of other species. He selectively cited higher life

expectancies and lower infant mortality in some countries as his proof that this is true. Further, he has said that fears about overpopulation have been disproven repeatedly in the past. He does not mention what he means by *disproven* but he may be referring to more catastrophic predictions.

As an example of human ingenuity and technological optimism being able to solve any problems, Eberstadt (2007) referred to the *Green Revolution* where the development of new wheat grains and agricultural practices like pesticides are said to have prevented one billion people from starvation. A better perspective on this comes from Dr. Norman Borlaug, the actual father of the Green Revolution. At the acceptance of his Nobel Prize in 1970, Borlaug stated, "we are dealing with two opposing forces, the scientific power of food production and the biologic power of human reproduction. There can be no permanent progress in the battle against hunger until the [two forces] unite in a common effort" (as cited in Weisman, 2013, p. 57-58). Borlaug further explained that his work had merely bought the world another generation or so to solve the overpopulation problem. He maintained this perspective and served on the boards of population organizations for the rest of his life.

A prominent conservative political writer, Wallace (2009) posted a blog for CentreRight, a conservative British website, in response to the release of a United Kingdom public opinion poll favoring a smaller world population. He denounced organizations that study population growth and its effects as "having open contempt for human beings and advocating for the removal of real human beings who live, love and laugh (para. 2). Wallace reported that people are perfectly happy with the status quo and want to "continue breeding (para. 9). His views, as well, are not based on any research.

Awareness of Overpopulation

History

Dating back to 1798, Thomas Malthus, British clergyman and intellectual, warned society of the exponential growth of population that, if unchecked, he felt would inevitably result in massive food shortages. Malthusian theory has been criticized and largely discredited by those who believe his ideas were pessimistic and socially biased. Malthus was simply not aware of all the impacting factors that would influence his predictions; however, his "Essay on the Principle of Population" brought forward the connection between resource supply and population growth (Brown, Gardner, & Halweil, 1999), and we have expanded our awareness of how a myriad of resources such as water, forests, disease, and air quality are impacted by population growth.

Modern neo-Malthusians, like Paul Ehrlich and Thomas Keynes, based their ideas on the theories of Thomas Malthus but expanded their beliefs to include other resources besides food as being vulnerable to unabated population growth (What is the definition, 2016). The neo-Malthusians are enthusiastic proponents of birth control.

Since the publication of Rachel Carson's book, *Silent Spring*, in 1962, scientists have been documenting worsening threats to all aspects of the biosphere (Koger & Winter, 2010). Population as an environmental stress has been considerably less discussed or even acknowledged. In the 1960s and 1970s, after Ehrlich's *The Population Bomb* was published, increased attention was paid to the world's rapidly growing human population. In 1960, global population stood at three billion. By the end of the century, this number had doubled to six billion and, if following the growth pattern of exponential growth, could double again later this century. But in spite of this astronomical growth, media and policy attention all but disappeared in the 1980s and 1990s. The silence on overpopulation was deafening and resulted both from

neglect and open hostility towards raising the issue. Population and the need to control its growth touch every sensitive human subject. Sex, reproduction, culture, religion, morality, and global inequities are just a few of the areas that contribute to its controversial nature and why awareness about it is so compromised.

In 1993 in New Delphi, a summit of representatives from the world's scientific academies met and concluded that humanity was reaching a crisis point of irreversible degradation of the natural environment if zero population growth were not reached within the lifetime of the children currently living. The following year, the International Conference on Population and Development (ICPD) met to discuss related issues but was sidetracked into alternate agendas and did not even address overpopulation (Weeden & Palomba 2012).

Family planning funding was recommended by both groups but has not kept up with the need. The proposed 2005 budget of $5.2 billion to be collected from developing country and developed country donors yielded $0.5 billion instead. As always, poorest families suffer most. In 1998, the African rich found ways to limit family size but the fertility rate of the poor remained unchanged at 20 percent, with an increase of unwanted pregnancies rising from 11 percent to 21 percent (Potts, 2007). The population of 870 million in sub-Saharan Africa is expected to grow to 1.8 billion in the next 39 years (Ehrlich, 2011).

Population Silence

Population has a long history of being notably absent from the discussion table of environmental threats. Using a random sample of 150 articles on urban sprawl, water shortages, and endangered species, Maher (1997) showed that only about one in 10 articles framed population growth as an ecological stressor and source of the problem. Further, only one story mentioned stabilizing population among the realm of possible solutions. The discussion of

population growth also seemed to be missing from concern about housing prices, energy shortages, and oil exploration efforts and other topics related to the law of supply-and-demand. Behind the taboo of discussing overpopulation, sensitive factors, such as race, birth control, religion, and individual freedom, have been identified (Campbell, 2012).

For example, most Americans do not want to feel that they are prejudiced against people of another race and because a global overpopulation discussion invariably includes the subject of race, the discussion is avoided. The fact is that birthrates have little to do with race and rather reflect economic opportunity, shortage of resources, and loss of land but, nevertheless, this topic is also avoided. Currently, immigration to the United States is the highest in its history – 1.5 million per year or 44 percent of the annual growth rate. The United States is already overcrowded with diminishing resources, and this level of immigration cannot help but diminish the standard of living for all. In fact, it is more often the affluent and educated persons of other countries who are capable of immigrating to the United States. This leaves those in the country of origin still struggling with their problems while creating a brain and resource drain that makes matters worse. Many Americans want to avoid this discussion, too, as it interferes with their cultural perception of America as open and fair to all.

The sensitive topic of birth control also contributes to the silence on overpopulation. Many religious Americans perceive using birth control as an act against the word of God. Others equate discussing the freedom to use birth control as synonymous with abortion. One of the world's largest religions, the Catholic Church, has played a substantial role in perpetrating the silence on overpopulation.

The first mission of virtually every population organization is to aid in the prevention of pregnancies, not in their termination, but this is not distinguishable to some people. Nothing in

the Bible specifically prohibits birth control and preventing pregnancies, rather than their termination, is the first mission of virtually every active population organization. For some, the Biblical statement attributed to God to "go forth and multiply" is often quoted as divine intent that humans should multiply without reserve. This is placing the statement out of context because this phrase was a standard greeting of the time to wish others abundance. It also fails to take into account the many statements present in the Bible that direct man to care for the earth and all its inhabitants.

Discussing overpopulation also touches on concern about the loss of personal freedoms. Fears of coercive population control are triggered with memories of dark events in our history when population control efforts were selectively based on certain populations. These were tragic abuses of power assuming the form of concern for overpopulation. In 1979, China imposed a political decision on families to limit reproduction to one child without addressing related individual health and women's issues. As with many politically-mandated decisions, there have been many unforeseen consequences such as demographic imbalances, violence, and female infanticide. Many studies have shown that when people have better education and control over their lives, they tend to have fewer children voluntarily which is ethically sound (Guttmacher Institute, 2015). It is also a legitimate perspective to consider that personal freedoms can be seriously curtailed under conditions of greater population density.

Campbell (2012) has studied the history of population growth in the last 200 years and what she has identified as the reasons for the silence is creating what she calls *the perfect storm* for public inattention. First is the visibility of birth rate declines in some countries. Since increased survival rates have driven growth far more than higher fertility rates, the current declines are of minimal consequence in the total picture. Another factor for a lack of public

awareness on overpopulation is focus on the patterns of overconsumption, a more visible factor. While it is important to recognize and reduce consumption, it does not negate the impact of population as a multiplier of consumption. For example, the waters of the Nile River are becoming seriously depleted; this is due to the booming population growth in the countries surrounding it. Thirdly, anti-abortion activists, religious leaders, and conservative think tanks have been actively diverting attention from population growth as a problem. Campbell believed that the AIDS epidemic and other urgent threats also reduced attention on the need to reduce births and provide family planning.

Many feel that the turning point in removing the subject of population from policy discourse was the 1994 United Nations International Conference on Population and Development in Cairo. The strategy adopted at Cairo to focus on women's reproductive health counterproductively associated family planning with government-driven coercive population control and avoided drawing any attention to environmental destruction. This position effectively destroyed any meaningful global discussion on the empowerment of women to reduce fertility by choice. The opportunity to understand family planning as a means of liberating women from domestic and cultural coercion and a means to escape poverty, prevent death from unintended pregnancies and induced abortions, and strengthen their own and their children's well-being, was lost (Campbell, 2012).

Psychology's Role in Raising Awareness

In many ways, our environmental problems, including overpopulation, are human behavior problems (Takács-Sánta, 2007). The role of science is to observe and describe the natural events that are occurring. Substantial scientific evidence has been collected and distributed. But we know that information only serves a purpose if it is heard and used, and there

is even more evidence that the public is not hearing this message and using it for behavior change. Working as an anthropologist in water resource management, Anderson (2001) believed that environmentalists often focus exclusively on economic self-interest as the only human factor involved in retarding pro-environmental behavior. Because humans are as much moved by emotion and mood as reason and frequently distort information in predictable ways, Anderson stated that environmentalists need all the help possible from psychologists.

Oskamp (2000) has written extensively advocating the role psychology must play in addressing human-caused environmental, including overpopulation, problems. He traced the root causes of all environmental problems to overpopulation and overconsumption. Psychologists must learn how awareness can be created that will lead to meaningful risk assessment of overpopulation and appropriate actions. Oskamp also believed it is the work of psychology to promote human welfare, and psychologists must lead the way in helping people adopt sustainable patterns of living. He suggested six motivations for psychologists to promote: voluntary simplicity, specific corrective actions, clear behavioral norms, focus of technology on better efficiency, effects of organized group activity, and sustainable living as a universal goal.

Barriers to Awareness

Types of Barriers

Barriers to awareness are plentiful and pervasive. How well they are recognized and addressed is related to the presence of environmental concern, which is correlated to pro-environmental behavior. In general terms, one group of barriers is related to the obtaining of information on environmental problems and the other to the mental appraisal processes used to appraise severity, probability, responsibility, and coping (Takács-Sánta, 2007). In the following section, I have categorized the barriers mentioned in the literature into those related to receiving

knowledge, those that affect us at a social or group level, and those affecting us as individuals. These are somewhat arbitrary divisions as there is considerable crossover in many cases.

Knowledge Barriers

Mathematical Principles

Environmentalist Alan Kuper (2004) wrote a thoughtful essay in the journal, *Free Inquiry*. He noted that the vast majority of people in the world never even consider if the world is overpopulated and the fact that the human population is over seven billion and could double in this century means little. Few even know the population of the globe or their country and do not understand why they should. No one has ever told them why it was important that if enough couples have more children than to replace themselves, population will grow like compounding money in the bank and build to unimaginable numbers.

Albert Bartlett, professor of nuclear physics and a forerunner in overpopulation study, wrote that many people lack *numeracy*, the mathematical equivalent of *literacy,* or the ability to understand how mathematical concepts apply in life. The ability to comprehend exponential growth is, as he put it, "one of the greatest shortcomings of the human race (Bartlett, 2012, p. 33). The time required for anything to double in quantity is its *doubling time*. If a population is growing at 7 percent and the mathematical equation of exponential growth is applied, it is found that this population will double in 14 years! What many people do not realize is that what seems like a modest growth rate can quickly produce enormous increases in just a few doubling times. Another surprising principle is that the growth in any one doubling time is greater than the total growth of all the preceding doubling times. Bartlett (2012) was so concerned about these facts that he wrote a lecture in 1969 called "Arithmetic, Population, and Energy" to educate people and gave it 1,742 times throughout his life.

Bartlett (2012) also tried to explain *sustainable growth* is an oxymoron. The idea that sustained growth of any material thing in a finite world is possible only serves to placate those who wish to deny or do not understand exponential growth. Through human history, population has been trending upward. The growth during early doubling times appears very small but as the number of doubling times increase, plus death rates decrease, population growth graphs take on the familiar ascent of the *J-graph*. An illustration of the growth of world population throughout history is shown in the graph in Appendix C.

Lack of Scientific Understanding

In 2011, Weber and Stern studied the continued polarization of U. S. public opinion against acceptance of climate change when there is plentiful accumulated scientific evidence to support its existence. They concluded that public awareness and understanding is affected by difficulty in conceptualizing climate change as a physical phenomenon. It is complex and requires non-conventional modes of conceptualization. It is not a single, visible hazard caused by easily definable causes, and its relationship to climate history is uncertain. Many nonscientists do not grasp the impact of the scientific data, for example, effects of an increase of 0.5°C.

Also, unlike scientists taking measurements and making observations, nonscientists must typically rely on second hand sources and personal experience to develop their understanding. Second-hand sources are primarily media events that can be more concerned with showing opposing sides and *breaking news* than unbiased truth. New information technologies with their floods of information can make it difficult to critically review what is being presented. Once established, these mental models may not be revised as readily as ongoing scientific collection of data. Scientific methods use multiple methods and build understanding over generations. Any

conclusions are in constant review. Nonscientific data is more swayed by extreme and changing events, and uncertain events are often given a value of *good* or *bad*.

Biological Laws of Living Systems or Ecosystems

For the impact of population growth to be understood, knowledge of certain physical and mathematical principles must be considered. The biological laws of living systems explain the means whereby the systems sustain themselves. By the interrelationship of complex parts, growth existing in balance with death, and adequate renewal of resources, homeostasis is maintained and the system is sustainable (Watson, 2012). These principles, identified in observations and research in biology and medicine over centuries, seem to apply to all types of self-regulating biological systems. This includes the human psyche which is in indissoluble union with the body (Jung, 1969b, para. 232). The central premise is that for a system to remain stable, its interrelated parts must balance each other with balanced cycles of creation and destruction. Whether it is cancer cells, economic growth or population numbers, any part of the system with uncontrolled growth will eventually destroy the system by direct damage or insufficient resources. Scientists at the Global Footprint Network (GFN) (2003) estimated that the Earth began to operate at a resource deficit beginning in the mid-1970s, and the deficit is being maintained by liquidating Earth's resources at a rapid rate.

The principles that govern living systems are no less true than those that govern non-living systems. They are, however, less well known and much less appreciated. These laws guide natural ecosystem functioning and are known as the *laws of ecology* (Ikerd, 2013). When a population grows out of balance, it is not obeying these laws. The following is a description of the three primary principles.

Holism. The first principle of ecosystems and sustainability is *holism.* The parts and the whole of a living system are so connected that each have properties that disappear when they are isolated. When these relationships change, the whole is changed. If a system is complex and connections are strong, like a biological or social one, ignoring the principle of holism can have critical consequences (Ikerd, 2013).

Diversity. Another essential principle of sustainability is *diversity.* The resilience needed for a living system to renew and regenerate comes from nature's diversity. Without diversity, organisms cannot adapt to change. An ecosystem that has been stripped of its resources will not sustain its populations (Ikerd, 2013).

Interdependence. For a life system to keep perpetuating, it must have interdependent relationships. In this type of system, relationships are mutually beneficial; the output of one process is the input for others. Relationships that are not interdependent can be exploitive and limiting. Humans do not always appreciate that they are dependent on nature and think that nature can be controlled. I have personally seen an automobile bumper sticker that addresses this position of overconfidence: "Nature Bats Last."

Laws of Ecology

As founder of Greenpeace, Captain Paul Watson is an outspoken activist for environment causes and overpopulation. He is also knowledgeable on the laws of ecology. His writing to explain these laws is very relevant to the overpopulation issue. The laws of ecology are (a) the law of diversity, (b) the law of interdependence, (c) the law of ecological niches, and (d) the law of finite resources. Briefly, the law of diversity states that the integrity and strength of an ecosystem depends on the diversity of its species within the system. The law of interdependence means that all species are dependent on all other species in the system. The ecological niches

law means that each species has a role to play in maintaining the integrity of the system. The law of finite resources states that there is limited growth that can occur in a system, and any species that exceeds its carrying capacity will lead to an imbalance and loss of resilience in the system. Watson (2012) wrote that no species can live outside of these laws in a physical, living world. He was unconcerned with political correctness when he wrote our only hope of survival is to reduce our population numbers drastically and immediately without waiting for the solution that offends no one.

Lack of Resources, Education, and/or Interest

There are many people in the world who lack the resources to know what scientific research has learned about overpopulation. They are so involved in meeting their basic needs that they have neither the time, materials, or interest to consider the future. In the foreword to their book, *The Psychology of Environmental Problems*, Koger and Winter (2010) acknowledged that as members of the privileged class, they have the luxury to consider these larger questions of survival. Throughout my research, I have found this to be the case—people are so caught up in managing their daily existence that they have only enough energy to focus on the here-and-now. Often those who have the most to lose are the most compromised in this way.

Lester R. Brown (1995), founder of the Worldwatch Institute, studied global population throughout his career. It was his observation that countries with rapid population growth continually struggled with social issues like educating children, finding jobs, and coping with environmental consequences to a greater extent than countries without this type of growth. Further, when new threats inevitably arrived, the impact of that new threat more easily overwhelmed their social systems, and they were less able to cope. For example, the presence of the HIV virus, although a threat to all countries, was decimating to many countries in Africa.

Some of what is interpreted as greed is the behavior of victims of circumstance. Anderson (2001) noted that Americans often do not take public transit to work because it is not available to them. To this point, he added the plight of the Maya Indians he lived with as well as hundreds of millions of other impoverished rural cultivators around the world. They know full well what the effects of their overcutting, overhunting, and overusing resources will be but they cannot stop because they are living on the edge of starvation and are blocked from most avenues of possible change.

Social Barriers

Social Norms and Conformity

It is well known that peer influence can be a significant force in affecting other people's awareness and choices. In his latest project, known as the Millennium Alliance for Humanity and the Biosphere (MAHB), Paul Ehrlich has emphasized the role of the social sciences in environmental change. As a more than 50-year activist in human-based environmental damage, he wrote that what has puzzled scientists most is why the public and media are not responding to reports of impending ecological crises. Ehrlich (2011) said, "We are learning that if you want to get people to understand and do something, you convince them that their neighbors are doing it. What matters are social norms" (p.4). The real work now is to use the social sciences to understand and change human behavior.

Ehrlich (2011) also felt a vast *culture gap* is responsible for the gap between available information and action. In his time spent living with the Inuit, he remembered that every member of the group had a basic knowledge of their common culture: "Even if you weren't responsible for fishing from the ice, you knew how to do it and why it needed to be done" (p. 6). In our splintered and heterogeneous culture, there is little common basis for understanding. The

relative lack of understanding we have about our collective experience as a species affects our awareness as well (Mora, 2014).

Childbearing is an important behavior to mention. It is a deeply ingrained social norm as well as a biological act. Having a large family is considered one's own choice, and there is a great deal of public and political support and sympathy for those who do so. Being a parent is considered a worthwhile source of identity in our society while a couple who choose to remain childfree may be regarded as selfish or odd. In addition, we are a youth-oriented culture that gives preference in many ways to the young.

Using system justification theory, Feygina, Jost, and Goldsmith (2010) proposed that the widespread denial and resistance to take pro-environmental actions is related to the human motivational tendency to defend and justify the societal status quo in the face of threat. This greater adherence to justification of the system could explain the lower levels of challenging the system associated with political conservatism, nationalism, and gender bias. Their research found that it is possible to reverse or eliminate the resistance to pro-environmental change by encouraging people to regard the changes as patriotic and consistent with maintaining the status quo.

Nationalism is a social factor affecting a society's ability to challenge its own beliefs and make change. In the West, especially, nationalism is related to the pre-existing belief we have in the stability of natural systems and the historical belief we have in perpetual progress. Nationalism also makes it easier to disavow guilt and personal responsibility for the actions or inactions taken in the name of the country. According to Weber and Stern (2011), the denialist movement in the United States about climate change stemmed from the views held by an individualistic capitalistic nation.

Anderson (2001) reviewed research on the behavior of individuals in groups to consider the prospect of groups working on environmental problems. He found that hostility between groups could cause members of a group to destroy a mutual resource for reasons of retaliation. In one example, ethnic Chinese and Malays engaging in group hatred led to the destruction and collapse of a fishery so that neither was able to use its resources. In his review of 59 studies, Gifford (2000) concluded that individuals in a group use resources more wisely when the group is small, communicates well, and is informed that the resources are limited. Unfortunately, the groups that share real-world resources have none of these characteristics.

Leadership and Politics

A reduced public interest in overpopulation makes the need for leadership critically important. Unfortunately, it is a topic that most political leaders prefer to avoid. More than a billion people live in extreme poverty under dire conditions, and ecosystem species are being lost at a rate seen only in mass extinctions. Mora (2014) conducted a review of recent studies showing how the issue of population growth has been trivialized and downplayed as a political agenda, resulting in almost a complete lack of policy action.

There are a few notable exceptions. After the death of Imam Khomeini in 1989, the Iranian minister of health launched a new national family-planning program. Doctors and university teams took to the streets, traveling on horseback to every little village to promote voluntary reduction in the numbers of children couples chose to have. Women were asked to space their pregnancies three to four years apart, bear children between the ages of 18-35, and have no more than three children. Any kind of birth control was provided free of charge. Everywhere they went, women expressed desire for fewer children and to better educate those they had. There was no coercion and the only government disincentive was the elimination of

individual subsidy for any child after the first three. The program succeeded beyond anyone's expectations. By 2000, Iran's total fertility rate had gone from 4.0 children per woman to 2.1. In addition, a 1975 literacy rate of less than 33 percent in younger Iranian women had gone to 96 percent, and one-third of government jobs were held by women. Twelve years after the program began, the Iranian health minister would accept the U.N. Population Award for the most enlightened and successful family program the world has ever seen (Weisman, 2013). Thailand saw a similarly impressive drop in population growth—from seven children per woman to two—after a government program made contraceptives widely available and distributed, reducing the number of births by 16.1 million between 1972 and 2010 (Weeden & Paloma, 2012).

Women's Reproductive Choice

The level of global population growth has an obvious relationship to women's reproductive choices. There is considerable evidence to show that when women have the freedom to think about their own and their children's well-being, they are concerned about having more for the children they have, not more children (Engelman, 2012).

Research of self-reported data also supports that more than 40 percent of pregnancies worldwide are unintended. In 2012, for example, 41 percent of the United States' 213 million births were unplanned and unintended (Guttmacher Institute, 2015). Engleman (2012) asked the question, "What would happen to world population growth if every pregnancy worldwide were the outcome of a woman's active intention to bear a child?" (p.234). Studies suggest that providing safe and effective contraceptive options to all sexually active women who do not want to become pregnant would end the problem of world population growth without fear of coercion.

The long-standing belief that it is "natural" for couples or women to want many children and its inferred corollary that they have to be induced to want smaller families is challenged by

this type of study (Campbell, 2012). David P. Barash, an outspoken sociobiologist at the University of Washington, believes that much of what is touted as a biological drive to have children is actually the result of extensive cultural programming (Barash, 1986).

Religion

Although a source of spirituality and strength to many, rigid adherence to some religious doctrines can bring about learned helplessness that prevents awareness and behavior change. People who believe that every occurrence is "God's will" may only try to adapt, not change. In his interview with Weisman (2012), Iman Raidoune stated, "To reduce or stop producing children on the presence of difficulties feeding them goes against a pact between Muslims and God. Allah has promised to provide for all the children" (p.233). Cardinal Turkson has seen enough African suffering and starvation in his country to understand what living conditions with more people can mean, yet his Church insists there is room for everyone and that it is a punishable sin to use effective means to prevent the addition of more (Weisman, 2012). His Church maintains that artificial contraception is sinful and immoral and may frustrate a divine plan to bring a new life into the world.

Economic Growth Models

Regarded as the most successful model for growth, capitalism is the economic system used in most developed countries and envied by many more. Belief in and use of this system promotes continuous consumption, competitiveness, self-interest, and, often, greed. Its inseparability from technology perpetuates an unrealistic belief in the ability of technology to solve any problem. Technology can create additional problems or more serious problems than it solves. Some anthropologists, such as Diamond (2005), believe that maximum environmental

impact played a significant role in the sudden decline of some advanced societies such as the Maya, Anasazi, and Easter Island, when the limit where impact outstrips resources was reached.

Individual and Psychological Barriers

Individualistic Perspective

The narrow construal of self that individualistic societies, such as the West, have can impose a barrier against global problems that require a unified effort. It is difficult when the ego function predominates to take the position of opposing the *other*, especially if the other is a nonhuman entity such as nature. When the self is not seen as part of a larger system like nature, concern for and responsibility to the system is not forthcoming. Individualistic individuals make choices primarily based on personal needs (Takács-Sánta, 2007). This perspective ranges from protecting one's self-interest to outright narcissism and can vary with one's life stage.

On the Earth Day of the millennium, ecologist professor Gifford (2000) addressed the cumulative negative effect of individuals on the environment, often by the well-intentioned. As an example, he cited the flights of 80,000 people to Seattle to protest the World Trade Organization (WTO) for environmental disregard. The actions of that many people in their admirable pilgrimage actually sapped tons of energy and released vast amounts of carbon dioxide into the air. According to Boeing's website, a commercial 747 uses approximately one gallon of fuel every second and over the course of a 10-hour flight might burn 36,000 gallons. The failure of individuals to understand or consider the result of their single action or cumulative actions with other individuals is a major factor in why we continue to damage the environment even as we think we are protecting it—a tragic irony.

Gifford (2011) reviewed environmental psychology research from the preceding 30 years and identified ways that individuals, mostly unconsciously, damage the environment every day.

In our energy choices, we drive when we could walk, fly when we could drive, and drive when we could teleconference. How much fossil fuel will be consumed is usually not part of our decision-making process. We routinely make decisions based on convenience as well**.** Also, many decisions are literally made in ignorance. Most people do not place their daily behavior choices in an environmental context. Every parent's personal decision to have a child results in significant environmental destruction, whether it is realized or not. I believe that the lack of individual awareness of the impact that a single individual can make, especially when combined with 100 or a million other individuals, contributes to our inability to see ourselves as part of and able to affect the larger system.

Defense Mechanisms

The question of how people split off awareness so that they do not have to experience anxiety is well-researched in the defense mechanism literature. Three principles underlie the mechanism of preventing conscious awareness: much human behavior is shaped by unconscious motivation, conflict is chronic and painful, and humans use defense mechanisms to contain their anxiety against unwanted thoughts, feelings, and desires (Koger & Winter, 2010). In addition to concerns about our personal selves, Macy (1995), in her work on environmental despair, wrote that we have apprehensions of the collective suffering that destruction of our environment will have. As a society, we are caught between a sense of impending apocalypse and the fear of acknowledging it. Environmental threat is among the most primal of threats, raising fears about our very existence, even a type of maternal abandonment.

As a coping style, defense mechanisms are used outside of conscious awareness. They can alter the relationship between self and object, altering perceptions of external and internal reality and other facets of cognition. Of the different classes of defense mechanisms, those in the

disavowal class seem the most relevant for defensiveness against environmental issues (Vailiant, 2000). *Denial*, *projection*, and *rationalization* allow people to separate themselves from anxiety and guilt about impending ecological crises. In addition to psychic relief, these defenses reduce awareness of and response to changes in reality.

Opotow and Weiss (2000) have studied three types of denial based on moral exclusion that are used against environmental conflict. If one's moral orientation is based on exclusion, unwillingness to act in the best interests of others, including the Earth, is characteristic. Denial of outcome severity, stakeholder inclusion, and self-exclusion allow the individual or group to minimize or conceal outcomes, label dissenters as outsiders or extremists, avoid taking responsibility, and blame the victim. A moral orientation of inclusion would be more likely to promote environmentalism and interest in working together.

Research on just-world theory has demonstrated that individuals often subscribe to a need to believe in a *just world*. When that belief is challenged, they commonly use defensive responses like denial or rationalization to try to resolve the threat. Dire messages about approaching environmental disasters can cause them to deny factual evidence. Just-world theory researchers recommend the importance of using less dire messaging and pairing findings with potential solutions (Feinberg & Willer, 2011). Of course, decreasing message severity can promote greater denial as well. The tendency of humans to believe in positive illusions, especially about the future, is also documented in the literature. Anderson (2001) has studied this in individuals and bureaucracies during his management of natural fisheries. Statements like "there are lots of fish – it's just a bad year" or "it won't hurt to take just one more" exemplify the rationale of unwarranted optimism. He explained his view that optimism can feel great until it kills you.

Related to defense mechanisms is *defensiveness*. Often, people have a defensive reaction when their existing practices are threatened. The users of a threatened resource often react so strongly that they take emotionally extreme measures when negotiation seems the better choice for all concerned. Conservation workers have been killed and plants and animals destroyed for illogical defensive reasons (Anderson, 2001).

Psychological dissonance, as defined in psychoanalytic theory, occurs when there is a conflict between an instinctual demand and its prohibition by reality (Koger & Winter, 2010). The resulting tension can sometimes be managed by the use of a defense mechanism but often at a price. According to Sapiains, Beeton & Walker (2015), a dissociative experience is created by the tension between people's awareness of environmental problems, including overpopulation, and their non-sustainable practices. The researchers theorize that to deal with the conflicting tension between these conflicting positions, people perform the behaviors that are likely to give them psychological relief rather than any effective action.

Blindness and Apathy

Blindness, an alternative term to *denial*, is sometimes found in psychological literature to express the unwillingness of individuals or groups of individuals to "see" what is clearly before them. Conservation biologists Orr and Ehrenfeld (1995) used this term in their article about ecological denial. The way people choose to shun reality is through "the willful dismissal or distortion of fact, logic, data, and evidence in the service of ideology and self-interest" (p. 985). A U.S. Congress attempting to dismantle needed environmental regulations contrary to all scientific evidence is engaging in this type of blindness. Strategies to avoid facing reality develop: focus on small nits, avoid big issues, and demand an unattainable level of proof. By

establishing double standards of proof and drawing unwarranted inferences from disconnected pieces of information, blindness is maintained.

In one study, Howard (1993) interviewed his university students about their willingness to change their future plans to help the environment. He found that most respondents who were educated about the risks to the environment of overpopulation stated that their own personal fulfillment was tantamount to any concern about the Earth. They expressed their intent to act according to their own self-interests. One student suggested that there were three categories of people with views about the environment: (a) those who will sacrifice all personal pleasure to save the world, (b) those who deny the data, and (c) those who know the state of the world but will continue to live as they wish. Howard proposed that the psychological dynamics in this thinking does not represent denial but would be better described as *self-deception*, stemming from the separate bracketing of concern for our species and the right of individuals to pursuit happiness.

Research has shown that individualistic motives can blind people to the fact that individual acts also result in significant effects at a group-level. Howard (1993) called for an immediate need to raise consciousness about the threat of overpopulation, beginning with psychologists themselves. Humans are capable of great altruism but must work to understand how their individual choices can affect the larger group which, in turn, cycles back to affect them as an individual.

In another 2011 qualitative study, college students were interviewed about their awareness of population size, global climate problems, and resource usage (Schuetz et al., 2011). Participants expressed a greater sense of entitlement about population growth as a problem than other environmental problems, maintaining their right to have as many children as they wished.

In general, they demonstrated a minimal awareness of ecological issues and a noted sense of apathy. Most respondents expressed a lack of concern about pro-environmental action being needed. Those who did placed the responsibility for action outside of their personal responsibility, and most said they had no plans to change if their personal comfort would be influenced (Howard, 1993). Howard suggested that the denial of death, as a fundamental aspect of our nature, might play a role in the avoidance of thinking about overpopulation. Lertzman (2008) wrote that the reason for apathy often stems from fear, grief, and resistance to being overwhelmed by the magnitude of a problem. The presence of competing threats in the world such as terrorism and other criminal acts of violence can also provoke a similar reaction as the individual struggles to prioritize dangers.

Young people's attitudes about two distinct risks were also studied by Threadgold (2011). He asked about their perceptions of achieving their ambitions and their perception of the future of the world in terms of environmental issues. He found that the young people placed a priority on the management of their individual goals. Using social theory to look at management of risk, reflexivity, and ambivalence, Threadgold argued that the experts in young people's lives, like parents, teachers, media, and politicians, create a hierarchy of risk for them that legitimizes one's own life trajectory and delegitimizes environmental action.

Thought Process Limitations

Risk assessment is often made by humans based on their affective responses to a potential threat (Weber & Stern, 2011). When risk is interpreted through affect, it has been processed by the human associative processing system, an evolutionarily old part of the brain. Emotional labeling or packaging of a problem makes this more likely to occur. Processing with logic is slower and must be learned consciously. This emotional connection contributes to humans being

less adept at understanding what they have not personally experienced. When emotion is paired with an event, people are more likely to be misled and have their judgment affected. It also causes them to over-bias their experiential learning and use these experiences to support their preexisting beliefs. In the assessment of risk, judgment can be strongly affected by whether the potential hazard is familiar, known but dreaded, or unknown.

Research on the phenomenon of *change blindness* has yielded important information on how the brain's processing of a visual scene causes failures in awareness with resulting perception and memory ramifications. Simons and Ambinder (2005) summarized the current state of research on the limits in our capacity to encode, retain, and compare visual information from one visual scene to the next. Furthermore, research has documented how unaware we are of these failures in detecting change, using these incorrect perceptions to form beliefs. We are especially vulnerable to failed awareness when an object is not our central focus. There is tremendous application here for our ability to detect progressive environmental and overcrowding damage correctly or at all.

In the area of compassion research, Markowitz, Slovic, Västfjäll, and Hodges (2013) have performed studies on the phenomenon of *compassion fade* and concluded that it poses a significant challenge to both our personal and collective capacity to respond effectively to many of the humanitarian and environmental crises we face. Research in the field of compassion fade has consistently shown that compassion towards people or animals decreases as the number of victims increases. Likewise, the proportion of victims helped usually shrinks over time. Markowitz et al. (2013) found that when the study participants were committed to a cause prior to the time compassion was needed, they were less influenced by compassion fade. This phenomenon could have an evolutionary basis to protect smaller groups. Being aware of the

problems of the large group, like overpopulation, is less important to the brain's processing system.

There is evidence to support that our perception to wide scale threat is susceptible to diminished sensitivity, especially as magnitudes increase. Constant increases in stimulus magnitude evoke smaller and smaller responses (Slovic & Västfjäll, 2010). This sort of psychophysical effect can be seen in our response to perceptions like loudness, heaviness, and wealth. When this principle is applied to threat to human life, this *psychic numbing* can be observed with larger losses of life. Because of this, we are far more likely to respond to the single individual that needs help and touches us emotionally. Alternatively, we can be rather insensitive to large losses of life and catastrophes and not *feel* the need to respond or be outraged. Overpopulation and its effects are vulnerable to this psychic numbing phenomenon.

Cognitive decision-making styles have been studied in the area of environmental context decisions. Sharps, Hess, and Hanes (2007) presented environmental scenarios requiring a decision to study participants and found that the presence or absence of relevant information in working memory made a difference in the respondents' ability to understand negative decision consequences. In the absence of relevant information in working memory during the consideration of a decision, participants tended to rely on a style of mindless cognitive processing that may result in premature or inaccurate decision making. If the context of a cognitive task is not understood, meaningful solutions will not be forthcoming. The authors suggested that the presence of contextual information at the time of decision-making may be more significant than other factors such as mental set, self-interest, and local norms. This supports my position that information that creates awareness is essential in addressing overpopulation.

Beliefs

Human beliefs are at the core of what drives us. Our belief systems are interrelated with other forms of psychological perception like attitudes, values, and worldviews. In 1993, ecological economist Garrett Hardin wrote *Life Within Limits,* demonstrating how a few misguided but very prevalent beliefs were combining to wreak enormous destruction on the natural world. Among these beliefs: there are no limits to growth and progress, that progress and population growth can coexist for a long time, that scientific default positions can be circumvented, that no one ever dies of overpopulation, and that individual rights supersede communal obligations (as cited in Howard, 1994). In reviewing the book, Howard (1994) commended Hardin for identifying an existing set of human beliefs that are inappropriate for the ecologically-challenged world. Once accepted, these maximization beliefs guide people in the same direction as economic theory. Hardin pointed out, unlike scientific observations based on physical measurements, man-made theories may be based on thought alone and subject to more subjective errors (as cited in Howard, 1994).

Behavior

Belief systems are also correlated with behavior. Leviston and Walker (2012) examined correlates of belief about climate change in their research and suggested that beliefs are significantly related to levels of pro-environmental behavior, political orientation, locus of responsibility, cognitive evaluations, affective responses, and perceived moral duty to act.

Even when awareness and desire to act environmentally are present, changing behavior requires developing a habit, and this can serve as a barrier. Establishing a new habit, despite the strongest of intentions, requires discipline and practice. The number of weight loss and stop-

smoking programs bear testament to the difficulties involved. Additionally, traits of personality and character dramatically influence a person's ability to act (Kollmuss & Agyeman, 2002).

Theoretical Models

As an environmental threat, overpopulation has been understudied for the reasons outlined in this dissertation. A specific theoretical framework of study has not yet been determined. Related attempts to explain the gap between environmental knowledge, awareness, and pro-environmental behavior, however, have been the subject of environmental research. Some of the most influential frameworks used have been (a) early U.S. linear progression, (b) altruism, (c) empathy, (d) prosocial behavior, and (e) sociological models. Other less frequently used models have included (a) economic, (b) psychological behavior, and (c) social marketing. During their review of these frameworks, Kollmuss and Agyeman (2002) found that the question of what shapes pro-environmental behavior is such a complex one that it cannot be visualized through a single framework or diagram. My own experience of reviewing the literature on overpopulation reached a similar conclusion. Because of the many facets of the issue and the relatively early stage of study, no one framework has been established.

Interventions: Past and Future

Some of the historical efforts to lower the growth of population have been controversial, instilling fear and suspicion of the topic. Previous ideas of how to lower population were affected by incomplete understanding of the issue, and many were riddled with racism, sexism, arrogance, and incompetence. In his 2008 book, *Fatal Misconception*, Matthew Connelly, associate professor of history at Columbia University, described the events that cast the concept of *population control* in a dark light. After describing these events, Dr. Connelly reached a conclusion that reflected ignorance of the larger picture: That the global population should

continue to grow unabated as a solution to any future attempt at coercion is simplistic and defies logic and reason to him. Writer Eric Ross (1998) also explored in his writing the role of Malthusian theory and overpopulation in blaming the victims for problems rather caused by social and economic problems, especially from capitalism.

During my review of the literature, I found several data sources regarding unintended pregnancies. It is estimated by the information collected that about half of all pregnancies in the United States are unintended. The Guttmacher Institute (2015) is a research organization dedicated to the study of human reproduction. Their research has found that up to 51 percent of all pregnancies in the United States and 42 percent of pregnancies worldwide are mistimed or unwanted. The institute also conducts research and studies the incidence and demographics of unintended pregnancies as well as trends, costs, causes, outcomes, and prevention. A greater focus on voluntary prevention of these pregnancies has the potential to help solve the problem of a burgeoning world population while preventing any personal infringement of freedom.

Ecopsychology

Definition

Simply stated, the field of ecopsychology, as it has emerged over the past few decades, is defined as an intellectual and social movement that seeks to understand and heal our relationship with the Earth. Its primary area of focus is to examine the psychological processes that bond us to the natural world or that alienate us from it (Yunt, 2001).

Although not the first to study the topic, Theodore Roszak is credited with introducing the concept and term ecopsychology in his pivotal book *The Voice of the Earth* in 1992. As a historian and cultural critic, Roszak's approach to ecopsychology was primarily from a spiritual perspective that sought to emphasize the reconnection of humans as part of a single cosmos. He

felt that a spiritual quest and the experience of oneness were the means by which individuals could transcend a reductive view of the natural world (Roszak, 1995).

Coming from a countercultural background, Roszak (1992/2001) was critical of the scientific worldview, feeling that it caused the experience of the individual to be repressed and restricted. He believed that this splitting of external and internal worlds contributed to the individual's alienation and lack of remorse for exploitation of the natural world and argued that the experiential Romantic Movement was a healthier alternative (Snell et al., 2011). Roszak further argued that the dominant schools of psychology could not address the problems inherent in urban industrialism because they were created by the same cultures that threatened the environment and that a new school of psychological thought was needed. He was interested in the spectrum of consciousness and considered alternative sources such as tribal practices that honored nature.

Roszak (1995) acknowledged Jung for the understanding that the personal self is anchored within a greater, universal identity that forms the matrix making our living intelligence possible. He thought many of Jung's ideas were relevant to the study of ecopsychology. He criticized Jung, however, for what he considered a pedantic approach to the connection between the psyche and physical nature. Despite Jung's obvious sentimentality for nature, Roszak wrote that Jung had chosen to align himself with psychic reality and abandon the physical universe. To give new recognition to his view that the psyche and ecology were irrevocably bound, Roszak (1992/2001) used the term ecopsychology and offered the following principles in his original vision:

> the core of the mind is the ecological unconscious, the contents of the ecological unconscious are the living record of cosmic evolution, the goal of ecopsychology is to awaken environmental reciprocity and heal alienation, the ecological ego matures toward planetary ethical responsibility, certain "masculine" traits that define our political

> structures must be re-evaluated, ecopsychology is post-industrial but not anti-industrial, and there is a synergistic interplay between planetary and personal well-being. (p. 320-321)

Another pioneer writing to expand psychological theory to include the world beyond our personal connections was psychologist researcher Ralph Metzner. He preferred the term *green psychology* to explore the sympathetic bond between the human species and the planet that creates a shared identity (Metzner, 1999). His work especially targeted the utter failure of mainstream psychology to address this connection. Expanding the use of myth beyond the individuation process, Metzner interpreted the great myths as messages from Earth. His definition of ecopsychology was "the expansion and re-envisioning of psychology to take the ecological context of human life into account" (Metzner, 1999, p. 183). He emphasized that ecopsychology has a unique and necessary point of view and is not a variation of other environmental studies.

In their book, *The Psychology of Environmental Problems*, Koger and Winter (2010) defined ecopsychology as "the study of synergistic relationships between planetary and personal well-being" (p. 302). They emphasized the holistic approach of ecopsychology and concepts of *ecological self* and *ecological identity*. These terms were coined in the 1970s by Arne Naess, an environmental philosopher, who believed that empathy for nature was required for people to act responsibly towards it. Some of the key tenets of ecopsychology described by Koger and Winter are (a) the existence of an ecological unconscious, which when repressed causes a collective madness; (b) a record in this unconscious of cosmic evolution connecting all life forms; (c) a reciprocal relationship between personal and planetary health; (d) disconnection from the ecological self leading to over-identification with the personal narcissistic self; and (e) the capacity for people to regain their ecological selves through transcendent experiences.

Dennis Merritt is a Jungian analyst who has written extensively about ecopsychology as an important development within the field of psychology that studies the attitudes, perceptions, and behaviors that create human dysfunctional relationships with the environment and how to change them. Merritt (2012b) suggested that the way we use or abuse the planet can be seen as projections of our unconscious needs and desires. He believed that exploring the psychological dimensions of our ecological behavior makes the problem as well as possible solutions more human.

In his writing, ecopsychologist Andy Fisher (2013) argued that the field of ecopsychology has yet to really define itself. He stated that the literature of ecopsychology is still small with most of it exploring what ecopsychology will become, not what it is. Suggesting that ecopsychology is best still thought of as a project at this point, Fisher defined four general tasks for ecopsychologists trying to bring a scheme into focus. The psychological task should be to promote understanding of the human-nature relationship as part of the natural order. Philosophically, the task is to place the psyche or soul back into the natural world. The practical task, likely the most difficult, is to develop therapeutic and recollective practices towards the development of an ecological society. Ecopsychology's critical task is to engage in ecopsychologically-based criticism. According to Fisher, the blind spots of anthropomorphic and Eurocentric influences to ecopsychology must be challenged in order for the field to define itself in line with social and cultural patterns of the world today. Splintered branches of ecopsychology must also be reconciled to give the field a united purpose.

Origin and History

In earliest human history, all psychology was in essence ecopsychology. Those who worked to heal the soul took it for granted that human nature was embedded in a shared world

and cosmos (Roszak, 1992/2001). Concomitantly, the environmental destruction and overcrowding of early cultures was able to be avoided or left behind. As humanity took on the mechanistic-materialistic worldviews of the modern era, a separation between the sacred and the natural world was created. Political, social, and economic movements like humanism, Protestantism, colonialism, and capitalism enhanced the feeling of human superiority, and animistic, shamanistic, and panentheistic worldviews were discounted as primitive. When Darwin suggested man had descended from apes, we reaffirmed ourselves by claiming to be the most advanced species and conquerors of nature. Paralleling this view, the field of psychology evolved towards consideration of the individual as an isolated being, giving a limited perspective to psychopathology (Metzner, 1999).

When Rachel Carson ignited the environmental movement with her book *Silent Spring* in 1962, psychoanalyst Harold Searles wrote about the great significance of *the nonhuman environment* for human psychological life and predicted that the next phase of psychiatry would enlarge to man's relationship with his environment (as cited in Fisher, 2013). Also, in 1965, scientist James Lovelock introduced the Gaia hypothesis. Formulated in modern biological language, this hypothesis proposes that the entire planet is a living being composed of both living and nonliving systems which sustain each other through feedback loops, homeostasis, and gradual evolution; humans are a part of that system (as cited in Metzner, 1999). Four years later, an actual image of Earth was obtained by space travel from astronaut Alan Shepard, and the two images became the symbol for the environmental movement (Ryland, 2000).

Beginning in the 1970s, *deep ecology* became the most far-reaching ecological approach and sought to transform the way society is organized and how it interacts with the natural world (Bishop, 1990). This approach insists that the flora and fauna of the world should be respected

not as a resource for humans but because of their inherent value. Each species is considered to have a consciousness that is no less valuable than that of humans, and it is the task of humans to bring their consciousness in line with the rest of the world.

Lester Brown (1995), prominent environmental analyst and founder of the Worldwatch Institute, began writing about environmentally unsustainable human practices in the mid-1970s. He recognized overpopulation as one of the primary causes of ecological issues. Brown argued that the environmental movement would succeed only if population size was stabilized, reestablishing a balance between people and nature. He also predicted that a field combining psychology and ecology would be needed in order to examine the psychological dimensions of ecological inaction and how to impact it. Brown believed that this field of study must bring together the expertise of ecologists, sensitivity of therapists, and ethics of environmental activists to restore the health of the planet or there would be no hope.

Also in the 1970s, *ecofeminism* emerged from the simultaneously developing women's and ecology movements. Supported by research showing that gender is the strongest predictor for environmental concern and behavior, ecofeminists took the position that patriarchy oppresses both women and nature with its emphasis on dominance, hierarchical and dualistic thinking, and power relationships. They focused on the common experiences of women to work together to address environmental problems (Koger & Winter, 2010). In the 1978 cornerstone work for ecofeminism, *Woman and Nature: The Roaring inside Her*, feminist Susan Griffin explored the identification of women and the Earth both as sustenance for humanity and as victims of male rage (Cantrell, 1994).

With growing awareness in the 1980s and 1990s that environmental disaster has its roots in the attitudes, values, perceptions, and worldviews of humans in the industrial-technological

global society, psychologists and ecologists began to interact across the lines (Metzner, 1999). A number of other environmentally focused psychologies, including environmental psychology, conservation psychology, and ecological psychology, began to develop, each with their own approach and method of study (Snell et al., 2011).

Ecopsychology was unique in that it had spiritual roots since its inception. The resonance between ecopsychology and depth psychology led to many ecopsychologists drawing heavily from depth psychology. Paris and Pye (2012) believed that all depth psychology is fundamentally an ecopsychology because it is an approach that takes the unconscious into account. Using depth psychology as the perspective allows the ecological model to be looked at in terms of its unconscious complexes. The theories of Jung already recognized the collective unconscious, which gave rise to the idea of an *ecological consciousness*.

Much of the early literature of ecopsychology arose from a critique of the scientific worldview, and many of the ecopsychologists tended to be in non-scientific fields. This led to a scientist-practitioner split, causing ecopsychology to have a limited credibility with mainstream psychology (Roszak, 1992/2001). The birth of a peer-reviewed journal *Ecopsychology* in 2009 resulted in more interest in ecopsychological research. Former editor Thomas Doherty described this change as a transition from the Romantic emphasis of Rozsak to a second generation of ecopsychology with emphasis on pluralism, self-reflection, and pragmatism (as cited in Doherty, 2009). He believed that ecopsychology differs from other environmental psychologies in its focus on the subjective aspect of human relationships in the natural environment and its emphasis on personal experiences, especially the sacred and the spiritual. Others in the field believe that to grow as a respected field, ecopsychology needs more peer-reviewed research taking a critical perspective and recording experiential data (Harvey, 2014).

Ecopsychological Perspectives on Ecological Threat

The ecopsychological perspective shares a concern with other fields that combine ecology with psychology but has a unique perspective honoring the spiritual and unconscious. It seeks to understand individual and collective relationships with the natural world and use this understanding for proenvironmental action and healing. The perspective of ecopsychology is very closely aligned with analytical theory, and Jungian psychologists are well-represented in the field of ecopsychology.

Jungian ecopsychologist Merritt (2012b) wrote, "an ecological perspective recognizes that every entity at every level presents a unique history of its relationship to the organic and inorganic realms as well as a potential of change" (p. 95). He believed that ecopsychology is a necessary new discipline, and Jungian psychology is the most important model that can do justice to something as complex as the human psyche.

Psychological theory cannot embrace the mytho-poetic dimensions of the psyche at a deep enough level to reach those in a spiritual vacuum; however, Jungian concepts and language, poetic and metaphorical, can be the least constrictive way to study this subject. Merritt also advocated integrating some of the concepts and practices of indigenous cultures into an ecopsychological model of the psyche within a Jungian framework. Indigenous cultures, including our Celtic, Slavic, and Teutonic ancestors, consider humans as one element humbly present in the grand scheme of things which are spiritually and interrelated in the cosmos (Merritt, 2012b). Many American Indian people hold "a traditional worldview that the Indian is not removed from and superior to nature but rather an essential part of that complex of relationships we call environment" (West, 2007, p. 87).

Using a Jungian or archetypal perspective, Pienaar (2011) took an in-depth consideration of the effect that reciprocal human-nature interconnectedness, one of the fundamental principles of ecopsychology, may have on our existential awareness of mortality and life meaning. She proposed the human psyche is coextensive with nature, and, as an archetype, nature manifests itself in the psyche through animal and nature symbolic power. The cycles of nature and spending time in nature symbolically remind us of the passage of time and our transitory nature. Knowledge of one's life span limitations can raise the existential question of meaning. Pienaar argued that this can lead to a broad range of behaviors. People may employ defenses against death anxiety, meaninglessness, and the human construct of time, resulting in denying an ecological problem, denying humans are the cause of the problem, or minimizing or projecting the effects of the problem. Pienaar believed a deep connection with nature has profound implication to help clients in their search for meaning and transformative healing.

Jungian analyst Leslie Stein (2012) used analytical psychology to explore the reasons for human inaction and denial in the face of the looming catastrophe of global warming. The scientific evidence is indisputable, so she was interested in how the psyche processes inaction and denial. Stein suggested that it is unfathomable to the psyche that nature may be that which will destroy man instead of that which generates and supports life. This is contrary to the fundamental orientation of the psyche and causes a primordial confusion. Secondly, Stein believed a catastrophe that is so unthinkable to the psyche is rejected by the ego, causing rejection of the facts or only a partial awareness. The fear that we may have projected our hopes and desires onto an uncaring Soul is a basic negation of the Self. This reminder of the dark, avenging side of life, however, offers a chance to reintegrate the psyche by acknowledging the confusion, annihilation, and destruction that must be felt.

Ginette Paris, professor of depth psychology, took the perspective that depth psychology is equivalent to an ecopsychology and, because of this, the ecological model can be looked at in terms of its unconscious complexes (as cited in Paris & Pye, 2012). Paris was highly critical of eco-activists who project a Mother Complex onto nature because she believes this is at the core of a despairing attitude. To Paris, the attitude that the planet would be better off without us creates the same depressive, deprecating, antihumanist rhetoric that influenced us to destroy nature in the first place: humans over nature merely changing to nature over humans. She insisted that, whereas humans must have their separation from nature in order to live, eat, and protect themselves, they must not see themselves as parasites but as interconnected and responsible partners with nature.

Gomes (1998) explored in her writing on ecopsychology how the inner world of feelings and soul can be blended with the action-oriented reality of the activist to create effective social change. In her interviews with ecopsychologists, the importance of bringing psychological sensitivity to the environmental movement was emphasized. Her interviewees expressed their perspective that the defining characteristic of ecopsychology is the integration of inner and outer reality. True activism is about more than *fixing things* externally; it must also include personal transformation of old mind sets.

As professional wildscape guides, Kerr and Key (2012) have studied how experiences of nature can help the self be a part of the larger ecology. They used a combination of transpersonal psychology, deep ecology, and ecopsychology models to promote a transpersonal Self as part of the body of the earth. Trips into the wilderness provide images, symbolic forms, and experiences with which to align with the ecological self. Kerr and Key believed that when

we feel healed as part of nature, the motivation to live more sustainably will emerge spontaneously.

White (2011) has studied the phenomenon of ecological consciousness, a key concept of ecopsychology, using a first-person experiential orientation. By developing and using a mindfulness-based perception exercise, he evoked a heightened ecological consciousness in himself in a variety of settings. White made the distinction between eco-consciousness and the more mainstream environmental consciousness. He considered environmental consciousness a detached perspective with an anthropomorphic orientation that accepts current political and economic systems and seeks to manage the effects of human activities within them. In contrast, eco-consciousness is grounded in an eco-centric, transpersonal orientation with a deep awareness of one's connection to nonhuman nature. White advocated for expanded research using his research instrument.

Anthony and Soule (1998) took a multicultural perspective to ecopsychology in their research. They asserted that social justice and ecopsychology share common ground with the intent to create healthy, diverse, and multifaceted communities. They found parallels in the psychological approaches to healing our relationship with nature and repairing communities fractured by racism. According to the authors, monocultures are not healthy for natural systems, and ecopsychology should be applied in city environments to promote respect for a sense of place and diversity. An internal stance of inclusivity, rather than exclusivity, would promote a more balanced psyche and ecosystem.

Using psychoanalytic concepts, ecopsychologist Kanner (1998) examined the darker side of one of the most recognizable symbols of American achievement, Mount Rushmore. Reducing the surrounding natural environment to a backdrop for human grandeur, the mountain sculpture

stands as a monument to self-fascination and narcissism. Coining the term *Mount Rushmore Syndrome*, Kanner feels that *narcissism* is at the core of the psychological processes that alienate people from the natural world. As with the individual narcissist, the false self compensates for deep feelings of unworthiness by inflated beliefs: humanity is superior to all living things, humanity is the pinnacle of evolution, resources are here for human purposes, and humans do not depend on the natural world. Narcissism is toxic in creating all forms of oppression, environmental as well as social. Ecopsychology takes a humble perspective which may help us see the real self, not the false one.

Metzner (1999) referred to other psychoanalytic and medical model concepts in his perspective of ecopsychology. He compared overpopulation to a *disease model*, such as cancer or a parasitic infection; the Western worldview with a *superiority complex*; and capitalism to an *addiction*. The concept of *developmental fixation* is used to describe the cultural pathology of Judaeo-Christian civilization, and *dissociation* plays an explanatory role in how the splitting between our external and internal worlds occurs. Metzner believed humans are vulnerable to *collective amnesia* and *repression*, especially of the ecological unconscious, allowing an ecological trance to take hold.

A recent branch of ecopsychology developing in the 1990s is *ecological literary criticism* or *ecocritism*. Jungian ecologist West (2007) explained that ecocriticism finds its focus in the inner connections between nature and culture, specifically in the cultural artifacts of language and literature. Ecocritics look at the way nature is represented in literary texts, believing that myths, metaphors, and attitudes found in literature mediate our experience of nature. They find insights in both the literature of feminism and indigenous people. Feminist writings can show

parallels between the exploitation and marginalization of women and land. In some indigenous literature, there is wisdom about different states of mind that know and value the land.

Ecocritics are often also environmental activists, looking at ways to enrich our understanding of the relationship between humans and the planet. Ecopsychology is being used in therapeutic ways to expand the domain of psychotherapy. The central holistic principles of humility, inclusiveness, integration of consciousness and unconsciousness, and wholeness can be incorporated into client work when psychotherapists recognize broader archetypal, ecological themes. These ecopsychological concepts and practices can help practitioners creates a person-in-environment model instead of the more restrictive, person-in-isolation view.

Historical Perspective of Jung's Interest in Overpopulation as an Environmental Problem

Jung's lifetime, 1875 to 1961, covered a period in which the world evolved from essentially Middle Age conditions to an emerging industrial age of technology (Sabini, 2008). His upbringing in a bucolic Swiss village put him in intimate contact with nature, and he continued to draw strength and inspiration from every aspect of the natural world throughout his life. Jung was witness to man's turning away from nature and the consequent plunge into increasing chaos. He saw first-hand the rise of industrialization, urbanization, worldwide wars, chemical weapons, political extremism, explosion of population, and genocide. Jung's unusual capacity to access his archaic mind as well as the modern one gave him clarity on how our dissociation from nature was manifesting in dysfunction (Sabini, 2008).

In his work, Dr. Jung did not address specifics of ecology and environmental destruction, including overpopulation (Yunt, 2001). However, his awareness and concern for these issues is replete throughout his works. To him, nature was interchangeable with the human soul, spirit, and psyche and the danger of alienation "runs like a leitmotif throughout Jung's opus" (as cited

in Sabini, 2008, p. xi). He made clear in his writings that he saw humans as a part of, but not superior to, the rest of the world's creations. According to Jung (1976), our capacity for consciousness while possibly unique to our species has permitted us to deviate from divine law in a way that animals do not. By overvaluing consciousness and forgetting that a primordial foundation connects all of life, our choices are made in an ego-driven vacuum without ascertaining whether there is foundational support for it.

In his memoirs, Jung (1963/1989) described his reverence for the natural world extensively. He summarized his personal experience of interconnectedness with Nature:

> At times I feel as if I am spread out over the landscape and inside things, and am myself living in every tree, in the splashing of the waves, in the clouds and the animals that come and go, in the procession of the seasons. There is nothing…with which I am not linked. (p. 225)

Jung was deeply concerned about the Western preoccupation with conquering Nature. Attempts to control Nature have been approached externally with rationalism and intellect, leaving ourselves without a connection to our inner nature as well as Nature. According to Jung (1978), Western man lacks the conscious recognition of his own inferiority to the nature within and around himself, and he will be destroyed by this nature if he does not learn that he may not do exactly as he wants. Humanity's blind faith in its own progressiveness ruled by conscious reason causes its one-sidedness that fails to recognize the power of Nature. Jung believed a concrete relationship with Nature is necessary for life satisfaction. He referred to the industrial worker as a "pathetic, rootless being" and capitalism as a system unlikely to provide psychic nourishment is its pointless striving for material possessions (Jung, 1950/1977b, p. 202).

In *The Symbolic Life: Miscellaneous Works* (1976), Jung cautioned that if we do not take moral responsibility for overpopulation and environmental problems, Nature will put an effective stop to these problems through accident and illness. With technology, we may put an end to a

disease and develop a new food source, only to have populations increase at such an unnatural rate that unsustainable conditions are created. He further wrote that by believing that we have conquered Nature, we are overwhelmed by the natural fact of overpopulation, which is then unmanageable because of our psychological dissociation and incapacity to reach necessary agreements (Jung, 1976).

Jung believed that the development of consciousness through science and technology had occurred too quickly, leaving the unconscious behind and unintegrated: a dangerous position. But man is so unaware of this psychic discrepancy that he does not realize that the greatest step forward is balanced by an equal step back, and that life at its best is balanced between pleasure and misery (Jung, 1963/1989). He also cautioned that civilization's greatest achievements would come at a cost to the natural world. Jung (1912/1977a) wrote, "There is no question that [man has] sacrificed many beautiful things to achieve your great cities and the domination of your wilderness. To build so great a mechanism [man] must have smothered many growing things" (p. 17).

Jung (1975) felt our unhealthy addiction to external things stemmed from a desire to silence our fears. We actively seek distractions to drown out instinctive warnings and prevent somber reflection which might require action. Noise, for example, and the complementary taboo on silence can scare away inner demons that could alert us to the alarming environmental threats everywhere and in plain sight. Noise also gives us a false sense of security, especially in groups or masses of individuals, and normalizes signs of pathology. Without the ability to concentrate and reflect, it is easier to relegate snowballing population figures and ecological destruction to a state of unimportance or hopelessness. Modern life contains many other immediate distractions

as well to the extent that life can become a daily march to the sea without time to address more far reaching crises.

In a 1959 interview, Jung made clear where he thought the responsibility for our environmental problems lies. Infinitely more devastating than natural disasters is the capacity of man for evil, and psychic epidemics affect individuals as well as whole nations (Jung, 1959/1977c). When humans are combined in a social mass, Jung thought that the individual was reduced to a condition of diminished responsibility and the effects of the unconscious are cumulative. The mass man is more likely to condone the pursuit of wish-fulfillment and drift into that infantile dream-state that "never thinks to ask who is paying for this Paradise" (Jung, 1970b, para. 538). In these comments, Jung seems to be suggesting that increases in the (social) masses could work to decrease individual accountability to environmental alarm.

Jung (1988) wrote that all well-meaning people should be terribly and morally concerned with the fast-increasing population, but that few seemed to be. He warned that overpopulation could create conditions that either cause people to live like termites or develop a competitive destructive instinct. Many years later, E. O. Wilson (2012) wrote these words that seem to echo Jung's concern:

> It is not the Nature of human beings to be cattle in glorified feedlots. Every person deserves the option to travel easily in and out of the complex and primal world that gave us birth. We need freedom to roam across land owned by no one but protected by all, whose unchanging horizon is the same that bounded the world of our millennial ancestors. Only in what remains of Eden, teeming with life-forms independent of us, is it possible to experience the kind of wonder that shaped the human psyche at its birth. (p. v)

In his essay explaining the phenomenon of flying saucers, Jung (1970a) again mentioned concern over population numbers. He suggested that the impulse to spin such fantasies springs from an underlying distress and the need that accompanies it. Fear of the hydrogen bomb and, at a deeper level, the prodigious increase in the population figures were not problems people

wanted to talk about, and a suspicion that the earth was becoming too small for us could have fostered a wish that space travel was a viable option. Congestion causes fear, and it was not hyperbole to reason that help might come from extra-terrestrial sources. To Jung, this fantasy seemed only slightly more unrealistic than our "optimistic references to the incalculable possibilities of intensive food production, as if this were anything more than a postponement" (Jung, 1970a, para. 615) of the inevitable.

Jung made observations of the continual shrinking of man's living space due to population, eroding optimism for many races (Merritt, 2012b). Writing that risks grow in proportion to expanding populations impinging on each other, Jung speculated Nature will conspire to dispose of her surplus with the underdeveloped countries suffering the most. He thought many of the social problems like drug abuse, promiscuity, and consumerism were actually attempts to fill the vacuum in our souls and noted increasing levels of pathology from the ravages of technology, neglect of the laws of nature, and environmental pollution (Sabini, 2008). Tensions between groups and nations increase as areas become polluted and food and water resources dwindle.

In his letters, Jung (1975) mentioned his concern about overpopulation repeatedly. In 1951, he wrote to an Austrian colleague that the danger of overpopulation was already staring society in the face and had not reached public consciousness, especially legislators who were blind to the issue. He also remarked in a meeting in Vienna that "there are few things which have caused as much anxiety, unhappiness, and evil as the compulsion to give birth" (Jung, 1975, p. 15). On another occasion, he wrote to his friend, Adolf Keller, about his fears for future generations that will have to face either overpopulation itself or the impact of overpopulation (Jung, 1975). In a written consultation with a colleague about a patient named "X," Jung

compared the patient to the average man who is reluctant to understand his psychology and learn about the unconscious, especially in areas he wants to avoid like his fertility and the inevitable overpopulation.

In other letters, Jung responded to female inquirers about the decision to have a child. In one, he advised Madam Katz that the decision to have a child must be a *fate*, not a personal wish. In another, he congratulated another woman on her new home and land and wished her time to commit her plants to the earth and to tend to their growth. In this letter, he included a remark that expresses the reverence he felt humans and the earth should have for each other, "The earth always needs children – houses, trees, flowers to grow out of her and to celebrate the marriage of the human psyche with the Great Mother" (as cited in Sabini, p. 220).

In the foreword of Odajnyk's book (1976) on Jung and politics, Marie-Louise von Franz wrote that Jung was more threatened by overpopulation and pollution than by wars. Odajnyk described the familiar chain of events that an increase in population alongside industrialization had shown: increased social mobility, breakup of communal ties, disruption of traditional norms, extremes of wealth and poverty, labor surplus, masses of unemployed with no place in society, chronic economic insecurity and social frustration, and an absence of institutionalized ways of processing grievances. Odajnyk noted that such a situation gives rise to "a mass of isolated, unstable, alienated, anxious, powerless, and despondent individuals" (p. 45) and in Jung's terms, *constellates the collective unconscious* (p.45). Seen repeatedly in countries today, this psychic epidemic occurs where population has grown beyond the area's ability to sustain it. It is obvious that persons caught in these situations can be vulnerable to false promises and desperate options.

Post-Jungian Interest and Scholarship on Overpopulation and Ecological Problems

Jung had profound respect for the natural world and believed in the cosmic nature of the mind. He saw individual consciousnesses that had lost their connection with the psychic totality as the source of our alienation. Despite Jung's great concern with ecological problems, including overpopulation, it was left to those who studied his work to develop his ideas in the direction of ecopsychology.

James Hillman became a central figure in ecopsychology. He was concerned about the field of psychology narrowing into a specialty where the human soul is estranged from its home (Hillman, 1995). He put psychology at a crossroads where it can either continue its track of maintaining the closed vessel of therapy or extend its horizon to allow the inner consciousness to flow into the outer. Reviving the Latin term *anima mundi* to describe the *soul of the world*, Hillman expanded his archetypal psychology by adding culture, ecology, cosmos, and philosophy to the Jungian discourse (as cited in Tacey, 2012). Although criticized for rebelling against Jung's work, Hillman actually reclaimed part of the lost heritage of Jungian thought by using philosophical dimensions of Jung's work to reposition archetypal psychology to include taking the world's suffering into account in therapy. As had Jung, Hillman argued that a mass loss of soul defines our times and a world robbed of soul will deanimate and inflate the investment of being a person (as cited in Fisher, 2013).

This more inclusive understanding of psychic reality is being explored by a new generation of depth psychologists, including Stephen Aizenstat, Robert Sardello, Robert Romanyshyn, Mary Watkins, and others. Stephen Aizenstat (1995) is among those depth psychologists who seek to carry Jungian theory to greater depths lying beyond human culture. He has suggested a more inclusive understanding of psychic reality in which all creatures and

nonliving things are animated by psyche. Although contemporary Jungian psychological practice has primarily centered on the human psyche, Aizenstat believes the depth psychology of the future has a pivotal and, as yet, unrecognized role to play in understanding ecological problems. He has argued that it is the responsibility of depth psychologists to advocate on behalf of all who share the world. Aizenstat defined four general areas in which the depth psychologist can play a role: (a) redefining applied psychology from an ecocentric worldview, (b) phenomenologically researching interactions with nonhuman psyches, (c) working with personal pathology in wholeness context, and (d) reducing alienation from the natural world to improve physiological health.

Others like Rinda West (2007) work directly in experiential settings using Jungian concepts. West has taught ecological restoration and classes on restoring land ethics. She believes the ecological crisis and psychological epidemics of addiction, depression, and hopelessness go hand in hand. West acknowledges the work of James Hillman and Andrew Samuels, archetypal psychologists who view that the disease they see in their offices is disease that is reflected in the world itself. Other ecopsychologists, including Chellis Glendinning, Paul Shepard, and Ralph Metzner have argued that it is actually through the current ecological breakdown that we are recognizing the soul of the world (Shepard, 2012). West recommends using Jung's concept of the psyche seeking wholeness to proclaim the joy, richness, and personal growth to be found in connecting to nature rather than a focus on an unrelenting message of guilt and despair.

Jerome Bernstein, Mary-Jayne Rust, and Sandra White are several post-Jungian authors who are working to develop ecopsychology. In the 2012 anthology edited by Rust and Totton, *Vital Signs: Psychological Responses to Ecological Crisis*, these writers described how the

multiple ecological crises with which society is faced affect them in their practices. Bernstein is a Jungian analyst who draws from his relationship with American Indian cultures to promote healing the relationship with nature through a transrational consciousness. White roots all of her work as an ecopsychologist and ceremony maker in Jungian analytical psychology. In her writing, Rust (2012) considered the question many working in this area ask, "What if we fail?" (p. xviii). It may then be the role of ecopsychologists to help people handle the pain and despair that will accompany the "end of the world" as we know it and to hold some hope for remaining humanity (Rust & Totten, 2012).

Hauke, a Jungian analyst and writer, sees Jung as being on the cusp between modernism and postmodernism. He acknowledges that Jung has been criticized for his many binary distinctions and that Jung's ideas have nowhere near universal acceptance. Hauke believes that it was Jung's intent to give psychology a set of workable tools and his binary concepts allow for useful exploration of the gray areas of the psyche (as cited in Ryland, 2000).

One of the strongest advocates for the use of analytic theory in environmental work is Dennis L. Merritt, a Jungian analyst and former biologist, who considers Jung the prototypical ecopsychologist. He believes ecopsychology calls for the deepest understanding of our ecological issues and that Jung offers the most fundamental analyses (Merritt, 2012b). Merritt gives workshops on Jungian ecopsychology and writes extensively on applying Jung's theory to the field.

In the last two decades, the concepts of *ecotheology* and *ecospirituality* have appeared, with religious-oriented authors like Matthew Fox and Thomas Berry (Merritt, 2012b). A growing number of philosophers, known as *ecophilosophers*, have been examining the philosophical bases of our attitudes toward the natural world and questioning our values and

environmental ethics. Warwick Fox is one such ecophilosopher who has proposed that we can learn to defend the integrity of the world from a sense of love. Merritt (2012b) challenged the dominant philosophical positions towards the natural world by making these points: (a) the need to change to an Earth-centered approach and develop an ecological conscience, (b) the need to ask deeper questions and look for root causes, and (c) the need to recognize how we can identify more deeply with the world.

Although not Jungian scholars, many social scientists have been increasingly active in asking questions and writing about re-visioning our relationship with the natural world, including sociologist William Catton, economists Herman Daly, and Joshua Farley, environmental lawyer Christopher Stone, and ecofeminist Carolyn Merchant (Merritt, 2012b).

Core Concepts in Analytical Theory and Jung's Writings Important to Ecological Study

The failure of the modern environmental movement's rational approach to warn and motivate pro-environmental action in the face of serious environmental threats and the unresponsiveness of mainstream psychology in responding to the inaction and denial about these threats has increasingly led to the recognition of the true source of our ecological problems: ourselves. Instead of looking for conventional answers "out there," many are beginning to consider the human psyche as the source of our ecological troubles.

Although Jung did not envision ecopsychology per se, his philosophical convictions and theoretical approach to psychology carry both the awareness and an approach to understanding and dealing with one of humanity's most significant problems: balancing human needs with the ecological needs of the natural world (Yunt, 2001). Jung knew that the human psyche without a connection to nature is capable of great disregard and destruction of it. Jung's holistic view of the psyche with a spiritual dimension and a deep connection to nature has been found by a

number of those interested in ecopsychology to be ideally suited to understanding the pathology fostered by separation of psyche, nature, and spirit (Merritt, 2012b). The reviewed literature describes how Jungian concepts are being used and reformulated within the ecopsychological framework (Merritt, 2012b; West, 2007; Yunt, 2001).

Collective Unconscious/Consciousness and Ecopsychology

Jung's idea of the *collective unconscious* has been one of the most important concepts in the development of ecopsychology. After his split with Freud, Jung began to consciously submit himself to the impulses of the unconscious. Through his dreams and fantasies, he came to believe that "below the threshold of consciousness, everything was seething with life" (Jung, 1963/1989, p.178). From his exploration of the unconscious, Jung dedicated his life to the service of the psyche. He realized that it was not enough to have insight into the collective unconscious but that the insight often comes with an ethical obligation (Jung, 1963/1989).

Ecopsychology addresses the moral obligation that the unconscious is bringing to our awareness through environmental destruction. The collective unconscious can connect us with the animal soul and the indigenous man within—connections that we need in order to care for the environment (Merritt, 2012b). Jung argued that these vital associations and feelings were still available in the unconscious (as cited in Bishop, 1990). A pioneer in systems theory, Gregory Bateson believed, like Jung, that the collective unconscious mind was greater and wiser than consciousness and that the human conscious mind was only of a limited quality. He believed that all three systems of the individual, society, and ecosystem were part of one supreme system that is beyond the self of the individual. Ecological health could only come from humans being in touch with this unconscious order (as cited in Hardy, 2008).

According to Yunt (2001), it is contact with this prerational and symbolic dimension of the psyche, associated with the limbic system, that helps lead to the experience of one's *ecological self*. In the ecological self, the psyche and the world are consciously joined through a transformation of one's psychological perception of one's self and one's place in the world. It is through the development of this ecological self that many ecopsychologists see the potential for humans to develop a heartfelt empathy between the human and non-human consciousness of the ecosphere. The broader view of psychic reality being explored by a new generation of depth psychologists is that all phenomena in the world have subjective inner natures. The vision of the collective unconscious as primarily a human phenomenon must be broadened to a world unconscious composed of all presences (Aizenstat, 1995).

Archetypes and Ecopsychology

Jung defined *archetypes* most simply as, "the content of the collective unconscious" (Jung, 1969c, para. 88). As primordial images, archetypes are determining influences that guarantee in every individual a similarity and sameness of experience that is independent of tradition (Jung, 1966). According to Jung, archetypes form the ancient natural core of the human psyche and our most basic connection to nature. Archetypes have their own energy and dynamism, giving them autonomy and numinosity. Merritt (2012b) added the belief that the ego inflated by archetypal energy has contributed substantially to the hubris that defines modern humankind and causes humans to destroy their natural world.

The *anima mundi* or world soul is one of the primary archetypes relating to ecopsychology. Intrinsic connection among all living things is a myth that is one of the oldest experiences of mankind. Both spontaneous wonder and dread characterize the human experience of Mother Earth (Roszak, 1992/ 2001). The Earth Mother is a universal symbol, and numerous

cultures point out that she is both benevolent and destructive. In writing on the inaction and denial about global warming, Stein (2012) noted that in order for there to be full understanding of the consequences of climate change, all potential aspects of the mother archetype must be considered. Changes are not only destructive but also instructive of the eventual loss and dissolution of all things.

Jung felt overextended scientific-technical reason in the modern world had repressed and ignored archetypal realities that would lead the personal self into wholeness, and it was a primary task of psychology to reconnect the self with nature in a healing relationship (Yunt, 2001).

White (2012) examined the archetype of *sacrifice*. To sacrifice, we surrender something for the attainment of some higher advantage or dearer object. For the best sacrifice to be possible, according to White, there needs to be the presence of love. Mobilizing this archetype is critical for overriding individual selfishness for the world.

The interesting archetype of Cassandra is mentioned in ecology literature. After being given the gift of foresight by Apollo, Cassandra reneged on her promise of a sexual liaison with him. Apollo retaliated by taking away Cassandra's confidence in her predictions, and her warnings as a visionary were ignored by all. She was increasingly marginalized and went mad, dying tragically (Merritt, 2012a). This archetype reminds those working for environmental change that the voices that *see* the dangers of the future must speak out, even while enduring society's damnation (Shamas, 2011).

Complexes and Ecopsychology

The idea of *complexes* was so central to Jung's ideas that he developed an entire complex theory. Explaining the complex as a constellation of unconscious retentive emotions experienced toward a specific psychological or physical feature, Jung thought *complexes* or

feeling-toned complexes could be conscious, partly conscious, or unconscious. A complex stems from basic instincts and at its core is an archetype. This psychic situation is strongly accentuated emotionally, has a powerful inner coherence, and a relative high degree of autonomy. It is under minimal conscious control, if at all, and may seem irrational and compulsive. Jung wrote that the complex is resistant to change, usually of long-term duration, and drives repetitive behavior that may seem illogical (Jung, 1969b).

Robertson (2012) believed humanity is facing planetary crisis based on its collective complex of apathy, produced by primal anxieties about lack of control. The narcissism of seeing ourselves as the pinnacle of evolution is related to the cultural complex of seeing our needs as most important. Metzner (1999) suggested that at the core of the psychic alienation of the West from the natural world lies a deeply-rooted humanist superiority complex. Environmental disintegration as a concept is both unfathomable and unthinkable to humanity and triggers chaos in the psyche and the activation of numerous complexes. A *fear of death and annihilation complex* is particularly endemic in the West. Inaction and denial are the result of a culturally-defined Western subjectivity that allows the ability to see, yet ignore, and thereby render the threat harmless (Stein, 2012).

Macy (1995) outlined the emotions that are constellated with our complexes about the environment: terror, rage, guilt, and sorrow. Our disbelief, denial, and despair hold us captive, trapping us in numbness and preventing us from facing our grief. There are empowering principles to be gained from working with despair, including a reconnection with the larger web of life and all other beings. Our feelings of social and planetary distress are impelling us towards a shift in consciousness. As we are confronted with our mortality as a species, understanding the

tragic mistake of seeing ourselves as separate and competitive beings can be transforming (Macy, 1995).

Ryland (2000) wrote about a significant complex that affects us individually and socially. The *environmental angst complex* is a huge source of painful and conflicted feelings, triggering feelings of anxiety, pessimism, and disempowerment. As with any complex, irrational action or lack of appropriate action can be the result.

Shadow and Ecopsychology

In *Aion*, Jung (1969a) explained his concept of the *shadow*. A Jungian approach often begins by looking at the unconscious neglected parts of our self. Our personal shadow often reflects out onto the world at large. As the hidden or unconscious aspects of oneself, which the ego has repressed or never recognized, the shadow represents the sum of all the personal and collective psychic elements that are denied conscious expression by the ego because of their incompatibility with ego-chosen conscious attitudes. To become conscious of the shadow requires acknowledging the dark aspects of the personality as real and to assimilate it requires considerable moral effort. As the persona is resistant to acknowledge the shadow qualities, projection-making onto the Other is common. Jung encouraged knowledge of the shadow for self-knowledge, instincts, and abilities which could be also used for good. He distinguished between the *personal shadow* and the *archetypal* or *collective shadow*. With the personal shadow, one might recognize relative evil in his own nature. The collective shadow contains all the evils of mankind.

Recognition of the shadow is especially relevant to ecopsychology. An evolution of consciousness towards the natural world is obviously required, and Jung was convinced that this was possible only when one consciously understands, accepts, and integrates all aspects of the

self, including projections, denials, and shadows (Yunt, 2001). It is only through conscious honesty that we can recognize and become accountable for the harmful actions we have inflicted on nonhuman life forms. Ecopsychologists can help people understand that feeling guilt can be a transformative state for moving to a more compassionate consciousness. Ecopsychologists, as Jung did, must recognize the need for self and societal criticism and challenge us to engage in it.

With the one-sided scientific-materialistic worldview so entrenched, our projections come back in the form of ecological imbalance (Yunt, 2001). Unbalanced rationality represses the collective shadow which has been forced into a defensive and aggressive position. It is for ecopsychology to help people acknowledge and relate to their personal and collective shadows towards nature and to once again gain access to healing symbols.

As an atmospheric climatologist and Jungian analyst, Kiehl (2012) had a unique perspective. In speaking of the lack of change occurring to the warnings about climate change, he discussed how the shadow of global warning can be considered from individual, collective, and archetypal levels. As individuals, we are unwilling to acknowledge our own role, even though we are all contributing. We may prefer to blame the corporation, for example. At the collective level, our fundamental belief in unending growth has a shadow side of forever consuming. If we do not question the value of constant growth, we will never see the dark side of needing to devour. Relatedly, archetypal energies have both positive and negative forms. By consuming so much of the Good Mother we projected Earth to be, we are seeing the appearance of the Terrible Mother.

Kanner and Gomes (1995) described the *consumer self*. This is a false persona that has become programmed into the identities of the members of a consumerist society. Often abetted by psychologists, the false self is created by a distortion of authentic human needs and desires

that produces a compulsion to buy and consume in search of fulfillment. Along the way, the environment is consumed and destroyed. Ecopsychologists can identify and nurture dormant qualities that will flourish when in contact with the natural world.

Heightened personal awareness can lead to recognition of the collective dimension of evil we all share. We realize the evil within by honestly acknowledging how much evil we are capable of doing, both individually and collectively (Merritt, 2012b). Jung wrote about an individual who is conscious of these shadows. He is no longer able to say *they* do this or that or *they* are wrong: "Such a man knows that whatever is wrong in the world is in himself, and if he only learns to deal with his own shadow he has done something real for the world" (Jung, 1938, p. 140). Ecopsychology needs to share this message.

Loss of Numinosity and Ecopsychology

Jung (1969b) spoke of *numinosity* as the quality belonging to an object or an invisible presence that causes an alternation in consciousness. An archetypal image could take the form of the numinous by acting as an unconscious organizing principle that results in an unusual or heightened psychological awareness. Having a numinous experience can feel spiritual in nature. Jung considered nature as a primary source of numinosity, and he was concerned that humanity's alienation from nature had destroyed its capacity to respond to numinous symbols and ideas. He believed that this had put us at the mercy of the psychic underworld, thereby losing our spiritual values to a dangerous extent (Sabini, 2008).

The environmental losses that we stand to face in this generation are thought to be unparalleled in history. Personal hardship has always been softened by a continuity of nature but this belief in the continuation in the world as we know it is no longer assured. In this state of disintegration from the spirit, and especially the spirit of nature, it is no wonder that many people

feel disbelief and despair. Another critical task for ecopsychology is to explain the need for connection with the numinous.

Spirit connections with animals are part of the collective unconscious. Jung maintained that to be truly human and reach one's potential, one had to be in relationship to animals (as cited in Merritt, 2012b). Only animals obey the laws of nature and by doing so connect us to the emotional energy in nature. Faver (2009) wrote on the growing interest of the impact of animals on human spirituality while, at the same time, animals are persistently being exploited. Using a definition of spirituality as "the process of taking our rightful place in the web of life" (Faver, 2009, p. 362), she believes that spiritual practices based on the human-animal bond can be used by social workers and others to foster an awareness of the kinship of life and to nurture compassion for all living beings.

Ecopsychologist Perluss (2012) wrote that the loss of numinosity is one of the high costs of too much civilization. It is less obvious than the physical damage but without it the world becomes dehumanized and our emotions dissolve. She described *numinous* as something supernatural and mysterious, filled with a sense of the presence of the holy. We need a connection to the numinous to sense the unconscious energy of the archetypes. For Perluss, the practice of ecopsychology is the willingness to step beyond the boundaries of the familiar and enter the mysterious space between psyche and nature. Ecopsychology must strive to be a science, but it is also a spiritual practice.

Psychological Dissociation and Ecopsychology

The psychological mechanism of *dissociation* lies at the heart of how people manage the conflict between their concern for the environment and their non-sustainable practices. Jung (1971) spoke of the state of *dissociation* as a necessary psychic activity for the development of

personality. When the ego identifies with a particular function, thereby depressing identification with others, this is a psychic dissociation that produces a tension of the opposites that can advance the complexity of the personality. However, when people are too deeply immersed in one of their psychic functions, as a result of trauma for example, and have differentiated it into their sole conscious means of adaption, the dissociative splits create *splinter psyches* (Noll, 1989). These splinter psyches can have increased autonomy from the archetypal core and exert irresistible force over the ego.

In his work on psychological types, Jung (1971) explained that whereas an individual may gain an advantage by adapting to collective demands and expectations, he runs the risk of alienating parts of the self, degrading the wholeness of the personality. He stated, "The more [the individual] identifies with one function, the more he invests it with libido, and the more he withdraws libido from the other functions" (Jung, 1971, para. 502). The reasons for psychological dissociation in our culture are multifold. In the United States, the culture favors extraversion, action, rationality, and individuality. According to Jung's work on dissociation, this one-sidedness limits access to the other functions, like introversion and intuition, which could be critical functions in addressing our environmental issues.

Metzner (1999) believed the entire culture of Western industrial society is dissociated from its ecological substratum. It is not that we do not have the knowledge or perception of our impact on the environment; it is that knowledge has been dissociated from the total effect by habitualizing it into all of our social institutions. Metzner equated the dissociative split between humans and nature as one between the spiritual and the natural. *To be godly* in the West has historically meant overcoming and being separate from nature. Metzner felt that this separation of our own nature and experience has had ecologically disastrous consequences and its distorted

perception has played out in the spread of European civilization around the globe. Metzner wrote, "It *is* a distorted, counterfactual image: we human beings are not, in fact, separate from or superior to nature, nor do we have the right to dominate and exploit nature beyond what is necessary for our immediate needs" (p. 96).

Applying what is known about psychopathology to the individualistic worldview and separateness from Nature prevalent in the West, ecopsychologist Andy Fisher (2013) wrote about how this has led to the denial and avoidance of proenvironmental action. The prevalence of shame accompanies the experience of not having the whole of ourselves accepted. An individualistic existence resulting from thoughts and fantasies rather than meaningful interconnectedness can promote a constricted, unfree, and contact-impoverished existence. To adapt for purposes of security and control, we develop a resistance to change, even while experiencing a soulless environment.

Macy (1995) believed we are caught between a sense of impending apocalypse and fear of acknowledging it, resulting in: disbelief, denial, and a double life. In her writing, she enumerated the fears that hold us captive and inhibit action. There is fear of pain, guilt, and feeling powerless. Towards others, there are fears of appearing morbid, stupid, unpatriotic, and too emotional. Followed by fears of causing distress, provoking disaster, and having religious doubt, our ability to cope and make change can drive us toward despair. Macy has conducted ecology workshops on despair and empowerment and believes this is a continued role for ecopsychology.

In the *Red Book*, Jung (2009) spoke of a dissociated God that has no concern for man. This God is the manifestation of the Pleroma state and, in it, man is undifferentiated and therefore, *nothing* (Stein, 2012). The confusion in the psyche that can cause man to reject the

presence of the Godhead in himself is the source of the dissociated God who views with contempt all things human.

Individuation and Ecopsychology

The concept of *individuation* used by Jung means the process of differentiation by which individual beings that are distinct from the collective are formed. It requires individual lines of development which can never be a function of collective norms (Jung, 1971). During the process, the personal and collective unconscious are brought into relationship with the conscious, extending consciousness and creating a whole personality.

Yunt (2001) applied Jung's thoughts on the ethical responsibility of moving towards wholeness to ecopsychology. If we turn more of our attention toward the self, we must at the same time extend our concerns beyond the personal and begin to embrace the health and wholeness of our natural and social environments as well. Otherwise, the ecological self becomes another form of anthropocentrism, asking how an environmental problem will affect humans (Yunt, 2001). For ecological healing, Yunt wrote that we must transcend the desire for a romantic return to archaic consciousness and develop an ecocentric, rather than egocentric, worldview. He believed that Jung charted a path for ecopsychology to help people to recognize and live out of this worldview.

The solution to environmental problems is the same as for other pathologic projections of the human psyche: becoming fully conscious of the source and dynamics of the problem and then working towards a reciprocal and sustainable relationship with the unconscious and the environment (Merritt, 2012b). Merritt (2012b) reflected a Jungian principle when he wrote that working for political, economic, and cultural change must be accompanied by self-work: "We

must stop bewailing the world for its demonic activity while we blindly make our individual contributions to racism, sexism, and intolerance" (p. 62).

Until this century, Western science had broken down the world into smaller pieces, dividing mind from matter, plants from animals, and humans from nature. In what she credits as the greatest shift in perspective of our time, Macy (1995) described the difference general-systems theory has made in our way of seeing. We are beginning to look at wholes instead of parts and interconnecting flows. What once was the Other is being recognized by some of us as an extension of the same organism and our feelings as legitimate sources of input. This transforms the meaning of an individual consciousness and what it means to individuate. Paradoxically, the process of individuation ultimately extends the individual beyond the individual self to wholeness, and "this is what sets Jungian depth psychology apart from all other psychologies, which focus mostly on individual wellness and healing" (Perluss, 2012, p.185).

Summary

A thorough review of the existing literature related to the research question was performed. The question of *How is awareness of human population growth as an underlying environmental threat affected by understanding of the holistic principles of ecosystems?* required a review of literature from several different fields. First, the scientific academic literature was researched for the historical and current information on environmental issues: their causes, magnitude, and effects. Literature documenting scientific data as well as reports and warning messages to the public were included in this review. The search yielded a growing awareness and a significant amount of factual reporting by the scientific community substantiating human population growth as a major contributor, if not direct cause, to the number and intensity of most of our environmental problems. Much of this literature has been written in the last 30 years and seems to reflect an increasing recognition of the interrelationship of humans and ecological

effects. This part of the review supported my idea in proposing this project that scientific study may be related to a more holistic understanding of the fundamentals of nature.

Literature on awareness of population growth as an environmental threat was also reviewed. Beginning with Malthus's "Essay on the Principle of Population" and the responses of his critics, academic literature was searched to trace the history of awareness of environmental issues including human overpopulation. Lack of awareness about the role of human population growth as a contributory factor to ecological damage is well documented in the literature so I included a review of sources from biologists, ecologists, social scientists, neuroscientists, and, especially, psychologists for what has been learned or proposed about human barriers to environmental awareness. Population growth, as a contributing factor, has always been a delicate, easily misunderstood subject and unique barriers to awareness of its impact exist. The literature documents a long-standing taboo on the discussion of the topic and low general awareness of the amplifying effect of increased population numbers.

A significant amount of literature during this review documented the gap between the possession of environmental knowledge and pro-environmental behavior (Kollmus & Agyeman 2002). My academic curriculum in Jungian Studies and ecopsychology contributed to my beliefs that this gap is related to a culturally-driven egotism that affects our ability to see the self as part of a larger system: the world ecosystem. Review of Jungian and post-Jungian literature, as part of this literature review, yielded information on Jung's views and concerns on the effects of the human disconnection with the ecological self. Jung saw the individual psyche as part of a larger, living system and was dismayed by the widespread lack of recognition and accountability in ourselves as the source of environmental problems. Despite his concerns, he did not write about ecological issues directly, but post-Jungian writers have been very active in using and developing

his concepts to address environmental concerns. Ecopsychology is a specialized field that incorporates analytical theory and ecological principles to approach the gaps in a way that promotes the awakening of environmental reciprocity between humans and nature. Review of both analytical theory and ecopsychology literature was performed to ascertain the applicability of this knowledge to my proposed research.

This review was informative and helped the future development of my rationale in conducting this study. It is well supported in the literature that human population growth and related consumption are very real factors in environmental destruction, threatening many of the world's ecosystem, of which we are a part. Traditional efforts to promote awareness and behavior change have been met with conscious and unconscious resistance. Ecopsychology, with analytical theory core concepts, offers a different perspective on healing the human-nature relationship but as a field, needs to add more data-driven research and recording of experiential data. My study is an effort to move in this direction.

CHAPTER 3: METHODOLOGY

The purpose of this multiple case study was to explore the awareness and knowledge of human population growth among groups of individuals from two different academic and work/volunteer backgrounds, as a factor underlying other environmental issues. I proposed that an understanding of the ecological principles and laws of ecology might affect the responses given by members of the two groups when asked about general awareness of environmental issues and the impact of increasing population growth on those issues. Semi-structured study questions were composed and asked in separate interviews of 10 purposefully-selected participants, and interview data was collected and analyzed. A thematic analysis method was used to code the data into study findings and patterns.

This chapter includes a description of the research methodology, which includes: an explanation of the rationale for working in the qualitative approach and selecting the multiple case study methodology, a description of the participants and how they were selected, data collection and analysis procedures, and an acknowledgement of ethics considerations and limitations of the methodology.

Research Method and Rationale

Qualitative Approach

The decision to use a qualitative research approach was based on the type of data I wanted to collect for the research question of *How is awareness of human population growth as an underlying environmental threat affected by understanding of the holistic principles of ecosystems?* The basic characteristics of qualitative research are that it is holistic, empirical, interpretive, and empathetic (Stake, 1995). This approach was appropriate for this study in order to view this subject holistically and avoid reductionism. I wanted to question interviewees in a

field setting and allow a picture to develop by listening to multiple perspectives with a focus on context and meaning (Creswell, 2014). The data would be collected in a face-to-face setting with open-ended questions to encourage participants to express their thoughts and feelings as they emerged. Qualitative methods also provide the opportunity to collect and organize data into increasingly more abstract units of information. Finally, this study sought understanding of a complex issue that has been understudied in which the researcher has related background experience, making a qualitative research paradigm most appropriate.

Case Study Design

Within the methods of a qualitative approach, this study was best suited to a case study design. According to Creswell (2014), case study research is ideally suited for the study of an issue explored through one or more cases within a bounded system. Yin (2009) recommended the case study method as particularly useful when a *how* or *why* question is being asked. He also noted that the case study methodology may be used effectively when research is being done to study a contemporary event(s), especially of a human psychological experience, of which in-depth understanding is sought and the investigator has little or no control over the outcome. In qualitative case study, the role of the researcher is one of ongoing interpretation to use insight and experience to conduct the data collection (Stake, 2006).

In this study, I wanted to explore the thoughts and perceptions of individual cases within the bounds of a common topic: environmental awareness. My research query wanted to ask *how* is that awareness affected, and I wanted to collect in-depth information about a psychological subject in a flexible and open-ended manner. As the researcher, my knowledge and experience in the fields were an asset for the case study approach.

Multiple Case Study Design

In multiple case study research, the single case is of interest as part of a collection, and the cases are bound together under a common characteristic or condition (Stake, 2006). Multiple cases allow more opportunity for understanding of the condition, and the more cases that are included and the wider the variation, the greater opportunity there is for generalization from findings. According to Yin (2009), when the choice is available, a multiple case design is preferred. There is decreased vulnerability to a case study's integrity when there is more than one case included, and external validity is strengthened. There can be substantial analytical benefits as well, and with more than a single case, there is the possibility of direct replication.

My research was designed as a multiple case study at two levels. The first consisted of two groups under the context of environmental awareness. The two groups represented two cases, each with different acceptance criteria. One case was characterized on the basis of having a qualifying background of life science exposure; the second case was characterized by the absence of this exposure. Within each of these cases, there were five embedded cases with variation in each of their educational and work background as well as demographic characteristics. By interviewing on the same topic with the same or similar study questions, there was an opportunity to analyze the data at both levels.

Participant Selection and Demographics

Purposeful sampling was used to ensure that the participants had the necessary selection criteria for the study. This is the method of choice in qualitative case study methodology in order to discover and understand the most information about the research question (Stake, 1995). This study focused on interview depth and quality so the sample size was necessarily small. Ten participants were selected using personal and professional referrals. The primary criteria for five

of the subjects were that they had at least three years of academic training in one of the life science fields of study and had at least three years of work or volunteer experience in that field. The five subjects in the life sciences group were purposefully selected from as wide a range of disciplines are possible: horticulture, forestry, water conservation, wildlife rehabilitation, and soil science. The five subjects in the non-life science group were purposefully selected from fields with no biological training or experience: accounting, business management, real estate, physical chemistry, and information technology. Differences in demographics such as gender, ethnicity, religion, marriage/family status, and age were selected when available, but academic/work background and availability took preference when selecting the subjects. See Table 1 for more detail on participating subjects. See Appendix D for more extensive information on each participant.

I obtained Saybrook Institutional Review Board (IRB) approval on the basis that the selected participants would be between 18-65 years of age, meet the selection criteria of the study, sign an informed consent indicating their willingness to participate in a study that would keep their identity and place of business confidential, and give written approval to consent to a single confidential digitally-recorded interview.

My first contact was a county horticultural agent referral. He was able to provide me with referrals for two other contacts for the life sciences group, and two others responded to random contacts to biologically-related agencies. All five participants in the non-life sciences group were selected from the organization where I am employed but were not personally known to me. All potential subjects were asked by email if they would be willing to participate and the purpose of the study explained. Ten individuals who responded and met the selection criteria were chosen and invited to participate.

Table 1

Participant Sample Demographic Information

Demographics (*n* = number)	% (percentage)
Life science background (***n*** = 5)	50%
Non-life science background (***n*** = 5)	50%
Male (***n*** = 6)	60%
Female (***n*** = 4)	40%
African-American (***n*** = 6)	60%
Caucasian (***n*** = 3)	30%
Hispanic (***n*** = 1)	10%
Christian (***n*** = 3)	30%
No religion (***n*** = 3)	30%
Non-denominational (***n*** = 2)	20%
Baptist (***n*** = 1)	10%
Catholic (***n*** = 1)	10%
Married (***n*** = 4)	40%
Single (***n*** = 4)	40%
Divorced (***n*** = 1)	10%
Separated (***n*** = 1)	10%
Children (***n*** = 5)	50%
No children (***n*** = 5)	50%
Age (28 – 58 years)	100%

A mutually agreeable time and location were selected for the interview. Settings for the interviews were always safe and secure offices in a public facility, allowing a relaxed environment for open discussion. Before the interview, the purpose of the study was again explained, and an informed consent was signed, allowing the interview to be digitally recorded (see Appendix E). The interviews lasted approximately one and one-half hours each.

Each person was given a pseudonym that recognized them as an individual member of their group. First and last initials of an individual were combined with a number designating the chronological order of their interview and their group. For example, the initials of the first interviewee, BH, were followed by "1S" as he was the first interviewee in the group with a life

sciences background (Group S). Therefore, the pseudonym of the first person interviewed in this group would be "BH (1S)." The group of five individuals without a life sciences background was designated as Group NS. There was also no specific information collected linking them to the organization(s) with which they were affiliated.

Data Collection Methods

The primary source of data for this study was the responses from a semi-structured, in-depth, face-to-face interview. Administering a standardized set of interview questions to all of the participants helped to triangulate the data. This gave different perspectives to the same data set. The research instrument was a set of 30 questions developed by the researcher (see Appendices F and G) and revised after discussion with the research committee. The first 16 items were more general questions about environmental issues including what they believed the current issues to be, what role humans play, and what understanding they might have of ecosystem functioning. The second set of 14 questions focused specifically on human population growth and what they heard or believed about its effect.

My familiarity with the research subject, life sciences, and case work interviewing were strengths in conducting and guiding the interviews. To reduce the potential bias that this also introduced, I attempted to maintain the interview style as neutral and non-directive. Since the interviews were face-to-face, I was able to observe participants as they responded to the questions or added additional comments. Each interview followed the same process steps for consistency.

Data Analysis

According to Yin (2009), the analysis stage is the most difficult and least developed aspects of doing case studies. There are few fixed formulas for case study analysis so adopting

an overall general strategy to guide the data is recommended. The strategy that was most apropos for this study was relying on theoretical propositions. In adopting a strategy for data analysis, four principles were considered for high quality research: attending to all the evidence, addressing all major rival interpretations, addressing the most significant aspect of your case, and using my own prior expert knowledge in the case study (Yin, 2009).

First, I used the analytical technique of thematic analysis to give a consistent, structured approach to analyzing the data. Thematic analysis is a widely used and flexible method for qualitative research in psychology (Braun & Clarke, 2006). It is particularly useful for identifying, analyzing, and describing patterns within data, especially in an under-researched area like this project. In this method, repeated patterns of meaning are searched for across all data. The researcher takes an active role in conducting a thematic analysis, and the themes are related back to the research question. Themes can be inductively created from the data itself or deductive as they relate to the theoretical framework used. In my study, I am relating data patterns to both ecopsychology and analytical theory so meaning was derived deductively. Data can signify a theme not only by frequency of occurrence but by relevance to the research question or by exception. I followed the method of analysis outlined by Braun and Clarke (2006) for thematic analysis of my collected data.

Phase 1 recommended by Braun and Clarke (2006) is familiarizing yourself with the data. To become very familiar with the data, as soon as possible after each interview session, I listened several times to its digital recording and any notes that were made during the interview. I then transcribed each recording verbatim into a notebook and read and re-read the transcription. The second phase of the analysis involved generating codes. For each interview, I created initial codes by forming data segments which were short phrases that summarized the content of a

response or comment. I organized these data segments so that similarities, differences, and exceptions could be seen. In the third phase, the data segments are searched for themes or patterns. In this phase of the analysis, I looked within each case and across cases of the multiple case studies to identify patterns in response data. In Phases 4 and 5, the patterns are reviewed and reworked to refine the findings. Thematic analysis is not considered a linear process, and it is important to reexamine the data before findings are solidified. This process yielded a total of 18 findings from which seven patterns or themes were drawn.

These patterns were then considered in context with the principles of ecosystems, the core concepts of ecopsychology, and selected analytical concepts. This was done to consider the findings and patterns in relation to the research question. Because of the amount of rich data collected in this study from the participants, I also created a case study profile for each of them that gives more detail about their responses.

Research Ethics

Permission to conduct this study was granted by the IRB at Saybrook University. It is the responsibility of the researcher to protect the privacy and rights of any participants, especially since they are generally proceeding with the study on a voluntary basis. Prior to being selected, the subjects in this study were given information about the purpose of the study and nature of the interview questions. To protect the participants, each was given an informed consent letter and given the opportunity to ask questions before the consent was signed. Participants were made aware by informed consent that they had the right to remove themselves from the study at any time without explanation. Additionally, all identifying information was removed from the interview data, and safe guarding measures were taken to secure the storage of the documents.

Limitations and Research Issues

There are expected limitations implicit in this methodology. Probably the greatest strength of the case study method is also its weakness. Results from a study with this method may not be generalizable although the data gathered could point to themes and patterns that indicate the need for further study. Because the sample is not randomly chosen and sampling is purposeful, the population studied is not representative of a larger set. The approach is investigative in nature, and the results are more likely to contribute to a knowledge base about the subject studied. In this research, I was interested in an open mode of questioning to be able to ascertain the familiarity the participant has with laws of ecology and how this systematic thinking shapes perception about overpopulation and environmental threats. Purposeful sampling runs a risk of bias as well. Candidates suggested by referral may meet the intent of the sample but may also have inherent bias as well.

My education and experience in ecological areas can be both an asset and a source of bias. Rigor in the questions asked and meaningful reflection about potential bias helped mitigate some of this risk. The interviews took place in an environment uncontrolled by the researcher. Finally, there is a risk that the questions asked may not have elicited the most complete information.

Summary

In this chapter, a detailed description of the research design and rationale for selecting the multiple case study model was given. Participant selection process was outlined, and descriptive information about each subject presented. The research instrument and how data was collected was explained. Limitations and ethical concerns were addressed. In the next chapter, the findings of the study will be discussed.

CHAPTER 4: FINDINGS

The purpose of this multiple case study was to investigate how the combined personal experience of academic training with subsequent professional and volunteer work experience in a life science field would affect awareness of human population growth as a cause or contributing factor to environmental problems. This chapter presents the themes and supporting findings obtained from 10 in-depth interviews with men and women, half with academic training and professional experience in a life-science field and half with training and work experience in a non-life-science field. A case study profile of each participant is given to provide the reader with additional context.

Summary of Themes

Seven themes were identified by analyzing the patterns found in 18 individual findings. Patterns reflected consistencies found between groups, dissimilarities between the groups, and variation within a group or groups. These themes or patterns were:

1. General awareness and agreement in both groups that:
   a) Humanity is not living in a harmonious relationship with nature.
   b) Humans have a significant impact on or are the direct cause of most environmental problems.
   c) Many or most environmental issues are interrelated.
   d) There is fear about the future impact of environmental degradations but a belief that these problems are solvable by humans.
   e) Continued human population growth will have long-term consequences.
   f) Critical discussion about overpopulation is difficult and actively avoided.
   g) There is high awareness that almost 45 per cent of pregnancies worldwide are unplanned or unwanted.
   h) An individual's preference, if made responsibly, is the only factor to be considered in determining family size.
   i) Environmental/population education must be experiential and targeted towards specific individuals/groups.

2. In-depth ecological understanding of the earth ecosystem was common among those trained in the life-sciences while virtually absent among the non-life-sciences participants.

3. There is more extensive awareness by the life-science professionals of the direct human impact on the environment along with the ability to describe these effects.

4. Obstacles to change were more likely to be identified as inherent to the individual and his/her consciousness by those in the life-sciences rather than the external causes cited by those in the non-life sciences.

5. Life-science professionals more often saw the human role towards the environment as one of action and responsibility.

6. Understanding the cycle of life can originate from various sources such as scientific background, religion, parents, and adult education.

7. There is a segment of the population that is unconcerned with human-caused environment destruction even when aware or educated.

Summary of Individual Findings

Eighteen findings were developed from the data analysis of coded interview responses. They were as follows:

1. In evaluating the seriousness of environmental threat, interviewees from both groups were more likely to list environmental issues that they had personally experienced or were involved with professionally.

2. There was general recognition among the case study subjects that most, if not all, environmental issues are impacted or caused by human activity.

3. There was a widespread belief among study participants that the human-related ecological problems are solvable by human action.

4. When identifying obstacles to corrective actions for environmental problems, interviewees from the life-sciences more often named factors at the level of the individual.

5. Life-science professionals were somewhat more likely to report more interrelatedness among different environmental problems than the non-science professionals.

6. There was a consensus in the study that human activity is a direct cause of environmental damage while population growth itself is less often identified as a cause.

7. Education and experience in an area of the biological life systems contributed to an understanding of the functioning of ecosystems.

8. Although most study participants believe humans have a role in the world ecosystem, there is considerable variation in opinions about the nature of that role. Most (4 out of 5) life-scientists saw humans as having a responsible role towards nature, while the non-scientists (4 out of 5) more often saw the role as recipients of nature's benefits but not contributors.

9. Human responsibility towards nature was defined in more specific terms by interviewees from a life-sciences background than those from a non-science background.

10. There was universal agreement across the study that humanity is not living in harmony with nature, and there will be future consequences for humanity for this.

11. When asked specifically about the relationship between human population growth (HPG) and other environmental issues, most people in both groups felt it was a factor that could exacerbate other environment problems. Participants from the life-sciences group tended to be more specific in their descriptions of the impact.

12. Population biology literacy and the nature of exponential growth were well understood by 4 out of 5 of the life-science professionals but not by those in the non-science group. No one in either group had specific knowledge of population data or trends.

13. The personal impact from population growth reported by non-science participants focused specifically on daily experiences like traffic, school crowding, and cost of living. The life-science respondents generally listed more far-reaching effects: less land availability, altered daily scheduling, less personal security, more resource competition, change nostalgia, and more opportunities.

14. Almost everyone interviewed recognized that overpopulation as a topic of discussion is a hot-button issue and gave reasons why it might be avoided.

15. When asked whether people should limit family size for ecological reasons or if everyone has a right to unlimited family size, only one participant mentioned that family size should be limited due to environmental stress on the world ecosystem. Even though most participants defended the human right to have as many children as desired, many qualified their remarks to include only those who wanted to be responsible parents and could support the children they had.

16. The ongoing research statistics that document a very high percentage of unplanned or unwanted pregnancies in the United States and worldwide were easily accepted by most people in the study.

17. Almost all participants stated their belief that continued population growth will have future negative long-term consequences for the quality of human and nonhuman life. Consequences described by the life scientists tended to be more inclusive of global effects.

18. Participant suggestions for non-coercive means to promote responsible socially-conscious family planning and environmental awareness largely centered on experiential education.

Case Study Profiles

The following is a narrative profile of each case designed to give the reader additional context about individual study participants, their demographic characteristics and perspectives. It is also a space where I can record some of the personally rich insights and comments that were shared with me during these interviews for which I am extremely grateful.

BH (1S)

BH was the first person interviewed for this study. He is a 39-year-old Caucasian male who is married with one child. He has no religious preference. BH is educated in the life sciences domain, having a bachelor's degree in horticulture and botany as well as a master's degree in agricultural education. All of his career positions have been in these fields, and he currently works as a county extension horticultural agent associated with a major university. Through his education and work experience, he has a working knowledge of ecosystems and ecological principles. Interested in both food availability and land policy, BH has a systemic perspective on many of the issues he discusses and a high level of awareness of how complex issues are usually affected by multiple contributing factors.

BH values the increased understanding of the environment that scientific study has given us. He states:

> More and more, as we are able to delve down into micro-ecosystems and habitats, with scientific understanding we learn how deeply each species within a species has evolved through eons to get where they are and if you take away a small component, you learn the importance of it in maintaining a system to work.

From his viewpoint, humans are biologically part of the world ecosystem and should strive to be integrated with the other parts to stabilize the system. He feels, though, that "the

majority of our population is out of touch with their environment" and has moved away from the inherent connection that we should have with nature. BH credits cultural and social interests related to personal belief systems for the illusion of separateness humans have from nature: "We live in a lot of conflict as a species – we know we should cut back on using fossil fuels, and the same week we buy a bigger SUV. We want convenience, and we want what others have," he says.

Working for five years in a city high school as an agriculture teacher, BH says his eyes were opened to the sorts of issues that urban youth are being exposed to at an earlier and earlier age. He explains, "They're forced into having to deal with decisions that they are not remotely ready for, including early parenthood." Although he is not aware of what the statistics are on population growth, BH thinks it is an amplifier of consumption which he personally believes puts the greater strain on the environment.

In his own family of origin, children were needed to work on the farm but BH and his wife made a conscious choice to have only one child. The reasons he gives for this, "we wanted to have a sustainable family unit—not spread the resources too thin—and we each value our own time, too." He continues:

> There's this primal urge we have as a biological organism to expand and grow but then there's this high level of intelligence which we should use to recognize the impact we're having, but we don't….No matter what we do, we will continue to change the ecosystem and have a big impact on the planet. If something does happen, it may not be a human decision. Nature will make the changes for us, and we'll need to be realistic and adaptable to survive.

NB (2S)

NB was referred to me by a local nature activist. He is a single, 37-year-old, African-American male without a religious preference. His educational and career backgrounds are in the earth sciences with an undergraduate degree in forestry/environmental conservation and a

graduate degree in natural resource management. He is certified as an arborist and a silvoculturist. NB has had a diverse career in forestry which he began by working for a commercial forest company in high school. He sought out summer forestry internships throughout college and worked in a variety of settings with the U.S. Forestry Service for nine years. Currently working as the conservation director of a large urban park and arboretum, NB interacts with both park staff and the public. It is apparent that he is very knowledgeable on the subject of ecosystems and ecology and sees forestry as both an art and a science. He is clearly an introspective thinker and observer of human nature and spontaneously offered his views.

NB notes a pervasive relatedness that he sees between human activity and environmental problems. He says:

> There is a tendency for us not to include ourselves in the environment so we tend to think we are separate from the environment or that nature is somehow this ogre that lives in the hills. And what it seems like that has led to is, at least in part, is we manage our resources in a way that doesn't hold us accountable since we are not part of the ecosystem. For me, that's probably the biggest problem.

In discussing the ecological principle of *holism*, NB observed:

> During my entire career, I've had to focus on "function over structure" because I knew that even though people get emotional over trees dying in the park, I knew it came from a place of not understanding that the ecosystem is more important than the life of the individual trees.

When asked about if he thought there was a shortage of people interested in forestry, NB observed that in his career, he has seen many people who are enthusiastic about environmental issues but who lack knowledge and direction about managing our resources:

> The public needs more quality knowledge to expand their consciousness about what's happening. They tend to learn about environmental issues in the same way they learn about money—from their friends, family, or co-workers. And there's some really great people out there who are able to tell us things from their real-life experiences with nature for their whole career. One of my hopes is to that we can get these two together.

> And there is a certain level of consciousness that we need to accept that to a much higher degree than we like to think, the problem is us. I really feel that way about all aspects of the environment. We need more of the knowledge and consciousness that will not allow us to remove ourselves from accountability because if we lose some of the functions of the ecosystem, we will cease to exist.

MK (3S)

MK was referred to me by BH and works in the area of water quality remediation at a state university. He is a 28-year-old, Caucasian male who is single and identifies himself as a Christian. He earned a bachelor's degree in environmental geoscience and continued his education with a master's degree in water management and hydrologic science. In his career, he has worked in the area of water quality remediation as a liaison between the state and private citizens and businesses, helping to resolve chemical pollution and water contamination problems. He now focuses on scientific education in his role as coordinator of a public watershed steward program for a state university.

MK's background seemed to give him a good understanding of mathematical principles. He was the most familiar with exponential growth as an "ever-increasing gain," which he could apply to the concept of population growth. He also had a working understanding of the cyclic nature of homeostatic systems such as ecosystems. His work has largely centered on human health issues, and he sees pollution as the primary issue underlying most environmental problems. In my discussion with him, he states that he has not widely considered the causes beneath this pollution.

MK strongly believes in the solvability by human action of all the environmental problems. His experience in working with the public has influenced him to believe that the two primary obstacles to environmental problems are: (a) lack of education and (b) viable alternatives. "Sometimes individuals might not be aware of the impact that a certain chemical

can have when released into the environment and providing education can inform of the extent of what can happen," he says. He also adds, "Another aspect is convenience. A quick response is usually a matter of convenience for someone and because they don't know an alternative way to handle it."

In his current role as an educator, MK stresses the value of experiential and one-on-one education as the most effective method of raising individual awareness and understanding of problems related to the earth's ecosystems: "Education to truly understand our impact to the environment is rather important," MK commented, "and the more personal we can make it, the better."

DC (4S)

DC is a 58-year-old married mother of two. She is Caucasian and religiously affiliated with the Baptist Church. A registered nurse with a degree in nursing, she has been volunteering as a wildlife rehabilitator for more than 20 years. She works with a local wildlife rehabilitation center and has maintained the required continuing ecological education to do this work. DC explains that she prefers working with animals over working with human patients and gets to use her nursing skills to nurse animals back to health.

As a life-science professional, she is familiar with the general principles of biological ecosystems and says, "As humans, we are not paying attention to the bigger picture. It has to start with the individual but everyone feels like, 'I'm kinda an exception to the rule.'" People want convenience but they are not knowledgeable about the impact of their choices on the integrity of the system that supports them." She feels education about environmental issues has to first engage the individual to truly understand the impact at a personal level before the understanding of systemic impact will be important.

Working in wildlife rehabilitation, DC is very attuned to the loss of animal habitats that continued human growth causes. She says:

> You know, there are so many people coming in they have to build more houses but they're clear-cutting whole forests for not only that but for, in my opinion, purposes that are totally unnecessary. We don't need an amusement park where a forest used to be, and we don't need a teak forest to be cut down so we all can have teak furniture. But for the animals, they need the forest to survive. Where can they go?
>
> People ask me, "Why are you working to save wildlife? Who needs more raccoons that are just going to get in my attic?" But we don't know all the roles these animals play. You have to work for the benefit of the whole.

She also shares with me her insights on how she thinks crowding impacts us psychologically:

> Of course, traffic is bad but besides that, so many more people everywhere change how you plan your day. When you go to a park now, you're in a mob. The reasons you used to go to a park don't exist anymore. You start rearranging where you go and when – to avoid the crowds. I think one thing about population growth is you have less security. People don't let their children just go out and play because security is less; there are more strangers around. We spend more time in our air-conditioned boxes. I wonder what things will be like in 20 years.

DC feels her religion helps her be aware of the dichotomy of humans and their relationship with nature:

> As humans, we can do good or we can do horrible. We have the intelligence that we should know better. With my Christian faith, I believe man was given the authority and the responsibility to pay attention and do what's right for the Earth. I don't think people reject nature as much as they have been pulled away. We enjoy nature but we've become estranged from it.

DC expresses her opinion that individual accountability is in short supply, "People are short-sighted; they don't think their one bottled water will make a difference. But when it's combined with you and you and you, then we have a problem." She states that responsibility can't be enforced but that education should make people more aware of the impact of their choices. "When people don't know, they don't care. They don't see the big deal involved in

killing honey bees—there's an eco-factor involved and you're breaking the chain," according to DC. She further comments on what she thinks should be a changing focus for education:

> I think education has to start with the individual to get it across that the decision he or she makes, whether it's made consciously or not, can have global impact when it's combined with you and you and you. Sex education needs to change to a different level to teach how an unwanted pregnancy could affect not only the individual and the child but go down that slippery slope to impact a family, a neighborhood, or a community.

DZC (5S)

I was able to make arrangements to interview DZC by randomly contacting an agency that employed soil scientists as this was an area of life science that I felt was important to the study. He was a pleasure to interview and contributed a number of thoughtful comments. Identifying himself as a Christian, DZC is a 55-year-old, African-American male who is married with one stepson. He was educated with a degree in general life science and has maintained a long career as a soil conservationist working in multiple areas of conservation with a national agency.

As a soil scientist, DZC is extremely familiar with ecosystem dynamics. He explains that soil is the ultimate ecosystem where microorganisms and nonliving elements live in an interdependent balance on which life itself depends. He says, "Now we're teaching the no-till method to row-croppers because we learned that the more soil is disturbed, the more you lose the goodness of its work because you're breaking up things in there that need to be left alone."

DZC has worked extensively as a liaison with farmers and landowners, and he attributes many of our environmental problems to our unconscious behavior. He states:

> There's a lot of unconscious behavior in this society and a lot of our problems, to me, are the result of that. Humans have a major impact on the ecosystem and being mindful of what we do when it comes to things of nature can make all the difference to the system. Without the ecosystem, we wouldn't be here, and not a lot of people understand that, especially if they're not in a professional discipline that deals with that.

He believes that living in nature requires respecting nature, and being educated about nature produces understanding. He continues:

> If we don't understand something, we're a lot less likely to care. Changing our thought patterns about nature to respect it, instead of fighting it, could go a long way to being aware of our actions. Individuals, especially, see their role as insignificant and excuse their behavior like, "it's just one more this or that." But the collective effect of individuals using pesticides, pouring their oil down the drain or not having their car tuned gets us where we are today. And as our population increases, there are going to be more and more things to try to deal with, more of us doing mindless human things.

DZC advocates for more standards to be in place to guide our behavior. He also feels that opportunities will be available in the future for young people who are prepared to address these challenges. He volunteers his suggestions for change:

> Educate yourself to be mindful and make conscious choices because it can make a world of difference to the system; don't take the rights of another being, human or nonhuman, lightly; be aware of what's going on in the world; take 'self' out of the equation sometimes and don't be so selfish; think about the impact of your actions before you take them; and be an individual yourself before having kids.

BE (1NS)

BE was the first study subject from a non-life science background. She is a 46-year-old, African-American single female. She has no children and is a practicing member of the Catholic faith. With an undergraduate degree in accounting while working on a master's degree in the same field, BE is an accountant in a health-related corporation. Additionally, she volunteers with the Girl Scouts, helping young girls learn self-reliance.

BE takes an economic perspective when she says people often have to base their choices on what they can afford. With greater economic stability, she thinks people might make more environmentally responsible choices. She is not certain about this, though, because "the majority of people are 'takers' and will do what's easiest." In her work in the accounting department, she says "we try to get the word out that if we don't keep the finances balanced, there won't be a

company for anything else." BE makes the comparison to awareness about environmental issues, "a lot of people are out there screaming the message but the collective group can dominate."

Although not formally educated in one of the life sciences and unfamiliar with ecosystem principles, BE credits her grandmother, her faith, and television nature documentaries with giving her an understanding of the circle and connectedness of life. She says, "everything has a purpose and sometimes you don't really know what the purpose was until it's gone. Citing the change in weather patterns she has noticed, she expresses her concern:

> I remember as a kid, we used to be able to go out and see the stars in the sky. It gave you a feeling of something bigger than yourself. But that doesn't exist anymore in most places. My niece, who is 23, has never seen the stars in the sky. And if you don't have the memory of something, you just go with it.
>
> It's just like the quality of the food isn't the same. When I was growing up, my grandmother always had a garden and when she would pick a watermelon, you never thought to say, "Do you think it'll be sweet?" You knew it would be. Now, it's like, "I got that watermelon, and it looked ripe. I thumped it and it sounded fine but when I opened it up, it was no good."

BE believes there are many things that need to change in our environmental behavior but she thinks most people "cop out" on individual action. She states, "Basically everybody knows some things they need to change, but it's optional. You can either opt in or opt out. Nobody wants to stand up until the faucet goes dry." She wonders if society has lost its core and is drowning in distractions, "there's all this trash TV, and you might have three channels out of 900 that are informing people about what's going on in the environment."

She worries about the availability of resources in future. "I'm single and I wonder if there will be any Social Security left for me with more and more people crowding the planet. And if we start to run out of resources, the strong will prey on the weak."

Despite her concerns, BE says she keeps an optimistic perspective. She is able to do this by relying on her religious faith and trying to be "in the world but not of the world." She thinks education and working with the youth like she does is our best chance for having the best outcome.

MC (2NS)

MC is a divorced, 47-year-old, male with three children. He is African-American and considers his religious preference to be non-denominational. Educated with a bachelor's degree in business management, he has worked since college in different retail management positions. Currently, MC is employed as a compliance coordinator where he monitors regulatory activities for a business organization. This was a difficult interview because MC did not seem interested in many of the topics of discussion. He was completely unfamiliar with ecological concepts.

MC says that he has not given much consideration to environmental issues but feels pollution and air quality are probably the most significant but are not necessarily related to the others. He lives in a large industrial city and has observed "huge amounts of smoke going up in the air" from the chemical plants on one side of town. He thinks these problems could be controlled if we had more regulations but he is not sure what the current regulations are. MC does not believe that discussions about population growth would be controversial.

He thinks that humans are superior to the earth ecosystem but should try to manage it so "we can get what we need from it." MC feels humans generally live in harmony with nature and that that will continue "as long as we have a proper plan in place." Likewise, he says, "increased population growth shouldn't have that much of an effect on things as long as we have a thriving environment." He has noticed an increase in traffic in his daily life but feels increasing population numbers in his city "may be good for business."

SB (3NS)

SB is a 33-year-old, African-American female with a degree in real estate. She is married with one child and two stepchildren and refers to herself as a Christian. She is a licensed realtor and has a work history in mortgage lending. Due to instabilities in the real estate market, she presently works for a plumbing business that serves homeowners. As a realtor, SB understands the need for more housing and commercial development but she feels conflicted about the problems she sees being created by "cutting down all the trees." She thinks the trend towards decreased zoning is a mistake and disagrees with some of the new home owner association rules such as forbidding the planting of backyard gardens.

SB is unfamiliar with what an ecosystem is but she feels humans are part of the cycle of life even though she is not sure what their role is in the system. From a viewpoint that "every living thing has a purpose," she feels "we should go more green" but is uncertain about what actions would be effective. Originally from a coastal state in the southern United States, SB is concerned about the oil spills that have occurred and feels that they may increase in the future.

She feels that her son's schools are getting increasingly crowded, and she is worried: "The ratio of students to teachers used to be 15:1; now, I think it's more like 24-25:1," she says. She continues, "I think I see more people are starting to realize that the whole planned parenthood thing about teaching people to plan their pregnancies has a point." She tells me that her brother has 16 children because "he wanted a certain number of boys." SB says this taught her that having a child is a lifelong decision and "it's not like a shirt that you can take back if you decide you don't like it."

VP (4NS)

VP is a 41-year-old Hispanic female with a degree in forensic physical chemistry. She is single and has no children. She was raised as a Catholic but now has no religious preference. Currently, she is working as a systems analyst and doing genetic research.

VP sees humans as both "heroes and villains" when it comes to the environment. She believes that we do not respect our animal companions as we should: "Why are we hunting animals, especially ones that are endangered?" she asks. "Even though we're at the top of the food chain, we depend on the earth for everything but we tend to forget that. I think we're kinda shooting ourselves in the foot by harming the environment," she says. According to VP, the hero side of humanity is expressed by the human mind that can appreciate nature and conceptualize many good things. She thinks everything in the world has a function but is unfamiliar with the principles of ecology.

VP predicts long-term consequences to the mounting environmental damage, and she thinks the growing world population will make things worse. She says, "It takes years, years, and years to grow back the forest lands we are destroying so I think eventually we're going to start seeing the effects of that."

In her hometown which has two large military bases, she describes extensive clearing of forest land to build homes for the massive numbers of military returning from deployments: "As the troops are being pulled back from the Middle East, the bases are getting 5,000 troops in a shot. They can't build fast enough to house them all," according to VP.

As a Hispanic female, she says that she is very aware of the effect that cultural values have on what people think and do. She explains the effects of cultural gender roles on

population in the Hispanic community. In her hometown, teenage pregnancy rates are especially high. VP states:

> In the Hispanic culture, the Mexican macho stereotype is alive and well. Girls are raised the way their mothers were where the basic rule is that the male is the head of the household, and the female is supportive of the male no matter what he wants to do. So, when the guy wants to have unprotected sex, the girls don't think about taking care of themselves because they are brought up to be in a secondary role. In the newer generation, that is changing a little bit in less conservative communities but it is still a major influence on making personally responsible choices.

Because of this, she thinks it's important for children to be taught self-responsibility for their actions early in life: "Education has to be personal and put in peoples' faces," she believes. She thinks our culture is one that has to learn the hard way, and giving a pamphlet and a method of birth control to a young person will be ineffective in creating a lasting impression on how to make the choice to become a parent responsibly. When VP was in high school, she took a class that required her to care for an "uncooked-egg-child" for a semester, "It made me understand that you just can't take things for granted. Your choices result in consequences, and you have to be prepared to deal with them."

RD (5NS)

RD is a 51-year-old, African-American male who works as a network administrator. He is divorced with two children and a nondenominational religious preference. His bachelor's degree is in informational systems technology, and he has worked several positions as a system analyst and network administrator. RD is also a veteran of the U.S. Army and, as such, is very concerned with homelessness in the veteran population as well as food availability.

As a systems manager, he believes he tends to look at things systematically. Despite being unfamiliar with the concept of an ecosystem, he is cognizant that "if you change a variable in an equation, you change the whole formula." When asked about ecosystem interdependency,

he hypothesized, “If we interrupt a system like by getting rid of pollinators or things like that, it could have adverse effects on the whole process. And then you don’t know what the end results will be.” He also places a high importance on *situational awareness* which he learned in the military: “It’s paying constant attention to what is going on around you whether it’s visible or not,” he says.

RD also feels strongly that there is a relationship between human population growth and the other environmental issues that is a cause of most every other human-related environmental problem. The more people you have, the more cars are on the road, and the more pollution builds up. One of his concerns is the gentrification of cities that population growth is causing. He sees the elderly being displaced from their homes as commercial builders build for more and more higher-income people moving in. He also mentions the lessons that history gives us about what can happen when it comes down to survival.

Personally, RD thinks the cost of everything has increased due to supply and demand so “we pay more for whatever because there’s a lot more people reaching for what I’m reaching for.” He expresses concern about what he sees as the way “the human mind starts to work when there is a decrease in resources–becoming competitive and controlling.”

His suggestion for change in the future is demonstrating to kids in experiential ways how their future will be impacted by different choices they make, including having a large family. As a coach, RD believes, “if you put something out there for kids, you’re never going to get them all, but you’ll get a good response from the ones that are listening and want to be in a better situation.”

Discussion of Individual Findings

I identified 18 findings by examining the coded data extracted from individual interviews and then identifying responses that showed prevalence, related to the research question, or that represented a significant outlier according my judgment. Individual findings were combined to reflect group findings when applicable. Contextual narrative or quotes from the data segments supported or explained findings. From these 18 findings, I developed themes by analyzing the findings for patterns.

Each of the findings is discussed below:

Finding 1. *In evaluating the seriousness of environmental threat, interviewees from both groups were more likely to list environmental issues that they had personally experienced or were involved with professionally.*

Interviewees in both groups most often named weather events and air pollution as serious threats; however, those from life-sciences backgrounds (Group S) listed a wider variety of environmental issues in prioritizing their responses while those in Group NS gave a narrower range—food and water availability—more consistently. Three people, two from Group S and one from Group NS, included human population growth as a serious environmental factor. NB (1S) was unable to name "most serious" threats as he stated, "I think they all are serious, since they are all interrelated."

Finding 2. *There was general recognition among the case study subjects that most, if not all, environmental issues are impacted or caused by human activity.*

Four of the five people in the life-sciences group felt that all issues with the environment were impacted by human activity while two of the non-science group did. The remaining four (one from Group S; three from Group NS) stated that human activity affected at least some of the

environmental problems. Most participants volunteered examples of how they believed these problems have been impacted by human activity.

Finding 3. *There was a widespread belief among study participants that the human-related ecological problems are solvable by human action.*

Everyone interviewed maintained a view that humans are capable of solving the problems that have been created. Although there were a number of caveats given for how these solutions might be difficult to achieve, no one expressed a concern that some of the issues might be irreversible or without an achievable solution. Interestingly, those in the life-science group were more likely to see the problems as having solutions. Disclaimers were posed more often by the non-science interviewees ranging from "if humans could somehow get it together" to "if people can agree to follow certain standards."

Reflecting on the consistently optimistic view that human solutions are possible, it is worthy of consideration that the lack of acknowledgement that human solutions may be limited or not in time arise from a collective denial generated by the emotional discomfort with our powerlessness.

Finding 4. *When identifying obstacles to corrective actions for environmental problems, interviewees from the life-sciences more often named factors at the level of the individual.*

While there was general awareness among both groups that obstacles to change are numerous and complex, people in Group S included more failures by the individual to be accountable, conscious, inconvenienced or knowledgeable about nature, to see the effect of individual collectiveness, or "just keep the car tuned," in their responses. Group NS responses were more frequently focused on obstacles at the external and the macro level: industry, commercial development, governments, lack of consensus, and insufficient regulations.

Clearly, there are many obstacles at both group and individual levels. On the subject of individual action, however, there were several comments made that reflected different views about individual accountability. "I think there's a whole lot more we could do but you're going to have to have the majority on board to make it work, stated MC (2NS). NB (1S) commented, "most of the time we interpret things in a way that removes us from accountability." BE (1NS) remarked during her interview, "Too many people think someone else should make the changes. It's a cop-out really because when they say the government should do something, and the government tries, they're yelling 'No!'"

Finding 5. *Life-science professionals were somewhat more likely to report more interrelatedness among different environmental problems than the non-science professionals.*

Four Group S participants thought that all of the issues listed were related, and two of them listed human population growth as a compounding factor of the others. Two from Group NS believed all issues were related. Others saw relatedness but more within smaller groupings.

This finding may be reflective of the emphasis that professional training in the life-sciences places on the relatedness of all things in nature. The two NS interviewees answering that all issues were connected based this on their belief that "all things are connected in the circle of life." These responses could mirror the growing awareness by the public reported that most ecological issues impact or are impacted by each other.

Finding 6. *There was a consensus in the study that human activity is a direct cause of environmental damage while population growth itself is less often identified as a cause.*

It was obvious to everyone interviewed that human activities and consumption play a role in damaging the environment in some way. All participants saw population growth as a factor of some degree but not necessarily a primary cause.

Based on the responses, the idea that increasing numbers of people consuming and engaging in damaging activities could serve to amplify these effects was less apparent. Three of the life-science professionals considered population growth a root cause of most, if not all, human-related environmental issues. Even though they listed consumption as having the greatest impact, they also recognized that every person is a consumer, which collectively has an impact of its own. One person, RD (5NS), gave population growth as a direct cause of environmental degradation. When queried about this, he related his response to his work as a systems analyst. "In administering a network, you see that in a system, all issues are related," he said.

Finding 7. *Education and experience in an area of the biological life systems contributed to an understanding of the functioning of ecosystems.*

Each research subject was asked in multiple interview questions about their familiarity with the concept and dynamics of ecosystems and the ecological principles that apply to them. All participants in the life-science group, which included the fields of horticulture, forestry, water conservation, wildlife management, and soil science, had a working knowledge of these biological concepts and could explain how ecosystems function to maintain and restore homeostasis. They were also able to discuss how ecosystems, as working life systems, can either react to a maximum level of stress by either readjusting or collapsing.

As a soil scientist, DZC (5S) has an extensive understanding of soil as an ecosystem following the principles of ecology: holism, diversity, and interdependence. He explained that human activities such as using pesticides, herbicides, and depleting organic material, "tamper with and can devastate the natural makeup of the biological system." Those in the non-science group had little, if any, understanding of ecosystems functioning as life systems. Several in this

group, however, had a belief in "all forms of life being here for a purpose." They associated this belief with lessons in their upbringing and/or their religious connections.

Finding 8. *Although most study participants believe humans have a role in the world ecosystem, there is considerable variation in opinions about the nature of that role. Most (4 out of 5) life-scientists saw humans as having a responsible role towards nature, while the non-scientists (4 out of 5) saw the human role as recipients of nature's benefits but not contributors.*

Of the disconnection he sees, BH (1S) said:

> Biologically, we are part of the natural environment, but my perception is that the majority of the population is out of touch with that. We have culturally created perceptions that we are separate and don't have to work with nature. The problem is our perception of separateness is not reality. Ecological principles apply to us whether we realize it or not.

NB (2S) also commented on the illusion of separateness many people have about our relationship with nature, "We tend to think we are separate from the environment and that nature is something apart from us." He referred to a conversation with ecologist author David Haskell (2012) who told him, "human beings are really like the hood ornaments of the ecosystem. We are much more beholding to the bacteria and fungi that they are to us."

Others expressed anthropomorphic views about the human role that ranged from MC (2NS)'s opinion that humans are separate from and superior to the ecosystem and must make sure to get what we need to MK (3S)'s thoughts that our primary role is that of consumers. Other human roles expressed by the NS interviewees were "takers, heroes and villains, and interferers."

Finding 9. *Human responsibility towards nature was defined in more specific terms by interviewees from a life-sciences background than those from a non-science background.*

For three responders in Group S, human responsibility to nature should start from an internal locus of control by developing an ecological consciousness or mindfulness from which sensitivity and concern for the environment would arise. These individuals seemed to see the human mind as a starting point for the responsibility. The other two people in Group S, DC (4S) and MK (2S) saw the human role as that of caretakers whose responsibility it is to lessen our impact as a species.

Group S participants also recommended that people acquire ecological knowledge to increase awareness about ecological impact and to make informed decisions about how to act in ways that truly cause improvement. NB (2S) remarked, "It can be life-changing to see the forest through the eyes of a forester or take a canoe ride with a water hydrologist. You see the matrix to what you only saw the surface of before."

Comments on the human role by those in Group NS tended to be less specific and more anthropocentric. MC (2NS) stated, "We have to make sure to get what we need from the earth but leave enough for our grandchildren." Others offered general remarks of, "we should do more" or "leave a smaller footprint." RD (5NS) also advocated the human role as one of less interference:

> I think the role we should play is to ensure that we don't make changes that will affect the way the diversity and everything else that's a part of the system works, because I think if we interrupt it—the pollution and things like that—it could cause adverse effects on the whole process. And then you don't know what the end result would be. But it probably wouldn't be good.

Finding 10. *There was universal agreement across the study that humanity is not living in harmony with nature, and there will be future consequences for humanity for this.*

All participants offered examples where they felt people are out of balance with the rest of nature. Some wondered if humanity would outgrow its resources. Ideas of potential

consequences included both short- and long-term ones with the long-term predictions being more serious. NB (2S) specifically mentioned the United States, "I think Americans do not live in balance. For example, the United States is the number one timber producer in the world. We're also the No. 1 consumer so we have to get a surplus from Canada!"

Short-term effects that have already occurred, such as oil spills, biodiversity loss, and polluted air space, were mentioned. For the long term, interviewees from both groups expressed a higher level of concern, alluding to a possible catastrophic outcome. BH (1S) considered a point in the future where "the system will be overwhelmed." Some, like BE (1NS), wondered about "an apocalypse if we don't change our ways." There seemed to be a commonality in responses that even though the current level of problems is tolerable, in the future they will progress to a level where they will not be. Certainly with this topic, feelings of fear were apparent but it was relegated to sometime in the future.

Finding 11. *When asked specifically about the relationship between human population growth (HPG) and other environmental issues, most people in both groups felt it was a factor that could exacerbate other environment problems. Participants from the life sciences group tended to be more specific in their descriptions of the impact.*

Responses from Group S more often elaborated on the direct effects of crowding on physical space availability, psychological well-being, and consumption as well as an amplifying effect from sheer numbers. DZC (5S) commented, "The bigger the population gets, the more people that are out there doing things. Just human things, and the more people doing 'em without thinking of the environmental consequences, the more bad things get done." According to BH (1S), many effects are still unknown, and science is just beginning to understand some of the fallout. Those in Group NS felt that increased population definitely impacts other

environmental issues but were less inclined to expand on their answers. Only MC (2NS) questioned whether increased population density would have an environmental effect, "I wouldn't think, if you have a good plan, that population should affect the environment."

Finding 12. *Population biology literacy and the nature of exponential growth were well understood by 4 out of 5 of the life-science professionals but not by those in the non-science group. No one in either group had specific knowledge of population data or trends.*

Population biology is the study of how populations grow. How populations are affected by the reciprocal relationship of birth and death rates, the dynamics of the doubling time or geometric growth of populations, and how population crashes occur when a population invades the balance of an ecosystem are a few of the concepts from this field of study. Whereas the principles are often included in the curriculum of many life-system academic programs, they are not commonly understood and can even be counterintuitive.

Population stability, for example, is dependent on birth and death rates being approximately equal. When death rates fall, as they have in the United States and many countries, without a corresponding drop in birth rates, the overall population size increases. An exclusive focus on birth rates fails to consider the total determining effects. MK (2S) noted this when he said, "A drop in infant death rates while birth rates have increased or stayed the same has been one cause of increased population numbers."

The concept of exponential or geometric growth is also difficult to comprehend, especially for the non-life science professional, as seen in this study. This pattern of growth in populations occurs when resources are available. Characteristics of exponential growth curves are slow initial growth and then a rapid, dramatic "explosion" after several generations. This is most common when the population is very small in relation to the available resources, as it was

earlier in human history, or very aggressive in taking resources away from other populations, as we are now. No one in Group NS was familiar with this accelerating pattern of growth.

Finding 13. *The personal impact from population growth reported by non-science participants focused specifically on daily experiences like traffic, school crowding, and cost of living. The life-science respondents generally listed more far-reaching effects: less land availability, altered daily scheduling, less personal security, more resource competition, change nostalgia, and more opportunities.*

All interviewees mentioned increased traffic as a personal effect of a higher population. RD (5NS) noted a "higher cost of everything," which he related to the law of supply and demand. Those in Group S offered a wider range of answers, including some physically invisible and psychological effects.

Finding 14. *Almost everyone interviewed recognized that overpopulation as a topic of discussion is a hot-button issue and gave reasons why it might be avoided.* There is documented evidence that the subject of overpopulation as an environmental issue is often avoided.

There was universal acceptance of this by nine out of 10 subjects, and many offered possible explanations from their perspective.

While BH (1S) felt the reasons to be financial and political, DC (3S) expressed her belief the topic brings up fear so it often avoided. She said:

> For people to acknowledge there's a problem is to acknowledge a solution is needed. And some of the solutions are just too uncomfortable to talk about—like abortion. No one knows how to handle it. We feel like how China dealt with it was so wrong. People are scared of being coerced; they think "Who is going to be 'the controller?'"

RD (5NS) added:

> I think it's because there are so many other problems that somehow always surface, like racism, for example. When you start discussing population or immigration, it's almost impossible to have that discussion without, at some point, not to have it appear to be an

> attack on someone's race or religion, even if it's not. When you discuss population and how to control it, you get into which group of people has more than this other group of people, and then emotions flare.

Several others mentioned "fear of the government telling you what to do" while BE (1NS) cited current movies like *The Purge* as sensitizing people to fear of having their options controlled. Notably, no one spoke to the necessity of this topic for discussion.

Finding 15. *When asked whether people should limit family size for ecological reasons or if everyone has a right to unlimited family size, only one participant mentioned that family size should be limited due to environmental stress on the world ecosystem. However, even though most participants defended the human right to have as many children as desired, many qualified their remarks to include only those who wanted to be responsible parents and could support the children they had.*

Most respondents strongly supported the idea that humans have a personal right to have as many children as they would like. Interestingly, however, this support was spontaneously tempered by expression of the belief that the decision to have children must be made consciously and with the child's welfare in mind. Each person offered examples of scenarios where they felt this was not the case.

BH (1S) took a somewhat different perspective when he said:

> Yes, it's extremely important that we try to stabilize our population numbers, but I don't know how we would do it. We're so fearful of change and what we know and what we do is at odds with itself. Driving our cars is a smaller analogy. We all know that we should be cutting back in our use of fossil fuels, and we say, "We should cut back." Then the next week, we're at the dealership buying a SUV. It doesn't seem like there's a lot of extrinsic or intrinsic motivation for people to act until something drastic happens. At some point, the system may have to make the decision for us, and we'll have to adapt when it does. It's really a matter of using our high intelligence to override the biological urge to grow, and we're not making much progress.

It is interesting that whereas most people in the study felt that each person should be responsible in being able to take care of the children they had, no one included a social or ecological component to one's responsibility. The scope of responsibility was seen as only how the individual and sometimes the child would be affected.

Finding 16. *The ongoing research statistics that document a very high percentage of unplanned or unwanted pregnancies in the United States and worldwide were easily accepted by most people in the study*.

Research shows that approximately 45% of pregnancies in the United States and worldwide is unintended, including three out of four teenage pregnancies (Guttmacher Institute, 2015). Eight out of 10 persons in this study were not surprised by this information and expressed their awareness that a large number of pregnancies are not planned or wanted. Several interviewees commented that, although not surprised by this data, it seemed to point out that a substantial portion of the population was not making a conscious choice to parent. Two of the Group S respondents, both parents themselves, indicated this data was unfamiliar to them, and they found it alarming. Some subjects speculated that it was "a shift in social, religious, and cultural values" and "greater sexual freedoms and unconscious behavior" that were responsible for these trends rather than lack of access to birth control.

Finding 17. *Almost all participants stated their belief that continued population growth will have future negative long-term consequences for the quality of human and nonhuman life. Consequences described by the life scientists tended to be more inclusive of global effects.*

When interview questions focused on what the effects of continued population growth will be in the long-term future, the responses were almost entirely negative. This seemed to be more the case than when the current impact of population growth was discussed or when

population growth is listed as one of many environmental problems. Two subjects, MK (3S) and DZC (5S), offered their thoughts that the problems created by increased crowding could also create additional opportunities or jobs for people trained in conservation.

Finding 18. *Participant suggestions for non-coercive means to promote responsible socially-conscious family planning and environmental awareness largely centered on experiential education.*

Four persons in the life-science group and four in the non-science group recommended more education of the public. While "more education" would not be an uncommon response to this type of question, what was noteworthy is that most subjects specifically emphasized that education must have personal meaning and be experiential in nature for this type of subject.

As an educator, MK (3S) commented that although group education is adequate for continuing education, the greatest effectiveness in learning is seen with "a hands-on, face-to-face environment if we're talking about developing that first line of understanding." DC (4S) shared her belief that education has to be personal first:

> We all learned about population growth in school but you're just not thinking it out in high school. Take the sex ed. classes to a new level; don't just talk about the sex but help them understand if they get pregnant in high school, they could easily go down that slippery slope and end up needing assistance and missing out on that good job and the life style they want. Help them realize how their personal future and goals will be affected. They're not going to care about the big picture before they understand how it applies to them. My kids had a program in high school where a boy and girl were paired up and had a baby doll to care for, and they both said it opened their eyes about being a parent before you are ready.

RC (5NS) also endorsed experiential education starting as soon as possible:

> I suggest starting with kids. Teach them: "if you're a C student, and you have this job, and you have five kids, this is what your life will likely be like." I used to watch a TV series called *Scared Straight,* and I think it made a difference when kids could actually see what could happen depending on the decisions they made. Some kids will listen and some won't but it's more than you had before you started.

VP (4NS) and SB (3NS) both noted in their interviews, “there’s plenty of education and birth control out there, but unless people have the knowledge about the impacts of their personal choices, you’re less likely to have choices made from a place of awareness.”

Referring to the predominance of unconscious behavior in society, DC (5S) added, “Conscious choices come from being educated. Educate your children to understand the personal, social and ecological ramifications of their actions and the importance of planning for long-term impact and things will change.”

Identified Patterns or Themes

To perform a second level of analysis, the identified findings were reviewed for patterns. In some cases, themes represented communalities that were consistently expressed in both groups. In others, dissimilar findings between the groups represented a theme. In still others, variation noted within a group or both groups contributed to a theme.

Members of both groups expressed understanding in some ecological-related areas. Based on the responses from both those with a life-sciences background and those without such a background, there is general awareness of the following:

1. Humanity is not living in a harmonious relationship with nature.
2. Humans have a significant impact on or are the direct cause of most environmental problems.
3. Many or most environmental issues are interrelated.
4. There is a general fear about the future impact of environmental degradations but a belief that these problems are solvable by humans.
5. Interviewees believe that continued human population growth would have long-term consequences.
6. Critical discussion about overpopulation is difficult and actively avoided.

7. There is high awareness that almost 45 per cent of pregnancies worldwide are unplanned or unwanted.

8. An individual's preference, if made responsibly, is the only factor to be considered in determining family size.

9. Environmental/population education must be experiential and targeted towards specific individuals/groups.

There were differences between the two groups in their understanding of ecological knowledge. Group S subjects demonstrated in-depth understanding of ecological concepts while individuals in Group NS had a very limited or no understanding. The ecological areas included in the interviews were

1. Ecosystem functioning
2. Ecological laws of nature
3. Population biology concepts
4. Population growth rate patterns

Another pattern was observed with some of the questions where participants were asked to elaborate on their perspective. Despite levels of agreement on an environment-related question, those in the life-sciences group were more likely to be specific and give wider ranges in their answers and see human impact on the environment as more extensive.

Obstacles to change were more often seen by life-science group members as inherent to individuals such as lack of consciousness, lack of knowledge, and lack of personal action. Non-science trained interviewees more often gave external causes at a more macro level as obstacles such as governments, regulations, and other countries.

In both groups, there was more acknowledgement of human population growth as an environmental problem when it is discussed as a single issue than when it is included in a group of issues.

Roles that humans play in the ecosystem were more often described by Group S subjects as what they *should be*, such as caretakers, stewards, and responsible sustainers. Answers from Group NS were more often what they see the current roles *are* such as takers, heroes and villains, and resource users.

In addition to the understanding of species interdependency by life-science professionals, several of the non-scientists expressed a belief that "there is a cycle of life" and "everything has its place." It is likely that this awareness is related to other sources beyond the scope of this study such as religious affiliation, parental upbringing, or adult education.

It was noteworthy that a single interviewee in the non-science group, MC (2NS) often indicated a lack of awareness or concern of the topics discussed that was decidedly different from other research subjects in both groups. I believe that although MC's responses were unique in this study, his participation was valuable in that it represents a segment of the population that is both unfamiliar and unconcerned with these subjects.

Summary

In this chapter, a contextual profile was created on each of the participants who were willing to share their thoughts and opinions with me during this project. The analysis of the interview content yielded 18 findings, and from these findings, seven patterns or themes were identified. In the next chapter, I consider the relationship of these results to the concepts of ecopsychology and analytical theory and make recommendations for the application of these conclusions and suggestions for future research.

CHAPTER 5: DISCUSSION

In this chapter, I discuss my findings in the context of the existing literature in order to address the research question of *How is awareness of human population growth as an underlying environmental threat affected by understanding of holistic principles of ecosystems?* The purpose of this project was to determine if a working understanding of the biological ecosystems governed by ecological principles might affect a person's ability to understand at a deeper level how an ecosystem can be damaged by a part of itself that operates outside these principles. When the study was designed, the assumption was made for this study that individuals academically educated and work experienced in one of the biological life sciences would have a core understanding of ecosystems and how they are sustained. A second assumption was that individuals trained and experienced in a non-science field would not have this understanding. Interview questions were included to assess these assumptions.

Another part of the inquiry was to discover if the ecosystem knowledge would be related to more awareness of the role that a burgeoning global population plays on critically damaging the world's ecosystems. Human population growth is an environmental stressor that is under-recognized, and I believe that the ability to truly understand this effect is a factor in why it is under-addressed as an environmental issue.

Also discussed are the implications of these findings and recommendations for future research. The chapter concludes with personal reflections and a summary.

Findings in Context to Existing Literature

Analysis of interview data for patterns or themes if done without a theoretical framework has limited interpretive power (Braun & Clarke, 2006). In this research, I used core concepts

from ecopsychology and related Jungian theory to support my inquiries and analyze the responses.

The first concept is resolution of alienation of humans with nature and nonhuman species. Responses from persons with a biological science background seemed to reflect a higher level of awareness that Earth is a holistic system with many interdependent parts that must live in balance with each other to maintain the system's integrity. Jung had a distinctly holistic view of the psyche, and his theories reflected that the journey to individuation requires a shared wholeness with the other parts of our Earth home; yet, in this current study there were several non-science participants who held beliefs that "there is a circle of life" but their responses did not seem as affected by this as those with a deeper understanding of biological systems. Because of their connection to nature in their work, the life science persons appeared to express the role of shepherd over consumers—a more integrated perspective. Comments from this group often contained references to consciousness and awareness.

Promotion of universal consciousness is another goal of ecopsychology. When one sees oneself as part of a larger whole, there is more consideration of the big picture. Jung believed that the more the unconscious could be made conscious, the more it could be integrated into ego-consciousness, and the more compassionate we can be. It was obvious that the interviewees involved in the life sciences understood the concept of the web of life, and their focus was more often on the effects of an action on a system. Many of the responses from those not trained in life science reflected more cause-and-effect thinking and personal concerns.

Ecopsychology seeks to reeducate humans to transcend their awareness to see the self as part of the world ecosystem. There was significant feedback from both groups that education in the area of population growth as an environmental cause was needed, yet, more importantly, that

this education needed to be experiential in nature. Education needs to address where the person is in their personal journey, and that often needs to be at a personal level first. Both ecopsychology and analytical concepts value experiential learning as the most effective. From the coordinator of a public education water conservation program to the coach of a little league team, recognition that experience teaches was there.

The biological theories of ecology are valued by ecopsychology and have been discussed throughout this paper. Jung, too, incorporated these concepts into his work: holism, diversity, and interdependency. These are often at odds with the American cultural norm of individualism. The life-science professionals expressed opinions that seemed to suggest a higher awareness of the ego-driven nature of our choices. Even as they acknowledged they were affected by this cultural norm as well, they were more likely to question the impact these choices might have.

Another core concept in ecopsychology is that the psyche is bound to ecology in a living system. Jung recognized the presence of an ecological unconscious and was cautionary about where the repression of this force could lead. When the ecological self develops, the psyche and nature are joined, and one's psychological perception of self and one's place in the world is changed. Without this connection, the psyche is impacted in a negative way. BH (1S) and DC (4S) were very descriptive in their remarks on the psychological effects of being crowded and isolated. The relationship between ecological and psychological crisis was noted by Jung and some of the post-Jungians such as James Hillman who see a loss of soul when we are disconnected. Life-science group members more often than the non-life sciences group members noted their concern about the absence of an ecological self in many people.

That disconnection with the ecological self can lead to over-identification with the narcissistic self is an important concept in ecopsychology. Unconscious cultural complexes

promote narcissism, and this is reflected in the anthropomorphic worldview many humans have towards the world. In my study, MC (2NS) spoke for many in our society, I believe, when he said we are superior to other species and need to make sure we get what we need from the world. Jung had great concern for our unhealthy addictions to external things and distractions and warned of estranged psyche's potential for destruction. Non-science study subjects more often answered questions in terms of how they were personally affected while science subjects more often considered ecological impact.

Jung told us that a repressed collective ecological unconscious can lead to a collective madness (Jung, 1970c). As previously mentioned, behavior by a species that will destroy the home it is completely dependent on is madness. One life science interviewee said," no one in his right mind would do that." There was awareness in persons from both groups that many human actions are not logical from the ego's perspective. It is evidence of the unconscious nature of our behavior that this is true. Several of the science participants commented, "people will not change their behavior until the faucet runs dry." This group mentioned sustainable practices in some of their responses; the non-science did not.

One perspective that was often heard from both groups was that the most serious consequences would be long-term, not immediately. A second one was a shared belief that all of our ecological problems are solvable. I believe, as Jung and the research on barriers to awareness has shown that with human defense mechanisms such as denial, rationalization, or intellectualization, we psychologically dissociate from what is too painful to consider. It is important that we also consider some of the options besides "it's not so bad" and "we can fix it." Ecopsychology should also prepare us to tolerate the ambiguity and reality of what nature may have in store for us.

Conclusions and Recommendations

Ecopsychology is an intellectual and social discipline emerging over the last few decades with the primary focus of examining the psychological processes that bond us to the natural world or alienate us from it (Yunt, 2001). Its original beginnings as an alternative to the scientific worldview and its spiritual orientation gave it a distinct disadvantage to being accepted by the scientific community (Thompson, 2009). The dearth of data-driven research in the small body of ecopsychological literature also prevents the field from appealing to a wider academic audience. To be progressive, ecopsychology needs to collect data related to the outcome of using its core concepts in ways that will inform and increase human awareness. As a multiple case study based on a small sample, this research begins an investigation into how awareness and individual accountability might be influenced by the holistic principles of ecology. Further research using qualitative and quantitative methodologies appropriate for exploration of this influence on a larger scale and how changes in education to teach these principles could be beneficial to the emergent specialization with the field of psychology and across disciplines.

Another area for potential research is the greater need for mathematical and science literacy in general society. It has been identified in the literature and was found in this research that knowledge of the mathematical and scientific principles that dramatically affect our lives is not well understood by a significant portion of the population. Specifically, avoidances of discussions of the relationship between family size and children's welfare, social and cultural customs and the individual freedom to ignore their effects, and how population relates to the future of humans on the planet (Howard, 1994) are undermined by a lack of literacy knowledge. Topics such as the nature of systems, the importance of feedback and control, the cost-benefit-risk relationship, and the inevitability of side effects can become part of the knowledge base of being scientifically literate. Without this understanding, it is much more likely people will not

move beyond their own immediate self-interests. More research on the effects of this change in education is needed.

One of the most important conclusions I draw from this study is the importance of a change in consciousness to see the self as part of a whole. Consciousness and mindfulness were mentioned directly by several research participants in the life-sciences field and indirectly referenced by some of the responses that considered individual accountability. Many of our ecological problems were created by an attempt to fill the holes in our hearts and as a substitute for finding meaning. Sharing these ecopsychological principles through experiential education that would impart meaning and understanding to more people emerged as an important goal from both study groups.

Limitations and Delimitations

Limitations are those potential weaknesses to a research study that are out of the researcher's control (Simon, 2011). In this study, one limitation was the time spent with each interviewee. Busy work schedules limited the availability of research subjects to a single session. This limitation made each interview a snapshot depending on the conditions during that time. A second limitation involved unavoidable variations in the amount of education and work experience in the participant's chosen field. Because sampling was based partly on availability and acquaintance, sample bias was a possible limitation.

In delimitations, factors within the researcher's control can affect the study (Simon, 2011). My choices of a small sample (10 subjects), a narrowly defined research question, the case study method, and my theoretical perspective could be considered delimitations that affected the generalizability of the study. These factors were taken into consideration during data analysis and interpretation of findings.

Researcher Reflections and Summary

My reasons for conducting this study were both personal and professional. It was my premise that the exponentially accelerating growth of population across the globe is a central factor causing and/or amplifying every human-related environmental issue we face. With a long history of concern about environmental problems that seemed to be growing progressively more serious, I theorized that it was something more than the traditionally studied barriers to awareness involved in our seemingly illogical lack of adequate response to the destruction of our Earth home. I wondered if it was indicative of the extent we were willing to go to deny the source of the problem: ourselves. I also considered if there were tools available to make this awareness more likely.

As a biological life science professional, I felt there were concepts available to me that helped me understand the world as a living system of which I should be a responsible part. This resonated with the concepts I learned in studying analytical theory and ecopsychology, teaching me more about how accepting responsibility for my role and the role of too many of us is long overdue. I was privileged to have the opportunity to pursue this project and learn so much. The people I interviewed taught me a valuable lesson. It is expressed well in a comment by NB (2S):

> From where I'm sitting, the overwhelming majority seem to be very uninformed. It reminds me of the analogy of Forrest Gump when he was playing football. He was told, "Run, Forrest, run" but without really understanding any of the rules or fundamentals of football, he just ran without cause or direction. It's really difficult for folks to fundamentally understand things they haven't learned academically.

What I heard from most of the people I talked to is that they are very aware that the world is out of balance, and we are the primary cause. I also heard that many people, instead of resigning themselves to what is occurring, could benefit from the development of an ecological

consciousness. This would allow them to understand their role in the ecosystem to make better decisions in activities of daily living that impact local community, national, regional and global ecosystems or as Jung and Hillman have noted, the *Unus Mundus*.

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Appendix A

World Population and Regions

Population of the World and its Regions According the 2015 United Nations Revision								
	Population (in billions)				Percentage of the world population (%)			
	2015	2030	2050	2100	2015	2030	2050	2100
World	7.35	8.50	9.74	11.21	100	100	100	100
Developed countries	1.25	1.28	1.29	1.28	17	15	13	11
Developing countries	5.14	5.89	6.54	6.77	70	69	67	60
Least developed countries	0.95	1.34	1.90	3.17	13	16	20	28
Africa	1.19	1.68	2.48	4.39	16	20	25	39
Asia	4.39	4.92	5.23	4.89	60	58	54	44
Latin America and the Caribbean	0.63	0.72	0.78	0.72	9	8	8	6
Northern America	0.34	0.40	0.43	0.50	5	5	4	4
Europe	0.74	0.73	0.71	0.65	10	9	7	6
Oceania	0.04	0.05	0.06	0.07	1	1	1	1
Source: Zlotnik, H. (2015, October). Future World Populations: The Latest United Nations Projections. *Population Connection, 47*(3), 12-13.								

Appendix B

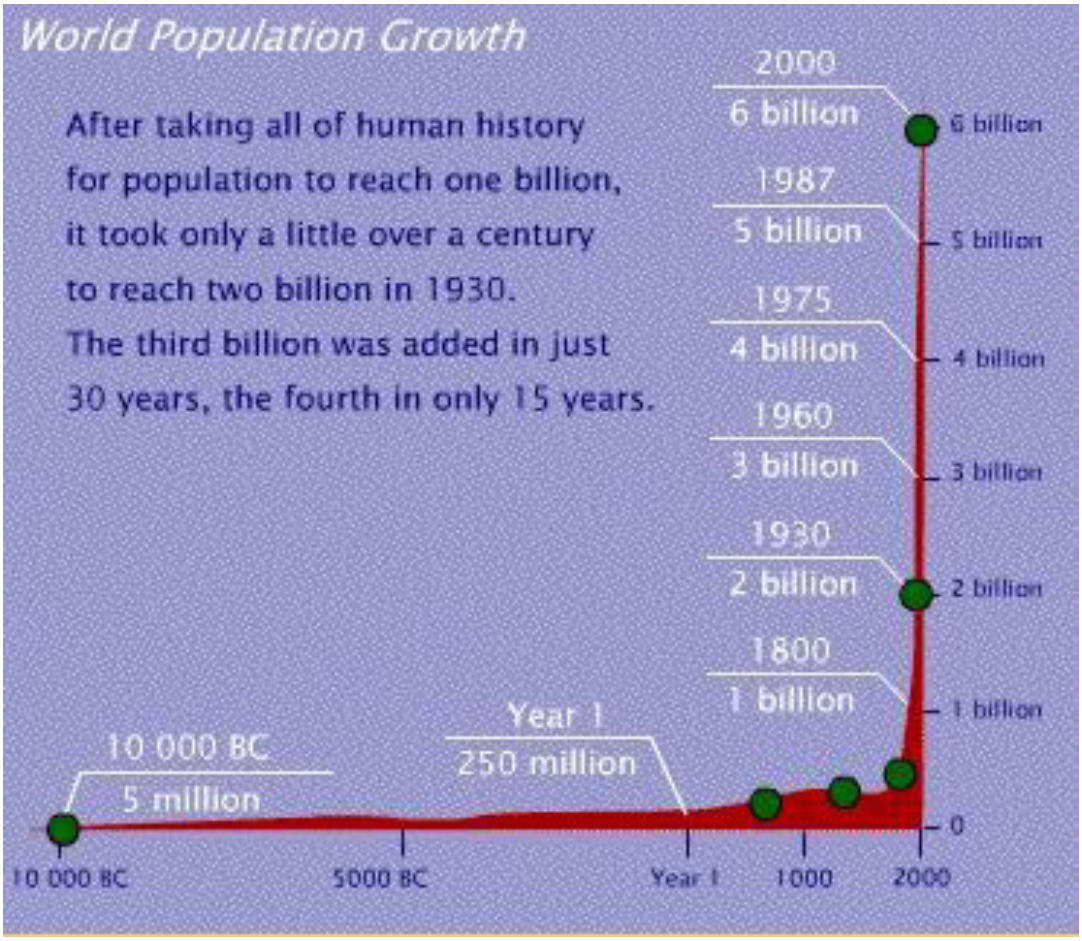
Top 20 Largest Countries by Population as of October 31, 2016

Rank	Country	Population
1	China	1,384,449,957
2	India	1,332,166,641
3	U.S.A.	324,915,092
4	Indonesia	261,608,635
5	Brazil	210,152,468
6	Pakistan	194,163,024
7	Nigeria	188,632,906
8	Bangladesh	163,563,169
9	Russia	143,434,059
10	Mexico	129,182,279
11	Japan	126,239,428
12	Philippines	102,779,520
13	Ethiopia	102,699,090
14	Vietnam	94,783,356
15	Egypt	94,025,967
16	Germany	80,680,258
17	D.R. Congo	80,569,984
18	Iran	80,361,195
19	Turkey	79,947,801
20	Thailand	68,209,999

Source: http://www.worldometers.info/world-population/

Appendix C

World Population Growth J-curve



Retrieved from http://natural sciences.sdsu.edu, 2015

Appendix D

Study Participant Demographics

Pseudonym	Gender	Age	Position	Education	Family Status	Ethnicity/Cultural Background	Religious Preference
Group S							
(1-S) BH	M	39	County Extension Agent/ Horticulture	Undergrad. – Horticulture/ Botany; Grad. – Agricultural Education	Married/ 1 child	Caucasian/US	None
(2-S) NB	M	37	Conservation Director/ Conservancy Forester	Undergrad. – Forestry/Environ. Conservation; Grad. - Natural Resource Mgmt.	Single/ no children	African American/US	None
(3-S) MK	M	28	Watershed Steward Program; Coordinator/ Licensed Geoscientist	Undergrad – Environmental Science; Grad – Water Management/ Hydrologic Science	Single/ no children	Caucasian/US	Christian
(4-S) DC	F	58	Wildlife Rehabilitator; Registered Nurse (retired)	Undergrad – Nursing; Trained as Volunteer Wildlife Rehabilitator	Married/ 2 children	Caucasian/US	Baptist
(5-S) DZC	M	55	Soil Conservationist	Undergrad. – General Science	Married/ 1 stepson	African American/US	Christian
Group NS							
(1-NS) BE	F	46	Accountant	Undergrad. - Accounting	Single/ no children	African American/US	Catholic
(2-NS) MC	M	47	Compliance Coordinator; Retail Manager	Undergrad. – Business Management	Divorced/ 3 children	African-American/US	Non-denominational
(3-NS) SB	F	33	Communications Administrator; Licensed Mortgage Lender	Undergrad. – Real Estate	Married/ 1 child & 2 stepchildren	African American/US	Christian
(4-NS) VP	F	41	Systems Analyst	Undergrad. – Forensic Physical Chemistry	Single/ no children	Hispanic/US	None
(5-NS) RD	M	51	Network Administrator; Air Force veteran	Undergrad. – Information Systems Technology	Separated/ 2 children	African American/US	Non-denominational

Appendix E

Saybrook University Informed Consent Form

Introduction**:**
My name is Susan Peacock. I am a Ph.D. student at Saybrook University in Oakland, California. I am conducting research to study how knowledge and work experience in various environmental and non-environmental fields of study may affect awareness of environmental problems. I am completing this research as part of my doctoral program. I invite you to participate.

Activities:
If you participate in this research, you will be asked to:

1. Be willing to be contacted to discuss participating in the study.
2. Complete an informed consent form.
3. Participate in an in-depth face-to-face interview and answer questions about your knowledge and awareness of life systems and environmental problems.

Eligibility:
You are able to participate in this research if you:

1. Currently work in a field that is either related (or not related) to life systems, depending on the needs of the study.
2. Have at least three years educational training in a field related to the field you currently work or volunteer in.

You are not able to participate in this research if you:

1. Are not between the ages of 18 – 65.
2. Are not available to perform the full activities of the study which include answering study questions and completing study forms, except any you object to, in a single interview of two hours or less.

I hope to include10 participants in this research.

Risks:
There are minimal risks to you in this study. A possible risk includes: loss of time.
To decrease the impact of any risks, you can refuse to answer any question asked. You can also stop participating in the study at any time without giving a reason.

Benefits:
If you decide to be included in the study, there will be no direct benefits to you except for possible awareness, knowledge, or understanding you may gain as a result of the study.
The potential benefits to others are: contributions to future educational plans.

Recording:
I would like to use a voice recorder to record your responses for the purpose of thorough data analysis. As this will be part of my research method, I will ask you not to participate if you do not wish to be recorded.
Your signature below indicates consent for your interview to be recorded.

Privacy:
The information you provide will be kept as private as the law allows. I will not use your name or any information that would connect you or your organization to any of the data resulting from this study. I will not use a name that identifies you with your responses and will keep your name and contact information in a separate file.
I will be the only person who has access to the data.
I will make sure your information is kept private by keeping the electronic files, paper files, and interview notes in a locked cabinet to which only I have access.
I will keep your data for 7 years and then discard the electronic data and destroy paper data.

Contact Information:
If you have questions for me, you can contact me at: email address.
My dissertation chair's name is: name of committee Chair. He is a member of the Core Faculty and Specialization Director for Jungian Studies and is supervising me on the research. You can contact him at: email address
If you have questions about your rights in the research, or if a problem has occurred, or if you are harmed while being in the study, please contact the Institutional Review Board at sirb@saybrook.edu or 510-593-2935.

Participation:
Whether to participate or not in the study is entirely up to you. If you decide not to participate, or if you withdraw from participation after you start, there will be no cost or loss of benefit to you.

Signature:
Your signature indicates that you understand this consent form. You will be given a copy of the form for your information.

_____	_____	_____
Participant Signature	Printed Name	Date
_____	_____	_____
Researcher Signature	Printed Name	Date

Appendix F

Interview Questions

Section I

(1) Using the items on the list provided or others you can add, which of these do you think are the most serious environmental problems currently facing humanity?
(2) Which of these do you think are impacted by human activity?
(3) Which of these problems do you think could be solved by human actions?
(4) Of those that you think could be solved by human efforts, what are some of the obstacles to doing so that you can think of?
(5) Do you see these environmental problems as independent issues or are they related to each other? Can you elaborate on why you answered the way you did?
(6) Do you think any of these issues are a direct cause of any of the others and can you explain?
(7) Considering the concept of a *system* as a set of connected things or parts, have you heard the term *ecosystem* and can you explain your understanding of the term or give any examples?
(8) A general definition of an *ecosystem* is "a system of living and nonliving entities living in the same environment that are subject to the principles of ecology." The three main principles of ecology that apply to an ecosystem are: *holism*, *diversity*, and *interdependence*. From your educational and/or experiential perspective, are you familiar these ecological principles?
(9) If *holism* refers to "viewing the whole as more than the sum of its parts," how might this principle apply to ecosystems?
(10) Nature is almost infinitely diverse in its makeup. Do you think this *diversity* serves a purpose(s) and if so, what would it be?
(11) A third principle of ecology is *interdependency*. Do you have any ideas on why this principle might be important to relationships in an ecosystem?
(12) Do you think humans play a role in the earth's ecosystem and are subject to the principles of ecology or have a unique role that is outside of this system?
(13) What role or responsibility do you think humans have or should have in the earth ecosystem?
(14) In general, do you think humans currently live in a balance with nature and can you offers any examples that support your answer?
(15) In any situation(s) where you think humans are out of balance with nature, do you foresee any short-term or long-term consequences?
(16) If you could advocate three changes in human activity or behavior that you believe would have the greatest positive impact on human-related environmental damage, what would they be?

Section II

(1) Do you think human population growth is having an environmental impact on the world ecosystem?
(2) If so, in what ways can you suggest?
(3) Do you think there is a relationship between human population growth and any of the other environmental issues discussed and can you explain your views?
(4) The population of any system is stable only when birth rates and death rates are equal. When they are different, the population will increase or decrease, depending on how the rates differ. Throughout human history, human population numbers remained at a relatively constant or modest level of increase. Around the 19th century, human population began an astronomical rate of growth that continues to the present, with the world population rising by an additional billion people in dramatically shorter and shorter intervals. What reasons can you think of that might be responsible for this change in growth rate?
(5) Population growth increases by doubling or growing exponentially. Are you familiar with the difference in arithmetic and exponential growth rates?
(6) Have you noticed any changes in your personal life as a result of population growth?
(7) Do you have any thoughts about how your own future or the lives of future generations might be impacted by continued population growth?

(8) If a population in an ecosystem uses more resources than its environment can provide, an imbalance in the system can occur. Do you think this type of risk could occur with the human population?
(9) There is documented evidence that there is a widespread silence on the discussion of overpopulation as a topic. Do you have any thoughts on why this would be the case?
(10) Do you think it is a basic human right for an individual to have as many children as desired or do humans have a shared responsibility to stabilize population growth?
(11) Do you think there could be short or long-term effects from continued human population growth? If so, what effects can you envision?
(12) How would you characterize the nature of the relationship humans have with nonhuman species?
(13) Ongoing research shows that approximately 45% of pregnancies worldwide are either unplanned or unwanted, with the U.S. having a slightly higher rate. Are you surprised by these statistics and what implications do you think this has?
(14) Since coercive means to lower population numbers have been associated with human rights violations and unintended consequences, what suggestions can you think of that would promote responsible decision-making in family planning?

Appendix G

Interview List of Environmental Issues

Weather/climate changes
Fresh water shortages/pollution
Food source shortages
Soil quality/top soil loss
Species biodiversity loss
Oceans/marine life damage
Air quality/atmospheric pollution
Arable land loss
Diminished forest lands
Global human population growth
Wildlife/habitat loss
Communicable diseases
Political instability/failed governments
Other