Understanding How Competitive Culture in Conservation Limits Progress: How a Multi-level Framework Analysis Reveals Deep Cultural Problems between Private and Public Conservation

A Research Paper Submitted to the Department of Engineering and Society

Presented to the Faculty of the School of Engineering and Applied Science

University of Virginia • Charlottesville, Virginia

In Partial Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

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Fall 2024

On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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STS Research Paper

Understanding how competitive culture in conservation limits progress

Introduction:

The Florida Everglades is a rich, biodiverse ecosystem of about 1.5 million acres of wetlands in the southern tip of Florida. The Everglades and its habitats support numerous endangered species as well as more than 360 bird species, 300 types of fresh and saltwater fish, 40 different mammal species, and 50 species of reptiles. Everglades National Park is protected by the National Park Service, making it the only federally protected subtropical wilderness area in North America. Parts of the Everglades consist of areas that are close to urban activities - unfortunately, this has caused this keystone ecosystem to be prey to the exotic pet trade. More specifically, exotic pet owners will abandon their pets in the Everglades once it no longer becomes convenient to have them. As a result, exotic fishes have been devouring native fish species and nonnative plants often shade out indigenous plants. Of the most devastating of these invasive species, none have had the impact that the Burmese Python has had on the Everglades. Almost perfectly suited for the Everglades, with coloring that blends in with the environment and no natural predators, they have eaten almost everything in their path. This has caused many species in the Everglades, particularly mammals, to decline very sharply in number (Fort Collins Science Center, 3). Current efforts to remove the python have been unsuccessful and inefficient. This paper shows that through the lens of a multilevel framework analysis as proposed by Frank Geels', a culture of competitiveness can be seen between the private and public entities of the removal effort. In this paper, I argue that by using Geels' framework and by case studies of invasive species removal in the past, we can encourage public and private entities to work together instead of competing against each other in order to remove the pythons in the Everglades.

Problem Definition:

There is a significant effort from federal, state, and local governments to get rid of the python's presence in the Everglades. However, it seems as if there are a lot of organizations doing their own approach rather than a strategic, systematic, and unified approach. Examples of this include private universities doing their own research regarding python patterns and movements, and federal governments creating their own citizen-based initiatives to track and remove pythons. The issue of invasive species incorporates a wide variety of perspectives from financial to societal issues which further complicates the situation (Poland, 1). For example, the government might be focusing on the best use of taxpayer dollars while those in academia may be focused on using the python problem to bolster their reputation and research. All these clashing interests can impede true conservation work from taking place. Additionally, these organizations may be redoing each others' work as they lack a centralized method of communicating with each other. With a precious ecological gem like the Everglades being threatened every day by invasive species, it is important that time and resources be conserved without the threat of clashing interests. Therefore, my STS research seeks to understand why the private and public sectors of invasive species removal are seemingly at odds with each other. Additionally, it seeks to understand ways we can bridge the gap between these two entities as shown in Figure 1.

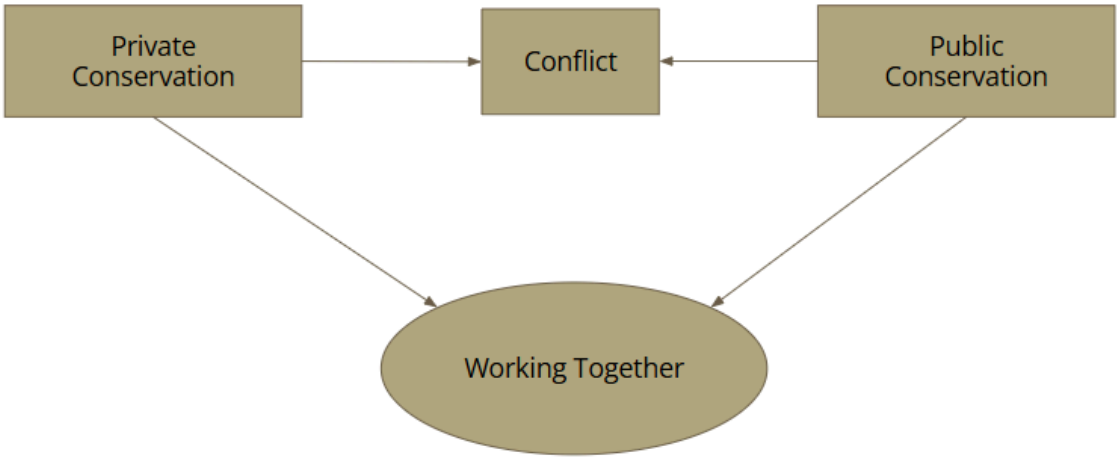

Figure 1. Public and Private Conservation paths of cooperation

Research Approach

Geels framework "distinguishes three conceptual levels": a niche level in which innovations emerge, a regime level that refers to broader societal structure in which innovation occurs, and a landscape level that refers to the overarching movements of society and culture (Geels 126). The central claim that the source supports is that understanding and analyzing socio-technical transformations in large systems does not just mean analyzing the technical transformations or innovations that may take place. On the contrary, it means understanding the climates and the conditions that lead to these innovations occurring. I plan on incorporating this view into my STS research by primarily focusing on the cultural context behind the python removal effort rather than technical methods that the efforts use. Often, the "why" has more weight than the "how", and it seems that larger cultural problems are slowing down true conservation work from taking place. Geels does a great job of understanding and incorporating this concept into his framework, which is why I plan on using it for my research.

The most relevant concepts Geels uses are his concepts of levels and the way each of these levels interact with each other, particularly his analysis of "regime trajectories" (132). Geels states that stable regime trajectories slowly build societal trends and attitudes, but systems change when criticism and negative outcomes force the regime level to adapt. Geels cites an example from Van de Poel (2000) who talked about outsider groups influencing regimes. Outsider groups, especially in the public sectors, are a significant actor in the python removal effort. The public sector and private sector are both competing for resources, funding, notoriety, and their own agendas (see Figure 2).

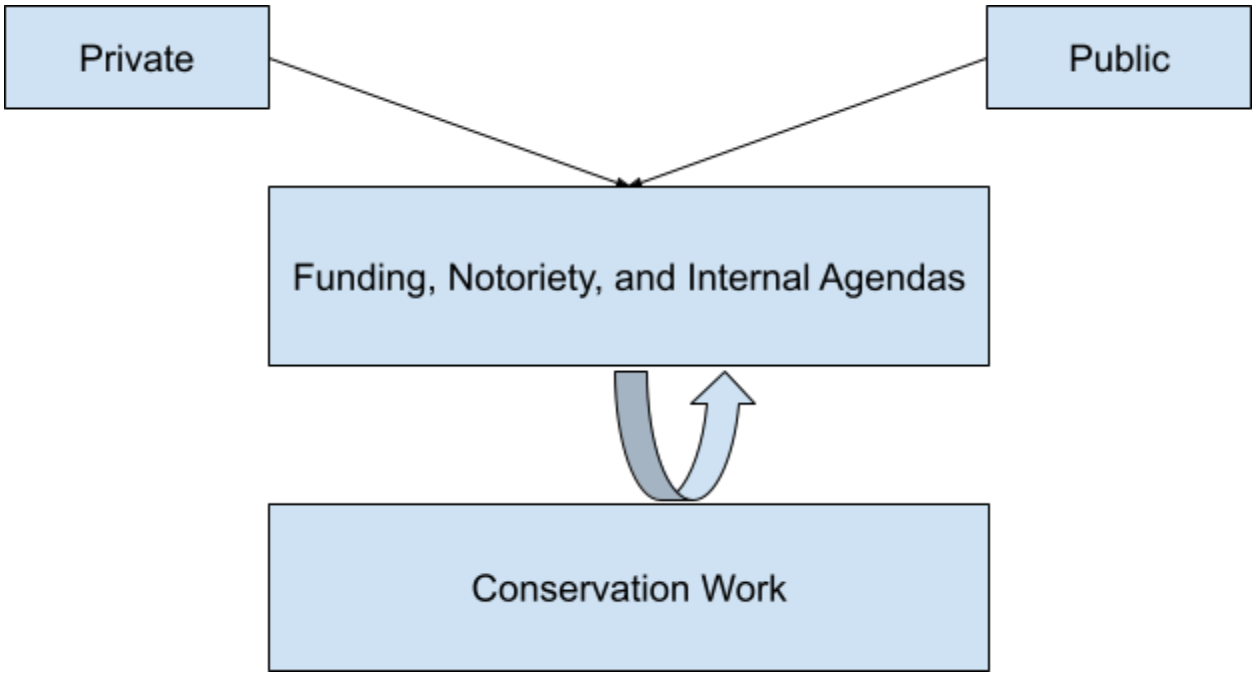

Figure 2. Various factors limiting conservation efforts

For my research, I plan on using the following methodology based on Geels framework to dig deeper into the culture of the python removal effort: describe the current regime, analyze and name outside influences for private and public sectors, analyze the goals of these outside

influences, and name the practical aspect this has on conservation efforts. My goal is that this systematic methodology will allow me to analyze the outside influences on both private and public conservation more effectively and allow me to see the impact they have on conservation. Figure 3 illustrates this methodology.

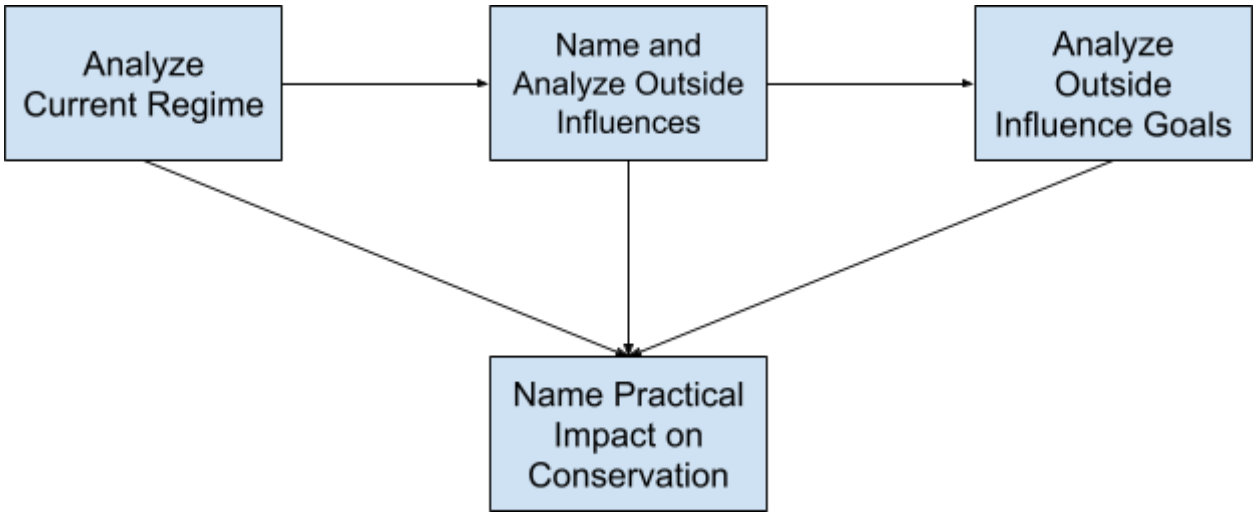

Figure 3. Visual Representation of Methodology

I want to use case studies with other invasive species particularly ones where removal was successful. It will be interesting to see how private and public entities interacted in a successful example compared to an unsuccessful case. While Geels provides a great starting point, I definitely plan on integrating other foundational STS sources to bolster my framework. Geels does a great job of providing an analysis framework for his levels, but understanding the relationship between these levels and the actors that comprise them will take another source to supplement this more narrow analysis. All in all, I think Geels provides a great broad-level framework for the bigger picture of issues behind socio-technical issues and transformations, but more niche level analysis will need other methodologies and frameworks to help me derive new insights.

Geels' framework of breaking down complicated socio-technical systems is a foundational aspect of my research as I break down the python removal effort in the Florida Everglades. Geels' analysis of the regime levels and trajectories of systems and how they can lead us to find hidden relationships particularly from outside influences will be invaluable to me as I seek to understand why python removal efforts have been inefficient and ineffective. As we have seen in our analysis of other complex systems' failures, culture plays a big role in these organizations and their technical shortcomings. A prime example includes Hurricane Katrina and how the ineffective levy system designed to prevent flooding was produced as a result of a culture of cutting corners and half-hearted work. Analyzing cultural norms in an organization is imperative as we seek to prevent further disasters and shortcomings from happening. As engineers, it is very easy to focus on the technical aspects of systems, and not understand the broader societal and cultural context that they are happening in. In reality, technical aspects are always shaped by the thoughts and habits of their creators. Geels' Framework allows us to not forget the imperative fact that the why and how people feel will always make its way to what they produce.

Results

I. Limited Resources and Competing motivations that impede Conservation

When it comes to conservation efforts, especially with regards to invasive species removal, researchers and those involved are under stress especially with regards to funding, timelines, and motivation. When I first looked at the invasive species removal efforts with regards to the Burmese Python, at first glance I thought this was due to the incompetencies of the organizations both private and public involved. The python has been in the Everglades for over a decade, yet it still continues to wreak havoc on this keystone ecosystem. However, as I used Geels multilevel

analysis to look at this situation, I quickly realized that incompetency wasn't the primary reason why python removal efforts have been ineffective and inefficient. Python removal efforts have been marked by new technologies such as machine learning, spacial technology, and also drone technology. Additionally, organizational efforts have not been lacking as there have been ample efforts from private universities, private organizations, and even public citizens to remove pythons. Doing more research in all three levels and incorporating other case studies that have shown successful invasive species removal, it is clear that the main issue in the python invasive species effort is the cultural aspects behind the movement. A culture that should be marked by collaboration and communication is actually one characterized by fragmentation and the advancement of one's personal agenda. However, successful case studies by other removal efforts provide efforts to reunite this movement specifically in the public and private sectors. Fixing cultural climate is not a silver bullet to solving the problem of invasive species in the Florida Everglades, but it can provide a framework to approach a resolution to understand why so much conservation efforts in the Florida Everglades have been slow and ineffective at best.

II. Public and Private Cooperation Success in the Past

While public and private entities in the Everglades have been at odds with each other, my research into other invasive species efforts has shown this was not always the case. In fact, some of the most successful invasive species removal efforts have been where public and private entities have worked together. Starting back from the 1950s, the U.S. has battled serious environmental threats posed by invasive species, and has used public and private entity cooperation to successfully stop and mitigate these threats. The Sea Lamprey Control Program is a perfect example of private and public entities working together. The Sea Lamprey is an invasive parasitic fish that was released in the Great Lakes in the early 1900s. The Lamprey fed

on native species, leading to drastic reductions in native fish populations and thereby commercial fishing. The Sea Lamprey Control Program was then formed to stop this threat and consisted of federal, state, and provincial agencies from the United States and Canada, and also incorporated the private research institutions to develop new technologies such as barriers and lampricides. This collaborative effort helped reduce the sea lamprey populations by 90%, improving the health of the Great Lakes native fish population. The Sea Lamprey Control Program showcased that private and private entities in conservation and ecology do not have to be at odds with each other, but rather can work together to accomplish more than they ever could as a single entity. The key piece in the Sea Lamprey Control Program was the public entities' willingness to seek help from private entities which led to technological innovation and coordinated management. As the saying goes, many hands make light work, and this was how the Sea Lamprey Control Program established an effective framework of collaboration between private and public entities. These guiding principles seem to have been lost in the case of the Florida Everglades, and I wanted to ask the question why. With other cases in the United States of successful invasive species effort, I wanted to know what specifically with the Everglades was preventing successful cooperation between private and public entities.

III. Competitiveness exposed through multilevel analysis

To answer this question, I employed Geels' multilevel framework analysis to analyze the context behind the invasive species effort in Florida. Geels divides his framework into 3 levels - the niche level, socio-technical regime level, and the landscape level (see figure 3). The niche level is characterized by technological innovation, and applying this to the python removal we see various new technologies that are being used such as drone technology, machine learning, and spatial tracking systems. The primary creators behind these innovations have been private

research institutions, universities, and technology companies. While these technologies have represented potential breakthroughs, the problem in the invasive python removal effort has been that these technologies have been struggling to be scaled up effectively. Even at this level, entities are competing for limited funding, recognition, and proprietary control over new technologies. This competition discourages collaboration and communication between public and private stakeholders and slows down the adoption of them. Additionally, public agencies constrained by funding and bureaucratic processes, have been slow to adopt these new technologies by private entities further slowing down public and private entities. I then analyzed the next level: the socio-technical regime, which is characterized by the dominant rules, practices, and institutions governing the invasive species removal effort. As I looked at this level, the culture of competition showed up again. Public agencies have a culture where they are driven by public accountability and political cycles where they can be viewed favorable or disfavorably. This places the emphasis on short-term, high-visibility projects rather than long-term, collaborative efforts. Private organizations are not exempt to this as well as they have their own motivations ranging from commercial interests and high reputation. These competing incentives lead to the practical effect of a lack of coordination and shared goals, which creates the slow removal process of pythons in the Everglades. Finally, the landscape level shows another aspect of cultural attitudes that influence the competitive culture between private and public entities. The landscape level refers to the broader societal factors that influence both the niche and socio-technical levels. At the landscape level in the python removal effort, fluctuating public support which can lead to varying funding and political support, can lead to competition over limited financial and societal support. All of these various factors, at each level that Geels describes contributes to a culture of competition that prohibits true conservation work from

taking place, and has led to the results we have seen in the python removal effort in the Everglades.

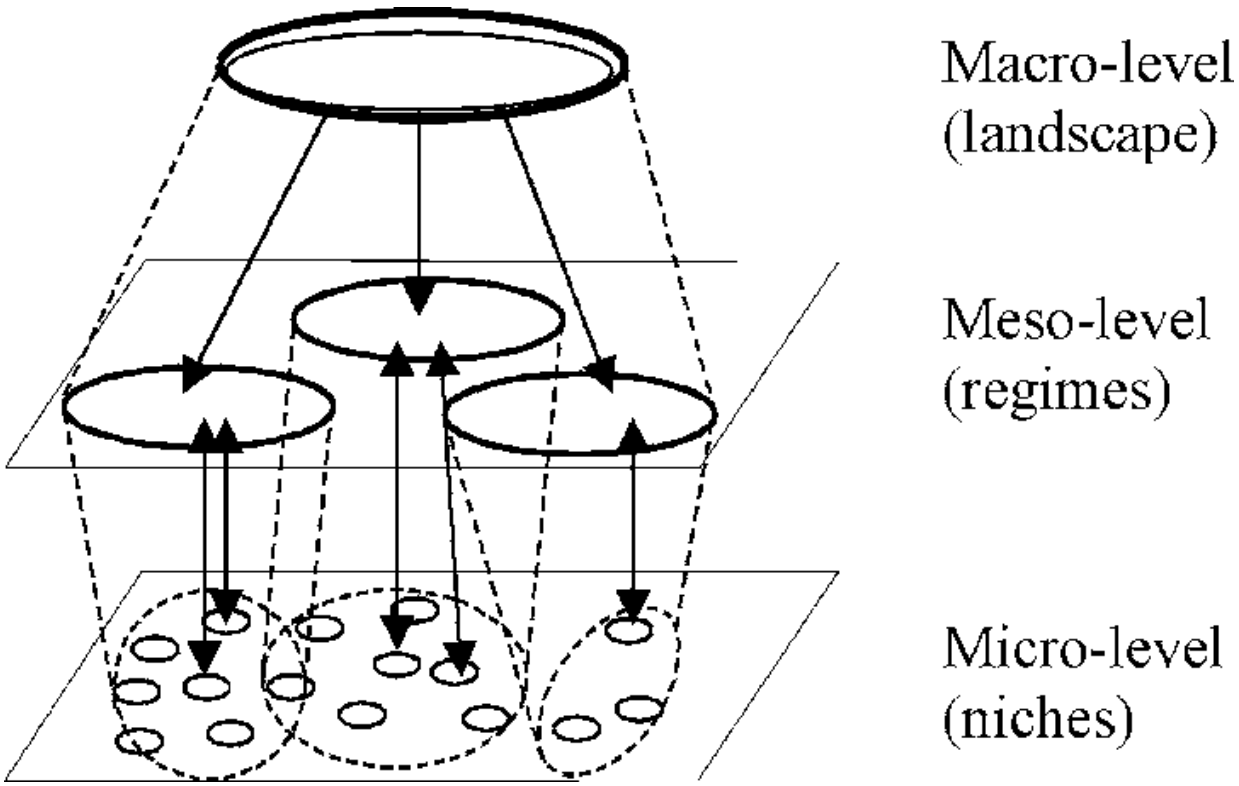

Figure 3. Geels' Framework Visualized

IV. Bridging the Gap through Niche-Regime Integration

Successful invasive species removal efforts, such as the Sea Lamprey Control program provide a framework for how we can investigate how to improve the python removal effort. The Sea Lamprey Control Program had effective niche-regime integration and clear goal alignment, both of which seem to be lacking from the Everglades situation. In the example of the Sea Lamprey technological innovations were effectively scaled up from the niche to regime level through cooperation and public and private agencies. Furthermore, there were enough common goals in

the Sea Lamprey situations. Effort was made to align the interests of the various agencies like public agencies and private organizations. These efforts allowed a unified goal to be achieved and successful removal of the sea lamprey. Looking at these two aspects, these would be two key areas where substantial progress can be made in the python removal efforts for the Everglades. Dealing with the factors behind the competitive culture of this effort will take strategic and coordinated effort, but this is the first step to making sure the Everglades can be protected from invasive species.

Table 1. Lessons Learned from Sea Lamprey Removal Effort

Lessons from Sea Lamprey Invasive Species Removal Effort
Clear Goal Alignment Despite Varied Interests
Common Goals Despite Varied Interests
Effective Technology Scaling
Niche-Regime Integration

Conclusion

Conservation effort especially with regards to invasive species removal is constrained by various factors such as limited funding, resources, and the pressure to get results quickly. These various factors have led to a culture of competition between private and public entities. This has been seen in the Florida Everglades, as the problem of invasive pythons continues to be marked by slow and ineffective mitigation efforts. While this situation can be seen as gloomy or somber, previous examples of public and private entities in the field of conservation have shown that this culture of competition does not need to exist, and that private and public entities can work together to accomplish meaningful conservation work. This paper employed Geels' multi-level framework analysis to analyze how the culture of competition has infiltrated every level of the

conservation efforts in Florida from the niche to landscape level with regards to the python removal situation. While this paper shows the culture of competition between private and public entities, it does not provide a solution. A solution to this problem will be multifaceted and involve all the actors in this conflict. However, the previous case studies as explained in this paper and the lessons they provide can be applied to the situation in the Florida Everglades. Lessons such as using technological innovation as a catalyst for cooperation, and seeking help and collaboration from more advanced organizations are two clear examples that both the private and public entities in this conflict can take. The Florida Everglades is one of the most beautiful and iconic national parks and landscapes in North America. Its incredible biodiversity and practical benefits to human life, has been an outcry for conservationists and environmentalists alike to protect this landscape. It is the author's hope that by analyzing successful case studies in the past as shown through this paper where private and public entities worked together in invasive species removal, the actors in the Florida Everglades can slowly begin to eradicate the culture of competitiveness and replace it with a culture of collaboration. While the external pressures of funding and notoriety can be great, the pressure of saving the Everglades for future generations should be the primary driver for unification between these two entities.

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