Abstract: Over the last few decades, urban expansion and population shifts have modified the existing landscape throughout the U.S. Protected areas and development are compatible lenses, yet stakeholders' involvement in decision-making is often missing from environmental governance. We examine how stakeholders living and working in proximity to Everglades National Park (EVER) perceive environmental and social changes to the park and community park relations. EVER was selected as a study site for several reasons: proximity to urban areas, rich biological diversity, largest subtropical wilderness in the U.S., International Biosphere Reserve, World Heritage Site, and prominence as a tourist destination for the region. Forty-one semi-structured interviews were conducted with neighborhood groups, representatives from gateway communities, and conservation organizations. An analysis of the interview data generated six research themes: loss of native species, urban development, a shortage and contamination of water, hurricanes, climate change, and increased recreation use. The results of this study add to the literature by providing a better understanding of the relationships stakeholders have with national parks. The results will provide usable knowledge that may help stakeholders and public land managers design strategies related for sustainable plans for the park and its surrounding communities.

Keywords: Everglades National Park; stakeholders' perceptions; social and environmental changes; sustainable management

1. Introduction

Over the last few decades, urban expansion and population shifts have modified the existing landscape throughout the U.S. [1], particularly observable in remote areas surrounded by natural assets. As a result, an increasing number of national parks and protected areas have become surrounded by newly formed or expanding communities, which have brought new challenges for both park managers and the parks' adjacent communities. Such changes in land use patterns have elevated the attention of the scientific community regarding the use and management of public lands. While this entails different aspects, a line of research has been particularly interested in better understanding those involved in the decision-making of such public lands.

Our study examines how the stakeholders living in proximity to and working with Everglades National Park (EVER) have perceived environmental and social changes and community park relations. In order to explore this phenomenon, we used the framework of environmental governance. Environmental governance describes how citizens and authorities are engaged in natural resource decision-making, specifically, “how we make environmental decisions and who makes them….” [2] (p. 1). In this framework, environmental governance involves decision-makers...
at a variety of levels such as consumers/residents, NGOs, federal agencies, governments, business people, and scientists [2] (p. 6). This process includes, “the interrelated and increasingly integrated system of formal and informal rules, rule-making systems, and actor-networks at all levels of human society (from local to global) that are set up to steer societies toward preventing, mitigating and adapting to global and local environmental within the normative context of sustainable development” [3] (p. 3).

Given the complexity of people-park relationships, more research needs to examine how these relationships have changed over time in order to facilitate more inclusive decision-making processes at the park and community levels [4]. To date, the majority of the research on park-community relationship has focused on the impacts of communities [5,6], the role of parks in improving physical and mental health and overall well-being [7,8], and factors of participation [9]. These studies have mostly considered the communities to be contextual components of their research; they have not examined communities as stakeholders and the parks around them.

Even though EVER has experienced numerous social (overpopulation and urban development) and environmental changes (environmental damage, water inflow, and natural disasters) over the last few decades, a limited number of studies have explored EVER and its stakeholders [10]. There have been many social science studies done on EVER; however, most have focused on the Everglades Restoration [10]. Thus, there is a need to explore how stakeholder groups perceive changes with EVER and how these threats involve stakeholders. This study contextualized the findings within an environmental governance framework to understand how various stakeholders’ perceive social and environmental changes affecting EVER. Given the pressures that EVER faces from urban forces, such as urban sprawl, pollution, population change, and natural disasters, the purpose of this study is examine how the stakeholders living in proximity to EVER perceive changes with the park and community park relations, and what this means for the future of the park.

1.1. Study Background: Social and Environmental Changes Affecting Everglades National Park

EVER was selected as a study site due to its proximity to urban areas and rich biological diversity. EVER is also an important tourist destination and economic engine affecting its surrounding region. EVER is situated at the southern end of the Florida peninsula. The park spans 1,508,570 acres and was declared a national park in 1947 [11]. It has been called “a river of grass flowing imperceptibly from the hinterland into the sea” [12]. EVER is the largest subtropical wilderness found in North America and one of the most popular and heavily visited tourist destinations in the U.S., with approximately one million recreational visits in 2017 [13]. It is one of only three locations in the world to appear on the following lists of protected areas: International Biosphere Reserve (1976), World Heritage Site (1979), and Wetlands of International Importance (1984).

In 1993, EVER was listed as an endangered property due to “damage caused by Hurricane Andrew and a marked deterioration in water flows and quality resulting from agricultural and urban development” [14]. Due to the efforts invested in restoration and conservation, EVER was removed from the UNESCO endangered list in 2007. However, environmental damage, overpopulation, pollution, water inflow, and natural disasters have dramatically decreased the biodiversity of species, leading UNESCO to relabel EVER as an endangered World Heritage Site [14].

Growth of population and development have squeezed EVER inland from both coasts. In the 1950s, researchers estimated that the population of Florida in the 21st century would be two million; however, as of 2015 it is more than seven million; this number is expected to double in the next 50 years [15]. The population increase in south Florida has accelerated pollution to the park’s
ecosystem. This pollution is derived primarily from phosphorus stemming from the use of the agricultural fertilizers in the counties north and south of Lake Okeechobee, which is over 100 miles from EVER. In 2005, Hurricanes Katrina and Wilma left no structure untouched within EVER, including the visitor center, lodge, and restaurant in the Flamingo area of EVER (southern Visitor Center) [16].

Currently, 68 plant and animal species are also threatened or endangered. Thus, the Comprehensive Everglades Restoration Plan (CERP) was created in 1999 to combat the threatened or endangered status of the flora and fauna to restore water, land, and the ecosystem in EVER. This effort has been the largest ecosystem restoration project in the world; it is projected to span over 35 years, and the federal government and the state of Florida have provided $7.8 billion in funding [17].

The vast majority of research conducted on the park has focused on its natural resources and restoration. For example, numerous studies have been conducted on exotic invasive species [18], the fauna [19], fire regime [20], pythons [18], vegetation [21], and water [22]. According to Knox [23], an increasing need exists to incorporate interdisciplinary research on the Everglades’ restoration in both the natural science and social science fields, including environmental [24,25], economic [26], socio-political [23,27,28], and cultural aspects [29,30]. However, little research has focused on the human dimension of the restoration work at EVER [31,32,33,34]. It is crucial to understand how the stakeholders perceive changes with national parks in order to facilitate more inclusive decision-making processes at the park and community levels [4]. Therefore, this study fills the research gap by exploring how stakeholders living and working in proximity to EVER perceive environmental and social changes to the park and community park relations.

2. Method

2.1. Data Collection and Sample

The researcher used a qualitative approach for data collection. This approach was chosen to get more detail about the attitudes, feelings and values from the study subjects [35]. The researcher conducted a series of interviews in the park as well as in Miami during the spring of 2014. Previous scoping visits to the study area allowed the researcher to identify the community stakeholders who were invited to participate in the interviews. Snowball sampling was used to obtain a list of key informants from the Everglades Coalition webpage, and select the participants for interviews. The Everglades Coalition was chosen to identify the key informants of EVER because this organization works “at the local, state, national and even international levels to increase awareness of environmental and conservation issues in the Everglades watershed” [36]. These stakeholders included consumers/residents, NGOs, federal agencies, state/local governments, business stakeholders, and scientists. The study participants met the following criteria for study inclusion: actively involved with EVER and willingness to participate in the interview.

The interviews were conducted using a semi-structured interview format that accommodated the chosen open-ended interview technique. All of the interviews were conducted in-person unless other arrangements were necessary (e.g., phone interview). All of the interviews were audio recorded and transcribed. The transcripts were coded and analyzed using the qualitative analysis software program Atlas.ti 7. These data were analyzed using a content analysis methodology, and the coding categories were generated directly from the raw data of the text. Open codes were generated across the data set by identifying meaningful units based on a line-by-line analysis. All of the text of the transcripts were coded, and themes were derived from these data.
2.2. Instrument

Based on a literature review of the relationship between the stakeholders and parks, the interview included questions focused on changes over time with EVER. The questions were adapted from Ogden's work [33], which identified perceived changes to EVER (i.e., How has EVER changed over the last 10 years? How have those changes affected EVER?).

2.3. Trustworthiness

This study incorporated trustworthiness during the research phase, which establishes credibility, transferability, dependability, and confirmability of the data [35,37,38]. For this study, prolonged engagement was conducted by visiting the research site and meeting the people in the study. Observations were completed in order to provide depth and details emerging from the interviews. Peer debriefings were conducted with colleagues and fellow researchers in order to check the interpretations during the analysis and in drawing conclusions. By providing a thick description, this process allowed the researcher to determine whether the results were relevant to other situations or subjects. An inquiry audit was completed by a colleague who reviewed the study process. This colleague then provided feedback to the researcher who considered and evaluated it. For this study, triangulation and consultation were conducted in order to confirm the consistency of the findings.

3. Results

The study findings were based on data gathered from 41 interviews, including consumers/residents, NGOs, federal agencies, state/local governments, business stakeholders, and scientists. Overall, 90% of the participants’ initial reactions to the question about whether they had perceived any changes to EVER was “yes.” Across the stakeholder groups, the findings demonstrated how the stakeholders perceived the changes in and around EVER, and threats to the natural environment became evident. From these data, we identified six themes: (1) loss of native species; (2) urban development; (3) shortage and contamination of water; (4) hurricanes; (5) climate change; and (6) increased recreation use.

3.1. Loss of Native Species

Changes in and around EVER were associated with a loss of native species. Our findings showed that development, pollution, and water shortages have reduced the number of native plant and animal species in EVER (e.g., Florida wood stork, Florida panther, American crocodile, and West Indian manatee) and increased the threat of invasive species (e.g., Burmese pythons and exotic plants, such as the Brazilian pepper and Australian pine). These results are consistent with information published in recent reports about EVER [15,39].

Invasive species play a strong role in the disruption of an ecosystem’s balance. For instance, exotic fish consume native fish and melaleuca trees prevent native plants from receiving sunlight. Since invasive species have less predators, they have a competitive advantage over native species, consuming water, sunlight, and nutrients [40]. Invasive species issues are “very serious” and “the most prominent problem” in ecosystem changes. According to a landscape architect from Miami’s parks administration department:

The Everglades ecosystem has become a depository for every exotic species that alleged pet owners no longer have an interest in maintaining or possessing. The notion that the Everglades is an acceptable dumping ground of reticulated pythons, Burmese pythons, and various other exotic species is anathema to sound and informed ecological policies. The federal government should immediately prohibit the import of such species.
Moreover, various conservation groups have cited the loss of native species and ecosystem deterioration as being closely connected with urbanization, rising sea levels, and climate change [41,42]. According to a director from one non-profit group:

Biologically, it (Everglades National Park) has been degraded due to ongoing problems onsite and offsite. The ecosystem can’t adapt to the new system. It has experienced a decline in wildlife diversity due to the python infestation. Its salinity balance is changing due to sea level rise. It is experiencing peat collapse.

3.2. Urban Development

The study findings focused on urbanization in Miami and Fort Myers, (approximately one-two hours respectively from EVER). Respondents described how more roads, homes, and buildings are replacing the natural environment and, therefore, eliminating habitat. Urban sprawl and agricultural expansion have resulted in an increased need for water, canal construction, and water control structures. The respondents have seen an increase in the number of new farming operations surrounding the entrance to EVER. On the surface, farms may appear to be safe buffers for the environment, but the increased use of water for irrigation as well as the flooding of fields, runoff, additional infrastructure, and construction for these new agricultural operations have been problematic. One public information officer said: “The farming is to at least serve as a safety for the wildlife between Everglades National Park and the urban world. So, a lot of farming is disappearing and ending that nice cushion that wildlife had.”

One landscape architect in Miami’s parks administration department stated that the most obvious changes were the product of undesirable and external forces that have been brought to bear on the Everglades ecosystem:

Notably, these include the failures to restore the random oxbows of the Kissimmee River through the total de-channelization of the river, and the restoration of wetland habitats without compensation to adjacent landowners … Internally, while energy flows, such as water movement within the park, are desirably impacted by NPS policies, the political interests of key financial players create adverse, undesirable impacts.

Furthermore, even though the Urban Development Boundary (UDB)1 was designed to protect all of the Everglades, it has not been as effective as planned. A retired sergeant at Miami-Dade Police Department commented that the purpose of the UDB was to restrict building, but the political pressures to revise the zoning rules have negatively impacted the Everglades. The participants of this study want to “protect Everglades National Park from development, extraction, and technology” and the UDB is not working the way the residents hoped that it would.

3.3. Shortage and Contamination of Water

The respondents reported that farmland was disappearing due to increased infrastructure to control water and flooding of agricultural lands; hence, increased infrastructure has reduced water availability and added to pollution levels. In the past, EVER did not have a water quality or quantity issue. However, over the last generation, population growth, urban development and the degradation of natural areas has intensified water competition between residential, agricultural, and preservation uses. One resident, who has lived in Miami-Dade County since 1975, described how the park has changed: “The supply of fresh water was cut off and, so, it has less fresh water that pushes the salt water back.” The participants provided many examples of how development

---

1 The Urban Development Boundary (UDB) is a line in Miami-Dade County’s master plan designed to limit development from encroaching west and south into fragile agricultural lands and wetlands (Miami-Dade County, 2016)
and environmental pollution have negatively affected the water in EVER. One participant from the Seminole Tribe of Florida said that the loss of water quality and quantity has affected the biodiversity in South Florida in several ways:

Plants, lives, even the animals, fish lives affected somewhat because the fish anything that related to water in the swamp, the living species are affected. Therefore, fish died out in South Florida. It affected all different kinds of animals, and human beings, too. It is not good consumption of the water in South Florida.

The respondents mentioned that EVER is helping supply water to large urban areas outside the park’s boundaries. For instance, one landscape architect from the city of Miami said that “Everglades National Park was not considered relevant before the Everglades Restoration Projected started. Now, it provides domestic water to several million people.” This thought elaborated on in an interview with an education director of an environmental foundation: “[Everglades National Park is] important for the quality of the water for us. Everglades National Park will [solve] the water problems within that geographic area.”

The respondents reinforced the idea that access to a high quantity of quality water is needed to restore and preserve the biodiversity of EVER; however, a high quantity of fresh water is a challenge given the demands on its current use and no new sources becoming available. The challenges with water use have negatively impacted the quantity and distribution of fresh water entering the Everglades. The Comprehensive Everglades Restoration Plan (CERP), one of the most extensive drainage systems in the Everglades, mimics a natural filtration system for ground water, including “more than 2,000 kilometers of levees and canals, 150 gates and other water-control structures, and 16 major pump stations” [43]. The CERP will help solve the shortage and contamination of water, resulting in an increased freshwater supply in the backcountry by providing substantial new water flow to the central Everglades.

3.4. Hurricanes

The stakeholders’ discussed how Hurricanes Andrew (1992), Katrina (2005), and Wilma (2005) devastated many aspects of EVER and its surrounding communities. In particular, the participants in the current study witnessed the destruction of park structures, including the visitor center, lodge, and restaurant in Flamingo (in the southern Visitor Center area of EVER), also a research site, near the Gulf of Mexico, and damaged equipment.

Few of the participants felt the hurricanes helped the environment clean out and start over. The hurricanes restored the natural water flow, redirecting dammed up water into EVER through canals and flooding systems. An environmental education associate from Miami-Dade County’s Regulatory and Economic Resources department perceived that the hurricanes have solved more problems from man-made pollution, saying: “Hurricanes also restored the water flow coming down the Everglades. The post hurricane changes affected everything fairly.” Individuals are committed to the park and its ecosystem. One volunteer couple has worked at EVER through the NPS’s Volunteer in the Park program since Hurricane Andrew in 1992. One male participant who has worked as a volunteer for the maintenance of EVER after hurricanes and mentioned that “the hurricanes probably improved the environment, helping clean it out. It destroyed what man put there, but it did not hurt what Mother Nature [makes].”

3.5. Climate Change

Most of the participants agreed that the Everglades Restoration Plan has helped raise environmental awareness about how climate change will affect EVER in the future; however, the respondents expressed feelings of uncertainty about the ability of the Everglades Restoration Plan
to overcome obstacles and challenges related to climate change. As “the Everglades Restoration Plan will take 100 years to implement,” they felt that a number of continuing factors may undermine its progress to combat climate change, such as the slow progress being made by the federal government, lack of funding, and inaction by other government agencies.

The last 10 years have been positive for Everglades National Park. It is cited as the largest project in the world. We have seen restoration begin to happen, projects are being constructed. People are better understanding the importance of restoration … but we need to do more. The problem is that it will take over 100 years for an impact to be seen.

Despite the Everglades Restoration Plan’s efforts, the participants worry about how climate change will affect EVER. One entomologist of Suwannee River Water Management District raised an issue regarding the future: “If the climate models are correct, most of Everglades National Park will be underwater in another hundred years.” A professor who is the conservation chair for several voluntary groups stated that “climate change will result in a rise in the sea level and possibly salt water intrusion that will increase the need for fresh water.” An education director of Sanibel Captiva Conservation Foundation worried that climate change may just become an excuse for not saving EVER: “There are plenty of people who are fearful of climate change. They are less likely to be motivated to save it. Climate change allows people to dismiss the importance of the restoration, as it gives them excuses not to be motivated to save it.” Some of the respondents believe that EVER will be better in the short-term with more money to achieve solutions; however, in reality, EVER has already suffered from sea level rise in the long-term. Others supported the notion that EVER can serve as a venue for adapting to and reducing sea level rise. They thought that EVER could be used as a model area in which to develop an overall strategy for dealing with climate change and its impact upon humans, wildlife, ecosystems, and landscapes in general.

3.6. Increased Recreation Use

The majority of the stakeholders felt increased recreation use from many types of outdoor activities was impacting the park’s natural resources. The number of visitors, boats, trailers, and cars in the park have increased, which has degraded the shallow water areas and trails. In particular, the vice mayor of Homestead, which is the closest community to EVER, shared his concerns regarding this elevated recreation use: “I have seen changes dramatically in terms of the number of people utilizing Florida Bay fishing. In regard to the boats, I have seen an increase in the size of the vessels, changes in boating behaviors, and increased numbers of people fishing within Everglades National Park.” Not only has increased recreation participation been a problem, but recreation value conflicts have emerged between various user groups. Environmental groups have become more resistant to various recreation user groups, especially all-terrain vehicle (ATV) users. Volunteer groups have become concerned about the environmental degradation and noise impact caused by ATVs.

Not only has increased recreation participation been a problem, but recreation use conflict has seemed to emerge between business groups and recreation user groups. Business owners, such as fishermen, have had other types of conflicts with recreation user groups, especially with an increase in the number of boats, number of recreationists, and size of the boats in EVER. According to one respondents, “The increasing number of boats and fishermen in shallow water has had an impact on the fish. It scares them away. Currently, there are no rules dictating what size vessel can fish in Florida Bay.” For instance, some fish species, such as the goby, use sound to detect predators or prey and their communications are disrupted by ship noise [44]. Furthermore, boats with large, powerful motors cause damage to the marine resources in shallow water. Due to these issues, these stakeholders have provided input for EVER’s General Management Plan related to new boating policies about where boaters can operate vessels (e.g., zoning regulations to prevent further degradation of the natural environment).
We concluded that stakeholders living in proximity to EVER perceive the social and environmental changes in EVER have become drivers for conflict among stakeholders. This view corresponds to the results presented by Williams [45] in that individuals feel loss and conflict when changes occur in special areas. These findings are consistent with the prior research which has shown that social values, goal interference, and contextual differences can yield recreation conflicts [46,47].

Overall, stakeholders living and working in proximity to EVER perceived environmental and social changes to the park and community park relations due to the pressures that EVER faces from urban forces, such as urban sprawl, pollution, population change, and natural disasters. These changes lend sustainable support by stakeholders to minimize changes to the park to prevent the loss of native species, slow urban development, improve water quality, or increased recreation use.

4. Discussion

We concluded in our study that stakeholders living in proximity to EVER perceive man-made threats as major culprits in the degradation of the park’s natural environmental. Our findings concur with recent research that documents population increases in urban areas as being the driver for many of the negative changes impacting protected areas [1]. Threats to the EVER ecosystem from urban sprawl, demands for clean water, and loss of biodiversity are well-documented in recent studies [15,39]. Our own findings support this research and suggest that climate change and natural disasters (e.g., hurricanes) also adversely affect EVER and its environments.

Theoretically, this study filled the void in existing research by focusing on the human dimension of the restoration work at EVER and how the stakeholders perceived the changes in and around EVER, their perceived changes in and around EVER and identified changes over time. This study contextualized the findings within an environmental governance framework to understand how various stakeholders’ perceive social and environmental changes affecting EVER, how they are engaged in decision-making, and what this means for the future of the park. This study identified stakeholders’ perceived changes in and around EVER by looking at protected area management practices and community park relations. Also, study findings showed that lessons learned from the past can help guide stakeholders’ perceptions with national parks and future community park relations. The results showed that stakeholders who perceived negative changes to EVER are more likely to engage in environmental and sustainability activities in the park as these changes motivate stakeholders to minimize changes to the park.

Since most of the adverse environmental impacts have been driven by humans, social scientists have highlighted the inclusion of the human factor to help mitigate environmental issues for sustainability [48,49]. Practically, this study identified how various stakeholders perceived the changes that EVER has recently experienced (e.g., urban development and increased recreation use). For instance, due to a growing population in the Homestead and South Florida areas, recreational use was impacting the natural environment of EVER and its neighboring communities. To mitigate the increased recreation use, park management could focus on educational programs to raise people’s environmental awareness, helping them understand EVER’S vulnerability and encouraging them to develop sustainable ways to minimize human impacts. Managers could target these programs to youth, seniors, new residents, recreational groups, and voluntary groups, thus incorporating stakeholders’ myriad of needs, interests, and values. Interpretative programs might also gain attention and interest from visitors involved with education and conservation [30], such as the Citizen Science project, the Girl Scout Ranger program, and the Artist-in-Residence program.

Furthermore, an adequate budget is critical to the management of any protected area and its programs. Public land managers need to work with partners to support EVER with human and financial resources through fundraising for educational and membership programs, friendraising, and recruiting volunteers within and beyond boundaries of the park [51]. For instance, public land managers could create partnering relationships with community colleges or other institutions of
higher education to train volunteers as seasonal rangers. Volunteers, such as the Florida Trail Association, could also be used to maintain and monitor sustainable trails [32].

Finally, the interview questions developed in this study explored how various stakeholder groups perceived changes in and around the park. Future research should incorporate additional questions about stakeholders who are involved in the collaborative process (e.g., role, power, influence, and political environment). Other areas of inquiry could focus on the length of time that the stakeholders have been working with the parks and interactions between protected areas and stakeholder groups.

Acknowledgments: Funding was provided by NPS and Texas A&M University, Division of Research, Office of the Vice President of Research. This study draws from the data obtained from the dissertation of “Examining the Relationship between Stakeholders and Everglades National Park” conducted by Yunseon Choe in 2016.

Author Contributions: Michael A. Schuett and conceived and designed the experiments; Yunseon Choe analyzed the data and wrote the paper; David Matarrita contributed reagents/materials/analysis tools.

Conflicts of Interest: The authors declare no conflict of interest.

References

3. World Resources Institute: Washington, DC, USA, 2002; pp. 1,


469. National Park Service. Nonnative species. Available online:

decline of reptiles, Døja Vu Amphibians: reptile species are declining on a global scale. Six significant
threats to reptile populations are habitat loss and degradation, introduced invasive species,

471. Tylianakis, J.M.; Didham, R.K.; Bascompte, J.; Wardle, D.A. Global change and species interactions in


473. Pucylowski, T.M. The behavioral effects of boat noise on fish populations in Oneida Lake, NY.
Bachelor level, State University of New York, New York, May 2013. Available online:

474. Williams, A. Changing geographies of care: Employing the concept of therapeutic landscapes as a

475. Hunt, L.; Lemelin, R.; Saunders, K. Managing forest road access on public lands: A conceptual model of

476. Lu, J. Voluntary associations and their involvement in collaborative forest management. Doctoral level,
Texas A&M University, College Station, February 2012. Available online:


478. Ramkissoon, H.; Weiler, B.; Smith, L.D.G. Place attachment and pro-environmental behaviour in national


481. O’Neill, B. 21 Partnership success factors for parks and trails. Available online: from
http://www.americantrails.org/resources/advocacy/Brian-ONeill-partnership-success-factors.html
( accessed on 20 August, 2016).