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INVASIVE FISH AND WILDLIFE PREVENTION ACT

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Asian Carp, Minnesota Public Radio News

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Brown tree snake, Uncyclopedia

PREFACE

This report concludes the work of the Workshop in Applied Earth Systems Management, a two-semester core course for the Master of Public Administration in Environmental Science and Policy at Columbia University's School of International and Public Affairs. During the summer semester, the group analyzed the environmental problems addressed by the Invasive Fish and Wildlife Prevention Act of 2013. During the fall semester, the group examined how the policy would be implemented upon passage into law. This report reviews the work of both semesters and provides a program design and implementation plan for the Invasive Fish and Wildlife Prevention Act.

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EXECUTIVE SUMMARY

The issue of invasive species is multidimensional and has a variety of negative impacts on society. Invasive species negatively impact the economy, the environment, and human health. Invasive species, which are defined as any harmful nonnative animal, plant, or pathogen, impact the economy by causing billions of dollars in control costs annually. They damage local ecosystems by threatening the stability of native wildlife, vital food chains, and ecosystem services that we rely upon. Nonnative pathogens can also cause illnesses and impact human health. The United States government is obligated to preemptively halt the onslaught of invasive species and alleviate the burden of established invasive species in our natural ecosystems. In March 2013, the Invasive Fish and Wildlife Prevention Act was proposed in the United States House of Representatives as a solution to this problem. At its core the Act creates a comprehensive national invasive species management plan for the United States. It aims to curtail the growth and development of invasive species already in the country, mitigate the impacts of already established invasive communities, as well as inhibit future introductions, an increasingly common issue in light of rapid globalization.

This report describes a program to implement the Invasive Fish and Wildlife Prevention Act to ensure it achieves its intended design. Significant consideration was taken to guarantee that the program design accurately addresses the critical needs of invasive species management, as well as to comply with the Act. Because the issue of invasive species has a large scope and the problem spans across multiple sectors, encompassing the economy, the environment, and human health, the collaboration of a variety of government agencies is paramount to ensuring adequate implementation and, ultimately, long-term success. Relying on just one agency to complete the task would assuredly result in overlooking key components in the governance of invasive species. The pitfall of preceding invasive species regulatory initiatives has been the lack of integrated and inclusive approaches to problem solving in the public sector. Consequently, though the Act does not explicitly make use of the National Invasive Species Council (NISC), the incorporation of their existing structure into the Program will facilitate the unification of other relevant and necessary government agencies attempting to achieve identical or similar policy objectives with regards to invasive species management.

At its core, the program design integrates the existing structure of the National Invasive Species Council and the US Fish and Wildlife Service (USFWS). Aside from these two core bodies, critical assistance will be provided by pertinent government agencies on the Federal, State, and local levels. The program itself is divided into a three-body structure: the Secretariat, the Research Body and the Injurious Wildlife Prevention Fund. Nonnative species will be managed according to six regional areas and will be governed by six corresponding regional Interagency Working Groups (IWG). Each regional IWG is comprised of four committees, each with varied but critical responsibilities: Science, Policy, Outreach, and Border Control. The Science Committees will focus on scientific risk assessments, which are a critical component to the policy decisions of the Secretariat. The Policy Committees will focus on creating regional management plans. The Outreach Committees will work towards fostering public

education and engagement in initiatives that focus on the impacts of invasive species on local communities nationwide. The Border Control Committees will prevent the ingress of invasive species into the country at relevant points of entry. Every element of the Act and the program will be funded entirely by fees, fines, and civil and judicial penalties to be paid by violators and importers of wildlife into the U.S. This revenue created by the Act allows room for growth and expansion moving forward in the future to best address the ever-changing issue of invasive species.

The expected milestones for the first calendar year of the Program aim to have an established management infrastructure, as well as begin to receive and review research proposals. By the second quarter, the Program will disburse funds and field research will begin. By the end of the third quarter, regional offices will submit suggestions for invasive species for further review during the Secretariat management meetings. By the conclusion of the first calendar year, the emergency declaration procedures will be finalized along with the scientific risk assessment process. This framework for the first calendar year has taken into consideration the immediate needs of invasive species management, as well as the priorities for the implementation of the Act. By establishing a management infrastructure and a baseline of research, the problem of invasive species can be more accurately assessed and managed moving beyond the first calendar year.

Left alone to settle into new and novel environments, invasive species quickly establish robust populations, become harmful to native communities, and persistently endure control or removal efforts. The combined estimated damage and control costs of invasive species in the U.S. alone in 2012 represented more than 1.5% of the United States' current dollar Gross Domestic Product (World Bank). Since 1999 more than 37,000 cases and 1,500 deaths have resulted from West Nile Virus, an invasive pathogen (Center for Disease Control). Nearly 42% of domestically threatened and endangered species are in jeopardy primarily due to invasive species (National Wildlife Federation).

The problem of invasive species is dynamic to say the least. To adequately address the problem, a solution as equally dynamic is needed. This is not a simple problem that has a simple solution. For centuries now invasive species have encroached into our daily lives, leaving citizens impacted in ways beyond our realization. An enterprising integrated solution is necessary to fix the problem. An exemplary solution is the Invasive Fish and Wildlife Prevention Act.



Case Study 1:
Zebra Mussels

Zebra mussels are currently one of the most notorious and disruptive invasive species in the U.S. They are largely a result of ballast water discharge from boats (Beyer et al. 2011). While native to the Black and Caspian Seas, the species has now invaded ecosystems in the Mississippi River, Great Lakes, and other critical U.S. waterways. With populations that have the potential to grow by the millions each year, zebra mussels remove plankton from the water, which is a critical food source for native fish. They also kill indigenous mussels by adhering to their shells. Furthermore, zebra mussels can clog the inside of water pipes, resulting in millions of dollars spent annually to clean and repair vital infrastructure (Scholastic News 2009). Overall, zebra mussels are estimated to cause \$1 billion each year in damage and control costs (Pimentel et al. 2005).

INTRODUCTION

Invasive species cost the United States nearly \$257 billion each year in control costs and damages (Pimentel et al. 2005). Aside from these costs, invasive species disrupt native ecosystems in a way that makes it difficult to remember what was once considered a normal, thriving ecosystem. By shifting the ecological baselines, invasive species prevent us from recognizing the true gradual decline they are causing in the environment around us (Diederich 2013). In response to the threats posed by nonnative species, the Invasive Fish and Wildlife Prevention Act was proposed to address this growing issue in the United States. It aims to prevent future invasions, mitigate the impacts of already established invasive species, as well as restore environments to their historically and ecologically natural baselines.

On March 6, 2013, Congresswoman Louise Slaughter (D-NY-28) introduced the Invasive Fish and Wildlife Prevention Act into the United States House of Representatives. The Act seeks to prevent the introduction and establishment of invasive species that have the potential to cause harm in the United States. Invasive species, for the purposes of the Act, are defined as any non-native animal, plant, or human pathogen in the United States. The U.S. Fish and Wildlife Service (USFWS) will serve as the chief authority to monitor imported and existing species. The legislation proposes updates to screening procedures with the option to designate harmful nonnative species as injurious, thus banning from private ownership. The simultaneous establishment of the Injurious Wildlife Prevention Fund finances species management and allows the legislation to be self-sustaining over time. The Act proposes monetary fines and penalties for violators, fees for the importation of wildlife, and an online database of the regulatory status for each nonnative species in the United States. Enactment would reduce the economic costs, health impacts, and environmental losses that result from nonnative intrusions.



Case Study 2:
Asian Carp

Originally from Southeast Asia, the Asian Carp was introduced into the United States through the aquaculture industry. Due to their voracious consumption patterns, their presence in United States waterways seriously threatens native fisheries as well as endangered and threatened native aquatic species. In the year 2010, the federal government spent \$78.5 million in control costs in an attempt to prevent their introduction into the Great Lakes. Aside from their economic costs, the Asian Carp is also known to jump out of the water at the sound of boat engines. This character trait has caused collision injuries to numerous boaters (USFWS 2012).

Currently invasive species are managed by a patchwork of more than forty Federal and State regulatory initiatives. Despite this medley of good intentions to mitigate the impacts of nonnative species, the problem has only accelerated in recent years. In the current age of globalization, the ease and frequency of international travel has increased, allowing ample opportunities for invasive species to cross what were once insurmountable barriers to dispersal. This highlights the necessity for more comprehensive and effective legislation that has the ability to unite multiple agencies and experts in an effort to address the problem.

Federal attempts at managing the problem date back as far as the Lacey Act of 1900, which today is widely regarded as ineffective. Plagued by inconsistencies and inefficiencies, it takes more than three years to have a species listed as invasive under the Lacey Act (Fowler et. al). Where the Lacey Act has failed in design and scope, the Invasive Fish and Wildlife Prevention Act will succeed. Currently, invasive species establish themselves too quickly for the Federal government to enact effective responses, which include reactive regulations, policy initiatives, and rapid dissemination and enforcement of those policies. The Invasive Fish and Wildlife Prevention Act will streamline the process of invasive species management across the breadth and scope of domestic government agencies. It will allow the U.S. to respond more swiftly to ecological, economic, and human health threats.

Long before the Age of Industrialism, humans, plants, animals, and pathogens traversed from place-to-place across the globe. However, today that rate of travel has accelerated to unmatched degrees as a result of technological advances. As the surge in global travel continues, so must the diligence of countries to protect their citizens, their economies, and their natural ecosystems. Threats to these bastions of society come in various forms. Invasive species are one of these threats. The Act seeks to serve the People's best interest in establishing a more stable and sound framework by which to regulate the influx of nonnative species passing through our borders daily.

THE SCIENCE BEHIND THE PROBLEM

The Invasive Fish and Wildlife Prevention Act seeks to mitigate the impacts of invasive species on the economy, environment, and human health in the United States. Due to the significance of the impacts of invasive species, it is necessary to study their biological and ecological characteristics and critically examine how they penetrate into our ecosystems. Establishing a baseline of information and knowledge allows one to objectively determine what can be done to most effectively eradicate current populations and limit future introductions (Pimentel et al. 2005).

Invasive species exhibit unique biological and ecological traits that enable them to succeed in nonnative habitats while simultaneously adversely impacting native species. Invasive species, by their very nature, originate from foreign lands. This implies that they evolved under an entirely different set of ecological constraints and controls. In their native regions, they are not detrimental to the ecosystems. Natural controlling mechanisms exist in their places of origin. However, upon arrival to a new ecosystem, their natural controlling mechanisms are nowhere to be found. They thrive without the constraints of their competitors and ecological inhibitors. Our native species have not evolved in concert with them, and are therefore unable to compete, often succumbing to their unique methods of dominance (Diederich 2013).

Invasive species typically exhibit fast growth and rapid reproduction rates and they are able to modify the natural conditions of the environments they infringe on to promote their own survival. The combined biological and ecological characteristics enable nonnative species to permanently alter ecosystems. Furthermore, most nonnative species are opportunists that are able to take advantage of a wide array of environmental conditions. Additionally, most invasive species are generalists, able to live off a wide variety of food groups to sustain themselves. They possess genetic adaptability and lack controlling mechanisms. Invasive species most frequently thrive in regions where they lack natural predators and have repeated opportunities for establishment within the habitat (Kolar and Lodge, 2001).

Determining if a species can be classified as invasive is dependent upon whether the habitat can sustain proliferation of the species. Introduced species often have superior competitive capabilities for resources and can more easily acclimate to ecosystem changes. For example, a wildfire or unexpected dry or wet season can wipe out a portion of local species, leaving an ecological void for more competitive and opportunistic nonnative species. Furthermore, because the world has entered what is known as the “Era of Globalization” over the last century, improvements in shipping, technology, and logistics have “accelerated the ease with which commodities are transported across the globe,” greatly increasing the magnitude of biological invasions (Hulme, 2009). Therefore, invasive species enter ecosystems through a variety of different sources, both intentionally (e.g., pest control) and unintentionally (e.g., contaminated materials).

A NATIONAL SOLUTION TO A NATIONAL PROBLEM

The purpose of the Invasive Fish and Wildlife Prevention Act is to “establish an improved regulatory process for injurious wildlife to prevent the introduction and establishment in the United States of nonnative wildlife and wild animal pathogens and parasites that are likely to cause economic or environmental harm, or, harm to human or animal health” (H.R.996, 2013).

Upon enactment, this Act would “establish a process for assessing and analyzing the risk of a non-native taxa” that has been, or could be found, existing in the United States. Live wildlife imports would be subject to pre-import risk screening, strict customs regulations, and diligent tracking if granted entry. Overall, the Invasive Fish and Wildlife Prevention Act calls for the designation of two categories of invasive species - Injurious I and Injurious II: An “Injurious I” marker indicates the top priority of a species invasion problem that needs to be addressed immediately and in a proper manner, and “Injurious II” suggests that the species is not causing an immediate harm but does demonstrate strong invasion potential which deserves attention and proper application of precautionary procedures. Moreover, the Act allows for proposals to be submitted by any entity for revised regulation of a specific species. Complete proposals will be published in the Federal Register for a 60-day public comment period and the program director will approve or disapprove the proposal within a 180-day timeframe.

The Act also calls for the establishment of an electronic database outlining quantities and the regulatory status of nonnative taxon, as well as annual, cumulative reports. It also calls for the establishment of a user fee structure to properly charge those who are legally using invasive species for scientific research, and public or private recreational uses. In terms of penalties for violating the Act, the Act specifies the procedures of setting up and collecting penalty fees from violators as well. All these user fees and civil penalties will go into a fund after the first year of program commencement, with 75% to carry out the Act and 25% to provide aid for state wildlife risk assessment. An annual report will detail revenue, expenditures, recommendations, and balance at the end of each fiscal year. Successfully tackling this issue requires a holistic approach to invasive species management such as the one outlined in this report.

The Act also demands that a full set of Scientific Risk Assessment (SRA) procedures to be set up within the 180-day timeframe. Coupling with the Invasive Species database, the SRA will become the standardized process for the responsible agencies to identify the risk, categorization, severity level and mitigation procedures during invasive species management and eradication work.

DEAD ON ARRIVAL

The Invasive Fish and Wildlife Prevention Act was proposed by U.S. Congresswoman Louise Slaughter, (D-NY-28) in March 2013. As of November 2013, there were 30 co-sponsors, all of whom are Democrats. The Act is also supported by a coalition of 28 organizations that hope to strengthen the regulation of the animal trade and prevent future establishment of non-native species (Brammeier et al. 2012). These organizations include environmental, conservation, fishing, boating, and religious groups. Among these include the Alliance for the Great Lakes, the National Audubon Society, the National Wildlife Federation, the Religious Coalition for the Great Lakes, Salmon Unlimited, and the Wildlife Society. Supporters of the Invasive Fish and Wildlife Prevention Act want the USFWS to gain full authority over regulatory decisions and also believe that this Act can greatly protect the nation from invasive species. Supporters also focus on the millions of taxpayer dollars that will be saved both in damage and control costs through the protection of native ecosystems from these species (*Louise.house.gov*).

On the other hand, opponents of the Act believe that these novel ecosystems, which include both native and nonnative species, are increasingly common and should only be addressed when the impacts on biodiversity are measureable (Kareiva 2011). Opponents include those that would be adversely affected, such as members of the reptile and pet industries, animal entertainment businesses, zoos, aquariums, and air, water, or truck transportation sectors. Specifically, members of the reptile and pet industries have been very proactive in lobbying against the Act and leading organizations include the U.S. Association of Reptile Keepers (USARK) and the Pet Industry Joint Advisory Council (PIJAC).

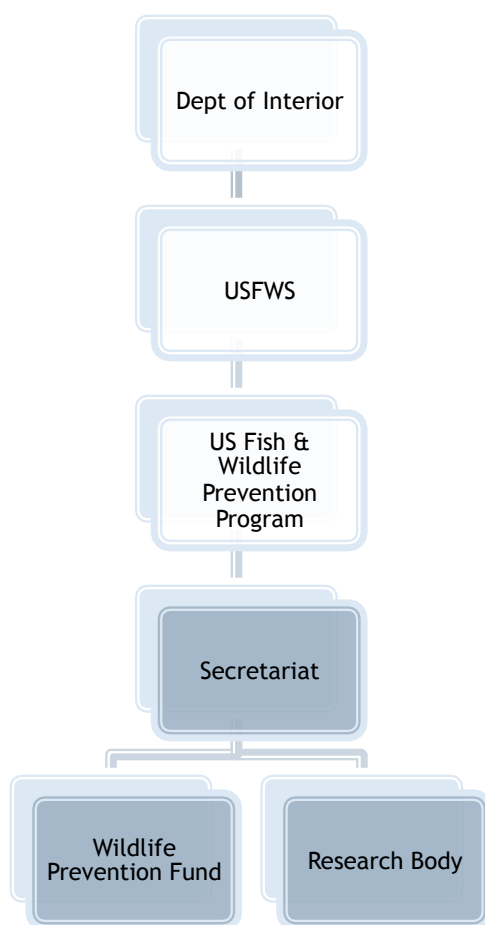
To determine the chances of this legislation moving forward in the current political climate, we adopted the American political scientist John W. Kingdon's policymaking model, in which he proposes the three essential streams to enact a new policy: problem stream, policy stream, and political stream (Kingdon 2011). In the context of the Act, the problem stream is characterized by the evolution of the invasive species problem; the policy solution stream consists of all possible program options that are currently available, and in the case of the Act, it is the major stream critiqued by congressmen of specific personal or industry-affiliated interests; and finally, the politics stream considers the macro political environment under which the Act is discussed. Regarding the current political environment, the lack of progress with the Act can largely be attributed to the fact that a Democrat in a Republican controlled House introduced it. Bilateral legislation is unlikely at best and members of both parties spend more time obstructing their opponents rather than compromising. Also, analysis of the statistical evidence alone allows a revealing insight into the likelihood of the Invasive Fish and Wildlife Prevention Act passing. At the halfway mark of the legislative year, the 113th Congress had passed only 22 Acts while more than 4,000 Acts have been referred to committees. Based on analysis of these facts, the Act is practically 'dead on arrival'.

PROGRAM IMPLEMENTATION

In order to implement the Invasive Fish and Wildlife Prevention Act, we have created a program design that unites existing infrastructure under the U.S. Fish and Wildlife Service and the National Invasive Species Council to maximize efficiency and effectiveness, and minimize costs. The proposed program design adopts a two-pronged approach that focuses on 1) preventing the entry and establishment of invasive species in the United States and 2) mitigating the impacts of already established invasive species in the U.S. The ultimate goal is eradication of invasive species and restoration of damaged ecosystems, markets, and public health issues.

Under our program design, three main administrative bodies will be created – the Secretariat, the Research Body, and the Injurious Wildlife Prevention Fund. The roles, staffing arrangements, and budgetary outline are as follows.

Figure 1. Organizational chart displaying the main components of the Invasive Fish and Wildlife Prevention Program.

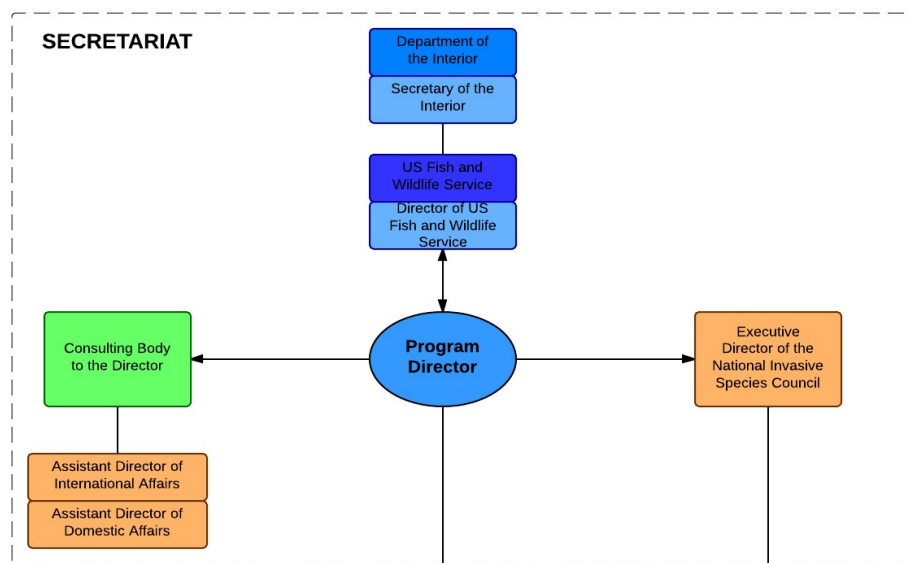


SECRETARIAT

The Secretariat will be the main governing body, providing operational and administrative management of the other bodies. As stipulated in the Act, the Director of the U.S. Fish and Wildlife Service and the Secretary of the Interior will oversee the implementation of the Act. A Program Director, a new position, will manage the implementation of the program. The Program Director will be a full-time employee who works closely with individuals from the Department of the Interior, the National Invasive Species Council, and the multi-agency Consulting Body and Interagency Working Groups (IWGs), which will also be created to implement the program. Final determinations and executive policy decisions will be made by the Director of USFWS and the Secretary of the Interior who have chief authority over the Act.

The Secretariat will house a number of operational individuals and bodies. As dictated by the Act much of the implementation activity will be executed by the USFWS in collaboration with the National Invasive Species Council (NISC). The NISC Executive Director will oversee the activities of the Research Body and will communicate the status of nationwide research to the Program Director. The NISC Executive Director is an existing position held by an individual with experience in international invasive species policy development and coordinating interagency partnerships at the Federal level.

Figure 2. Organizational chart displaying the detailed components of the Secretariat.



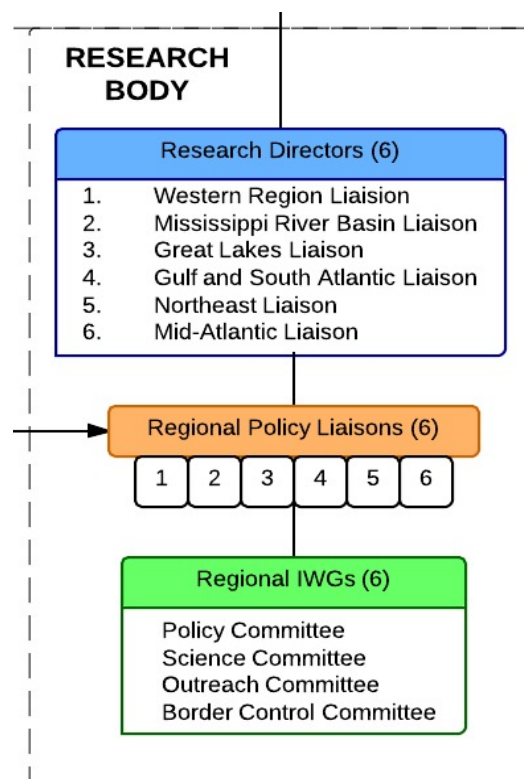
A new Consulting Body to the Director will also be housed in the Secretariat (see Appendix A for staff that will be hired and those that will be reallocated to this task). The Consulting Body will provide support and advice to the Director with each individual drawing on his/her department's expertise. The Act requires the Director of USFWS to refer to the Consulting Body for opinions before making final Injurious Species determinations. Finally, the NISC Assistant Directors of Domestic and International Affairs work to establish the U.S. position on invasive species and negotiate international agreements

with corresponding agencies outside the United States. These Assistant Directors work under the Consulting Body to align their analyses with national events and the federal agenda.

RESEARCH BODY

The Research Body will focus on gathering and analyzing information on the spread and impact of invasive species in the U.S. It will help identify points of entry and provide all data required for management plans and will be responsible for the classification of invasive species into Injurious I, II, and Non-injurious. It will also work towards the creation of a “clean list” of species, which indicates species that are not negatively impacting the economy, environment and human health of the United States. Part of its research will focus on currently established invasive species, their spread, and impacts – particularly on the ecosystem and U.S. economy. The remaining research will center on how invasive species enter the U.S. with a specific interest on ports of entry and countries of origin. The research body will liaise with related government agencies such as the Department of Agriculture, National Park Service, Fish and Wildlife Service, Bureau of Land Management, United States Geological Survey, and the National Invasive Species Council to benefit from the scientific expertise of each organization.

Figure 3. Relationship of Research Body, regional offices, and sub-committees.



The program divides the nation into six regions similar to the current designations by the Aquatic Nuisance Species Program—a governmental program focusing on invasive aquatic species control (See Appendix C). Many states overlap within these six regions to ensure coverage in high-risk areas that receive large amounts of imports. There will be six USFWS Research Directors who will serve as lead scientists for invasive species ground research. Each Research Director will report to the NISC Executive Director and is primarily responsible for a single geographic region. Each director will work closely with an existing NISC Regional Policy Liaison in his/her respective region lead the six regional IWGs, which are each comprised of a Policy Committee, a Science Committee, an Outreach Committee, and a Border Control Committee. These committees are the “workhorses” of this program.

The Policy Committees have various responsibilities to properly implement the Act. The Policy Committees will create state specific and regional invasive species management plans by using data provided by the Science Committees. Furthermore, the Outreach Committees will work closely with educational institutions on a regional level and will work towards spreading awareness of invasive species in the region through community groups.

The Border Control Committees will focus on the movement of species between state borders. Since one of the goals of the Act is prevention of invasive species in the United States, formation of the Border Control Committees are vital to achieving efficient implementation because invasive species are imported via multiple pathways. The Border Control Committees will be trained to detect irregular routes of entry by live species.

The four committees in each region will be partially staffed by individuals from the pre-established Aquatic Nuisance Species Task Force (ANSTF). The ANSTF will be expanded to assist with management of not only aquatic invasive species, but also terrestrial nonnative species intruding on native ecosystems throughout the United States. The ANSTF will collaborate with the IWG’s who will house expertise from various federal and state agencies and research institutions. The IWG’s will be established with specific species and habitats as focal points.

The majority of resources that flow into the Research Body will be distributed to the regional Inter-agency Working Groups, which includes the four Committees that comprise each IWG, as they will be conducting preliminary and subsequent field research. Regional office managers as well as policy liaisons, plus mid-career and entry-level analysts will be hired.

INJURIOUS WILDLIFE PREVENTION FUND

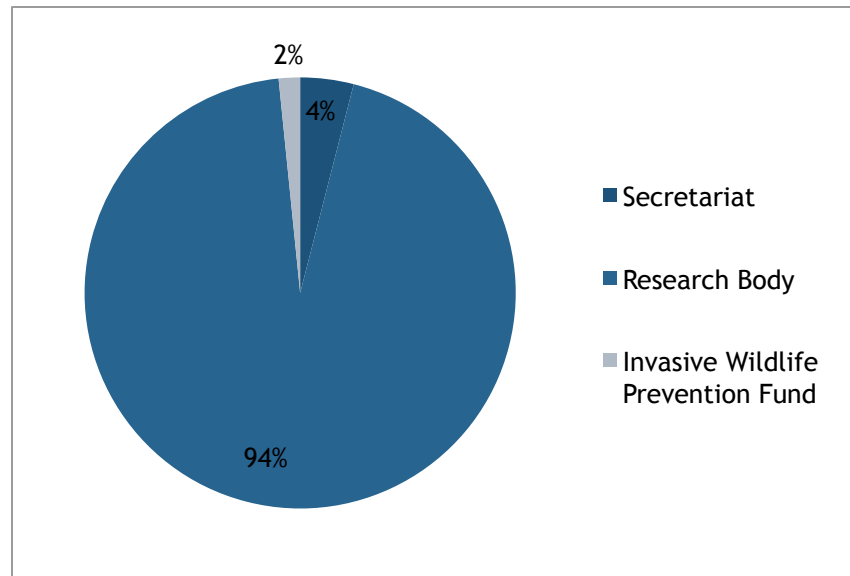
The Injurious Wildlife Prevention Fund manages the finances of the program. A Budget Analyst will be hired who will be responsible for financial management of the program, and overseeing collection of importation user fees and fines from civil penalties and misdemeanors. The position will report to the Program Director. The fines, as stipulated under the Act, will be levied for misdemeanors under the Act such as the possession of illegal non-native wildlife species and are not to exceed \$10,000. The fees will be placed on imported wildlife species that are not listed as Injurious I or II. Specific fees will vary based on factors such as weight and economic impact. The Program Director, in consult with the Budget

Analyst, will determine the exact fees for imported wildlife. They will be collected at local, state and national levels and the revenue accrued will be channeled back into the program. The Act mandates that 25% of fines and fees levied are allocated to individual states for invasive species management and 75% are allocated to the national implementation. The Budget Analyst will be responsible for all program expenses, and ensure that each component of the Program is adequately funded. A Budget Coordinator will be hired to support the Budget Analyst and to interact with the Regional Policy Liaisons to determine the appropriate distribution of funds for regional invasive species control by the IWGs. Funds are transferred from the Fund to the IWGs upon mutual agreement of a final budget for Program activities. Both of these positions would be employed by USFWS.

The financial viability of the Act will be ensured through the revenue system outlined in the Act as well as a thorough budget plan estimating the first year expenses for the Program. The proposed budget plan is based on expected revenues, personnel expenses, and other than personnel services costs. A line item budget operationalizes the program budget and detailed personnel and non-personnel items were taken into careful consideration. Personnel costs are estimated based on the roles and responsibilities of anticipated employees within the outlined organizational structures according to the U.S. General Schedule.

We allocated our budget roughly according to the following ratios: 4.0% to the Secretariat (amount of \$464,186), 94.4% to the Research Body (amount of \$11,012,400 and about 1.6% to the Injurious Wildlife Prevention Fund (amount of \$184,830). As demonstrated below, slightly less than 6% of the total budget is spent on administration, while the remainder goes directly toward program implementation. Each Regional IWG will receive equal amount of funds.

Figure 4. Organizational budget breakdown.



STAFFING PLAN

While the three administrative bodies are distinct (Secretariat, Research, Fund) this design facilitates inter-Program collaboration to establish uniform invasive species prevention, mitigation, and research strategies and techniques. This entails restructuring existing organizations and redefining roles to maximize efficacy and budgetary constraints. The Interagency Working Groups operate under Memorandums of Understanding (MOUs) that will be created on a case-by-case basis to outline the roles and responsibilities of staff working to combat particular species. While the IWGs are not exclusively staffed by the ANSTF, the existing ANSTF regional divisions have been adopted under this plan. Finally, the present NISC Policy Liaisons have been reassigned as Regional Policy Liaisons and Border Control Officials under this design.



Case Study 3: Lionfish

The lionfish was introduced into U.S. waters from the Indo-Pacific region through the saltwater aquarium trade. Experts also believe that lionfish invasions are a result of human dumping from home aquariums (NOAA 2013). This species is now abundant in the Caribbean Sea, as well as along the southeast U.S. coast, even being found as far north as New York. They have also invaded the Gulf of Mexico and the coast of South America. Lionfish are able to produce 30,000 to 40,000 eggs in only a few days, enabling them to take over native marine fish populations (Linendoll 2013). With no natural predators, this species can dramatically alter ecosystems and local fishing economies by their ability to surpass native aquatic fish numbers. Furthermore, they pose a threat to human health due to their venomous spines. With more than 1,000 lionfish per acre in some areas, this species poses great harm to the surrounding environment, human health, and the economy (U.S. Fish and Wildlife Service 2012).

MEASURING SUCCESS

The Invasive Fish and Wildlife Program relies on various measures of success in order to monitor its implementation and ensure its effectiveness. The program will ultimately gauge its performance based on the decline in the number of invasive species detected and deemed injurious, as well as improvements to the health of the environment, economy, and humans. The management system established aims to quantify the program's performance using a series of strategic indicators. These indicators represent the inputs, processes, outputs, outcomes, and impacts of the program. Central measures of success are discussed in more detail below.

ENFORCEMENT

Enforcing the program will not be an easy task. The success of the program critically hinges on the ability of law enforcement on the federal, state, and local levels to catch violators and fine them, and if the courts deem it necessary, to incur civil penalties. Violators, in this sense, refer to individuals caught in the United States who are in possession of an Injurious I or Injurious II-listed species. Fines and civil penalties are a direct result of the number of violations. These are metrics that can be easily quantified and translated across a variety of fields of expertise to show programmatic successes and failures. Data based on enforcement will assist the Secretariat assessing the effectiveness of the IWGs, the MOUs that govern them, and how well law enforcement officials understand and enforce the Act on a variety of levels.

BORDER CONTROL

Each regional IWG will have a Border Control Committee devoted solely to preventing invasive species from entering the country in any form; whether that is through routine inspections at the border, at shipping hubs, at airports, or patrolling to prevent imports from illegally crossing the border. Inspection information can provide sound data that detail the number of potential invasive species introductions that are stopped prior to ever entering the country's interior. An extension of this information will be comparing the number of fines

charged to violators of the Act at the borders per the amount spent on Border Control efforts. Effectiveness and cost-efficiency of individual Border Control agents at each locale will be evaluated and re-assigned during future budgetary and staffing arrangements for better staff allocation.

SCIENTIFIC RISK ASSESSMENT

Scientific Risk Assessments (SRAs) will be performed by the Science Committees within each Regional IWG. The SRAs will create the baseline from which the Director and Secretary will determine whether or not a species is to be listed as Injurious I, Injurious II, or non-Injurious. The process will be critical in creating the framework for regulation, policy design, and ultimate success outlined in the Act. The SRAs will provide quantitative data to the key decision makers in the Secretariat. The calculated risk will be comprised of two elements. The first component is the magnitude of the potential loss due to the presence of the invasive species. “Loss”, in this sense, is considered to be any ecological, economic, or public health-related damage. The second component is the probability that the loss will take place. The Director will determine the amount of risk that is acceptable for each invasive species case.

The SRAs will give the Secretariat robust and scientifically sound data with which to make programmatic management decisions over time. This data will be critical in compiling understanding the success of the program.

EDUCATION

Public education and awareness efforts largely fall under the Outreach Committees in each Regional IWG. The extent that their efforts are quantifiable will be, for example, in the actual number of outreach programs implemented, the number of volunteers used, as well as the total number of volunteer hours sourced by the Outreach Committees. The measurement of actual education of the public will be a more qualitative measure, and will be based heavily off of components such as community surveys and citizen science reports. The quantitative and qualitative assessment of education and outreach efforts will assist the Secretariat in better managing performance as well as managing future program implementations.

ANNUAL REPORT

As required by the Act, the U.S. Secretary of the Interior must submit an annual report at the end of each fiscal year to Congress outlining the revenue, expenditures, recommendations for additional authorities and the remaining balance of the Invasive Fish and Wildlife Prevention Program. This annual report will be based on the biannual reports composed by the Program Director detailing all data collected and collected through each component of the Research Body—including enforcement, border control, scientific risk assessment, and education, along with financial details of the Injurious Wildlife Prevention Fund and administrative details of the Secretariat. The Program Director is responsible for analyzing all financial, personnel, and scientific data to evaluate where changes, either policy-focused or management-focused, must be made.

FRAMEWORK FOR SUCCESS

To manage implementation of the Program, we created a framework to outline the progression of invasive species management during the first calendar year and beyond. It is based on the mandates of the Invasive Fish and Wildlife Prevention Act, as well as the staffing plan, program design, revenue plan, and performance management system that were crafted for the Program. Starting on January 1, 2014, the framework details the first-year tasks to implement the program under the starting budget. The Master Calendar for 2014 includes five activities for each of the three bodies (Secretariat, Research Body, and Injurious Wildlife Prevention Fund):

- **ARRANGEMENT OF OFFICE**
 - Determining location of office and lab space, gathering supplies, acquiring equipment, and securing administrative support
- **HIRING**
 - Posting positions, reviewing applicants, holding interviews, hiring best candidates; also includes appointing new duties to existing positions
- **OPERATIONS**
 - Functional tasks, e.g. research planning, developing the database system, writing reports, collecting and transferring invasive species information
- **CAPACITY BUILDING**
 - Training courses and workshops – all three bodies will participate in monthly courses relevant to their role
- **PROGRAM COORDINATION**
 - Coordination and communication between the three bodies; meetings to share information, hear feedback, and plan for future activities



Case Study 4: Kudzu

Japanese Kudzu, deemed “the vine that ate the South,” is a perennial vine that has the ability to reach up to 100 feet in length. This plant can grow over anything in its path and eventually outcompetes the native species by blocking their sunlight. It is estimated that 2 million acres of forest in the southern U.S. is now covered with kudzu after its introduction through the ornamental plant trade in the 19th century. Once established in an area, kudzu can grow up to a foot per day (Center for Aquatic & Invasive Plants 2007). Spreading both horizontally and vertically, kudzu greatly impacts the surrounding ecosystems, such as by decreasing plant diversity, as well as the total elimination of native trees and brushes. This further disturbs the local food chain, as many herbivores rely on these native plant species as their major resources. Finally, due to kudzu’s disruption of the forestry industry, it causes an estimated \$500 million each year in productivity losses and a total of 7.4 million acres are now rendered useless (UNC 2010).

As can be seen in the full calendar (Appendix D), 2014 relies chiefly on organization, training, and staffing. It is necessary that Program staff at all levels have a standardized baseline of knowledge and understanding, and that they have access to continued education and training. This will allow them to manage invasive species more effectively. Key deadlines for the year 2014 include:

March	<ul style="list-style-type: none"> • Key Program staff are hired • Qualified institutions submit reports of their holdings
April	<ul style="list-style-type: none"> • On-the-ground research launch
October	<ul style="list-style-type: none"> • International outreach begins • Review of research funding dispersal
November-December	<ul style="list-style-type: none"> • Emergency declaration proposals and decisions
December	<ul style="list-style-type: none"> • Secretary finalizes legislative regulations and SRA process

The Master Calendar also includes the necessary following steps post-2014:

18 Months	<ul style="list-style-type: none"> • Electronic database is publicly available online • Public Injurious species nominations and proposals open
2 Years	<ul style="list-style-type: none"> • Fund announces user fee system • Customs and quarantine process in place • Biannual Reports are published
3 Years	<ul style="list-style-type: none"> • Formal definition of "nonnative wildlife species to the U.S." • Annual Reports are published and available online

CONCLUSION

The United States is home to a complex variety of plants and animals that are becoming increasingly threatened by invasive species infringing on their ecosystems and natural habitats. Nonnative species have negative impacts on the economy, environment, and human health throughout the United States, resulting in the loss of billions of dollars annually in damage and control costs. Furthermore, 42% of the species considered to be threatened or endangered are at risk as a direct result of the presence of invasive species in their natural ecosystem (Pimentel et al. 2005). Current legislation and U.S. Code is ineffective in managing the onslaught of invasive species. It is not for lack of regulation, but rather for lack of effective design and implementation. The Invasive Fish and Wildlife Prevention Act aims to update federal policies through a two pronged approach: mitigating the impacts of invasive species already established in the United States, and undertaking preventative measures to ensure that future invasive species introductions do not occur.

The implementation plan and design uses a holistic, innovative management approach and enables the use of existing departments of the U.S. Fish and Wildlife Service in conjunction with the National Invasive Species Council to efficiently work to combat the invasive species problem in the United States. There will be three new bodies carrying out the main program implementation: the Secretariat, the Research Body, and the Injurious Wildlife Prevention Fund. The implementation of the Program is funded by the Injurious Wildlife Prevention Fund, which is established in the legislation. The design and framework for management, success, and longevity will ensure successful implementation and will play a pivotal role in maintaining the integrity of America's native ecosystems from the enduring disruption caused by invasive species.

Overall, the Invasive Fish and Wildlife Prevention Act is a critical component to addressing the issue of invasive species in the U.S. As these nonnative species continue to decimate the environment and disrupt natural biodiversity, it is becoming increasingly more difficult to reverse these effects and prevent their further introduction and establishment. With approximately 50,000 foreign species already established in the U.S., this program works to preserve the country's natural resources and to reduce the costs to the economy and human health by both addressing the existing problem and preventing the future introduction of nonnative invasive species (Pimentel et al. 2005).

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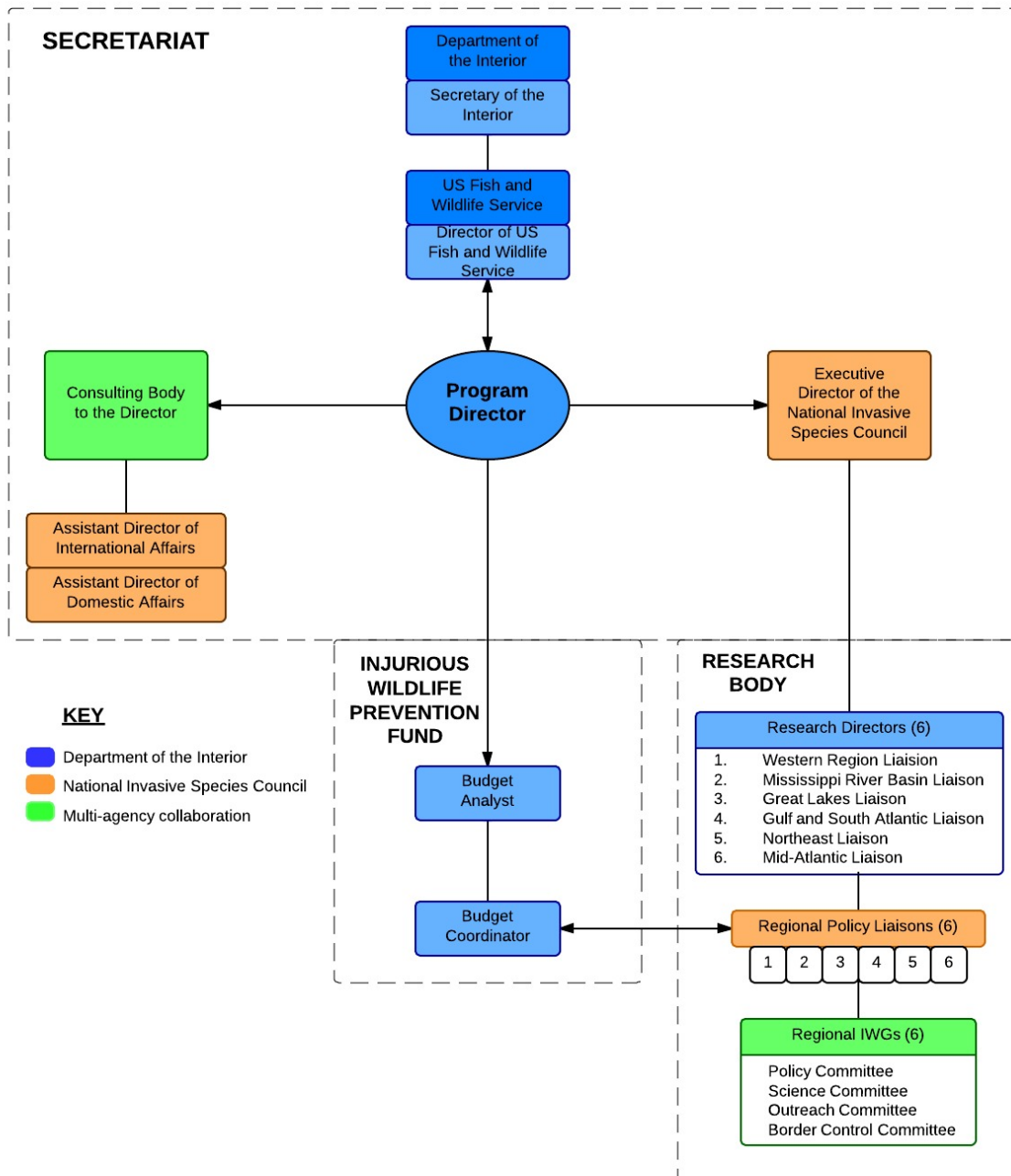
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APPENDIX A: ORGANIZATIONAL PLAN



APPENDIX B: BUDGET PLAN

Table 1. Fees Collected for Non-Injurious Wildlife

Legally Imported Wildlife	Unit	Subtotal
Estimated Total Number of Animals Imported		124,180,155
Number of Non-Injurious Animals Imported	87% of Total	108,036,735
Fee	\$0.25 per animal	
Revenue Received Beginning Year 1		\$27,009,183.75

Table 2. Civil Administrative Penalties Charged for Injurious Wildlife

Illegally Imported Wildlife	Unit	Subtotal
Estimated Total Number of Animals Imported		124,180,155
Number of Injurious I and II Animals Imported	13% of total	16,143,420
Estimated Number of Animals Actually Caught for Fees and Penalties	0.1% of injurious animals imported	16,143
Fee/Penalty	\$1,000 per animal	
Revenue Received in Year 1		\$0
Revenue Received Beginning Year 2		\$16,143,420.15

Table 3. Civil Judicial Penalties Charged for Violators

Violators Charged with Possession of Injurious I or II	Unit / Total
Estimated Number of Prosecutions per Year	1,000
Average Charge per Penalty	\$250
Revenue Received in Year 1	\$0
Revenue Received Beginning Year 2	\$250,000

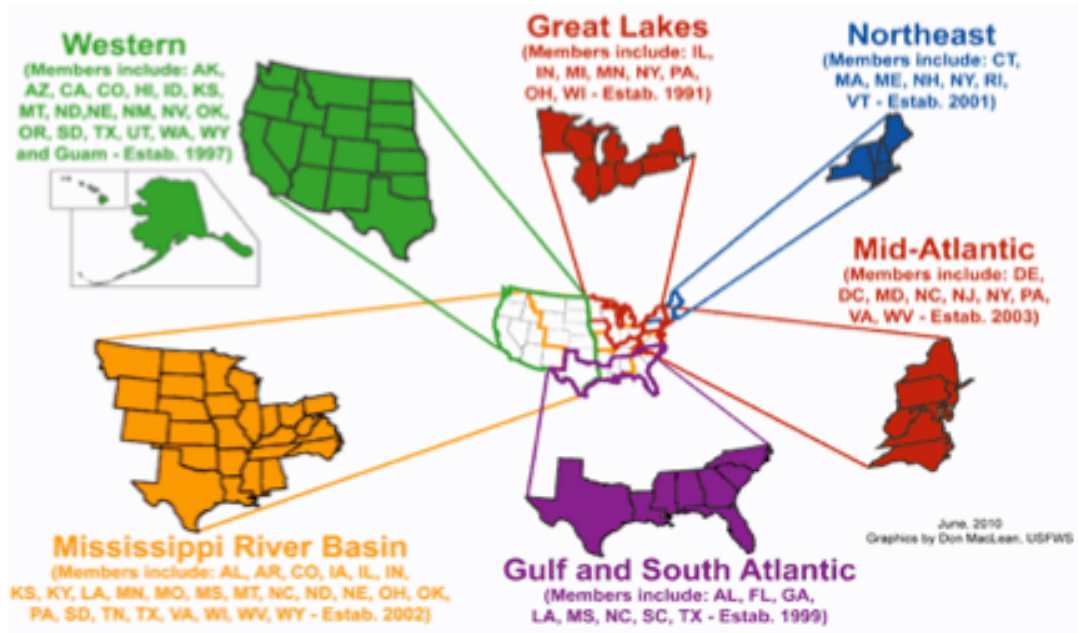
Table 4. Total Revenue for the First and Subsequent Years

	Year 1	Year 2	Year 3	Year 4
Civil Administrative Penalties	--	\$16,143,420.15	\$16,143,420.15	\$16,143,420.15
Fees	\$27,009,183.75	\$27,009,183.75	\$27,009,183.75	\$27,009,183.75
Civil Judicial Penalties	--	\$250,000	\$250,000	\$250,000
Total	\$27,009,183.75	\$43,402,603.90	\$43,402,603.90	\$43,402,603.90
Sub-Total to States (25%)	\$6,752,295.93	\$10,850,650.98	\$10,850,650.98	\$10,850,650.98
Subtotal to Program Implementation (75%)	\$20,256,887.81	\$32,551,952.93	\$32,551,952.93	\$32,551,952.93

Table 5. Total Program Budget for Personal and Other Than Personal Services (year 1)

Expense Type	Total
Total Salaries	\$9,329,202.10
Total Fringe (25%)	\$2,332,330.53
Total Personal Service	\$11,661,502.63
Total Other Than Personal Service	\$1,203,117.75
Total Program Budget	\$12,864,620.38

APPENDIX C: REGIONAL BREAKDOWN MAP



APPENDIX D: MASTER CALENDAR

Master Calendar for 2014		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1. Secretariat	1.1 Arrangement of Office	1.11 Setting Up	Logistics & Setting up office										
		1.12 Executive Meeting	High-level USFWS, NISC and DOI meetings		Executive Meeting		Executive Meeting		Executive Meeting		Executive Meeting		Executive Meeting
	1.2 Hiring	1.21 Hiring Staffs	Interviews	Final Decision		Position Posting for Secretariat, Research Body and Fund							
		1.22 Consulting Body				Assemble Consulting							
	1.3 Operations	1.31/2/3/4/5 Working Meetings	Quarterly Meeting				Quarterly Meeting			Quarterly Meeting	Injurious Determination and Review Meeting		Quarterly Meeting
		1.33 International Outreach								Annual Outreach Meeting			
		1.34 Emergency Response								Identify Requests/Needs			
	1.4 Capacity Building												
	1.5 Program Coordination	1.52 Feedback/Improvement			Hearing Session								
	2.1 Arrangement of Office	2.11/2 Setting Up	Logistics & Setting up office								Hearing Session	Fund Audit Session	Hearing Session
2. Research Body	2.2 Hiring	2.21-3 Hiring & Appointing Staffs	Hire Research Director										
			Hire Regional Policy Liaison										
		2.24/33 IWGs	Hire IWG Leads										
			IWG Leads to Assemble										
	2.3 Operations	2.31 Regional Project Planning		Project Planning									
		2.32/4/5 Reporting	Blueprint Report Draft	Blueprint Report Release									
		2.36 Building Database											
	2.4 Capacity Building												
	2.5 Program	2.51 Regional Meetings	Regional Meetings										
	3.1 Arrangement of Office		Logistics & Setting up office										
3. Wildlife Prevention Fund			Hire Budget Analyst and Coordinator										
	3.2 Hiring Staffs												
	3.3 Fund Dispersal and Management		Invite Proposals	Fund Proposal Review		Fund Dispersal			Midterm Progress Report		Fund Audit		