

State and Local Approaches From a National Perspective | 7

This chapter picks up from the last, adding how State and local efforts affect the management of non-indigenous species (NIS). Here, OTA discusses Federal and State relations and relationships among States. The chapter's centerpiece is an analysis of the States' 50 distinct approaches to regulating importation and release of "fish and wildlife"—mammals, fish, birds, reptiles, and amphibians.¹ In some cases, States have pioneered exemplary approaches and these are highlighted. The chapter examines how States treat non-indigenous invertebrates and plants also. Various proposed model State laws and local approaches conclude the chapter.

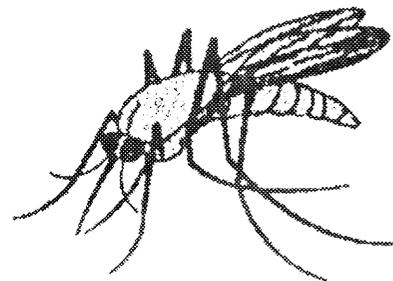
THE RELATIONSHIP BETWEEN THE FEDERAL GOVERNMENT AND THE STATES

Generalities come with difficulty regarding Federal-State relationships. The authority of the Federal and State Governments varies not only with the type of organism regulated, but also depending on the particular Federal and State laws and agencies involved. Mainly, however, States control the entry of NIS across State borders and release of MS within the State. Often these are pests, of either foreign or U.S. origin, that are already established elsewhere in the country.

For fish and wildlife, States retain almost unlimited power, notwithstanding the Federal Lacey Act,² to make decisions about

¹ Some State and Federal laws include all, or certain groups of, invertebrate animals under their definitions of "fish and wildlife." For example, the Lacey Act covers invertebrates like snails and **crayfish**. Occasionally, "wildlife" is defined to include all fauna and **flora**, as in Illinois. The **term**, as used here, refers **only** to vertebrates, but it does include domesticated or cultured species.

² For full citations of this and other Federal laws see **footnotes** to ch. 6.



Box 7-A—*Mahine v. Taylor*; A Key Constitutional Decision

The Commerce Clause of the U.S. Constitution grants to Congress the power to regulate international and interstate trade. This grant puts limits on, but does not eliminate, the power of States to ban imports of NIS. The limits were outlined by the U.S. Supreme Court in a 1986 ruling on the constitutionality of a Maine law that prohibited importation into the State of “any live fish, including smelts, which **are** commonly used for bait fishing in inland waters.” The case of *Maine v. Taylor* upheld the law even though it clearly discriminated against out-of-state bait fish dealers. The Supreme Court applied a two-part test for validity under the Commerce Clause: “the statute must serve a legitimate local purpose, and the purpose must be one that cannot be served as well by available nondiscriminatory means.” The Supreme Court approved a lower court’s findings that both parts of the test had been met:

First, the lower court found that Maine “clearly has a legitimate and substantial purpose in prohibiting the importation of live baitfish,” because “substantial uncertainties” surrounded the effect that baitfish parasites would have on the State’s unique population of wild fish, and the consequences of introducing nonnative species were similarly unpredictable Second, the court concluded that less discriminatory means of protecting against these threats were currently unavailable, and that in particular, testing procedures for baitfish parasites had not yet been devised.... “[T]he constitutional principles underlying the commerce clause cannot be read as requiring the State of Maine to sit idly by and wait until potentially irreversible environmental damage has occurred or until the scientific community agrees on what disease organisms are or are not dangerous before it acts to avoid such consequences.”

The Supreme Court has long upheld State quarantine laws that, notwithstanding the Commerce Clause, ban importation of pests of known significance. Importantly, the *Maine v. Taylor* ruling upholds ban based on threats whose significance involved “substantial uncertainties.” This gives States leeway in drafting laws on NIS importation in the face of such uncertainties so long as they **do not needlessly discriminate against out-of-State interests.**

SOURCES: 12 Me. Rev. Stat. Ann. see. 7613; *Maine v. Taylor*, 477 US. 131 (1986).

which species are imported and/or released. Congressional incursions on this traditional State control over fish and wildlife have been limited and controversial (16). In contrast, several major Federal laws—such as the Federal Plant Pest Act and the Federal Noxious Weed Act—set national policy for weeds and other plant pests.

Where Federal programs miss significant problems, States, in effect, determine the success of nationwide efforts to manage harmful NIS. There are important limits to the States’ capacities, however.

The Constitution vests the power to regulate international and interstate commerce in Congress.³ Therefore, States cannot unnecessarily restrict such commerce. The key Supreme Court

case is *Maine v. Taylor* (box 7-A). As a result of the Commerce Clause, States lack the power to stop the importation and release of a potentially invasive NIS in a neighboring State.

A few States, e.g., Hawaii and Alaska, have geographical barriers against the interstate spread of NIS. A small number of States, like California, have border inspection stations to interdict pests in transit. Without these kinds of barriers, a State cannot do much to slow the influx of State-prohibited plants or seeds that were acquired legally in another State or country (53). Nor can a State effectively stop mail-order sales of plants or seeds it prohibits, as policing the mails is a Federal function.

³ U.S. Constitution Article I, section 8, clause 3.

Also, States cannot legislate in direct conflict with Federal law. Nor can they directly regulate activities on Federal lands, absent a cooperative agreement. Occasionally, Federal laws explicitly preempt State involvement.

Federal Preemption of State Law

Finding:

Federal preemption of State law varies among categories of NIS. It is more common in agricultural laws than in those related to fish and wildlife. Cooperative programs are a more feasible way for the Federal Government to influence State actions.

A key issue in the relationship between Federal and State authorities is whether an applicable Federal law preempts State laws, keeping States from legislating in the area. This occurs when the Federal law explicitly or implicitly provides for preemption, or regulates an area so comprehensively as to leave no practical State role.

Federal preemption is more common in agricultural laws than in those pertaining to fish and wildlife—traditionally an area of State prerogatives. The Lacey Act required that a list of “injurious species or groups be created and it preempts States from allowing foreign importation of the 23 “injurious” taxonomic categories of fish, wildlife, and fish pathogens on that list. The Lacey Act does not, however, forbid more restrictive State laws.⁴ Similarly, no State may permit foreign importation of a weed species prohibited and listed under the Federal Noxious Weed Act, although it does not otherwise preempt State weed laws.⁵ The Federal Plant Quarantine Act also allows States to be more restrictive under certain circumstances, but it imposes a strong Federal presence. For example, the Federal Government can quarantine an entire State under the

Act.⁶ The Federal Plant Pest Act similarly provides strong emergency authority to override State laws.⁷

The Federal power to preempt does not mean that the Federal approach is always the best. Some State laws regulate more comprehensively than parallel Federal laws and their implementation is more effective (see below). Such States are, in effect, laboratories where different approaches are tested; their successes can spawn Federal imitation. Nevertheless, when States adopt widely varying laws, the regulated industries may support federally imposed uniformity to facilitate commerce.

Using Federal preemptive powers to implement a national approach is fraught with political difficulties—especially for fish and wildlife—and usually engenders resistance from the States. Thus, the trend is toward programs administered cooperatively by State and Federal officials. In these the Federal Government provides incentives to pull, and sanctions to push, the States toward certain general goals or national minimum standards. Several points made in a 1987 U.S. Fish and Wildlife Service discussion paper on aquatic introductions appear applicable to NIS introductions in general:

Introduced aquatic organism issues are inherently interjurisdictional and, thus, clearly national, indeed international in scope. Despite this Federal interest, however, emergence of a fully effective program for avoiding undesirable introductions of aquatic organisms requires that involvement by the Federal Government not preempt State authority. Rather, the Federal Government should function as a catalyst/facilitator establishing incentives for action by the States and the other co-managers of the Nation’s fishery resources. However, it will also be imper-

⁴Lacey Act (1900) (16 U. S.C.A. 3378(a)).

⁵Federal Noxious Weed Act of 1974 (7 U. S.C.A. 2812).

⁶Federal Plant Quarantine Act (1912) (7 U.S.C.A.161).

⁷Federal Plant Pest Act (1957) (7 U.S.C.A. sec.150dd(b)(1)).

ative to ensure universal applicability of any action. Although it must be exercised as a last resort, a credible threat of Federal sanctions against non-complying jurisdictions is essential to ensure uniform and, therefore, fair application of any corrective strategy. (66)

Congress has previously recognized circumstances that justify overriding State management of NIS when it conflicted with Federal goals. Congress restricted State control of feral horses (*Equus caballus*) and burros (*Equus asinus*) through the Wild Free-Roaming Horses and Burros Act. State officials may not kill them, or allow their killing, even if they stray off Federal lands.⁸

A major extension of Federal authority resulted from litigation over the palila (*Loxioides bailleui*), a rare bird found only in Hawaii.⁹ The State's Department of Land and Natural Resources had been managing feral goats (*Capra hircus*) and introduced mouflon sheep (*Ovis* spp.) for the benefit of sport hunters but to the detriment of the palila and its habitat. A Federal court ruled that Hawaii's action amounted to an illegal "taking" of the palila under the Endangered Species Act and ordered the State to remove the non-indigenous goats and sheep (6). Under this reasoning, other States could be compelled to manage NIS to prevent conflicts with threatened or endangered species.¹⁰ Thus, precedents exist for Federal preemption even in the traditionally State-dominated area of fish and wildlife management.¹¹

New emergency powers to override State control were added to the Federal Plant Pest Act after the 1980-1982 medfly (*Ceratitidis capitata*)

crisis in California.¹² Delays occurred in developing a coordinated Federal-State response because of many factors including California's unwillingness to spray chemical insecticides over cities. These helped drive the eventual costs to the highest ever for a single eradication project—at least \$100 million (17). Although they have not yet been invoked to preempt State authority, these powers represent a potent assertion of Federal prerogatives, but only under defined circumstances. They provide sufficient leverage such that actually invoking them may never be necessary. They also provide a potential model for preempting State control efforts if they are found lacking for other NIS (box 7-B).

Federal preemption can engender controversy when applied to new areas, even in agricultural regulation where preemption has a long history. In 1993, Federal officials asserted their authority to preempt more restrictive State laws regarding releases of genetically engineered organisms, raising concerns among some State officials (see ch. 9).

I Federal-State Cooperation

Cooperative programs serve several key functions in Federal and State efforts. Many provide a means for developing consistent strategies in areas of common concern. Federal and State agricultural officials, for example, collaborate in the regulation of NIS importation, interstate commerce, and control. Postentry quarantine of certain federally restricted plants is a joint program, in which private importers keep the plants in quarantine, usually subject to State inspection (50). The National Plant Board, and four regional

⁸Wild Free-Roaming Horses and Burros Act (1971) (16 U. S.C.A. sec. 1334).

⁹*Palila v. Hawaii Department of Land and Natural Resources*, 471 F. Supp. 985 (D. Ha. 1979), *aff'd*, 639 F.2d 495 (9th Cir. 1981).

¹⁰The Endangered Species Act does not provide the same protection against "takings" of endangered or threatened plants as it does for fish and wildlife, 16 U. S.C.A. 1538(2).

¹¹In certain narrow cases, Federal laws regulating States may be unconstitutional under the Tenth Amendment. *New York v. United States*, 112 S. Ct. 2408 (1992). Federal laws may setup powerful incentives for State action, or may impose preemptive Federal standards; however, they may not compel State legislatures to enact federally desired legislation.

¹²7 U.S.C.A. 150dd(b)(1).

Box 7-B-When Federal and State Interests Collide: Control of Harmful NIS In and Around Protected Lands

Where Federal- and State-related lands-, conflicts can arise over differing management goals. Some national parks and other natural areas provide safe havens for non-indigenous pests of agriculture that are controlled elsewhere. However, harmful NIS also invade Federal reserves from lands under State jurisdiction. The lack of comprehensive State regulation and control exposes the reserves to these species' impacts when they are introduced nearby and then spread.

Federal agencies can be stymied in trying to address problems attributable to State-supported NIS with multiple impacts. An example occurs in and around the Great Smoky Mountains National Park, where park and Forest Service managers were compelled to cooperate with North Carolina in a trapping plan for introduced hogs (*Sus scrofa*). The plan limits control efforts in lower elevations of the park, despite the widespread ecological damage the hogs have caused. The park engages in time-consuming and costly transfer of live-trapped hogs, which could otherwise be killed, so that they can be released on State lands. The reason: North Carolina's wildlife agency wants to maintain hogs in the area for hunters and it had support in dealing with the Park Service from the State's congressional delegation.

The Park's hog management budget dropped drastically from FY 1992 to FY 1993 -from \$197,000 to *5,000. The hog numbers will likely increase as will their negative effects.

Federal managers sometimes must commit resources to control or eradicate threatening NIS in areas outside their boundaries and their jurisdiction. A clear Federal interest lies in improving this situation by providing an unambiguous mechanism for Federal managers to act beyond their boundaries, but only if compelling circumstances exist. While cooperative, negotiated agreements are always preferable, unresolved NIS threats may justify Federal preemption of State management to protect Federal reserves.

SOURCES: R. Joseph Abrell, Chief, Resource Management and Science Division, Great Smoky National park, personal communication to P.T. Jenkins, Office of Technology Assessment, Dec. 15, 1992; F.C. Craighead and R.F. Deamann, Bureau of Land Management, "Exotic Big Game on Public Lands; September 1954; E.F. Hester, "The U.S. National Park Experience with Exotic Species," *Natural Areas Journal*, vol. 11, No. 3, 1991, pp. 127-2S; L. Loope, Research Scientist, Haleakala National Park, personal communication to P.T. Jenkins, Office of Technology Assessment, Aug. 21, 1991.

plant boards, composed of officials from State departments of agriculture, help coordinate Federal and State regulations (50).

Certain programs aim for consistent goals in the management and control of harmful NIS across a geographic region; it does little good for an invasive NIS to be controlled in one area but not in adjacent areas from which it can reinvade. The 1990 amendment to the Noxious Weed Act acknowledged this by requiring Federal land managers to control State-prohibited weeds.¹³ Several other cooperative programs for non-indigenous weeds are voluntary. For example, representatives of Federal, State, and local jurisdictions with holdings in the area surrounding

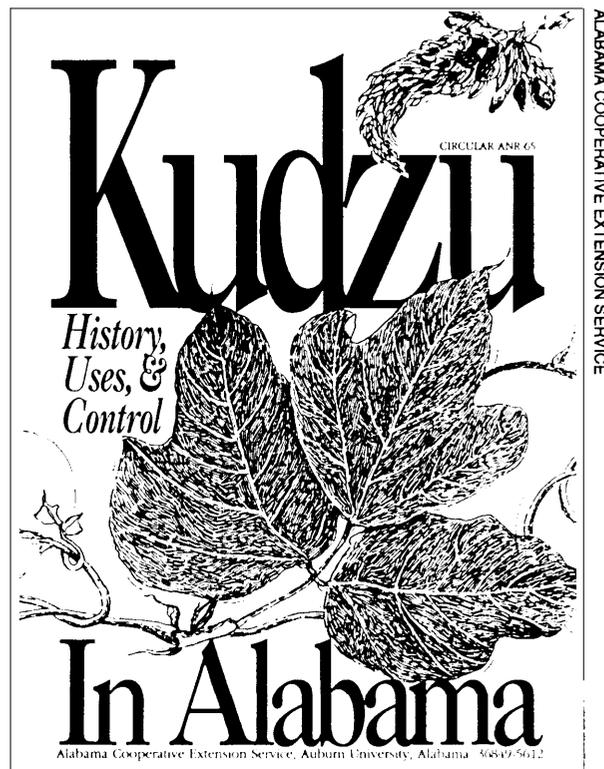
Yellowstone National Park signed a memorandum of understanding to control noxious weeds. The agreement included adoption of comprehensive management guidelines (3). In Hawaii, Federal and State officials have an interagency agreement to research the biological control of forest weeds (ch. 8). Similarly, the Western Weed Coordinating Committee, with members from western Federal and State agencies, enhances cooperation in weed management (44). Florida's Exotic Pest Plant Council (EPPC) fills this role for primarily non-agricultural weeds; agency officials, botanists, and others from private groups in California recently created their own EPPC using Florida's model.

¹³⁷ U.S.C.A. 2814.

Some programs allow targeting of Federal funds or technical assistance to the States for actions serving both national and State needs. Both APHIS and the U.S. Forest Service cooperate extensively with States in the suppression of forest pests such as the European and Asian strains of the gypsy moth (*Lymantria dispar*). The Forest Service trains State personnel in the management of forest insects and diseases (65). Funding for pest surveys and control is on a cost-sharing basis, with States providing 50 percent or more of the funds for some activities (65). According to the Forest Service, such coordinated approaches have greater effectiveness and lower overall costs than separate efforts (65). The U.S. Army Corps of Engineers also oversees a program for the control of aquatic weeds in which State or local governments can partially recover costs for weed control in navigable waterways (64). The Fish and Wildlife Service provides information and expertise on diseases affecting aquaculture, an area where no comprehensive Federal program currently exists (47).

In some areas, the Federal Government assists or provides funds to address State needs. Sometimes these programs rely on Federal powers, for example, the program to help California prevent entry of agricultural pests via first class mail from Hawaii (58). Also, Federal inspectors at ports of entry in a particular State may help interdict species prohibited by that State, even if they are not federally listed (19).

Federal assistance for local problems makes sense if, over the long run, they may become national ones (e.g., a rapidly spreading NIS) or if local problems are so common they become a national concern. The Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 provides for State submission of comprehensive aquatic nuisance species management plans. States with approved plans may receive Federal matching grants for implementation. No Federal funds have yet been budgeted for these grants (64).



*The Cooperative Extension Service, which produced this booklet on kudzu (*Puereria lobata*) in Alabama, is one of several means by which Federal and State efforts are joined.*

Federal and State agencies cooperate extensively in the prevention, quarantine, and control of agricultural pests, but several problems exist. Federal agencies do not always inform States of foreign pest threats in a timely fashion. For example, although the Animal and Plant Health Inspection Service (APHIS) was aware of the apple ermine moth (*Yponomeuta malinellus*), a serious orchard pest, in British Columbia in 1981, it did not advise Washington State officials until 1985. Shortly thereafter, the pest spread into the State. According to a Washington State agriculture official, it ‘just fell between the cracks’; in other words, Federal officials lacked a good system for communicating about potential threats (1).

The balance between Federal and State efforts sometimes shifts too quickly to adequately ad-

dress potential problems. After APHIS removed Federal quarantine restrictions on the movement of nursery stock from Japanese beetle-infested areas (*Popillia japonica*), a number of States, but not all, promulgated quarantine regulations of their own. The resulting patchwork of State regulations led to the inadvertent movement of infested nursery stock to States both with and without their own quarantines (49). In another case, black stem rust (*Puccinia graminis*), APHIS has maintained a Federal quarantine, but has delegated nearly all responsibility to the States. Inconsistent enforcement by the States has increased the possibility that barberry (*Berberis vulgaris*) varieties susceptible to black stem rust will be shipped to areas protected by the quarantine (49).

Some observers maintain that the balance of responsibility for eradicating agricultural pests has tilted to the States since roughly 1980. This was forcefully argued by a Florida official in 1991, after seven frustrating years of trying to eradicate citrus canker (*Xanthomonas campestris* pv. *citri*):

The concept of dual responsibility, a partnership, if you will, between States and the USDA has never fallen into greater disrepair or erosion than it has over the last decade or so. Simply put, USDA/APHIS has become less and less responsive to domestic and exotic pest eradication programs. (2)

The official further complained that the State had been forced to can-y out quarantines of several well-known, damaging NIS like the varroa mite (*Varroa jacobsoni*) and Caribbean fruit fly (*Anastrepha suspensa*), because APHIS considered them local pest problems of little economic significance (2).

RELATIONSHIPS AMONG STATES

Finding:

Conflicts, particularly regarding aquatic releases, arise among States because of their

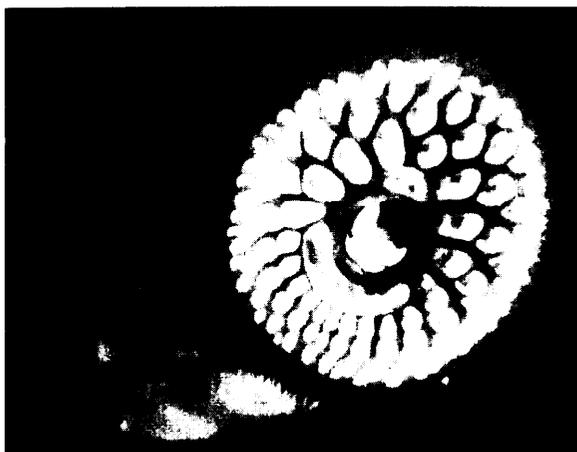
differing ecological, economic, and policy contexts. Regional approaches provide opportunities for States to resolve their differences and influence the actions of neighboring States. Such approaches have been used most frequently for evaluating aquatic releases. Expanding the use of regional approaches for other types of releases appears promising, but is limited by their voluntary nature.

States lack the power to stop the importation and release of a potentially invasive NIS in a neighboring State. Since few Federal laws compel States to cooperate with each other, and States have differing priorities, conflicts can and do occur. A recent conflict between Virginia and Maryland over the proposed introduction of the Pacific oyster (*Crassostrea gigas*) to the Chesapeake Bay has largely economic origins and is partly rooted in different patterns of public versus private ownership of oyster beds (10,30). Harvests of the indigenous Atlantic oyster (*Crassostrea virginica*) have declined to a historic low, especially on the Virginia side of the Bay (34). Virginia has a greater economic incentive to promote the introduction than Maryland, which still maintains a viable oyster fishery based on the indigenous species. Virginia approved an experimental release of sterile Pacific oysters in 1992, but later reversed this decision.

The experimental release by North Dakota of a new sport fish, the European zander (*Stizostedion lucioperca*), demonstrated how a State can introduce NIS notwithstanding concerns of adjacent States. Minnesota had objections to the release because of ecological and disease risks. (Federal and provincial Canadian governments also disputed North Dakota's action; see Scarratt and Drinnan (51) for a description of Canadian fisheries policies). Still, Minnesota officials supported the principle of paramount State sovereignty over natural resources (71). States themselves are unlikely to be advocates for less State sovereignty.

Several councils or commissions exist to coordinate introduction policies across a particular

FISH AND WILDLIFE SERVICE



The Great Lakes Fishery Commission, like its 4 counterparts elsewhere in the United States, coordinates introduction policies across the region; controlling the damaging sea lamprey has been a major focus in the Great Lakes.

region. For fish and wildlife, these include the Great Lakes Fishery Commission, the Colorado River Fish and Wildlife Council, and the three Marine Fisheries Commissions (Atlantic States, Gulf States, and Pacific). They provide venues for State officials to agree on guidelines for releases, inspections, and permits. For example, 5 western States and the province of British Columbia signed a cooperative agreement in 1980 for the interstate transfer of shellfish under the auspices of the Pacific Marine Fisheries Commission (28). The U.S. Fish and Wildlife Service provides technical and research assistance to the various regional groups.

The National and four regional Plant Boards, composed of State plant health officials, fill a similar role for agricultural pests, i.e., facilitating coordination of quarantines. They have commissioned a compilation of all State laws on weeds and pests with the goal of improving communication and reducing inadvertent violations. These boards move slowly, however, because of limited funding and spotty State participation.

Sometimes no mechanism exists for resolving conflicts between States short of a Federal lawsuit. The regional organizations that exist, how-

ever, provide important forums for proactively addressing potential differences. Indeed, many States require approval by the regional council or commission as a prerequisite for certain NIS introductions (52). Most of these regional organizations currently deal with aquatic releases, although similar structures could be useful for nonaquatic NIS issues. Regional organizations are limited in that they are essentially voluntary and not all States are members. Moreover, they have no independent regulatory authority. Robson Collins (11), a California official, notes the clear need for interstate cooperation but also that the members of the Pacific Marine Fisheries Commission have largely gone their own ways since the efforts of the 1970s and early 1980s.

STATE LAWS REGULATING FISH AND WILDLIFE IMPORTATION AND RELEASE

Findings:

- States prohibit importation and/or release of a median of only eight potentially harmful fish and wildlife species or groups. In a survey of State fish and wildlife agency officials, about one-third

responded that their lists of prohibited species are too short.

- About one-quarter of the States lack legal authority over importation and/or release of one or more of the five major vertebrate groups (mammals, birds, fish, reptiles, and amphibians). Also, about 40 percent of State agencies would like to receive additional regulatory authority from their State legislatures.
- Among those States that do have decision-making standards for approval of importation and/or release of non-indigenous fish and wildlife, none legally requires adherence to a scientific protocol when considering a proposal. A few States mandate scientific studies for certain proposals. About half the States require a general determination of potential impacts, defined broadly enough to include all ecological impacts. The rest lack rigorous decisionmaking standards.
- Most State agencies rate their own implementation and enforcement resources (staff, funding, or others) as “less” or “much less” than adequate; on average, they would like increases of resources of about 50 percent to meet their responsibilities.
- Several States present exemplary approaches to managing non-indigenous fish and wildlife. On the other hand, many States are under-regulating in several important respects. Overall, States are not adequately

addressing non-indigenous fish and wildlife concerns.

Overview of State Laws

OTA researched the laws¹⁴ of all 50 States to answer the following questions regarding fish and wildlife importation and release: What regulatory approaches are used? Are large groups of clearly harmful NIS not being regulated? What decision-making standards are agency officials required to meet? The aim of this undertaking is to determine which laws are exemplary, providing potential models for national approaches. However, drawing conclusions from State-to-State comparisons requires caution because each State has an unique ecological, agricultural, and institutional setting.

No efficient way exists to find and compare State laws and OTA's process was time consuming and expensive. States' key provisions diverge broadly, use different terminology, are often scattered within their codes, and some rules and regulations are unpublished. No group has the job of maintaining a comprehensive, up-to-date compilation. The last private compilation was based on 1983 laws; it rapidly became obsolete (29). Any future oversight of State efforts will require updating the information summarized in this chapter.¹⁵ In order to supplement this legal research, OTA also surveyed the heads of the responsible State agencies for their opinions about their own laws as implemented (box 7-C).

¹⁴ “Laws” here means State statutes and formal rules and regulations adopted by the executive agencies. Table 7-6 cites the key provisions. OTA's initial legal research was sent for review, correction and updating to the 50 relevant State agencies in fall 1992. Thirty-six States responded and their information was used for the analysis throughout this chapter. Another two States responded too late to be incorporated into the full analysis but their corrections are included in table 7-6. Respondents are listed in App. B.

¹⁵ A research project is underway at the University of New Mexico Law School's Center for Wildlife Law to collect all State wildlife laws and regulations (not just those affecting NIS) in an accessible, standard-format collection, which eventually may be computerized (45).

Box 7-C-Views From the State Fish and Wildlife Agencies

States responding: 36(7%)-AK, AL, AR, AZ, CO, FL, GA, HI, IA, ID, IL, IN, KS, LA, MA, MD, ME, MN, MO, MS, MT, NC, ND, NE, NJ, NY, OH, OK, PA, RI, TN, UT, WI, WV, WY

Not responding: 14 (28%)-4A, CT, DE, KY, MI, NV, NH, NM, OR, SC, SD, TX, VA, WA

NOTE: The OTA survey was conducted by mail in fall 1992. Percentages below are for the respondents listed in appendix B. Explanations provided with the answers are not included here. South Dakota and New Hampshire's responses were received too late to be included in the analysis, although their corrections for table 7-6 are tabulated.

Question 1: Beyond your existing authority, are there additional areas of legal authority that your agency would like to receive from your State legislature to regulate the importation, possession, or introduction of non-indigenous (exotic) fish and wildlife?

Yes: 15 (42%)-AK, AL, GA, HI, ID, MA, MD, MO, MS, MT, ND, NE, NY, WI, WY

No: 18 (50%)-AR, AZ, CO, FL, IA, IL, IN, KS, IA, ME, MN, NC, NJ, OK, PA, TN, UT, WV

No answer/other: 3 (8%) – OH, RI, VT

Question 2: Evaluate the numbers of non-indigenous species that are prohibited outright (disregarding minor exemptions such as for research) from importation, possession, or introduction into your State.

List is too short: 13 (36%)-AL, FL, KS, LA, MD, MN, MO, MS, MT, ND, NE, RI, WI

List is about right: 17(47%)-AK, AR, CO, GA, HI, IA, IL, IN, MA, ME, NC, NJ, OH, OK, UT, VT, WY

List is too long: 0

Not sure: 2 (6%)-PA, WV

No answer/other: 4 (11%)-AZ, ID, NY TN

BASIC LEGAL APPROACHES

The States employ several basic legal approaches (table 7-1).¹⁶ The most restrictive approach is to prohibit all NIS except those individually evaluated and listed as allowed, that is, a “clean” list. Hawaii is the only State with laws that require this for both importation and release of all major fish and wildlife groups. A few other States have adopted clean lists for particular actions, most commonly for fish releases.

More than half the States have “dirty” list approaches, in which certain listed NIS are prohibited from importation and/or release because of their economic, ecological, or health effects. A smaller proportion of States have neither clean nor dirty lists, that is, they have *no* species prohibited by statute or regulation. For importation this is true for 11 States regarding all major vertebrate groups and for 7 States regarding some groups. For release, 12 States prohibit no

¹⁶Some important preliminary qualifications and observations: 1) The information summarized represents the *main* provisions of the State laws that directly govern whether or not importation and release of NIS is allowed in particular cases. This narrow scope of inquiry excludes minor provisions, limited exemptions, and a myriad of veterinary, commercial, endangered species, humane, and other provisions that may incidentally affect NIS importation and release. 2) Some definitional differences exist regarding what is included when States regulate “non-indigenous” or “exotic” species. Generally, the legal definitions refer to any species not naturally found within the State; a small number, such as Delaware, include only species not indigenous to the United States as a whole. A few States define these terms ecologically, similar to OTA’s definition of ‘indigenous’ (ch. 2), so as to potentially cover intrastate movements. 3) The agencies responsible for carrying out the laws vary. Many States divide responsibility for different taxonomic groups among different agencies, which can lead to inconsistencies and even conflict within a State (54).

Question 3: Has your agency undertaken internal or external evaluations of your programs in this area?

Yes: 11 (31%)-FL, HI, KS, MA, ME, MT, OH, RI, VT, WI, WY

No: **23 (63%)-AK, AL, AR, CO, GA, IA, ID, IL, IN, LA, MD, MN, MO, MS, NC, ND, NE, NY, OK, PA, TN, UT**
WV

No answer/other: 2 (6%)-AZ, NJ

Question 4: How closely do your agency's resources (staff, funding or others) match your current and anticipated responsibilities in enforcing your State's existing laws regulating the importation, possession, or introduction of non-indigenous fish **and wildlife**?

More than adequate: 0

Adequate: 7 (19%)-IA, LA, MD, MO, NY, OH, OK

Less than adequate: 20 (56%)-AL, AR, CO, GA, HI, ID, IL, KS, MA, ME, MN, MS, NC, ND, NJ, PA, RI, UT,
WV, WY

Much less than adequate: 7(19%)-AK, AZ, FL, IN, MT, VT, WI

Not sure: 1 (3%)-TN

No answer/other: 1 (3%)-NE

Question 5: in future regulation of the importation, possession, or introduction of non-indigenous fish and wildlife, how would your agency prefer to see **the Federal role in relation to the role of the States?**

increased: 23 (63%)-CO, FL, GA, HI, IN, KS, IA, MA, MD, ME, MN, MT, NC, ND, NE, NJ, NY, PA, RI, TN,
VT, WV, **WY**

Decreased: 1 (3%)-WI

About the same: 8 (23%)-AL, AR, IA, IL, MO, OH, OK, UT

Not sure: 1 (3%)-MS

No answer/other: 3 (8%) — AK, AZ, ID

SOURCES: Office of Technology Assessment, 1993 and Center for Wildlife Law, University of New Mexico Law School, "Selected Research and Analysis of State Laws on Vertebrate Animal Importation and Introduction," contractor report prepared for the Office of Technology Assessment, Washington, DC, April 1992.

species in any fish or wildlife group and 9 States prohibit none in some groups. State's that do treat vertebrate groups differently usually treat fish apart from the other wildlife groups.

A species or group that is not prohibited maybe allowed in one of two ways: formal agency permission is required, which the agency may grant or deny, or no formal permission is required, except possibly to comply with incidental veterinary, commercial, or other laws. Many States use a combination of these two. They may have a list of species for which permits are required and allow any unlisted species to be imported or released without government oversight. Others

use the opposite, and stricter, approach of only listing the permit-exempt species, such as common pets, and requiring permits for all others.

Wide variety exists both in the structure of statutory approaches and the detail of implementing regulations, even within the basic categories of table 7-1. For example, California lists no prohibited species but requires a permit for importation of dozens of listed groups—including whole orders, families, and genera.¹⁷ The total of individual species requiring a permit is probably well into the thousands. Unlisted species and groups do not require a permit for importation, but all species do for release.¹⁸ By

¹⁷Cal.Fish and Game Code SCC. 2118.

¹⁸14 Cal. Code Reg. sec. 671.

Table 7-1—Basic Legal Approaches Used by States for Fish and Wildlife Importation and Release

Basic approach	Importation ^{a,b}		Release	
	Number	States	Number	States
All species are prohibited unless on allowed (“clean”) list(s).	2 + 1 pt ^c	HI, IDpt, VP ^d	1 + 5pt	AKpt, FLpt, GApt, HI, IDpt, KYpt
All species may be allowed except those on prohibited (“dirty”) list(s).				
Prohibited list(s) have 5 or more identified species or groups.	20+ 3pt	AL, AR, CO, CT, FL, IL, KS, KY, MI, MN, MTpt, NC, NE, NY, OH, PA, SCpt, SD, TN, TXpt, UT, WA, WY	14+ 6pt	AL, AR, CO, CT, FLpt, GApt, IL, KS, KYpt, MN, NE, NY, OHpt, PA, SCpt, TN, TXpt, UT, WA, WY
Prohibited list(s) have fewer than 5 identified species or groups.	11 + 3pt	AK, DE, IN, LApt, MD, ME, MS, NH, NV, NJ, ORpt, RI, VA, WVpt	11 + 6pt	AKpt, IN, LApt, NC, NDpt, NJ, MD, MN, MS, NH, NV, OR, RIpt, SD, VA, VTpt, WVpt
All species may be allowed; there is no prohibited list.	11 + 7pt	AZ, CA, GA, IDpt, IA, LApt, MA, MO, MTpt, ND, NH, NM, OK, ORpt, SCpt, TXpt, WI, WVpt	12+ 9pt	AZ, CA, DE, IDpt, IA, LApt, MA, ME, MI, MO, MT, NDpt, NM, OHpt, OK, RIpt, SCpt, TXpt, VTpt, WI, WVpt

^aState regulation of “possession” of a group or groups is considered here as regulation of both “importation” and “release,” since neither act can be done without having possession. For the few states that specifically regulate “importation with intention to release (or introduce),” it is not treated here as comprehensive regulation of “release” because it covers only acts of importation done with a specific intent.

^bMany States that regulate importation of particular group exempt mere transportation through the State. They are not distinguished here.

^cSome States treat different groups of vertebrates differently. This is designated, where applicable, by using the abbreviation “pt” after the State initial to indicate the entry covers only “part” of the vertebrates regulated. They are totaled separately.

^dThe summary classifications are general; in many States there limited exemptions, such as for scientific research, and other minor provisions which are not covered here. The extensive State regulation of falconry is excluded.

SOURCES: Office of Technology Assessment 1993 and Center for Wildlife Law, University of New Mexico Law School, “Selected Research and Analysis of State Law on Vertebrate Animal Importation and Introduction,” contractor report prepared for the Office of Technology Assessment, Washington, DC, April 1992.

contrast, Texas prohibits 50 fish species or groups outright, and it requires a permit for release of all but two fish species and for importation of many others.¹⁹ However, Texas lacks a permit system to regulate importation and release of non-indigenous reptiles, amphibians, birds, or mammals, except for 15 mammal species that are public safety risks such as lions (*Panthera leo*).

Analyzing the numbers of groups a State prohibits outright presents an attractively quantitative, but problematic, measure of the State’s attentiveness to potentially harmful NIS. Comparing the totals is difficult for some States that list by taxonomic categories larger than single

species. A few list large indeterminate categories (which are only counted as one listing here), such as Alaska’s prohibition against importing or releasing “venomous reptiles.”²⁰ States with few or no species prohibited outright may still be restrictive in their review of permit applications, so that in practice they prohibit more species than do States with a larger number of species prohibited outright but lower decisionmaking standards. And, of course, States vary in their ecological vulnerability to NIS invasions such that they would not be expected to all have the same number of prohibited species.

¹⁹ Vernon’s Tex. Code Annot. sec. 134.020.

²⁰ AK. Stat. 16.05.920.

Table 7-2—Numbers of Species or Groups Prohibited From Importation and/or Release by States

Number NIS prohibited:	0	1-4	5-9	10-19	20-29	30-39	40-49	50-99	100+ ^a
Number States:	9	10	8	7	1	1	1	2	11

a 100+category includes those States that generally prohibit importation or release of one or more of the five vertebrate groups as a whole, e.g., all non-indigenous fish.

SOURCES: Office of Technology Assessment, 1993 and Center for Wildlife Law, University of New Mexico Law School, "Selected Research and Analysis of State Lawson Vertebrate Animal Importation and Introduction," contractor report prepared for the Office of Technology Assessment, Washington, DC, April 1992.

Given these limitations, breaking down the numbers of prohibited species does provide a rough sense of the variability (table 7-2). A total of 34 States prohibit fewer than 20 species or groups, and 19 of those prohibit fewer than 5; the median number prohibited is 8.

The species most commonly prohibited include piranhas, walking catfish (*Clarias batrachus*), grass carp (*Ctenopharyngodon idella*), European (also called San Juan) rabbit (*Oryctolagus cuniculus*), nutria (*Myocaster coypus*), and coyote (*Canis Latrans*)-the latter by the eastern States into which it is expanding its range because of human activities (21). The processes States use in listing species vary extensively, with some based on expert input and others of unclear origin. State lists of prohibited fish, in particular, have been criticized for lack of scientific input (13,26).

At least one-third of the State fish and wildlife officials surveyed rated their own lists of prohibited species as "too short" (box 7-C, question 2). North Dakota's self-evaluation typifies the comments of this group:

There are presently no non-indigenous species of animals other than fish that are prohibited from importation, possession, or introduction into North Dakota. Given the documented problems that other states have had with the introduction and escape of non-indigenous species, this is obviously an unacceptable state of affairs.

No States rated their prohibited species list as "too long." Slightly less than half rated their list as "about right."

GAPS IN LEGAL AUTHORITY

The least restrictive approach would be to have no laws regulating importation or release for any groups. No States fit this description, although a few come close. Several either omit or only partially cover major taxonomic categories of fish and wildlife (table 7-3).²¹ OTA's listing of gaps is limited to those States in which no legal authority exists to regulate a particular group comprehensively; it does not include those in which the laws do give such authority, but the agencies have, for whatever reason, chosen not to exercise it. Thus, table 7-3 gives a conservative picture.

Thirteen States lack legal authority over importation of one or more of the major vertebrate groups. Twelve States lack legal authority over release of one or more of the groups. Fish are least likely to be left uncovered. The only State without authority over fish releases is Mississippi, which lacks authority over all releases except birds.

Almost half of the State officials who responded to OTA's survey wanted additional legal authority from their legislatures (box 7-C, question 1). They typically commented that their existing authority left potentially harmful activities, such as NIS importation for game farming,

²¹Most of the gaps are complete omissions where the entire vertebrate group is unregulated. A few gaps are due to partial coverage of a group; for example, Connecticut's law only regulates mammals that are "quadrupeds" (Conn. Gen. Stat. Annot. 26 sec. 55). This covers most potentially harmful non-indigenous mammals, but it does omit authority over several taxa such as pinnipeds (e.g., seals), primates, and bats.

Table 7-3-Gaps in Legal Authority

Vertebrate group	Legal authority over importation omits, or only partially covers, the group		Legal authority over release omits, or only partially covers, the group	
	Number	States	Number	States
Mammals	9	CT 1A, LA, ND, OR, SC, TX, WI, WV	10	CT, MI, MS, ND, OH, RI, SC, TX, VT, WV
Birds	8	1A, IA, ND, OR, SC, TX, WI, WV	8	MI, ND, OH, RI, SC, TX, VT, WV
Fish	4	1A, ND, NJ, WI	1	MS
Reptiles	10	1A, LA, MI, ND, OR, PA, SC, TX, WI, WV	9	MI, MS, ND, OH, RI, SC, TX, VT, WV
Amphibians	10	AK, 1A, LA, MI, ND, OR, PA, SC, TX, WI	9	AK, MI, MS, ND, OH, RI, SC, TX, VT

SOURCES: Office of Technology Assessment, 1993 and Center for Wildlife Law, University of New Mexico Law School, "Selected Research and Analysis of State Law on Vertebrate Animal Importation and Introduction," contractor report prepared for the Office of Technology Assessment, Washington, DC, April 1992.

uncovered. Those States with authority gaps might try to keep harmful NIS out under their general laws, but they could be legally challenged in disputed cases.

DECISIONMAKING STANDARDS

How are State agencies required to exercise their discretion in cases where they do have legal authority? "Decisionmaking standards" refers to the legal criteria imposed on, or adopted by, the agencies to guide this discretion. With respect to NIS, these criteria typically address potential ecological impacts of the proposed action. States have more restrictive standards for releases than for importation, but overall few States require careful studies, even for releases (table 7-4).

The most restrictive standard, of course, is where the legislature prohibits entire groups of NIS outright, eliminating agency discretion. Florida's statute prohibiting any marine releases is an example.²² But predeterminations are rare—agencies commonly have broad discretion when permitting or denying NIS proposals.

For allowing NIS importation, 17 States lack standards for all vertebrate groups and 3 States lack them for some groups; for NIS releases, 15 States wholly lack standards, and 6 in part.²³ In these States the discretion of the responsible agency may still be generally guided by the statute(s) that grants the agency's general powers. Nevertheless, having no defined, legally enforceable standards, and thus less accountability, increases the likelihood of widely varying decisions. Political and citizen pressure, personal preferences or values of agency officials, and other unpredictable factors will more likely be influential, especially as this regulatory area is relatively volatile and fast changing (13).

Among the States that *do* have express decisionmaking standards for allowing importation and/or release of NIS, none legally requires that a scientifically based protocol, such as that developed by the American Fisheries Society, be followed. Such protocols are designed by experts to provide formal guides for examining all potential risks and benefits of a proposal (see protocols section inch. 4). Three States—Florida,

²² 28 Fla. Stat. Annot. sec. 370.081(4).

²³ These numbers include the States previously identified in table 7-3 as lacking legal authority to regulate in these areas; plainly, if a State's laws provide no authority to make a decision, neither do they provide decisionmaking standards.

Table 7-4—Decisionmaking Standards Used by States

Decisionmaking standard ^a	For importation permission		For release permission	
	Number	States	Number	States
Agency has no discretion; action prohibited	1 pt ^b	VTpt	6pt	AKpt, FFLpt, GApt, KYpt, MDpt, WApt ^c
Mandated study of potential ecological impacts	1 pt	FLpt	3pt	FLpt, HIpt, MTpt
Determination of potential impacts, defined broadly enough to include all ecological impacts	18 + 5pt	AL, CApt, CO, CT DE, FLpt, GA, HI, ILpt, IN, KY MD, ME, MN, NC, NE, NH, NY, SCpt, TN, UT, VTpt, WA	15 + 12pt	AL, AZpt, CO, CT, GApt, DE, HIpt, ILpt, IN, IA, KYpt, MDpt, ME, MN, MSpt, MTpt, NC, NE, NH, NY SCpt, TN, TXpt, UT, VApt, WApt, WI
Determination of potential impacts, not defined broadly enough to include all ecological impacts	8 + 4pt	AZ, AKpt, CA@, ID, ILpt, MT NJ, NM, NV, PA, RIpt, VA	4 + 6pt	AZpt, ID, ILpt, NJ, NV, OKpt, ORpt, PA, VApt, WApt
No specific decisionmaking standards	17 + 3pt	AKpt, AR, 1A, KS, LA, MA, MI, MO, MS, ND, OH, OK, OR, RIpt, SCpt, SD, TX, W, WV, WY	15 + 6pt	AKpt, AR, CA, KS, LA, MA, MI, MSpt, MO, ND, NM, OH, OKpt, ORpt, RI, SCpt, SD, TXpt, VT, WV, WY

a "Decisionmaking standards" refers to the requirements legally imposed on, or adopted by, the permitting agencies when they exercise discretion.
 b Some States treat different groups of vertebrates differently. This is designated, where applicable, by using the abbreviation "pt" after the State initial to indicate the entry covers only "part" of the vertebrates regulated. They are totaled separately.
 c The 18 States indicated in bold italics have general environmental policy statutes, regulations or executive orders that may overlay NIS permitting and require higher decision-making standards with regard to environmental impacts than the standard indicated (18). They are: CA, CT, HI, IN, MD, MA, MI, MN, MT, NJ, NY, NC, SD, TX, UT, VA, WA, WY.

SOURCES: Office of Technology Assessment, 1993 and Center for Wildlife Law, University of New Mexico Law School, "Selected Research and Analysis of State Law on Vertebrate Animal Importation and Introduction," contractor report prepared for the Office of Technology Assessment, Washington, DC, April 1992.

Hawaii, and Montana—mandate “studies” for certain groups to investigate the potential ecological effects a proposed species will have if released.

The main drawbacks to mandating scientific protocols or detailed studies are the costs to applicants and agencies (52). This is reflected, for example, by Maine’s explicit decision not to require rigorous scientific studies as a precondition for marine NIS releases, on the grounds that “[existing] regulations require substantial pre-introduction screening and review processes that are the most appropriate safeguard and the most efficient utilization of scarce resources’

(12). Some States require that NIS be scientifically studied and evaluated *after* release, e.g., Washington.²⁴

Many States require some determination-but not detailed scientific studies---of the potential impacts, and they define this broadly enough to include all ecological impacts. Eighteen States require such determinations for *importation* of all vertebrate groups and five require them for some groups. Fifteen States require determinations of impacts for *release* of all vertebrate groups and 12 require them for some groups. These standards vary remarkably in their attention to detail.²⁵ A few States set out long and complex permitting

²⁴ Wash. Admin. Code 232-12-271(2)(a).

²⁵ The classification by OTA in table 7-4 is liberal as to whether the laws provide for consideration of all ecological impacts, even when such impacts are not mentioned specifically. Thus, Alabama’s standard of “best interests of the State” is treated as potentially including all ecological impacts.

criteria, such as Maine’s regulatory standards for wildlife imports.²⁶ By contrast, Alabama’s standard governing the Commissioner of Conservation and Natural Resources’ decision to prohibit a species is simply “the best interests of the State.”²⁷ It is difficult to hold decisionmakers accountable for their actions regarding NIS when legal standards are vague.

Several States require determination of potential impacts of the decision but do not define these broadly enough to include all ecological impacts. For example, Oregon’s standard for denying a fish release permit is “if the [Fish and Wildlife] Commission finds that the release of the fish into a body of water would adversely affect existing fish populations.”²⁸ That standard does not require consideration of the other organisms potentially affected by a fish release, such as plants, insects, and non-fish predators, nor of the overall condition of the ecosystem.

Adding the number of States in table 7-4 with *no* decisionmaking standards to the number of States with standards that are not broad enough to include all ecological impacts gives the following totals: For importation, 25 States have no or narrow standards for all vertebrate groups and 7 States have such standards for some groups. For release, 19 States have no or narrow standards for all vertebrate groups and 12 States have such standards for some groups. These are the “States without comprehensive decisionmaking standards in their NIS laws” (category (a) in table 7-5).

However, 18 States have a superimposed layer of decisionmaking standards in the form of State environmental policy acts (SEPAs) (table 7-4 in italics). The application of SEPAs varies widely, and they appear to have had little effect in State NIS decisionmaking.²⁹ However, they can provide general protection against ill-considered

Table 7-5 Non-indigenous Species Decisionmaking Standards In Relation to State Environmental Policy Acts

	For <i>importation</i> permission	For <i>release</i> permission
(a) Number of States without comprehensive decisionmaking standards in their NIS laws	25+ 7pt	19 + 12pt
(b) Number of States in category (a) that have adopted general environmental policy acts	8 + 1 pt	6 + 3pt
(c) Remainder of States lacking comprehensive decisionmaking standards (a minus b)	17+ 6pt	13+ 9pt

NOTE: Some States treat different groups of vertebrates differently. This is designated, where applicable, by using the abbreviation “pt” after the State initial to indicate the entry covers only “part” of the vertebrates regulated. They are totaled separately.

SOURCES: Office of Technology Assessment, 1993 and Center for Wildlife Law, University of New Mexico Law School, “Selected Research and Analysis of State Law on Vertebrate Animal Importation and Introduction,” contractor report prepared for the Office of Technology Assessment, Washington, DC, April 1992.

decisions by requiring formal environmental review of both agency-permitting and agency-initiated actions (18). For example, Montana requires a detailed environmental impact statement under its SEPA for all new releases of non-indigenous fish, the only State to do so explicitly.³⁰

These SEPAs could make the decisionmaking processes more rigorous in the States that lack comprehensive standards written directly into their NIS laws. But in how many States do SEPAs make up for their low (or no) standards? The pattern of adoption of SEPAs answers this question (table 7-5). Even after considering those

²⁶ 402 Code Me. Rules, part IV, sec.7.60.

²⁷ Code Al. 9-2-13.

²⁸ Or. Rev. Stat. 498.228.

²⁹ State releases supported by federal funds may require environmental review under the National Environmental Policy Act (ch. 6).

³⁰ Rev. Code Mont. 87-5-71 1(2).

States that have SEPAs, approximately one-third of the States have agencies that permit MS importation and release with no legal requirement that they give comprehensive consideration to the potential ecological impacts of their decisions.

Emerging Fish and Wildlife Issues

With a general decline in hunting opportunities on public and open private lands, numerous States face new proposals for releases of non-indigenous mammals and birds on private hunting preserves (22). A trend also exists toward use of “exotics” such as red deer (*Cervus elaphus*) for livestock. When the Wyoming Game and Fish Commission was confronted with a proposal for a large ranch using several hundred animals from 15 non-indigenous species, officials surveyed 13 other western States and four Canadian Provinces that had experience with these ranches. They found a good deal of variation, including quarantine and fencing requirements and responsibility for escapees (32). The key finding: “As they have become more experienced with the problems of disease, competition, and hybridization with exotics and game farms, regulations governing exotics and game farms in 7 States and 3 provinces have become more restrictive for biological reasons.” Four of the States and Provinces either lacked legal authority or did not respond to the survey; only one State (Arizona) indicated it had become less restrictive in certain circumstances.

As additional conflation of the greater State concern in this area, in 1991 and 1992 Montana and Washington imposed emergency moratoriums on various game farm activities, including NIS importation. They cited mainly disease and hybridization risks.

Another emerging area of State concern is the release of non-indigenous fish stocks. (Stocks are sub-species or recognized strains.) The concern focuses on genetic dilution resulting from releases within the larger species’ range, but outside the particular stock’s range. The most prominent genetic dilution problems occur in the Northwest

where massive intentional releases of non-indigenous stocks of hatchery salmon have diluted several wild stocks, contributing to their endangered status (67).

All States but Mississippi have general legal authority to regulate non-indigenous fish releases (table 7-3). A 1990 survey found that 26 of the 39 responding States had some restrictions on interstate and intrastate fish movements based on genetics (70). But, 19 of the 26 States restricted movements of only one or a few species. Usually these were popular sport fish. Only 7 of the 26 had policies applicable to *all* non-indigenous stock releases.

The growth of aquiculture, with the potential for accidental releases, compounds the risks of genetic dilution.

Lessons From State Fish and Wildlife Laws

The above comparison of State wildlife laws yields several lessons about exemplary approaches, areas of under-regulation, and problems regarding enforcement.

EXEMPLARY APPROACHES

Which States’ approaches represent good examples for other States and the Federal Government? OTA’s broad answer, based on overall comprehensiveness and attention to detail in existing statutes and regulations, is that exemplary States include (in alphabetical order): Florida, Georgia, Hawaii, Montana, and Utah. They leave no major authority gaps, they have detailed laws, and they require decisionmakers to observe rigorous standards. This does not mean that their approaches cannot be improved or that OTA endorses decisions these States have made in particular cases.

Also, a number of States’ individual legal provisions stand out. The States listed below are not necessarily the only ones with the provisions discussed. The wide variety of these exemplary provisions illustrates the strength of the U.S.

system, in which 50 different regulatory approaches can be developed and tested.

- *Burdens of Proof:* Georgia strongly asserts that importation and release of NIS are a ‘privilege’ to be granted only upon a ‘clear demonstration’ that the review criteria are satisfied (Ga. Game and Fish Code 27-5-1).
- *Expert input:* Illinois created an Aquaculture Advisory Committee, which makes recommendations regarding importation and possession of NIS for aquaculture (17 Ill. Admin. Code sec. 870.10(e)). The regulation provides for participation by experts from universities, government, and private industry.
- *Funding:* In the past, State fish and wildlife agencies focused mostly on providing fishing and hunting opportunities. Many still rely for operating funds on license fees and taxes on purchases by hunters and anglers. Understandably, these agencies balk at meeting the costs of additional department responsibilities, like new MS regulations, out of traditional revenues. Tennessee addressed this problem directly by mandating that ‘costs of administration’ of NIS laws come from either NIS permit fees or the general fund (Tenn. Code Annot. 70-4-417). New Jersey authorizes its Commissioner of Environmental Protection to charge user fees adequate to cover the costs of NIS inspections and other necessary governmental services (N.J. Stat. Annot. 23:2A-5).
- *Control of Escapees:* Louisiana’s regulation, of non-indigenous game breeders is clear. Applicants must submit a written plan for recapture of an escaped animal that includes: equipment, personnel, recovery techniques, and the method of payment for any damages caused (La. Wildlife and Fisheries Reg. sec. 107.11 .D.).
- *Compensation for Damages:* Many States hold private owners of NIS responsible for damages caused both to the State and to private claimants if their animals escape. Vermont goes further than most by assessing *treble* damages against importers of illegal NIS for expenses



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*Illegal releases of fish and wildlife, such as the introduced wild boar (*Sus scrofa*), are a major concern to States. Hogs and other animals that become feral are seldom brought under State law.*

- incurred (10 Vt. Stat. Annot. sec. 4709). Nevada created a compensation fund for private property damage and crop loss caused by ‘game mammals not native to this State’ (Nev. Rev. Stat. 504.165). Georgia requires a major insurance policy to cover potential damages caused by certain ‘inherently dangerous’ animals, such as lions (Ga. Game and Fish Code 27-5-4(f)).
- *Emergency Powers:* Legal authority to respond quickly to newly perceived threats can cut off problems before they become widespread. Montana imposed a 4-month moratorium in 1991 on importation of certain non-indigenous game species on the basis of disease concerns, using emergency rule-making powers (Mont. Admin. Register 2-1/30/92).
- *Hybrids and Ferals:* Although non-naturally occurring hybrid animals are non-indigenous, few States explicitly bring them under their laws. Wisconsin spells out coverage of hybrids (Wise. Admin. Code NR 19.05). Almost all States exempt domesticated species from wildlife laws, leaving their authority over feral domestic animals ambiguous. However, Alaska specifically defines regulated ‘game’ so as to include ferals (Ak. Stat. sec. 16.05.940(17)).

- *Bait Fish:* The importation of live bait fish, followed by its release during or after sport fishing trips, can cause NIS infestations (37, 43). Some States have specific laws regulating live bait; Maine flatly bans all importation of live bait fish commonly used in inland waters (12 Me. Rev. Stat. Ann. 7613) (see box 7-A, on the constitutionality of this ban).
- *Sanctions:* A Vermonter's hunting or fishing license may have "points" assessed against it for violation of animal import laws, in addition to a fine and/or imprisonment (10 Vt. Stat. Ann. sec 4502(b)(2)(L)). This is similar to points assessed against auto drivers convicted of traffic offenses—a certain number results in license suspension. In Montana, a conviction for violation of NIS laws can lead to loss of hunting, fishing, or trapping privileges for 2 years (Rev. Code Mont. 87-1-102).
- *Compliance Incentives:* Hawaii recently amended its laws to provide some of the most severe fines for violations of its importation permit laws—up to \$10,000 for a first offense and up to \$25,000 for a subsequent offense within 5 years of the prior offense (Ha. Rev. Stat. sec. 150A-1431). However, the same statute provides a strong compliance incentive by granting amnesty to any violator who "voluntarily surrenders any prohibited plant, animal, or microorganism or any restricted plant, animal, or microorganism without a permit issued by the department [of Agriculture], prior to the initiation of any seizure action by the department.
- *Comprehensive Planning:* Many States have uncoordinated patchwork of NIS provisions. Minnesota recognized this in its own laws and directed a public-private task force to prepare a major report on NIS threats (41). Based on this, the Commissioner of Natural Resources was to develop a comprehensive management plan for "ecologically harmful exotic species" by January 1993,

UNDER-REGULATION

The comparison of State non-indigenous fish and wildlife laws also reveals areas of under-regulation of clearly harmful MS by some States. Five States (listed alphabetically) represent those lacking complete regulatory authority, lacking detailed implementing regulations, and/or not legally requiring careful decisionmaking for proposed NIS: Mississippi, North Dakota, Ohio, Texas, and West Virginia. (This does not mean that OTA disagrees with particular decisions these States have made.) Many others also under-regulate in one or more respects—a conclusion supported by the survey of State officials, 42 percent of whom wanted additional regulatory authority.

The most important areas of NIS regulation in which many States fall short are:

- prohibiting harmful species or groups,
- adopting legal authority covering all major fish and wildlife groups and harmful activities,
- following rigorous decisionmaking standards that look at all ecological impacts,
- requiring scientific study of potential significant impacts,
- defining "non-indigenous" so as to potentially include both interstate and intrastate releases,
- regulating all releases of fish stocks to protect genetic diversity,
- covering hybrids and ferals unambiguously,
- making comprehensive rules for containment and other ownership duties,
- clarifying liability for escapes and damages they may cause,
- mandating post-release monitoring and evaluation, and
- obtaining expert input to aid in decision-making.

³¹Amendments enacted in Hawaii House of Representatives Bill No. 2597, effective on June 17, 1992.

OBSERVATIONS REGARDING ENFORCEMENT

As with the laws themselves, great variability exists in legal enforcement regarding NIS (24). The following admission from Michigan's Department of Natural Resources probably applies to many States:

[Michigan's] laws and regulations have developed over many years and now exist in a somewhat complex and fragmented manner. These laws and regulations should be reviewed, consolidated, and publicized. Most people in the State are probably not aware of the existing regulations, and the impacts of ignoring these regulations. Moreover, these regulations are often not vigorously enforced. (40)

A major enforcement difficulty is that States generally lack effective ways to monitor imports from within the United States, except for Hawaii and Alaska. Few real geographic checkpoints exist; State borders only provide meaningful enforcement points in the rare States, like California, with inspection stations. A popular or wide-ranging species imported or released into one unrestrictive State can soon spread on its own or be taken into others.

Illegal releases are a major concern of State managers, especially of sport fish (52). Fisheries agencies repeatedly eradicate illegal releases. California recently spent about \$2 million to clear white bass (*Morone chrysops*) out of a Central Valley reservoir, where they were threatening native salmonids, only to find them introduced again in a neighboring reservoir (43). Indeed, in some States, thwarting illegal private fish releases is an impetus for officials to undertake their own, more carefully managed, releases (52). Nevertheless, legal releases intended for one watershed can be illegally transplanted by citizens into other watersheds (72).

Illegal releases of animals for sport hunting also occur occasionally, particularly of wild boar

(*Sus scrofa*) (35,36). Several other NIS have escaped from game farms, especially in Texas. In Montana, on March 2, 1992, the Wildlife Division conducted a statewide inspection and enforcement blitz of the 107 licensed game farms in the State, looking for illegal or negligent practices (42). They uncovered a number of serious violations, falling into 22 different categories. Five categories involved escape or other opportunities for MS, such as red deer, to come into contact with indigenous wildlife. As a result of the blitz, the Division pursued legal action against 12 of the farms' operators (42).

These types of enforcement operations are relatively new for many States' fish and wildlife agencies.³² Their traditional focus on fishing and hunting still holds. In many cases, their budgets depend almost exclusively on dollars generated by hunters and anglers. For example, Utah's State Division of Wildlife Resources receives only 6 percent of its budget from the State legislature (52). They have a strong incentive to introduce popular, harvestable NIS. However, non-game concerns, including MS regulation, have risen dramatically in the last 15 years or so (52). Internal and external evaluations are important ways to assess whether an agency is meeting its obligations, especially at times when its clients are rapidly changing. Still, only 11 (31 percent) of the agencies that responded to OTA's survey had undertaken prior evaluations of their NIS programs (box 7-A, question 3).

Also, a majority of responding State agencies—20 of 36 (56 percent)—rated their own implementation and enforcement resources (staff, funding, etc.) as "less than adequate" (box 7-A, question 4).

In the opinions of several commentators, the States' limited mandates, authority, laws, policies, and resources, when taken as a whole, have led States to do relatively little to slow the establishment or spread of harmful non-indigenous

³² In a few States, agriculture departments have primary enforcement responsibility for non-indigenous fish (especially aquaculture) and wildlife.

fish and wildlife (table 7-6) (9,13,31,62). OTA's analysis supports these opinions. On the positive side, OTA's research revealed that many States have recently taken steps to upgrade their laws and programs, particularly in the West where threats from non-indigenous fish and wildlife have caused significant concern.

STATE LAWS ON NON-INDIGENOUS PLANTS, INSECTS, AND OTHER INVERTEBRATE ANIMALS

Finding:

State laws governing agricultural pests are relatively comprehensive. However, for non-indigenous invertebrates and plants that do not affect agriculture, State laws provide only spotty coverage.

Overview of State Laws

The Federal Government dominates the regulation of foreign plants and invertebrate agricultural pests—much more than for fish and wildlife. Nevertheless, States play a major role in quarantining interstate and intrastate movements of weeds and pests of both foreign and U.S. origin.

No government agency maintains a compilation of State laws regulating plants and invertebrates. The National Plant Board, composed of State and Federal agriculture officials, has commissioned a new compilation of nursery regulations and plant quarantines, available in June, 1993. Regional compilations are also underway. For example, the Southern Plant Board had compiled restrictions for 10 of the region's 12 States as of December 1992 (25). These included a "quick reference" to each State's full regulations and lists of: definitions; shipping and additional permit requirements; fees; regulated professions or industries; State noxious weeds; applicable Federal and State quarantines; and apiary and miscellaneous information. A similar, standardized format for the national compilation is planned.

State seed laws are compiled annually by Seed World magazine (57). However, a State's restrictions on seeds do not necessarily mean that corresponding restrictions exist against importing or planting whole plants of the same species. Also, limited tolerances of most noxious weed seeds are allowed per unit weight of imported seed. In other words, State seed laws primarily protect seed consumers (farmers) rather than the environment.

As with fish and wildlife, variability exists in State approaches to non-indigenous plants and invertebrates (68). However, all States have agricultural pest prevention programs and certification programs for pest-free nursery stock (68). Most States inspect nursery stock before commercial interstate shipments (50). These programs have been successful in eliminating the occurrence of certain pests in some States (27). Many States also have interior quarantines designed to limit infestations to certain counties.

WEEDS

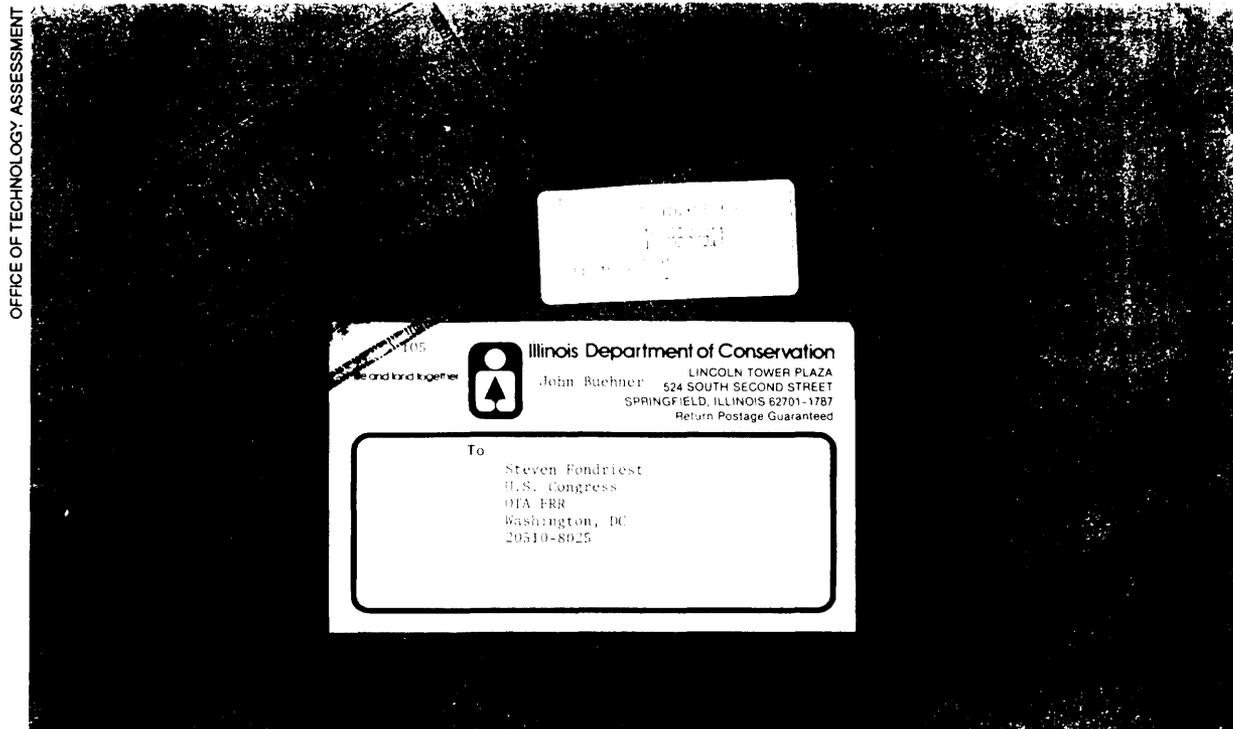
Almost all States list some prohibited agricultural weeds beyond those listed under the Federal Noxious Weed and Seed Acts. In these cases, State prohibitions may reduce interstate spread of some harmful non-indigenous weeds otherwise allowed by Federal laws and regulations. Relatively few States, however, have natural area weed laws, that is, plant prohibitions separate from agricultural quarantines. The lack of such prohibitions in most States has left them unable to address some harmful NIS, such as the wetland invader purple loosestrife (*Lythrum salicaria*) (63). A trend exists to adopt non-agricultural weed prohibitions, especially to protect aquatic or wetland areas. Washington, for example, has recently adopted detailed regulations on natural area weeds (box 7-D).

Since no national compilation of State plant laws exists yet, OTA commissioned a case study on the adequacy of the weed and seed laws for five contiguous western States: Idaho, Oregon, Utah, Washington, and Wyoming. An expert on

Table 7-6-References to Key State Statutes and Regulations on Importation and Release of Fish and Wildlife

State	Statutory authority	Authority in regulations
Alabama	9-2-13	220-2-.26, -.93
Alaska	16.05.251, -.255(8), -.920, -.940(10), 20-(17)	5 AAC 41.005, -.030, -.070, -.92.029
Arizona	3-2901; 17-306	R12-4-401, -405, -406, -410, -412, -413
Arkansas	15-46-101	Game and Fish Comm'n's Code Book §§04.07; 18.1 2; 32.12-.16; 42.05, -.09
California	Fish and Game Code 2118, -2150	Fish and Game Comm'n regs §§171 -171 .5; 236; 670.7; 671.1 -671.5
Colorado	33-6-112, -114, -114.5	Art. VII.007, -.008, -.009
Connecticut	26-40a, -55, -56	26-55-1, -2
Delaware	3 §7201, 7§741, -772	Dep't of Nat. Res. and Env't'l Control, Div. of Fish and Wildlife regs. 10, 14
Florida	.370.081 ; 372.26, -.265, -.922; -.98, -.981	Vol. 14, 39-4.005; 39-6; 39-12.004, -.011 ; 39-23.006-.008; 39-23.088
Georgia	27-5 -1, -2, -4, -5, -7	391 -4-2-.06; 391-4-3-.12
Hawaii	142-94, 150A-6, -7, -8; 197-3	Title 4, chs. 18, 71; Title 13, ch. 124
Idaho	36-1 04(6), -701	13K 1.5.4, 7; 13L 3
Illinois	8 §240; 56 §10-1 00, -105; 61§2.2, 2.3	17 IAC 630.10, -870.10, -870.80
Indiana	14-2-7-20, -21	310 IAC 3.1-6.7, -10-1, -10-11
Iowa	109.20, -.47,-.83	none
Kansas	32-956, -1004	23-16-1 ; 115-20-3
Kentucky	150.180	301 KAR 1:1 15; -:120; -:122;1:171 ; 2:040; 2:080
Louisiana	56:20; 56:319, -:319,1	Title 76, §107
Maine	7 §1809, 12 §6071, -7202,-7204, -7237, -7237a, -7239, -7240, -7613	Tab 402, Pt. IV, §7.60; Dep't Marine Res. regs. Ch. 24
Maryland	Agric. Code 5-601; Health-Gen. 18-219, 24-109; Nat. Res, 4-1 IA-02, 10-903	08.02.14.05, -.07; 08.03.09.0; 08.02.1 1.05K
Massachusetts	131 §§19, -1 9A, -23	321 CMR 2.12, -9.00-9.02
Michigan	300.253 93.(1), -(8), 300.257; 300.258(m); 304.2 §2(a); 305.9; 308.1 15a; 317.81	Wildlife Conservation Act Comm'n Order update #92, 9/1 7/91: §§4.2, 5.2, 5.5
Minnesota	17.45, -.497; 84.967,-.968,-.9691 ; 97C.515, -.521	Dep't of Nat. Res. Comm'r's Order No. 2450 published in June 22, 1992 State Register, Chs. 6216,6250
Mississippi	75-40-1 13; 79-22-9, -11	Dep't of Wildlife Conservation Public Notice No.s 1405,2768
Missouri	252.190; 578.023	3 CSR 10-4.110, -0134
Montana	75-1-201 ; 87-3-105, -210, -221 ; 87-4-424; 87-5-701 et seq.	12.7.602, -.701 ; 12.6.1506, -.1507, -.1512, -.1514, -.1515

State	Statutory authority	Authority in regulations
Nebraska	37-713, -719	Title 163, ch. 2, §§002, 004.03, 008.08
Nevada	503.597; 504.295	503.110, -.140
New Hampshire	207:14; 21 1.62-(e) I and II (previous provisions as reenacted in HB 1183, ch. 171 of 1992 Laws), 211 :64; 212:25 and 467:3	FIS ch. 800
New Jersey	23:4-50; 23:4 -63.1 , -63.2,-63.3, -63.4; 23:5-30, -33.1	7:25-4.1 et seq., -5.1 et seq., -10.1 et seq.
New Mexico	17-3-32; 77-18-1	Reg. 677, Ch. 5, Art. 3, §A
New York	Ag. and Markets Law §74-9; Env't'l Cons. Law §11-0507, -0511, -0917, -1703,-1709, -1728	Title 6, part 174; part 180, 3180,1
North Carolina	113-158, -160, -274, -291, -291.3, -292	T0252B.0212; T15A03B.0108; T15A:10B.OI00; T15A:1 OC.0211
North Dakota	20.1-01-02; 20.1 -02-05.14; 20.1-04-03	29-04-04-01, -03; 30-04-04
Ohio	1533.31	1501.31-19-01
Oklahoma	29 §§5-103, 6-504, 7-801	800.25-25
Oregon	498.052, -.222.b, -.242; 609.309	635-07-515, -522, -523, -527, -585, -600, -615, -620
Pennsylvania	30921 02; 34 §102, -2163, -2961, -2962, -2963	58§§71.1-71.6, 73.1-73.2, 77.7, 137.1
Rhode Island	4-11 -2; 4-18-3, -5; 20-1 -12; 20-1 O-12; 20-17-9	Dep't of Env't'l Management, Div. of Fish and Wildlife, Rules and Regs. no.s 61 -63; Dep't of Health, Rules and Regs., R4-18-IWA, §§2.0, 3.0, 4.0
South Carolina	50-11-1 760; 50-1 3-1630; 50-16-20, -40, -60	none
South Dakota	41-2-1 8, -3-13, -13-1.1, -13-3	41 :07:01:11; 41 :09:01 :02, 41 :09:02:02; 41 :09:02:06.01; 41 :09:08; 41:1 4:01
Tennessee	70-2-212; 70-4-401,-403,-412	Rules of Term. Wildlife Resources Agency, ch. 1660-1-18-.01 (5), -.02(2), -.02(5), -.03(1) , -.03(4), -.03(5)
Texas	Ag. Code §134.020; Parks and Wildlife Code §§12.015, 66,007	31 TAC 52.202-.401, 55.201 et seq., 57.111 et seq., 57.251 et seq.
Utah	23-13-5, -14	R657-3-1 et seq., -16-1 et seq.
Vermont	10 §4605, -4709	Fish and Wildlife Regs. Governing Importation of Wild Birds and Animals
Virginia	28.1-183.2; 29.1-521, -531, -542, -545	325-01-1. sec. 5,325-01-2. sees 1 -4; 325-02-27 §§12, 13; 325-03-1 §§5, 6
Washington	75.08.295; 77.12.020,-030, -.040; 77.16.150	220-20-039, -040; 232-12-017, -271
West Virginia	20-1 -2; 20-2-13	none
Wisconsin	29.47(6), -51, -535	NR 19.05; 150.03
Wyoming	23-1 -302; 23-3-301; 23-4-101	Game and Fish Comm'n regs. Chap. X.



*This mailing package was designed to complement a State-produced videotape on the dangers of zebra mussels (*Dreissena polymorpha*) in Illinois. Generally, State laws on importation and release of these and other aquatic mollusks are less comprehensive than for agricultural pests.*

non-indigenous plants of that region, Richard Mack of Washington State University, assessed the adequacy of the protection afforded by the restrictions under the States' noxious weed and seed lists (also considering the species restricted under the Federal Noxious Weed Act and Federal Seed Act) (33). He based his assessment on the likelihood of unlisted weeds causing economic or ecological problems. His conclusions:

Idaho—list of 47 weeds (species or larger taxonomic groups) provides adequate protection but omits at least 6 well-known threats.³³

Oregon—list of 67 provides more than adequate protection, although a few additions would be appropriate.

Utah—list of 23 does not provide adequate protection, omitting at least 11 threatening species.

Washington—list of 75 provides more than adequate protection (box 7-D), although a few additions would be appropriate.

Wyoming—list of 34 provides barely adequate protection, omitting at least 11 threatening species.

Thus, the adequacy of the case-study States' lists of prohibited weeds varies considerably, but only Utah's was rated as inadequate. Also, some State lists include inaccurate or misspelled scientific names, raising questions about the lists' technical validity (33).

³³A partial list of the weeds most commonly found unlisted by these States that nevertheless present economic or ecological threats includes: poison hemlock (*Conium maculatum*), kochia (*Kochia scoparia*), Russian thistle (*Salsola kali*), silver-leaf nightshade (*Solanum elaeagnifolium*), tamarisk (*Tamarix gallica*), tansy ragwort (*Senecio jacobaea*), and yellow nutsedge (*Cyperus esculentus*).

Many western States have implemented a promising approach to protect both agriculture and natural areas through certification of noxious weed-free forage (feed, hay, straw, or mulch) (4). Forage is grown, marketed, and transported throughout the West and is often taken into natural areas to feed pack animals. The certification program reduces the pathways for the spread of noxious weeds and protects consumers who want to purchase pure feed.

INSECTS AND OTHER INVERTEBRATE ANIMALS

In many States, the same laws governing importation and release of vertebrate animals govern those invertebrate animals not otherwise covered by agricultural pest quarantines. Non-indigenous aquatic invertebrates that can be cultured, like oysters, are commonly covered by specific laws regulating aquaculture. Most States also have specific laws on bee culture. But in many States, other non-agricultural pest invertebrates are simply left unregulated, including, for example, aquatic mollusks—one of the most potentially invasive animal groups—imported for use in home aquariums (7).

As of 1992, only three States had adopted regulations specifically on biological control agents. They are California, Florida, and North Carolina (39). However, a later survey identified seven States with laws encouraging the development and application of biological control (see ch. 1).

ENFORCEMENT

State pest and weed programs lack the personnel to undertake comprehensive enforcement against illegal importations. Almost all States lack border inspection stations. Existing programs also have been weakened in recent years by two major outside factors: widespread budget crises affecting State Governments, and demographic changes favoring urban areas, with rural

interests losing their former dominance in many legislatures (56).

Weed prevention and control programs are highly underfunded (44,48), perhaps more than other pest programs, Montana has addressed the funding problem by creating an innovative Noxious Weed Trust Fund.³⁴ Funded by a 1-percent surcharge on retail herbicide sales and a 'vehicle weed fee' imposed through automobile registration, it provides \$1.2 million per year for grants for weed control, with one-fourth earmarked for "research and development of non-chemical methods of weed management" (44). Another avenue Montana has pursued that lessens the need for government expenditures is imposing greater legal responsibility on private landowners to prevent the spread of weeds from their property. Designated noxious weeds are treated as common nuisances, and it is illegal to "permit any noxious weed to propagate or go to seed" unless the landowner is in adherence with a local weed management plan.³⁵

The leading agricultural production State, California, is the most well equipped to address importation of weeds and pests. The California Department of Food and Agriculture (CDFA) has 16 border agricultural inspection stations to check the almost 30 million incoming vehicles annually, and it carries out cooperative inspection programs with USDA at ports and airports (15). CDFA also inspects parcel post. It carries out intensive insect detection trapping (over 100,000 traps per year), as well as active pest eradication programs. Public education and involvement receive high priority. In 1990, CDFA began an apparently unique enforcement program called "We Tip," with its own toll-free hotline. It offers rewards of up to \$10,000 (from funds donated by private growers) for information leading to convictions of people who smuggle in quarantined fruit (8). Yet even with such programs, three agriculturally significant new NIS were detected

³⁴ Mont. Code Ann. 80-7-801 *et Seq.*

³⁵ Mont. Code Ann. 7-22-2115, -2116.

Box 7-D—Washington State's New Quarantines on Natural Area Weeds

in response to concerns about natural area degradation, in 1992 the Washington Department of Agriculture promulgated sweeping regulations prohibiting all transactions that could lead to the spread of seeds or whole plants of 39 invasive plants not indigenous to the State. Previously, the only non-agricultural weed under quarantine was purple loosestrife (*Lythrum salicaria* and *L. virgatum*). The new listings are:

Scientific name	Common name
<i>Amorpha fruticosa</i>	indigobush, lead plant
<i>Anchusa officinalis</i>	common bugloss, alkanet anchusa
<i>Anthriscus sylvestris</i>	wild chervil
<i>Carduus acanthoides</i>	plumeless thistle
<i>Carduus nutans</i>	musk thistle, nodding thistle
<i>Centaurea diffusa</i>	diffuse knapweed
<i>Centaurea jacea</i>	brown knapweed, rayed knapweed, brown centaury, horse-knobs, hardheads
<i>Centaurea maculosa</i>	spotted knapweed
<i>Centaurea macrocephala</i>	bighead knapweed
<i>Centaurea nigra</i>	black knapweed
<i>Centaurea nigrescens</i>	Vochin knapweed
<i>Chaenorrhinum minus</i>	dwarf snapdragon
<i>Chrysanthemum leucanthemum</i>	oxeye daisy, white daisy, whiteweed, field daisy, Marguerite, poorland flower
<i>Cytisus scoparius</i>	Scotch broom
<i>Daucus carota</i>	wild carrot, Queen Anne's lace
<i>Echium vulgare</i>	blueweed, blue thistle, blue devil, viper's bugloss, snake flower
<i>Heracleum mantegazzianum</i>	giant hogweed, giant cow parsnip
<i>Hibiscus trionum</i>	Venice mallow, flower-of-an-hour, bladder ketmia, modesty, shoo-fly
<i>Hieracium aurantiacum</i>	orange hawkweed, orange paintbrush, red daisy, frameweed, devil's weed, grim-the-collier
<i>Hieracium pratense</i>	yellow hawkweed, yellow paintbrush, devil's paintbrush, yellow devil, field hawkweed, king devil
<i>Hypericum perforatum</i>	common St. Johnswort, goatweed, St. Johnswort
<i>Isatis tinctoria</i>	dyers' woad
<i>Kochia scoparia</i>	kochia, summer-cyprus, burning-bush, fireball, Mexican fireweed
<i>Linaria genistifolia dalmatica</i>	Dalmatian toadflax
<i>Lepidium latifolium</i>	perennial pepperweed
<i>Mirabilis nyctaginea</i>	wild four o'clock, umbrella-wort
<i>Onopordum acanthium</i>	Scotch thistle
<i>Proboscidea louisianica</i>	unicorn-plant
<i>Salvia aethiopsis</i>	Mediterranean sage
<i>Silybum marianum</i>	milk thistle
<i>Torilis arvensis</i>	hedgearsley
<i>Ulex europaeus</i>	gorse, furze
<i>Zygophyllum fabago</i>	Syrian bean-caper

Wetland and Aquatic Plants

Scientific name

*Myriophyllum spicatum****Hydrilla verticillata****Spartina patens**Spartina anglica**Spartina alterniflora**Myriophyllum aquaticum**Egerja densa* or *Elodea densa*

Common name

Eurasian watermilfoil

hydrilla

salt meadow cordgrass

common cordgrass

smooth cordgrass

Parrot' s-feather, parrotfeather or waterfeather

Brazilian elodea or egeria

SOURCE: Washington State Department of Agriculture, Plant Services Division, Plant Quarantine Manual, Seattle, WA, 1992.

in 1990—one weed (jointed vetch—*Aeschynomene rudis*), a fungal plant disease (a smut—*Ustilago esculenta*), and one nematode (*Hirschmanniella* spp.) (8). This is further evidence that completely preventing entry of harmful non-indigenous species is not possible.

California's park system is also active in NIS issues. Its policies support replacing NIS, such as eucalyptus (*Eucalyptus* spp.), with indigenous species; however, the expense is high and opposition occasionally comes from members of the public who prefer the NIS (ch. 2) (69).

A few other States have begun to emphasize the use of indigenous plants for soil conservation, wildlife habitat, landscaping, and other public purposes, which have traditionally depended heavily on NIS. Illinois has blazed a trail in this change (box 7-E).

PROPOSED MODEL STATE LAWS

Model State laws have been developed by experts outside the legislative process to help legislators improve, and achieve consistency in, States' statutes and regulations. Legislatures have adopted them, sometimes wholly but usually in part, in a wide range of contexts. Model State laws have been directed to a wide range of topics, e.g., controlling narcotics, enforcing child support obligations, and facilitating interstate business (the Uniform Commercial Code).

A model law can be a preferred alternative to a superimposed, preemptive Federal uniform law from the perspective of preserving State sover-

eignty (see Federal/State section of ch. 8). Robert McDowell, Director of New Jersey's Division of Fish, Game, and Wildlife, expressed this in testimony against a proposed congressional House of Representatives bill that would have imposed greater Federal control over State fish and wildlife releases (38). He supported, as an alternative to Federal control, a 'model law that states could adopt to control undesirable impacts of introductions'; adopting the model law "would be a requirement in order to have, for example, . . . lack of Federal intervention in the issue" or possibly as a condition for obtaining related Federal funding (38).

Three proposed model laws address NIS issues. The first, and by far most detailed, is for fish and wildlife.

"Model for State Regulations Pertaining to Captive Wild and Exotic Animals"

In 1985, the Animal Health Association, a national veterinary group, resolved to develop a model law for upgrading State laws on NIS introduction and related subjects, an effort led by the Southeast Cooperative Wildlife Disease Study Center (SCWDSC) at the University of Georgia's College of Veterinary Medicine. The Center proposed a broad regulatory system for animal importation that addressed veterinary, humane, public safety, ecological, and other concerns (46). After extensive external review and revisions, SCWDSC sent the model out to all appropriate State agencies in late 1988 (60).

Box 7-E-Illinois Shifts to Indigenous Plants

In the early 1980s, the Illinois Department of Conservation took a hard look at the benefits and costs of its heavy reliance on non-indigenous species (NIS) in the two State-run nurseries. These produce plants for such uses as landscaping of State property, erosion control, and for wildlife habitat and feed. Department officials recognized the risks of degrading natural ecosystem and even endangering indigenous plants through competition and hybridization with NIS. They found no evidence that NIS were better food or habitat for wildlife. In 1983 they decided to phase out NIS. It took roughly 5 years to changeover.

First they proved that indigenous plants could be grown in nurseries using existing techniques and equipment. Then, they collected seeds from State parks and began producing plant materials on a commercial scale. Currently, they grow 67 species of Indigenous trees and shrubs, 61 species of prairie wildflowers and grasses, plus 13 woodland herbs. In 1990, the two nurseries filled 2,517 orders with 4.5 million plants.

Also, they adopted a general policy restricting the use of NIS on Department lands. Harmful NIS are to be controlled or eradicated from Department-owned or managed land 'as time, manpower, and funds allow.' Officials rewrote several manuals and public information pieces, such as "Landscaping for Wildlife," to emphasize indigenous species. The Department of Conservation, USDA's Soil Conservation Service, and the Cooperative Extension Service at the University of Illinois jointly prepared a manual for all agencies and organizations planning and designing wind and snow breaks in the State. It specifies 31 indigenous trees and shrubs and just three well-tested, non-invasive NIS (blue spruce (*Picea pungens*), Norway spruce (*Picea abies*), and Douglas-fir (*Pseudotsuga menziesii*)).

Despite the Department's trailblazing efforts against the use of potentially harmful NIS, it was stymied in the Illinois Legislature by commercial nursery and agricultural interests when it sought to add more prohibited species to the State's Exotic Weed Act. The act designed to protect natural areas, prohibits only three species, each of which is already extensively present—purple loosestrife (*Lythrum salicaria*), multiflora rose (*Rosa multiflora*), and Japanese honeysuckle (*Lonicera japonica*). To put this number in perspective, at least 811 non-indigenous plant species grow in a free-living condition in Illinois, representing 29 Percent of its total plant species. About 37 of these 811 are considered to be damaging invaders of natural communities, yet Illinois law allows most of them to be planted.

SOURCES: M. Bolin, R. Oliver, S. Brady, and F.M. Harty, *Illinois Windbreak Manual* (Springfield, IL: Illinois Department of Conservation, 1987); F. M. Harty, "How Illinois Kicked the Exotic Habit," conference on Biological Pollution: the Control and Impact of Invasive Exotic Species, Indiana Academy of Sciences, Indianapolis, IN, Oct. 25-26, 1991; R.D. Henry and A.R. Scott, "Time of Introduction of the Alien Component of the Spontaneous Illinois Vascular Flora," *American Midland Naturalist*, vol. 105, No. 2, 1981, pp. 31 S-S24; J. Schwegman, Botany Program Manager, Illinois Department of Conservation, personal communication to P.T. Jenkins, Office of Technology Assessment, Aug. 20, 1992.

The entire model law runs to 45 pages. It gives States an optional resource to fill gaps in their laws. Key features include:

- A permit requirement to "own, possess, transfer, transport, exhibit, or release" non-exempt and non-"established exotic wild animals.
- A list of 30 common domestic animals that should be exempt from the model's regulatory requirements.
- A list of "established exotic wild animals" that have "become widespread and are

generally considered native wild animals." These "will vary from State to State and the species listed below are a partial list offered for consideration." It consists of ring-necked pheasant (*Phasianus colchicus*), chukar (*Alectoris chukur*), Hungarian partridge (*Perdix perdix*), European starling (*Sturnus vulgaris*), English or house sparrow (*Passer domesticus*), Muscovy duck (*Cairina moschata*), mute swan (*Cygnus olor*), European carp (*Cyprinus carpio*), brown trout (*Salmo trutta*), and nutria.

- Criteria for deciding on “environmentally injurious animals” and a list of animals that meet the criteria “offered for consideration. The list includes all 18 vertebrate species or groups already prohibited under the Federal Lacey Act plus 36 other species or groups—28 more than the median number of State-prohibited species. The list was designed to be tailored to each State’s particular circumstances.
- A Technical Advisory Committee to provide advice regarding regulations and exemptions, consisting of 12 members representing scientific, commercial, humane, and other interests,

No States have adopted the model wholly, but some, such as Missouri, have used different parts. Utah recently adopted the most detailed non-indigenous animal regulations of any State; it considered the SCWDS model, but chose their own approach instead (20). No further revisions of the model are planned, nor has it been formally evaluated.

Model Honey Bee Certification Plan

In response to the impending invasion by the African honey bee (*Apis mellifera scutellata*), State and Federal officials and private beekeepers developed a Model Honey Bee Certification Plan. In 1991, they offered it to the States for adoption or modification. It sets out methods to certify that queen bees are the desired European type, rather than African types, and it recommends steps for quarantining areas in which the African bee appears. It also prescribes beekeeping practices to reduce “Africanization.” Texas, the first State affected by the new bee, has adopted most of the plan; other States are considering it (23). However, some experts question the plan’s technical assumptions and probable effectiveness, particularly in light of the very limited enforcement personnel States commit to bee inspection and certification (61).

Outline of a Model Law for Non-Indigenous Weeds in Natural Communities

John Schwegman, the Botany Program Manager of the Illinois Department of Conservation, has outlined the only known model State law approach to combating weeds in natural areas (55):

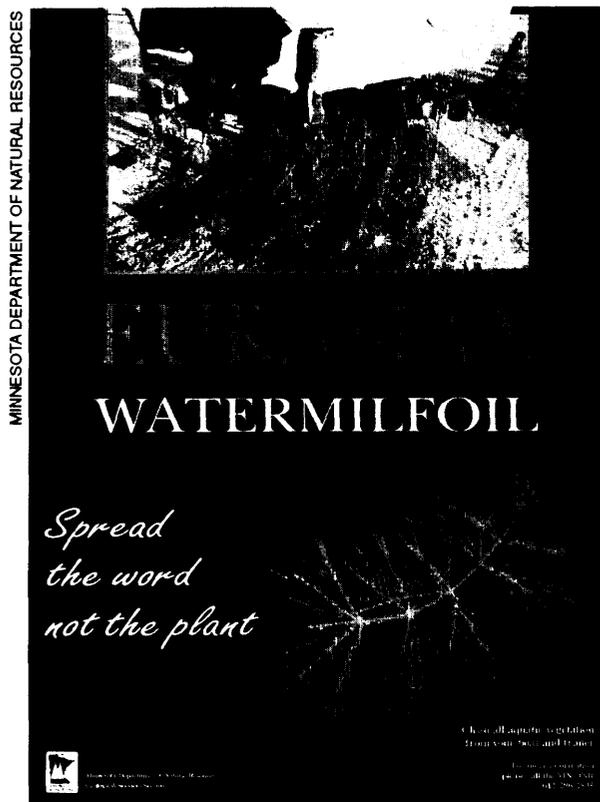
States should enact laws that:

1. Allow for designation of State exotic weeds by a flexible administrative procedure under control of conservation interests as opposed to agricultural interests.
2. Prohibit the sale, offering for sale, or planting of plants or seed of designated **exotic weeds**.
3. Designate plants and seeds of **exotic weeds** offered by dealers as contraband subject to seizure by the State in addition to imposition of fines.
4. Do not force landowners to remove or control exotic weeds growing naturally on their lands (based on the idea that doing so would rouse intolerable public opposition).
5. Set policy on removal and control of exotic weeds on all State owned and managed lands.
6. Require testing or other proof of safety from escape to natural communities of new potential problem plants proposed for marketing in the State.

Nonregulatory components of the model program include supporting research into control methods, providing adequate management staff, supporting Federal efforts, and public education. Schwegman’s suggested approach has not been widely adopted, even in his own State (box 7-E). Indeed, few States have comparable programs, although some have made steps toward them, e.g., Washington (box 7-D).

LOCAL APPROACHES

Some local governments have ordinances covering harmful NIS. Generally, local authority has not included imposing quarantines or prohibiting importation of particular NIS except in public health and safety matters. (However, particular



Eurasian watermilfoil (*Myriophyllum spicatum*) is among the non-indigenous weeds of natural areas newly targeted by State and local efforts.

counties are routinely quarantined by State authorities to stop the intrastate spread of pests.) Local governments most commonly address localized problems, such as the capturing of dangerous escaped exotic pets by animal control officers.

Local authority has predominated in the control of agricultural weeds in many western States, in the form of weed control districts. These districts generally develop a county-wide management plan and provide enforcement mechanisms. In the event a landowner fails to comply with the plan by allowing designated weeds to flourish, the districts often have authority to take control measures directly and charge the landowner for its costs. Operations are typically funded through local property assessments with some State sup-

port. Funding can vary greatly from county to county, depending on local economies and property values (44). In regions without such districts—most of the East and South—weed control, other than private efforts, is a State Government function. The historical reasons for this split relate to the greater roles of county governments in the West, the greater size of western States, and their relatively severe weed problems.

Another key area of local authority is the regulation of land development and use. As development involves alterations to vegetation, the local permit process affords an opportunity to require the elimination of existing weeds. Ordinances can also require that certain areas be kept in indigenous vegetation or prohibit the planting of certain NIS. However, the nursery and landscaping industries, already concerned with 50 disparate State approaches, view increasing local regulation with alarm (5). They would prefer not to have to adjust their activities to a variety of ordinances adopted by hundreds of sub-units within a State.

The only “model local law” addressing NIS combines weed control with regulation of land development. In 1985, the South Florida Exotic Pest Plant Council, an association of government and private individuals concerned with non-agricultural weeds, drafted a “Model Exotic Species Ordinance for Municipalities and Counties” (59). Below OTA summarizes, with their titles, the ordinance’s main provisions:

- “Model Ordinance Prohibiting the Importation, Transportation, Sale, Propagation and Planting of Harmful Exotic Vegetation”—an outright prohibition is imposed on the listed activities for particular designated harmful species.
- “Requiring Removal of Harmful Exotic Vegetation Prior to Development of Land or When Such Vegetation Constitutes a Nuisance”—before development, the landowner must remove all of the designated species, subject to the plant removal standards; also,

owners of land that is not being developed can be ordered to remove the designated species within 1 year if their property lies within given distances of defined environmentally sensitive areas.

- “Providing Property Tax Reductions for Removal of Harmful Exotic Vegetation”—landowners who have been ordered to conduct removal efforts to protect sensitive areas under the previous provision are entitled to a 1-year 25 percent property tax reduction for the portions of their land from which the vegetation was removed.
- “Establishing Standards for Exotic Vegetation Removal”—specifies removal techniques and precautionary measures.
- “Establishing Standards for Acceptance of Covenants for the Protection and Management of Environmentally Sensitive Lands”—lays out a procedure encouraging the long-term protection of ecologically important areas, with an emphasis on maintainingg them free of harmful vegetation.

At least seven South Florida counties and two cities have adopted parts of the model ordinance

(14). Clearly, South Florida’s non-indigenous plant problems are among the worst in the country (ch. 8). The model ordinance offers a useful example for other regions with similar, but perhaps currently less severe, problems.

CHAPTER REVIEW

This chapter surveyed State and Federal relationships and State laws regulating fish and wildlife, insects, other invertebrate animals, and weeds. States’ approaches vary widely, some tend to under-regulate certain types of potentially damaging NIS, and their enforcement of existing standards is often inadequate. Other States’ show exemplary approaches. More successful management of harmful NIS depends upon addressing the deficiencies, disseminating noteworthy State approaches, and ensuring that Federal and State efforts are mutually supportive. This chapter, along with chapter 6, suggests that much more can be done by both Federal and State Governments. In the next chapter, OTA takes a closer look at the situation in two States where severe NIS-related problems have prompted special concern: Hawaii and Florida.