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Preparing to Meet the Challenge

An Assessment of Invasive Species Management in Idaho

Prepared for:

The Idaho Invasive Species Council

With the Support of:

The Idaho Department of Agriculture
and

The Nature Conservancy



Northwest Natural
Resource Group, LLC

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Foreword

“Invasive species”—those nonnative plant, animal and microbial organisms that cause widespread economic and environmental damage—are becoming a major issue, not only in Idaho but across the country. Hundreds of nonnative organisms from around the globe have reached Idaho through trade, travel, intentional introduction, and dispersal from neighboring states. Most will never cause problems. Many are beneficial. But a small percentage will grow out of control and become invasive species. Free from the natural competitors, predators, and parasites that keep them in check in their native range, invasive species reproduce rapidly. They invade agricultural lands and waterways and displace desirable plants and animals. Invasive species are truly a form of biological pollution.

This document describes the threat invasive species pose to Idaho’s economy and environment. This assessment also describes ongoing state and federal efforts to prevent and manage invasive species, highlights effective points and deficiencies of some current programs and recommends a few simple steps that the State of Idaho could take to meet the threat of invasive species. This is not intended to be an encyclopedic study of biological invaders or of the myriad public and private responses to the threats invasives pose. Rather, the assessment “hits the high points” of the issue, in Idaho and at the federal level. Fortunately, there are sound efforts underway in Idaho to control noxious weeds, to prevent, detect, and control agricultural pests and to protect human health. Each of these programs has strengths that can be applied to a more comprehensive effort to address all invasive species; each has areas in which improvements may be needed.

Idaho also has taken a first step toward a coordinated and effective statewide invasive species program by creating the Idaho Invasive Species Council, named by Governor Kempthorne in 2001. The sponsors of this Assessment—The Nature Conservancy and the Idaho Department of Agriculture—intend for it to be both a source of information for the Council and a springboard for further actions to assure that the Council can effectively carry out its mission. In addition, the assessment will serve to help educate policy makers and various stakeholders about the threats posed by invasive species and what must be done to minimize those threats.

~ *The Nature Conservancy and the Idaho State Department of Agriculture*

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Executive Summary

The Threat of Invasive Species

Idaho has benefited greatly from the introduction of many nonnative species of plants and animals and suffered from others. It would, indeed, be hard to envision an economy or a lifestyle in our state without potatoes, chukar partridges, apples or wheat—all species that evolved elsewhere and were brought to this state. On the other hand, there are species of plants, animals and microorganisms that have caused great damage to our State. For example, white pine blister rust has completely changed the composition of north Idaho's forests while cheatgrass encroaches on thousands of acres of otherwise productive rangelands. These, too, are nonnative species that arrived in Idaho by accident, but once here, thrived by destroying or displacing far more desirable native species.

Introduced species that escape their intended niche or which are unintentionally brought to our state and then cause either economic or ecological harm are termed "invasive." Idaho is vulnerable to such species, for we have a variety of climates and habitats and vast rural areas where invasions can spread unnoticed until eradication is too late. The danger is magnified by recent growth in number of visitors to Idaho as well as in interstate and international commerce. As Idaho's connections to the rest of the world increase, so does the pace of new infestations by undesirable, nonnative species – ranging from noxious weeds to insect pests.

There are two types of invasive species—those not here but are likely to arrive, and those here now that have proven to cause damage and which may multiply or spread to areas of the state where they are not now found. Both types arrive through a variety of invasion pathways. People buy "exotic" pets or fish and allow them to escape to the wild. Boats or boat trailers harbor aquatic animals or weeds and then transfer them to Idaho's waters. Imports of agricultural products or nursery stock can bring insect pests or diseases, and visitors from other countries may inadvertently bring seeds, insects or disease organisms with them. Once here, these new organisms can spread in numerous ways. Livestock and recreational vehicles carry weed seeds to new areas, as can the wind. Aquatic plants and animals can simply float downstream, and many species spread the "old fashioned way"—reproducing and moving into areas they do not currently occupy.

The enormous impact of these invasions is already evident as invasive species have damaged Idaho's rangelands, waterways, farms, forests, and urban environments. They even threaten human health. Noxious weeds like yellow starthistle infest vast areas of formerly productive rangelands in Idaho – displacing wildlife and reducing livestock grazing. Eurasian watermilfoil chokes swimming and boating areas in several popular lakes. Hawkweed is out-competing tree seedlings in northern Idaho forests. Cereal leaf beetle has cost Idaho wheat farmers thousands in crop damage and control costs. Dutch elm disease has decimated elm trees that once graced city parks. And the West Nile virus, which has not yet reached Idaho, can be deadly to humans and animals.

Other invasive species that have yet to reach our state could cause new and even more damaging impacts. Zebra mussels, a scourge in the Midwest, clog irrigation and power

turbine intakes; the citrus longhorned beetle, originating in China and spreading to the United States in wood packing material or bonsai plants, is an urban pest. Once established, the beetles kill common shade trees and eradication requires the removal of all surrounding trees, devastating whole city blocks.

Purpose and Methods

The purpose of this Assessment is to heighten awareness of the problem, summarize ongoing efforts both in Idaho and nationally to address it, examine the strengths and weaknesses of these efforts and suggest some needed changes. Just as Idahoans have met the challenges posed by a host of plant and animal pests or noxious weeds, we now need to extend these efforts to invasive species that might arrive here or, if here already, might spread uncontrollably to other parts of our state. This is not simply a matter of “doing more of the same.” The problem is too large and the risks to Idaho’s economy and ecological values too high. Rather, a more comprehensive and coordinated effort will be needed to stem an increasing number of undesirable species brought here by an increasingly complex and growing number of invasion pathways if we are to win the battle.

The heart of this assessment is a review of existing local, state, and federal programs to protect Idaho from invasive species. In completing this assessment we reviewed the invasive species literature, interviewed dozens of agency staff and other experts, and conducted a survey with Idaho’s invasive species managers. The following section describes our findings.

Key Findings

Fortunately we have programs in place that have, within limits, been effective in keeping many invasive species at manageable levels or in preventing their entry into the state. Existing efforts have largely been directed toward various agricultural pests or noxious weeds. Idaho has enacted laws to direct these programs, including specific statutes to address noxious weeds, plant pests, exotic animals, forest pests and human health. We also have dedicated significant financial resources to the problem. While it is difficult to derive a total expenditure in Idaho for all invasive species, the available data indicates that the amount spent to control noxious weeds and agricultural pests probably exceeds \$10 million per year.

However, despite our efforts, the invasive species problem is growing. New invaders cross our borders each year. Some, like forest insects or agricultural pests, are tracked closely and controlled by public agencies. Others may go unnoticed, growing quietly on our lands or in our waters until their populations explode to nuisance levels. Idaho is good at managing some types of invasive species and ineffective at managing others. Overall our management is fragmented, marked by gaps and overlaps in authorities and responsibilities among agencies who could be powerful allies in the fight against invasive species.

One product of the past piecemeal approach to managing invasive species is that in Idaho, as well as at the federal level, a large number of agencies and organizations share occasionally conflicting or overlapping authorities. The state departments of Agriculture, Lands, Fish and Game, Environmental Quality, Transportation, Parks and Recreation, along with the University of Idaho all have roles to play in invasive species management. They are joined by federal agencies in Idaho that include the Environmental Protection Agency (EPA), the Forest Service, Bureau of Land Management (BLM), Fish and Wildlife Service, various Department of Agriculture agencies, Commerce and the military, among others.

One result of the large number of participants is recognition of the need for a coordinating body. Both the state and the federal government have created “invasive species councils,” established, in both cases, through executive orders. In addition, Congress has introduced a number of bills to better coordinate invasives species programs or to authorize additional financial support for them. Idaho’s congressional delegation has strongly supported these efforts. Much of the anticipated future financial support would flow through to the states. While there is a clear role for the federal government in coordination, sponsoring research and extension of knowledge, or monitoring international or interstate commerce to prevent entry of undesirable species, much of the work to track, prevent, eradicate and control invasions of undesirable species will fall to the individual states.

Although we are making progress in stepping up to the invasives challenge, much work remains. There are gaps in existing prevention and control programs that need to be filled and there are new actions needed if we are to be effective in the future. The key findings of this Assessment include:

- ✓ Invasive species management in Idaho is fragmented. Responsibilities and authorities for invasive species management are not clearly defined for most agencies. There is no clear relationship among budgets, needs, and results. There is a need to set priorities and measure results.
- ✓ The levels of education and awareness among landowners, policy makers, and the general public are not commensurate with the degree of the problem. Landowners need to better understand their obligations to control weeds and the costs associated with failure to manage them. Political leaders need to ensure adequate funding, appropriate legal authorities, and accountability from the agencies. The general public needs to understand invasive species so they become mindful of actions they can take, and build broad public and political support for adequate programs.
- ✓ Idaho does a good job at managing noxious weeds, agricultural pests, forest insects, and invasives that threaten human health. Other invasive species, such as aquatic invaders, receive little attention.
- ✓ Resources are scarce, so we must ensure that we expend them wisely. Science can help us set priorities and develop cost-effective methods for managing invasive species.

- ✓ There is a need for adequate resources to do the job, including funding. This was perceived as the greatest barrier to effective invasive species management. Counties have widely different levels of resources and capacity to fight a problem that affects everyone.
- ✓ It is better to prevent than to control, due to our limited ability to eradicate or control invasive species once they become established. Idaho managers placed a high premium on prevention (i.e., actions to keep an invasive species from ever arriving here) and on early detection and rapid response once a species arrives.

Recommendations

One of the tasks associated with the Assessment was a comprehensive survey of professionals currently engaged in invasive species management in Idaho. Their wisdom and experience plus the track record of programs to control noxious weeds and agricultural pests, human health or our fish and wildlife resources provide a basis for some recommendations to be considered by Idaho's policy makers. Foremost among these is the recommendation that this Assessment become the basis for a more comprehensive plan designed to address the threats posed by invasive species in Idaho in a coordinated and effective manner and with a response that is adequate to the size of the risks. Other recommendations include:

- **Establish an Equitable and Stable Source of Funds**
Insufficient funding and staff was noted as a major barrier by a great majority of Idaho's invasive species managers. Additional money is fundamental to overcoming the gaps in public and landowner education cited by Idaho managers as well as to achieving the goals of prevention and early detection. The sources and amounts of additional money are guaranteed to create a discussion. The broad nature of the causes and contributors to the problem implies that a broad-based tax is appropriate as a funding mechanism. Such a tax might take the form of a small surcharge for boat, RV or off-road vehicles licenses, fish and game licenses, exotic species importation permits or similar activities closely tied to invasive species pathways or through general fund tax revenues.
- **Conduct Educational Programs**
There are obvious educational needs to be met, falling into two broad categories: (1) property owners, and (2) those whom have some relationship with invasive species pathways. The latter category ranges from nursery operators who import exotic species to recreationists who bring in boats or recreational vehicles from other locales.
- **Set Priorities for Species to be Addressed**
There is a wide variety of species requiring control efforts and little consensus among managers on priorities for them. Unfortunately, this implies a program that is reactive, since priorities are set by actual occurrence and not by preventative actions or for especially high-risk species that may not be here yet.

Targeting high priority species early on in the implementation of a comprehensive invasive species management program might serve to create a better focus and mission for the program.

- **Establish a Process to Assess Risks Posed by Various Species**
Efforts to prioritize species and work to prevent or manage outbreaks of them in Idaho must be accompanied by an assessment of the risk that each poses. Risk assessment is a combination of identifying species that might arrive here (the risk of introduction) and of the damage they would likely cause if they were introduced (the risk of significant damage). Species that have a high risk of appearing in Idaho and a high risk of causing widespread, significant damage if they do, require a higher priority for prevention or control (if it is already here) than those with lower risks.
- **Coordinate Invasive Species Work within State Government**
It is important to assure that a comprehensive invasive species program in Idaho is not diluted by competing efforts among various agencies. There is a need to examine whether the invasive species authorities for each of the state agencies involved in invasive species management are clear, and that each agency is enthusiastic about carrying out its responsibilities. The Idaho Invasive Species Council is probably best equipped to create a sense of mission among all involved agencies and to assure that the overall program receives the attention it deserves within state government.
- **Enact the Necessary Changes in State Law**
There are some additional statutory authorities that should be considered. The first is the need to consider providing the Idaho Invasive Species Council with a clear statutory basis for developing and implementing a comprehensive invasive species program that cuts across the numerous agencies involved in it. Another change in the law that should be considered is a measure that would “hold harmless” landowners who find and report the presence of high priority invasive species on their lands. For invasive species, it should be made clear when landowners incur liability for control measures and when they do not.
- **Identify Research Needs**
There is much to be learned about invasive species, ranging from how some microbials might spread to finding acceptable biological controls for noxious weeds. Fortunately, the University of Idaho has a proven track record for research relating to both agricultural pests and noxious weeds. These efforts should be a basis for future work, and those agencies involved in invasive species management will need to identify gaps in their knowledge and work closely with research institutions to fill those gaps. It is equally important to communicate information regarding invasive species through extension programs.

➤ Hold an Idaho “Invasive Species Summit”

There is a need to convene a “summit meeting” of Idaho invasive species managers, legislators and other elected officials, representatives of the scientific community and those who otherwise have a stake in invasive species management to review the current situation and discuss what future steps will be needed.

Perhaps the biggest reason for such a gathering would be to begin to focus on the structure of a comprehensive invasive species program in Idaho, just as the “Weed Summit” in 1998 paved the way for the Cooperative Weed Management Areas and the implementation of a comprehensive weed strategy in the state.

Conclusions

Unfortunately, the question is not whether Idaho will see additional or spreading invasions of undesirable invasive species, but rather which species, how and where they will show up and what will be the magnitude of the damage or risk. That is the reality, not only in Idaho, but nationwide. On the positive side for Idaho is a wealth of experience in addressing many such species, a work ethic and organization that is well suited as a model for a larger effort and some time to create that effort.

What Idaho needs now are the financial resources, legal authorities and organization that can meet the coming challenges. This must be coupled with public understanding of the need to take actions and the political will to do so. The risks of inaction, as measured by the potential costs to our economy and to our natural world, far exceed the present costs of recognizing those risks and doing what is needed to face up to them.

Introduction

Life in Idaho is much fuller as a result of many species; plant and animal, which now exist here but are not native to our state. They were successfully introduced and now thrive here. The list is long. Wheat, corn, sugar beets—even our trademark potatoes—greatly adds to our economy. Ringneck pheasants, chukar partridges and smallmouth bass add to our already large spectrum of recreational activities. Roses, maple and oak trees, rhododendron and lilacs help beautify our towns and homes. And we all enjoy strawberries, tomatoes and melons from our gardens. None of these are native species. All were brought here but few people would ever question their value.

At the same time, though, our state has witnessed invasions of nonnative, introduced species that have had little or no value—species that have, in fact, caused enormous economic and ecological damage. That list, too, is long, ranging from halogeton, which threatened Idaho’s sheep industry early in the last century to spotted knapweed, now taking over thousands of acres in North Idaho. Perhaps there is no better example of what a single introduced organism can do than white pine blister rust, a fungus that, in less than a human lifetime, has so modified our native white pine forests that only 5 to 10 percent of the original 5 million acres of white pine timber stands in the inland Northwest still includes a significant number of the tree (Fins et. al., 2001).

The purpose of this Assessment is to focus on those nonnative species that either are here now and doing great harm or have the potential to arrive in our state and then cause damage. There will hopefully be two results of this effort; first, build a greater public awareness of the costs and problems associated with nonnative invasive species, and, second, serve as a platform for the development of thoughtful plans to identify and manage those species which pose the greatest threats.

The Concept of “Invasiveness”

European settlers brought with them many plants and animals that have added to the native landscape. In fact, it is estimated that fully one-quarter of all plants now growing in this country evolved elsewhere (Raloff, 2003). An estimated 4,000 nonnative plant and 2,300 nonnative animal species are already established in the United States (Cabreza, 2002). Most are well behaved, remaining within the ecological niche into which they were introduced. Corn or improved forage grasses tend to remain where they are planted, even if they are perennials and reproduce naturally. Pheasants remain close to farms and have not become the urban pests that pigeons or starlings have. While each are introduced species, they are not invasive and their biological makeup restricts them to manageable populations within acceptable habitats. This assessment is not concerned with nonnative species that have a clear purpose and use in Idaho, such as nonnative fish and game introduced by the Idaho Department of Fish and Game, improved forage grasses, crops, or domestic livestock.

Other species have reacted differently to the environments in which they were introduced. They become invasive of other species’ habitats, displacing those that are

more desirable and causing economic or ecological harm. Worldwide, there are about 260,000 known plant species. If only 10 percent have the potential to become invasive of habitats in which they did not evolve, then there are 26,000 exotic plant species that could become a problem (Cabreza, 2002).

Sometimes invasive species simply reproduce so rapidly that the sheer amounts of them become unmanageable, as in the case of yellow starthistle and spotted knapweed, both of which now overwhelm parts of north Idaho. Others may be better adapted to out-compete native vegetation. Cheatgrass, for example, greens up early in the spring, sends its roots deep and consumes water needed by the native species that develop later in the spring. Then cheatgrass dies early, producing easily ignited fuel. When areas burn, native grasses and forbs are killed, opening areas that are quickly colonized by more cheatgrass. Some species introduced here find they have left their natural predators and control agents behind and without them are able to take fully advantage of their new environment. One focused on 473 European plant species that have invaded the U.S. landscape and found that the plants faced, on average, only 16 percent as many fungal species and 76 percent as many viruses as their kin remaining in Europe (Raloff, 20003) (Mitchell and Allison, 2003).

One defining characteristic of the species upon which this Assessment focuses is their ability to become “invasive,” escaping the original or intended ecological niche to habitats where a species can then grow uncontrollably. The second characteristic is the ability of a plant, animal or microbial organism to cause harm, whether to Idaho’s economy, to human health or to our natural world. Generally, “harm” is easily identified. A non-palatable weed occupies pastures or rangeland sites and displaces the grass needed by livestock or wildlife or an introduced disease decimates trout populations. However, there are times when the harm is discovered much later than the organism itself. White pine blister rust, for example, was detected in British Columbia in 1910, thirteen years before anyone noticed that the disease had begun to infect Idaho’s white pines.

A final distinction regarding the species addressed in this Assessment is whether or not an introduced species is likely to trigger an adequate response from appropriate public agencies. Many do. The coming invasion of West Nile Virus, for example, will clearly be met with legions of medical and veterinary expertise. It is an invasive species with a “home,” an identifiable, organized and appropriate response from those trained to deal with such a disease. Similarly, there are any numbers of nonnative and potentially invasive agricultural pests—blights, rusts and other diseases—that only attack certain valuable agricultural commodities and, as such, will create an appropriate response from those who grow them and the governmental agencies that serve the agricultural industries. Such invaders, too, will be “handled.”

There are some species that will not trigger a clear response and some not being addressed through Idaho’s cooperative weed management program. These are the species and organisms not here now but will inevitably arrive or those that will spread to areas of the state where they are not now found, and, in both cases, will cause problems. To a large extent, these invaders will inhabit Idaho’s rural lands and backcountry, where

they may not be found or where the damage may not be visible for years. By no means, though, will these invaders be restricted to sparsely developed areas or to terrestrial habitats. Snails and mussels can clog water systems and damage fisheries. Forest pests cannot only decimate our forests, but also the shade trees of our towns and cities. Viruses and bacteria can wreak havoc with wildlife, and many of these threats are either unknown to us now or have not yet shown up in our state.

Death with Tiny Wings—West Nile Virus



Conjuring up images of the plague or malaria, other diseases spread by insect vectors, West Nile virus is now attacking the Pacific Northwest, including Idaho. It infects horses and poultry—as well as humans. Humans exhibit flu-like symptoms and the Center for Disease Control (CDC) reports for 2002 over 4,000 cases across the U.S., with 284 resulting deaths (CDC, 2003 (APHIS, 2003). Within the human population, the elderly are most at risk.

*First isolated in New York from zoo animals in 1999, the West Nile virus seems to have arrived here from the Middle East, Africa or West Asia. It is not known how the disease arrived in the United States, but it is clear that it is transmitted to animals and humans alike through mosquitoes, including the *Culex* species which can “over winter” in the adult stage. This allows the virus to survive along with the mosquitoes to the summer months when it is most commonly spread.*

With occurrences now in 44 states (only the Northwest has, so far, been spared), the CDC notes, “The continued expansion of West Nile virus in the United States indicates that it is permanently established in the Western Hemisphere.” From the time it was first detected, this virus spread across the country in less than four years. Fortunately, the chances of humans contracting the disease are small and most cases are mild. Horses can be vaccinated, although expensively, but there can be significant deaths among wild birds.

For the purposes of this Assessment, the focus will be on those nonnative species that either are already here or may come here (either intentionally or unintentionally) and share these characteristics:

- An ability to grow uncontrollably and outside their intended habitat,
- The potential to displace native species and cause either economic or ecological harm, and which,
- May not trigger an appropriate response designed to identify, eradicate or control the organism before harm has been manifested.

Why Should Idaho's Citizens Worry About Invasive Species?

Idaho has a wide variety of habitats, ranging from cool, moist forests to high deserts, as well as geographical and cultural traits that make our state more susceptible to invasive species. Idaho's economy and lifestyle depend on our natural resources and our agricultural lands. We share an international border and welcome large numbers of visitors and workers from other countries. Many of these visitors travel here for recreation, bringing their boats, travel trailers, and all-terrain vehicles with them – along with weeds, insects, and aquatic animals that might have originated far from Idaho. We have access to the Pacific and the two rivers that converge at our seaport of Lewiston have tributaries that drain perhaps two-thirds of the state. Vast areas of the state are undeveloped, with thousands of acres where various species can become well established before they are detected. All of these factors add up to a situation in which invasive species might easily come here and flourish, and also cause a lot of damage when they do. We in Idaho are not strangers to such consequences; from the nearly complete devastation of our native white pine forests from blister rust to the explosion of cheatgrass, yellow starthistle and knapweed. Idaho has not only the potential to become the unwilling host of unwanted invasive species; in fact, we have a history of playing such a role.

There is no single accurate figure to describe the total impact of invasive species. Impacts are typically measured in three ways: (1) the direct costs of management and control, (2) the direct or indirect costs of lost productivity or impacts to species with economic or ecological values, and, (3) rates of spread or other measures of the extent of invasive species. The Government Accounting Office (GAO) notes with a certain sense of frustration, "Narrowly focused estimates include analyses of past damages limited to certain commercial activities such as crop production and simple accountings of the money spent to combat a particular invasive species. These estimates typically do not examine economic damage done to natural ecosystems" (GAO, 2002).

Despite the scarcity of comprehensive economic analyses of the impacts of invasive species, there are individual measures that help define a problem that is not only large but also growing in magnitude and costs:

- "Meeting the Invasive Species Challenge" the nationwide management plan of the National Invasive Species Council, quotes Cornell University researchers as estimating the total cost of invasives in the United States at \$137 billion annually, while the 1994 impact of just invasive plants was estimated at \$13 billion (NISC, 2001 and 2003) (Pimentel, 1999).
- The Federal Interagency Committee for the Management of Noxious and Exotic Weeds (FICMNEW) estimates that the economic impact of weeds on the U.S. economy to be about \$15 billion annually (GAO, 2002).
- Leafy spurge, a weed now invading Idaho rangelands, is estimated to cause \$100 million in damage each year in the Great Plains states (GAO, 2001).

- The Aquatic Plant Management Society estimates that, nationwide, invasive weeds cover an additional 4,500 acres of public lands and waters each day (Cabreza, 2002).
- According to The Nature Conservancy, of the 958 species listed under the Endangered Species Act as “threatened” or “endangered,” approximately 400 of those are at risk primarily because of competition or predation by nonnative species. For example, at Flathead Lake in Montana, introduced opossum shrimp led to the collapse of the kokanee salmon population. The salmon were an important food resource for migrating bald eagles along a tributary stream in Glacier National Park (Wilderness Research Institute, 2003).

It may be easy to view invasive species as “just weeds” or as a problem that affects only farmers or some species of wildlife. In truth, however, invasive species threaten not only agriculture, forests or rangelands, but also our urban environment, recreation and public health. Consider Boise without shade trees, lost because of the Asian long-horned beetle or the beaches of Payette or Priest Lake unusable because of uncontrolled Eurasian watermilfoil. And, West Nile virus is now with us in the West. It remains to be seen what the effects will be on livestock and human health.

Idahoans must pay attention to the threat that invasive species poses just as individuals should pay attention to their weight, blood pressure and stress level. It is a matter of our collective economic and ecological health. And we are vulnerable, no less so than an individual with a poor diet and little exercise is vulnerable to serious health problems. Moreover, our “family history” illustrates our weaknesses because of the problems we have encountered in the past. Put simply, the threats of invasive species to our lifestyle and economy, the costs of controlling them that must generally be borne by taxpayers and the vulnerability that our state’s geographical and social characteristics pose all create a situation, which, if ignored, will result in dire consequences.

Facing Up to the Challenge

Ideally, this statewide assessment of invasive species in Idaho will serve as a springboard for subsequent plans and actions adequate for the prevention, detection and management challenges created by invasive species. Whether plant or animal, invasive species fall into two basic categories—those here now and might spread and those not currently in Idaho, but which might show up. Although there is little consensus on the species that currently pose the greatest risk to Idaho (note “Recommendations”) there are certainly species where there is agreement that, if they did arrive in Idaho, the consequences would be very bad indeed. In addition to focusing on individual species, it is equally or perhaps even more important to consider how species might arrive here or spread once they have arrived. Finally, it is important to understand where various species might arrive and what consequences might be expected if they do.

Species that are already here present a distinct set of challenges. We generally know where they are, can identify them readily and, in the case of noxious weeds, agricultural pests or threats to human or animal health, have systems in place to track their occurrence and spread. Weeds have the advantage of being both visible and immobile—we can spot them, identify them and individual plants are not likely to move.

To the contrary, animal invasives are often less visible, can be highly mobile, can often reproduce, spread quickly and impacts may not be readily apparent. New Zealand mudsnails, for example, arrived in Idaho in the late 1980s but tracking their distribution has been hit or miss rather than the result of an institutionalized, disciplined survey of susceptible waters coupled with a reporting and tracking system. The problem only increases for microbial invasive species, which, by definition are invisible to unaided human eyes. Tracking their occurrence and spread usually requires monitoring infected host plants or animals. Tracking aquatic species, particularly aquatic weeds, requires regular surveys of streams and lakes, without which infestations are often too big to effectively control when they are found.

The second broad category of invasive species—potential invaders—poses its own set of challenges. Some, such as “new” weed species are fairly predictable. We know where they are now, know how their seeds can travel and can pinpoint both the likely invasion pathways and the habitats in which they will likely thrive. For most weed species in adjacent states but not here now, the question is probably when (as opposed to if) they might arrive here and, once they do, will eradication or control methods be effective. The arrival of other potential invaders is not so easy to predict. Due to increased interstate and international travel and commerce, invasive species can travel long distances before establishing in Idaho.

Predicting which exotic species will likely arrive in our state and when is not an exact science. For example, there seems to be no record that anyone was concerned about the fungus that causes “Sudden Oak Death” as recently as a decade ago. Yet, now it is a major issue on the West Coast (UCCES, 2003). Add to this the fact that many animal species like some pets or aquarium species are brought to an area intentionally (one recent sign at a pet shop in southwestern Idaho advertised “giant centipedes”). It is only when they escape and spread that they become “invasive.”

Lack of funds and direction for statewide surveys could allow for the expansion of intentional and illegal release of species such as snakeheads (introduced in other states as an ethnic food item). These species could expand to the point where control would be prohibitively expensive. Aside from such imponderables as the appearance of species that had evoked no previous concern like Sudden Oak Death and the escapement of species brought here intentionally and later found to be harmful, there is the growth in the number of invasion pathways and the likelihood that something undesirable will arrive by them. For that reason, adequately addressing the threats posed by invasive species is largely a function of recognizing where and how they might enter the state or how those here now might spread.

Domestic and international travel, tourism and recreation, agricultural and horticultural imports and the demand for exotic pets—all promise to bring in species from far away and for which the effects cannot reasonably be predicted now. The invasion pathways include all roads—from interstate highways to trails— plus all the airways and water courses that serve commerce in all its forms, while the vectors that might use these pathways to bring new species or spread existing ones range from parcel delivery services to boat trailers, barge shipments to the Port of Lewiston, campers and ATV’s, livestock, wildlife, shipments of produce, grains or ornamental shrubbery. The list of ways and routes through which invasive species can reach our borders is limited only by the human imagination.

Developing a consensus on a comprehensive list of species Idahoans should be concerned with is as difficult as defining all pathways. Few professionals in the field venture guesses beyond the obvious. This section of the Assessment describes some species that are or could become a problem in Idaho (Table 1). It is not an all-inclusive list and merely provides representative examples of species along with potential pathways, preferred habitats, and potential impacts. Perhaps more importantly, the section will omit some species which we cannot now predict but which will arrive and be a problem simply because we do not now know what those species may be. Those, among all others, are the species that should cause those sleepless nights.

Table 1. Examples of Invasive Species and their Potential Risks to Idaho

<u>Environment</u>	<u>Invasive Species</u>	<u>Species Category</u>	<u>Pathways and Vectors</u>	<u>Where They Would Appear</u>	<u>Possible Consequences</u>	<u>Occurs in Idaho Now</u>
Agriculture Cropland	Brown rot of potatoes <i>Ralstonia solanacearum</i>	Plant pathogen bacterium	Transmitted through soil, contaminated irrigation water, equipment, or personnel. May be spread by transplanting and propagating infected plants including geraniums	Host include potato, tomato wild solanaceae and geraniums	Severe negative impact to fresh pack, processing and seed industries. Increase in input cost for control of pathogen Bioterrorism Act of 2002 list this species as a select agent with special requirements for US laboratory research and accountability	Not known to occur in Idaho
	Golden nematode <i>Globodera rostochiensis</i>	Plant parasitic nematode	Primarily infested soil contaminating farm equipment	Hosts include potato, tomato and eggplants other wild solanaceae	Severe yield reduction of potatoes if infested fields untreated. Increase input cost for management (soil fumigants). Possible negative environmental impacts of soil fumigation. Possible loss of Idaho seed potato industry	Not known to occur in Idaho
	Onion White Rot <i>Sclerotium cepivorum</i>	Soil-borne fungus	Transmitted through the soil and is a highly persistent organism and can lie dormant in the soil for years	Hosts include the <i>Allium</i> family which includes onions, leeks, garlic, chives, shallots and salad onions	Severely widespread disease that can have destructive effect on onion fields and once established in the soil is extremely difficult to control or eradicate	One to three occurrences tightly quarantined
Urban Landscapes	Citrus Longhorned Beetle <i>Anoplophora chinensis</i>	Terrestrial Insect	Larvae and pupae transported in plant material and wood products, adult insects can fly to uninfected trees	Feeds on more than 40 species of hardwoods and fruit trees	Destructive to forest stands greenbelts, urban landscapes, and orchards	Not known to occur in Idaho
<u>Environment</u>	<u>Invasive Species</u>	<u>Species Category</u>	<u>Pathways and Vectors</u>	<u>Where They Would Appear</u>	<u>Possible Consequences</u>	<u>Occurs in Idaho Now</u>

	Asian Longhorned Beetle (<i>Anoplophora glabripennis</i>)	Terrestrial Insect	Larvae and pupae transported in plant material and wood products, adult insects can fly but have low rate of dispersion	Feeds on a variety of hardwoods including maples, elms, birch, willow, and popular	Northwest has suitable host tree species and climate for potential invasion; could destroy large forest areas and urban landscapes	Not known to occur in Idaho
Forest Ecosystems	Sudden Oak Death (<i>Phytophthora ramorum</i>)	Microorganism	Nursery industry, infected wood particles (i.e., firewood)	Forests and woodlands affecting many tree and shrub species including Douglas fir	Total loss of several species and major disruption of forest ecosystem processes	Not known to occur in Idaho
	White Pine Blister Rust (<i>Cronartium ribicola</i>)	Microorganism	Nursery industry, host tree to uninfected plants	Throughout most of the range of the native pines	Loss of populations of western white pine and other pine species	Found in Idaho
	Balsam Woolly Adelgid (<i>Adelges piceae</i>)	Terrestrial Insect	Nursery industry, eggs and nymphs transported by wind, birds, and mammals	Feeds on conifer species including subalpine fir and grand fir	This species has already become a destructive pest on fir stands	Occurs in the central third of Idaho
	Citrus Longhorned Beetle (<i>Anoplophora chinensis</i>)	Terrestrial Insect	Larvae and pupae transported in plant material and wood products, adult insects can fly to uninfected trees	Feeds on more than 40 species of hardwoods and fruit trees	Destructive to forest stands greenbelts, urban landscapes, and orchards	Not known to occur in Idaho
	Asian Longhorned Beetle (<i>Anoplophora glabripennis</i>)	Terrestrial Insect	Larvae and pupae transported in plant material and wood products, adult insects can fly but have low rate of dispersion	Feeds on a variety of hardwoods including maples, elms, birch, willow, and popular	Northwest has suitable host tree species and climate for potential invasion; could destroy large forest areas and urban landscapes	Not known to occur in Idaho
	Asian Gypsy Moth (<i>Lymantria dispar</i>)	Terrestrial Insect	Larvae in contaminated wood products, insect movement from infested to uninfested areas	Feeds on host range of 500 species of broadleaf and coniferous trees and shrubs	Northwest has suitable host tree species and climate for potential invasion; could destroy large forest areas	Not known to occur in Idaho

<u>Environment</u>	<u>Invasive Species</u>	<u>Species Category</u>	<u>Pathways and Vectors</u>	<u>Where They Would Appear</u>	<u>Possible Consequences</u>	<u>Occurs in Idaho Now</u>
	Nun Moth (<i>Lymantria monacha</i>)	Terrestrial Insect	Resilient eggs can become attached to bark making long distance transport possible, spread by windblown larvae and flying females	Feeds on a variety of host conifer trees	Northwest has suitable host tree species and climate for potential invasion; could destroy large forest areas	Not known to occur in Idaho
Waterways, Lakes and Reservoirs (Aquatics)	South American Waterweed Elodea (<i>Egeria densa</i>)	Aquatic Plant	Aquarium trade	Flowing or still water of lakes, ponds, pools, ditches, and streams	Affect water recreation; displace native aquatic plants; degrade water quality	Not known to occur in Idaho
	Hydrilla (<i>Hydrilla verticillata</i>)	Aquatic Plant	Aquarium trade, nursery industry, boating and fishing activity, waterfowl	Lakes, ponds, rivers, streams, reservoirs, and ditches	Adversely affect aquatic ecosystems; shade-out native plant species and displace wildlife species	Not known to occur in Idaho
	Eurasian Watermilfoil (<i>Myriophyllum spicatum</i>)	Aquatic Plant	Recreational boaters, vessel hulls of boats, sea planes, or any type watercraft	Lakes, ponds, streams, and canals	Affect water recreation and water flow degrading water quality; displace native aquatic plant communities	Found in a few rivers and lakes in Idaho
	Parrotfeather (<i>Myriophyllum aquaticum</i>)	Aquatic Plant	Aquarium trade, transported by water boats, sea planes, or recreational water vehicles	Lakes, ponds, streams, and canals	Adverse effects on aquatic ecosystems that shade out algae and provide mosquito larvae habitat	Found in Idaho
	Zebra Mussel (<i>Dreissena polymorpha</i>)	Aquatic Pest	Ship ballast, boats, and water-based recreational equipment	Can feed and reproduce in many different aquatic habitats	Could have disastrous effects to irrigation systems, hydroelectric power plants and fish ladder structures	Not known to occur in Idaho
	New Zealand Mud Snail (<i>Potamopyrgus antipodarum</i>)	Aquatic Pest	Ship ballast or in the water during shipping of game fish from infested waters	Can feed and reproduce in many different aquatic habitats	Take over river bottom and out compete native species; degrade habitat with high reproductive capacity	Middle portion of Snake River in Idaho
<u>Environment</u>	<u>Invasive Species</u>	<u>Species Category</u>	<u>Pathways and Vectors</u>	<u>Where They Would Appear</u>	<u>Possible Consequences</u>	<u>Occurs in Idaho Now</u>
Riparian Ecosystems	Japanese Knotweed (<i>Polygonum cuspidatum</i>)	Riparian Plant	Escaped ornamental, root fragments spread in fill dirt,	Areas of disturbance such as roadsides, stream banks	Displace native or desirable riparian plant communities;	Found in Idaho

			flowing water, and in discarded lawn cuttings	and vacant lots	reduce forage and cover for livestock and wildlife	
	Purple Loosestrife (<i>Lythrum salicaria</i>)	Riparian Plant	Escaped ornamental, seeds and plant material transported by animals, humans, boats, and vehicles	Freshwater or brackish wetlands and potentially any wet disturbed area	Clog and disrupt irrigation systems; loss of wetland pastures for grazing; may disrupt production of aquatic crops like wild rice	Found in Idaho
	Tamarix or Saltcedar (<i>Tamarix ramosissima</i>)	Riparian Plant	Escaped ornamental, spreads by seeds and root material transported to moist soils	Primarily along stream banks, bottomlands, waterways, and moist rangelands	Can lower water tables causing surface springs to dry up and the reduction of stream flows	Found in southern Idaho
Rangeland Ecosystems	Diffuse Knapweed (<i>Centaurea diffusa</i>)	Terrestrial Plant	Seeds dispersed by wind, grazing animals, contaminated hay and commercial seed, vehicles, and humans	Found in a wide range of habitat types, riparian areas, rangelands, pastures, road rights of way, and waste areas	A very aggressive species that can infest large areas of habitat in a short time; displace native plant communities	Found in Idaho
	Spotted Knapweed (<i>Centaurea maculosa</i>)	Terrestrial Plant	Seeds dispersed by rodents and livestock, hay and commercial seed and vehicles	Found in a wide range of habitat types, rangelands, dry meadows, pastures, road rights of way, and floodplains of rivers and streams	Infest large areas displacing native plant communities; reduce forage for livestock and wildlife; can increase soil erosion	Found in Idaho
	Yellow Starthistle (<i>Centaurea solstitialis</i>)	Terrestrial Plant	Contaminated seed and feed, farm and recreational vehicles, livestock, birds and humans	Found in disturbed areas of pasture or rangeland, along roadsides, field edges, and recreational areas	Invade and dominate a wide variety of habitats; out compete native plants species; reduce recreational value and forage supply for livestock and wildlife	Found in Northern Idaho

<u>Environment</u>	<u>Invasive Species</u>	<u>Species Category</u>	<u>Pathways and Vectors</u>	<u>Where They Would Appear</u>	<u>Possible Consequences</u>	<u>Occurs in Idaho Now</u>
	Leafy Spurge (<i>Euphorbia esula</i>)	Terrestrial Plant	Seeds spread by birds, grazing animals, water and in contaminated hay	Invades and dominates a wide variety of sites from lowlands to steep uplands, valley bottoms to mountains	Invade and displace native vegetation on a wide variety of habitats including highly productive sites; reduce forage value of infested areas	Found throughout Idaho
	Orange Hawkweed (<i>Hieracium aurantiacum</i>)	Terrestrial Plant	Escaped garden ornamental spread through contaminated hay and wind-born seeds	Invades and dominates a wide variety of sites from grasslands, rangelands, meadows, pastures and forest edges	It can invade and dominate a wide variety of habitats by out competing native plants species; reduces value for grazing or hay production	Found in Idaho
	Perennial Pepperweed (<i>Lepidium latifolium</i>)	Terrestrial Plant	Seeds moved along irrigation and riparian pathways, root fragments transported by water or vehicles	Rapidly colonizes riparian habitats, pastures, hay meadows and waste areas	Extremely competitive displacing more desirable species particularly in riparian area; reduce forage value for livestock and wildlife	Found in Idaho
Animal and Human Health	West Nile Virus	Mosquito-borne Virus	Virus found in a bird-mosquito-bird cycle which is passed on to other birds, animals and people	Occurs now in 45 states except for the Northwest U.S.	It can cause death in some human cases and effect horses and the poultry industry along with other wildlife species.	Not known to occur in Idaho at this time

What Level of Commitment is Needed?

Although the threat of invasive species in Idaho is real and growing, this is an issue with which we have experience. In fact, there are categories of invasive species and invasion pathways where we have considerable experience and a record of success. Existing efforts to manage noxious weeds, agricultural pests, and organisms that threaten human and animal health deserve attention as models for species for which management efforts are not yet as sophisticated. This is not to suggest that additional support or improvements for each of these ongoing efforts will not be needed as part of a comprehensive program of invasive species management. Undoubtedly, changes in even successful programs will improve their overall effectiveness.

The dynamics of infestation pose special challenges to natural resources managers. New or expanding infestations can quickly grow beyond feasible control and are often hard to detect in their early stages, particularly for aquatic invaders. Moreover, with dozens of noxious weeds already established in the state, it is exceptionally difficult for local weed control managers to determine which emerging infestations may cause the most damage and therefore should receive priority for treatment. To make matters worse, invasive species do not respect property boundaries; failure to control them in one jurisdiction can affect all neighboring jurisdictions.

These challenges can only be met by establishing a highly effective network of agencies and private interests, to set clear priorities, create a comprehensive detection system and respond quickly and decisively to emerging threats. Idaho has several coordination bodies that include many of the key players in the fight against invasive species – such as the Idaho Weeds Coordinating Committee and the Idaho Weed Control Association. But, these efforts do not yet cover the full range of potential invasive species and should be expanded and augmented. There are elements of each of the following programs in Idaho that provide some idea of what will need to be included in a comprehensive, statewide invasive species program.

Weed Management in Idaho

Idaho's recent history of weed control began with the Idaho Weed Summit, held in 1998. From this gathering of public officials, industry representatives and public and private landowners, there came a clear call to action. As a result, the Idaho State Department of Agriculture was charged with drafting a plan that addressed eight broad issues deemed critical to building a successful statewide program (ISDA, 1999):

- Organization and leadership
- Coordination, cooperation and partnerships
- Awareness and education
- Funding and resources
- Inventory, mapping and monitoring
- Assessments and adaptive planning
- Research and technology
- Compliance and enforcement

In 1999, the Department of Agriculture released the final plan, “Idaho’s Strategic Plan for Managing Noxious Weeds,” the purpose of which was twofold:

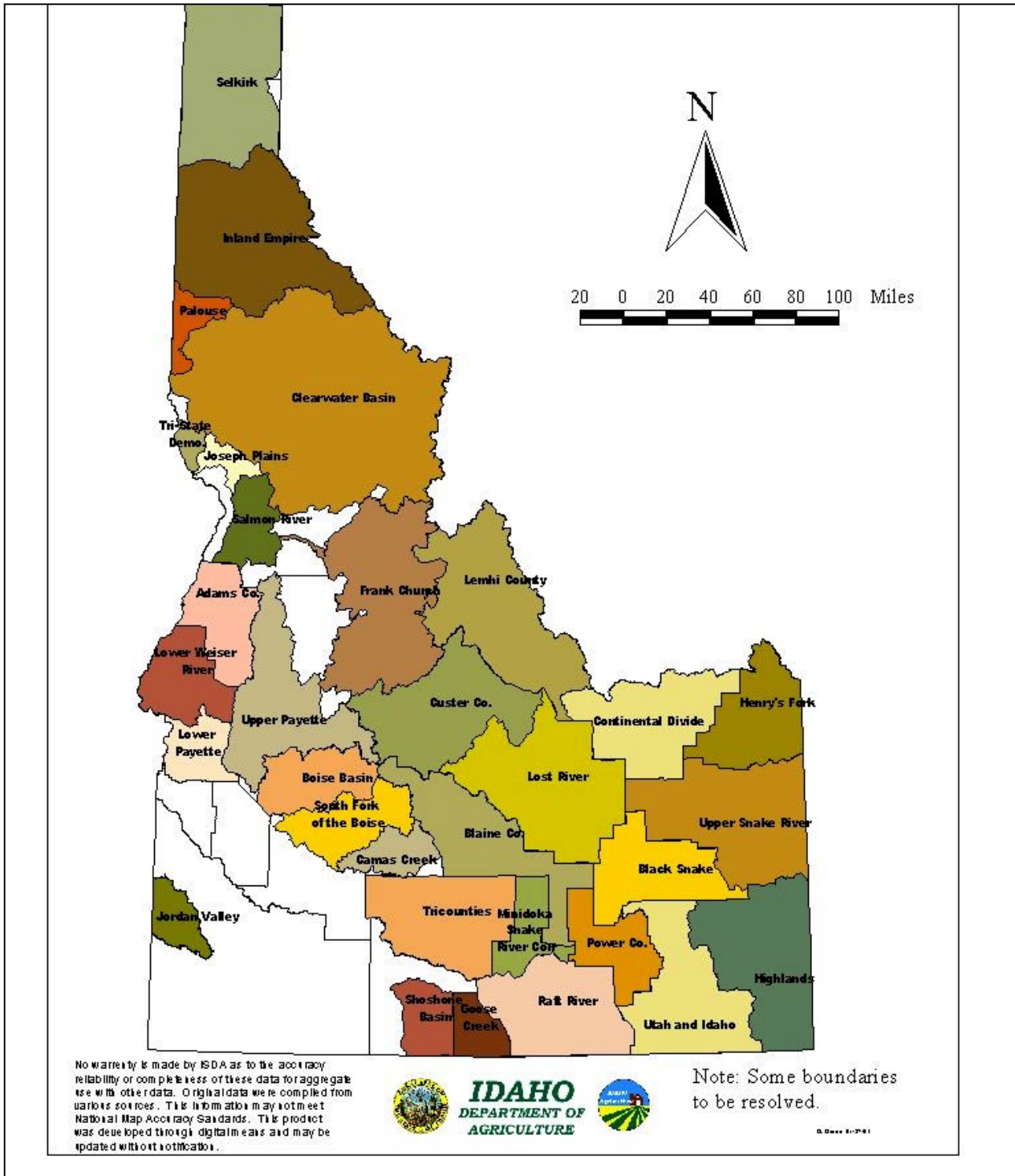
(1) Heighten awareness among all citizens of the degradation brought to Idaho lands and waters by the explosive spread of nonnative weeds, and, (2) bring about greater statewide coordination, cooperation and action that will successfully halt the spread of such weeds and restore infested lands and waters to a healthy and productive condition (ISDA, 1999).

The statutory basis for the measures designed to meet the purposes of this ambitious plan is found in Idaho Noxious Weeds Law (22 Idaho Code, Ch. 24, I.C). Most recently revised in 1993, this law gives the Director of the Idaho State Department of Agriculture, together with the county commissioners, the duty of enforcing the law. In summary, the state duties include these tasks: (1) developing a state list of noxious weeds, (2) employing a statewide weed coordinator, and, (3) identifying “items” (presumably invasion pathways) capable of disseminating noxious weed and designing treatments. Powers given the counties include: (1) establishing and maintaining a coordinated noxious weed control program for each county, (2) employing a county weed superintendent, (3) providing operational and educational funds for the county program, and, (4) enforcing the law on nonfederal lands in the county.

The same law also provides for the establishment of state and county weed advisory committees and authorizes the counties to assess property owners for control of noxious weeds at an amount “...not to exceed six-hundredths percent (.06%) of the market value” (ISDA, 1999). The funds raised by the county tax assessment support the county weed departments and can only be used for noxious weed control purposes. The noxious weed law also clearly outlines landowner and citizen duties. These include four duties: (1) controlling noxious weeds on their property, (2) obligating landowners to pay for the cost of weed control, (3) reimbursing the county for work done on their property if the landowners, fail to adequately control noxious weeds, and, (4) prohibiting the movement of any article infested with noxious weeds.

Cooperative Weed Management Areas (CWMAs) are the centerpiece of on-the-ground efforts to implement Idaho’s plan and Idaho now has 32 successfully functioning CWMAs (Fig. 1). The “CWMA Cookbook” recently published by the Idaho Noxious Weed Coordinating Committee defines CWMAs as “a local organization that integrates all noxious weed management resources across jurisdictional boundaries in order to benefit entire communities” (IWCC, 2003). In a practical sense, this means that landowners, land management agencies, and other partners in a specific watershed or region come together to jointly pursue their weed management objectives.

Figure 1. Cooperative Weed Management Areas in Idaho



Individual CWMA's, often under the leadership of a county weed supervisor, can decide on priorities, seek funds for projects, and coordinate work across a county or watershed without making fine distinctions about land ownership. The result reflects the fact that the spread of weeds recognize no geographical or ownership boundaries. In this case the work of the CWMA "spreads" without regard to who owns the lands in question. Idaho's Noxious Weed Coordinator Brenda Waters notes, "Success of the CWMA's comes from the grass roots involvement and cooperation, public and legislative support, timeliness and effectiveness of teamwork, and energy that is gained by putting a plan into action" (Waters, 2003).

Idaho's Department of Agriculture provides substantial support to each of the CWMA's. In addition to the efforts of the Noxious Weed Coordinator, the Department employs a specialist who can assist with mapping and inventory work. There is also a temporary position offering support for the Noxious Weed-Free Forage and Straw Program, and an interagency shared staff position to help in organizing CWMA's and building stakeholder support. Finally, the Department administers a cost share program that provides funding to the CWMA's. In 2002, CWMA's received \$1,259,885 in grants for 221 individual projects, including education, control, inventory and mapping, prevention and restoration activities (Waters, 2003) (Table 3, page 23).

ISDA Plant Industries' Agricultural Pest Surveys

Survey, detection, and exclusion of invasive plant pests impacting Idaho agriculture are some of the primary program efforts of the Division of Plant Industries (PI) at the Idaho State Department of Agriculture (ISDA). The PI Division undertakes two major types of pest surveys:

- 1) **Detection Surveys.** These surveys are for high priority plant pests, usually not established in the state that could cause major economic harm to the affected crop or industry. Potential impacts include both direct damage to the crop and related management costs, as well as costs related to impairment of interstate or international sales and transport of the affected commodity. Over the last ten years, ISDA PI has conducted detection surveys on 32 pest species including 23 insects/mites, 8 plant pathogens, and 1 complex of plant parasitic nematodes (i.e. golden nematode). On an annual basis the division conducts surveys on 5-7 species (Cooper and Simko, 2003). Fortunately, most of the surveys have been negative, meaning the surveyed species have not been detected. Notable exceptions include the establishment and spread of apple maggot, cereal leaf beetle, and European pine shoot moth through parts of the state. During the early 1990s two significant pest detections occurred in Ada County of Japanese beetle and Mexican bean beetle infestations. In both cases, the early detection by PI surveys resulted in the successful eradication of the insect outbreaks. Without the detection survey program, invasives like the Japanese beetle and the Mexican bean beetle may well have become widely established in Idaho, causing significant economic harm.

- 2) Surveillance Surveys. In addition, the Plant Industries Division conducts ongoing surveillance surveys of several commodities covering a large number of invasive and regulated pest species. The surveys are part of the protocols for field inspection for phytosanitary certification of agricultural producers. In 2002, the division staff inspected 2,538 fields comprising 29 crops and 60,691 acres. In a typical year, inspectors look for 301 pest species, including 269 plant diseases, 18 plant parasitic nematodes, 8 insects and 6 weeds.

As a regulated agricultural pursuit, the Idaho Floral and Nursery industries also undergo regular ISDA inspections and surveys (Appendix A). In 2002, there were 1,805 licensed nurseries and of those, 911 had site visits for compliance with Idaho law and for the presence of plant pests and noxious weeds. Specific checks were made for infestations or infections of invasive pest species, especially targeting important insects and plant pathogens. A total of 4,705 inspections by PI staff augmented the pest surveillance efforts of the department.

ISDA also regulates high risk or important agriculture pests. These pests have the potential to severely impact the production and or commerce of one or more Idaho commodities. These pests may be monitored by one or both types of surveys described above. Currently, ISDA has a total of 34 regulated plant pests which include 18 species of plant pathogens, 3 plant parasitic nematodes, 7 insects and 6 mollusks (snails). Japanese beetle, European corn borer and Karnal bunt are three examples of ISDA regulated invasive species.

Conclusions

There are clearly successful efforts in the state to prevent, detect, control and otherwise manage a variety of invasive species. Each of these efforts includes necessary elements of any comprehensive program for all invasive species. These elements range from the organizational strengths of Idaho's CWMA's to the sophisticated prevention, detection and control measures employed by state and federal agencies in the case of agricultural pests. As Idaho moves toward a comprehensive invasive species program, it should take into account successes such as the early detection and eradication of Japanese beetle and apply the lessons of such efforts to other invasives.

The broader question is whether existing programs are adequate for the increasing threat. If not, what improvements are needed? A successful comprehensive program will require the financial resources, staff talent, organizational strengths, and leadership that characterize successful existing programs, combined with a recognition of the threat and the resolve to meet it.

Efforts to Manage and Control Invasive Species

There are some basic elements that must be a part of any effective program for invasive species. The first element is detection, either of species not here yet but which may enter the state or those here and spreading to new areas. Effective detection can provide for either prevention, wherein the species is detected before it can enter an area and become established, or for an early response to eradicate or contain a species before it can spread. Detection is also a function of educating those whom might encounter new or spreading invasions so that those responsible for treatment can take appropriate steps.

Inevitably, though, some species will arrive and become established, despite the best detection and prevention strategies, or they have already become well-established. In such cases, management of the species is the only option, and the goal must be to minimize the damage. In such situations, education must also play a key role, since those with the species present must understand how best to carry out management actions on their lands. There must also be laws that spell out detection, prevention, control and management responsibilities, as well as establish an organizational structure appropriate for the task. Finally, there must be sufficient funding to hire the staff and cover the costs of the program.

In the face of a clear threat to economic and ecological well-being, both the federal and state governments have responded. The result has been a myriad of programs, task forces, studies, new organizations and partnerships all designed to either identify, prevent, eradicate or manage various harmful species. While some might argue that governmental responses have been insufficient or misdirected, the response is both a beginning and a platform from which future directions can proceed. This section describes the current state and federal efforts directed toward invasive species.

Idaho's Current Invasive Species Authorities

In the broadest sense, invasive species include: pests that threaten various agricultural commodities, forest pests including those that may attack commercially valuable timber species and those that threaten shade trees found mostly in urban settings, diseases that threaten the health of humans or domestic animals and wildlife, exotic animal species, noxious weeds which displace ecologically or economically valuable native species or agricultural crops, and those that threaten the integrity of streams and lakes. There are existing efforts in Idaho directed toward various invasive species that may afflict each of these broad categories. These include: Over the years, Idaho has passed laws and established programs to address these classes of invasive species, including:

- Idaho's Noxious Weed Law administered by the ISDA,
- Fish and Game authorities to govern the importation, release, sale, possession and transportation any species of exotic wildlife, along with similar authorities governing fish species (note: tropical and common (large grey area) aquarium fish are exempted from import rules.

- ISDA authorities that require weed free seeds, straw for revegetation projects and livestock feed,
- ISDA authorities to inspect nursery and horticultural operations and to quarantine areas or articles that may spread pests or disease
- Department of Lands authorities to manage and control forest pests
- ISDA authorities to control specific agricultural pests and to declare “crop management areas” with specific practices mandated to manage certain pests
- The State of Idaho’s ability to take steps on private or state lands to suppress insect outbreaks

In addition, the state is also threatened by aquatic invaders, such as Eurasian watermilfoil and New Zealand mudsnails, that threaten recreation and fisheries values. A subcommittee of the Idaho Invasive Species Council is developing an aquatic nuisance species plan for Idaho. However no state laws specifically address this issue and no state agency currently leads a program to detect and prevent these damaging aquatic invaders.

Aquatic Noxious Weed--Eurasian Watermilfoil



Eurasian watermilfoil is a submersed aquatic perennial plant with finely dissected feather-like leaves native to Europe, Asia and Africa. Introduced into North America in the 1880s, by 1985 it was found in 33 states and three Canadian provinces. It is primarily spread through boating and recreation activities. While it is presently found in only a few rivers and lakes in only five counties in Idaho, many waters in Washington State are experiencing substantial infestations.

Eurasian watermilfoil is a highly adaptable invasive plant that can grow and thrive in a wide variety of conditions ranging from still to flowing water, high water salinity, and water depths up to 35 feet. It can grow in a wide range of water pH and temperatures, even surviving under ice. Watermilfoil is most efficiently spread by movement of plant material to new sites; thus any activity that breaks up plants into pieces can lead to the spread of this species.

Eurasian watermilfoil forms dense canopies that can shade out native plants and displace aquatic wildlife species, increase water temperature and provide habitat for insects such as mosquitoes. Dense mats of watermilfoil inhibit swimming, boating, and other water recreation activities. Eurasian watermilfoil can also interfere with power generation and irrigation systems by clogging intake pipes.

Table 2 summarizes the existing statutory authorities related to invasive species management in Idaho as well as the implementing actions of the agencies charged with administering the law. It should be noted that several other agencies have responsibilities for either assisting in the implementation of existing laws or for generally cooperating with overall efforts. For example, the Department of Environmental Quality does not have specific statutory authority for managing invasive species, but does control infestations of aquatic weeds or animals as part of its responsibilities to maintain water quality within the state.

Table 2. Major State Authorities and Agency Responsibilities

<i>State Agency</i>	<i>Invasive Species Function</i>	<i>Authorities and Guidance</i>	<i>Key Responsibilities</i>
Idaho Dept. of Fish and Game	Prevent importation or transport of animals and fish that might harm native wildlife populations.	Sec. 36-104, I.C., gives the Fish and Game Commission authority to develop rules regulating all wildlife, native and exotic.	Govern the import, transport, release, possession and sale of native and exotic wildlife and fish through permits.
Idaho Dept. of Lands	Manage weed and insect infestations on state endowment lands and restore lands damaged by weeds. Prevent, detect and manage forest pests, on state and private lands.	Sec. 38-600, I.C., provides authority for the detection and management of forest pests. 58-100, I.C., gives the Land Board the authority to manage pests and weeds on endowment lands and reseed areas.	Prevent, detect, eradicate and manage forest insects and diseases, not only on state lands, but also private lands. Much of this is done cooperatively with the Forest Service. Control insects and weeds on endowment lands.
Idaho Dept. of Agriculture	Prevent, detect, respond to and manage: (1) all insects and diseases that threaten agricultural products, (2) all noxious weeds, (3) deleterious or exotic animals that threaten agricultural crops, livestock, wildlife or the environment, (4) threats to nursery stock. The Department also regulates additives to animal feeds, and (5) animal health, Idaho Code Chapter 25.	Sec. 22-2000, I.C., provides authority to regulate plant pests. 22-2400 is the Idaho Noxious Weed Act, while Ch. 4 is the Pure Seed Act, and Ch. 23 is the Nurseries and Florists Act. Section 25-3900 regulates deleterious and exotic animals, and Ch. 27 allows the regulation of adulterants to animal feeds.	Maintain regular surveys of various agricultural pests and diseases that threaten agricultural products or livestock. Implement actions to control or manage harmful species. Cooperate with the Dept. of Fish and Game in detecting and preventing threats to wildlife and the Dept. of Lands in surveys for such forest pests as gypsy moths. Control commercial fish raising facilities and ponds.
University of Idaho and the Cooperative Extension Service	Conduct research on various invasive species and help build public understanding.	Sec. 33-2800, I.C., plus federal statutes that govern land grant institutions and provide broad research and extension authorities.	The College of Agriculture conducts a variety of research and extension programs for agricultural pests, including noxious weeds. The College also helps track noxious weeds and other invasive pests. The College of Natural Resources fulfills a similar role for forest pests and those that effect wildlife or the environment.

Responsibilities for various aspects of invasive species management are divided among several state agencies (Table 2). For example, each landowning agency (Departments of Lands or Fish and Game) must control weeds on their own lands and the Idaho Department of Transportation is responsible for controlling roadside weeds along state highways. New additions to the code that address deleterious exotic animals specifically call for cooperation between the Departments of Agriculture and Fish and Game in implementing sections of affecting wildlife or the environment. In all, there are at least ten separate state laws that authorize or provide guidance regarding agency responsibilities for invasive species management.

In 2002, the Environmental Law Institute published “Halting the Invasion: State Tools for Invasive Species Management,” a comprehensive review of the laws, policies and programs related to invasive species management in each state. Their work considered state efforts to identify, prevent or control invasive species, as well as state level mechanisms to coordinate efforts and enforce existing laws. The summary of ELI’s findings for Idaho is presented in Appendix D. Among their findings for Idaho, ELI noted these possible shortcomings in Idaho’s statutory framework for invasive species management:

- No specific authority to identify future invasive species threats and mitigate for them,
- Limited authority to carry out education programs,
- No requirements for bonds or insurance coverage for introduced species that escape and become problematical,
- No requirements for post-release monitoring of introduced plant or animal species,
- No authorization for emergency powers to address invasive species outbreaks,
- No authorization for restoration of areas degraded by invasive species,
- No specific fund to implement invasives species programs, and,
- Lack of a comprehensive statewide invasive species management plan.

Two points need to be made regarding ELI’s conclusions for Idaho. First, their study was completed prior to the passage of the Plant Protection Act in 2002 and the new law addressing “deleterious animals” passed in 2003. The Idaho Department of Agriculture is currently drafting regulations to implement both new laws and they will undoubtedly close some of the deficiencies that ELI noted. Second, lack of specific authority does not necessarily prevent an agency from undertaking a needed action. For example, even though there is no specific legislative mandate to carry out educational programs to assist in prevention or control of invasive species, such agencies as Fish and Game or Parks and Recreation are certainly not prohibited from undertaking such activities. While there may be a lack of funds or direction to do so, there may not be a legislative barrier.

Idaho has a wide range of statutory authorities to manage the variety of plant, animal and microbial organisms that become invasive. In the “Recommendations” section, there are some suggestions for changes in the law to correct any remaining deficiencies. Perhaps the most glaring gap that ELI noted is any statewide central authority for invasive species management. Rather, the authority is split among several agencies, each of which maintains a separate budget and staff appropriate to their responsibility. This poses two immediate challenges. First is the operational difficulty of coordinating efforts among agencies. Second is the near impossibility of identifying the total costs of invasive species management to state government. There may also be confusion on the part of legislators or the public regarding just what agency responsibilities are and the effectiveness of various programs.

Idaho has attempted to address these issues through the statewide “Idaho Invasive Species Council” created by Executive Order No. 2001-11, signed by Governor Kempthorne on

September 26, 2001. This council includes representatives of state, local, federal and tribal governments as well as private entities that “provide policy level direction and planning for combating harmful invasive species infestations throughout the state and for preventing the introduction of others that may be potentially harmful.” The overall goals of the Council include using the existing authorities to minimize the effects of harmful nonnative species; serve as a non-partisan forum to build understanding of invasive species; encourage control and prevention; organize and streamline the process for identifying and controlling invasive species; and finding possible ways to bring current problems under control.

While the intent of the Council clearly is coordination among the various public agencies and tribes toward achieving the goals outlined above, active participation in the Council is largely voluntary. It operates without a staff or budget, and leadership must come from the staffs of the organizations that form it. Thus, while the Council may serve as an effective discussion forum, one must question whether the ability for follow-up actions between meetings is hampered by the lack of a staff responsible for assuring that the goals of the Council are being met.

The Budget for Invasive Species Management in Idaho

The lack of a single legislative authority for invasive species management in Idaho coupled with the complexity of accounts and funding sources for this work makes it virtually impossible to determine how much is spent on these efforts. Species management—noxious weed control and the work associated with surveys, detection and control of plant pests—as a way to illustrate both the magnitude of the expenditures and the sources of funds for both.

Funds for Weed Control

The intricacies of the federal and state budgeting processes plus a lack of data regarding how much individual private landowners pay for weed control make a single dollar figure for weed control in Idaho rather elusive. However, just including the known expenditures establishes a minimum weed management cost in Idaho of approximately \$7 - \$10 million annually. This amount includes (based on FY 2002 estimates):

- Funds appropriated by the Idaho Legislature to the Department of Agriculture, most of which is given in cost-share grants to individual CWMAAs (\$336,000)
- Federal grants from the BLM and Forest Service which are added to the ISDA weed cost -share fund (\$1,340,000)
- Property tax assessments levied by individual counties to support their own weed departments (\$3,594,000)
- Direct payments for weed control work by the Forest Service, BLM, and such state agencies as the Idaho Department of Lands, Idaho Department of Parks and Recreation and the Idaho Department of Fish and Game (approximately \$4,400,000)

These are estimates. The difficulty in identifying more specific numbers is largely a function of how agencies account for weed expenditures in their own budgets. Few identify “weed management” as a specific line item, and such expenditures are more likely added into such general budget categories as “land management” that can include the costs of any number of projects clearly not related to weed or other invasive species management. The resulting inability to account for actual expenditure or to relate budgets to needs and accomplishments is addressed in the “Recommendations” section.

As shown in Table 3, cost-share grants include much more than control measures. While nearly half of the ISDA funds granted to the CWMA's went toward on-the-ground control efforts, a significant amount went to education, mapping and inventory, prevention and restoration. In terms of acres, the ISDA estimates that in 2002 cost-share grants resulted in 154,287 acres treated, 675,628 acres mapped and 26,986 restored acres, for a total of 856,901.

The state emphasis on weed treatment contrasts sharply with federal level invasives funding, where the lion's share of funding goes to prevention. Although, federal agencies do their best to protect international borders from unwanted invasions, it is up to states to provide a second line of defense. Although prevention is widely considered to be the least cost strategy to manage invasive species, current spending on prevention measures in Idaho is low relative to overall expenditures and to the need.

Table 3. FY 2002 Noxious Weed Grants thru ISDA

<i>Region</i>	<i>Educ</i>	<i>Erad/Man</i>	<i>Invent/Map</i>	<i>Prevent</i>	<i>Restore</i>	<i>Other</i>	<i>Total</i>
N (1)	\$9,776	\$99,302	\$21,239	\$742	\$618	\$5,126	\$136,803
N.Cent (2)	8,550	39,472	38,532	2,000	0	7,812	96,366
SW (3)	9,612	86,711	0	14,490	50,180	14,411	175,404
S.Cent (4)	6,200	112,701	0	1,260	56,830	2,051	179,042
SE (5)	19,500	125,110	29,920	1,450	4,335	3,008	183,323
NE (6)	21,964	144,135	47,408	210	16,825	11,700	242,242
Ed. Grp	18,000	0	0	0	0	0	18,000
Res. Grp	0	0	34,593	0	29,044	84,000	147,637
Task Forces	12,600	0	30,000	17,828	0	20,640	81,068
Totals	\$106,202	\$607,431	\$201,692	\$37,980	\$157,832	\$148,748	\$1,259,885
% of Tot	8	48	16	3	13	12	100

Source: Idaho State Department of Agriculture

Possibly the largest amount of money available to the CWMA's through the participation of the county weed departments is the property tax assessments authorized in the Noxious Weed law (Table 4). According to the Idaho Tax Commission, all counties made weed control assessments that ranged from less than \$0.05 per private acre to over \$1.00, with an average of \$0.21 per acre. In total, county weed assessments provide the counties with \$3.5 million to pay for the county weed superintendent and for control efforts. Coupled with the grants from the ISDA, there is the implication that the individual CWMA's have approximately \$5 million or about \$156,000 each year. However, there is a great range in the funds available to the individual CWMA's. Those with an urban tax base and a large acreage of private land generally enjoy more funds than those counties with a lot of federal lands. At the low end, some CWMA's have as little as \$18,000 per year to conduct their activities.

Table 4. County Weed Assessments, 2002

<i>Counties</i>	<i>Total Acres</i>	<i>Private Acres</i>	<i>Federal Acres</i>	<i>State Acres</i>	<i>Total Public Acres</i>	<i>County Weed Assessment</i>	<i>Assessment per Private Acre</i>
Ada	675,200	423,537	196,633	47,267	243,900	\$488,648	\$1.15
Adams	873,408	268,573	565,066	37,529	602,595	\$7,500	\$0.03
Bannock	712,448	431,560	221,402	47,586	268,988	\$248,085	\$0.57
Bear Lake	621,696	314,515	287,994	19,064	307,058	\$101,433	\$0.32
Benewah	496,640	385,250	48,887	60,614	109,501	\$12,000	\$0.03
Bingham	1,340,672	786,156	392,484	156,198	548,682	\$148,943	\$0.19
Blaine	1,692,736	312,501	1,314,806	60,429	1,375,235	\$111,652	\$0.36
Boise	1,217,600	227,322	900,540	88,771	989,311	\$21,277	\$0.09
Bonner	1,112,064	440,780	492,593	170,053	662,646	\$107,233	\$0.24
Bonneville	1,195,904	513,118	623,145	53,694	676,839	\$264,984	\$0.52
Boundary	812,032	208,056	495,219	107,267	602,486	\$64,503	\$0.31
Butte	1,429,056	183,511	1,229,906	13,252	1,243,158	\$8,005	\$0.04
Camas	688,000	214,981	445,876	24,816	470,692	\$30,357	\$0.14
Canyon	377,472	353,236	20,486	2,900	23,386	\$232,743	\$0.66
Caribou	1,130,304	567,127	447,779	112,578	560,357	\$142,711	\$0.25
Cassia	1,642,624	663,408	925,150	51,670	976,820	\$82,000	\$0.12
Clark	1,129,408	300,813	747,690	79,301	826,991	\$57,869	\$0.19
Clearwater	1,575,424	496,662	841,755	234,768	1,076,523	\$59,189	\$0.12
Custer	3,152,384	158,503	2,937,675	53,901	2,991,576	\$38,000	\$0.24
Elmore	1,969,792	522,354	1,327,041	120,355	1,447,396	\$23,887	\$0.05
Franklin	425,920	273,366	139,255	13,259	152,514	\$71,216	\$0.26
Fremont	1,194,752	370,316	708,023	115,287	823,310	\$93,773	\$0.25
Gem	360,064	202,825	135,009	20,325	155,334	\$121,097	\$0.60
Gooding	467,712	209,238	237,503	20,124	257,627	\$10,750	\$0.05
Idaho	5,430,528	826,261	4,523,385	75,648	4,599,033	\$50,000	\$0.06
Jefferson	700,865	343,168	328,226	29,029	357,255	\$55,067	\$0.16
Jerome	383,936	276,955	96,510	7,951	104,461	\$20,372	\$0.07
Kootenai	796,928	494,957	254,276	43,768	298,044	\$199,738	\$0.40
Latah	689,088	532,695	112,791	39,883	152,674	\$39,070	\$0.07
Lemhi	2,921,152	233,189	2,648,258	37,829	2,686,087	\$27,944	\$0.12
Lewis	306,624	291,922	8,104	6,588	14,692	\$20,063	\$0.07
Lincoln	771,584	164,100	584,486	22,851	607,337	\$26,606	\$0.16
Madison	301,824	214,093	63,519	22,240	85,759	\$34,460	\$0.16
Minidoka	486,208	300,441	174,649	7,720	182,369	\$16,000	\$0.05
Nez Perce	543,424	420,752	33,771	84,065	117,836	\$49,137	\$0.12
Oneida	768,256	345,903	409,305	13,007	422,312	\$37,503	\$0.11
Owyhee	4,914,176	857,838	3,727,155	327,472	4,054,627	\$9,290	\$0.01
Payette	260,800	183,860	66,136	8,624	74,760	\$135,486	\$0.74
Power	899,648	569,484	300,239	26,690	326,929	\$90,477	\$0.16
Shoshone	1,685,760	370,066	1,255,653	56,886	1,312,539	\$16,500	\$0.04
Teton	288,256	191,275	95,131	1,644	96,775	\$29,650	\$0.16
Twin Falls	1,232,064	558,124	640,399	30,309	670,708	\$73,636	\$0.13
Valley	2,354,048	221,151	2,063,164	67,545	2,130,709	\$64,000	\$0.29
Washington	932,096	511,815	345,204	71,962	417,166	\$51,727	\$0.10
Total	52,960,577	16,735,757	33,412,278	2,692,719	36,104,997	\$3,594,581	\$0.21

Source: Department of Commerce and Idaho State Tax Commission, 2003

Funds for Agricultural Pest Management

As might be expected, the Idaho Department of Agriculture's Plant Industries Division's work to survey for and manage a variety of plant pests has an organization and budget that is less complex and smaller than the noxious weed program. This is understandable for a number of reasons. Primarily, there is no parallel organization at the county level for detection and control. Within the Plant Industries Division, there are currently 3.2 full-time equivalents in staff time allocated to the invasive pest survey and detection programs which includes both full-time staff and part-time allocations from the division's eight agricultural "inspectors." In addition, one to two seasonal employees are hired for the four to five month trapping and survey season. Their budget includes funds from three sources (Cooper and Simko, 2003):

- 1) Inspection Fees for Phytosanitary Certification and Nursery Surveillance – These funds help pay for surveillance surveys for the phytosanitary certification and the nursery inspection programs. In 2002, these fees brought in \$384,435. Seed companies, processors, growers and nursery operators pay these fees to support the regulatory activities of ISDA. The phytosanitary certificates are commonly required for interstate and international shipment of many agricultural products, especially seeds. Nursery inspections are mandated by the Idaho Nurseries and Florists Act and also facilitate pest control and interstate commerce.
- 2) USDA Cooperative Agreements and Grants – These are fixed term grants primarily from the USDA Animal Health Inspection Service (APHIS) through the Cooperative Agricultural Pest Survey Program (CAPS). The USDA grants primarily cover activities associated with the detection surveys of invasive species. In 2003, the Plant Industry Division garnered \$345,000 in grants to help fund its annual program of survey, detection, and education for 5-7 key invasive pest species.
- 3) Idaho State General Funds – The State has provided some general funding to the Plant Industry invasive pest survey program. For each of the last three fiscal years, the division has received a deficiency warrant authorization from the Board of Examiners totaling \$70,000.

Tracking New Weed Invaders in Idaho—A Model for other Species?

The need for vigilance is a constant challenge. Glen Secrist, now with the BLM but certainly a guiding force in creating Idaho's weed management programs for the ISDA, noted that he believed that not enough effort was being given to "Checking the back forty"—a reference to rangelands, forests, and wildlands that are not actively farmed and not close to heavily populated areas. In Idaho, there are a lot of "back forties" to check. Laws themselves have no value in managing invasive species without an effective way to identify those species which are new to the state or which are here already and threaten to spread to new areas. While properly structured and enforced laws or control programs are vital to effective invasive species management, the first priority of these efforts must be given to finding and identifying new or spreading invasive species. The greatest challenge facing Idaho is to make

a difference on the ground. This will require much greater attention to Idaho's ability to prevent new invasions and slow the spread of existing infestations.

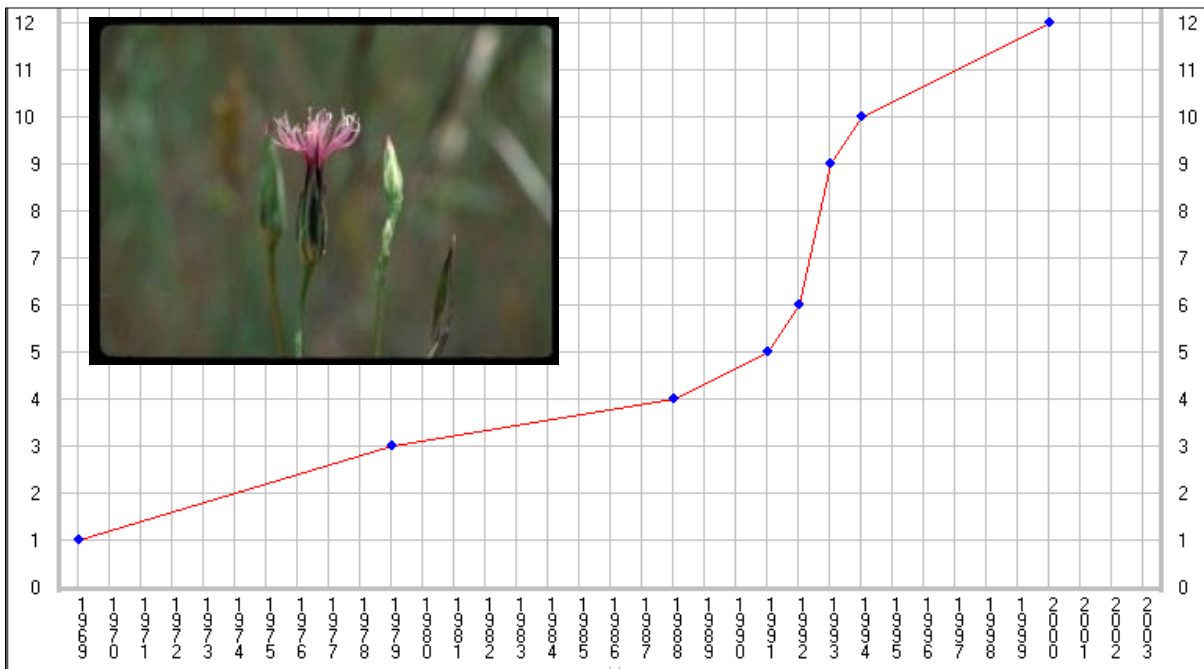
According to the University of Idaho's Extension Weed Specialist Dr. Tim Prather, Cooperative Weed Management Areas (CWMAs) are the primary way to identify new or spreading species of weeds. He notes that "most invasions fail" simply because many are along roads since vehicles represent the manner through which most weeds spread. These incipient invasions of a single plant or two typically are eradicated through the county or state's roadside spraying. But, often enough, weeds do escape roadside or other entry points and establish themselves where detection and control may be more difficult. Still, Dr. Prather believes that even most of these instances are relatively quickly detected and controlled, largely through the vigilance of the CWMAs and their cooperators (Prather, 2002).

This of course doesn't mean that all weeds are either identified or controlled as they enter new areas. For example, in 2002 Dr. Prather's crew mapped the extent of what appears to be the southernmost spread of yellow starthistle near Cambridge, even though the species has been in the state for a number of years. There is also the ever present—and perhaps more frightening possibility—of a new species showing up that the CWMA cooperators or others do not recognize. For that reason, Dr. Prather's responsibilities include maintaining a sophisticated lab to identify and catalog species and developing educational materials to help increase our ability to identify invasive species.

Rush skeletonweed is another example of a species detected and not treated. Native to Eurasia, Rush skeletonweed was first identified near Spokane, Washington in 1938. An infestation of approximately 5 acres in size was first detected in Idaho in 1960 near Banks; it had grown to 60 acres by 1962 and to 100 acres by 1965. By 1982, the infested area was estimated at 35,000 acres, having increased at an approximate rate of 80% per year. Why was nothing done to prevent the spread from its early detection in 1960? There is a simple answer; it was not a "priority." History records tell us that Canada thistle, already a widely established invasive plant in 1960, received top priority over Rush skeletonweed. As a result, this highly invasive and noxious weed has now spread across 100,000 acres of Idaho lands.

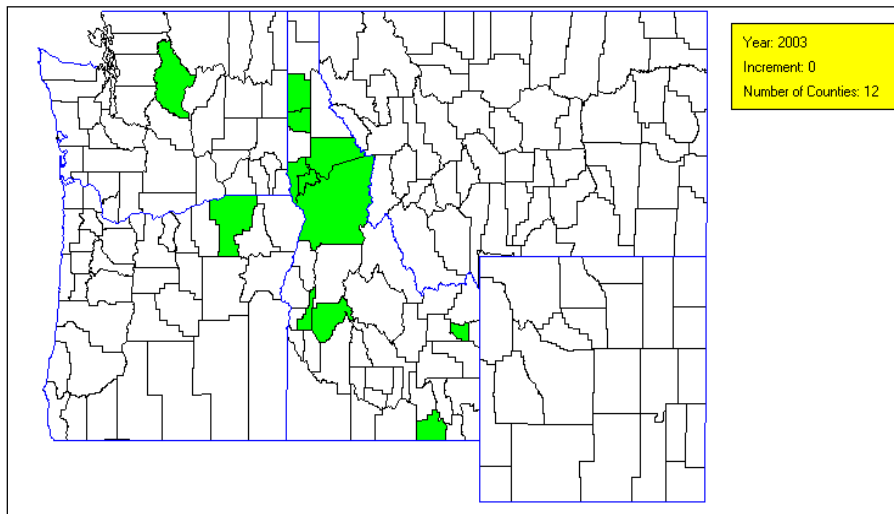
At a regional level (Montana, Idaho, NW Wyoming), the University of Montana's "Invader's Database" plays a key role in tracking and predicting weed invasions, as well as determining which "new" species might exhibit invasive behavior. New sightings as reported by field personnel are ultimately reported to the "Invaders Database," maintained by the University of Montana. There, researchers have examined the traits and bio-geographic factors associated with the 554 exotic plant species believed to now be outside the bounds of artificially maintained settings in Idaho and Montana (Rice, 2003) (see www.invader.dbs.umt.edu). Of this number, 29 of the 120 plants arriving after 1950 were determined to have invasive characteristics by the researchers (various states have classed 89 of these 554 species as "noxious") (Rice, 2003). The "Invaders Database" has tracked the cumulative rate of spread for these plants and the counties in which they are now found (Figures 2 and 3). One example of this work is common crupina (*cuprina vulgaris*), first sighted in North America in Idaho in 1969. In the 1980s this plant was placed on the federal noxious weed list and listed in most western states.

Figure 2. The Spread of Common Crupina by Number of Counties, 1969-2003



Source: Invaders Database

Figure 3. Counties with Occurrences of Common Crupina



Source: Invaders Database

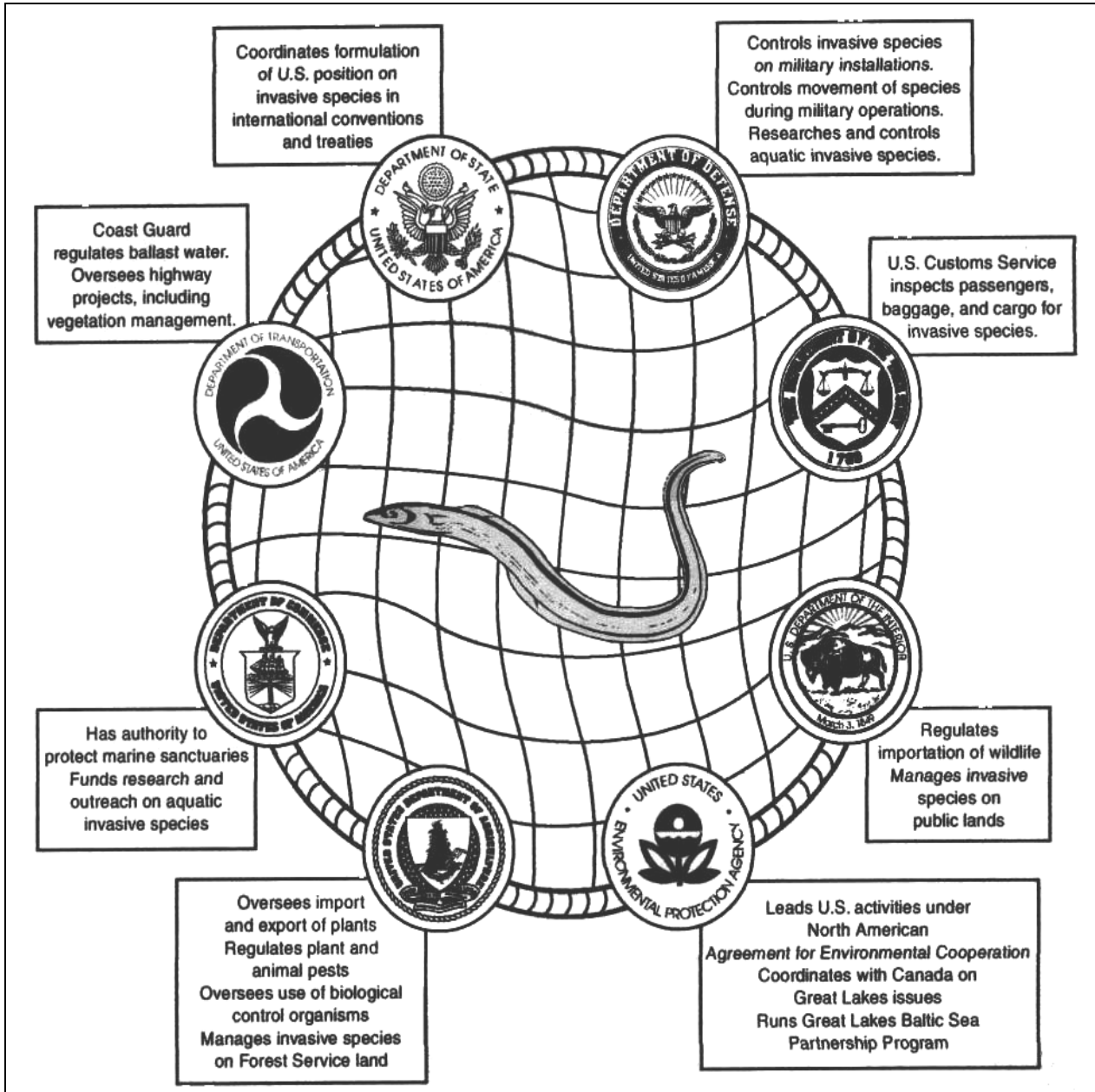
Work such as this has a number of practical applications for managers. First, it serves as an “alert list” of species spreading, along with some idea of the rate of spread. This means that field personnel can be trained to recognize the new invaders before they can become established over broad areas. Second, by plotting distribution patterns it may be possible to isolate the pathway through which the species is either spreading or has spread. For example, if the counties where a species is found border the Columbia River, one might conclude that commercial waterways are an important pathway. Third, distribution maps and likely areas of future infestation can illustrate which landowners or agencies need to anticipate cooperative management efforts. Finally, the straightforward approach to describing the species, where it is located and its rate of spread makes it easy to communicate the need for control efforts to non-technical audiences, including those who set budgets and policies.

Technology such as that employed by the “Invaders Database” are only as good as the reported sightings of new or spreading weeds. Here, Dr. Prather’s efforts are key for Idaho. Assisted by Sandra Robins, who directs the work of the Erickson Weed Diagnostic Laboratory, Dr. Prather’s team receives and documents reports of weed outbreaks, identifies new weed species, and tracks in the field the spread of selected species. These data ultimately become part of the Invaders Database. In 2002, 26 counties submitted 319 plants for identification in the lab. One species, false spiraea (*Sorbaria sorbifolia*), was found to be new in the Pacific Northwest, while willow bellflower (*Campanula persicifolia*) was identified for the first time in Idaho. The University of Idaho is working on a website and protocols for digital submissions of plant photographs as a way to make weed identification quicker and easier.

The Role and Effort of the Federal Government

The response of the federal government toward the increasing threat of invasive species reflects the broad nature of the issue. More than 20 federal agencies in 10 cabinet level departments have responsibility for some aspect of invasive species management (GAO, 2002). These range from the management of weeds on millions of acres of national forests or BLM lands to the inspection of baggage by the U.S. Customs Service to inclusion of appropriate invasive species provisions in the international treaties negotiated by the State Department (Fig. 4).

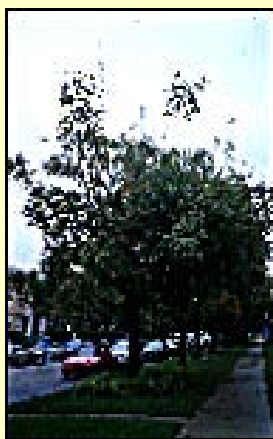
Figure 4. The Roles of Federal Agencies in Invasive Species Management



Source: (GAO, 2002)

Not only is the federal mission for management of invasive species varied, it is also growing, in terms of budgetary resources. The GAO reports that in FY 1999, the agencies referenced in Fig. 5 spent \$513.9 million in their collective invasive species efforts. The next year, FY 2000, this investment grew to \$631.5 million and by FY 2001 expenditures totaled \$1.05 billion (GAO, 2002) (GAO, 2000). During this period, the U.S. Department of Agriculture averaged 90 percent of these expenditures. Most of the USDA funds were focused on individual agriculture pests and such forest pests as gypsy moths and Asian long-horned beetles.

Urban Pest—Asian Longhorned Beetle

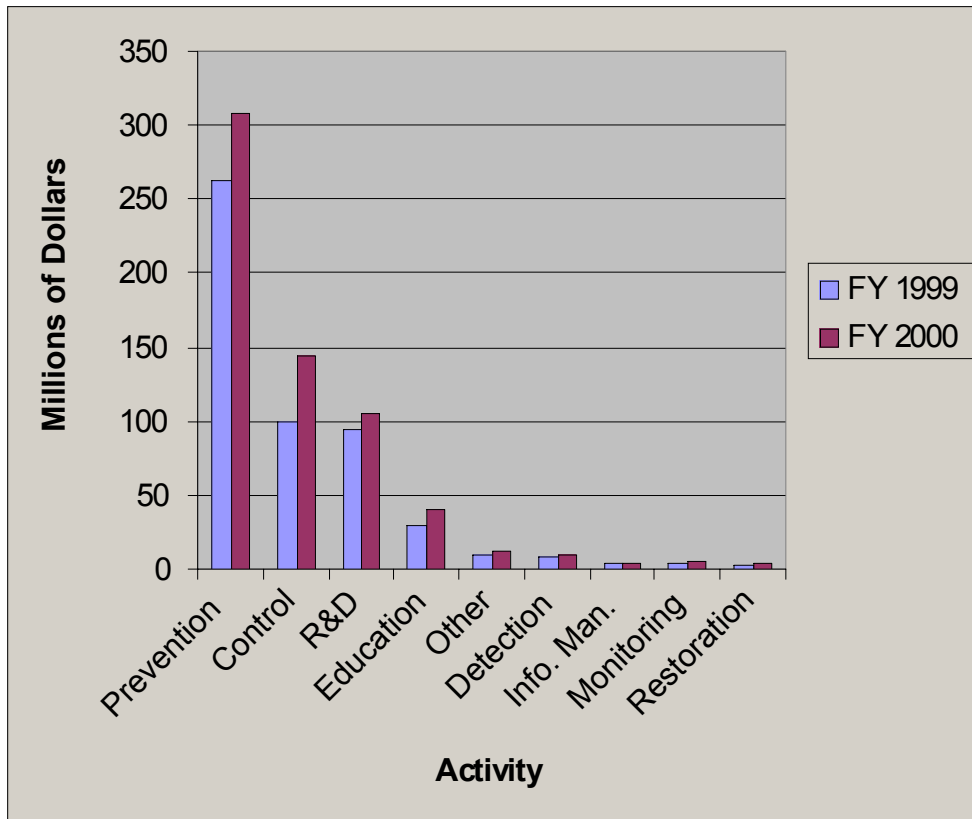


A serious pest in China is making its way into the United States through shipments of wood products, in solid wood packing material like pallets and through popular “bonsai” nursery stock. The Asian longhorned beetle attacks many popular shade tree species, including maples, birches, elms, horsechestnut, poplars and willows—all of which are common in Idaho’s cities and towns. Repeated attacks will ultimately kill the trees. Adult beetles do not usually stray far from the trees in which they emerged, but may travel short distances to reach a new host to feed and reproduce. Beetle larvae

tunnel beneath the bark, disrupting the flow of water and nutrients within the tree.

Despite strict quarantines and inspections by Animal and Plant Health Inspection Service and the Forest Service, the beetle has been intercepted at ports and found in warehouses throughout the United States, including those in our neighboring state of Washington. Early detection and rapid treatment are crucial to successfully eradicating the beetle (USFS and APHIS, 2002). Unfortunately, once the beetles are discovered, the only effective control is to cut all surrounding trees down, and chip or burn them. In this manner, the shade trees of entire city blocks and neighborhoods are lost. The before and after pictures above (courtesy of the USDA) illustrates a city block in a mid-western town where Asian longhorned beetles were found.

The GAO also reported how invasive species funds were collectively spent. The prevention roles of the USDA’s Animal, Plant Health Inspection Service—arguably the front line of defense for all invasive species with its inspection and quarantine authorities—along with other agencies’ efforts to prevent the entry or spread of invasives claimed the largest share of the dollars spent, approximately 55 percent of the two years examined. Direct control of undesirable species represented the second largest category of expenditures.

Figure 5. Federal Expenditures for Invasive Species Activities, FY 1999, 2000

Source: GAO, 2000

Two events indicate that it may be appropriate to make a distinction between invasive species funding for the years shown in the previous graph and what has transpired since. The first is the February 1999 order by President Bill Clinton that sought to coordinate the disparate federal efforts on invasives species by creating the “Invasive Species Council.” The second is the near doubling of federal funds, which rose from \$631.5 million to just over \$1 billion from FY 2000 to FY 2001. Both illustrate the growing federal concern over the issue.

Despite the diversity of federal programs addressing invasive species, Congress has never adopted a comprehensive response to the full range of biological invaders. The result is a patchwork quilt of federal programs addressing specific problems and issues – such as ballast water and international trade. These scattered authorities do not leave the federal government in a strong position to lead invasive species efforts at the regional and state level. State and local governments have a broader reach, deeper ties with the public and wider responsibilities for natural resources management. They are in the best position to develop coordinated systems for controlling invasive species within their borders.

The Invasive Species Council and National Plan

There is no single law that provides coordination among federal agencies for the management of nonnative, invasive species. While this is a concern that is growing commensurately with the introduction and spread of more invasive species, it is not a new problem. In 1993, Congress's Office of Technology Assessment (OTA) found:

The current Federal framework is a largely uncoordinated patchwork of law, regulations, policies and programs. Some focus on narrowly drawn problems. Many others peripherally address [nonindigenous species]. In general, present Federal efforts only partially match the problems at hand” (CRS, 1999).

It is to be noted also that the passage of the “Homeland Security Act” and the realignment of various agencies under it will have some implications for invasive species management not yet fully understood. For example, various functions of the Animal Plant Health and Inspection Service could move from the Department of Agriculture to the Department of Homeland Security. Table 5 summarizes all the current federal roles in addressing invasive species.

Despite the myriad of authorities and federal programs focused on various aspects of invasive species management, there were those who clearly felt these actions to be too little or too disjointed. In 1997, 500 scientists and resource managers wrote the Vice President to request action on the issue, stating, “*We are losing the war against invasive exotic species, and their economic impacts are soaring. We simply cannot follow this unacceptable degradation of the Nation’s public and agricultural lands to continue*” (NISC, 2001). This led to probably the most definitive action yet by the federal government to better coordinate invasive species efforts, President Clinton’s Executive Order 13112 on Invasive Species, signed February 8, 1999 and published 64 Federal Register 6183. Through this order, the President:

- Prohibited any action by federal agencies likely to cause or promote the introduction or spread of invasive species
- Created the “Invasive Species Council” consisting of the secretaries of ten cabinet departments or agencies and co-chaired by the Secretaries of Interior and Agriculture, who would appoint and Executive Director and provide staff
- Established an advisory committee to guide the actions of the Invasive Species Council and which would represent stakeholders and existing organizations
- Called for the development of a national “invasive species management plan” to “recommend performance-oriented goals and objectives and specific measures of success for Federal agency efforts concerning invasive species” (E.O. 13112).

Table 5. Summary of Federal Roles in Invasive Species Management

<i>Invasive Species Function</i>	<i>Authorities and Guidance</i>	<i>Agencies</i>	<i>Key Responsibilities</i>
Prevention	Plant Protection Act; Animal quarantine laws; Lacey Act; Federal Seed Act; Non-indigenous Aquatic Nuisance Prevention and Control Act	USDA, particularly APHIS; U.S. Fish and Wildlife Service; NOAA, EPA, Depts. of Defense, State and Transportation (for aquatic noxious weeds)	Prohibit or restrict imports or movements of plant pests, including noxious weeds; Control interstate movement of invasive animals and those with communicable diseases; Control weed infested seeds; Regulate the movement of injurious animals; Prevent and control noxious aquatic weeds
Early Detection and Rapid Response	Plant Protection Act; Animal quarantine laws; NEPA	Only USDA has the emergency authority to deal with incipient invasions	Seize, hold, quarantine and treat prohibited species imported into the U.S. or transported between states
Control, Management and Restoration	Such organic acts as NFMA, FLPMA and those that guide the management of lands or waters under various agency jurisdiction; the Non-indigenous Aquatic Nuisance Prevention and Control Act; Clean Water Act; FIFRA; NEPA; Plant Protection Act; Emergency Watershed Program	Forest Service, Dept. of Interior, NOAA, Defense, EPA, BOR, CoE, NRCS; No single agency has overall responsibility	Control and manage invasive species and restore affected areas on federal lands and waters
Research and Monitoring	Cooperative Agriculture Pest Survey; various organic acts	USDA, NOAA, Dept. of Interior; EPA	Develop databases on various invasives, research invasive species and pathogens of concern to forests, ag lands, rangelands and wetlands. Research risks associated with invasive species
Information Management	International Plant Protection Convention; NAFTA; Convention on International Trade in Endangered Species of Wild Fauna and Flora; Convention on Biological Diversity; N. American Agreement for Environmental Cooperation	USDA, Office of the U.S. Trade Representative, World Trade Organization, Depts. of Interior, Transportation, State, and International Maritime Organization, EPA, U.S. AID	Develop strategies for international control of invasive species and share information; Capacity building in other countries; treaty and trade negotiations; ballast water management
Public Outreach and Partnership Efforts	Various organic acts	USDA, Dept. of Interior, Dept. of Commerce	Dissemination of public information; Cooperate with state, local and tribal governments
Interagency Efforts	Various organic acts Executive Order 13112	Aquatic Nuisance Species Task Force, Federal Interagency Committee on the Management of Noxious and Exotic Weeds, Committee on Environment and Natural Resources of the National Science and Technology Council National Invasive Species Council	Problem specific cooperative efforts and the coordination of control and research efforts

The National Invasive Species Plan was finalized in January of 2001. As presented, the plan outlines 57 specific actions the Council considers priorities for adequately addressing invasive species issues. It is difficult to characterize the individual actions in the plan. Many simply call for the Council to assume leadership and encourage other agencies to “do more” of what they probably are already doing. Others, such as the creation of tax credits for private landowners who engage in invasive species management, constitute new tools in the invasive species arsenal. Some significant or illustrative action items in the national plan, together with their “due dates” are:

- Prepare an analysis of barriers to coordinated and joint actions among federal agencies, including legal and policy barriers (January 2002)
- APHIS and FWS will dedicate additional human and financial resources to strengthen inspections at ports of entry (as resources permit)
- Develop a fair, feasible and risk-based comprehensive screening system for evaluating first-time, intentionally introduced nonnative species (December 2003)
- Implement a process for identifying high priority invasive species likely to be introduced unintentionally (January 2002)
- Implement a system for evaluating invasive species pathways and issue a report identifying, describing in reasonable detail, and ranking the most significant pathways (January 2003)
- The Departments of Agriculture, Interior, and Commerce and the EPA will institute systematic monitoring surveys of locations where introductions of invasive species are most likely to occur (January 2003)
- USGS and USDA will develop a more “user-friendly” means to identify and report invasive species and provide information about species to federal, state and local authorities (January 2004)
- Develop a program for coordinated rapid response to incipient invasions of both natural and agricultural areas and pursue increases in funds to support this program (July 2003)
- Propose draft legislation to authorize matching federal funds for state programs to manage invasive species, including a provision to assist in the development of state management plans. This legislation may also include tax incentives or other provisions to encourage landowner participation (January 2002)

This sample of action items in the plan indicates its ambitious nature. In truth, these actions may reflect a plan that is too far-reaching to be effectively implemented. In late 2002, the General Accounting Office reviewed progress toward implementing the plan. Their study was based largely upon a survey of all 32 members of the Invasive Species Advisory Committee, which 68 percent completed. Two findings of the GAO were critical of the national plan and its implementation to date. First, GAO investigators lacked a clear long-term outcome and quantifiable measures of performance. One advisory committee member noted, “A fundamentally misguided approach”, without

measures of success, such as reductions in the rates of species introduction and the spread of an invasive species.

GAOs second conclusion was that the pace of implementation was lamentably slow. This conclusion was shared by a number of respondents to the GAO survey, wherein 18 of 21 who responded to that question judged the Council's progress to be "inadequate" or "very inadequate." One noted that the only clear accomplishment to date was the creation of the Council's website. With no performance measures by which to gauge progress, GAO relied upon the completion of the individual action items by the date they were due as an indicator of the Council's performance. As of September 2002, less than 20 percent of the planned actions were completed on time, although work had begun on others. The report also noted that the Council had started work on 60 percent of the other planned actions, including some with a due date beyond September of 2002.

Congress's Actions on Invasive Species

Congress has, over the years, debated various efforts designed to establish a more comprehensive approach to invasive species management and has passed a number of measures designed to do so. These have included the "Plant Protection Act" which consolidated and modernized all the major statutes related to plant protection and quarantine, including the existing Federal Noxious Weed Act. More recently, Congress has considered legislation to provide more stable funding for state and federal invasive species. As of June 2003, there were 34 bills pending in Congress related to invasive species management (www.thomas.gov).

Three legislative measures would significantly increase invasive species control efforts by both federal agencies and individual states. They are:

- The National Invasive Species Council Act (H.R. 266, S. 536)
- The National Aquatic Invasive Species Act (H.R. 1080, S. 525)
- The Noxious Weed Control Act of 2003 (S. 144, now referred to the House as H.R. 119)

The first of these measures, the Invasive Species Council Act, would put into law the existing Invasive Species Council and the provisions of the Executive Order that created it. It would also authorize \$2 million annually for the Council's operation. Although the Council already exists and is operating, a statutory charter for the Council would provide a Congressional endorsement of the effort and a niche in the annual budgeting process, a shortcoming that GAO observed in its review of the Council's work.

Bills addressing aquatic invasive species would further underwrite the work of the Council by giving it a major statutory role in the management of aquatic invasive species. The National Aquatic Invasive Species Act mirrors the framework of the National Invasive Species Plan through its focus on prevention, public outreach and education, early detection and rapid response, research and risk analysis, and control and

management. This measure would authorize funds to the states for the development and implementation of state plans to manage invasive aquatic species. One criticism of the bill from federal agencies is that it imposed too many obligations, with a number of deadlines for specific actions that will be hard to meet. In the Senate, the bill is under the jurisdiction of the Environment and Public Works Subcommittee on Fisheries, Wildlife and Water. Idaho Senator Mike Crapo chairs the subcommittee.

U.S. Senator Larry Craig from Idaho has played a lead role in the passage of S. 144, the Noxious Weed Control Act of 2003. Senator Tom Daschle brought support from Senate Democrats and Senator Mike Crapo was a co-sponsor as well. Senator Craig's concept is that while the federal Plant Protection Act strengthens the prevention capabilities of APHIS, the Noxious Weed Control Act will complement that function by creating state-based incentives to manage weeds already here. The bill passed the Senate in March, 2003 and is awaiting a vote in the House.

This measure would greatly increase funding to states and local governments for control of terrestrial noxious weeds. It would authorize expenditures of up to \$100 million each year, the vast majority of which would be granted to the states for support of their own programs. Like the aquatic invasive species measures, the Noxious Weed Act would require the Secretary of Interior to coordinate implementation of the Act with the Invasive Species Council. In a state like Idaho, passage of this Act, coupled with full funding, could significantly increase the funding available for weed control.

Conclusions

Despite a long-standing and considerable effort by the federal government to control invasive species, the cumulative impact of invasives is growing at an alarming rate. While there have clearly been "start-up" pains, the work of the Invasive Species Council to coordinate federal actions and create a roadmap for a unified effort is a commendable recent step. The Council also recognizes that as implementation of the Plan moves forward, it will do so best if the Council's actions are based upon cooperative, well-coordinated approaches not only with federal agencies, but also with individual states.

Congress, too, has clearly responded to the growing threat of invasive species. There are several pending measures that have a clear chance of enactment. These measures could greatly enhance federal government's ability to address invasive species through increased funding, new authorities, and direction. One hallmark of nearly all the pending Congressional actions is the increasing dependency on state programs, encouraged by the grant programs included in these bills. It is clear that the states will play a much greater role through their future activities.

How to be Effective Against Invasive Species

Increases in travel, tourism and recreation, access to the sea, new residential and commercial developments and changes in agricultural practices and crops will all undoubtedly bring new invasive species to the state and promote the spread of those here. The question is not whether new and undesirable species will arrive and spread, but when, which ones and how we manage them. Fortunately, there are strengths in Idaho's current invasive species programs and the strong potential for additional assistance from federal agencies that can become a basis for an effective and comprehensive state level program.

So far, most of Idaho's most visible efforts to manage invasive species have been targeted toward noxious weeds. There are now over 100 professionals who dedicate a significant portion of their time toward weed issues. These include county weed supervisors and those who serve on their advisory committees, state agency managers with weed control responsibilities, federal agency managers, and those in the private sector who provide services, products and expertise. As part of this Assessment, each was asked to respond to a short questionnaire to gain their perspectives on current and future challenges. The questionnaire and a more detailed discussion of the responses to it can be found in Appendix B.

Four clear themes emerged from the survey of Idaho managers. While most of those responding to the questionnaire work with noxious weeds, their observations seem equally applicable to all other invasive species. They are:

- 1) An understanding that it is better to prevent than to control, based upon some skepticism about our ability to either eradicate or successfully control invasive species once they become established. Idaho managers placed a high premium on prevention (i.e. actions to keep a species from ever arriving here), and on early detection and rapid response if one does arrive.
- 2) The levels of education and awareness among landowners, policy makers, and the general public are not commensurate with the degree of the problem. Landowners need to better understand their obligations to control weeds and the costs associated with failure to manage them. Political leaders need to ensure adequate funding, adequate legal authority, and accountability from the agencies. The general public needs to understand invasive species so they become mindful of actions they can take, and build broad public and political support for adequate programs.
- 3) There is a need for adequate resources to do the job, including funding. This was perceived as the greatest barrier to effective invasive species management and perhaps was further reflected in the large number of respondents who simply listed "the total magnitude of the job" as a significant barrier.

- 4) Many are concerned current laws are not adequate. This ranged from concerns over local officials willingness to enforce laws, to the complexity of public land management planning to a lack of regulations regarding exotic pets or plants.

There probably is no better basis to create a comprehensive invasive species program for Idaho than the needs and priorities identified by those with the most experience in managing the issue. The task at hand is to examine each of the themes identified by Idaho's managers, gauge our current response to them and then identify where and how improvements can be made.

Prevention and Early Detection

Existing laws restrict the entry of identified invasives and control the vectors for their transmission. Laws alone are of limited value without the resources and capacity to detect and prevent new infestations on the ground. Effective prevention and early detection is a function of education, training and consistent vigilance. Success depends on a network of observers who can recognize a threat when they see it. One has only to remember that an alert Department of Transportation employee noticed zebra mussels on a boat traveling on a trailer through the Northwest. He may well have stopped the spread of that pest to northwest waters. What is truly important is that somewhere in that person's training and experience he learned the threat that zebra mussels posed and how to recognize them. At present, Idaho has no state plan establishing an early detection and prevention program for the full range of invasive species.

Aquatic Pest--Zebra Mussels



Zebra mussels were discovered in North America in 1988 in the water connecting Lake Huron and Lake Erie. Within two years they were found in all the Great Lakes. The first introduction was probably through water used as ship ballast. By 2002, 20 eastern states reported the occurrence of zebra mussels. While no live colonies are currently reported in the Pacific Northwest, zebra mussels were recently found on a recreational boat and a trailer in eastern Washington. They breed prolifically, with females producing 1 to 5 million eggs a year. The mussels can live for several days out of water in cool or humid conditions.

If this mussel were introduced in Idaho, it could have disastrous effects on irrigation systems (by clogging sprinklers and reducing flows in pipes, on hydroelectric power plants, and on fish ladder structures for salmon in the Clearwater, Snake, and Columbia River drainages. Nationwide, the cost of the zebra mussel invasion in the U.S. is estimated at over \$3 billion over the next decade.

CWMAs and their cooperators are “on point” for invasive weeds, both to identify new outbreaks and provide a prompt response. Their efforts are aided by the technical capabilities of the U of I Cooperative Extension Service’s weed expertise and by the University of Montana’s Invaders Database project. There are opportunities to increase the number and capabilities of those in Idaho who might recognize and report likely invaders. For example, boats, motor homes, and ATVs must all be licensed and, in some cases, inspected. Each interaction between the owner of such a vehicle and the state or county authority responsible for regulating them is an opportunity for education, an exchange of paper in which information on weeds or aquatic invasives is added relatively simply. Similarly, each county sends out yearly tax notices. This is another opportunity to communicate with landowners regarding noxious weeds, one that some counties are apparently already using.

Education

Beyond the nexus of governmental regulatory or taxing authorities and those who own something to be licensed, inspected or taxed as an educational opportunity, there are numerous other opportunities to communicate with the segment of the public that might have interactions with invasive species. There are any number of professional groups (nursery or landscaping operations), or those who are interested in a particular pursuit (backcountry horsemen, for example) and an equally large number of newsletters, meetings and other regular correspondence with the memberships of these groups. All are opportunities for interactions designed to increase their awareness of invasive species issues and the part they might play in creating an effective program for Idaho.

Communication with such groups paves the way for a constructive public climate. It is generally inaccurate to blame “the public” for their indifference or lack of understanding of a given issue. In truth, “the public” is a collection of individual groups and interests, some of which choose to engage in a particular issue when they perceive active involvement to be in their interest. Therefore, creating the perception that invasive species management is a meaningful issue for a broader spectrum of the public is key to greater political support for necessary public programs or to build public acceptance of needed actions.

One means of efficient communications between invasive species professionals and stakeholders or interest groups might be to identify “opinion leaders”—those who are influential in their particular organizations or areas of interest or those who have the ability to communicate to a larger audience, representatives of the news media, for example. Messages targeted toward that much smaller group often extend beyond the individual recipients, based on their ability to communicate these messages to others within their sphere of influence. Working with opinion leaders also allows more intensive and expensive types of communications than is possible with a mass audience. For example, it is possible to take ten key news editors on a two-day tour of weed management projects. It is also likely to be cost-effective, since there is a high likelihood of articles and editorials from such a tour that will be read by those for which it was infeasible to have attended.

One obvious set of “opinion leaders” are legislators, other elected officials, the staffs of Congressional offices and managers of key public agencies. These are the people who will make decisions about funding and priorities for invasive species programs. Their understanding and support is vital. It will also be more easily attained if they see there is broad support for these programs among various interests.

Funding and Resources

There is undeniably a public benefit from adequate efforts to manage invasive species. This public interest is the basis for some level of public funding to support management programs. Right now, in Idaho, the approximate amount of public funds being spent for invasive species is \$7-\$10 million, of which \$ 3.6 million is from individual county weed tax assessments. Virtually all this money is dedicated toward weed control and includes the direct expenditures for weed control by such agencies as the Idaho Department of Lands and Idaho Fish and Game. It does not reflect the expenditures of various agencies for other invasive species.

Current expenditures are small compared to the impacts of invasive species on Idaho’s economy. While precise figures are unavailable, the direct cost of controlling noxious weeds is estimated at \$300 million annually; the impact to crops and rangelands is higher still. These impacts are only likely to increase as more invasive species reach the state and existing infestations continue to spread.

While existing expenditures are significant, they are insufficient to meet the needs identified by Idaho’s invasive species managers. Creating additional financial resources is, of course, never easy. Much depends upon the perceived benefits of additional public expenditures and level of support from key interest groups and opinion leaders, as well as a lack of opposition to invasive species management programs.

One possibility for increased funding comes from the new spending authorities included in the weed and invasive species management bills now pending in Congress. While spending authority does not automatically translate into additional funds actually appropriated, the number of bills and the support for them does indicate a high level of interest among those in Congress in increasing federal efforts, including funding. Nevertheless, the current federal fiscal situation makes any increases in long term funding highly uncertain.

Are New Laws Needed?

A number of managers who responded to the questionnaire noted a concern over the adequacy of Idaho’s laws. Most of these concerns were from county level weed managers. This would seem significant, since, as noted previously, these managers are those most involved with direct control efforts. Most of the comments did not contain specific suggestions for new laws. One manager noted, “The Idaho State Noxious Weed Law needs to be updated to this time and culture.” Another expressed some frustration that, “Current Idaho noxious weed law does not address invading species. If a weed isn’t

already on the noxious weed list, there is nothing we can do about it. The law specifically states that funds generated by the noxious weed levy can only be used for noxious weed control. There is mention of “prevention” but that does nothing for you after the weed is already here.”

Others cited the inability of federal managers to complete NEPA and other requirements in a timely fashion. There was also some perception that federal managers either don't do enough given the vast federal ownership in Idaho or that their efforts are ineffective. The feeling that some landowners or managers aren't doing their share is not limited to federal lands, however. One manager noted that, “Without jurisdiction on Tribal ground, I cannot enforce weed laws. Some of the worst weed patches are on Tribal ground.” Another said, “We have no way to control a species that is out of control in one county and I have none within my county. The other county says it's too wide-scattered to anything about it, but it is causing major invasive problems in my county.”

For some managers, lack of enforcement of the current laws seemed to be a pressing problem. One said, “Many counties in Idaho don't exercise their right to enforce,” while a federal manager believes, “Idaho has a good noxious weed law. Landowners tend to ignore it because enforcement is generally lacking. Another county weed superintendent expressed his opinion that elected officials may be remiss in enforcing the law. “When it comes to enforcing the law, the Commissioners are always running for election and will not impose the necessary fines that would definitely get the attention of property owners.” He called for the “modification of current laws to allow for immediate action, without question or restraint, when a new species is known to do more harm than good.”

Not all the concerns over the adequacy of state laws or their enforcement are centered on weeds. One manager with responsibilities for invasive species other than weeds responded that, “...it is too easy to ship live species. While this is technically illegal, without an import permit most of the public is unaware of rules or do not care. Education of the general public will help but increased protection and/or better inspections at the federal level are needed to limit overnight shipping of live species or plants and animals.”

The foregoing indicates some frustration with current laws but doesn't identify a clear gap in them. Many lawmakers would likely be surprised over the concern that current laws are inadequate because they enacted the Idaho Plant Pest Control Act in 2002. The Plant Pest Act (Appendix C) authorizes a broad array of assessment, prevention and control actions by the Idaho Dept. of Agriculture for a wide variety of pests, including:

Any insect, snail, rodent, nematode, fungus, virus, bacterium, microorganism, mycoplasma-like organism, weed, plant, or parasitic higher plant and any other pest as defined by rule or any of the following that is known to cause damage or harm to agriculture or the environment:

(a) Any infectious, transmissible or contagious disease of any plant; or any disorder of any plant which manifests symptoms or behavior which, after investigation and hearing, is found and determined by a duly constituted federal,

state or local plant protection organization, to be characteristic of an infectious, transmissible or contagious disease;

(b) Any form of invertebrate animal life;

(c) Any form of plant life.

Obviously, this law provides a basis for a broader invasive species program than Idaho's Noxious Weed Law, alone. Basically, the new law repealed, consolidated and updated five previously existing statutes dealing with pest controls, plant quarantines and nursery and horticultural inspections. In doing so, the law addresses how plants, plant material and plant products may legally move into and within the state. The broad authority in it gives the Idaho Department of Agriculture the means to control and prevent all contagious or infectious plant pests deemed destructive to the state's agricultural, forestry or horticultural interests or to the state's general environmental quality. Specific provisions of the law include:

- Allow ISDA to take immediate action to hold or stop sale of a plant or plant product when a plant pest of quarantine, regulatory, and/or economic significance is found. Then if necessary order any action needed.
- Prevent non-indigenous species from being allowed into the state, except under permit. Currently we have to deal with each species on an individual quarantine basis.
- Detail the provisions for quarantines of plant pests.
- Consolidate current programs for abandoned orchards, bean disease control, Japanese beetle quarantines, grasshopper and Mormon cricket control and a number of others.
- Add no new fees or fee programs that were not already in place when the new law was passed (Cooper, 2002).

The new law also opens doors for additional funding. In the current year, the Idaho Department of Agriculture will receive approximately \$300,000 in grant funds under the federal Cooperative Agriculture Plant Pest Survey. This money will be used for surveys and stakeholder education to improve early detection and response in the state. The Idaho Department of Agriculture is now developing the rules and other procedures to implement the act's provisions. Once managers begin to understand the implications of this new law there can be a fair evaluation of it and an assessment of what statutory addition might be needed. It is almost a certainty, though, that it will address many concerns over the adequacy of existing laws that Idaho managers seem to share.

There are changes being contemplated in Idaho's Noxious Weed Law by the Department of Agriculture, the Idaho Weed Control Association and others involved in weed management in the state. These changes will likely include ways to make the noxious weed list more flexible, particularly at the county level, and to establish categories of weeds as a prelude to defining program and species priorities. The amendments to the law may also call for a risk assessment process, which would be helpful in setting species

priorities. Other changes may include civil penalties for landowners who refuse to address their weed problems. There may be some procedural aspects of program management that will need attention; such as the ability to prioritize management efforts, to allow separate county lists of noxious weeds and other invasive species or to develop various categories of species as a way to help set priorities.

The Continuing Role of the Federal Establishment

While the states have taken the lead in the on-the-ground management of many invasive species, particularly weeds, there is a need to better define the role of the federal government and its relationship with the states on all invasive species issues. This is particularly important now, as Congress contemplates the various pending bills on the issue. An appropriate federal role would likely be based on the following:

- Act as a coordinator of those activities common to a number of states and to a number of invasive species and, in doing so, sponsor important research and extend knowledge among those working on invasive species issues.
- Serve as a “home” for management efforts that transcend state or national boundaries (ballast water, for example), including developing and enforcing laws on the importation of exotic species or other preventative actions.
- Reflect the common “ownership” of the invasive species issue by being a source of funds for non-federal research, control efforts and technologies like early detection and control methods useful at the state or regional level.

The foregoing premises for an effective federal role are reflected in the National Invasive Species Council’s plan. While the Council has clearly made progress in implementing the national plan, it is equally clear that there is some frustration with the rate of progress and obstacles to achieving some of the plan’s goals. This is made evident by a least four GAO studies on the invasive species issue and the work of the Invasive Species Council.

Part of the problem seems to be in the ten cabinet level federal departments and the myriad of agencies all with some invasive species responsibilities. It would be interesting to determine how many federal employees have some version of “invasive species coordinator” in their position titles or job descriptions—the result would likely be a surprisingly large number. At some point, one of the major jobs of the federal establishment is to “coordinate the coordinators.” While one would hope that the Invasive Species Council can achieve the fully coordinated effort needed in the war against invasive species, the results so far, again as reported in the numerous GAO and Congressional Research Service critiques of the federal effort, is not cause for immediate optimism.

Irrespective of the future actions of the Invasive Species Council, it is safe to assume that major direct federal prevention efforts will continue. These include the work of APHIS to halt the intentional and unintentional importation of invasive species and Coast Guard efforts to enforce ballast water regulations. These “point of entry” inspections and

enforcement of current laws are a vital part of national prevention efforts. It is important that they not be overlooked in the zeal of trying to create new invasive species programs.

Current federal efforts to share in preventing, detecting, and otherwise managing invasive species are extremely important to the programs of individual states. USDA APHIS is a key federal partner to all state invasive species efforts. In addition to providing funds to help sustain state and local surveys, the USDA provides valuable technical expertise and support in invasive pest survey and management programs. Three critical areas of support include: 1) interstate coordination of programs and standardization of survey protocols; 2) management of national pest information systems; and 3) establishment and dissemination of pest biocontrol agents (Cooper and Simko, 2003).

It is important that the federal establishment focus on advanced technologies not likely to be funded by individual states. There is much potential, for example, in remote sensing technologies like satellite imagery as a means to efficiently identify new outbreaks of noxious weeds, particularly in remote areas. Similarly, it might be possible to build upon such models as the University of Montana “Invaders Database” to track all invasive species occurrences and rates of spread and to predict where they might occur in the future. There are few effective controls for many invasive species, other than herbicides for most weeds. Accordingly, there is a huge opportunity for research into effective control mechanisms, particularly in developing biological controls and in assuring their safety.

The foregoing potential roles for federal agencies as well as some of the points of the National Invasive Species Plan are being borne out in the recently released “conceptual design” for “A National Early Detection and Rapid Response System for Invasive Plants in the United States.” This plan, developed by the Federal Interagency Committee for the Management of Noxious and Exotic Weeds (“FICMNEW”), is designed to the effort and resources that will be needed to “detect, assess, and respond to invasive species infestations in their early stages of establishment” (FICMNEW, 2003). The conceptual design’s overall goal includes:

- Early detection and reporting of suspected new plant species to appropriate officials,
- Identification and vouchering of submitted specimens by designated specialists,
- Verification of suspected new state and national plant records,
- Archival of new records in designated regional and plant databases,
- Rapid assessment of confirmed new records, and,
- Rapid response to verified new infestations determined to be invasive.

Implementation of the concept will rely heavily on partnerships and cooperators at the state and local level. As noted in the “Conceptual Design,” “The National Early Detection and Rapid Response System for Invasive Plants will be a network of independent elements working together to achieve a common goal...to detect new invasive plants early and to act against them quickly” (FICMNEW, 2003). The federal agencies involved in the preparation of this plan are currently testing the concept, including working with individual states to assure that communications from state and local entities to regional and national coordinators is effective. This will be vital to the success of the concept once it is fully employed.

The federal establishment is often looked upon as a source of funds for state or local invasive species management efforts. This is understandable, given the condition of most state budgets and the pending invasive species legislation in Congress, most of which authorizes additional funding. While, as noted earlier, enacting funding authorizations offers no guarantee of funds actually being appropriated, it does at least open the door to that possibility and it is highly likely that some additional federal funding will be forthcoming.

Whether the amount of funding available will be adequate for the job at hand remains to be seen. The total magnitude of the job and the potential sources of invasive species raise the question of who should pay. One advocate of a specialized fee structure to establish a trust fund for invasive species work is Peter Jenkins of the International Center for Technology Assessment in Washington, D.C. He suggests that fees be collected on intercontinental travelers, shipments of live plants and animals and on cargo ships and airplanes to create a \$200 million trust fund dedicated to invasive species detection, prevention and management. He also suggests that individual states pass legislation that emulates California’s \$200 fee for arriving ships that raises \$1.6 million for its “Exotic Species Control Fund” that supports research, monitoring and education to improve prevention efforts (Jenkins, 2002).

Irrespective of the source of any additional funds, there are major questions over how they might be most effectively used. While there are clearly research needs and inadequate prevention and control programs that need to be bolstered, it is difficult to conclude that current organizations can simply “do more” if there are additional funds. Perhaps this question is best looked at on a state and local basis.

In Idaho, as previously noted, there is a mature ongoing effort to manage noxious weeds; while relatively little attention is given to the prevention or management of other invasive species. If there were substantial additional funds available, however, it would probably be both unfair and ineffective to simply assume that those currently involved in weed management could take on additional duties or have the expertise to deal with invasives other than weeds. While there are almost certainly additional “weed” needs to be addressed through additional funds, it is misleading to conclude that either all the additional needs are related to weed management or that the weed organizations can simply gear up to take on new, “non-weed” tasks. A more comprehensive organization will surely be called for.

States share to some extent the same problem that federal agencies have—a number of agencies have invasive species responsibilities, these responsibilities can overlap, and the statutory authorities prevent any single agency from assuming all responsibilities for invasive species. Thus, in Idaho, at least four state agencies (Agriculture, Lands, Fish and Game, Parks and Recreation and Transportation) have some responsibilities for weed management, while Fish and Game, Department of Environmental Quality (DEQ) and Agriculture share responsibilities for managing other invasive species. Sometimes those responsibilities are confusing. For example, it was the Department of Agriculture, not Fish and Game or the Department of Health and Welfare, that recently adopted the emergency rule to ban imports of prairie dogs because they might carry monkey pox. This disease affects humans and rodents such as native ground squirrels but there is no clear threat to agricultural products.

Since numerous state agencies each have staff with some invasive species management authorities, there would likely be a need to “coordinate the coordinators” in a comprehensive state program, just as there seems to be at the federal level. Idaho’s Invasive Species Council offers probably the best mechanism to coordinate the state’s collective efforts on invasive species management. That organization, too, would probably function best if it had a clear legislative mandate and specific authorities.

Learning from the Past—Just how Effective Are We?

White pine blister rust arrived in this country on the East Coast around the turn of the century, brought on white pine seedlings grown in European nurseries. It was introduced to the West Coast around 1910 and by the 1950's had spread throughout all the commercial white pine areas of the West. While the fungus cannot spread from tree to tree, it does spread if there is an alternate host from the *Ribes* genus (currants, gooseberries), species that are native to Idaho's white pine regions. When the spores of this fungus land on white pine needles and conditions favor germination, it soon infects the tree. There, the cankers caused by the fungus slowly surround the entire trunk, disrupting the flow of water and nutrients, and death of the tree is then inevitable (Maloy, 2001).

What would happen if this invasive species were introduced in the United State today? At the time the rust appeared in the Eastern United States, there were, of course, no means to quickly communicate its presence there and to detect or predict its spread. The rust did not arrive on the West Coast by traveling across country and spreading throughout susceptible pine stands. Rather it was brought here, either on infected seedlings or on its alternate hosts in the *Ribes* genus, possibly as garden plants. At the turn of the century, the species' journey from east to west coasts took ten years. Now, it would likely take far less time and the chances of an inadvertent translocation of the disease on nursery stock multiplied in direct proportion to the growth and increased mobility of our population.

If, today, white pine blister rust were known as an undesirable invader that could potentially cause great harm to Idaho's forests, then there would be a prevention and eradication program similar to that currently associated with gypsy moths. But if that knowledge didn't exist, then we would have to rely upon current plant inspection laws and nursery inspections to, first, find "something funny" but unknown on nursery stock, and, second, determine its threat to our white pine forests. If, today, white pine blister rust did arrive in a shipment of currant bushes destined for a commercial currant growing operation in North Idaho, then within perhaps five to ten years, it is likely that foresters and biologists would have made the tie between dying branches and young trees in the surrounding white pine stands and the orange spores found on both the trees and the nearby currant bushes. Landowners would demand action and information on treatments. Unfortunately, our knowledge of how to arrest the spread of white pine blister rust is little changed from that of 100 years ago. Basically, treatment would involve removing wild currants and gooseberries, natural components of North Idaho's forests, and possibly by creating "*ribes* free zones" around white pine stands (this is the current practice in western North Carolina, for example).

But in today's world, is it feasible to consider removal of a plant species such as those in the *Ribes* genus? It is possible to enact prohibitions against allowing *Ribes* species to grow upon one's land, as lawmakers did North Carolina. In Idaho, though, perhaps half of the land in the white pine regions of the state is federally managed and such an approach by the Idaho Legislature would have no effect on those lands. Presumably, federal managers would be just as willing to protect the white pine resource as anyone else and, if *Ribes* removal was the way to do that, then probably equally willing to participate in removal or quarantine projects, just as they were when this strategy was employed in the 1900's (although herbicides would potentially be a tool now). However, this is a different legal world and the time required to develop plans, complete NEPA analyses and comply with requirements such as those imposed by the Endangered Species Act would be significant, as would the budgetary resources necessary for such a project.

One must conclude that if blister rust threatened Idaho today, then we could take steps to prevent its introduction. On the other hand, if blister rust simply surfaced in Idaho as a previously unknown invasive, then its rate of spread would likely outstrip both our ability to detect its impacts in time and to mount an effective eradication or control program.

There are obvious parallels between the introduction and spread of white pine blister rust in Idaho and "Sudden Oak Death" in Oregon and California, which is killing oak and other trees in twelve central California counties as well as in Southern Oregon (as of July 2002). It is a fungus and there are numerous other hosts for it. It was introduced on ornamental shrubs from Europe. There is no known cure for the disease. In addition to oaks, the disease is known to attack conifers like Douglas-fir and even Idaho's famed huckleberry plants—and that would be a tragedy. So, could the tragedy of white pine blister rust (or something like it) happen again? In Oregon and California, it has, and the detection, response and control mechanisms available have been put to the test. How successful they may be remains to be seen.

Recommendations

This Assessment – *Preparing to Meet the Challenge* – is intended to provide a basis for future actions to better manage invasive species and not a blueprint for doing so. Specific actions and the responsibility for completing those actions must follow, presumably under the direction of Idaho’s Invasive Species Council. There are, however, some recommendations for the shape and direction of those future actions that logically arise from this Assessment. Following is a summary of those recommendations.

Establish an Equitable and Stable Source of Funds

Adequate funding for Idaho’s efforts has to be at the top of the list. Insufficient funding and staff was noted as a major barrier by a great majority of Idaho’s invasive species managers. Additional money is fundamental to overcoming the gaps in public and landowner education cited by Idaho managers as well as to achieving the goals of prevention and early detection. Without additional funds, little else is possible.

While few would disagree that additional funding is desirable, the source and amounts of this additional money is guaranteed to create a discussion. Clearly there are public benefits from a comprehensive and effective invasive species program. It is equally clear that responsibility for the problem itself is wide, ranging from homeowners who fail to recognize and control weeds on their property to out-of-state recreationists who fail to keep campers and boats clean. The broad nature of the causes and contributors to the problem implies that a broad-based tax is appropriate as a funding mechanism. Such a tax might take the form of a small surcharge for boat, RV or off-road vehicles licenses, fish and game licenses, exotic species importation permits or similar activities closely tied to invasive species pathways or through general fund tax revenues.

It will, of course, be more tempting to state political leaders to await the outcome of pending federal spending authorities for invasive species management before raising taxes at the state level. This is an option and perhaps a good one if federal funds seem to be forthcoming, in adequate amounts and with sufficiently flexible conditions that they can be used to address each state’s unique situations. There are two caveats—there will be an inevitable need for more funds, whether from state or federal sources, and there must be a significant response in a timely manner. While assuming that federal funding will adequately address the problem may serve short-term political objectives, all must understand that the problem of invasive species will only grow during the wait.

Conduct Educational Programs

There are obvious educational needs to be met, falling into two broad categories: (1) property owners, and (2) those whom have some relationship with invasive species pathways. The latter category ranges from nursery operators who import exotic species to recreationists who bring in boats or recreational vehicles from other locales. While there is a “general public” component, there is probably little utility in trying to reach those who are not in one of the foregoing groups. So, while a statewide campaign of

public service announcements might seem attractive, specific communications target toward individual audiences will likely be more effective.

Set Priorities for Species to be Addressed

The wide variety of species noted as “in the top three” for control efforts probably is indicative of the current geographic diversity of invasive species in the state (particularly weeds), with some species like yellow starthistle prevalent only in limited areas (albeit a huge problem there), but not present or on the minds of weed managers in other parts of the state. Unfortunately, it also implies a program that is perhaps reactive, since priorities are set by actual occurrence and not by preventative actions or for especially high-risk species that may not be here yet.

Rangeland Noxious Weed—Yellow Starthistle



Considered a noxious weed in Idaho, yellow starthistle is a winter hardy annual with abundant seed germination in the fall. The largest infestations are generally restricted to the area from Lewiston north, with over 200,000 acres infested in Clearwater, Idaho, Latah, Lewis, and Nez Perce Counties, but new colonies have been detected as far south as Cambridge. Most of Idaho’s rangelands are susceptible to invasion.

Yellow starthistle affects livestock production by reducing grazing capacity and is poisonous to horses. The impacts on recreation, particularly upland hunting are extreme; since when it becomes established, the spiny seedheads make sites difficult to walk through. Control is possible but expensive. Herbicides, mowing, fire, and grazing are being used individually and in combination to manage yellow starthistle with varying effects. Certain insects offer some promise of biological control, since they can attack the flowers and seedheads to reduce the seed production. However, if control procedures do successfully kill existing plants, it is critical that desirable plant species be established to fill the void left by starthistle, requiring expensive restoration efforts.

Some states have addressed the question of priorities by setting ones a function of risks and the ability to prevent, eradicate or effectively control invasions. The Oregon Invasive Species Council maintains an annual list of the “100 Most Dangerous Invaders Threatening Oregon,” with a special note of those that have been previously detected in Oregon but not established, those that are targets for eradication and those in danger of becoming permanently established. Colorado’s noxious weed law calls for the establishment of three lists: “List A,” which includes rare noxious weed species subject to eradication, “List B” that addresses noxious weed species with discrete statewide distributions subject to eradication, containment or suppression in portions of the state, and, “List C,” for widespread, established species for which the state does not require control, but local authorities may choose to control (Colorado Code, 35-5.5-108).

Similar approaches to identifying priority species would seem to be an appropriate strategy for Idaho. This would pave the way for a more strategic approach, through which there could be coordinated and intensive programs aimed at preventing, eradicating or isolating some of the more high-risk species or to develop programs which, while aimed at one or more species, might become templates for other species that have yet to surface in Idaho. Also, targeting high priority species early on in the implementation of a comprehensive invasive species management program might serve to create a better focus and mission for the program.

Establish a Process to Assess Risks Posed by Various Species

Efforts to prioritize species and work to prevent or manage outbreaks of them in Idaho must be accompanied by an assessment of the risk that each poses. Risk assessment is a combination of identifying species that might arrive here (the risk of introduction) and of the damage they would likely cause if they were introduced (the risk of significant damage). Therefore, species that have a high risk of showing up in Idaho and a high risk of causing widespread, significant damage if they do require a higher priority for prevention or control (if it is already here) than those with lower risks. Risk is also a function of transmission vectors. While aquatic organisms most likely to be introduced through ballast water discharge will not likely pose a large threat to inland states, they can if established in adjacent waters be moved by smaller boats in live wells and bilge areas.

Idaho, perhaps in conjunction with other states or federal efforts, should identify those species with the highest risks as a way to help set program priorities. The culmination of this risk assessment and species prioritization should be a comprehensive list of species to be addressed in Idaho's program, the threats they pose, actions needed to prevent or control them and the agencies that will be responsible for implementing those actions.

Coordinate Invasive Species Work within State Government

It is important to assure that a comprehensive invasive species program in Idaho be elevated to a high priority within state government and not diluted by competing efforts among various agencies. As is the case in the federal government, a number of state agencies have invasive species responsibilities, including the departments of Agriculture, Fish and Game, Environmental Quality, Lands, Transportation and Parks and Recreation, among others. There is a need to examine whether the invasive species authorities for each of these departments are clear and without overlaps. It is equally important to assure that each agency is enthusiastic about carrying out its responsibilities and that "turf wars" or indifference are minimized. The Idaho Invasive Species Council is probably best equipped to create a sense of mission among all involved agencies and to assure that the overall program receives the attention it deserves within state government.

Enact the Necessary Changes in State Law

Aside from the previously mentioned need to establish a way to prioritize species and programs, there appear to be some additional statutory authorities that should be considered. First is the need to consider providing the Idaho Invasive Species Council with a clear statutory basis for developing and implementing a comprehensive invasive species program that cuts across the numerous agencies involved in it. This is the same situation as at the federal level, where a number of pending bills would create a statutory authority for the National Invasive Species Council.

There might also be a need to better understand the concerns of Idaho's invasive species managers (many of whom cited shortcomings in the law) to identify either additional, needed changes or to better inform managers about the relationship of such federal laws as the National Environmental Policy Act (NEPA) or the Endangered Species Act (ESA) to invasive species management. Finally, there are both new changes in law from the 2002 passage of the Idaho Plant Pest Act and proposed changes in the state's noxious weed law that need to be discussed with Idaho invasive species managers.

One change in the law that should be considered is a measure that would "hold harmless" landowners who find and report the presence of high priority invasive species on their lands. This is in contrast to the provisions of the federal Endangered Species Act, wherein land management practices can be restricted and fines imposed if listed species show up on private lands or landowners do something to harm them, even inadvertently. For invasive species, it should be made clear when landowners incur liability for control measures and when they do not.

Identify Research Needs

There is much to be learned about invasive species, ranging from how some microbials might spread to finding acceptable biological controls for noxious weeds. Fortunately, the University of Idaho has a proven track record for research relating to both agricultural pests and noxious weeds. These efforts should be a basis for future work, and those agencies involved in invasive species management will need to identify gaps in their knowledge and work closely with research institutions to fill those gaps. Appendix E includes a recent assessment of research needs regarding invasive species in wilderness areas as prepared by the Aldo Leopold Wilderness Research Institute at the University of Montana. The thoroughness of this assessment, even in its relatively narrow scope of inquiry, is an indication of the breadth of research that will likely be needed for invasive species in their broadest sense. It is equally important to communicate information regarding invasive species through extension programs.

Hold an Idaho “Invasive Species Summit”

There are a number of reasons why it might make sense to convene a “summit meeting” of Idaho invasive species managers, legislators and other elected officials, representatives of the scientific community and those who otherwise have a stake in invasive species management to review the current situation and discuss what future steps will be needed. Those reasons include the status of federal legislation and the implications of those bills for Idaho, along with the recent and proposed changes in Idaho’s law and those implications for invasive species managers. Perhaps the biggest reason for such a gathering would be to begin to focus on the structure of a comprehensive invasive species program in Idaho, just as the “Weed Summit” in 1998 paved the way for the Cooperative Weed Management Areas and the implementation of a comprehensive weed strategy in the state.

Conclusion

The question is not whether Idaho will see additional or spreading invasions of undesirable invasive species, but rather which species, how and where they will arrive and what the damage will be. That is the reality, not only in Idaho, but nationwide. On the positive side, Idaho has a wealth of experience in addressing many invasive species, a work ethic and organization well-suited as a model for a larger effort and the opportunity to prevent many invasives from ever crossing our borders.

What Idaho needs now are the financial resources, legal authorities and organization that can meet the coming challenges. This must be coupled with public understanding of the need to take action, and the political will to do so. The risks of inaction, as measured by the potential costs to our economy and to our natural world, far exceed the present costs of recognizing those risks and what is needed to face up to them.

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List of Acronyms and Glossary of Terms

APHIS	Animal and Plant Health Inspection Service
ATV	All Terrain Vehicle
BLM	Bureau of Land Management
CDC	Center for Disease Control and Prevention
CWMA	Cooperative Weed Management Area
DEQ	Department of Environmental Quality
EPA	Environmental Protection Agency
FICMNEW	Federal Interagency Committee on the Mgmt of Noxious & Exotic Weeds
FS	Forest Service
FWS	Fish and Wildlife Service
FY	Fiscal Year
GAO	Government Accounting Office
GIS	Geographic Information System
GPS	Global Positioning System
ISDA	Idaho State Department of Agriculture
NEPA	National Environmental Protection Agency
NISC	National Invasive Species Council
NOAA	National Oceanic and Atmospheric Administration
USDA	United States Department of Agriculture
USDI	United States Department of Interior
Control	As appropriate, eradicating, suppressing, reducing, or managing invasive species populations, preventing spread of invasive species from areas where they are present, and taking steps such as restoration of native species and habitats to reduce the effects of invasive species and to prevent further invasions.
Ecosystem	The complex of a community of organisms and its environment.
Introduction	The intentional or unintentional escape, release, dissemination, or placement of a species into an ecosystem as a result of human activity. An alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.
Invasive species	An alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.
Native species	With respect to a particular ecosystem, a species that, other than as a result of an introduction, historically occurred or currently occurs in that ecosystem.

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Appendix A – Noxious Weed Rules, Plant Pest Watch List, Default Species and Disease Field Inspection Listing, Invasive Species Surveys

- (1) Noxious Weed Rules
- (2) ISDA, Plant Industries Div., Recommended Plant Pest Watch List
- (3) ISDA Default Species and Disease Field Inspection Listing
- (4) ISDA, Plant Industries Div., Invasive Species Surveys 1994–2003

(1) Noxious Weed Rules 02.06.22

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**IDAPA 02
TITLE 06
CHAPTER 22**

02.06.22 – NOXIOUS WEEDS RULES

000. LEGAL AUTHORITY.

This chapter is adopted under the legal authority of Section 22-2403, Idaho Code. (3-30-01)

001. TITLE AND SCOPE.

01. Title. The title of this chapter is IDAPA 02.06.22, “Noxious Weed Rules”. (3-30-01)

02. Scope. This rule identify those noxious weeds which have been officially designated by the Director as Noxious Weeds in the state of Idaho, designates articles capable of disseminating noxious weeds, requires treatment of articles to prevent dissemination of noxious weeds and provides authority to designate special management zones for management of noxious weeds. (3-30-01)

002. WRITTEN INTERPRETATIONS.

There are no written interpretations of these rules. (3-30-01)

003. ADMINISTRATIVE APPEAL.

There is no provision for administrative appeals before the Idaho State Department of Agriculture under this chapter. (3-30-01)

004. PUBLIC RECORDS ACT COMPLIANCE.

These rules are public records and are available for inspection and copying at the department. (3-30-01)

005. ADDRESS, OFFICE HOURS, TELEPHONE AND FAX NUMBERS.

01. Physical Address. The central office of the Idaho State Department of Agriculture is located at 2270 Old Penitentiary Road, Boise, Idaho 83712-0790. (3-30-01)

02. Office Hours. Office hours are 8 a.m. to 5 p.m., Mountain Time, Monday through Friday, except holidays designated by the state of Idaho. (3-30-01)

03. Mailing Address. The mailing address for the central office is Idaho State Department of Agriculture, P. O. Box 790, Boise, Idaho 83701. (3-30-01)

04. Telephone Number. The telephone number of the central office is (208) 332-8540. (3-30-01)

05. Fax Number. The fax number of the central office is (208) 334-4062. (3-30-01)

006. -- 099. (RESERVED).

100. NOXIOUS WEEDS.

01. Designation of Noxious Weeds. The following weeds are hereby officially designated and published as noxious: (7-1-93)

a. Buffalobur (*Solanum rostratum*) Dun. (7-1-93)

b. Canada thistle (*Cirsium arvense*) (L.) Scop. (7-1-93)

c. Common crupina (*Crupina vulgaris*) Cass. (7-1-93)

d. Dalmatian toadflax (*Linaria dalmatica*) (L.) Mill. (7-1-93)

IDAHO ADMINISTRATIVE CODE Department of Agriculture	IDAPA 02.06.22 Noxious Weeds Rules
e. Diffuse knapweed (<i>Centaurea diffusa</i>) Lam.	(7-1-93)
f. Dyers woad (<i>Isatis tinctoria</i>) L.	(7-1-93)
g. Eurasian water milfoil (<i>Myriophyllum spicatum</i>)	(3-30-01)
h. Field bindweed (<i>Convolvulus arvensis</i>) L.	(7-1-93)
i. Henbane (<i>Hyoscyamus niger</i>) L.	(7-1-93)
j. Johnson grass (<i>Sorghum halepense</i>) (L.) Pers.	(7-1-93)
k. Jointed goat grass (<i>Aegilops cylindrica</i>) Host.	(7-1-93)
l. Leafy spurge (<i>Euphorbia esula</i>) L.	(7-1-93)
m. Loosestrife (<i>Lythrum salicaria</i>) L.	(7-1-93)
n. Mat grass (<i>Nardus stricta</i>).	(7-1-93)
o. Meadow knapweed (<i>Centaurea pratensis</i>).	(7-1-93)
p. Milium (<i>Milium vernale</i>).	(7-1-93)
q. Orange hawkweed (<i>Hieracium aurantiacum</i>) L.	(7-1-93)
r. Musk thistle (<i>Carduus nutans</i>) L.	(7-1-93)
s. Perennial pepperweed (<i>Lepidium latifolium</i>) L.	(7-1-93)
t. Perennial sowthistle (<i>Sonchus arvensis</i>) L.	(7-1-93)
u. Poison hemlock (<i>Conium maculatum</i>) L.	(7-1-93)
v. Puncture vine (<i>Tribulus terrestris</i>) L.	(7-1-93)
w. Rush skeleton weed (<i>Chondrilla juncea</i>) L.	(7-1-93)
x. Russian knapweed (<i>Centaurea repens</i>) L.	(7-1-93)
y. Scotch broom (<i>Cytisus scoparius</i>) (L.) Link.	(7-1-93)
z. Scotch thistle (<i>Onopordum acanthium</i>) L.	(7-1-93)
aa. Silver leaf nightshade (<i>Solanum elaeagnifolium</i>) Cav.	(7-1-93)
bb. Skeletonleaf bursage (<i>Cambrosia tomentosa</i>) Nutt.	(7-1-93)
cc. Spotted knapweed (<i>Centaurea maculosa</i>) Lam.	(7-1-93)
dd. Syrian bean caper (<i>Zygophyllum fabago</i>) L.	(7-1-93)
ee. Tansy ragwort (<i>Senecio jacobaea</i>) L.	(7-1-93)
ff. Toothed spurge (<i>Euphorbia dentata</i>).	(7-1-93)
gg. White top (<i>Cardaria draba</i>) (L.) Desv.	(7-1-93)

IDAHO ADMINISTRATIVE CODE Department of Agriculture	IDAPA 02.06.22 Noxious Weeds Rules
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hh.	Yellow hawkweed (<i>Hieracium pratense</i>) Tausch.	(7-1-93)
ii.	Yellow starthistle (<i>Centaurea solstitialis</i>) L.	(7-1-93)
jj.	Yellow toadflax (<i>Linaria vulgaris</i>) Mill.	(7-1-93)
02.	Designation Of Articles Capable Of Disseminating Noxious Weeds. The following articles are designated by the Director as capable of disseminating noxious weeds:	(7-1-93)
a.	Construction equipment, road building and maintenance equipment, and farm machinery.	(7-1-93)
b.	Trucks and motorized vehicles.	(7-1-93)
c.	Grain and seed.	(7-1-93)
d.	Hay, straw and other material of similar nature.	(7-1-93)
e.	Nursery stock.	(7-1-93)
f.	Feed and seed screenings.	(7-1-93)
g.	Fence posts, fencing and railroad ties.	(7-1-93)
h.	Sod.	(7-1-93)
i.	Manure, fertilizers and material of similar nature.	(7-1-93)
j.	Soil, sand, and gravel.	(7-1-93)

101. -- 199. (RESERVED).

200. TREATMENT OF ARTICLES.

01. Duty. It shall be the duty of every person, before removing any article from any place that is infested with noxious weeds or before moving the article onto any public roadway, to enclose, clean, or treat the article in a manner that will prevent the spread of noxious weeds. (1-15-91)

02. Treatment. No article containing noxious weed propagules shall be sold or furnished to any person within this state, until it has been treated in a manner sufficient to eliminate all noxious weed propagating capability except when sold or furnished to a person for the purpose of destroying the viability of the noxious weed propagules. (1-15-91)

201. -- 299. (RESERVED).

300. SPECIAL MANAGEMENT ZONES.

Special management zone designation shall define the geographical location of the zone, identify noxious weeds which will receive modified control, and delineate the modified control. (1-15-91)

301.--999. (RESERVED).

**(2) ISDA, DIVISION OF PLANT INDUSTRIES, RECOMMENDED
PLANT PEST WATCH LIST***

DRAFT- 11/05/2003

INVASIVE PESTS NOT KNOWN TO OCCUR OR NOT DETECTED IN IDAHO

Plant Pathogens and Parasitic Nematodes

Sudden oak death, *Phytophthora ramorum*
Karnal bunt, *Tilletia indica*
Bean anthracnose, *Colletotrichum lindemuthianum*
Bacterial wilt of beans, *Curtobacterium flaccumfaciens* pv *flaccumfaciens*
Common blight of beans, *Xanthomonas axonopodis* pv *phaseoli*
Halo blight of beans, *Pseudomonas savastanoi* pv *phaseolicola*
Bean common mosaic virus, (strain US-6)
Bean common mosaic necrosis virus (strain NL-3 and NL-5)
Potato wart, *Synchytrium endobioticum*
Golden nematode, *Globodera rostochiensis*
Soybean cyst nematode *Heterodera glycines*
Wheat seed gall nematode *Anguina tritici*
Pine wilt nematode *Bursaphelenchus xylophilus*
Brown rot of potatoes, *Ralstonia solanacearum*, race 3, biovar 2 (alternate hosts include tomato, pepper, eggplant, and some greenhouse plants including geranium)
Java downy mildew of corn, *Peronosclerospora maydis*
Philippine downy mildew of corn, *Peronosclerospora philippeninsis*
Soybean rust, *Phakospora pachyrhizi*
Plum pox potyvirus
Cherry leaf roll virus
Stewart's wilt of corn, *Pantoea stewartii*
Brown stripe downy mildew of corn, *Sclerophthora rayssiae* var. *zeae*
Potato mop top virus, PMTV
Pierce's disease of grapes *Xylella fastidiosa*
Peach yellows virus
Peach rosette virus
Little peach virus
Anthracnose of lentils, *Colletotrichum truncatum*
Black currant reversion disease

Insects and Mites

Asian longhorned beetle, *Anoplophora glabripennis*
Citrus longhorned beetle, *Anoplophora chinensis*
Emerald ash borer, *Agrilus planipennis*
European gypsy moth, *Lymantria dispar*

Asian gypsy moth, *Lymantria dispar* spp.
Japanese beetle, *Popilla japonica*
European corn borer, *Ostrinia nubilias*
Mexican bean beetle, *Epilachna varivestis*
Kaphra beetle, *Trogoderma granarium*
Red imported fire ant, *Solenopsis invicta*
Glassy-winged sharpshooter, *Homalodisca coagulate*
Silver Y moth, *Autoographa gamma*
False Codling moth, *Cyrtophlebia leucotreta*
Light brown apple moth, *Epiphyas postvittana*
Apple tortrix, *Archips fuscocupreanus*
Pine shoot beetle, *Tomicus piniperda*
Cherry bark tortrix, *Enarmonia formosana*
Apple ermine moth, *Ypomoneuta malinellus*
Cherry ermine moth, *Enarmonia formosana*
European grape vine moth, *Lobesia botrana*
Plum fruit moth, *Cydia funebrana*
Plum curculio, *Conotrachelus nenuphar*
Leek moth, *Acrolepiopsis assctella*
Small hive beetle, *Aethina tumida*
Africanized honey bee, *Apis mellifera*
Black currant gall mite, *Cecidophyopsis ribis*
Exotic bark beetles, (Scolytidae)
 Scolytus mali
 Xylosandrus crassiusculus
 Xylosandrus germanus
 Xyleborus californicus

Other Invasive Terrestrial Invertebrates

Invasive Mollusks (Terrestrial Snails and Slugs)

Brown garden snail, *Cryptomphalus aspersa*
Green or Burrowing snail, *Cantareus apertus*
Pulmonate snail, *Helix pomatia*
White garden snail, *Theba pisana*
Giant African snail, *Achatha fulica*
Lactea snail, *Otala lactea*

PESTS WITH LIMITED INCIDENCE OF DETECTION, NEWLY ESTABLISHED, AND OF MAJOR CONCERN TO IDAHO

Insects and Mites

Cereal leaf beetle, *Oulema melanopus*
 Apple maggot, *Rhagoletis pomonella*
 Russian wheat aphid, *Diuraphis noxia* (biotype B not recorded in ID)
 Mint stem borer, *Pseudobaris nigrina*
 Haanchen barley mealybug, *Trionymus haancheni*
 German yellowjacket, *Vespula germanica*
 European paper wasp, *Polistes dominulus*
 European elm bark beetle, *Scolytus multistriatus*
 Banded elm bark beetle, *Scolytus schevyrewi*

Plant Pathogens and Parasitic Nematodes

Powdery Mildew of Hops, *Sphaerotheca macularis* (*s. humuli*)
 Bacterial brown spot of beans, *Pseudomonas syringae* pv *syringae*
 Wheat smut, *Tilletia tritici*
 Wheat scab, *Fusarium graminearum*
 Potato ring rot, *Corynebacterium sepedonicum*
 Potato late blight, *Phytophthora infestans*
 Onion white rot, *Sclerotium cepivorum*
 Sugar beet Rhizomania (beet necrotic yellow vein virus (BNYVV) and transmitted by the soil fungus *Polymyxa betae*)
 White pine blister rust, *Cronartium ribicola*
 Cereal cyst nematode *Heterodera avenae*
 Columbia root knot nematode *Meloidogyne chitwoodi*
 Onion stem and bulb nematode *Ditylenchus dipsaci* (onion race)
 Iris yellow spot virus – IYSV of onions

*** This list is a compilation of pest species based on various inputs including: Current ISDA regulated pests, pest species of export significance, national priority lists of pest species with hosts that occur in Idaho, and based on advice from university and other public agency entomologists and plant pathologist.**

(3) ISDA, Plant Industries Division Default Species and Disease Field Inspection Listing

Bolded Names are ISDA Regulated Plant Pest Diseases, Insects, Nematodes, and Mollusks
(Many of these species are considered invasive threats to Idaho)

ALFALFA

ALFALFA MOSAIC ALFAMOVIRUS (AMV) ALFALFA MOSAIC VIRUS
CERCOSPORA MEDICAGINIS SUMMER BLACKSPOT
CLAVIBACTER MICHIGANENSIS PV BACTERIAL WILT
CUSCUTA SPP. DODDER
DITYLENCHUS DIPSACI STEM & BULB NEMATODE
EUPHORBIA ESULA LEAFY SPURGE
VERTICILLIUM ALBO-ATRUM VERTICILLIUM WILT
XANTHOMONAS CAMPESTRIS PV. BACTERIAL LEAF SPOT

BEANS

COLLETOTRICHUM LINDEMUTHIANUM ANTHRACNOSE OF BEANS
CURTOBACTERIUM FLACCUMFACIENS BACTERIAL WILT
PSEUDOMONAS SYRINGAE BROWN SPOT
XANTHOMONAS AXONOPODIS COMMON BLIGHT
PSEUDOMONAS SAVATANOI HALO BLIGHT
BEAN COMMON MOSAIC POTYVIRUS
BEAN SOUTHERN MOSAIC

CABBAGE

LEPTOSPHAERIA MACULANS BLACK LEG
PSEUDOMONAS SYRINGAE PV. CRUCIFER BACTERIAL LEAF SPOT
XANTHOMONAS CAMPESTRIS PV. BLACK ROT OF CRUCIFERS

CANTALOUPE

ACIDOVORAX AVENAE SUBSP. CITRULLI BACTERIAL FRUIT BLOTCH
COLLETOTRICHUM ORBICULARE ANTHRACNOSE
CUCUMBER MOSAIC CUCUMOVIRUS
PSEUDOMONAS SYRINGAE PV. ANGULAR LEAF SPOT
SQUASH MOSAIC COMOVIRUS
XANTHOMONAS CUCURBITAE BACTERIAL LEAF SPOT OF CUCURBITS

CARROT

ALTERNARIA DAUCI ALTERNARIA LEAF BLIGHT
ALTERNARIA RADICINA BLACK ROT OF CARROT
PECTOBACTERUM CAROTOVORA PV. BACTERIAL SOFT ROT
XANTHOMONAS CAMPESTRIS PV. BACTERIAL BLIGHT OF CARROT

CHERRY

WESTERN CHERRY FRUITFLY (RHAGOLETIS INDIFFERENS)

CHIVE

ALTERNARIA PORRI PURPLE BLOTCH
BOTRYTIS ACLADA GREY MOLD
COLLETOTRICHUM CIRCINANS SMUGE
DITYLENCHUS DIPSACI STEM & BULB NEMATODE
ONION YELLOW DWARF POTYVIRUS
PERONOSPORA DESTRUCTOR DOWNY MILDEW OF ONION
PUCCINIA ASPARAGI ASPARAGUS RUST
SCLEROTINIA SCLEROTIORUM SCLEROTINIA ROT
SCLEROTIUM CEPIVORUM WHITE ROT OF ONION
UROCYSTIS COLCHICI ONION SMUT

COLLARDS

LEPTOSPHERIA MACULANS BLACK LEG
PSEUDOMONAS SYRINGAE PV. CRUCIFER BACTERIAL LEAF SPOT
XANTHOMONAS CAMPESTRIS PV. BLACK ROT OF CRUCIFERS

CORN

AUREOBASIDIUM ZEA EYESPOT
CEPHALOSPORIUM MAYDIS LATE WILT
CLAVIBACTER MICHIGANENSE PV. GOSS'S BACTERIAL WILT
COCHLIOBOLUS CARBONUM HELMINTHOSPORIUM LEAF SPOT
COCHLIOBOLUS HETEROSTROPHUS SOUTHERN CORN LEAF BLIGHT
MAIZE DWARF MOSAIC POTYVIRUS
PANTOAE STEWARTII SUBSP. STEWARTII STEWART'S WILT
PERONOSCLEROSPORA MAYDIS JAVA DOWNY MILDEW
PERONOSCLEROSPORA PHILIPPINENSIS PHILIPPINE DOWNY MILDEW
PERONOSCLEROSPORA SACCHARI SUGARCANE DOWNY MILDEW
PERONOSCLEROSPORA SORGHI SORGHUM DOWNY MILDEW
PERONOSCLEROSPORA SPONTANEUM SPONTANEUM DOWNY MILDEW
PHYLLOSTICTA MAYDIS YELLOW LEAF BLIGHT
PHYSODERMA MAYDIS BROWN SPOT
SCLEROPHTHORA MACROSPORA CRAZY TOP OF CORN
SCLEROPHTHORA RAYSSIAE VAR. ZEA BROWN STRIPE DOWNY MILDEW
SCLEROSPORA GRAMINICOLA DOWNY MILDEW OF GRASSES
SPORISORIUM HOLCI-SORGHI HEAD SMUT

CUCUMBER

ACIDOVORAX AVENAE SUBSP. CITRULLI BACTERIAL FRUIT BLOTCH
COLLETOTRICHUM ORBICULARE ANTHRACNOSE
CUCUMBER MOSAIC CUCUMOVIRUS
PSEUDOMONAS SYRINGAE PV. ANGULAR LEAF SPOT
SQUASH MOSAIC COMOVIRUS
XANTHOMONAS CUCURBITAE BACTERIAL LEAF SPOT OF CUCURBITS

GARLIC

ALTERNARIA PORRI PURPLE BLOTCH
BOTRYTIS ACLADA GREY MOLD
COLLETOTRICHUM CIRCINANS SMUGE
DITYLENCHUS DIPSACI STEM & BULB NEMATODE
ONION YELLOW DWARF POTYVIRUS
PERONOSPORA DESTRUCTOR DOWNY MILDEW OF ONION
PUCCINIA ASPARAGI ASPARAGUS RUST
SCLEROTINIA SCLEROTIORUM SCLEROTINIA ROT
SCLEROTIUM CEPIVORUM WHITE ROT OF ONION

UROCYSTIS COLCHICI ONION SMUT

KOHLRABI

LEPTOSPHAERIA MACULANS BLACK LEG
PSEUDOMONAS SYRINGAE PV. CRUCIFER BACTERIAL LEAF SPOT
XANTHOMONAS CAMPESTRIS PV. BLACK ROT OF CRUCIFERS

LEEK

ALTERNARIA PORRI PURPLE BLOTCH
BOTRYTIS ACLADA GREY MOLD
COLLETOTRICHUM CIRCINANS SMUGE
DITYLENCHUS DIPSACI STEM & BULB NEMATODE
ONION YELLOW DWARF POTYVIRUS
PERONOSPORA DESTRUCTOR DOWNY MILDEW OF ONION
PUCCINIA ASPARAGI ASPARAGUS RUST
SCLEROTINIA SCLEROTIORUM SCLEROTINIA ROT
SCLEROTIUM CEPIVORUM WHITE ROT OF ONION
UROCYSTIS COLCHICI ONION SMUT

LENTILS

ANTRACHNOSE OF LENTILS

LETTUCE

LETTUCE MOSAIC POTYVIRUS (LMV)

MINT

FUMIBOTYS FUMALIS MINT ROOT BORER
PSEUDOBARIS NIGRINA MINT STEM BORER
VERTICILLIUM DAHLIAE VERTICILLIUM WILT

MUSTARD

LEPTOSPHAERIA MACULANS BLACK LEG
PSEUDOMONAS SYRINGAE PV. CRUCIFER BACTERIAL LEAF SPOT
XANTHOMONAS CAMPESTRIS PV. BLACK ROT OF CRUCIFERS

ONION

ALTERNARIA PORRI PURPLE BLOTCH
BOTRYTIS ACLADA GREY MOLD
COLLETOTRICHUM CIRCINANS SMUGE
DITYLENCHUS DIPSACI STEM & BULB NEMATODE
ONION YELLOW DWARF POTYVIRUS
PERONOSPORA DESTRUCTOR DOWNY MILDEW OF ONION
PUCCINIA ASPARAGI ASPARAGUS RUST
SCLEROTINIA SCLEROTIORUM SCLEROTINIA ROT
SCLEROTIUM CEPIVORUM WHITE ROT OF ONION
UROCYSTIS COLCHICI ONION SMUT

PEAS

PSEUDOMONAS SYRINGAE PV. PISI BACTERIAL BLIGHT OF PEAS

PEACHES

PEACH YELLOWS
PEACH ROSETTE
LITTLE PEACH VIRUS

PEPPER, BELL

CLAVIBACTER MICHIGANENSE PV BACTERIAL CANKER
COLLETOTRICHUM DEMATIIUM PEPPER ROOT ROT
CUCUMBER MOSAIC CUCUMOVIRUS
PHYTOPHTHORA CAPSICI PHYTOPHTHORA BLIGHT
PSEUDOMONAS SYRINGAE PV. ANGULAR LEAF SPOT
XANTHOMONAS VESICATORIA BACTERIAL SPOT

PEPPER, HOT

CLAVIBACTER MICHIGANENSE PV BACTERIAL CANKER
COLLETOTRICHUM DEMATIIUM PEPPER ROOT ROT
CUCUMBER MOSAIC CUCUMOVIRUS
PHYTOPHTHORA CAPSICI PHYTOPHTHORA BLIGHT
PSEUDOMONAS SYRINGAE PV. ANGULAR LEAF SPOT
XANTHOMONAS VESICATORIA BACTERIAL SPOT

PLUM (OTHER TREE FRUITS)

PLUM CURCULIO (CONOTRACHELUS NENUPHAR)

POTATO (SEED)

LEAF ROLL NET NECROSIS PLRV
CORYNEBACTERIUM SEPEDONICUM RING ROT
MELOIDOGYNE CHITWOODII COLUMBIA ROOT KNOT NEMATODE
MYZUS PERSICAE GREEN PEACH APHID
MELOIDOGYNE HAPLA NORTHERN ROOT KNOT NEMATODE
CORKY RING SOPT TOBACCO RATTLE VIRUS
SPONGOSPORA SUBTERRANEA POWDERY SCAB
PARATRICHODORUS PACHYDERMUS STUBBY ROOT NEMATODE
PHYTOPHTHORA INFESTANS POTATO LATE BLIGHT

PUMPKIN

ACIDOVORAX AVENAE SUBSP. CITRULLI BACTERIAL FRUIT BLOTCH OF
COLLETOTRICHUM ORBICULARE ANTHRACNOSE
CUCUMBER MOSAIC CUCUMOVIRUS
PSEUDOMONAS SYRINGAE PV. ANGULAR LEAF SPOT
SQUASH MOSAIC COMOVIRUS
XANTHOMONAS CUCURBITAE BACTERIAL LEAF SPOT OF CUCURBITS

RADISH

COLLETOTRICHUM HIGGINSIANUM TURNIP & RADISH ANTHRACNOSE
XANTHOMONAS CAMPESTRIS PV. BLACK ROT OF CRUCIFERS
XANTHOMONAS CAMPESTRIS PV. BACTERIAL BLIGHT OF RADISH

RUGULA

LEPTOSPHAERIA MACULANS BLACK LEG
PSEUDOMONAS SYRINGAE PV. CRUCIFER BACTERIAL LEAF SPOT
XANTHOMONAS CAMPESTRIS PV. BLACK ROT OF CRUCIFERS

SPINACH

LEPTOSPHAERIA MACULANS BLACK LEG
PSEUDOMONAS SYRINGAE PV. CRUCIFER BACTERIAL LEAF SPOT
XANTHOMONAS CAMPESTRIS PV. BLACK ROT OF CRUCIFERS

SQUASH

ACIDOVORAX AVENAE SUBSP. CITRULLI BACTERIAL FRUIT BLOTCH
COLLETOTRICHUM ORBICULARE ANTHRACNOSE
CUCUMBER MOSAIC CUCUMOVIRUS
PSEUDOMONAS SYRINGAE PV. ANGULAR LEAF SPOT
SQUASH MOSAIC COMOVIRUS
XANTHOMONAS CUCURBITAE BACTERIAL LEAF SPOT OF CUCURBITS

TURNIP

LEPTOSPHAERIA MACULANS BLACK LEG
PSEUDOMONAS SYRINGAE PV. CRUCIFER BACTERIAL LEAF SPOT
XANTHOMONAS CAMPESTRIS PV. BLACK ROT OF CRUCIFERS

WATERMELON

ACIDOVORAX AVENAE SUBSP. CITRULLI BACTERIAL FRUIT BLOTCH OF
COLLETOTRICHUM ORBICULARE ANTHRACNOSE
CUCUMBER MOSAIC CUCUMOVIRUS
PSEUDOMONAS SYRINGAE PV. ANGULAR LEAF SPOT
SQUASH MOSAIC COMOVIRUS
XANTHOMONAS CUCURBITAE BACTERIAL LEAF SPOT OF CUCURBITS

GENERAL PLANT PESTS**MOLLUSKS**

BROWN GARDEN SNAIL CRYPTOMPHALUS ASPERSA
GREEN OR BURROWING SNAIL CANTAREUS APERTUS
PULMONATE SNAIL HELIX POMATIA
WHITE GARDEN SNAIL THEBA PISANA
GIANT AFRICAN SNAIL ACHATHA FULICA
LACTEA SNAIL OTALA LACTEA

(4) ISDA, Plant Industries Division
 Invasive Species Surveys 1994 – 2003

Mike Cooper, Acting Administrator
 Ben Simko, Program Manager
 Darcy Heckathorne, Pest Survey Coordinator



Invasive Species	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Apple Maggot <i>Rhagoletis pomonella</i> ISDA Regulated Species	S	S	S	S	S	S	S	S	S	S
Cereal Leaf Beetle <i>Oulema melanopus</i>	S	S	S	S	S	S	S	S	S	S
European Pine Shoot Moth <i>Rhyacionia buoliana</i>	S	S	S	S	S	S	S	S	S	S
Gypsy Moth <i>Lymantria dispar</i> Regulated Species Interagency survey program	S	S	S	S	S	S	S	S	S	S
Japanese Beetle <i>Popillia japonica</i> ISDA Regulated Species	S	S	S	S	S	S	S	S	S	S
European Corn Borer <i>Ostrinia nubilias</i> ISDA Regulated Species									S	S
Light Brown Apple Moth <i>Epiphyas postvittana</i>				S					S	
Cherry Bark Tortrix <i>Enarmonia formosana</i>	S	S								
Apple Ermine Moth <i>Ypomoneuta malinellus</i>	S	S	S		S					

Invasive Species	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Oriental Fruit Moth <i>Grapholita molesta</i>		S	S	S		S				
Lesser Appleworm <i>Grapholita prunivora</i>			S	S						
Summer Fruit Tortrix <i>Adoxophyes orana</i>			S						S	
Plum Fruit Moth <i>Cydia funebrana</i>			S						S	
Pear Leaf Blister Moth <i>Leucoptera malifoliella</i>				S					S	
Silver Y Moth <i>Autographa gamma</i>					S					
Mexican Bean Beetle <i>Epilachna varivestis</i>	S	S								
Mediterranean Fruit Fly <i>Ceratitis capitata</i>		S	S	S						
European Cherry Fruit Fly <i>Rhagoletis cerasi</i>				S						
Japanese Cedar Long-Horned Beetle <i>Callidiellum rufipenne</i>						S				
Khapra Beetle <i>Trogoderma granarium</i>						S	S			

Invasive Species	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Leek Moth <i>Acrolepiopsis assctella</i>								S	S	
Varroa and Honey Bee Tracheal Mites							S			
Chrysanthemum White Rust <i>Puccinia horiana</i>				S						
Karnal Bunt <i>Tilletia indnica</i> ISDA Regulated Species			S	S	S	S	S	S	S	S
Late Blight A2 Strain <i>Phytophthora infestans</i>		S								
Beet Necrotic Yellow Vein Virus(Rhizomania)	S	S	S	S	S					
Bean Anthracnose <i>Colletrichum</i> <i>lindemuthianum</i> ISDA Regulated Species									S	
Plum Pox Virus							S	S	S	
Potato Mop Top Virus									S	
Sudden Oak Death <i>Phytophthora ramorum</i>									S	S
Exotic Nematode Survey i.e. Golden nematode					S	S	S		S	

S=survey conducted

Appendix B –Invasive Species Questionnaire & Summary of Results

Idaho Invasive Species Assessment Questionnaire for Managers

(1) First, we'd like to know a little about you and your responsibilities as they relate to invasive species management (Note: you may add your name and address if you wish, but it is not necessary).

Type of Organization or Employer (i.e., state agency, county, federal agency, private organization):

Brief description of your invasive species responsibilities:

What species or organisms do you deal with?

What percent of your time is spent in invasive species management?

(2) Do you feel that your organization or employer dedicates an amount of time and resources to the management of invasive species that is appropriate for the magnitude of the problem?

(3) If you see barriers that hinder you or your organization's ability to effectively carry out your responsibilities for identifying and managing harmful invasive species, please check all those that apply:

- No barriers, we can do our job effectively,
- Shortages in staff and funding,
- Shortcomings in the laws that direct or guide what we can do,
- Other organizations and/or public perceptions that hinder us in our job,
- State or federal regulations that hinder our effectiveness,
- Too many limitations on what we can do on private lands,
- Too many limitations on what we can do on public lands,
- The public and landowners don't know enough about what we do or what their role is in controlling invasive species on their lands,
- Our organization does not have sufficient leadership and support for invasive species management work
- The total magnitude of the job is overwhelming
- Other (please describe):

(4) If you have identified barriers in the preceding question, can you identify the one or two that you think are the most significant and describe why?

(5) Now, looking toward the future, can you tell us:

(A) The top three species that are either here and might uncontrollably spread or that may come here and for which you have the most concern:

(B) The pathways or vectors that you believe leave Idaho most vulnerable to the arrival or spread of harmful invasive species:

(C) Where you think priorities should be placed for future invasive species management programs:

- Prevention
- Early detection and rapid response
- Mapping, inventory, and monitoring
- Control and management
- Ecological restoration
- More funding, staff
 - Training of staff
 - Public education
 - Inspections, enforcement of current laws
 - Modifications to current laws
 - Greater coordination among various agencies
 - Clearer responsibilities or designation of a “lead” agency for all invasive species efforts
- Other (please describe)

(6) Of the priorities you listed in 5(C), which single one do you see as most important and why?

(7) Finally, tell us what part of your organization’s efforts regarding invasive species do you feel is most effective. Are there improvements that you would suggest and how would you implement them?

*Thanks for your time in answering these questions
And for all your work to manage harmful invasive species in Idaho!*

Idaho Managers' Perspectives

Time Spent in Invasive Species Management

Clearly county level managers put in the most time directly on weed control in Idaho. They reported spending an average of 66% of their time on weed management; with fully half noting that weed responsibility was a full time job for them. Those who reported lesser amounts of time seemed to generally be either volunteer advisory committee members or county elected officials, each of whom spend a portion of their time on weeds. One respondent suggested that he spent "115%" of his time on weed projects, while another superintendent noted that while he spend 16-32 hours per week on weed efforts, he also performed one or two other jobs for the county. One volunteer CWMA chair reported spending over at least one day per week (400 hours) in that position in 2002.

Federal managers spent 41% of their time actively engaged in weed or other invasive species work, while state managers reported spending 42% and those in the private sector 51%. Managers in federal, state and private employment spent more time serving on advisory boards or state level organizations and far less in direct management work. While a few managers reported nearly full time efforts on weed management work, most combined that responsibility with other jobs in their organizations. One state manager reported spending approximately 20% of their time on aquatic invasive species other than weeds. This was one of the few responses from a manager who did not work exclusively on weed issues.

The Adequacy of Time and Resources

The question, "Do you feel that your organization or employer dedicates an amount of time and resources to the management of invasive species that is appropriate for the magnitude of the problem?" drew a varied response. Overall, two-thirds of those at the county level said, "No", while 71% of the state and 50% of federal managers believed time and resources were inadequate. On the other hand, all those in the private sector tended to believe that their efforts were adequate.

Dividing responses into "yes" and "no" is probably an oversimplification. Most respondents qualified their answer, with such comments as:

"We may be devoting enough time and money to the problem, but we are doing it in an uncoordinated way"

"Currently, yes, but that is a recent development"

"[Our organization] is emphasizing weeds more and more, and that is great. But other duties as assigned have not been lessened so there is still not enough time to stay ahead of the curve"

"Yes, on time allocated; no on resources for management. Invasive species spread faster than we can keep up with or can be detected"

“The answer is probably no, but our county commissioners are very weed minded and allocate as many dollars as the budget will allow”.

Perceived Barriers to Adequate Invasive Species Management

Most respondents felt that staff and funding shortages constituted the greatest barrier to an effective management program. Of county managers, 18% believed this to be the case, a percentage that increased for those in the state, federal or private sectors (19%, 30% and 21%, respectively). In total, 21% of all respondents identified this as the greatest barrier. This was closely followed by the percentages of respondents (counties-17%, state-19%, federal-10% and private-21% and 16% of all respondents) who believed that landowners didn't grasp the importance of weed management, were indifferent or didn't understand their responsibilities. Other significant perceived barriers included the total magnitude of the problem (13% of all respondents), limitations on the ability to control weeds on public lands (10% of all respondents) and other organizations or public perceptions that hindered the ability to manage invasive species (10 % of all respondents).

Those who felt there were barriers (only one respondent reported “no barriers”) were asked to identify those that they perceived to be most significant. Of all the responses, 29% identified lack of funding and staff as the most limiting, while 20 percent believed that lack of landowner knowledge and public awareness was the most significant. Typical explanations included:

“I don't believe that the public or the landowners know enough about the magnitude of the damage to the environment and the costs to those who have to fight the invasive species to maintain their livelihood...Also they don't seem to feel that the few they have on their property are a threat to anyone else”

“Even if 10% or the funding available for fire programs were available for noxious weed control, it would make a big difference”

“What is it with weeds anyway, why is everyone talking about them?” is the attitude I hear a lot”

“Public agencies and private property owners do not understand the threat that these invasive species pose to the economy or quality of life. If the general public was educated to the impact of these organisms, they would demand...proper funding...to help combat this problem”

“Without staff and funding sources, nothing happens.”

The Species and Invasion Pathways that are Most Troublesome

The question of which species might either show up in Idaho or spread uncontrollably if they are already here created probably the greatest diversity of opinion. Clearly the top three were leafy spurge, rush skeletonweed and Eurasian milfoil, with managers nearly

equally divided on the first two for the most troublesome (17% and 16%, respectively). Yellow starthistle and spotted knapweed were also frequently mentioned as a “top three” species. While respondents identified 28 invasive species that they believed should be ranked in the top three for Idaho, no other species got more than three “votes.” In short, beyond leafy spurge, rush skeletonweed, spotted knapweed, Eurasian milfoil and yellow starthistle, there was little consensus among the respondents on which species posed threats. Most of the other species were mentioned only one or two times.

There was greater unanimity on the invasion pathways that pose the greatest threat. Thirty-nine percent identified “transportation” as the major threat, including tourism, vehicles and roads, recreational vehicles, trails and recreation. About half this amount (20%) suggested agricultural operations (contaminated seed, grazing, irrigation) as a significant pathway, while 18% believed waterways (boats, water transportation) should be included in this category.

Future Priorities

Despite a belief firmly established in previous questions that public perceptions and landowner awareness was a major barrier to an effective invasive species program, “early detection and response” coupled with “prevention” was cited as the highest priority for future programs. Thirty-one percent of all respondents selected these as their top priority. It was followed by “public education”, with 15% of the responses. “Control and management” was the third highest priority, followed by “more funding and staff” and “greater coordination”. One county manager responded, “Early detection and response—greatest chance of success is in early detection,” might best explain most of the choices made under this question. “Once established, it seems almost impossible to eradicate a species,” he noted. When asked to choose the most important future priority, Idaho managers ranked “Early detection” and “Public education” as equally high. This seems to reflect a number of comments that early detection is not possible unless the public is an active participant.

Our Strengths and Areas Needing Improvement

The final question asked which of each organization’s current activities were most effective and what improvements might be needed. Cooperation and participation in CWMAs, public education and direct control efforts were listed most often as most effective activities (28%, 20% and 15% of all responses, respectively). Some significant observation includes:

“Funding! Make cost-share money available for anyone who has noxious weeds or harmful invasive species”

“Establishment of cooperative weed management areas is paramount in the effective battle against invasive species. We know how to organize, how to manage species, and generally have all available tools at our disposal. We also know that cooperation across all jurisdictions as well as sustainable and dependable long-term funding are mandatory elements of successful programs”

“We’ve been a partner in publishing posters and brochures urging boaters to clean their boats to prevent milfoil, zebra mussel spread. We need to refocus that campaign so that education efforts are more about the practice than the specific invasive, since the prevention is nearly identical in all cases”

“We are very effective at crossing what once seemed like impossible administrative boundaries between federal, state and private lands. We could be better at including NRCS and the CRP grounds”

“Information! Tours, seminars, articles, outreach”

“Public awareness campaign has been very effective; the use of noxious weed information in property tax notices, our newspaper ads, etc.”

It must be noted that a number of managers, even some from federal agencies, cited federal laws and funding procedures as a barrier. While “too many limitations on what we can do on public lands” was listed as the fourth highest barrier in the “perceived barriers” question, several narrative responses indicated that there is room for major improvements in federal approaches to invasive species management (again, mostly weeds) in Idaho. These comments, the first from a federal manager and the others from county level managers, serve to illustrate the point:

“One of the main problems is still the thinking that weeds are not everyone’s problem. They are just the problem of the person in charge of weeds. If you are in recreation then timber and road building are to blame, and if you are in timber, then recreation and ATVs are to blame”

“EA’s and EIS’s take too long...also, agencies have too many regulations the prevent cooperation. Cooperative approaches are great, especially if you have minimal public land agencies to deal with”

“Federal funding usually is associated with agency policies and federal appropriations language that severely impacts and limits adaptive noxious weed management at local levels”

“In one instance, we were given 2 days in May 2003 to develop a grant proposal for \$125,000. We were awarded the grant from a federal agency (we think), but the details are not yet defined as of July 1, 2003; therefore we haven’t been able to hire contractors and get the work done. We, of course, are required to spend the funds by the end of the year”

Tabular Summary of Questionnaire Results					
	Co.	State	Fed.	Priv.	Total Resp.
1. How much time do you spend? (Average)	66%	42%	41%	51%	50%
2. Are the time and resources adequate?					
Yes	8	2	5	3	18
No	15	6	5	1	27
Total	23	8	10	4	45
3. What barriers do you perceive?					
None	0	0	1	0	1
Staff shortages, funding	15	7	9	4	35
Shortcomings in laws	9	3	1	1	14
Other orgs, pub percept.	9	3	2	1	15
State or federal regs	6	3	2	1	12
Limitations on private lands	3		1	1	5
Limitations on public lands	11	2	2	1	16
Landowners don't know enough	14	7	3	3	27
Lack of leadership	2	3	2	1	8
Total magnitude	8	6	5	2	21
All	1				1
Uncertainty of state, federal funding	2				2
Inconsistency across state and among programs	1		2		3
Insufficient rules for importation of pets		1			1
Lack of clear priorities across the state				1	1
Total	81	35	30	16	162
4. What are the most important barriers?					
public perception, landowner awareness	9		1	1	11
fed limitation	4	1			5
Lack of funds	7	3	4	3	17
Weed law needs updated	6				6
Commissioners won't enforce	1				1
Fed agencies exempt from enforce	2				2
Lack of cooperation, program consistency	2		3		5
No jurisdiction on tribal lands	1				1
Total magnitude	1	2	1		4
Uncertainty, timing of federal, state funds	1				1
Lack of control within road rights of way			1		1
Lack of awareness in pet trade		1			1
Lack of clear priorities				1	1
ESA constraints			1		1
Leadership within our organization		1			1
Insufficient biological control programs			1		1
Total	34	8	12	5	59

	<i>Co.</i>	<i>State</i>	<i>Fed.</i>	<i>Priv.</i>	<i>Total Resp.</i>
5. What are the most threatening species?					
Leafy Spurge	12	3	5	1	21
Spotted knapweed	11	1	2		14
Rush skeleton weed	8	3	8	1	20
Common tansy	4		1		5
Hawkweed	2	1			3
Sulphur cinquefoil	3		2		5
Eurasian milfoil	7	4	2	1	14
Oxeye daisy	1				1
Scotch thistle	2				2
Pepperweed	1				1
Dyers Woad	1				1
Hounds tongue	3		1		4
Russian knapweed	2				2
Dalmation toadflax	2		1	1	4
Japanese knotweed	2				2
Yellow starthistle	3	3	3	1	10
Buffalo Burr		1			1
Tamarisk			2		2
Diffuse knapweed			1		1
White Bryony			1		1
Cheatgrass		1	1		2
Hydrilla				1	1
Zebra mussel		1		2	3
Purple loosestrife		1	2		3
Medusahead Rye				1	1
Nun moth				1	1
New Zealand Mudsnail		1			1
Sudden Oak Death				1	1
Gypsy Moth				1	1
White Pine Weevil				1	1
Scotch Broom	1				1
Total	65	20	32	13	130
5B. Which are the most important pathways?					
Construction, urbanization, landscaping	2		1	1	4
Logging	2				2
Tourism, vehicles/roads, ATVs, Trails, Recreation	15	7	7	2	31
Agriculture, grazing, contaminated seed	9	1	3	3	16
Wildlife	2		1		3
Waterways	6	4	3	1	14
Imports, exotic pets, wood packaging	1	2		3	6
Drought, fire			3		3
Total	37	14	18	10	79

	<i>Co.</i>	<i>State</i>	<i>Fed.</i>	<i>Priv.</i>	<i>Total Resp.</i>
5C. Where should future priorities be placed?					
Prevention	9	2	8	2	21
Early detection and response	13	5	8	5	31
Mapping and inventory	3	3	3	3	12
Control and management	8	2	5	2	17
Restoration		2	2	1	5
More funding, staff	6	1	3	1	11
Training of staff	1	1		2	4
Public education	13	4	7	3	27
Inspections, enforcement	2	1	4	2	9
Modify current laws	4			1	5
Greater coordination	3	1	4	3	11
Clearer responsibilities		1	1	5	7
All	4	2	1		7
Consistency across state and between programs	1				1
Clear expression of priorities				1	1
Total	67	25	46	31	169
6. Which is the most important future priority?					
Public education	8	3	1	1	13
More funds, staff	2	1	2	1	6
All	1				1
Agency cooperation, CWMAs	2	3	3		8
Modifications to law	1				1
Early detection	4	2	2	3	11
Consistency across state and between programs	1	1			2
Inspections, enforcement	1		1		2
Prevention			2		2
Bio-controls	1				1
Ecological restoration		1			1
Total	21	11	11	5	48
7. What parts of your program are most effective?					
Public education	4	3		1	8
Cost share	3				3
Milfoild control program	1			1	2
New county ordinance, detection	1				1
Training	1		2		3
Databases	1				1
Response to landowner needs	2				2
Direct control	3	1	3		7
Cooperation, CWMAs	5	1	5		11
Early detection and mapping				1	1
Adaptability for working among agencies				1	1
Enforcement	1				1
Total	22	5	10	4	41

Appendix C – Summary of Idaho’s Plant Pest Act and Draft Rules for “Deleterious Animals” Statute

Idaho Plant Pest Act Title 22, Chapter 20, Idaho Code Summary

Purpose

The purpose of this chapter is to prevent the introduction and subsequent dissemination of plant pests into Idaho through the movement of nursery stock and other plants and plant products. This chapter provides for the regulation of plant material and plant pests moving into Idaho and establishes provisions under which such plant material and products may legally enter the state. This chapter also establishes provisions for the establishment of interstate and intrastate quarantines to restrict the movement of nursery stock, bio-control agents, genetically engineered plants or plant pests, plant pests and plant products.

Duties of the Department

The department may control and prevent, by such means as shall be prescribed and provided by law, rule, or by order of the department, all contagious, infectious and plant pests destructive to the state's agricultural, forestry or horticultural interests or to the state's general environmental quality.

Other Points:

- 1) It allows ISDA to take immediate action to hold or stop sale a plant or plant product when a plant pest of quarantine, regulatory, and/or economic significance is found.
- 2) Prevents non-indigenous species from being allowed into the state, except under permit.
- 3) The authority for the department to adopt quarantines
- 4) Indemnification for the loss of property is not allowed for, except as might be specifically provided for by the legislature.

The introduction of any plant pest (i.e. Golden nematode, potato wart, or Japanese beetle) would be very disrupting to the associated industry and could cause the loss of domestic and foreign export market(s). The USDA is stepping up its pest detection program(s) and aid to the states for pest detection due to the Homeland Security Act. There is a whole new infrastructure in the works on how to deal with and support pest survey, detection and eradication programs. This legislation is written broadly enough that it can deal with plant species that may be considered noxious, but are not yet under the realm of the Noxious Weed Law.

Response to specific points addressed in the draft document “State and Local Efforts for Managing Invasive Species in Idaho:”

- 1) **Identifying** – The act covers all species considered to be a plant pest as defined in the act (Sections 22-2003, 22-2004, and 22-2005 (40), Idaho Code). The act allows for adopting rules listing plant pests of concern to the state as regulated, non-quarantined pests (Section 22-2015, Idaho Code). This allows the state to list, by rule, all plants pests that might be of concern to the state whether or not they occur here. Authority is also given to specify conditions for plant pest host material that may be allowed into the state.
- 2) **Detection** – Section 22-2007, Idaho Code, provides broad authority to enter any public or private premises for the purposes of inspecting, surveying, treating, controlling or destroying any plant or plant pest. Mapping is viewed as a tool to be used in any survey and detection program. ISDA conducts numerous pest survey and detection programs in support of state and federal programs and quarantines. Results of these surveys are published annually on the ISDA Internet Webpage at: <http://www.idahoag.us/publications.htm>.
- 3) **Import/Introduction/Release** – Section 22-2016, Idaho Code, requires a permit for any plant pest, non-indigenous or otherwise before it can be introduced into the state.
- 4) **Quarantines** – Sections 22-2012, 22-2013, and 22-2014, Idaho Code, set forth the protocol for establishing and repealing a quarantine. A quarantine may be very broad or very specific in its scope to prevent the introduction of a specific plant pest or group of plant pests.
- 5) **Education** – Educational efforts are not specifically covered under the act. However, ISDA can cooperate with other governmental agencies, such as USDA under the director’s broad authority of Section 22-103 (20), Idaho Code. ISDA is working toward educational programs concerning significant plant pests threatening to the state under a grant from USDA through the Cooperative Agricultural Pest Survey (CAPS) program.
- 6) **Permits and licenses** – See number 3 above.
- 7) **Bonds and Insurance** – None are specifically authorized under the act but could possibly be a condition for the issuance of a permit.
- 8) **Post-Release Monitoring** – This could be a condition of a permit issued under the authority of Section 22-2016, Idaho Code.
- 9) **Transportation and Shipping** – Requirements concerning transportation and shipping can be set forth by each individual quarantine rule, as each plant pest or host thereof may require. There is no broad requirement set forth in the act.
- 10) **General Control and Management Authority** – Sections 22-2010 and 22-2019, Idaho Code, allow ISDA to order control actions or perform them, if necessary. Authority can also be set forth in rules under Section 22-2017, Idaho Code, to set up a crop management area to deal with a number of endemic plant pest situations that may be of an ongoing nature or through the act’s direct quarantine authority against a specific plant pest or group of plant pests.
- 11) **Emergency Powers** - Sections 22-2010 and 22-2019, Idaho Code, allow ISDA to order control actions to be taken or perform them, if necessary. Sections 22-2008

and 22-2009, Idaho Code, provide for the identification, and marking and implementation of a “Hold” or “Stop Sale” order on a commodity or plant pest found in the state.

- 12) Management of Bio-Control Agents – Section 22-2016, Idaho Code requires bio-control agents to have a permit before entering into the state. However, some generally accepted bio-control agents, such as preying mantids, lady beetle, lacewings, etc., may be exempted from this requirement by rule. There are no standards established.
- 13) Restoration Policies – None are provided within the scope of the act.
- 14) Enforcement Mechanisms – Penalties for violations are authorized under Section 22-2020, Idaho Code. They can include misdemeanor charges, prison, and civil penalties.
- 15) Specific Funds – No specific funds are allocated for the enforcement of the act from the state general fund. However, authority to charge fees and the enforcement of some rules is carried out by fees received for services rendered under those specific rules.
- 16) Councils – The creation of a council or advisory committee is not authorized under the plant pest act. However, a council could be authorized under the Directors’ broad authority in Section 22-103 (26), Idaho Code.
- 17) Plans – A comprehensive plan to manage invasive species is not addressed under the plant pest act, except that a quarantine or crop management area enacted against a specific plant pest or group of plant pests, could be considered a management plan.

Survey and Detection Data:

All pest survey and detection data collected by ISDA is entered into the USDA National Agricultural Pest Information System administered by Purdue University under a cooperative agreement with USDA. This system is considered by USDA to be the official database for the documentation of the occurrence of agricultural pests.

IDAPA 02
TITLE 04
Chapter 27

02.04.27 - RULES GOVERNING DELETERIOUS EXOTIC ANIMALS

000. LEGAL AUTHORITY.

This chapter is adopted under the legal authority of Title 25, Chapter 39, Idaho Code.
(10-1-03)T

001. TITLE AND SCOPE.

01. Title. The title of this chapter is “Rules Governing Deleterious Exotic Animals.”
(10-1-03)T

02. Scope. These rules govern the designation, importation, and possession of deleterious exotic animals. The official citation of this chapter is IDAPA 02.04.27.000 et.seq. For example, this Section’s citation is IDAPA 02.04.27.001.
(10-1-03)T

002. WRITTEN INTERPRETATIONS.

There are no written interpretations of these rules.
(10-1-03)T

003. ADMINISTRATIVE APPEAL.

Persons may be entitled to appeal agency actions authorized under these rules pursuant to Title 67, Chapter 52, Idaho Code.
(10-1-03)T

004. INCORPORATION BY REFERENCE.

This chapter incorporates the following documents by reference:
(10-1-03)T

01. Code Of Federal Regulations. Title 9, Parts 1, 2, 3, 4, and 161, CFR, January 1, 2003.
(10-1-03)T

005. ADDRESS, OFFICE HOURS, TELEPHONE, AND FAX NUMBERS.

01. Physical Address. The central office of the Idaho State Department of Agriculture is located at 2270 Old Penitentiary Road, Boise, Idaho 83712.
(10-1-03)T

02. Office Hours. Office hours are 8 a.m. to 5 p.m., Mountain Time, Monday through Friday, except holidays designated by the state of Idaho.
(10-1-03)T

03. Mailing Address. The mailing address for the central office is Idaho State Department of Agriculture, P.O. Box 790, Boise, Idaho 83701-0790.
(10-1-03)T

04. Telephone Number. The telephone number for the Division of Animal Industries at the central office is (208) 332-8540. (10-1-03)T

05. Fax Number. The fax number for the Division of Animal Industries at the central office is (208) 334-4062. (10-1-03)T

006. IDAHO PUBLIC RECORDS ACT.

These rules are public records available for inspection and copying at the Central Office of the Idaho State Department of Agriculture. (10-1-03)T

007. -- 009. (RESERVED).

010. DEFINITIONS.

The following definitions shall apply in the interpretation and enforcement of this chapter. (10-1-03)T

01. Accredited Veterinarian. A veterinarian approved by the Administrator and the USDA/APHIS/VS, in accordance with provisions of Title 9, Part 161, Code of Federal Regulations, to perform functions of State-Federal animal disease control programs. (10-1-03)T

02. Administrator. The administrator of the Division of Animal Industries, Idaho State Department of Agriculture, or his designee. (10-1-03)T

03. Animal. Any member of the animal kingdom, except man. (10-1-03)T

04. Deleterious Exotic Animal. Any live animal that is not native to the state of Idaho and is determined by the Administrator to be dangerous to the environment, livestock, agriculture, or wildlife of the state. (10-1-03)T

05. Department. The Idaho State Department of Agriculture. (10-1-03)T

06. Director. The director of the Idaho State Department of Agriculture or his designee. (10-1-03)T

07. Division of Animal Industries. Idaho State Department of Agriculture, Division of Animal Industries. (10-1-03)T

08. Federal Animal Health Official. An employee of the United States Department of Agriculture, Animal Plant Health Inspection Service, Veterinary Services who is authorized to perform animal health activities. (10-1-03)T

09. Livestock.

10. Operator. The person who has authority to manage or direct a premises or other area where animals are kept. (10-1-03)T

11. Owner. The person who owns or has financial control of premises or other areas where animals are kept. (10-1-03)T

12. Person. Any individual, association, partnership, firm, joint stock company, joint venture, trust, estate, political subdivision, public or private corporation, or any legal entity, which is recognized by law as the subject of rights and duties. (10-1-03)T

13. Premises. The ground, area, buildings, corrals, enclosures, pens, cages, ponds, raceways, tanks, and equipment utilized to keep, hold, or maintain animals. (10-1-03)T

14. State Animal Health Official. The Administrator, or his designee, responsible for disease control and eradication activities. (10-1-03)T

011. ABBREVIATIONS.

01. AZA. American Zoo and Aquarium Association. (10-1-03)T

02. CFR. Code of Federal Regulations. (10-1-03)T

03. IDFG. Idaho Department of Fish and Game. (10-1-03)T

04. ISDA. Idaho State Department of Agriculture. (10-1-03)T

05. USDA. United States Department of Agriculture. (10-1-03)T

012. -- 019. (RESERVED).

020. APPLICABILITY.

These rules apply to the importation and possession of all deleterious exotic animals in Idaho. (10-1-03)T

021. DELEGATION OF AUTHORITY.

The Administrator may designate IDFG to conduct permitting activities for deleterious exotic animals. (10-1-03)T

022. INSPECTIONS.

In order to ascertain compliance with this chapter, the Administrator is authorized to enter and inspect premises and other areas where animals are held or kept. (10-1-03)T

01. Entering Premises. State or federal animal health officials will attempt to notify the owner or operator of the premises or other area prior to conducting an inspection. (10-1-03)T

02. Emergencies. In the event of an emergency, as determined by the Administrator, the notification requirements of this section may be waived. (10-1-03)T

023.-- 099. (RESERVED).

100. IMPORTATION OF DELETERIOUS EXOTIC ANIMALS.

No person shall import any deleterious exotic animals into Idaho, except by permit. The Administrator may authorize, by permit, the importation of deleterious exotic animals to: (10-1-03)T

01. Zoos. Public or private zoos accredited by the AZA. (10-1-03)T

02. Educational Institutions. Public or private institutions of higher education, for research purposes. (10-1-03)T

03. Research Facilities. Persons conducting research determined by the Administrator to be beneficial to agriculture, the environment, or wildlife. (10-1-03)T

04. USDA Licensed Facilities. Zoos and exhibitors open to the public, licensed by USDA pursuant to Title 9, Parts 1, 2, 3, and 4, CFR, and approved by the Administrator. (10-1-03)T

101. CIRCUSES AND TRAVELING EXHIBITIONS.

The Administrator may authorize, by permit, the importation and possession of deleterious exotic animals by circuses and other traveling exhibitions licensed by USDA. (10-1-03)T

01. Period of Validity. Import permits, issued pursuant to this section, shall be valid for no more than fourteen (14) days. (10-1-03)T

02. Removal. All deleterious exotic animals imported pursuant to this section, shall be removed from Idaho prior to the expiration of the import permit. (10-1-03)T

03. Time Extension. The Administrator may extend the time limits in this section on a case-by-case basis. (10-1-03)T

102. IMPORT PERMIT AND CERTIFICATE OF VETERINARY INSPECTION.

All deleterious exotic animals imported pursuant to Sections 100 or 101 shall be accompanied in transit by an import permit issued by the Administrator, any permits required by the Idaho Department of Fish and Game, and an official certificate of veterinary inspection. (10-1-03)T

103. CONTENTS OF CERTIFICATES OF VETERINARY INSPECTION.

All certificates shall be written, legible, and attest that the animal(s) meet the importation requirements of the state of Idaho. The certificate shall be on an official form of the state

of origin, be approved by its livestock sanitary official, and be issued by an accredited veterinarian. An equivalent form of the USDA issued by a federal animal health official is acceptable in lieu of a certificate of veterinary inspection. All certificates shall contain the following information: (10-1-03)T

01. Name And Address. Name and address of the consignor and consignee; and (10-1-03)T

02. Origin Of Shipment. Including city and state; and (10-1-03)T

03. Final Destination Of Shipment In Idaho. Including city; and (10-1-03)T

04. Description Of Animals. An accurate description and identification of each animal; and (10-1-03)T

05. Purpose Of Shipment. The purposes for which the animals were shipped; and (10-1-03)T

06. Method of Transportation; and (10-1-03)T

07. Health Status. The certificate shall indicate the health status of the animals involved including dates and results of inspection and of tests and vaccinations, if any, required by the state of Idaho; and (10-1-03)T

08. Signature. The signature of the accredited veterinarian, or state or federal animal health official, conducting the veterinary inspection. (10-1-03)T

09. Submission of Certificate. The required copies of certificates of veterinary inspection or other approved certificates shall submitted, within thirty (30) days of inspection, to the Division. (10-1-03)T

10. Period Of Certificate Validity. Certificates of veterinary inspection shall be valid for no longer than thirty (30) days after the date of inspection. (10-1-03)T

104.--109. (RESERVED).

110. DECLARATION OF EXISTING DELETERIOUS EXOTIC ANIMALS.

Any person that possesses deleterious exotic animals shall declare those animals to the Administrator, in writing, on a form provided by the Division of Animal Industries prior to June 30, 2004. The declaration form shall be filled out accurately, legibly, and completely. (10-1-03)T

111. POSSESSION PERMIT REQUIRED.

Effective July 1, 2004, no person shall possess a deleterious exotic animal without a possession permit signed by the Administrator. (10-1-03)T

01. Existing Deleterious Animals. The Administrator may authorize possession permits for existing deleterious exotic animals on a case-by-case basis. (10-1-03)T

02. Permit Applications. Possession permit applications shall be on a form prescribed by the Administrator and obtained from the Division of Animal Industries. (10-1-03)T

03. Deadline for Application. Possession permit applications for existing deleterious exotic animals shall be received by the Administrator prior to June 30, 2004. (10-1-03)T

04. Exceptions. The Administrator may grant exceptions to the requirements of this section, or extensions of the time limits set in this section, on a case-by-case basis. (10-1-03)T

112.--119. (RESERVED).

120. IDENTIFICATION OF DELETERIOUS EXOTIC ANIMALS.

All deleterious exotic animals in Idaho shall be officially identified with permanent types of identification, approved by the Administrator. (10-1-03)T

121.--149. (RESERVED).

150. PROPAGATION OF DELETERIOUS EXOTIC ANIMALS.

No person shall propagate any deleterious exotic animals in Idaho. The Administrator may authorize, by permit, the following entities to propagate deleterious exotic animals: (10-1-03)T

01. Zoos. Public or private zoos accredited by the AZA. (10-1-03)T

02. Educational Institutions. Public or private institutions of higher education, for research purposes. (10-1-03)T

03. Research Facilities. Persons conducting research determined by the Administrator to be beneficial to agriculture, the environment, or wildlife. (10-1-03)T

04. USDA Licensed Facilities. Zoos and exhibitors, open to the public, licensed by USDA pursuant to Title 9, Parts 1, 2, 3, and 4, CFR, and approved by the Administrator. (10-1-03)T

05. Existing Operations. Persons that have declared under Section 110 and that possess deleterious exotic animals under Section 111 may be permitted to propagate deleterious exotic animals on a case-by-case basis. (10-1-03)T

151.—199. (RESERVED).

200. CONFINEMENT OF DELETERIOUS EXOTIC ANIMALS.

All deleterious exotic animals shall be confined in appropriate facilities, as determined by the Administrator. These facilities shall be constructed and maintained to: (10-1-03)T

01. Prevent Escape. Prevent the escape of deleterious exotic animals. (10-1-03)T

02. Prevent Ingress Of Wildlife. Prevent the ingress of free ranging wildlife that could be negatively impacted by the confined deleterious exotic animals. (10-1-03)T

03. Assure Animal Care. Assure the appropriate level of animal care.-1-03)T

201.—299. (RESERVED).**300. DISPOSITION OF DELETERIOUS EXOTIC ANIMALS WITHIN IDAHO.**

No person shall sell, barter, trade, change ownership, or release into the wild within Idaho, any deleterious exotic animal except: (10-1-03)T

01. To Permitted Facilities. Deleterious exotic animals may be sold, bartered, traded, or given to a zoo, educational institution, USDA licensed facility, or research facility that has a possession permit pursuant to Section 111. (10-1-03)T

02. Between Permitted Facilities. Zoos, educational institutions, USDA licensed facilities, or research facilities that have a possession permit pursuant to section 111 may sell, trade, barter, or exchange deleterious exotic animals with other zoos, educational institutions, USDA licensed facilities, or research facilities that have possession permits pursuant to Section 111. (10-1-03)T

301. EXPORT OF DELETERIOUS EXOTIC ANIMALS.

Any deleterious exotic animals exported from Idaho shall meet all applicable federal regulations for the interstate movement of animals. (10-1-03)T

302.—309. (RESERVED).**310. DEAD ANIMALS.**

All deleterious exotic animals that die, or are euthanized, shall be disposed of in accordance with IDAPA 02.04.17 "Rules Governing Dead Animal Movement and Disposal." (10-1-03)T

311.—399. (RESERVED).**400. DELETERIOUS EXOTIC ANIMALS - INVERTEBRATES.**

01. Zebra Mussel (*Dreissenia polymorpha*). (10-1-03)T

02. New Zealand Mud Snail (*Potamopyrgus antipodarum*). (10-1-03)T

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| 03. | Red Claw Crayfish. | (10-1-03)T |
| 04. | Yamabe Crayfish. | (10-1-03)T |
| 05. | Marone Crayfish. | (10-1-03)T |
| 401.—499. (RESERVED). | | |
| 500. DELETERIOUS EXOTIC ANIMALS – FISH. | | |
| 01. | Green Sturgeon (<i>Acipenser medirostris</i>). | (10-1-03)T |
| 02. | Walking Catfish (<i>Claridae</i>). | (10-1-03)T |
| 03. | Bowfin (<i>Ania Calva</i>). | (10-1-03)T |
| 04. | Gar (<i>Lepiostidae</i>). | (10-1-03)T |
| 05. | Piranhas (<i>Serrasalmus spp.</i> , <i>Rosseveltiella spp.</i> , <i>Pygocentrus spp.</i>). | (10-1-03)T |
| 06. | Rudd (<i>Scardinus erythrophthalmus</i>). | (10-1-03)T |
| 07. | Ide (<i>Leuciscus idus</i>). | (10-1-03)T |
| 08. | Grass Carp (<i>Ctenopharyngoden idella</i>). Diploid grass carp. | (10-1-03)T |
| 09. | Bighead Carp (<i>Hypophthalmichthys nobilis</i>). | (10-1-03)T |
| 10. | Silver Carp (<i>Hypophthalmichthys molitrix</i>). | (10-1-03)T |
| 11. | Black Carp (<i>Mylopharyngodeon piceus</i>). | (10-1-03)T |
| 12. | Snakeheads (<i>Channa spp.</i> , <i>Parachanna spp.</i>). | (10-1-03)T |
| 501.—599. (RESERVED). | | |
| 600. DELETERIOUS EXOTIC ANIMALS – AMPHIBIANS. | | |
| 601.—649. (RESERVED). | | |
| 650. DELETERIOUS EXOTIC ANIMALS - REPTILES. | | |
| 651.—699. (RESERVED). | | |

700. DELETERIOUS EXOTIC ANIMALS – BIRDS.

01. Mute Swan (*Cygnus olor*). Mute swans except those that have been pinioned. (10-1-03)T

701.—799. (RESERVED).

800. DELETERIOUS EXOTIC ANIMALS – MAMMALS.

01. Red Deer (*Cervus elaphus elaphus*). (10-1-03)T

02. Sika Deer (*Cervus nippon*). (10-1-03)T

03. European or Russian Wild Boar (*Sus scrofa*). (10-1-03)T

04. Brush Tailed Possum (*Trichsurus vulpecula*). (10-1-03)T

05. European Hedgehog (*Erinaceus*). (10-1-03)T

06. Nutria (*Myocastor coypus*). (10-1-03)T

07. Prairie Dogs (*Cynomys*). (10-1-03)T

08. African Tree Squirrels (*Heliosciurus*). (10-1-03)T

09. African Rope Squirrels (*Funisciurus*). (10-1-03)T

10. African Dormices (*Graphiurus*). (10-1-03)T

11. Gambian Giant Pouched Rats (*Cricetomys*). (10-1-03)T

12. Brush-tailed Porcupines (*Atherurus*). (10-1-03)T

13. African Striped Mice (*Hybomys*). (10-1-03)T

14. Peccary (*Tayassuidae*). (10-1-03)T

15. Capybara (*Hydrochoerus hydrochaeris*). (10-1-03)T

16. Barbary Sheep (*Ammotragus lervia*). (10-1-03)T

17. Lion (*Panthera leo*). (10-1-03)T

18. Tiger (*Panthera tigris*). All tigers. (10-1-03)T

19. Leopard (*Panthera pardus*). All leopards. (10-1-03)T

- 21. **Jaguar (*Panthera onca*).** (10-1-03)T
- 22. **Cheetah (*Acinonyx jubatus*).** (10-1-03)T
- 23. **Serval (*Felis cerval*).** (10-1-03)T
- 24. **Caracal (*Felis caracal*).** (10-1-03)T
- 25. **Ocelot.** (10-1-03)T
- 26. **Margay.** (10-1-03)T
- 27. **Jeoffroy’s Cat.** (10-1-03)T
- 25. **South American Rodents.** All South American rodents except guinea pigs. (10-1-03)T
- 26. **Mouflon Sheep (*Ovis musimon*).** (10-1-03)T

801.—899. (RESERVED).

900. ADDITIONAL REQUIREMENTS.

The Administrator may add additional animals to the deleterious exotic animals list in this chapter by issuing a written order listing animals and the reasons for adding them to the deleterious exotic animals list. (10-1-03)T

901.—989. (RESERVED).

990. PENALTIES FOR VIOLATIONS.

Any person who violates the provisions of this chapter shall be subject to the penalty provisions of Section 25-3905, Idaho Code. (10-1-03)T

991.—998. (RESERVED).

999. MINOR VIOLATIONS.

Nothing in this chapter shall be construed as requiring ISDA to report minor violations when ISDA believes that the public interest will be best served by suitable warnings or other administrative action. (10-1-03)T

Appendix D – ELIs Summary of Idaho’s Invasive Species Laws and Regulations and Table of Idaho’s Invasive Species Strategy and Programs

I. Idaho Overview

Idaho has a list of noxious weeds, a list of invasive phytophagous snails, and a list of nineteen species of live wildlife that may be imported into Idaho to private wildlife facilities. County control authorities also maintain lists of noxious weeds for their county. Idaho has a pest survey program, and regulates plants, invertebrates, wildlife, fungi, and insects.

II. Invasive Species Councils and Plans

Idaho has a statewide council that addresses all categories of invasive species, as well as a committee that was established to implement the state’s invasive weed management plan.

In 2001, Idaho established a comprehensive, statewide invasive species council - the Idaho Invasive Species Council - through gubernatorial executive order.¹ The council is a “joint effort between local, tribal, state, and federal governments, as well as the profit and not-for-profit private sectors.”² The purpose of the council is “to provide policy level direction and planning for combating harmful invasive species infestations throughout the state and for preventing the introduction of others that may be potentially harmful.”³ The council is charged to: “Minimize the effects of harmful nonnative species on Idaho citizens and to ensure the economic and environmental well being of the State of Idaho; Serve as a nonpartisan forum for identifying and understanding invasive species issues from all perspectives; Take measures that will encourage control and prevention of harmful nonnative species; Organize and streamline the process for identifying and controlling invasive species; and Consider ways to halt the spread of invasive species as well as finding possible ways to bring current problems under control.”⁴

Prior to the development of the comprehensive Invasive Species Council, the Idaho Weed Coordinating Committee (IWCC) was established through a Memorandum of Understanding to coordinate statewide integrated weed management programs and to implement the action items outlined in “Idaho’s Strategic Plan for Managing Noxious Weeds.”⁵ The plan was endorsed by 19 local, state and federal agencies, private associations, industry, environmental organizations, tribes, and academic institutions.⁶ The state legislature supported its development, and the final plan was approved by the governor in February of 1999.⁷ The plan addresses eight broad issues critical to building a successful statewide invasive plant management program: 1) organization and leadership, 2) coordination and partnerships, 3) awareness and education, 4) funding and resources, 5) inventory, mapping, and monitoring, 6) assessments and adaptive planning, 7) research and technology, and 8) compliance and enforcement. The noxious weeds plan is the only statewide invasive species management plan for Idaho.

To promote on-the-ground implementation, the centerpiece of the strategic plan is the creation of cooperative weed management areas (CWAs) at the local level.⁸ Through cooperative agreement, county weed advisory committees or steering committees are to be formed for each CWA to ensure an integrated geographic approach to managing noxious weeds across all relevant jurisdictional boundaries within the designated areas. CWAs must develop an integrated weed management plan, an annual operating plan with measurable objectives, and a budget to be eligible for cost-share grants administered by the state department of agriculture.⁹ Funding earmarked by the state legislature is available to assist CWAs in the development and implementation of their integrated weed management plans. This funding has increased from \$118,000 in 1998 to over \$2.4 million in 2001. To date, 33 cooperative weed management areas covering almost 90 percent of the state have been formed and have developed, or are in the process of developing management plans.¹⁰

III. Relevant Authorities

A. Wildlife

1. General Authority

The Idaho Fish and Game Commission has primary responsibility for wildlife and fish in Idaho and is empowered to adopt rules governing the importation, exportation, release, sale, possession or transportation into, within or from Idaho of any species of live, native or exotic wildlife.¹¹ There is a list from the Department of Fish and Game of nineteen mammals and birds that may be imported into Idaho and no other species may be imported.¹² A permit from the department is needed to import or release into Idaho any species of wildlife.¹³ Anyone wishing to import any live wildlife into Idaho must obtain a valid import permit and an appropriate commercial big game farm license.¹⁴ Furbearing animals imported for fur farming purposes are exempt.¹⁵ No permit will be issued if the wildlife would pose a threat to wildlife in Idaho either through threat of disease, genetic contamination or displacement, or competition with existing species.¹⁶ No permit is necessary to import, export, transport, or sell agricultural or domestic animals common to Idaho, furbearers, conventional household pets, and game birds produced in captivity, and legally possessed birds of prey.¹⁷ All native and exotic game birds require a Department of Fish and Game import permit, but are exempt from a commercial game farm license.¹⁸ A licensed veterinarian must certify each animal to be imported as free of diseases.¹⁹ It is forbidden for anyone to possess, import, transport, release, or sell any prohibited species without the authorization of the director.²⁰ Intrastate movement is allowed only for nonquarantined wildlife between licensed facilities.²¹ The commission will capture, propagate, transport, buy, sell or exchange any species of wildlife needed for propagation or stocking purposes, or to exercise control of undesirable species.²² The director may introduce any new species.²³ When the Department of Fish and Game imports or transports any deer, elk, antelope, moose, bighorn sheep or bison, the director must ensure that the game animals are tested for the

presence of certain communicable diseases.²⁴ Regulations prohibit the possession of any wildlife imported into Idaho without a valid import permit, if a permit is required.²⁵ It is prohibited to release or abandon any domestic or exotic birds, mammals, amphibians, or reptiles on all lands and woods under the control of the Department of Fish and Game, although the director may specifically approve activities as an exception or for administrative purposes.²⁶ Any prohibited species that is released by or escapes from an owner must be captured or destroyed by the owner or by the department.²⁷ Violations are generally misdemeanors, punishable by a fine of between \$25 and \$1,000 and/or up to six months in jail.²⁸ It is a felony to release into the wild, without a permit from the director, ungulates, bears, wolves, large felines, swine, or peccaries, whether native or exotic.²⁹ The felony carries a punishment of up to 5 years in prison and/or a fine of up to \$50,000.³⁰

2. Shooting Preserves

A permit is required for private parks and commercial wildlife farms that include big game animals.³¹ The parks cannot be located where wildlife abounds, and a fence is necessary to prevent the escape of wildlife.³² Permits and licenses, including import permits, are also required for operating a wildlife facility, which is defined to include a private zoo, menagerie, animal display, private wildlife park or commercial wildlife farm.³³ Shooting preserves must have permits and may only include species of upland game birds specified in the permit.³⁴ For wildlife facilities, all wildlife must be kept in cages so that it will be impossible for the animals to escape.³⁵ All big game must be marked, and each wild animal that is imported must be examined by a licensed veterinarian for diseases, parasites and genetic characteristics of concern.³⁶ The director of the Department of Fish and Game has the authority to inspect the wildlife facilities.³⁷ Records must be maintained and made available to the director upon request.³⁸ The director of the Department of Fish and Game and the director of the Department of Agriculture must work together to determine the diseases, parasites of concern, and measures to control them within Idaho, such as inspection and quarantine.³⁹ Particular attention is paid to those diseases and/or parasites that may have significant detrimental effect on native wildlife, other captive wildlife, livestock, or the public health of the citizens of Idaho.⁴⁰ The owners of big game facilities are liable for any wildlife that is released without a permit or escapes. Any such wildlife must be captured or destroyed by the owner or the department.⁴¹

B. Aquatic Life

1. General Authority

The Idaho Fish and Game Commission has primary responsibility for wildlife and fish in Idaho. A license is necessary to obtain, possess, preserve or propagate fish for sale.⁴² A permit from the Department of Fish and Game is needed to import, export, transport into, release or sell any living fish within Idaho.⁴³ No permit is necessary to import, export, transport, or sell ornamental or tropical aquarium fish that are commonly shipped interstate (except for specific listed fish), fish that one has caught, fish purchased from a

commercial facility, fish being transferred between licensed commercial facilities, or nonviable fish eggs used for bait or personal consumption.⁴⁴ The commercial facility cannot be constructed in or across any natural streambed, lake, or other watercourse containing wild fish, and all water inlets must be screened to prevent escape of the commercial fish.⁴⁵ It is prohibited to release or abandon any domestic or exotic fish on all waters under the control of the Department of Fish and Game, although the Director may specifically approve activities as an exception or for administrative purposes.⁴⁶ Violations are punished by administrative penalties of up to \$1,000.⁴⁷ Violations are generally misdemeanors, punishable by a fine of between \$25 and \$1,000 and/or up to six months in jail.⁴⁸

2. Other

a) *Private Ponds* - A permit is required for private ponds.⁴⁹ The ponds cannot be located in or across a natural stream or lake containing wild fish.⁵⁰

C. Plants

1. Noxious Weeds

A noxious weed is any plant having the potential to cause injury to public health, crops, livestock, land, or other property.⁵¹ There is a list of noxious weeds, established by the director of the Department of Agriculture, as well as articles capable of disseminating the noxious weeds.⁵² The Idaho Fish and Game Commission will, upon request by a board of county commissioners, provide a management plan that addresses noxious weed control for any land purchased by the state.⁵³ The director of the Department of Agriculture is responsible for employing a statewide weed coordinator.⁵⁴ The director will appoint a state noxious weed advisory committee to aid in the development and implementation of a state noxious weed management strategy.⁵⁵ The director is also authorized to require information, annual work plans and reports from each county and from each state agency regarding the presence of noxious weeds and steps to control them.⁵⁶ The director will disseminate information and conduct educational campaigns.⁵⁷ The director will inspect and certify Idaho crops and imports and exports to verify freedom from noxious weeds.⁵⁸ The director may enter any public or private land at reasonable times.⁵⁹ The director may control noxious weeds on federal land with the consent of the relevant federal agency.⁶⁰ All landowners must control noxious weeds on their land, including prevention and eradication of noxious weeds and restoration of the land.⁶¹ Any not-for-profit company that operates any irrigation project or canal system to supply water to its shareholders has the right to treat and eradicate noxious weeds growing on the lands within and adjacent to the boundaries of the project or water system.⁶² Controlling, treating, and eradicating the noxious weeds should be carried out in cooperation with the state's weed program.⁶³ The provisions governing noxious weeds on lands within irrigation projects are permissive, not mandatory.⁶⁴ For state lands that are sold in noxious weed control districts, or which may become part of a noxious weed control district, the purchaser must join the district and pay for the eradication and control of noxious weeds on these lands.⁶⁵ If the purchaser does not join a weed control program

within ninety days, the director may order treatment of the purchased land by the weed control district.⁶⁶

Every person, before removing any article capable of disseminating weeds from any place infested with noxious weeds or before moving the article onto any public roadway, must enclose, clean, or treat the article to prevent the spread of noxious weeds.⁶⁷ The regulations also prohibit the sale or provision of these articles in Idaho which contain noxious weed propagules unless the materials have been treated in a manner to eliminate all noxious weed propagating capability.⁶⁸ The Idaho Department of Agriculture Phytosanitary and Post-Entry rules establish a certification process that governs the production of pest-free plants and plant products and provide for inspection areas and set forth minimum field inspections that must be conducted to search for diseases and pests.⁶⁹ The rules establish a voluntary certification program for forage and straw, governing the certification of noxious-weed-free forage and straw.⁰ Violations are misdemeanors, punishable by a fine of up to \$1,000 and/or up to 1 year in jail.⁷¹

The county control authority may designate weeds, in addition to the state noxious weed list, as noxious within their county, but such additional species are not subject to provisions of the state noxious weed laws.⁷² The county control authority is responsible for establishing a coordinated program for control of noxious weeds in the county and employing a county weed superintendent.⁷³ County control authorities may appoint weed control advisory committees, which assist in planning and carrying out noxious weed control programs and provide a forum for public input.⁷⁴ The county weed superintendent has the authority to enter lands in the county that have noxious weeds in order to ascertain conditions and may stipulate items that require treatment.⁷⁵ Each year, a general notice for control of noxious weeds will be published in a newspaper listing the noxious weeds and identifying those known to be in the county, and stipulating the obligation to control them.⁷⁶ If a non-federal landowner receives notice that his land contains noxious weeds but fails to initiate the required controls within five days, the county will have proper control methods used on the land, including necessary destruction of crops.⁷⁷ The county control authority may quarantine any tract of land where the landowner appears unable to control an infestation of noxious weeds.⁷⁸ Idaho has established a noxious weed account as a dedicated fund.⁷⁹ In addition, each county is also required to create a noxious weed fund and to set up a Range Improvement Fund, whose monies are expended by the board of county commissioners for range improvement and maintenance projects including the extermination of poisonous or noxious weeds.⁸⁰

2. Seeds

Noxious weed seeds are seeds of any plant which is determined by the director of the Department of Agriculture to be injurious to public health, crops, livestock, land or other property.⁸¹ There is a list of prohibited noxious weed seeds, which are seeds that when established are highly destructive and difficult to control in Idaho by ordinary good cultural practices.⁸² There is also a list of restricted noxious weed seeds and their tolerances. Restricted weed seeds are seeds of weeds that are very objectionable in fields

or lawns but can be controlled by good cultural practices.⁸³ The director is responsible for maintaining a list of noxious weeds.⁸⁴ The Director can enter public or private premises during business hours to have access to seeds and to sample and inspect the seeds.⁸⁵ Before any seed can be sold or delivered, the label must designate the percentage by weight of all weed seeds and the name and rate of occurrence per pound of each kind of restricted noxious weed seed present.⁸⁶ It is illegal to sell or deliver any seed in Idaho that contains prohibited noxious weed seeds or restricted noxious weed seeds in excess of established tolerances.⁸⁷ It is also unlawful to transport screenings containing noxious weed seeds without proper covering to prevent noxious weed dissemination, and all screenings containing noxious weed seeds must be processed to eliminate germination.⁸⁸ The director can issue and enforce a “stop-sale” order to the owner of any lot of seed that is in violation of any of the provisions.⁸⁹ Upon complaint to a court, the director may seize seed that does not comply with the law, and if the court finds that the seed does not comply with the law, the court may order the seed condemned, in which case it will be denatured, processed, destroyed, relabeled, or otherwise disposed of.⁹⁰ Violations are misdemeanors, carrying a fine of up to \$3,000 and/or imprisonment for up to 12 months.⁹¹ The department may also assess civil penalties of up to \$2,000 plus reasonable attorneys’ fees for each offense.⁹²

3. Feed

It is prohibited to distribute a soil or plant amendment that contains weed seed.⁹³ The director is authorized to issue a written “stop-sale, use or removal” order to the manufacturer, distributor, or owner of any soil or plant amendment containing weed seeds.⁹⁴ A violation of these provisions is a misdemeanor carrying a fine of up to \$500 for the first violation and up to \$1,500 for subsequent violations.⁹⁵ Violations are also subject to a civil penalty of up to \$10,000 plus reasonable attorney’s fees for each offense.⁹⁶

4. Land Management

When leasing land from the state for grazing or agricultural purposes, the lessee must take measures to control noxious weeds except those resulting from activities beyond his control.⁹⁷ The lessee is not responsible for controlling noxious weeds that result from other land management activities such as temporary permits, easements, special leases and timber sales.⁹⁸ For state grazing lands, the lessee and lessor are equally responsible for controlling noxious weeds.⁹⁹

D. Plant Pests and Diseases

1. Nurseries

The Department of Agriculture is charged with horticultural and nursery inspection.¹⁰⁰ The director is authorized to enter any public or private land at any reasonable times.¹⁰¹ If, upon any inspection, there is found any disease or pests injurious to fruits, plants, trees, shrubs or vines, the director must notify the owner and require him to destroy the

pests or to take other steps to remove the threat, and if the owner does not do so, the department must disinfect or destroy the infested articles or host materials.¹⁰² It is prohibited for any person to knowingly offer to sell nursery or florist stock or fruit that is infected or infested, and it is illegal to advertise, transport, or store nursery or florist stock that is infected or infested.¹⁰³ It is illegal to substitute or transport uninspected nursery or florist stock and to misrepresent, mislabel, or sell misrepresented or mislabeled stock.¹⁰⁴ It is illegal to plant any bean seed that has not been approved for planting.¹⁰⁵ The director may seize any infected or infested nursery or florist stock.¹⁰⁶ The department may issue “stop-sale” orders.¹⁰⁷

The Department of Agriculture may enforce a quarantine of any area or articles in Idaho when they may be liable to spread pests or disease.¹⁰⁸ The department may also establish a quarantine for any counties in Idaho, as well as all states, territories, and foreign countries against any pests and diseases which are liable to be introduced into Idaho.¹⁰⁹ Some violations of this chapter are misdemeanors, and civil penalties of up to \$500 per offense plus reasonable attorney’s fees may also be assessed.¹¹⁰ Some violations are civil offenses, punishable by treble the damages sustained, all costs of the suit including reasonable attorney’s fees, and a civil fine of up to \$3,000 per incident of violation.¹¹¹ Violations of the bean planting prohibition incur a civil fine of between \$5,000 and \$25,000, as well as a misdemeanor punishable by up to 6 months imprisonment, and a criminal fine of up to \$300.¹¹²

2. Forests

Idaho law seeks to protect and preserve forest resources from the ravages of the Tussock moth, pine beetle and other destructive forest insects, pests and diseases.¹¹³ The director of the Department of Lands must develop plans for the regulation, management and control of forest insects, diseases and other pests, including areas of prevention, detection, evaluation and control.¹¹⁴ The forest insect and disease program is incorporated into the broader forest protection program.¹¹⁵ When there is a threat of an infestation of destructive forest insects, pests or diseases injurious to the timber or forest growth on forest lands, the director of the Department of Lands can declare a “zone of infestation” and set its boundaries.¹¹⁶ The director may enter land within the zone to suppress, eradicate, and destroy the insect, infestation or disease.¹¹⁷ The Forest Practices Act provides for the prompt salvage of timber to help contain outbreaks of insects and diseases.¹¹⁸ There is a dedicated fund in the state treasure, the Forest Pest Account, to help pay for pest control projects on state lands.¹¹⁹

3. Specific Quarantines

The director of the Department of Agriculture is authorized to establish quarantines to protect articles of agriculture or horticulture against infestation by any pest new to or not widely prevalent within Idaho.¹²⁰ The director is authorized to promulgate rules to implement and enforce the quarantines, including the setting of quarantine boundaries, requirements for importing and exporting plant materials, planting, testing, inspection, and compliance verification procedures.¹²¹ Idaho has regulations that seek to prevent,

mitigate, and control the spread of diseases and pests that harm crops, including diseases of hops, bacterial diseases of phaseolus species of beans, white rot disease of onion, control of the cherry fruit fly, annual blue grass, mint diseases, the anthracnose disease of lentils, late blight of potato, Karnal bunt disease, and potato diseases.¹²² Idaho also has a quarantine on the necrotic strain of the potato virus y, European pine shoot moth, rough blue grass, apple maggot, grape viruses, Japanese beetle, and plum curculio.¹²³ The rules govern the planting of potatoes, prohibit planting peach and apricot trees in the management area, and regulate the storage of infested potatoes, disposal of cull potatoes, and transportation of potatoes.¹²⁴ A violation of the rules is a civil offense, with the violator liable for treble damages and all court costs, including reasonable attorney's fees, as well as a civil fine of up to \$3,000 per incident.¹²⁵ Violations of quarantine statutory provisions are misdemeanors, punishable by a civil fine of up to \$10,000 for each offense plus reasonable attorney's fees.¹²⁶

4. Specific Plant Pests

a) Agricultural Pests - The board of county commissioners in any county may declare agricultural pests and take steps to control the pests.¹²⁷ Agricultural pests are defined as any predatory animal that destroys any poultry or livestock, or any rodent, jack-rabbit, gopher, ground squirrel, cricket, locust, grasshopper and other insect pests or plant disease causing organisms/agents or any other invertebrate organism that destroys any livestock, natural grasses, or cultivated crops.¹²⁸ The board has latitude in controlling agricultural pests in any manner they see fit, including facilitating the sale of supplies and equipment, at cost, to landowners to control agricultural pests and the use of poisoned bait.¹²⁹ The county board can establish "special control districts" to address agricultural pests infecting a particular area.¹³⁰ A special control district is governed by three commissioners, who have the power either to order landowners to control the pests on their own land within a specified period of time or to pay the actual costs of having the county control the pests.¹³¹ The board may hire people to control agricultural pests in the county, and those people are authorized to enter any farm, right of way, or other premises where there are agricultural pests to ascertain conditions and to control the pests when the owner or occupant neglects to do so.¹³² Every landowner, including federal, state, county, and municipal governments, in an agricultural pest control district has the duty to control declared agricultural pests.¹³³ To control agricultural pests, the board may establish a revolving Pest Fund financed by an annual property tax not exceeding 0.02%.¹³⁴

b) Snail s- There is a list of snails, all of which are not native to Idaho and particular areas of origin are targeted.¹³⁵ There is a quarantine on the introduction and/or distribution of live, nonnative, plant-feeding snails and their host material into Idaho.¹³⁶

5. Other

a) Crop Management Areas - The director of the Department of Agriculture is authorized to establish crop management areas, in which specific practices may be mandated such as the use of clean seed, destruction of infested plants, use of chemicals, and prohibiting

introduction of host materials.¹³⁷ A crop management area is established by the director upon petition by fifteen registered electors residing in the proposed area.¹³⁸ The director may enter onto public and private land at any reasonable time.¹³⁹ The director may make regulations that specify the kind and quality of seed or other propagative material which may be planted in the area; treatments which will be used to control pests in the area; the transportation of vegetative material into, within, or out of the area; the disposition of infested crops, undesirable plants or other material which may include destruction; and the disposition of vegetative material planted in violation.¹⁴⁰ Violations of the crop management area provisions are civil offenses.¹⁴¹ Offenders may be liable for treble the damages sustained and all costs of the suit including reasonable attorney's fees, as well as a civil fine of up to \$3,000 per incident of violation.¹⁴²

b) Plant Pest Control and Research Commission - The Plant Pest Control and Research Commission was established to combine the executive authority of the government, the quarantine and inspection powers of the Department of Agriculture, and the research facilities of the University of Idaho with the goals of preventing public economic loss from insect and other agricultural pest infestations, preventing infestations by and introduction of agricultural pests, and eliminating the existing pest infestations.¹⁴³ The commission is housed in the governor's office, and includes the governor or his representative, the director of the Department of Agriculture, and the director of the agricultural experiment station of the University of Idaho.¹⁴⁴

E. Insects

1. General Authority

Whenever the director of the Department of Agriculture determines that there is a threat of an infestation of grasshoppers, crickets or other similar pests on state-owned land or private land and that the infestation is a menace to state and adjacent private rangeland or agricultural land, the director may declare the existence of a zone of infestation and its boundaries.¹⁴⁵ Upon making this determination, the director may suppress and eradicate the insect infestation on the state-owned land in the manner approved by the state board of land commissioners.¹⁴⁶ The director may enter on the land and suppress the infestation.¹⁴⁷ The director may designate areas infested with the cherry fruit fly, which will then lead to spraying of cherry trees.¹⁴⁸

2. Apiaries

The director of the Department of Agriculture is authorized to establish a certification program for beekeepers in order to prevent and control the movement of exotic strains of bees into Idaho.¹⁴⁹ The director is responsible for investigating threats from bees, including transmissible diseases and exotic strains of bees.¹⁵⁰ If a disease or exotic strain is present, the director can prescribe abatement measures including destruction of the infested bees or exotic strain of bees and contaminated equipment.¹⁵¹ It is prohibited to remove infested colonies or equipment from where they are found, without permission from the director.¹⁵² Violations are misdemeanors, subject to a fine of between \$100 and

\$1,000 and/or imprisonment for 3 to 12 months.¹⁵³ Civil fines of up to \$100 per offense plus reasonable attorney's fees may also be assessed.¹⁵⁴

Endnotes

¹ The Office of the Governor. 2001 (Sept. 26). Establishing the Idaho Invasive Species Council. Executive Order No. 2001-11. State of Idaho, Executive Department, Boise, ID. <<http://www.agri.state.id.us/animal/weedintro.htm>>

² *Id.* Membership includes a representative from the executive office of the Governor and the directors of the State Departments of Agriculture, Environmental Equality, Parks and Recreation, Fish and Game, Lands, Water Resources, Commerce, Health and Welfare, and Transportation, and the University of Idaho. Representatives of the following federal entities, local government organizations, and tribal governments are invited to participate in the council, along with private and non-profit organizations: USDA Forest Service, Animal and Plant Health Inspection Service, Natural Resources Conservation Service, Bureau of Land Management, Bureau of Reclamation, Idaho's Senators, Idaho's Congressmen, Association of Idaho Cities, Idaho Association of Counties, Regional planning or economic development districts, Resource Conservation and Development Districts, Health Districts, Kootenai Tribe, Coeur d'Alene Tribe, Nez Perce Tribe, Shoshone-Paiute Tribes, and Shoshone-Bannock Tribes.

³ *Id.*

⁴ *Id.*

⁵ Idaho Weed Coordinating Committee. 2000 (March 27). Idaho Weed Coordinating Committee Memorandum of Understanding, draft.

<http://www.agri.state.id.us/PDF/Animal/iwccchar.pdf>

⁶ Idaho State Department of Agriculture, Idaho Dept. of Lands, Idaho Transportation Dept., Idaho Weed Control Assoc., Idaho Assoc. of Weed Control Superintendents, Nature Conservancy, Bureau of Land Mgmt, Forest Service- Intermountain Region and Northern Region, Idaho Association of Counties, University of Colorado, Idaho Fertilizer and Chemical Assoc., Idaho Hay Growers, Idaho Water Users Associations, Food Producers of Idaho, Idaho Association of Soil Conservation Districts, Nez Pierce Tribe, Idaho Department of Fish and Game, and Bureau of Reclamation.

⁷ Secrist, G. Noxious Weed Department, Idaho State Department of Agriculture. Personal communication, 11 June 2002.

⁸ Idaho State Department of Agriculture. 1999 (February). Idaho's Strategic Plan for Managing Noxious Weeds. 11pp.

⁹ Idaho State Department of Agriculture. 2000 (May 23). "Noxious Weed Cost-Share Program." <www.agri.state.id.us/animal/CostShare.htm> (11 June 2002).

¹⁰ Secrist, G. Noxious Weed Department, Idaho State Department of Agriculture. Personal communication, 11 June 2002.

¹¹ Idaho Code §36-104(b)(6).

¹² Idaho Admin. Code §§13.01.10.700.03.a, 13.01.10.701.

¹³ Idaho Code §36-701(d).

¹⁴ Idaho Admin. Code §§13.01.10.700.02.a, b.

¹⁵ Idaho Admin. Code §13.01.10.700.02.b.

¹⁶ Idaho Admin. Code §13.01.10.100.

- 17 Idaho Admin. Code §13.01.10.100.01.
18 Idaho Admin. Code §13.01.10.700.02.b.
19 Idaho Admin. Code §13.01.10.700.02.d.
20 Idaho Admin. Code §13.01.10.700.03.b.
21 Idaho Admin. Code §13.01.10.700.04.a.
22 Idaho Code §36-104(b)(11).
23 Idaho Code §36-106(e)(6)(A).
24 Idaho Code §36-106(e)(9).
25 Idaho Admin. Code §13.01.10.100.09.
26 Idaho Admin. Code §13.01.03.100.j.
27 Idaho Admin. Code §3.01.10.700.04.b.
28 Idaho Code §§36-1401, 1402(b).
29 Idaho Code §36-1401(c).
30 Idaho Code §§36-1402(c), 18-112.
31 Idaho Code §36-706.
32 *Id.*
33 Idaho Admin. Code §13.01.10.400.01.
34 Idaho Admin. Code §13.01.10.500.
35 Idaho Admin. Code §13.01.10.400.07.a.
36 Idaho Admin. Code §§13.01.10.200.03, 04.
37 Idaho Code §36-709.
38 *Id.*
39 Idaho Admin. Code §§13.01.10.200.16, 13.01.10.700.05.
40 *Id.*
41 Idaho Admin. Code §13.01.10.200.14.
42 Idaho Code §22-4602.
43 Idaho Admin. Code §13.01.10.100.
44 Idaho Admin. Code §13.01.10.100.01.
45 Idaho Code §22-4602.
46 Idaho Admin. Code §13.01.03.100.j.
47 Idaho Code §22-4604.
48 Idaho Code §§36-1401, 1402(b).
49 Idaho Code §36-706.
50 *Id.*
51 Idaho Code §22-2402(12).
52 Idaho Admin. Code §§02.06.22.100.01, .01.
53 Idaho Code §36-104(b)(7).
54 Idaho Code §22-2403(2).
55 Idaho Code §22-2404(1)(h).
56 Idaho Code §22-2404(1)(b).
57 Idaho Code §22-2404(1)(g).
58 Idaho Code §22-2404(1)(j).
59 Idaho Code §22-2404(1)(k).
60 Idaho Code §22-2404(1)(q).
61 Idaho Code §22-2407(1).
62 Idaho Code §42-2301.

- ⁶³ Idaho Code §§42-2303, 22-2401 et seq.
⁶⁴ Idaho Code §42-2304.
⁶⁵ Idaho Code §58-314.
⁶⁶ *Id.*
⁶⁷ Idaho Admin. Code §02.06.22.200.01.
⁶⁸ Idaho Admin. Code §02.06.22.200.02.
⁶⁹ Idaho Admin. Code §§02.06.04.000 et seq.
⁷⁰ Idaho Admin. Code §02.06.31.
⁷¹ Idaho Code §22-2409(1).
⁷² Idaho Code §22-2406(1)(k).
⁷³ Idaho Code §22-2405(1)(b).
⁷⁴ Idaho Code §22-2410.
⁷⁵ Idaho Code §22-2406(2)(b).
⁷⁶ Idaho Code §22-2405(2).
⁷⁷ Idaho Code §22-2405(4).
⁷⁸ Idaho Code §22-2406(1)(b).
⁷⁹ Idaho Code §22-2402(2)(a).
⁸⁰ Idaho Code §§22-2402(2)(b), 57-1202, 57-1203.
⁸¹ Idaho Code §22-414(17).
⁸² Idaho Code §22-414(17), Idaho Admin. Code §02.06.01.200.01.
⁸³ Idaho Code §22-414(17), Idaho Admin. Code §§02.06.01.200.01, .02.
⁸⁴ Idaho Code §22-414(17).
⁸⁵ Idaho Code §§22-418(5), (6).
⁸⁶ Idaho Code §§22-415(1)(f), (g).
⁸⁷ Idaho Code §§22-416(1)(d), (e).
⁸⁸ Idaho Code §22-416(2)(f).
⁸⁹ Idaho Code §22-418(7).
⁹⁰ Idaho Code §22-420.
⁹¹ Idaho Code §22-421(1).
⁹² Idaho Code §22-421(2).
⁹³ Idaho Code §22-2215.
⁹⁴ Idaho Code §22-2217(3).
⁹⁵ Idaho Code §22-2219(1).
⁹⁶ Idaho Code §22-2219(2).
⁹⁷ Idaho Admin. Code §20.03.14.111.01.
⁹⁸ Idaho Admin. Code §20.03.14.111.02.
⁹⁹ *Id.*
¹⁰⁰ Idaho Code §§22-1901 - 1922.
¹⁰¹ Idaho Code §22-1914.
¹⁰² Idaho Code §§22-1901, 22-1902.
¹⁰³ Idaho Code §§22-2318(1), 22-2218(2), 22-1906.
¹⁰⁴ Idaho Code §§22-2315 - 2317.
¹⁰⁵ Idaho Code §22-1922.
¹⁰⁶ Idaho Code §22-2318(3).
¹⁰⁷ Idaho Code §22-2319.
¹⁰⁸ Idaho Code §22-1905.

- 109 Idaho Code §22-1905.
110 Idaho Code §22-2324.
111 Idaho Code §22-1915(2).
112 Idaho Code §22-1922.
113 Idaho Code §38-601.
114 Idaho Code §38-603.
115 Idaho Code §38-604.
116 Idaho Code §38-602.
117 *Id.*
118 Idaho Code §38-1303(16).
119 Idaho Code §§38-605, 38-606.
120 Idaho Code §22-2001.
121 Idaho Code §22-2006.
122 Idaho Admin. Code §§02.06.05 - 02.06.450.
123 Idaho Admin. Code §§02.06.09 - 02.06.38.
124 Idaho Admin. Code §§02.06.26.150 - 02.06.26.400.
125 Idaho Admin. Code §02.06.26.450.
126 Idaho Code §22-2004.
127 Idaho Code §25-2601.
128 *Id.*
129 Idaho Code §§25-2603, 2605, 2609.
130 Idaho Code §25-2604.
131 Idaho Code §25-2606.
132 *Id.*
133 Idaho Code §25-2608.
134 Idaho Code §25-2602.
135 Idaho Admin. Code §§02.06.29.010, 015.
136 Idaho Admin. Code §02.06.29.005.
137 Idaho Code §22-1001.
138 Idaho Code §22-1003.
139 Idaho Code §22-1004.
140 Idaho Code §22-1003.
141 Idaho Code §22-1006.
142 *Id.*
143 Idaho Code §22-2103.
144 Idaho Code §§22-2105, 2102.
145 Idaho Code §§58-155, 22-2108.
146 Idaho Code §58-155.
147 Idaho Code §22-2108.
148 Idaho Code §22-1913.
149 Idaho Code §22-2520.
150 *Id.*
151 *Id.*
152 *Id.*
153 Idaho Code §22-2539(1).
154 Idaho Code §22-2539(2).

Table D-1. Summary of Idaho's Invasive species Strategy and Programs

<u>Identifying</u>	<u>Wildlife</u>	<u>Aquatic</u>	<u>Plant</u>	<u>Plant Pest</u>	<u>Insect</u>		
Specific authority to identify future invasive species threats and mitigate for them	No	No	No	No	No		
<u>Detection</u>	<u>Survey</u>	<u>Mapping</u>	<u>Inspection</u>				
Types of detection tools that are authorized	No	No	Yes, for plants, insects				
<u>Import/Introduction/Release</u>	<u>Import</u>		<u>Introduction</u>		<u>Release</u>		<u>Standards</u>
Requirements for the import, introduction or release of invasive species, and any standards governing import, release or introduction	<u>Permit/Certificate</u>	<u>Prohibitions</u> Plants	<u>Permit/Certificate</u> Wildlife	<u>Prohibitions</u> Plants	<u>Permit/Certificate</u> & Aquatic life	<u>Prohibitions</u>	Wildlife
<u>Quarantines</u>	<u>Species and/or Premises/Area</u>		<u>Transportation</u>	<u>Mandatory?</u>			
Authority for quarantines of potentially invasive species, either for an area or for transportation through the state	Wildlife, plants		Plants	No			
<u>Education</u>	<u>Wildlife</u>	<u>Aquatic Life</u>	<u>Plants</u>	<u>Plant Pests and Disease</u>	<u>Insects</u>		
Authority for education programs to inform the public and decision-makers about invasive species	No	No	Yes	No	No		
<u>Permits and Licenses</u>	<u>Species Permit/License</u>	<u>Conditions</u>	<u>Facility Permit/License</u>	<u>Conditions</u>			
Requirements for permits or licenses to import, possess or release a potentially invasive species and whether there are conditions for inspection, recordkeeping	Wildlife, aquatic life	Wildlife, aquatic life, insects	No	Wildlife, aquatic life			
<u>Bonds and Insurance</u>	<u>Bonds</u>	<u>Insurance</u>					
Requirement for posting bonds or obtaining liability insurance in order to possess potentially invasive species	No	No					
<u>Post-Release Monitoring</u>	<u>Wildlife</u>	<u>Aquatic Life</u>	<u>Plants</u>	<u>Plant Pests and Disease</u>	<u>Insects</u>		
Requirements for post-release monitoring of introduced species	No	No	No	No	No		
<u>Transportation and Shipping</u>	<u>Prohibition</u>	<u>Permit/Certificate</u>	<u>Inspection</u>	<u>Labeling</u>	<u>Registration</u>		
Requirements for shipping or transportation of invasive species through the state	Plants	Wildlife, aquatic life	Plant pests, diseases	Plants	No		

General Control and Management Authority General authority for a state agency to manage invasive species or for a landowner to report their presence and for a statewide management plan	<u>State Agency Authority</u> Wildlife, plants, plant pests and disease, insects	<u>Required State Notice</u> No	<u>Statewide Plan/Program</u> Plants, plant pests and diseases				
Emergency Powers Authorization of emergency powers to address invasive species outbreaks	<u>Wildlife</u> No	<u>Aquatic Life</u> No	<u>Plants</u> No	<u>Plant Pests and Diseases</u> No	<u>Insects</u> No		
Management of Biological Control Agents Requirements for approval, permit or a license to use biological control agents and are there standards for them	<u>Approval, Permit or License</u> No	<u>Standards</u> No					
Restoration Policies Authority for or existing restoration policies for areas invaded by invasive species	<u>Wildlife</u> No	<u>Aquatic Life</u> No	<u>Plants</u> No	<u>Plant Pests and Diseases</u> No	<u>Insects</u> No		
Enforcement Mechanisms Authority for different mechanisms to enforce laws that regulate invasive species	<u>Fines</u> Wildlife, aquatic life, plants, plant pests and disease, insects	<u>Civil Penalties</u> Aquatic life, plants, plant pests and diseases, insects	<u>Imprisonment</u> Wildlife, aquatic life, plants, plant pests and diseases, insects	<u>Misdemeanor/Infraction</u> Wildlife, aquatic life, plants, plant pests and diseases, insects	<u>Felony</u> Wildlife, plant pests and diseases	<u>Compensation for Damages</u> No	<u>Positive Incentives</u> No
Specific Funds Authority for specific funds to implement regulation of various invasive species	<u>Wildlife</u> No	<u>Aquatic Life</u> No	<u>Plants</u> Yes	<u>Plant Pests and Diseases</u> Yes	<u>Insects</u> No		
Councils Existing councils or organizations to coordinate regulation of various invasive species	<u>Comprehensive Council</u> Yes	<u>Invasive Plant Council</u> Yes	<u>Aquatic Nuisance Council</u> No	<u>Species Specific Council</u> No	<u>Other Council(s)</u> No		
Plans Completed plans to address the management of various invasive species	<u>Comprehensive Plan</u> No	<u>Invasive Plant Plan</u> Yes	<u>Aquatic Nuisance Plan</u> No	<u>Species Specific Plan</u> No	<u>Other Plan</u> No		

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Appendix E – Aldo Leopold Wilderness Research Institute Summary of Research Needs Summary

Research Needs for Managing Nonnative Species in Wilderness Areas

Missoula, MT

July 2003

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The Aldo Leopold Wilderness Research Institute (Leopold Institute) develops and communicates knowledge needed to manage wilderness for the protection of its unique ecological and social values. In its 1996 Strategic Plan, the Leopold Institute identified nonnative species, fire, and recreation as its three highest-priority wilderness research issues. This document was developed to guide scientists (agency, university, or private) conducting or planning to conduct research on nonnative species in wilderness. We provide a general list of high-priority research questions that are relevant to understanding and managing nonnative plants, animals, and pathogens throughout the wilderness system. This list has been reviewed by 17 individuals, including wilderness managers and agency and university scientists.

BACKGROUND

Wilderness and similarly managed areas (e.g., many National Parks), hereafter collectively referred to as “wilderness,” provide many benefits to society. These benefits include the protection of biodiversity, unique natural features, and watersheds, as well as opportunities for recreation and personal fulfillment. Although land management agencies place a high priority on wilderness protection, some wilderness benefits are threatened by increasing levels of human activity within and outside wilderness. The introduction of nonnative species into wilderness, intentionally or unintentionally, is of particular concern due to the potential for irreversible impacts on natural systems. These impacts include the loss of native biodiversity, alteration of ecosystem processes (e.g., fire regimes, hydrology, and nutrient cycling), and reduction in the quality of wilderness recreation experiences (Cox 1999, Osborn et al. 2002). This document identifies priority research needs to improve our understanding of and ability to minimize the impacts of nonnative plant, animal, and pathogen species within both wilderness terrestrial and aquatic habitats.

Even using the best possible science, nonnative species management in wilderness is complicated. First, wilderness areas are typically remote and difficult to access, making nonnative species management a logistical problem. Second, the 1964 Wilderness Act (Public Law 88-577) does not provide clear direction. The Act mandates that wilderness

must be maintained in both a natural condition and an “untrammled” condition (i.e., free from human manipulation and control). A conflict between the two mandates occurs when control or eradication of nonnative species (i.e., restoring natural conditions) requires human manipulation of the wilderness ecosystem. Third, establishing management goals (e.g., desired future conditions) and deciding which management approaches to implement are value-laden processes. Philosophical and ethical considerations are important components of these processes. Fourth, and perhaps most importantly, public awareness of the magnitude of the nonnative species problem, both within and outside of wilderness, remains low. Increased public awareness should lead to greater efforts by wilderness users to minimize the introduction and spread of nonnative species, as well as greater support for laws and regulations to reduce their introduction and spread nationwide.

RESEARCH QUESTIONS

We group pertinent research questions into three topical areas:

- Understanding the introduction, spread, and distribution of nonnative species within wilderness.
- Understanding the effects of nonnative species on wilderness values.
- Identifying and evaluating management options and their consequences.

Within each topic, we briefly present background information followed by a list of proposed research questions. For the last two topics, we further divide the questions into ecological and social categories because successful protected area management requires knowledge of both biological and social factors (Mascia et al. 2003).

Among the diverse wilderness areas in the U.S., the specific threats posed by nonnative species and the appropriateness and efficacy of various management responses may vary greatly. Thus, we do not attempt to identify site-specific research questions or to rank our suggested research questions.

Understanding the introduction, spread, and distribution of nonnative species within wilderness

Nonnative species have been introduced, both intentionally and unintentionally, into wilderness. Some species have been intentionally stocked within wilderness or on adjacent lands to provide increased fishing and hunting opportunities, while others have been intentionally introduced to slow erosion following fires. Conversely, many nonnative species, especially plants, have been unintentionally introduced and dispersed by a variety of agents. Dispersal agents can be human-associated (e.g., recreationists, pack stock, livestock) or natural (e.g., wind, water, wildlife). Management efforts (e.g., requiring the use of weed-free hay) are commonly taken to disrupt these dispersal vectors, but their effectiveness is largely unknown.

Depending on the relative importance of different dispersal vectors and the resistance of different sites to invasions, certain areas within wilderness (e.g., disturbed sites, trail and

river corridors, near wilderness boundaries) are usually more susceptible to invasions than others (Osborn et al. 2002). To more efficiently detect nonnative species within vast areas of land, managers would benefit from an improved ability to prioritize areas for inventory and monitoring. Data exist on the mechanisms and most probable locations of introduction and spread for some wilderness areas, but information for a wider range of wilderness areas is needed.

Environmental disturbance can promote the establishment of nonnative plants by temporarily eliminating native competitors, increasing resource availability, or both (Stohlgren et al. 1998). Based on knowledge that fire is essential to many wilderness ecosystems, however, some managers are attempting to restore historical fire regimes by allowing natural fires to burn or by setting prescribed fires. A better understanding of the process of establishment by nonnative species after fire may enable managers to restore fire while employing methods to minimize the spread of nonnative species. Other natural disturbances such as windstorms, insect and pathogen outbreaks, and floods may also facilitate the spread of nonnative species. Control and restoration techniques that favor establishment of native species after disturbance need development and evaluation.

In addition to disturbance, other factors can influence a wilderness area's vulnerability to invasion by nonnative species. The biophysical elements of a wilderness, such as the structure and composition of plant communities, soils, and climate, could be important factors. A wilderness area's position within a landscape matrix of more intensively developed lands may also be important, requiring the consideration of factors such as surrounding land use practices, proximity to major roads and cities, and wilderness area dimensions. Finally, some wilderness areas may be subject to large-scale human disturbances within their boundaries, such as mining activities on historic claims or forest-thinning activities undertaken to reduce the potential for wildfires or pathogen outbreaks.

Effective management of nonnative species requires scientifically sound survey, mapping, and monitoring procedures to detect new occurrences, determine rates and direction of spread, and assess the results of management actions. Most wilderness managers, however, are unable to support such programs because they lack the funding and personnel to thoroughly survey what are often large, remote areas (Marler 2000). With respect to invasive plants, remote-sensing and Geographic Information System (GIS) technologies have been used to map large populations (Everitt et al. 1996) or to prioritize locations for field surveys (Dewey et al. 1991) because remote-sensing methods may lack the sensitivity to detect small initial populations. Further research to develop and improve a range of inventory and monitoring techniques at multiple scales is needed.

Priority research questions on introduction, distribution, and spread include:

- Which dispersal vectors are most important for spreading nonnative species into wilderness? How can they be most effectively disrupted?
- How can historic disturbance regimes (e.g., fire) be restored to wilderness while minimizing the establishment or spread of nonnative species?

- To what extent do nonnative species established in wilderness facilitate the colonization of additional nonnative species?
- To what extent do historic and existing “special provision” land-use practices (e.g., grazing, mining, water development projects) within wilderness influence invasions?
- To what extent do the biotic (e.g., vegetation types and conditions) and abiotic (e.g., soils, climate) characteristics of a wilderness influence invasions?
- To what extent does the landscape context of a wilderness (e.g., land use practices adjacent to the wilderness, wilderness dimensions, proximity to major roads and cities) influence invasions?
- How can we accurately and efficiently assess the current distribution and abundance of nonnative species in wilderness? How rapidly are they being introduced and spreading?
- How can managers determine the best locations for field surveys to monitor nonnative species in wilderness?
- How can remote-sensing methods for detecting and mapping nonnative species in wilderness be further utilized and improved?

Understanding the effects of nonnative species on wilderness values

Ecological Values

Wilderness areas serve as ecological reference areas for native ecosystems and often provide critical habitat for threatened and endangered species. These ecological benefits may be compromised, however, by nonnative species that compete with, prey upon, or cause disease in native species or by those that alter ecosystem processes to the detriment of native species. A few examples illustrate the potential severity of impacts in wilderness. At Hawaii Volcanoes National Park, firetree (*Myrica faya*) increased the available soil nitrogen, thereby facilitating the establishment of nonnative earthworms and plants (Vitousek and Walker 1989). Throughout the western U.S., plants such as cheatgrass, Lehmann lovegrass, and saltcedar have increased the frequency of fire, reinforcing their dominance over native plants and reducing habitat for native wildlife (Cox 1999). At Flathead Lake in Montana, introduced opossum shrimp (*Mysis relicta*) precipitated the collapse of the kokanee salmon (*Oncorhynchus nerka*) population. The salmon were an important food resource for migrating bald eagles (*Haliaeetus leucocephalus*) along a tributary stream in Glacier National Park (Spencer et al. 1991).

Considerable data exist on the ecological effects of nonnative species, and such effects remain the focus of ongoing research. Nevertheless, further research is needed to

understand the impact to ecosystems and species that are largely restricted to or dependent upon wilderness areas. For example, the introduction of nonnative fish into wilderness alpine lakes may alter ecosystem processes and threaten native amphibians with extirpation (Pilliod and Peterson 2001, Schindler et al. 2001). White pine blister rust, an introduced pathogen, decimates whitebark pine (*Pinus albicaulis*) populations found largely in wilderness (McCool and Freimund 2001). In some locations, whitebark pine is a critical food resource for the grizzly bear (*Ursus arctos horribilis*), another wilderness-dependent species (Mattson et al. 2001).

Priority research questions on ecological effects include:

- How do nonnative species affect ecosystem structure and function within wilderness (e.g., how do nonnative species affect natural disturbance regimes, nutrient cycling, or carbon storage)?
- How do nonnative species affect the composition of and relationships within biological communities in wilderness?
- How do nonnative species in wilderness affect the regional persistence of endangered, threatened, sensitive, and wilderness-dependent species?

Social Values

Wilderness has important existence value for many members of society. People may value the existence of wilderness for its protection of biodiversity, sacred sites, and other irreplaceable resources, or simply because few places remain that are wild and relatively unaltered by people. For example, the majority of Americans oppose oil exploration in the Arctic National Wildlife Refuge because it threatens the region's wildlife and wilderness qualities (Defenders of Wildlife 2003). Wilderness also has subsistence value for some traditional cultures. For instance, many native Alaskans hunt, fish, and trap within wilderness to obtain food and other raw materials critical to their way of life.

Wilderness provides important personal benefits for visitors seeking solitude, inspiration, challenge, and contact with nature. Research is needed to evaluate how nonnative species affect human perception and enjoyment of wilderness. High densities of nonnative species, especially certain plants, can hinder recreational access or lower an area's aesthetic value. On the other hand, many visitors are unaware of the presence of nonnative species, and nonnative species can even enhance the wilderness experience for some visitors (e.g., nonnative fish stocked in lakes for recreational angling). When weighing management options, wilderness managers must address conflicts between those who favor the removal of nonnative species and those who favor their presence (e.g., stocked fish, feral horses and burros) or those who oppose manipulation of the wilderness.

Although some people may object to assigning monetary values to wilderness benefits, economic research demonstrating the financial impacts of nonnative species in wilderness may encourage prevention and control efforts. Wilderness benefits that can be quantified

monetarily include the provision of critical ecological services to society (e.g., watershed protection, nutrient cycling, carbon storage), tourism revenue to nearby rural communities, and opportunities for recreational use (Loomis and Richardson 2001). Other benefits are more difficult to quantify such as existence value, protection of biodiversity, and providing natural areas for scientific research (Loomis and Richardson 2001). Further research is needed to more fully develop methods that accurately reflect the economic benefits provided by wilderness to society and the impact of nonnative species to these benefits.

Priority research questions on social effects include:

- To what extent do nonnative species in wilderness affect the existence value (e.g., providing a haven for intact native biological communities) provided by wilderness to society?
- To what extent do nonnative species affect subsistence activities (e.g., hunting, food gathering, collecting plant material for traditional medicines) in wilderness?
- To what extent do nonnative species affect recreational experiences in wilderness?
- How can conflicts be fairly resolved between people who disagree on whether or not nonnative species should be intentionally introduced or allowed to remain in wilderness?
- What are the full range of economic costs and benefits associated with nonnative species in wilderness and management efforts directed toward them?

Identifying and evaluating management options and consequences

Under the 1964 Wilderness Act, wilderness managers are expected to maintain natural conditions in wilderness while preserving its “untrammeled” character (i.e., free from human manipulation). Wilderness managers balance these two mandates by choosing the least intrusive action (i.e., the minimum tool) to accomplish management objectives. Determining the minimum tool for nonnative species control in wilderness can be especially problematic. Chemical and biological control methods can have unintended, potentially irreversible ecological impacts. However, they also may be the only effective way to combat some nonnative species. In addition, managers must often act quickly to prevent nonnative species from becoming established in wilderness. Important social issues should also be considered, such as public acceptance of different control methods, public attitudes toward specific nonnative species, and, ultimately, the role of humans in wilderness. Managers must weigh the various risks and benefits, both ecological and social, when choosing an appropriate management strategy.

Ecological Issues

Despite a multitude of information about the immediate ecological effects of different control methods, little is known about the success or failure of specific methods at achieving long-term restoration goals. Published studies tend to focus on whether control methods have reduced populations of the target nonnative species, but they seldom monitor the long-term effects on populations of native species. To more efficiently allocate limited resources, managers also need guidance on how to prioritize nonnative species for management. Existing and new frameworks need to be further evaluated and/or developed, particularly with respect to wilderness settings. Conducting further research will require time, and managers may need to act immediately using the best available information. Nonetheless, additional information will benefit wilderness managers when making future decisions regarding nonnative species management.

Biological control, or biocontrol, agents are considered to be an economical and relatively selective control method. However, these agents are typically other nonnative species. Recent research has documented that these nonnative agents can have unanticipated effects on native species. For instance, biocontrol agents can negatively impact non-target, native species that are related to the target species (Louda et al. 1997, Louda and O'Brien 2002). Conversely, native species can adapt and act as predators, herbivores, parasites, or pathogens upon nonnative biocontrol agents. In some cases, the biocontrol agents benefit native species that carry serious human disease (Pearson et al. 2000). In other cases, more benign native species benefit from the biocontrol agent (Sheldon and Creed 1995). In these instances, boosting or restoring populations of these native species may be a viable and less intrusive alternative to biocontrol agents. Further research on interactions between native species and biocontrol agents is essential.

Priority research questions on ecological issues affecting the determination and evaluation of management options include:

- What frameworks and decision-support tools are most useful for prioritizing nonnative species for management efforts?
- What control techniques serve as the minimum tool to most effectively contain, eradicate, or prevent the establishment of nonnative species within wilderness?
- What restoration techniques are most effective at re-establishing native species and ecological processes in wilderness after the removal of nonnative species?
- What control and restoration techniques have the least ecological impact within wilderness?
- What are the ecological risks and benefits of alternate control methods in wilderness? How can we better predict the potential negative effects of biological or chemical control on native species prior to their use in wilderness or on adjacent lands?

- Are some native species effective at controlling nonnative species in wilderness? In what situations can their populations be augmented or protected to help control nonnative species?

Social Issues

Wilderness managers need the cooperation of both wilderness users and society at large to effectively prevent the introduction of nonnative species. Accordingly, managers often attempt to educate wilderness users and local communities about the adverse effects of nonnative species, as well as ways of preventing their introduction. Communicating desired messages to the public is complicated, however, by several factors. Different people often have different understandings of basic terms such as “weed” and “exotic,” which can greatly influence their perception of the issue (Schwaller 2001). An individual’s receptiveness to a message can also be influenced by his or her attitude toward the agency providing the message. Barriers other than lack of knowledge may also limit compliance with recommended, preventative practices. Harding et al. (2000) offer a useful model for understanding the factors leading to non-compliance with low-impact practices. A diverse array of factors should be considered when designing and assessing the efficacy of alternative educational techniques and messages.

In addition, wilderness managers may need to work collaboratively with surrounding landowners, land agencies, and interested non-governmental organizations (NGOs) to limit the spread of nonnative species into wilderness. Managers of surrounding lands, even other resource specialists within the same agency, often have vastly different mandates and goals than the wilderness manager. Additionally, past relationships between nearby communities and landowners with the managing agency can affect the public’s willingness to collaboratively address the issue. An improved understanding of these institutional and social barriers, as well as the identification and evaluation of methods to overcome them, should greatly benefit wilderness managers.

Priority research questions on social issues affecting the determination and evaluation of management options include:

- What is the role of humans in actively managing wilderness and how much does it vary for different types of wilderness areas?
- How do managers currently determine their priorities and desired future conditions for nonnative species in wilderness? How do these differ among agencies?
- What level of ecological impact is acceptable to the public when dealing with nonnative species in wilderness? How much does this level vary for different nonnative species and different members of the public?

- What methods and messages can managers use to most effectively educate the public about nonnative species impacts and elicit their help in prevention and control strategies? What factors limit the public's acceptance of these messages?
- How can wilderness managers better overcome the institutional and social barriers with surrounding land managers, landowners, and communities to cooperatively manage nonnative species?

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