

ANALYSIS OF THE DEPARTMENT OF DEFENSE'S POLICIES TOWARD  
PROTECTED SPECIES

by

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## **ABSTRACT**

After the terrorist attacks on September 11, 2001, the United States has had an increased interest in national defense and military readiness. Current Department of Defense spending has increased substantially over the past year in the areas of national defense and military readiness. Early attempts to weaken the Endangered Species Act and the Marine Mammal Protection Act within the US House of Representatives were blocked. However, the \$400 billion defense appropriation bill, Public Law 108-136, seeks to weaken the Endangered Species Act and the Marine Mammal Protection Act to improve military readiness and national defense. Section 318 of the defense appropriation bill seeks to weaken the Endangered Species Act by precluding the designation of critical habitat on military installations. Section 319 of the bill seeks to weaken the Marine Mammal Protection Act by allowing the Navy to conduct research and training necessary to national defense even if those activities kill marine mammals.

A policy design theory analysis shows that the Department of Defense has two different standards for land and marine species; land based organisms will receive high protection under the law, however, marine based organisms will receive minimal or no protection. The rationale and assumptions of section 318 seem to be sound because of the long running tradition of successes of endangered species management on military installations and the limited inclusion of critical habitat in endangered species management. More research needs to be conducted on the impact of the SURTASS LFA sonar system on marine mammals before the assumptions and rationale of section 319 can be determined to be correct.

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## **INTRODUCCION**

### **Overview**

The terrorist attacks perpetrated against the United States on September 11, 2001 caused an increase in the awareness of military readiness and national defense. The budget of the Department of Defense (DOD) has increased almost 21% from the FY 2001 budget to the FY 2003 budget (World Policy Institute 2002). The budget for national defense in particular will see an increase of 43% between FY 2001 and FY 2007 (table 1). The 2003 budget nearly doubled the funding of homeland security focused on four key areas: bioterrorism, emergency response, airport and border security, and improved intelligence (World Policy Institute 2002). The development of a new cabinet level department, the Department of Homeland Security, by President Bush, also shows the increase in awareness of the current weaknesses of the US national defense network.

Military readiness was a key debate within the 108<sup>th</sup> Congress. The National Security Readiness Act of 2003 was the culmination of this debate. This bill, HR 1835, sought to exempt the DOD from two key environmental laws, the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA). The rationale behind these exemptions was that these two laws hinder military readiness, military training exercises, and national defense.

The DOD has over 300 threatened or endangered species within its US installations. There are a large proportion of threatened and endangered species on military installations because they have limited access and often have buffer zones in which development cannot occur. Therefore, military installations have many types of rare natural habitat, such as natural prairies and old growth forests, which have been destroyed elsewhere due to development (Bender 2004). The exemption from the ESA stemmed from the fact that often large portions of

military bases become closed off to training due to critical habitat designation to protect a single or multiple threatened or endangered species.

The exemption from the MMPA stemmed from the use of the Navy's Surveillance Towed Array Sensor System (SURTASS) Low Frequency Active (LFA) sonar system. This system is an advanced active sonar which has the ability to detect the quiet diesel or nuclear subs, which are almost undetectable by current sonar. The Navy claims that the testing and development of this system is necessary for national defense (Department of the Navy 2001). However, this sonar is thought to cause strandings in several species of marine mammals, specifically beaked whales.

### **Military installations and threatened or endangered species**

Currently, the DOD manages approximately 25 million acres (10 million hectares) on more than 425 major military installations in the US alone. The Army, in particular has 172 distinct federally threatened or endangered species on 99 installations as of October 1, 2002 (Watland 2002). Spending on threatened and endangered species has increased by one-half in the past 5 years to approximately \$27.6 million. However, the total amount budgeted for the DOD's conservation programs has declined slightly in real dollar terms over the same period (Bender 2004). Specifically, the Army's spending on threatened and endangered species increased over the periods from 1990 to 2000 from under \$5,000,000 to well over \$15,000,000. However there has been a decline in funding from 2000-2001 (Watland 2002) (figure 1). In 2001, the Army spent a total of \$18,000,000 on threatened or endangered species; however \$2.6 million of that money was spent on non-reportable expenses for onsite and contiguous species. The non-reportable expenses included money spent on multi-species projects, proposed

threatened, proposed endangered, candidate, state-listed, and any other species of concern (Watland 2002).

### **SURTASS LFA sonar**

The SURTASS LFA sonar is a new sonar system being tested by the Navy to detect submarines from long-range. Submarine technology has been improving in recent years and has crippled the old sonar system, so that the Navy will only have minutes to react to a potential submarine attack. There are currently 224 submarines operated by non-allied nations patrolling the ocean, and these submarines are much quieter and more deadly than ever before (Department of the Navy 2001)

The SURTASS sonar system is a low frequency passive surveillance system, which is pulled behind surface ships. The LFA system is a set of acoustic transmitters suspended by cable beneath a surface ship. The transmitters create an underwater sound, which then bounces off a submarine and returns to the SURTASS system for detection. The SURTASS LFA sonar system, when working in combination, is able to detect submarines that would be too quiet to detect by the passive (SURTASS) system alone (Department of the Navy 2001) (figure 2).

The Navy Fleet Commanders in Chief have determined that SURTASS LFA sonar is a crucial element of the Navy's anti-submarine warfare force and is an asset required for our national security (Department of the Navy 2001). However, preliminary evidence suggests that the system is causing mass strandings in several species of marine mammals. The Navy has provided over \$16 million conducting scientific research and developing an Environmental Impact Statement (EIS), including the development of a state-of-the-art marine mammal mitigation system (Department of the Navy 2001).

**Natural Resources Defense Council, Inc., et al. v Donald Evans, Secretary of Commerce, et al.**

The debate about marine mammals and the use of the Navy's SURTASS LFA sonar system came to a head when the Natural Resources Defense Council (NRDC) filed suit against Donald Evans, the Secretary of Commerce, seeking an injunction against the Navy using the SURTASS LFA sonar, because NRDC claimed that the sonar system is causing irreparable injury by harassing, injuring, and killing marine mammals and other endangered species with sensitive hearing, including sea turtles and salmon. The NRDC claimed that the National Marine Fisheries Service (NMFS) improperly approved the use of LFA in as much as 75% of the world's ocean in violation of the MMPA and the ESA, and that the Navy participated in the ESA violation and issued an inadequate EIS, which is in violation of the National Environmental Policy Act (NEPA). The defendants countered that they have complied with the NEPA and that testing and training with the SURTASS LFA sonar system is necessary for military readiness. On October 31, 2002, the Court granted a preliminary injunction on the testing and training of the SURTASS LFA sonar system. However, this decision was appealed by the defendants. The Court ultimately ruled that it was in the public interest to have both military preparedness and the protection of marine life, and that these competing interests could be resolved through an injunction that:

Allows the Navy to meet its needs for peacetime training and testing, while also providing reasonable safeguards for marine mammals and other sea animals...The Courts injunction permit[s] the Navy to train and test LFA sonar in a wide range of oceanic conditions as needed, while restricting it from operating in certain sensitive areas when marine mammals are particularly abundant there. In particular, the injunction will extend the coastal buffer zone beyond the current twelve miles to include more of the continental shelf in the great majority of coastlines where the record shows that the Navy need not operate closer to shore. The injunction will also require the Navy to avoid certain areas of the deep ocean during seasons when data on marine mammals and other endangered

species such as sea turtles shows that they are migrating, breeding, feeding or otherwise clustering there...Furthermore, where the Navy needs to operate close to shore in areas where sea life tends to be abundant and where conditions may make sightings of whales more likely, whenever feasible the Navy shall use additional measures to check for the presence of marine mammals before activating the sonar. In sum, the Navy and the NMFS can fully comply with environmental laws and also meet the need to test and train with this new type of SONAR (Laporte 2003).

The Court hopes that the injunction will be able to reduce the likelihood of irreparable injury to the abundant marine life that flourishes in coastal areas, and help protected marine mammals like beaked whales from the risk of stranding.

## **RELEVANT LEGISLATION**

### **The Endangered Species Act (16 USC § 1536)**

The Endangered Species Act was signed into law in 1973, as a response to the extinction of more than five hundred species in America since British colonization (Opler 1976). The predecessor to the ESA was the Legacy Act of 1900. This act prohibited interstate commerce of animals killed in violation of state game laws and stated that any dead animals taken across state boundaries were subject to the laws of the state in which they were imported (NRC 1995). This Act was followed by the Endangered Species Preservation Act (ESPA) of 1966. The ESPA directed the Secretary of the Interior to conserve, protect, restore and propagate selected species of native fish and wildlife. The act also gave authority to the Secretary of the Interior to acquire land for habitat protection and required the Secretary to determine if a species was endangered. In 1969, the Endangered Species Conservation Act became a supplement to the ESPA by giving authority to the Secretary of the Interior to promulgate a list of species or subspecies of fish and wildlife threatened with worldwide extinction and to prohibit their importation into the US (NRC 1995).



Authority under the ESA is given to the US Fish and Wildlife Service (USFWS) through the Secretary of the Interior and to the NMFS through the Secretary of Commerce. Protection for species of animals were divided into subspecies and distinct populations, however in 1978, the ESA was amended so that only vertebrates could be divided into distinct populations. The ESA represented the first time plants were protected in federal legislation, with plant being defined as any species in the plant kingdom; so subspecies and populations are not afforded the same protection under the law as the animal kingdom (Czech and Krausman 2001).

The ESA is broken into 18 sections (table 2). Section 3 provides definitions to important terms in the ESA. Within this section there are several important definitions: an endangered species is any species which is in danger of extinction throughout all or a significant portion of its range. A threatened species is any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Critical habitat is defined as:

1. The specific areas within the geographical area occupied by the species ... on which are found those physical or biological features essential to the conservation of the species and which may require special management considerations or protection; and
2. specific areas outside the geographical area occupied by the species ... upon determination by the Secretary (of Commerce and/or Interior) that such areas are essential for the conservation of the species.

The term take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in such conduct. In addition to this definition is that Section 7 prevents any federal action likely to jeopardize the future of any endangered species or to result in destruction or adverse modification of designated critical habitat (NRC 1995).

Section 4 outlines the steps that the Secretaries of Commerce and Interior must take to list a species as threatened or endangered. The Secretaries of Commerce and/or Interior

determine whether to list a species as threatened or endangered if it fulfills at least one of these requirements:

1. The present or threatened destruction, modification or curtailment of its habitat or range;
2. over-utilization for commercial, recreational, scientific, or educational purposes;
3. disease or predation;
4. the inadequacy of existing regulatory mechanisms; or
5. other natural manmade factors affecting its continued existence

The Secretaries make the decision on the best scientific and commercial data available to him after conducting a review of the status of the species. This section also directs the Secretaries to designate critical habitat on the basis of the best scientific data available and after taking into the consideration of the economic impact, and any other relevant impact.

Interagency cooperation is covered in section 7 of the Act. It requires federal agencies, other than the Department of Interior and the Department of Commerce, to cooperate with the Secretaries of both to protect and conserve listed species. Federal agencies must authorize action that will not jeopardize the long-term survivability of threatened or endangered species.

Section 10 addresses exemptions to the Act. Permits can be given by the Secretaries for scientific reasons or if the taking is incidental to the carrying out of an otherwise lawful activity.

For a permit to be issued, the Secretaries must determine that

1. The taking will be incidental;
2. the applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking;
3. the applicant will ensure that adequate funding for the plan will be provided; and
4. the taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild.

### **The Marine Mammal Protection Act (16 USC § 1362)**

The Marine Mammal Protection Act was enacted by Congress in 1972. The MMPA was ratified as a response to the “danger of extinction or depletion as a result of mans activities” to

species and populations of marine mammals (Sect. 2(1)). This act works to set a moratorium on the taking or importation of marine mammals. Authority under the MMPA is given to the NMFS by way of the Department of Commerce and to the USFWS through the Department of the Interior. The NMFS is responsible for enforcing the moratorium on the taking of most types of marine mammals and for granting exemptions, while the USFWS is responsible for walruses, polar bears, sea otters, and manatees (NRC 1994).

There are several important definitions in the MMPA that need to be defined to understand the problem. Under the MMPA take is defined as to harass, hunt, capture or kill, or attempt to harass, hunt capture or kill any marine mammal. Waters under the jurisdiction of the United States means:

1. The territorial sea of the United States; and
2. the waters included within a zone, contiguous to the territorial sea of the United States, of which the inner boundary is a line coterminous with the seaward boundary of each coastal State, and the outer boundary is a line drawn in such a manner that each point on it is 200 nautical miles from the baseline from which the territorial sea is measure.

This means that the waters under the jurisdiction of the United States are the waters that are 0 to 200 nautical miles from the coast; taking up both the state territorial waters and the exclusive economic zone (EEZ). Harassment means any act of pursuit, torment or annoyance. However there are two levels of harassment under the MMPA, level A and level B harassment. Level A harassment has the potential to injure a marine mammal or marine mammal stocks in the wild. While Level B harassment has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.

The secretaries of the Department of Commerce and the Department of the Interior have the authority to issue permits which authorize the taking of marine mammals. Permits must specify:

1. The number and kind of animals which are authorized to be taken or imported,
2. the location and manner (which must be determined by the Secretar[ies] to be humane) in which they may be taken, or imported,
3. the period during which the permit is valid, and
4. any other terms or conditions which the Secretar[ies] deems appropriate.

Therefore, the Secretaries may issue permits for individuals or for agencies to take marine mammals. However, the permit process may take as long as 90 days because permits must be put in the Federal Register and must be up for public comment. There is also an exemption for a small incidental take (SIT), which authorizes human activities that may disturb or even kill small numbers of marine mammals but that have negligible effects on the overall population. Few of these SIT authorizations have been applied for because the process is complex and time consuming (NRC 1994).

### **The Sikes Act (16 USC § 670)**

The Sikes Act was passed in 1960 and amended several times in 1968, 1974, 1978, 1982, 1986, 1988, and 1989. This Act authorizes the Secretary of Defense to develop cooperative plans for conservation and rehabilitation programs on military reservations.” The Secretary of Defense must work with the Secretaries of Interior through the USFWS and the state in which the military installation is located, to create a plan for the resources on the installation.

The Sikes Act defines conservation and rehabilitation programs as to utilize methods and procedures necessary to protect, conserve and enhance wildlife, fish and game resources to the maximum extent practicable on public lands, consistent with applicable land use and management plans. Therefore the Secretary of Defense is authorized to carry out a program of

planning for, and the development, maintenance and coordination of wildlife, fish and game conservation and rehabilitation in each military reservation (USFWS 2004).

The plans required under the Sikes Act are called Integrated Natural Resource Management Plans (INRMPs). The INRMPs must provide for fish and wildlife habitat improvements or modifications; range rehabilitation where necessary to support wildlife; specific habitat improvement projects and related activities and adequate protection for species of fish and wildlife and plants considered threatened or endangered (USFWS 2004). Secretaries of each military department, Army, Navy, and Air Force, are authorized to manage natural resources of each military reservation under the Secretary's jurisdiction, to the extent not inconsistent with the military mission of the reservation, so as to provide for sustained multipurpose uses of those resources and to provide the public access necessary or appropriate for those uses. However Section 101 of the Act authorizes the Secretaries to identify installations for which an INRMP is not needed if the secretary determines that the absence of significant natural resources on a particular installation makes preparation of such a plan inappropriate. The DOD, as a policy, uses a combination of installation size (acreage), the specific nature of an installation, and the findings of a biological survey to determine if there is an absence of significant resource (DOD 2004). The USFWS and the DOD have been working to finish the INRMPs for the military installations in the US. As of 2002, of the 379 required INRMPs, the DOD has completed 349 of them on their installations (table 3) (Boice 2002)

### **National Security Readiness Act of 2003 (HR 1835)**

The National Security Readiness Act of 2003, HR 1835, was introduced to the US House of Representatives on June 13, 2003. This bill, sponsored by Rep. Elton Gallegly of California (24<sup>th</sup> district), was an attempt to limit the designation of critical habitat on areas owned or

controlled by the Department of Defense. This bill would prohibit the Secretary of the Interior from designating as critical habitat any land or geographical area controlled by the Department of Defense, or designated for its use, that is subject to an INRMP. This bill would change the responsibilities of the DOD under the ESA for water consumption impacts on critical habitats or endangered species to

1. Water consumption occurring on a military installation, whether the source of the water consumed is located on or off the installation; or
2. Water consumption occurring off of a military installation and the source of the water is under the direct control of the Department of Defense.

This, in essence, would exempt military installations from ESA requirements regarding official actions or agency actions with respect to civilian water consumption impacts on critical habitats or endangered species.

The bill would also amend the MMPA in several ways. First it would redefine “harassment” as:

1. Any act that has the potential to injure a marine mammal or marine mammal stock in the wild to:
  - a. any act that has the significant potential to cause such an injury; and
2. Any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing a disruption of natural behavioral patterns to:
  - a. causing such a disruption to the point where such behavioral patterns are abandoned or significantly altered.

It also authorizes the Department of Defense, after conferring with the Secretary of Commerce or the Secretary of the Interior, to exempt any action of the DOD from requirements of the MMPA, if the Secretary of Defense determines that the action is necessary for national defense. It would repeal the restrictions on specified geographical region or a region of small numbers of any allowance of incidental, but not intentional taking of marine mammals by US citizens engaging in a specified activity other than commercial fishing; these specified activities would include the activities necessary for military readiness. Lastly, the bill would exempt the Department of

Interior from the requirement to publish notice, except in the Federal Register, with respect to incidental takings of marine mammals and marine mammal products while engaged in military readiness activities authorized by the Secretary of Defense.

### **Current Status**

This bill was sent to the House Committees on Armed Services and Resources. It was amended within the House Committee on Resources, but has not been decided upon by the House Committee on Armed Services. It was placed on the Calendar for consideration when the House Committee on Armed Services reconvenes.

### **HR 1588: National Defense Authorization Act for Fiscal Year 2004. Conference Report (PL 108-136)**

The National Defense Authorization Act for Fiscal Year 2004, HR 1588, is a \$400 billion dollar appropriation bill for the DOD. Within the 900 page document are two sections that will work to exempt the DOD from portions of the ESA and the MMPA. Section 318 entitled “military readiness and conservation of protected species” exempts the DOD from certain requirements established by the ESA. Section 319 entitled “military readiness and marine mammal protection” exempts certain activities of the DOD from the MMPA.

#### **Section 318: Military readiness and conservation of protected species**

This section seeks to amend section 4(a)(3) of the ESA to preclude designation of the critical habitat on DOD lands that are subject to an INRMP prepared under section 101 of the Sikes Act. This is not a blanket exemption from the critical habitat designation established by the ESA, but the Secretary of the Interior must determine that:

1. The management activities identified in the plan will effectively conserve threatened and endangered species; and

2. That adequate funding will be provided for such management activities.

The Senate agreed to a similar standard in their portion of the National Defense Authorization Act. In the Senate version, the Secretary of Interior must determine that an INRMP provides benefit to the species for which a critical habitat is proposed for designation. The Senate hopes that this approach would allow for a balance between military training requirements and protection of endangered or threatened species. Both the House of Representatives and the Senate expect:

The Secretary of the Interior to assess an INRMP's potential contribution to species conservation, giving due regard to those habitat protection, maintenance, and improvement projects and other related activities specified in the plan that address the particular conservation and protection needs of the species for which critical habitat would otherwise be proposed.

This section would only apply to new critical habitat designations on military installations alone. The land that has already been designated as critical habitat on military installations would not be affected by this section. Also, the designation of critical habitat on other federal lands, whether they have INRMPs or not would not, would not be effected by this section.

### **Section 319: Military readiness and marine mammal protection**

The conference agreement would work to amend section 3(18) of the MMPA by providing a new definition of "harassment" applicable only to military readiness activities, and scientific research activities by or on the behalf of the Federal Government. Specifically, under the new definition of level B harassment,

Behavioral patterns would be considered 'abandoned' if long-term cessation of behaviors and demographic consequences to reproduction or survivability of the species or stock were involved. In order for natural behavioral patterns to be considered 'significantly altered,' there must be demographic consequences to reproduction or survivability of the species.



Along with the new definition of level B harassment, the conference agreement would authorize the Secretary of Defense, after conferring with the Secretary of Commerce, the Secretary of the Interior, or both, to exempt from the MMPA any action by the DOD or its components for up to two years, if the activity was determined necessary for national defense. The conference agreement would also work to eliminate the requirements for “specified geographic region” and “small numbers” as defined in the MMPA because military readiness activities take place over large areas of the ocean. The bill would also expedite the incidental take permit process, cutting down the time it takes for the DOD to obtain an incidental take permit. The conference committee however, would still require mitigation and monitoring taking into account safety, practicality of implementation, and impact on the effectiveness of a military readiness activity. The final agreement of the conference is a, at the minimum, \$7 million per year guarantee for research regarding the impact of anthropogenic sounds upon marine mammals, marine mammal densities, and the health and vitality of marine mammal species. This section of the National Defense Authorization Act would allow the DOD, specifically the Navy, to continue with the testing of the SURTASS LFA sonar system, and exempt other activities they may conduct in the future, from the authority of the MMPA.

**Current Status:**

The Bill HR1588 was agreed upon by both the House and the Senate and was sent to the President to sign in November of 2003. The President signed HR1588 into law on November 24, 2003, and it has become public law No: 108-136.

## **RESEARCH QUESTION**

Public law number 108-136, exempts the DOD from the ESA and the MMPA on the basis of military readiness and national defense. However, due to the high density of threatened or endangered species on military installations and the potential for Navy SURTASS LFA sonar to kill marine mammals, this public law may not be in the best interest of the public as a whole. In PL 108-136 there is no analysis on what the impacts of the proposed changes to ESA and the MMPA will be. Using the policy design theory analysis tool, the rationale of the authors of the law will be examined. This technique will allow the research to determine if species protected under the law will continue to be protected after the implementation of public law number 108-136.

## **METHODS**

To determine the policy ramifications of public law number 108-136, a policy analysis technique was used: policy design theory. Policy design theory works to do two things, preserve democracy and to solve technical problems (Czech and Krausman 2001).

### **Policy design theory**

Policy design theory assumes that American public policy is supposed to serve democracy in addition to solving technical problems. Thus, a good policy has the rationale required to lead efficiently and effectively from clearly stated procedural requirements or incentives to a clearly stated goal. Policy design theory encourages public participation and enables policy implementers to respond to public needs (Schneider and Ingram 1997).

The first step in a policy design analysis is identification of the policy's legal proclamation and the agents, targets, and goals identified and established by that proclamation.

Agents are the agencies responsible for pursuing the policy, and targets are the populace whose behavior is modified or protected by the policy. The next step is identification of the rules and tools created by the policy for agents to use in pursuing the goals. Tools are methods to achieve the goal, and they include prohibitions, sanctions, incentives, and education, while rules are the qualifications standards and criteria that are applied during the use of tools. The last step is identifying and assessing the assumptions made and the rationale employed by the authors of the policy (Czech and Krausman 2001). Figure 3 shows a model of how a policy design analysis could look. These steps will be used to analyze the public law number 108-135: sections 318 and 319 separately.

## **ANALYSIS**

### **Section 318: Military readiness and conservation of protected species**

Figure 4 shows the diagram of the policy design theory for section 318 of public law 108-136. There are three goals established by this statute;

1. The preservation of national defense,
2. military readiness, and
3. the conservation of threatened and endangered species.

The agencies targeted by the statute are the Secretary of Defense and the Secretary of the Interior. The target populations are the DOD, the USFWS through the Department of the Interior and threatened and endangered species. The tool used by this section is to preclude the designation of critical habitat on DOD lands that are subject to an INRMP. The rules established are that threatened or endangered species are effectively conserved, that the DOD will adequately fund the protection of the species, and that a balance exists between military training requirements and the protection of threatened and endangered species.

The authors of this legislation had several rationales when setting the goals, rules, and tools. The first is that the DOD has had many successes in the management of threatened and endangered species. The DOD has many success stories with threatened or endangered species in military installations. The Mokapu Peninsula component of Marine Corps Base-Hawaii on the island of O'ahu is the home for some 50 species of waterbirds, shorebirds, and seabirds. Among these 50 birds are four of Hawaii's endangered waterbirds, the stilts. Management of these birds on the O'ahu base has more than doubled the number of stilts on the bases from 60 to over 130. This base is the home of nearly 10 percent of the state's total stilt population estimate. The managers have been so successful in their management techniques because they have limited the number of invasive plants, the mangrove (*Rhizophora mangle*) and the pickleweed (*Batis maritima*) (Rauzon and Tanino 1998). The managers have used an integrated ecosystem approach to management and this has benefited other species such as fish, crustaceans, and other native birds. This management technique has also allowed for the development of environmental friendly barracks along the reserve area. This has become a natural watershed area with best management practices concerning storm water runoff and development (Drigot 2001).

The peregrine falcon has been an endangered species due to a large population decrease in the 1970s. Alaska is the home to all three subspecies of peregrine falcon, and Alaska is also an ideal location for Air Force training activities. Thus the falcon and the Air Force came into conflict in the 1990s when training activities of the Air Force increased and threatened to disturb and kill the endangered peregrine falcon. The Air Force established no-fly zones around peregrine falcon nesting areas. Additionally, the Air Force is monitoring several nearby populations outside of the installation. The Air Force has led several important studies on the

nesting and the distribution of peregrine falcons in Alaska. By 1999, the falcon had recovered to such a level that they were removed from the list of threatened and endangered species within Alaska (Ambrose and Eberly 2002).

The Air Force has also had successes with marine species. Eglin Air Force Base in Florida has both terrestrial and marine species under its jurisdiction. One of the many islands on the base is Santa Rosa Island. Santa Rosa Island is a testing and training site and has many facilities for electronic support; however, the island is also a nesting site for the loggerhead sea turtle (*Caretta caretta*) and the Atlantic green sea turtle (*Chelonia mydas*). The Air Force initiated a comprehensive sea turtle program due to the critical nesting habitat of these endangered species on Santa Rosa Island. This program was designed to document and protect nests while maintaining national defense. As an example, nighttime defense missions which require lights are carefully managed to prevent misorientation of nesting females or disorientation of emergent hatchlings. As a result of this management, the hatchling emergence rate has climbed by 59%, since 1987. In addition, the numbers of nesting females on Santa Rosa Island and neighboring islands have increased (Helmstetter and Atencio 2004)

The lesser long-nosed bat (*Leptonycteris curasoae*), an endangered species, is found in two caves at Fort Huachuca. Fort Huachuca is an Army base located in Arizona. During the first 6 years of studying the lesser long-nosed bat, only one was actually observed in the wild. However, due to the closing of areas around the caves during certain times of the year and through protective measure such as removing obstruction at cave entrances, posting closure signs, and fencing roost sites and the roads leading to them, the population of lesser long-nosed bats has increased. Following these actions there was an immediate increase in number of other bats that share the same nesting roosts as the lesser long-nosed bat. Over 10 years the population

of lesser long-nosed bat has either remained constant or increased. In fact, in the past two years the abundance has increased to more than 70 times more than what was first observed (Sidner 2002).

The last known habitat of the Palos Verde blue butterfly (*Flaucopsyche lygdamus paloverdesensis*) was thought to be destroyed in 1983, it was assumed that the species had become extinct as a result. However, a single colony survived at the Defense Logistic Agency's (DLA) Defense Fuel Support Point in San Pedro, California, and was discovered in 1994. Due to the protection that this habitat received by being on a military installation, and through breeding efforts to augment the population, the Palos Verde blue butterfly has been able to move to other habitat within the installation. In 2000, a total of 117 new adults emerged from the breeding program (Mattoni and Powers 2002). This has been a huge success story for the protection of endangered species on military installations.

The Navy has also had a success story for a threatened species, the marbled murrelets (*Brachyramphus marmoratus*). The murrelets are the only seabird to nest in old growth forests. The Navy was able to protect the old growth by buying the timber rights to this land in 1995. Military training occurs within the old growth forests but is limited to navigation/orientation courses where only foot traffic is allowed. Any action that will occur near the habitat that has the potential to disturb the nesting murrelets will be relocated or changed so that there will be a minimum impact on the seabirds. The seabirds have continued to nest in the area since the management practices have been in place (Briggs and Lackey 2002).

Not only animals are making a comeback on military installations in the US. The Hawaii National Guard's Kanaio Training Area in Hawaii is one of the last two wild 'ohai bush (*Sesbania tomentosa*) populations on the island of Maui. Only 13 plants are thought to exist in

the training ground. However, the Guard is working to protect those 13 plants and to regenerate the population by cultivating more than 1,200 for planting in the wild. Two miles of fence have been installed to prevent feral goats and deer from feeding on the plants. Already more than 850 individuals of native and endangered species have been out-planted, and about 3,500 native and endangered plants have been reared in the Training Area (Snyder and Lai 2002).

The next rationale used by the authors of section 318 is that there are limited critical habitat designations on military installations. Out of all of the Army installations in the US, only 12 critical habitat designations have been established (Watland et al. 2002). Additionally, the USFWS has only 145 critical habitat designations for the 1258 species listed as threatened or endangered (McCarthy 2002).

The third rationale used by the authors is that the Secretary of the Interior will have oversight of the INRMPs to determine if they are protecting threatened and endangered species on military installations. The statute sets up criteria that the Secretary of the Interior would use to determine whether an INRMP would protect threatened and endangered species:

1. The management activities identified in the plan will effectively conserve threatened and endangered species; and
2. that adequate funding will be provided for such management activities.

These practices are already in place because the USFWS can preclude the designation of critical habitat on military installations if the INRMP provides:

1. A conservation benefit to the species;
2. certainty that the management plan will be implemented; and
3. certainty that the conservation effort will be effective (DOD 2004).

To determine if a conservation plan will benefit the species the DOD must demonstrate that the INRMP will reduce fragmentation of habitat, maintain or increase populations, insure against catastrophic events, enhance and restore habitats, buffer protected areas, or test and implement

new conservation strategies (DOD 2004). The INRMP must be funded for it to fit the second criteria. To ensure that the INRMP is will be effective it must include:

1. Biological goals and objectives;
2. quantifiable, scientifically valid parameters that will demonstrate achievement of objectives and standards for these parameters by which progress will be measured;
3. provisions for monitoring and, where appropriate, adaptive management;
4. provisions for reporting progress on implementation and effectiveness of the conservation effort are provided; and
5. a duration sufficient to implement the plan and achieve the benefits of its goals and objectives (DOD 2004).

However, these goals and objectives are not explicitly stated in any legislation; they are the policy of the USFWS. Therefore, this statue would put into law a policy that already exists within the USFWS.

The fourth, and final, rationale used by the authors is that a balance exists between conservation of threatened and endangered species and military training. The case studies presented above show that, through spatial and temporal closures, the DOD has had successes in both training and protecting endangered species. One other such success is the red-cockaded woodpecker at Fort Bragg, North Carolina. The Army found out that they could reduce the training restrictions within red-cockaded woodpecker habitat and still promote the recovery of the species. The open pine forest that is good woodpecker habitat is also suitable for many types of military training. Training restrictions have not been shown to be important in promoting expansion of the red-cockaded woodpecker populations. Since the new reduction in restrictions there has been a continued rise in red-cockaded woodpecker population, suggesting that the new guidelines are beneficial to the species (Beaty et al. 2003).



## **Section 319: Military readiness and marine mammals**

Figure 5 shows the diagram for the policy design theory for section 319 of public law number 108-136. This statute has three goals:

1. Preservation of national defense;
2. preserving military readiness; and
3. continued funding of research on marine mammals, specifically related to the effects of Navy sonar on marine mammals.

The agencies targeted by this statute are the Secretary of Defense, the Secretary of the Interior, and the Secretary of Commerce. The target populations are the DOD, Department of the Interior, Department of Commerce and marine mammals. This section uses several tools to obtain the goals, the modification of the definition of harassment, exemptions for the DOD from the MMPA, and a requirement for funding for research. The authors used four rules to achieve the goal. The first rule is to expedite the process of authorization of permits for activities necessary for military readiness and for scientific research. The application process for a permit is a lengthy process, and this rule would cut down on the time it takes between requesting and receiving a permit for the two specified activities. The second rule is that for harassment to occur to marine mammals that there must be significant demographic consequences to reproduction or to the survivability of the species. It is unclear in the statute as to what organization is responsible to prove that marine mammals are being harassed. However, it is assumed that the burden of proof will rest on individuals or organizations seeking to limit the DOD's activities with SURTASS LFA sonar, because the original Navy EIS claims that there will be no harm to marine mammals (DOD 2001). The third rule is a renewable exemption from the MMPA for up to two years that the Secretary of Defense can issue after consulting with the Secretary of Commerce and/or the Secretary of the Interior. The final rule is that mitigation and monitoring must be conducted by the Navy; however any mitigation and monitoring requirement

would take into account the safety, practicality of implementation, and impacts on the effectiveness of a military readiness activity.

The first rationale employed by the authors of the statute is that the Navy's SURTASS LFA sonar system is vital to national defense. The Navy is currently trying to bring anti-submarine warfare into the forefront of national defense. The Navy is concerned with the 224 submarines operated by non-allied forces within the ocean, and keeping the safety of US Naval personnel is of utmost importance in the Navy (Tiron, 2003). Given that current technology would allow Navy ships only minutes to react to the detection of an enemy submarine, the Navy is concerned that this will not give enough time to respond to the threat. With the new SURTASS LFA sonar system the detection of submarines would occur hours before any action would need to be taken (Department of the Navy 2001). Currently, there is also an increase in the development of other advanced technologies for anti-submarine warfare, and the Navy is actively seeking industry participation, including the development and expansion of unmanned undersea vehicles for the detection of submarines and mines (Tiron, 2003). In the 2004 budget there is an increase of \$2.4 billion over the FY2003 budget to \$11.5 billion for ship building alone. Among the large ship building projects, the Navy has several multi-billion dollar projects to develop and build new submarines (Defense Acquisition University Press 2003). Therefore, there is a marked effort by the Navy and the federal government to improve submarine detection and anti-submarine warfare technology because there is a perceived threat to national security by the abundance of non-allied submarines.

The second assumption is that the current definition of harassment is too stringent and is crippling the ability of the Navy to conduct training exercises vital to national defense. The current definition of harassment was the ground for the lawsuit brought up by the NRDC against

the Department of Commerce and the Navy. In changing the definition of harassment to include only significantly altered natural behavior, the authors hope to limit the number of litigations brought up against the Department of Commerce or the Navy.

The third assumption is that the SURTASS LFA sonar system does not significantly alter behavior patterns of marine mammals. The authors claim that the system does not cause demographic consequences to reproduction or the survivability of marine mammals. However, there have been spatial and temporal links between some mass strandings of cetaceans, predominately beaked whales, and the deployment of military sonar (Jepson et al. 2003). One such incident happened in the East Ionian Sea, the Mediterranean Sea, where a species of Cuvier's beaked whale, *Ziphius cavirostris*, seems to be abundant. Mass strandings of the Cuvier's beaked whale are very rare, with only seven strandings of more than four individuals recorded since 1963 world wide. However, from the morning of May 12, 1996 to May 13, 1996 there were a total of 12 Cuvier's beaked whales stranded alive along the coasts of the Kyparissiakos Gulf, over a stretch of 38.2 km (figure 6). This spread in time and location was atypical because whales usually mass-strand at the same place and at the same time. In addition, another whale was found two weeks later on an island, 57 km, away from the closest strandings on the mainland. Necropsies of eight of the stranded whales found no apparent abnormalities or wounds. However on the morning of May 12, 1996 the British Navy began testing the SURTASS LFA sonar system in the area. It is likely that the military activity caused the mass strandings of the whales because these strandings showed characterizes unlike those that occur with other whales (Frantzis 1998).

In another such event, fourteen beaked whales were stranded in the Canary Islands, close to the site of an international naval exercise held on September 24, 2002. Strandings began

about 4 hours after the onset of the SURTASS LFA sonar activity. Of the beaked whales stranded, eight Cuvier's beaked whales, a Blainville's beaked whale (*Mesoplodon densirostris*) and a Gervais' beaked whale (*M. europaeus*) were necropsied. These animals showed severe, diffuse vascular congestion and disseminated microvascular hemorrhages associated with widespread fat emboli within vital organs. It appears that the lesions were consistent with acute trauma due to *in vivo* bubble formation resulting from rapid decompression. It is hypothesized that the sonar exposure might result from behavioral changes to normal dive profiles, such as accelerated ascent rate, causing excessive nitrogen supersaturation in the tissues. Alternatively, bubble formation might result from a physical effect of sonar on *in vivo* bubble precursors in nitrogen-supersaturated tissues. The livers of the animals are the most consistently affected organs (Jepson et al. 2003).

In yet another incident, on March 15 and 16, 2000, a multi species mass stranding of 17 cetaceans was discovered in the Northeast and Northwest Providence Channels of the Bahamas Island. Four species were stranded in this event, Cuvier's beaked whales, Blainville's beaked whales, Minke whales and a spotted dolphin, were found within a 36 hour period along a 240 km arc. Necropsies showed that the cetaceans were in good condition with no evidence of debilitating infectious disease, ship strike, blunt contact trauma, or fishery related injuries. Some auditory structural damage was found in four beaked whales examined, specifically hemorrhages near and around the ears. These hemorrhages would have probably not caused death, but compromised hearing or navigational abilities, resulting in disorientation and subsequent stranding. The most likely cause of the trauma was acoustic or impulse injury. The strandings coincided with ongoing naval activities involving tactical mid-range frequency sonar use by the US Navy. Analysis of ship movement and acoustic modeling indicate that this was the most

likely cause of the mass strandings. In this event, the Navy was not testing the SURTASS LFA sonar system. In addition, the Navy has determined that the low frequency sounds produced by the SURTASS LFA sonar system at levels less than 180 dB. The Navy concluded that sounds less than 180 dB should not cause serious problems in marine mammals' hear capabilities (Schlundt et al 2000, Kastak et al. 1999). Thus, the SURTASS LFA system should not damage the hearing of marine mammals.

The authors of the statute concede that more research needs to be conducted to determine that actual effects of the SURTASS LFA system on marine mammals. They included a minimum funding requirement of \$7 million per year for research about marine mammals and on the effects of the SURTASS LFA sonar system on marine mammals.

## **DISCUSSION**

### **Section 318: Military readiness and conserving protected species**

The first rationale behind section 318 of public law 108-360 is that the DOD can successfully manage threatened and endangered species absent of critical habitat designations. The vast number of successes that the DOD has had in managing protected species seems to support the rationale of the authors. The second assumption is that there are limited critical habitat designations on military installations. There are only 12 critical habitat areas in all of the Army military installations, and the USFWS has not been designating critical habitat for many of the species. Therefore, the critical habitat designations are not being used fully on military installations across the US. The third assumption espoused by the authors of the legislation is that the Secretary of the Interior will have oversight of the INRMPS to determine their effectiveness. The Secretary of the Interior is already using criteria that exempt areas that have

an INRMP from critical habitat designations. In essence this section would put into written law a policy that the Department of the Interior is already using to preclude critical habitat on military installations. The last rationale is that a balance exists between the conservation of threatened and endangered species and the ability to conduct training exercises. The DOD has had several successes in both managing threatened and endangered species and continuing training exercises. Through techniques like temporal and spatial closures, limiting access to people and vehicles, removing barriers, installing fences, and using best management practices, the DOD has been able to continue limited training on the habitat of threatened or endangered species.

The authors of the policy used rationale that has been backed up by the good track record of the DOD in protecting threatened and endangered species. Through various techniques the DOD has seen the stabilization or increase of many threatened or endangered species within military installations. Also, the military has played key roles in the gathering of data about the habitat and behaviors of many species that can not be observed in the wild anymore. The DOD has embraced the management of threatened or endangered species, often going beyond what is required of them by the ESA by continuing the conservation after the species has been removed from the list of threatened and endangered species, like the peregrine falcon. Therefore, this statute is able to solve the technical problem of training on military bases where threatened and endangered species live, and to serve democracy by upholding the ideals espoused by the ESA.

### **Section 319: Military readiness and marine mammals**

The first rationale held by the authors of the law is that currently the Navy's SURTASS LFA sonar system is vital to national defense. The Navy is aggressively funding and testing anti-submarine warfare technology. The DOD is concerned about the number of anti-allied

submarines that are patrolling the oceans, because these submarines are so advanced that they are almost impossible to detect without the SURTASS LFA sonar system. The second assumption is that the current definition of harassment is too stringent and is crippling the ability of the Navy to conduct the necessary training exercises to test the SURTASS LFA sonar system. This assumption has also proved to be correct because the definition of harassment was the basis of the lawsuit brought up by the NRDC against the Department of Commerce. The court case has put a tailored injunction on the use of SURTASS LFA sonar. The DOD feels that the training of SURTASS LFA sonar must be able to continue in these areas, and through changing the definition of harassment to include only “significantly altered” natural behavior, the authors hope that this will be able to limit the number of court cases brought up against the use of the system. However, it is unclear whether the new definition of harassment will actually cut down on the number of court cases brought about as a result of SURTASS LFA sonar. The NRDC court case was filed as a result of the NMFS not fulfilling their responsibilities under the MMPA. The changes in the statute change the MMPA in such a way that a suit filed on the same grounds would be dismissed. In addition, the statute changes the MMPA so that any individual or group would have to prove that marine mammals are being “significantly altered” by Navy exercises. However, to prove that marine mammals are being “significantly altered” is difficult, so the authors seem to hope that the difficulty will stop any future court cases. The final assumption is that the SURTASS LFA sonar system does not significantly alter behavior patterns. There have been two cases where the use of SURTASS LFA sonar is believed to cause the stranding of several species of marine mammals, specifically beaked whales. However there is yet to be a causal link established between the use of SURTASS LFA sonar and the strandings of marine mammals. One mass stranding event was not caused by the SURTASS LFA sonar system,

because the Navy was not using the SURTASS LFA sonar in this test, however the mass stranding seemed to be caused by other sonar in the Navy exercise. The Navy has also determined that the system should not seriously damage the hearing capabilities of marine mammals because the decibel levels are not considered to be damaging to marine mammals. The authors conclude by requiring a minimum level of funding in the legislation. This was used to ensure that behaviors are not significantly altered in such a way that they effect reproduction and the survivability of the species.

The first assumption is based on a perceived or real threat of anti-alliance submarines in the ocean. Whether the threat is perceived or real, it is considered a real threat because submarine warfare has been an important part of wars since their invention. The mission of the DOD is to be prepared for any type of warfare in the event a war would break out, and there may be a real threat posed by anti-alliance submarines. Assumptions two and three from this section are based on the new definition of harassment. With the new definition, the use of the SURTASS LFA system would not, according to the current science available, significantly affect reproduction and the survivability of marine mammals; there are only two recorded mass strandings of marine mammals with the use of the sonar system. However, there is very limited evidence to either support or deny the claim that marine mammals are not being significantly affected by the SURTASS LFA system. More research needs to be conducted in this field before a final ruling is made. The authors have chosen to allow the continuation of the training of the SURTASS LFA sonar system and research at the same time. However, a precautionary approach may be more appropriate because some species of marine mammals are so small that even a few deaths could cause the extinction of the whole species. Therefore the assumption that marine mammals are not being significantly altered by the sonar system may in fact be shown to



be wrong in the future. An approach that slowly reinstate the SURTASS LFA system, while allowing continued research may have been more appropriate then just allowing the Navy to continue testing before more research has been conducted.

## LITERATURE CITED

- Ambrose, Skip, and Chris Eberly. 2002. A partnership for peregrines. *Endangered species bulletin*. US Fish and Wildlife Service. Michael Bender, editor.  
<http://endangered.fws.gov>.
- Beaty, Timothy A., Albert E. Bivings, Theodore Reid, Terence L. Myers, Stephen D. Parris, Ralph Costa, Timothy J. Hayden, Thomas E. Ayers, Scott M. Farley, and William E. Woodson. Success of the Army's 1996 red-cockaded woodpecker management guidelines. *Federal Facilities Environmental Journal* 14(1).
- Bender, Michael, ed. 2004. *Endangered species bulletin*. US Fish and Wildlife Service.  
<http://endangered.fws.gov>.
- Boice, L. Peter. 2002. Current conservation issues in DOD. Presented to NMFWA, Dallas, TX.
- Briggs, Walter, and Carolyn Lackey. 2004. Navy saves old growth for murrelets. *Endangered species bulletin*. US Fish and Wildlife Service. Michael Bender, editor.  
<http://endangered.fws.gov>.
- Czech, Brian and Paul R. Krausman. 2001. *The Endangered Species Act: History, conservation biology, and public policy*. The John Hopkins University Press, Baltimore, MD, and London, England.
- Defense Acquisition University Press. September 2003. Conferees approve fiscal year 2004 defense appropriations conference agreement: U.S. House of Representatives Committee on appropriates news room – policy and legislation. Defense Acquisition University Press. [http://www.findarticles.com/cf\\_0/m0KAA/5\\_32/111506049/p1/article.jhtml](http://www.findarticles.com/cf_0/m0KAA/5_32/111506049/p1/article.jhtml)
- Department of Defense (DOD). 2004. Resources for integrated natural resources management plan implementation: a handbook for the natural resources manager.  
<https://www.denix.osd.mil/inrmp>.
- Department of the Navy. 2001. Final overseas environmental impact statement and environmental impact statement for surveillance towed array sensor system low frequency active (SURTASS LFA) sonar. Volume 1. Department of the Navy, chief of Naval operations.
- Drigot, Diane C. 2001. An ecosystem-based management approach to enhancing endangered waterbird habitat on a military base. *Studies in Avian Biology*, No 22: evolution, ecology, conservation, and management of Hawaiian Birds, a vanishing avifauna. J.M Scott, Sheila Conant, and Charles van Ripper, III, editors. Allen Press: Cooper Ornithological Society.
- Frantzis, A. 1998. Does acoustic testing strand whales? *Nature* 329.
- Helmstetter, Andrea, and Debby Atencio. 2004. Eglin Air Force Base and sea turtle nesting: a success story. <http://www.umich.edu/~esupdate/library/97.09-10/helmstetter.html>
- HR 1835. National Security Readiness Act of 2003.
- Jepson, P.D., M. Arbelo, R. Deaville, I.A.P. Patterson, P. Castro, J.R. Bakers, E. Degollada, H.M. Ross, P. Herraez, A. M Pocknell, F. Rodriguess, F.E. Howie, A. Espinosa, R.J. Reid, J.R. Japer, V. Martin, A.A. Cunningham, and A. Fernandez. 2003. Gas-bubble lesions in stranded cetaceans: was sonar responsible for a spate of whale deaths after an Atlantic military exercise? *Nature* 425.
- Kastak, D., R.J. Schusterman, B.L. Southall, and C.J. Reichmich. 1999. Underwater temporary threshold shift induced by octave-band noise in three species of pinniped. *J. Acoust. Soc. AM.* 106(2).

- Laporte, Elizabeth D. United States Magistrate Judge. August 2003. Natural Resource Defense Council, Inc. et al., v. Donald Evans, et al. No C-02-3805-EDL. United States District Court for the northern district of California.
- Mattoni Rudi, and LTC Nelson Powers. 2002. The Palos Verde blue: an update. Endangered species bulletin. US Fish and Wildlife Service. Michael Bender, editor. <http://endangered.fws.gov>.
- McCarthy, Scott. 2002. Critical habitat – what is it? DOD Endangered Species Act seminar. Tucson, Arizona.
- National Research Council. 1995. Species and the Endangered Species Act. National Academy Press, Washington, DC.
- National Research Council. 1994. Low frequency sound and marine mammals: current knowledge and research needs. National Academy Press, Washington, DC.
- Opler, P.A. 1976. The parade of passing species: A survey of extinctions in the United States. *The Science Teacher* 43(11): 30-34.
- PL 108-136. National Defense Authorization Act for Fiscal Year 2004.
- Rauzon, Mark and L. Tanino. 1998. Bird Monitoring during mangrove removal at Nu'upia Ponds Wildlife Management Area, Kaneohe Bay, MCBH. US Army Corps of Engineers.
- Schlundt, C.E., J.J. Finneran, D.A. Carder, and S.H. Ridgway. 2000. Temporary shift in masked hearing thresholds of bottlenose dolphins (*Tursiops truncatus*) and white whales (*Delphinapterus leucas*) after exposure to intense tones. *JSA* 107.
- Schneider, A.L. and H. Ingram. 1993. Social construction of target populations: implications for politics and policy. *American Political Science Review* 82(2).
- Schneider, A.L., and H. Ingram. 1997. Policy design for democracy. Lawrence: University Press of Kansas.
- Sidner, Ronnie. 2002. A bat boom at Fort Huachuca. Endangered species bulletin. US Fish and Wildlife Service. Michael Bender, editor. <http://endangered.fws.gov>.
- Snyder, Neal, and Steve Lai. 2002. On guard for endangered plants. Endangered species bulletin. US Fish and Wildlife Service. Michael Bender, editor. <http://endangered.fws.gov>.
- Tiron, Roxana. October 2003. Anti-submarine warfare moving to the forefront. *National Defense Magazine*. <http://www.nationaldefensemagazine.org/article.cfm?Id=1225>.
- United States Fish and Wildlife Service (USFWS). 2004. Sikes Act: summary from the federal wildlife handbook. <http://ipl.unm.edu/cwl/fedbook/sikesact.html>.
- Watland, Angela, Jason Bak, Steven Sekscienski, and Bill Woodson. August 2002. Installation summaries from the FY 2001 survey of threatened and endangered species on army lands. Aberdeen proving ground, Maryland 21010-5401.
- World Policy Institute. October 2002. Increases in military spending and security assistance since 9/11/01: a fact sheet prepared by the Arms Trade Resource Center. <http://www.iansa.org/documents/2002/spendingdod911.doc>.
- 16 USC § 1362. The Marine Mammal Protection Act.
- 16 USC § 1536. The Endangered Species Act.
- 16 USC § 670. The Sikes Act.

## **APPEDIX I: Tables**

## Tables

Table 1: The Department of Defense budget authorization from FY01 to FY07, in billions of dollars. Included is the % increase from the previous year (adapted from World Policy Institute 2002)

	Budget authorization (\$ billions)						
	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06	FY 07
National Defense	329	350.7	396.8	405.6	426.6	447.7	469.8
Increase over previous year (%)	-	6.595745	13.14514	2.217742	5.177515	4.946085	4.936341

Table 2: Content according to section of the Endangered Species Act (adapted from Czech and Krausman 2001).

Section	Content
2	Lists findings and declarations of Congress
3	Provides definitions
4	Outlines listing procedures
5	Authorizes land acquisitions for habitat protection
6	Provides for USFWS cooperation with states in endangered species programs
7	Requires federal agencies to pursue the preservation of species, and to consult with USFWS before taking any action that could threaten the existence of a species or specimens thereof
8	Calls for international cooperation in general
8A	Provides guidelines for the implementation of the Convention of International Trade of Exotic Species of Fauna and Flora
9	Prohibits the taking of threatened and endangered species by any party, public or private
10	Provides exemptions to Section 9
11	Outlines enforcement mechanisms and specifies penalties
12	Directs the Smithsonian Institution to review the status of endangered plants and to develop methods for plant species conservation
13	Brings the act into conformance with other legislation
14	Repeals portions of the prior endangered species acts usurped by the ESA
15	Authorizes appropriations in five-year cycles
16	Specifies the effective date (as the date of enactment)
17	Prevents any interpretation of the ESA that would weaken the provisions of the Marine Mammal Protection Act
18	Requires the secretary of the interior to submit an annual cost report on a species-specific basis

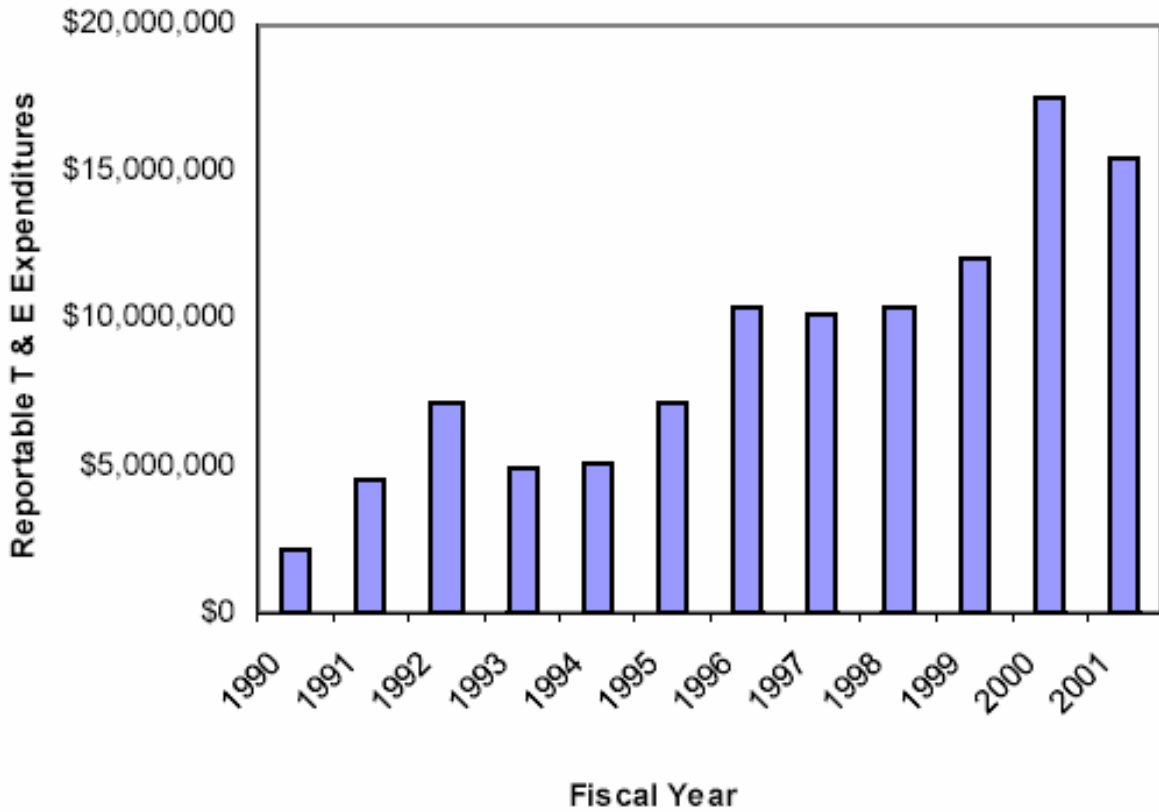
Table 3: INRMP status for the individual branches of the Department of Defense (adapted from Boice 2002).

	INRMP Status		
	Required	Completed	Incomplete
Army	178	171	7
Navy	87	80	7
Air Force	96	85	11
Marine Corps	15	12	3
DLA	3	1	2
<b>Total</b>	<b>379</b>	<b>349</b>	<b>30</b>

## **APPEDIX II: Figures**

## Figures

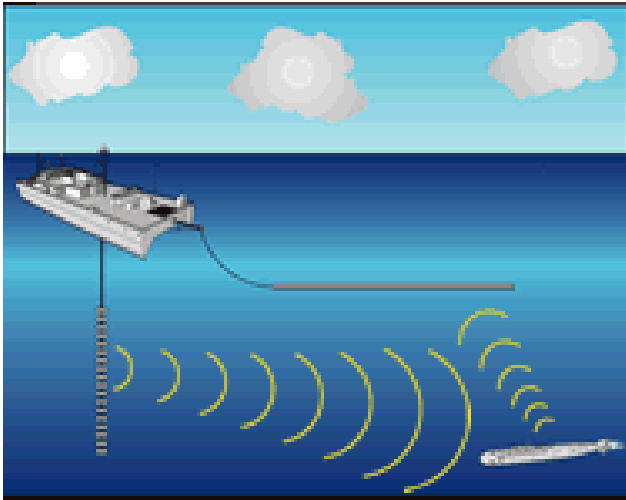
Figure 1:



The reportable threatened and endangered (T & E) expenditures for FY90 to FY01. The spending has increased by one half over the past 5 years. The decrease in FY01 represents an increase in non-reportable expenditures to \$2.6 million (adapted from Watland 2002).

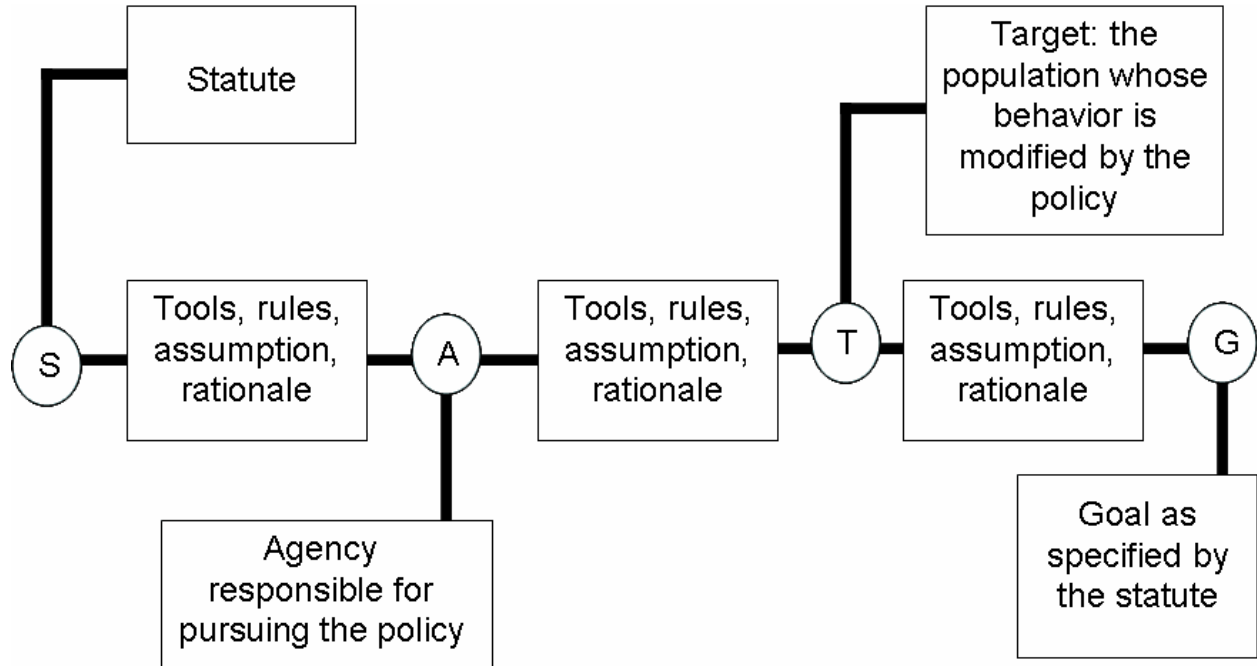


Figure 2:



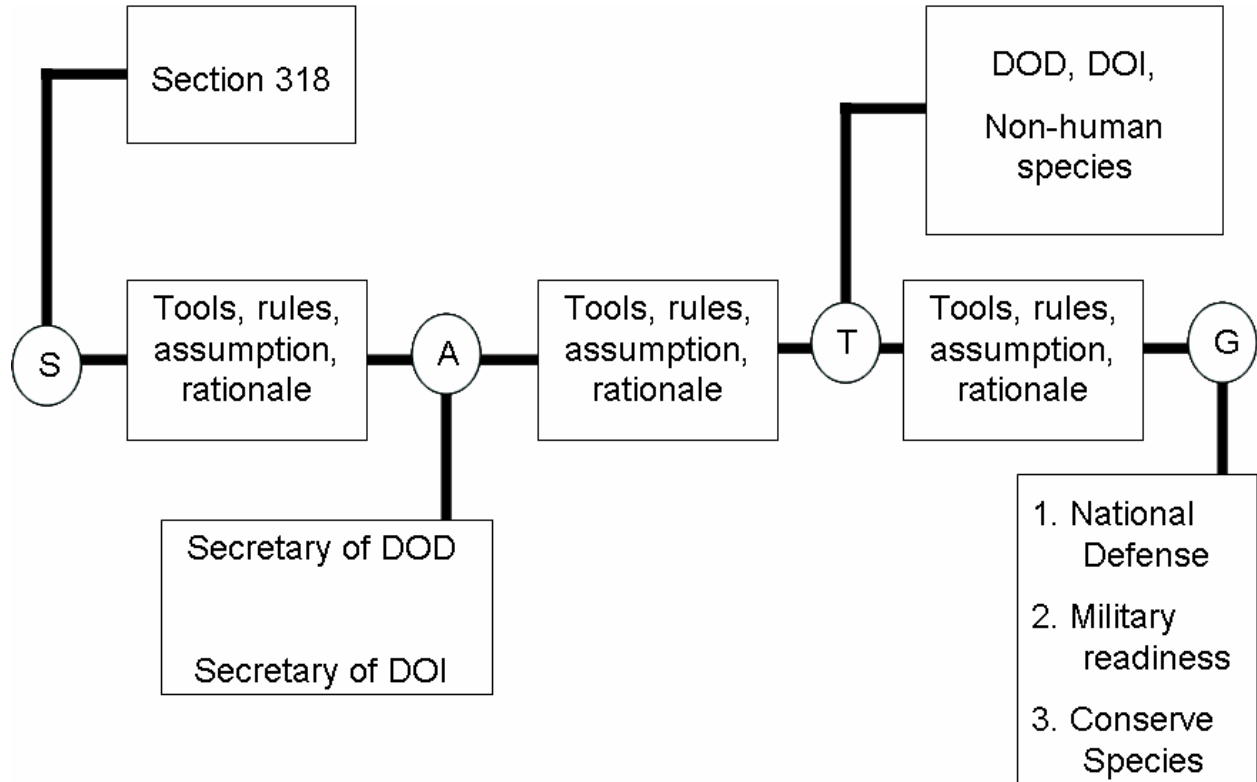
The SURTASS LFA sonar system. The section hanging below the surface ship is the LFA portion of the system, which sends out acoustic sounds that bounce off of objects in the ocean, such as a sub. The sound then travels off the sub and is collected in the SURTASS portion of the system, which is towed behind the surface ship. The sound is then analyzed on the surface ship (Department of the Navy 2001).

Figure 3:



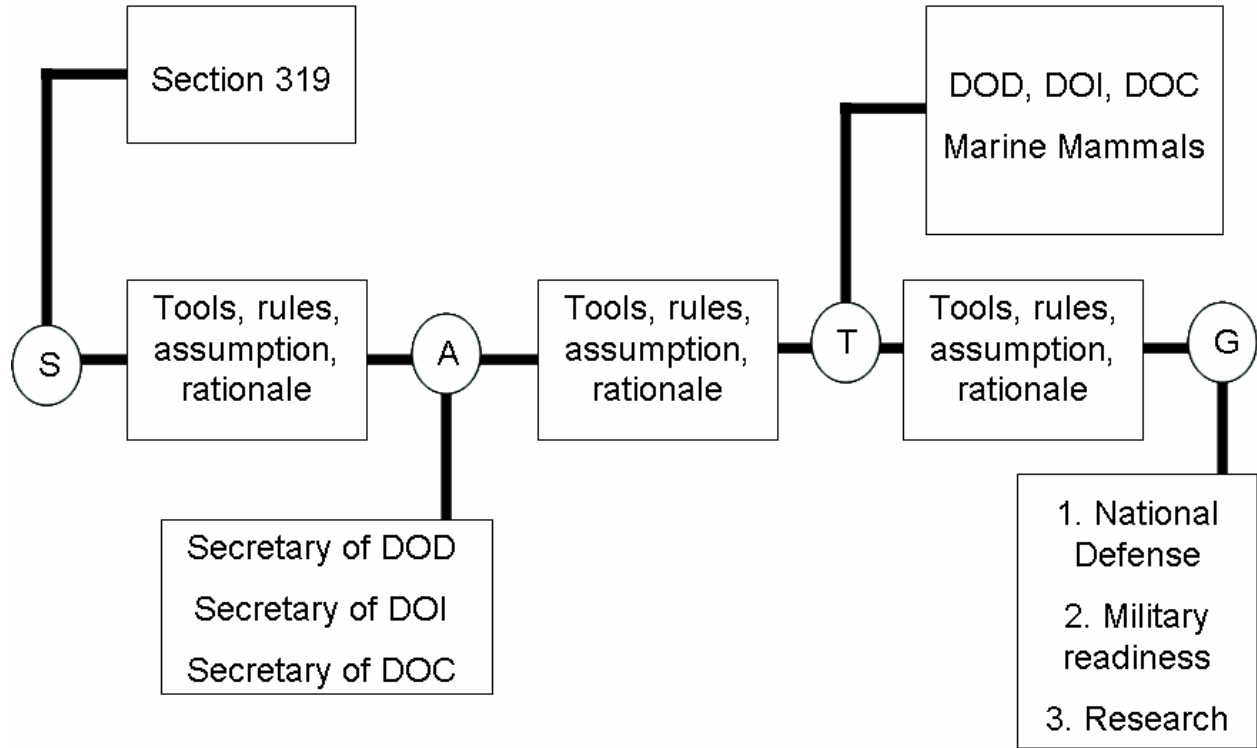
Model for policy design theory analysis. The agency, target, and goals are all modified by the tools, rules assumptions and rationale employed by the authors of the policy (adapted from Czech and Krausman 2001).

Figure 4:



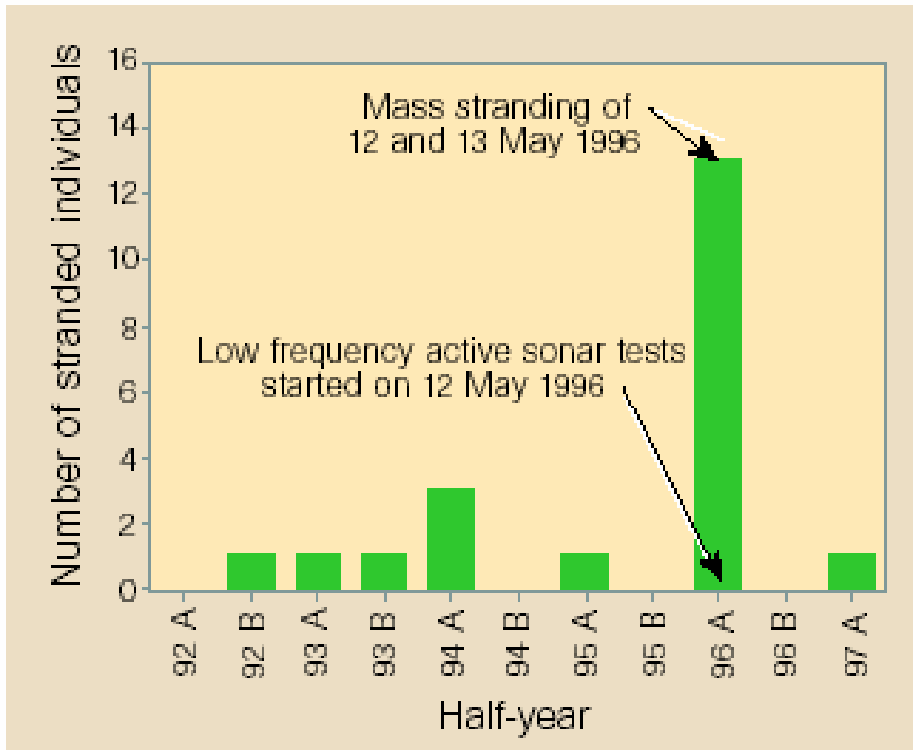
Policy design theory model for section 318 of PL 108-136. The agencies responsible for implementing the policy are the Secretary of Defense and the Secretary of the Interior. The target populations are the Department of Defense, the Department of the Interior, and non-human threatened or endangered species. The goals of this section are national defense, military readiness and the conservation of species.

Figure 5:



Policy design theory model for section 319 of PL 108-136. The agencies responsible for implementing the policy are the Secretary of Defense and the Secretary of the Interior, and the Secretary of Commerce. The target populations are the Department of Defense, the Department of the Interior, the Department of Commerce, and marine mammals. The goals of this section are national defense, military readiness and research.

Figure 6:



Mass strandings of Cuvier's beaked whales in the Kyparissiakos Gulf after a British Navy testing of the SURTASS LFA sonar system. A total of 13 whales were stranded on May 12 and May 13 1996, right after the SURTASS LFA sonar testing (Frantzis 1998).