Committee on Resources
Subcommittee on National Parks and Public Lands

Testimony

Statement of

Faith Thompson Campbell, Ph.D.

on behalf of

American Lands Alliance

Before the

Subcommittee on National Parks and Public Lands

Oversight Hearing on

Noxious Weeds and Invasive Plants

24 June 1999

Overview

Damaging plant invasions can be found everywhere in the United States. The total area infested is not known, but surely is larger than Texas - 267,339 square miles or 170 million acres.

Hundreds of species have been documented as invading forests, wetlands, grasslands, and other ecosystems in the country. At least 4,500 additional species have escaped cultivation and become established in the wild; some will probably prove as damaging as some of today's well-known invaders.

These plant invasions have a huge impact on the ecological health and productivity of our Nation's natural resources. Half of the units in the National Parks system have reported harm; infestations damage millions of acres of other public lands.

Hawai`i, southern Florida, and the grasslands of the intermountain west are often cited as examples of areas severely affected by invasive exotic plant species.

In both Hawai`i and Florida, exotic plant species make up a frightening proportion -- about half -- of the total flora. In several states on the east coast and Great Lakes, alien plants constitute about one-third of the plants growing "in the wild".

Heavy damage does not depend on numbers alone. In California and western Montana, the proportion of the flora that is exotic is about 17% -- yet these states have severe weed problems. A single species can do significant damage -- as is illustrated by leafy spurge in the Great Plains.

Losses and control costs to American agriculture and other activities due to invasive exotic plants have been estimated at between $13 billion and more than $35 billion. These costs probably do not include those associated with weed-fueled fires. In 1996, fires stoked by tinder-dry cheat grass burned half a million acres in Idaho and Utah. In Florida in 1985, a *Melaleuca* fire under major transmission lines caused more than 2.3 million people to lose electrical service and caused more than $1 billion in losses.

Ecological Impacts

Biodiversity and Imperiled Species

Forty-nine percent of America's imperilled species are threatened in part by invasive exotic species. Unfortunately, the data do not specify the extent of damage caused by introduced plants as opposed to other types of organisms. However, I have been able to find examples of rare species threatened by invasive exotic plants.

In Florida, Japanese climbing fern is threatening the habitat of more than 32 federally listed plant species in Appalachicola National Forest in Florida. On Eglin Air Force Base, 60 listed plant species are threatened by invasions of Cogon grass and Japanese honeysuckle, as well as feral pigs. Exotic plants also impede management intended to benefit rare plants. Prescribed burning to enhance five federally listed fern species in the pine rocklands of Dade County, and rare *Tillandsia* on cypress in Loxahatchee Strand, has been hindered by favorable response to fire of Burma reed and Old World climbing fern.

In Idaho, competition with introduced grasses has reduced native annuals such as gymnosteris from "abundant" to rare and is exacerbating the threat to the already uncommon Aase's onion.

Large monotypic stands of purple loosestrife jeopardize several rare species, including bog turtle, dwarf spike rush, and bulrush.

In Haleakala National Park in Hawai`i, alien plants threaten the habitat of 15 listed species.

Broader Ecosystem Impacts

Introduced grasses often promote more frequent or hotter fires that contribute to destruction of native plant species and wildlife habitat. Cheat grass is present on more than 100 million acres -- about one-third of the Intermountain Region. Cheat dominates up to 50 million acres. When cheat dries out in June, it is easily ignited by lightening or other sparks. As a result, in the Great Basin, fires which once burned once every 60 to 110 years now occur every 3 - 5 years -- preventing the regeneration of shrubs depended on for food or cover by mule deer, antelope, raptors, songbirds, rabbits, and native lizards.

Exotic plants, especially legumes, can change soil chemistry in ways that favor the invader over native plants. One example in the particularly vulnerable Hawaiian islands is firetree. Iceplant along the California coast and salt-cedar trees exude salt from their leaves, suppressing germination of native species.

Exotic plants can change an ecosystem's structure in ways harmful to wildlife. When *Melaleuca* transforms the everglades ecosystem of southern Florida from a sawgrass marsh to a stand of tightly packed trees, wildlife species diversity is decreased 60 - 80%. The endangered snail kite and wood stork are among the birds that do not adapt to the new ecosystem. On Florida's coasts, the roots of Australian pine trap sea turtle hatchlings. The beach closer to the water erodes, eliminating nesting habitat. Australian pine already occupies between one-third and one-half of Florida's undeveloped coast.

Even less conspicuous changes in structure can affect wildlife. When purple loosestrife displaces native wetland vegetation, especially cattails, the biological value of the wetland is greatly diminished as waterfowl are deprived of food and places to nest. Muskrat, long-billed marsh wrens, certain fish, as well as turtles, snakes, frogs, toads, and salamanders all lose shallow water breeding and/or feeding sites.

Introduced plants can shade out native plants. For example, Japanese honeysuckle prevents regeneration of trees. Japanese honeysuckle is found on more than 19 % of forested acres from Georgia north to Virginia -- a total of 16 million acres.

There are sometimes other costs to the general environment. For example, erosion from land infested by spotted knapweed can be double that covered by native bunchgrasses, reducing water infiltration and increasing siltation that harms fisheries.

Control Efforts Are Not Sufficient

As best I can determine, in Fiscal Years 1995 and 1996, federal land managing agencies, the Corps of Engineers, and USDA Animal and Plant Health Inspection Service (APHIS) spent a total of about $42 million annually to combat exotic plant species. (See also Appendices A and C.) State and local governments spend at least the same amount overall.

However, public and private expenditures are not sufficient to control the invasive plants' spread. Noxious weeds -- not including cheat grass -- continue to spread across our Western public lands at a rate estimated at 4,600 acres per day -- a new area the size of Delaware every year.

How Do Invasive Plants Get Here and Why Do The Spread?

In the past, weed seeds often came into the country as contaminants in immigrants' crop seed or in soil used as ballast. Many were also brought intentionally. I believe that deliberate imports now is the principal way new plant species reach the U.S. There is no system at present to "screen" such imports to try to identify and exclude those that might become "weedy". Even when a species' invasiveness is documented, commercial sales continue: 60% of my list of 450 invasive plants are offered for sale -- in other words, they are being dispersed across the country through deliberate -- if thoughtless -- actions. Once in a region, an invasive plant has many ways to reach a new area. Seeds and other propagules are also transported as hitchhikers -- on vehicles; hikers' boots; pack stocks' hooves and fur and in their guts; on boats. Wildlife, wind, and water also transport seeds. Disseminated in these ways, the invaders are ready to exploit any opening.

That opening is often created by a human activity that disturbs the soil, opens the forest or other vegetative cover, or changes the fire regimes or stream flows -- grazing, logging, road building, stream channelization or dams, or other development. The exotic plants are often better adapted to the altered ecological niches. For example, wide establishment of cheat grass was greatly assisted by overgrazing of livestock, which devastated the vulnerable native bunchgrasses. Roads represent a double threat because the people, vehicles, and pack animals that gain easier access to an area can transport seeds. People also often cause fires that damage native plant species and spur growth of exotic weeds. For example, in the Snake River Birds of Prey National Conservation Area, about 72 % of wildfires are human caused. Once established in a disturbed area, the exotic plants can often spread into relatively undisturbed habitats in the vicinity.

An effective control program must address both sides of the equation: halt or modify the disturbance activities **and** counter the invading plants themselves.

WHAT SHOULD WE DO?

An effective program must coordinate local and national strategies to prevent new introductions and the spread of weeds already in the country; and develop and apply the most effective and environmentally benign control or suppression technologies to existing infestations. Therefore, to protect parks, wildlife refuges, and public lands generally, resource managers will need a voice in setting U.S. policies on weed "exclusion" at the border and regulating interstate movement and sale of invasive plants -- responsibilities traditionally assigned to USDA Animal and Plant Health Inspection Service (APHIS).

Public land resource managers will also need research assistance to identify and prioritize weed species invading or threatening to invade their region and to develop effective and sound control strategies. They should start by learning which plant species have already proved invasive in similar ecosystems *around the world*. The Biological Resources Division of the U.S. Geological Survey is leading efforts to identify and coordinate weed databases. Those maintained by Kartesz of the University of North Carolina and Peter Rice at the University of Montana appear particularly valuable.

Control strategies must devote much greater attention to curbing human activities that promote invasions. The ways that human activities facilitate the establishment and spread of weeds will need to be examined through environmental impact assessments and land planning processes, and alternatives developed that minimize these -- as well as other

environmentally harmful -- impacts. Weed control projects will have to incorporate steps to minimize the likelihood of weeds' becoming established in new areas, and to restore damaged areas to prevent re-infestation.

Actual control or suppression strategies should be chosen after careful analysis of the site, the target species, ecological vulnerabilities and sensitive species, and the entire range of possible technologies. Prevention and restoration must be part of any program. Herbicides can be part of an environmentally sound program, but only when carefully targeted and applied. Thus,

herbicides are most effective when used to suppress initial infestations, and are less useful when one is dealing with widely established weed species. Biocontrol shows great promise for controlling widespread species, but the proposed biocontrol agents must be tested carefully to ensure that they will attack only the specific target plant.

For more detailed recommendations, see Appendix D.

For public land agencies to carry out effective and environmentally sound weed control programs -- programs that will win the support of the American public -- they must have access to much higher funding and staffing levels than is currently available. Not only is the job bigger than current resources can handle. Doing weed control the right way is resource-intensive -- hence more expensive.

Controlling invasive exotic plants is an increasingly important and worthwhile resource management task. Careful planning and implementation can result in reduction of weed invasions and restoration of native habitat. Examples of apparently successful programs include integrated mechanical and chemical programs in Hawai`i Volcanoes National Park and Haleakala National Park; mechanical removal of salt-cedar at Bosce del Apache National Wildlife Refuge; aerial spraying of knapweed and other species at Lola National Forest; biological control on purple loosestrife in wetlands across the northern states and Canada.

Finally, but certainly not least, public land resource managers will also need the active cooperation of those responsible for managing neighboring lands and waters.

The goal is to create new, "artificial" barriers to obstruct transport of invasive exotic weeds by means of equally "artificial" pathways. Those involved -- government and non-government -- should consider and employ the full armament: law and regulations; encouraging more responsible behavior by those who import or transport plants, including establishing legal liability; technical fixes (washing, inspections, management, etc.); and mechanical, chemical, and biological methods of combating non-indigenous species already established in natural ecosystems. The choice of method depends on the specific factors of a particular species at a particular site.

The Time for Action is Now

Many scientists have urged prompt action, pointing out that delay or an inadequate effort allows the problems caused by invasions to become almost irreversible.

Fortunately, the needed coordinating mechanisms have been created and are beginning to function. These include the Federal Interagency Committee on Managing Noxious and Exotic Weeds -- FICMNEW and the National Council established by Executive Order 13112. Their efforts need the involvement and support of the Congress -- in the form of funds, adoption of supportive legislation, and interested and informed oversight.

Appendix A

War in the National Parks

Everglades National Park & Big Cypress National Preserve

Everglades National Park has been invaded by 220 exotic plant species, of which about 40 are being watched closely or combated. One example is *Melaleuca.* This tree has been kept out of the Park by a major effort begun in 1986. In 1994, *Melaleuca* was present on 489,000 acres -- nearly 25 % of Florida's remaining everglades ecosystem. If it

continued to spread at the rate of 4% per year, *Melaleuca* would have invaded the entire everglades within 20 years. Big Cypress National Preserve has spent an additional $1 million since 1984 to battle *Melaleuca*, Brazilian pepper, Australian pine, and Java plum.

Great Smoky Mountains National Park

More than 600 exotic plant species are found in Great Smoky Mountains National Park on the Tennessee-North Carolina border; more than 30 pose significant threats to Park resources. In the mid-1990s, Park staff spent $800,000 over 3 years to pull, cut, and poison millions of plants over tens of thousands of acres -- including privet, oriental bittersweet, tree-of-heaven, etc. Now, these plants are largely under control -- as long as Park staff watch them closely and eradicate new outbreaks.

Hawai`i Volcanoes National Park

Hawai`i Volcanoes National Park has been invaded by 475 exotic plant species, more than 40 of which are seriously damaging Park resources. Through an aggressive, multi-year program, which cost $669,000 just between FY1991 - FY95, with additional funds since then, Park staff have cleared high-impact alien plants such as banana poka, various raspberries, several grasses, and strawberry guava from about 30,000 acres; the goal has now been expanded to 60,000 acres. Expensive maintenance efforts are required.

Haleakala National Park

At Haleakala National Park, 8 years of effort costing nearly $1 million has protected one of the best remaining tracts of native forest -- 1,600 acres that are home to 15 federally listed plant and animal species. Seven ecosystem-altering plant species are controlled in a 1,200 acre buffer zone. The rare flora is now thriving, with dramatic recovery of some of the critically endangered plant species. Funding to maintain the "cleared" areas and control new invasive species will be critical to permanent success.

Appendix B

Why plant invasions will grow worse in the near future

* Weeds continue to infest new areas:

- funding and staff levels are insufficient to halt the spread of those species already targeted; officially declared "noxious weeds" are estimated to be spreading on western public lands at a rate sufficient to cover a new area the size of Delaware every year.

* Many additional species are invading natural areas but are not yet widely targeted for control. This is especially true of the shrubs, vines, trees, and herbaceous species damaging forests in the National parks, National forests, and National Wildlife refuges in the East.

* An estimated 4,500 exotic plant species (in addition to those already known to be invasive) have escaped cultivation and now grow "in the wild". If even 10% of these turn out to be highly damaging invaders, land managers will collectively have double the number of problem species to address.

* Thousands of other plants have been introduced for our gardens or other purposes. Some proportion -- perhaps 10% -- are likely to become troublesome invaders in the future. If 10% of the 8,000 species now grown in Hawai`i prove to be invasive, that will double the number of invasive plant species which National Park and other already overwhelmed resource managers on the islands must try to combat.

* At present, there is no program for screening new species being imported for the first time to determine whether they are likely to become "weedy". Allowing these species to be brought in without screening is playing Russian roulette.

Appendix C

Funding

The resource management agencies' funding levels are low and shrinking. Already, funding for conservation and land management is one quarter of one percent of total federal spending. Budget balancing agreements will require further cuts -- just when the enormity of the invasive species problem is being realized.

National Park Service:

Funding for the National Park Service has decreased by more than 40% since 1978 -- while visitation has increased by 48%. For the past several fiscal years, the NPS has spent between $2 and 3 million per year on invasive alien plants -- but there are estimated to be $20 million annually in unmet needs.

Bureau of Land Management:

In both fiscal years 1998 and 1999, BLM has spent $3.7 million on managing invasive weeds. The Bureau wishes to increase the program gradually (over 5 - 6 years) to $25 million.

USDA Forest Service:

The Forest Service has increased funding for weeds in recent years, despite the downward trend in overall funding. Still, in Fiscal Year 1999 it was just $5 million. The Forest Service plans to "ramp up" the program more rapidly than does the BLM; it estimates $30 million are needed for a fully operational program. The Forest Service also has an active research program that includes efforts devoted to weeds; in FY99, about $1.5 million in research funds went to weeds. The Forest Service would like to have $5 million for research on invasive plants.

American Lands has proposed redirecting 10% of the Forest Service' budget away from environmentally harmful activities such as logging and road building and to funding of such restoration programs as combating invasive exotic species.

All three agencies need additional funds and larger staff allocations so that they can hire botanists to inventory for weeds, develop and supervise the treatments methods, and collaborate with neighboring landowners and other partners.

In addition to on-the-ground control for specific weeds (including through the challenge cost share program managed by the Fish & Wildlife Foundation), the agencies should be studying alternative control technologies -- especially biological control, increasing information sharing with other stakeholders, increasing awareness-raising educational efforts, and researching techniques for restoring sites after weeds are treated

Appendix D

Components of a Weed Control Program

An effective weed program should contain all the following elements:

I. **Prevention** -- should include:

* education to persuade

1) other entities -- including state highway and wildlife departments, neighboring landowners, and the nursery trade -- to stop planting invasive exotic species.

2) public land users -- including loggers, grazers, miners, and recreational visitors -- to clean their equipment, including boots; and to use weed-free forage for stock

* an early warning system that includes obtaining and analyzing information on species invasive in the region, and determining whether those species are already present on the unit

* providing information on own invaders to a regional database for use by others

* halting the deliberate planting of plant species known to be invasive in the course of revegetation, restoration or habitat "enhancement" programs. Expand efforts to restore sites using native plants of local origin.

* halting activities that create conditions that favor establishment of exotic weeds: e.g., the building of roads, logging, and grazing in roadless areas and in areas not yet infested with exotic weeds. In areas that are infested with weeds, grazing should be permitted only as part of an integrated management plan that has as its specific purpose management of target weed species.

* closing roads and trails that are serving as pathways for introduction and spread of weeds.

* requiring agency personnel, including those fighting fires, to clean equipment immediately after leaving an area so as not to transport weed seeds to the next area where it will be used.

II. **Control/Eradication** -- undertake weed control projects only in the context of a comprehensive plan that

* sets priorities among weed species present in the unit or threatening to invade it

* monitors to both establish "baseline" data and evaluate program results

* evaluates on-going and planned activities' impacts on weed invasions and sets out steps to minimize effects that might exacerbate invasions

* evaluates the gamut of control/eradication methods, including fire, mechanical,

biocontrol, as well as chemical -- in the context of the site, with an emphasis on especially

sensitive areas such as wetlands and riparian zones, and on T&E species, other "species of concern" etc.

* chooses that combination of control methods found to be effective and most

environmentally benign for the site

III. **Monitoring/Follow-Up**

* Before a control program is initiated, develop and fund a comprehensive monitoring

program to evaluate the weed threat -- species present, species likely to invade, locations

most under threat, etc.

* When planning a control program, incorporate a comprehensive monitoring program to

evaluate the effectiveness of the control program. Use information gained both to make any

needed changes in the on-going control program and to advise others seeking to control weed

invasions in similar ecosystems.

IV. **Research**

Research should be carried out in cooperation with other entities also seeking to prevent or control

weed invasions. Topics needing research include:

* development of better methods for preventing the spread of established weed

species, and to reduce these species' density and impact on the environment.

* improved ability to inventory, monitor, and map weed species; and to predict which species may become invasive in various types of ecosystems.

* ecological impacts of established and newly introduced exotic weed species. Ensure that research examines cumulative effects of these introductions combined with other stresses on the forest, including invading insects, fungi, and disease pathogens.

Disclosure Statement

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5. Training, educational certificates, diplomas, or degrees: I hold a Ph.D. in politics from Princeton University; and a B.A. in political science from Dickinson College.

6. Professional licenses, certifications, or affiliations: none.

7. Employment or occupation or work experience related to my qualifications to testify on this subject matter: I have studied policy questions arising from conservation of biological diversity and represented environmental organizations on these issues since 1976. I have focused on the management of invasive exotic species, particularly plants and plant pests, since 1987. I have published chapters in several books and numerous periodicals; presented papers before dozens of fora; and served on advisory committees for federal agencies and the Congressional Office of Technology Assessment.

8. Any offices, elected positions, or representational capacity held in the organization on whose behalf you are testifying: I am the staff member at American Lands charged with developing and carrying out our invasive species program.

Federal Grants and Contracts

1. I have received no grants or contracts from the Department of Interior or the Department of Agriculture since 1 October, 1994.

2. American Lands Alliance has received no grants or contracts from the Department of Interior or the Department of Agriculture since 1 October, 1994.

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Develop and Carry Out Invasive Species Program

Since January 1998

National Association of Exotic Pest Plant Councils

Executive Secretary and governmental representative

January 1995 - December 1997

Natural Resources Defense Council

Senior Research Associate

November 1976 - December 1994

Since 1987, I have represented my employer on efforts to improve policies and programs aimed at countering the impacts of invasive alien or exotic species, particularly exotic plants and plant "pests". This initially focused on National parks in Hawai`i, but has concerned primarily invasive plants and forest pests of the continental states since 1991.

Publications on Exotic Species include:

F. Campbell, "Political and economic Barriers to Scientifically-Based Decisions" in K. Britton, ed. Biological Pollution In press.

S. Schlarbaum, R. Anderson, F.T. Campbell. 1998. "Control of Pests and Pathogens." in J.D. Peine, ed. Ecosystem Management for Sustainability. 1998.Lewis Publishers. Boca Raton.

F.T. Campbell. The EPPCs: Cooperating to Assess and Control Invasive Non-indigenous Plant Species. In James Luken and John Thieret, eds. Assessment and Management of Plant Invasions. Springer-Verlag. 1997.

F. Campbell, "Legal Avenues for Controlling Exotics," in Bill N. McKnight, Ed. Biological Pollution The Control and Impact of Invasive Exotic Species. Indiana Academy of Science, Indianapolis. 1993

More than a dozen articles in periodicals and presentations at meetings sponsored by the Society of American Foresters, regional sections of the Weed Science Society of America, Natural Areas Association, Society of Environmental Journalists, and others.

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Outline and Recommendations:

Invasive exotic plants have infested an area as large as Texas and are damaging important ecological and economic

values, including National parks, Wilderness areas, and habitats of endangered species.

Weed invasions will become worse in coming years because of the momentum behind each species' spread, the large number of weed species not now being controlled, fiscal and technical constraints, and the absence -- so far -- of policies aimed at curbing the importation and dissemination of potential weed species.

These problems can be successfully addressed and the weed invasion brought under control.

Public land resource managers need

a greater voice in setting national policies aimed at curbing the importation and dissemination of potential weed species.

additional funds and staff to tackle weed problems on their units.

backup from focused research to develop better methods for identifying, tracking, and controlling weeds.

Well-planned, adequately-funded programs succeed.

Creation of the Federal Interagency Committee on Managing Noxious and Exotic Weeds (FICMNEW), the National Invasive Species Council, and numerous state and regional cooperative bodies promise to improve weed management -- but they need support from the Congress.

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