

**LEGAL TOOLS AND GAPS RELATING TO  
COMMERCE IN EXOTIC LIVE FISH**

**PHASE I REPORT TO THE  
GREAT LAKES FISHERY COMMISSION**

**BY THE**

**ENVIRONMENTAL LAW AND POLICY  
CENTER**

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## **I. INTRODUCTION**

This report has been researched and drafted by the Environmental Law and Policy Center at the request of the Great Lakes Fishery Commission. The report examines laws governing live fish handling and commerce, a potential source of aquatic nuisance species invasion. It describes both the substance of the relevant laws and the practical dimensions of their enforcement. Although many of the conclusions in this report begin to suggest ways in which the various regulatory programs could be strengthened, this report is intended as the first in a two-part series, the second of which would describe in detail the policy options for improving these programs.

### **A. SCOPE**

#### **1. GEOGRAPHIC**

The report covers the federal programs in the U.S. and Canada, as well as the eight U.S. states and two Canadian provinces that border on the Great Lakes (Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin; and Quebec, and Ontario). It also covers states in the Mississippi River basin, as those states are a potential source of invasion of Lake Michigan via the Chicago Sanitary and Shipping Canal. Although there is now a barrier at the canal, expected to be supplemented in the near future, the possibility remains that the barrier may fail, in which case fish in the Mississippi River would likely find their way into the Great Lakes. Additionally, there is a large volume of trade between aquaculture operations in the southern states (especially Mississippi and Arkansas) and purchasers in the northern states, a pathway for exotic species invasion both through intentional purchases (e.g., for live fish markets) and unintentional inclusion in shipments (e.g., minnows for bait).

#### **2. SUBSTANTIVE**

We have evaluated all laws that govern the importation, handling, and management of live fish. This broad scope includes laws that regulate fish more generally, regardless of whether they are live and potentially invasive. Many laws regulating fish were drawn up not with invasive species in mind, but rather for public health and economic regulation purposes. However, since their applicability is broad, they may incidentally restrict live exotics; and taken as a whole, they reveal patterns of regulation and the types of issues that tend to concern legislative bodies and agencies.

The aspects of live fish handling that are covered by regulation in the majority of jurisdictions are importation, possession, release and stocking, transportation, aquaculture, sales and markets, bait, fee fishing, and the aquarium pet trade. We have laid out the laws (or noted the lack thereof) governing each of these aspects in each of the jurisdictions evaluated. In so doing, we have both reviewed the substantive laws and regulations conducted interviews with administrative officials.

Generally speaking, the applicable regulations in many jurisdictions are complex and ambiguous, sometimes reflecting an uncoordinated regulatory approach resulting in overlap or unclear relationships between disparate provisions. In some cases as well, we discovered

through interviews that provisions that could be powerful tools are not used or interpreted in a useful way; and, by the same token, that some regulations drafted with limited strength and specificity have been well-used by enforcement agencies finding ways to exercise discretion in favor of restricting exotics. Thus, the only way to fully apprehend the nuances of how a jurisdiction's laws function would be to meet with a team of representatives of all of its relevant agency divisions – aquaculture, import permitting, enforcement, etc. – and pull together their collective knowledge. Although such meetings in all 19 jurisdictions surveyed here were beyond the scope of this report, we have made best efforts to talk to at least one person with knowledge in each jurisdiction (sometimes more) in order to better understand the workings of the laws we reviewed. We anticipate that efforts can be made following the Phase II report to pull together more comprehensive teams of informed personnel in the jurisdictions seeking to tighten their laws governing live imports.

## **B. FORMAT**

Most of our substantive findings are contained in the appendices to this report, which set forth a detailed description of each jurisdiction's program. While we have summarized these findings below, that summary is inherently limited in that the states programs vary quite widely in substance.

The appendix summary of each jurisdiction's laws is divided into nine parts. The first eight describe the substantive areas subject to regulation as listed above (importation and possession, release and stocking, transportation, aquaculture, sales and markets, bait, the aquarium pet trade, and fee fishing), with the ninth describing available enforcement tools, in terms of entry and inspection authority or penalties. Each of the eight substantive areas, in turn, is broken down into two categories to the extent they are applicable. The first category – part A, approved and unlisted species – summarizes laws generally governing all species across the board (for instance, a restriction requiring all live fish imports to be permitted, or all live fish transportation shipments to be labeled in a certain way). “Approved and unlisted” refers to the fact, described in more detail below, that many jurisdictions maintain a list of species that are considered benign and therefore automatically approved for importation or possession; the category thus includes either these approved species or species not on any regulatory list. The second category – part B, prohibited and restricted species – summarizes laws that either heavily regulate certain species or else ban them altogether. The part A and part B categories are not used where there is no distinction made between types of species in the area of regulation at issue.

Where there are no laws expressly addressing a particular subject, we have made a notation that “No specific regulations or restrictions apply.” However, the fact that a particular activity (e.g., fee fishing) is not specifically addressed in a jurisdiction's law does not mean it is entirely unregulated, as more general regulation (e.g., stocking) may be applicable.

Following the summary of the jurisdictions laws is a section setting forth the results of any interviews that were conducted concerning implementation and enforcement of the program. For ease of reference in subsequent phases of this report and any follow-up to it, we have

described each contact made in the subject jurisdiction.<sup>1</sup> Note that some comments are listed as having been made “off the record.” In order to honor the request for confidentiality on the part of the officials concerned, the off the record comments should be deleted in any public version of this document.

The last section of each summary is a “comment” portion that summarizes the strengths and weaknesses of the program, and lists its primary gaps to the extent they exist. In the list of gaps, we have not included those that are essentially universal to the programs we studied, as described in more detail below (e.g., the lack of proactive enforcement of importation bans, the lack of substantive criteria for issuance of fish or baitfish dealer licenses). A separate section summarizes the status of Asian carp regulation in the jurisdiction.

## **II. FINDINGS**

Our investigation revealed as many different approaches to regulation as jurisdictions evaluated. While there are many common elements between them, there is no model code, de facto or otherwise, and programs have generally evolved separately over a period of many years, punctuated by occasional emergency regulation of known invasive fish such as round gobies or snakeheads. Given this diversity of regulation, there is no uniform set of gaps or inadequacies common to all regulatory programs. However, in our analysis, certain patterns emerged of aspects of the live fish trade that have been largely neglected by regulatory programs.

We summarize below the regulatory authority patterns found in the jurisdictions studied; our findings in each of the specific categories of regulation we looked at (e.g. importation and possession, aquaculture, etc.), and our findings as to the most widespread gaps in these programs.<sup>2</sup> Although policy solutions to these regulatory gaps will be the subject of the planned Part II of this report, we conclude with general findings regarding the most beneficial aspects of the programs studied that may be useful to duplicate elsewhere.

### **A. PATTERNS OF REGULATORY AUTHORITY**

#### **1. SCOPE OF GOVERNMENTAL AUTHORITY**

##### **a. FEDERALISM AND SPECIES REGULATION**

Generally speaking, the vast bulk of regulation of live aquatic species is found at the state and provincial level. However, the federalism structure governing regulation in this area differs between the United States and Canada. In the United States, there is no overarching set of regulations that “occupies the field” so as to preclude state-level regulation pursuant to the constitutional Supremacy Clause. Accordingly, while there is U.S. federal law restricting importation of specified injurious species (the Lacey Act, discussed below), most states maintain

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<sup>1</sup> We have not yet succeeded in obtaining interviews with officials in Kentucky. Additionally, in a few jurisdictions where we did conduct one or more interviews, we tried unsuccessfully to contact others in the jurisdiction who may have additional information.

<sup>2</sup> We have not provided a legal citation for every statement summarizing our findings, as all of the legal authority is set forth and explained in detail in the jurisdictional summaries.

their own lists of species whose importation is restricted, as discussed below; as well as other types of regulation of live fish (transportation, aquaculture, etc).

The Canadian federal government, by contrast, has sole jurisdiction over species importation in its Fisheries Act, and the provinces may not regulate them; however, the federal government has no regulations of its own in place to do so, either. We are informed that provincial officials and others have been requesting that the federal government put a regulatory program in place, and that the federal government is in preliminary stages of studying the issue.<sup>3</sup> In order to put some exotic species restrictions in place, Ontario and Quebec have regulated possession (as opposed to importation) of live fish, albeit incompletely. Additionally, the provinces may petition the federal government agency responsible for administering the Fisheries Act, the Fisheries and Oceans Department, to implement province-specific regulation of an aspect of fish importation. In Ontario, the federal government has used its Fisheries Act power to prohibit importation of live baitfish.

#### **b. FEDERAL AGENCY AUTHORITY**

The United States Fish and Wildlife Service (“FWS”) has authority to regulate exotic fish. Its authority derives from the federal Lacey Act, which provides FWS with two avenues for regulation of these species: (i) a prohibition on “injurious” fish and wildlife, with a short list in the statute that has been supplemented through agency regulation; and (ii) a prohibition on importation or possession of fish in violation of any other jurisdiction’s law, be it a foreign government or a U.S. state.

The prohibition on injurious wildlife is implemented in inspections at the United States border. Since the Lacey Act requires that live fish be imported solely through specified ports of entry, FWS generally has personnel stationed at or near these border crossings. Although FWS is the agency charged with ensuring that species on the prohibited list do not enter the country, it has cooperative relationships with the other agencies that are charged, for different reasons, with inspection and control of live fish imports. The FWS regulations are expressly connected to U.S. Customs Service regulations, and Customs is authorized to detain illegal live fish shipments. The other federal agencies that regulate such shipments and would be likely to inspect them are the Food and Drug Administration, which would inspect the fish for reasons related to human health, and the Department of Agriculture, which would inspect them for disease.<sup>4</sup> According to an enforcement official we interviewed at FWS, the inspection officers from these various agencies have developed an informal cooperative relationship, whereby they have taught one another to recognize what might be of interest to another agency – e.g., FWS shows FDA

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<sup>3</sup> We were also informed that the person primarily responsible for considering that request at the federal Fisheries and Oceans Department, Chris Wiley, recently left the government’s employ, leaving the entire problem of exotic species in some degree of disarray. See the Canada Federal summary.

<sup>4</sup> Note that DOA’s Animal and Plant Health Inspection Service is now part of the Department of Homeland Security.

inspectors how to recognize prohibited species, while the FDA inspectors may show FWS personnel how to recognize certain conditions making the fish unfit to consume.<sup>5</sup>

There is some debate about whether FWS's regulations are properly within the scope of its Lacey Act authority. On the one hand, outside commenters and some agency officials (privately) believe that the Lacey Act authorizes far more extensive prohibitions on species importation than have been implemented through regulation. As described in more detail in the U.S. Federal jurisdictional summary, while the system currently operates by prohibiting a limited number of species and allowing in the rest (a "dirty list" system, see infra Section II.A.2), they argue that the statute would support much broader regulation whereby the agency could allow a listed set of species and prohibit or restrict the rest (a "clean list" system). Conversely, FWS may be reluctant to prosecute violations involving transportation or acquisition of injurious species, even though these are crimes under the FWS Lacey Act regulations, because the statute would appear to be narrower, prohibiting only importation of these species. These issues will be discussed in further detail in Part II of this report.

With respect to the Lacey Act prohibition on species traded or possessed in violation of state law, FWS applies a number of criteria in determining when to use this authority to prosecute, and has acknowledged that its resources to do so are generally quite limited (see the U.S. Federal summary). As an initial matter, FWS is not likely to learn of an illegal shipment of live fish unless informed by state officials where the violation is occurring, although occasionally FWS inspectors in the field will happen upon a violation on their own. Once FWS learns of a state law violation, the criteria generally applied in deciding whether to turn it over for prosecution include whether the fish have crossed state lines, which is a prerequisite for FWS jurisdiction; the strength of the underlying state law, i.e. whether the case against the violator will be strong; and whether the state law provides for adequate penalties. Recently, all of these factors came together to warrant prosecution by FWS of an aquaculture operator in Iowa who imported large numbers of non-sterile black carp into the state from Arkansas and Taiwan in violation of Iowa law. Since the violator had crossed state lines with the fish, Iowa's permitting requirement for live non-native species was clear, and the state law penalty for importation of the fish without a permit was a veritable slap on the wrist (suspension of aquaculture license and \$25 fine), FWS stepped in to prosecute. The violator was ultimately sentenced to a \$13,000+ fine and a term of home confinement. Further details are set forth in the Iowa jurisdictional summary.

### **c. STATE AGENCY AUTHORITY**

At the state and provincial level, resources agencies in most cases are charged generally with implementing and enforcing laws governing live fish importation. In a few cases (Minnesota, Mississippi, Pennsylvania, and Wisconsin), however, the Department of Agriculture is given authority over aquaculture, including (except in Minnesota) importation of live fish for

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<sup>5</sup> See U.S. Federal summary. As discussed in more detail in that summary, it may not be useful to formalize these relationships further in an MOA, as the institutional interests at higher levels of these agencies may make cooperation more difficult (e.g., DOA may be less interested in restricting importation of injurious species where the restriction is detrimental to the aquaculture industry).

that purpose. The success of this bureaucratic authority split seems to vary. In Minnesota, the resource agency administers DOA regulations governing importation. In Wisconsin, where the DNR shares authority over live fish importation with the DOA, the two agencies have entered into an MOA that enforcement officials believe is working well, wherein the agencies agreed on a list of species that DOA may approve for importation without further DNR input (a contractual “green list,” see Section II.A.2 *infra*); and agreed that DOA would consult with DNR before issuing an importation permit for any other species.

In Mississippi, however, it appears that DOA has essentially assumed all meaningful authority over imports, in a manner that strongly favors the local catfish aquaculture industry. In Louisiana, the DOA has introduced legislation to take over jurisdiction of species imported for aquaculture, which, if passed, is expected to drastically reduce oversight of potentially invasive species.

#### **d. MUNICIPAL AUTHORITY**

The City of Chicago, but no other major city of which we are aware, has enacted a ban on Asian carp species that are not on the state of Illinois prohibited list. While Illinois expressly bans only black carp, the City’s ordinance further bans grass, bighead, and silver carp. The ordinance makes an exception for carp sold in live markets, but requires the fish to be killed before they are sold to the consumer. Interpreted together with Illinois state law, which bans possession of black carp outright, the live market exemption would apply only to the other three species of carp.

### **2. “CLEAN LIST” AND “DIRTY LIST” SYSTEMS**

Nearly every state and province (with a few exceptions) lists at least a few species of fish that are either outright prohibited or heavily regulated, along the lines of – but generally not duplicating – the Lacey Act injurious species list. In most cases, the list of prohibited species is fairly short. The level of restriction of these species varies somewhat among jurisdictions. Some states outright ban them in all respects for all purposes; others ban some combination of importation, possession, transportation, or sale, but not all of these activities. Some states allow them only for public display or scientific purposes (Arkansas, Illinois, Indiana, Kentucky, Minnesota, New York, Ohio<sup>6</sup>), and some merely require that a permit be obtained to possess them, often with no criteria specified for permit issuance (Louisiana<sup>7</sup>, Kentucky, Michigan, Mississippi). Where the fish are allowed for limited purposes, most states require little more than that they be kept in closed systems, although one state – Minnesota – has fairly elaborate requirements for both escape prevention and contingency planning in the event of escape. In the case of fish required to be triploid – generally grass carp and sometimes black carp – there are usually testing and control requirements to ensure triploidy, and a ban on diploid species except in some cases for the purpose of breeding triploids.

Many states have gone beyond this basic type of restrictive regulation to draw up lists of species that are automatically approved for one or more purposes. These approved lists are often

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<sup>6</sup> Ohio maintains a separate short list of species that are prohibited outright.

<sup>7</sup> There are two species, piranha and Mexican banded tetra, that Louisiana bans outright.

referred to as “clean lists,” “green lists,” or “white lists.” The prohibited and restricted lists are, conversely, also known as “dirty lists,” “red lists,” or “black lists.” The state with the most thorough regulation of exotic aquatic species, Minnesota, defines a third level of regulation for “regulated” but not prohibited species (a “yellow list” presumably). In a number of cases, the “clean list” is essentially all species that are native and/or established in the jurisdiction, such that importation of any non-indigenous species requires authorization.

States have varying means of addressing species that are not listed as either approved or prohibited (or “regulated” in Minnesota). A number of states that maintain only a “dirty list” do not otherwise restrict import of unlisted species at all. But states that provide a clean list as well have some means of addressing imports of unlisted species, which would otherwise be in regulatory limbo. In many cases, the law merely states that such species must be authorized for importation, leaving the permitting agency with broad discretion. In Minnesota and Illinois, the law defines a specific process and set of factors for adjudicating applications to import unlisted species. In Illinois, there is an “Aquaculture Advisory Committee” consisting of various agency officials that meets on an as-needed basis to decide such applications. In Minnesota, the agency must make a decision to list any unlisted species as either approved, regulated, or prohibited before it may be imported (or refused permission as the case may be). Minnesota’s regulations allow for public comment on applications to import unlisted species. Indiana, while lacking the evaluation apparatus in place in Illinois and Minnesota, is unique in placing the burden expressly on the applicant to demonstrate that the unlisted species proposed to be imported will not become a nuisance.

Finally, a number of states maintain “clean lists” and “dirty lists” only for specified purposes. Some apply only to aquaculture, some only to baitfish, some only to imports for the purpose of release into the wild, and some to varying combinations of these purposes. The hazards of these limited-purpose importation lists are discussed in more detail below. As explained in Section II.B.5, the lists most often fail to address importation for hobby aquarium purposes or for sale at live fish markets.

## **B. FINDINGS REGARDING AREAS OF AUTHORITY STUDIED**

As discussed above, the jurisdictional summaries review nine different subjects of regulatory authority. We summarize below our findings with respect to each of them.

### **1. IMPORTATION AND POSSESSION**

#### **a. FEDERAL**

In the U.S., importation of injurious species is the only aspect of live fish handling that is independently regulated by the federal government. Although possession, transportation, and sale of species prohibited under state law are illegal under the Lacey Act, it is only with respect to importation that FWS has independently proscribed a list of species.

The fish species currently on the federal list are walking catfish and snakeheads (there are several mollusk species on the list as well). The snakehead ban was imposed last year, promptly

following the incident of the invasive snakeheads in Maryland. Black carp were proposed for a ban at the same time, but the proposal is still pending, and on June 4 was re-opened for 60 days of additional public comment (evidently due to intense pressure from the aquaculture industry).

Where possible, FWS agents will inspect all incoming shipments of live fish (and when that is not possible, as noted above, agents from DOA or FDA often assist each other). When a live shipment comes in, time is of the essence, making complete inspection nearly impossible. This is particularly the case with respect to fish shipped in the aquarium pet trade. Each fish will be in a small plastic bag that has been oxygenated, but the oxygen runs out after a short period of time. The cargo hold will be filled with boxes of these individually bagged fish, meaning that the best agents can do is pull out a few to verify what species they are. See U.S. Federal summary.

In Canada, importation of species is not regulated at all. As noted above, federal officials are in the very preliminary stages of studying the issue.

#### b. **STATE**

While nearly all of the jurisdictions studied have defined a dirty list and/or a clean list for live fish species, the patterns among them vary widely. The following is a summary of the many ways in which these lists have been implemented:

1. No species-based restrictions on importation at all: Canada federal, Quebec<sup>8</sup>, and Ontario. (Note that Canadian federal law does ban all live bait imports into Ontario).
2. No dirty list, but a permit requirement for all non-native species: Iowa
3. Dirty list only: Arkansas<sup>9</sup>, Mississippi, Louisiana.
4. Dirty list plus a permit requirement for all other species: Michigan.
5. Dirty list plus a permit requirement for all non-native species: Kentucky.
6. Dirty list plus a permit requirement and/or clean list for certain purposes: Iowa (aquaculture and sales), New York (aquaculture), Ohio (aquaculture), Pennsylvania (aquaculture), Wisconsin (bait, aquaculture, or stocking).
7. Clean list, dirty list, and permitting requirement for unlisted species: Illinois, Indiana, Minnesota<sup>10</sup>
8. Clean list only, permitting requirement for all other species: Missouri.
9. Clean list only, permitting requirement for non-native species: Tennessee.

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<sup>8</sup> As noted in the Ontario summary, the Canadian provinces has authority only to ban possession, not importation. Quebec has broadly banned possession of non-native species, although that prohibition does not apply to the undefined category of “hobby” fish.

<sup>9</sup> Arkansas requires aquaculture operators cultivating non-native species to register, but places no restrictions on those imports generally.

<sup>10</sup> As noted above and described in the jurisdictional summary, Minnesota also has a category of “regulated” species that are allowed in the state but whose release into public waters is restricted. The categorization requirement for unlisted species also applies only where the species are proposed for release (however, there is also a more general live fish importation permitting requirement in place).

Among this multiplicity of systems, the one that appears to function best is number 7: a clean list and a dirty list not limited to any specific purposes, plus a permitting requirement for all unlisted species. A dirty list, while essential, is not sufficient. As described below in this section, the content of dirty lists tends to vary widely, and more often than not reflects an ad hoc compilation of known invasive species that have received publicity rather than a careful scientific evaluation of which species may create a problem in the future. Thus, a dirty list standing alone will almost always fail to list all of the species that may pose an invasion threat. Nonetheless, even in the presence of a general importation permitting requirement, a separate dirty list is useful to circumscribe the discretion of permitting officers with respect to known invasive species. With respect to clean lists, their benefit is to focus the agency's time and attention on the species that may be of general concern. A system requiring all live fish to be permitted regardless of species seems to lead to permitting that becomes more revenue collection than genuine scrutiny.

One particular pitfall of note is the choice in some jurisdictions to specify import permitting requirements only when the imports are for a specific purpose (number 6 above). As discussed in more detail below, the trouble with this system is that imports for other purposes are left largely unregulated. In Wisconsin, for instance, although three categories of imports are heavily regulated, importation of live fish for either the aquarium pet trade or live fish markets are unregulated. Similarly, in Quebec, although there is a broad-based ban on possession of all non-native species, there is an equally broad – and undefined – exception for “hobby fish.” These limited purpose bans also render enforcement more difficult, as officials need to ascertain and prove the purpose of a shipment in order for it to constitute a violation.

The species included in state dirty lists vary almost as widely as the patterns of clean list/dirty list regulation described above. To some extent they are regional, with the southern states more likely to prohibit, e.g., walking catfish and Mexican banded tetra and the Great Lakes states more likely to ban, e.g., round goby. This pattern reflects a more general problem that dirty lists tend, in most cases, to be reactive to discovery of invasions that have already occurred rather than preventive measures; and they tend not to be imposed where they would negatively impact the aquaculture industry.

As a case in point, only slightly more than half the jurisdictions surveyed (Illinois, Indiana, Louisiana, Michigan, Minnesota, New York, Ohio, Tennessee) include on their dirty lists black carp, the species of Asian carp not yet found in the Mississippi river and likely to cause the most damage to ecosystems if it ever gets there (since black carp are moluskavores, as opposed to herbivores like grass carp, they are likely to demolish endangered molusk populations).<sup>11</sup> And in several cases (e.g. Indian, Michigan, Pennsylvania, and New York<sup>12</sup>), the black carp ban was put in place only recently, adjunct to a snakehead ban imposed around the time that snakeheads in Maryland were making news. The southern states whose aquaculture is dominated by catfish farming (e.g., Arkansas and Mississippi) generally allow these fish, albeit

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<sup>11</sup> Note that the absence of black carp on a dirty list does not mean that their import is allowed, as many states (e.g., Iowa) have taken fairly aggressive measures to exclude black carp based on more general import permitting requirements for all non-native species.

<sup>12</sup> Pennsylvania's ban is proposed but not final; and New York's ban is still pending as a regulatory pre-proposal.

with some precautions in place (probably not rigorously enforced, for the reasons explained in Section II.B.4).<sup>13</sup>

One compromise solution used by a number of jurisdictions with respect to Asian carp is to impose a requirement that the carp be triploid.<sup>14</sup> This restriction is most often applied to grass carp, which are the most widely used of the Asian carp species by virtue of their ability to eat plant matter in ponds; and which are also the most prevalent in the Mississippi River. Two states (Arkansas and Missouri) also allow triploid black carp.<sup>15</sup> Here again, the application and enforcement of triploidy requirements varies widely from state to state. Some states allowing triploid carp have in place elaborate cradle-to-grave checks in place to make certain that the fish are genuinely triploid and that they are never allowed to escape (e.g., Kentucky) and that they be certified triploid by the FWS; others require only a sampling of fish to be tested by the state (e.g., Illinois); and others merely allow the owners of the fish to perform the tests without any state supervision. This difference is key, because triploidy is only a reliable preventive measure if each fish is individually tested. Triploid fish are created through various treatments performed on the eggs, which are successful approximately 98-99 percent of the time – a significant failure rate for a shipment of thousands of carp. An additional protectiveness gap in triploidy requirements is that broodstock must by definition be diploid. States such as Arkansas that allow breeding of black carp necessarily allow diploids to be kept for this purpose.<sup>16</sup> Many resource officials believe that these gaps render triploidy overall ineffective as a means of preventing invasions. This is most likely true in the strict sense, although a stringently enforced triploidy requirement clearly reduces the likelihood of invasion.

Iowa actually lists diploid (non-sterile) grass carp on its clean list, and Missouri includes both grass carp and bighead carp with no triploidy requirement (Missouri had grass carp on its dirty list until 1980). The logic given in both cases is that these carp are so thoroughly established in the Mississippi River at this point that additional escapes make no actual difference. Whether or not this is accurate (grass carp and bighead carp are, in fact, prevalent in the Mississippi River in both states), this logic ignores the threat posed to other states by commerce in diploid fish.

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<sup>13</sup> Black carp – as well as bigheads and silvers – are generally only useful in catfish ponds as service fish, since they devour a particular type of snail that tends to infest them. The same is true with respect to silver carp and bighead carp, which feed on the copious waste generated in catfish ponds and eliminate the need to empty them out with each harvest (see Ohio jurisdictional summary).

<sup>14</sup> Triploid means sterile by virtue of having a third chromosome attached to a particular pair that renders the fish unable to reproduce.

<sup>15</sup> As described in the Arkansas jurisdictional summary, triploid Asian carp are on the approved species list for aquaculture, such that no special permit is required to stock them.

<sup>16</sup> Black carp are currently being propagated in Arkansas, Florida, Louisiana, Mississippi, Missouri, North Carolina, Oklahoma, and Texas (and possibly elsewhere). The extent of the propagation varies widely among these states (e.g., Texas and Louisiana are reported to have a handful of scientific research populations, while propagation in Arkansas is a major commercial industry).

A common limitation on all of the importation regulation systems surveyed is the limited reach of enforcement. Essentially every enforcement officer we spoke with on the subject stated that it is simply not possible for the agency to proactively enforce the import restrictions – *i.e.* take steps to catch violators that they do not already know about. All enforcement of these restrictions is for all intents and purposes reactive: the agencies will catch a violator only if they have received a tip concerning an illegal shipment. Several officers compared their efforts to control import of invasive species to the war on drugs, in that one can never hope to catch all of the violators, but only to catch enough of them on occasion to serve as a deterrent. This characterization is quite accurate, in that vast numbers of shipments not only of aquaculture fish but the minnows used to feed them come across the border every day, and it is simply not possible for any agency, no matter how large its enforcement staff, to inspect them all (and most enforcement staffs are not large). An Illinois official reports that one hatchery receives 50,000,000 fathead minnows annually to feed musky fingerling and bass broodstock. He noted that virtually all of the baitfish used for angling and aquaculture is imported, making anything beyond a few spot checks impossible.<sup>17</sup> (For this reason, a few jurisdictions, *e.g.* Ontario, ban baitfish importation entirely.)

The task of implementing restrictions on this vast volume of commerce is further enhanced by the lack of complementary restrictions in the states from which the shipments come. Unlike the war on drugs, where at least the ban is federal and universal, the ban on Asian carp and other invasive species is not. The midwestern states that have banned Asian carp, and otherwise put stringent importation regulations into place, are attempting to stem the tide of shipments from states in the Mississippi River basin that freely allow these species, and are hostile to any attempts to limit them.

Minnesota, for a time, instituted road checks to inspect for exotic species. Following a decision by the Minnesota Supreme Court's limited use of sobriety checkpoints on state constitutional grounds,<sup>18</sup> DNR continued to use the roadblocks on the reasoning that public needs for resource protection outweighed privacy interests. However, subsequent state court decisions suggested that this practice would likely be found improper, so DNR discontinued it.

The consequences of the limited reach of importation enforcement capability are evident in a variety of ways. The fact that one violator in Iowa was caught with vast numbers of black carp suggests that he is not likely the only one flouting these laws – based on both statistical principle and the comment by the Iowa enforcement official interviewed that, at least in his state, the aquaculture industry has a distinctive scofflaw character to it. Additionally, the official interviewed in Ohio, who made numerous calls to aquaculture operators in the southern states to find out the destination of their Asian carp species, was told by the one willing to talk to him that huge shipments were made on a regular basis to the live Asian markets in Chicago<sup>19</sup> and Toronto. Even leaving aside these intentional violations, it is believed, as discussed in Section

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<sup>17</sup> Mike Conlin, Chief, Division of Fisheries, Illinois DNR, letter (February 9, 1999), quoted in Eric Reeves, “An IJC White Paper On Policies for the Prevention of the Invasion of the Great Lakes by Exotic Organisms,” July 15, 1999 (hereinafter “IJC White Paper”).

<sup>18</sup> Ascher v. Commissioner of Public Safety, 505 N.W.2d 362 (Minn. App. 1993).

<sup>19</sup> It is not clear whether Chicago's recently-imposed Asian carp ban has had any impact on this traffic.

II.B.6, *infra*, that Asian carp may be finding their way inadvertently and undetected into live baitfish shipments to the midwest.

Officials generally emphasized their dependence on tips regarding unlawful conduct, and a few made comments suggesting ways that their access to such tips might be enhanced. The Iowa official reported that aquaculture operators are generally more than happy to turn their competitors in for violations, suggesting that – at least in some regions – that more formal tip lines might be useful. The Ohio official noted that good tips often come from agency personnel in other states, who know of a suspicious shipment but have not been able to stop it. The inherent limitation on the latter source, of course, is that agency officials in the states most likely to be the source of illegal shipments of black carp and other species would not be interested in turning their citizens in for having them.

A partial solution may ultimately lie in an innovative measure in place in two states (Minnesota, Mississippi) allowing for those possessing potentially invasive fish to be held legally liable to the state for removal and eradication costs engendered by any escapes. Mississippi’s provision is weakly worded and permissive (owners “may” be held liable if the escape can be shown to be their fault through “neglect or mismanagement”), but Minnesota’s is quite strong. In Minnesota, anyone learning of the escape of regulated or prohibited species must notify the Department of Natural Resources within 48 hours of any escape, and anyone who “allows or causes” an escape is liable for costs of capture and control of the fish and its progeny. Those who have allowed escapes have an incentive to timely report them, however, because if they do so they are exempt from criminal penalties.

## **2. STOCKING AND RELEASE**<sup>20</sup>

Nearly every jurisdiction has in place some requirement that authorization be obtained to release non-native species into the jurisdiction’s waters. Most do not set forth any criteria for a grant of authorization, leaving broad discretion for the resource agency to use its best professional judgment. In some cases, the law is worded to prohibit “stocking” of species rather than release, which could theoretically be an important distinction for enforcement purposes if a person were caught releasing one fish (the claim would be that releasing a single fish does not constitute “stocking”).

As a practical matter, the regulations governing release are of little use in halting the spread of invasive species. While it is essential that these laws be on the books in case violators are caught, from a practical standpoint they rarely will be. Enforcement officials we spoke with were quite clear that it is rarely possible to catch individuals in the act of releasing small numbers of fish – *e.g.*, unused live bait or unwanted aquarium fish. The only way to prevent these releases, other than through education, is by keeping out of the state any fish that would be harmful if released.

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<sup>20</sup> This category covers intentional releases, as opposed to escapement. Escapement is addressed in the sections covering introduction and aquaculture.

### 3. TRANSPORTATION

Most states, but not all, require a license to transport live fish. There are variations in the scope of the regulation, e.g. with some states not requiring permits for clean list species, and some requiring permits only for minnow transport. But a common thread in nearly all of the laws requiring transport licenses is that they set forth no criteria for issuance of the license – i.e., there are no requirements as to manner of transport, knowledge or skill of operators, etc. Like fish seller and baitfish dealer licenses discussed below, transportation licenses are generally non-substantive, except for labeling or accompanying documentation requirements ( a requirement that the containers have a label stating species and number, or that shipments be accompanied by a bill of lading). As with importation restrictions, transportation restrictions are to some degree on the honor system, as no one is proactively stopping trucks.

A number of states (Indiana, Iowa, Louisiana, Ohio, Tennessee, Wisconsin), while prohibiting import and/or possession of live exotic species of concern (through either dirty lists or permitting programs), do not regulate transport of these species.<sup>21</sup> This omission leaves a vulnerability to release of these species through transport accidents.

There are a few jurisdictions that have imposed limited but moderately useful substantive requirements and restrictions on transporters. In two jurisdictions (Illinois, Louisiana), there is a requirement that authorities be notified 24 hours in advance of certain shipments into the state. This advance warning allows authorities to arrange for inspections of the shipments (although, of course, compliance with this requirement is de facto on the honor system like most other regulations governing imports). Louisiana additionally requires that trucks transporting live fish be specially labeled. This requirement does not apply to all fish, only game fish fingerlings; but could prove useful to enforcement authorities if expanded for more general coverage. Under the law in question, trucks transporting the fingerlings are required to have the words “GAME FISH FARMER” displayed on the truck in 3 inch block letters.

One beneficial feature unique to Minnesota’s program is its restrictions on transportation of fish contained in water taken from state waters determined to be infested with exotic species. This restriction controls a significant vector of introduction, which is the accidental inclusion of invasive species in a shipment of allowed species.

### 4. AQUACULTURE

Regulation of aquaculture varies quite widely among jurisdictions, both in the substance of the law and the degree of enforcement. Some states with laws that are quite strong on paper do not engage in vigilant oversight in practice; while, conversely, some states do not codify their vigilance but exercise it extensively. Aquaculture violations can be more readily discovered than importation violations, as the facilities are stationary and not readily concealable. But at the same time, enforcement stringency is on many levels diminishing, due to growth in recent years in the size and diversity of the aquaculture industry and the concomitant increase in the power of

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<sup>21</sup> A transporter does not necessarily legally “possess” the fish being shipped, and hence would not be automatically covered by a possession restriction.

the aquaculture lobby (which, as noted above, is credited with holding up the black carp ban on the federal level). Catfish farming grew from approximately 400 acres in 1960 to 161,000 acres in 1991, with 59 percent of that in the state of Mississippi (where, as noted below, the catfish industry has succeeded in exempting itself from the resource agency's jurisdiction).<sup>22</sup> Asian Carp usage in these catfish ponds appears to have begun in the early 1970s. In recent years, growers have been turning more to exotic species such as tilapia, and not all state regulations have kept pace with the added demands associated with containing these species (tilapia being the best example, because they are both popular as a food fish and potentially invasive).

Essentially all jurisdictions surveyed require some sort of authorization to operate an aquaculture facility. But the meaningfulness of this requirement varies widely. Authorization required for aquaculture varies from a rigorous application process, setting forth extensive criteria and requiring initial compliance inspections; to the system described by the Tennessee resource official interviewed, whereby aquaculture licenses may be procured through electronic kiosks set up in Wal-Mart.

In the states that do have credible application processes, the licensing criteria differ. Some states permit cage and pen culture in open public waters, greatly heightening the risk of escape (Arkansas, Minnesota, Mississippi); others expressly ban it (Kentucky, Louisiana, Missouri, New York, Ohio, Wisconsin, Quebec); and others are silent on the matter. A few states that generally restrict aquaculture to private ponds have a grandfathering exception for certain facilities (e.g. Wisconsin, for facilities in operation before 1998). The potential invasive species consequences of allowing cage or pen aquaculture may be diminished by attendant restrictions on the types of fish that may be cultivated in aquaculture (although escapes of even non-invasive fish may negatively impact the native fish population in other ways). Minnesota, for instance, has tight restrictions on what species may be imported and cultivated; and a few states (Illinois, Indiana, Missouri, Pennsylvania) expressly require that aquaculture of species not on the aquacultural clean list, or that are otherwise restricted, be conducted only in "closed systems" – raceways, indoor facilities, etc. – having no outlet to waters of the state.

A substantial minority of the jurisdictions surveyed have express requirements that some sort of escapement prevention measures be in place; although in some cases interviews revealed that this requirement was being imposed absent express regulatory authority for it. Here again, however, the stringency of this requirement varies. Some jurisdictions – including those that allow the more invasive types of fish such as Asian carp (Arkansas) – merely state that such preventive measures must be in place, without describing them further. Others describe them in greater detail, specifying the level of protectiveness of screens or filtering systems that must be used (Mississippi, Ohio) – but the fact that escapement prevention measures are described in the regulations does not necessarily mean they are effective (one commenter has described the filter system required in Mississippi and elsewhere to contain black carp as akin to "guarding against an amphibious landing by planting poison ivy"<sup>23</sup>). Ohio has a unique type of regulatory program

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<sup>22</sup> IJC White Paper, section 4.

<sup>23</sup> Ted Williams, "Want Another Carp?", <http://www.flyrodreel.com/conservatoio0601.html> (hereinafter "Williams"). The article also recounted an incident in which tilapia escaped from a supposedly "secure" Mississippi aquaculture facility when an osprey snatched one out of the

specifying with respect to four individual aquatic regions (e.g., the Lake Erie drainage basin) a specific set of aquacultural species of concern and the number of levels of escapement protection that must be in place when cultivating those species. Two jurisdictions expressly prohibit non-closed system aquaculture from locating in a flood plain (Illinois, Minnesota).

A key ingredient in the success of any of these programs – and one missing from many of them – is inspections. No matter how many or detailed the escapement prevention measures required and restrictions on species that may be cultivated, none of these laws are particularly meaningful if state officials never show up to determine whether they are being complied with. Ideally, inspections should be conducted before a permit is issued, and at various intervals thereafter. In times of tight state budgets and understaffed agencies, however, this ideal is often not met. Only two jurisdictions have in place express requirements for inspection of aquaculture facilities (Illinois, Minnesota). Some states' officials admitted that they simply do not conduct regular inspections at all (Iowa, New York, Tennessee); and in many other states it is not clear whether inspections occur since they are not mandated. Arkansas, the source of a vast number of Asian carp propagated for both catfish ponds and the foodfish trade, conducts essentially no inspections.

In two jurisdictions (Louisiana and Mississippi), the benefit of whatever protective restrictions may be in place in the aquaculture regulations generally is greatly diminished by sweeping exemptions for catfish and/or crayfish aquaculture, the biggest and most powerful producers in those states. In those states, although triploidy and escapement prevention requirements for Asian carp used in the catfish and crayfish ponds are technically still in place, the resource agency has been divested of oversight jurisdiction, and, as noted above, enforcement by DOA officials appears to be less than vigilant.<sup>24</sup> It is believed that use of both triploid and diploid Asian carp in catfish ponds in these states is widespread.

## **5. FISH SALES/FISH MARKETS**

The majority of states require some sort of license to sell fish, live or otherwise. The scope of the licenses varies, with some required specifically for live fish sales, and some required only for wholesale transactions. For the most part, their common feature – as with transport licenses – is that they are largely non-substantive. There are no criteria for their issuance other than payment of a fee, and generally the only requirement associated with them is documentation of sales. As a general matter, fish dealer licenses appear to have been created to address issues unrelated to invasive species – e.g., public health or prohibitions on sale of local game fish.

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pond, causing the fish (a mouth-brooding species) to spew fry into the Mississippi river. A local tilapia population now thrives there.

<sup>24</sup> Overall, one cannot underestimate the overwhelming power exerted by the catfish aquaculture industry on both the making and enforcement of regulations governing live exotic species. See Williams (describing, e.g., how readily catfish industry lobbyists secured the dismissal of a FWS official to did his job a little too effectively). This topic will be covered in greater depth in Part II of this report.

Some jurisdictions do restrict sales of certain species as part of their dirty list or other exotics permitting regulations, prohibiting sale of these fish in addition to importation; but others (Indiana, Iowa) restrict only importation, leaving a significant enforcement gap with respect to sales. Similarly, some states expressly require that all carp sold (as well as possessed) be triploid.

Of more concern with respect to fish sales – and live fish markets in particular – is the fact that several jurisdictions have unintentionally excluded fish sold at these markets from otherwise fairly protective import and handling restrictions (there is a similar gap with respect to the aquarium pet trade, as discussed below). This has occurred in the jurisdictions described in Section II.B.1.b. – Iowa, New York, Ohio, Pennsylvania, and Wisconsin – that specify importation restrictions only for fish intended for particular uses. Since importation of foodfish for sale in live markets is not included on that list of uses, live foodfish importation is largely unregulated –except with respect to dirty list species, where the prohibition is generally across the board. In Wisconsin, a permit is required to import fish for three specified purposes: bait, aquaculture, and stocking. Since this list does not include consumption, and since there is no dirty list ban on Asian carp species, these species may legally be sold in live food markets (the official interviewed did not know whether any such markets actually exist in the state). The laws in New York, Pennsylvania, and Ohio have similar gaps, although the consequences are controlled by the fact that they have (or will probably soon have in the case of New York and Pennsylvania) dirty lists regulating Asian carp and other species of concern. However, this gap could become a problem in those states should any new species emerge that is popular as a live foodfish and potentially invasive. In Iowa, although there is a general restriction on receiving and selling non-native fish without a permit, contextual ambiguities may limit its reach to aquaculture sales.

There are a small handful of regulations specifically limiting the species that may be sold in live markets. Indiana has a special clean list of species that may be sold live (although the list includes tilapia, a potentially invasive fish).<sup>25</sup> Additionally, as described in Section II.A.1.d., Chicago passed an ordinance in April, 2003 allowing Asian carp species to be sold in live markets, but only if they are killed before they are given to the consumer. This solution, if enforced, effectively addresses the concern with the cultural tradition of purchasing two live fish and releasing one for karmic purposes; but does not address the potential harm from transport accidents.<sup>26</sup>

## **6. BAIT**

The licensing requirements for baitfish are very similar in character to those applicable to foodfish sales. That is, most states have them, and in almost all cases they are non-substantive and devoid of criteria for their issuance. Most of the bait licensing laws exempt possession

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<sup>25</sup> Note that Pennsylvania restricts the species that may be sold wholesale, but not retail.

<sup>26</sup> There is some disagreement over the likelihood of this practice with respect to Asian carp bought in live markets, as some have argued that the fish are too expensive to be candidates for release; and others pointing out that the releases traditionally have been done in ponds specially created for that purpose. A full analysis of this tradition is beyond the scope of this report.

and/or transportation of minnows for personal use; and some exempt sales to a licensed dealer by the person who caught them.

A few states have bait-specific dirty lists, *i.e.* species that are not otherwise prohibited but that may not be used for bait. Arkansas prohibits rudd; Illinois prohibits ruffe, gobies, rusty crayfish, and rudd (a list that overlaps with the state's dirty list); Minnesota prohibits game fish, goldfish, and carp; New York prohibits carp, goldfish, and lamprey larvae; Ohio prohibits any fish or minnow not already established in Ohio waters; Pennsylvania prohibits goldfish, comets, koi, and common carp; and Wisconsin prohibits goldfish in all waters and alewife in all waters except Lake Michigan and its tributaries.

Several jurisdictions prohibit or restrict the export of minnows (Arkansas, Iowa, Michigan). Two jurisdictions (Minnesota, Ontario) ban importation of live baitfish entirely.

Only one jurisdiction (Wisconsin) has an express provision prohibiting the release of unused baitfish into waters of the state, although such a prohibition is for the most part subsumed in any general prohibition on unpermitted release or stocking of fish. Realistically, it is impossible in any event to police individuals who purchase bait and release the unused portion, except in the occasional rare instances where a wildlife officer happens to be nearby.

The lack of close oversight of baitfish shipments is of particular concern given that there have been reports that black carp fingerlings are being inadvertently included in shipments of live baitfish to the midwest.<sup>27</sup> Several resource officials we interviewed emphasized generally how nearly impossible it is to effectively enforce restrictions on bait use and disposal, either with respect to sales establishments or individual purchasers. Bait is very often sold in small “mom and pop” stores in remote locations, and it is simply not possible for enforcement officers to check all of their tanks or the trucks that deliver to them. The enforcement official interviewed in Ohio noted that when those inspections have taken place, he has on occasion found prohibited fish such as round gobies in the tanks that had been accidentally scooped up together with legal fish; and is quite confident that such finds are the tip of the iceberg.

## 7. AQUARIUM PET TRADE

The aquarium pet trade is perhaps the most under-regulated aspect of live fish commerce. Hobby fish are in a large number of cases either expressly exempted from otherwise protective laws, or *de facto* exempted for the same reason that foodfish is sometimes exempted as described in Section II.B.5 (*i.e.*, it is not among the enumerated importation purposes that are restricted). Illinois, for example, has extensive restrictions on importation, requiring a letter of authorization from the Aquaculture Advisory Committee for any species not on the approved list. However, it exempts the aquarium industry entirely from this requirement, so long as it is “operating in a manner which will prevent escapement” into the waters of the state – a weak narrative restriction with no specific parameters and, as far as can be ascertained, no real oversight. Similarly, Quebec broadly prohibits possession and transportation of non-native fish, but includes a broad

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<sup>27</sup> See Williams, *supra*.

exemption for the entirely undefined category of “hobby fish.” Indiana and Michigan have similar exemptions.

A slightly less sweeping approach to hobby fish exemptions is to define them as applicable only to fish that will be held in closed aquaria for their entire lifetime (Kentucky, Mississippi, Tennessee, Wisconsin). Although this type of exemption is preferable to the industry-wide exemptions described above, it does not address the problem of individual purchasers releasing fish they no longer want into the wild. Such a release of pet aquarium fish was the cause of the much-publicized snakehead infestation in Maryland.

Some jurisdictions, however, have accomplished the goal of accommodating hobby breeders and sellers without a sweeping exemption to importing laws that opens the door broadly to invasive species. This has been done by describing an exemption based not on the purpose for which the fish are imported or held – *i.e.* for hobby aquariums – but rather on the survivability of the fish in local waters. Exempt aquarium fish are defined in these jurisdictions (Minnesota, Pennsylvania, Wisconsin) as those that cannot survive in cold and (where applicable) fresh water. This type of restriction greatly minimizes the risk of invasion by aquarium species, so long as the definitions are correctly applied; although they are clearly less useful in southern states where a greater number of tropical fish are capable of survival.

## **8. FEE FISHING**

Fee fishing – also known as “pay lakes” or “fishing preserves” – are recreational operations where fish are stocked in ponds and fished out by individual anglers (usually children) who pay for the privilege of doing so. We have no independent information suggesting that these ponds are a vector for invasions; and the likelihood that they would be is somewhat diminished by the fact that they are usually stocked with species of local gamefish. However, since they may be connected to public waters, and are in some instances not covered by the aquaculture regulations or regularly inspected, it is important to be aware of the regulatory scheme applicable to them.

Pay lakes that breed their own fish would for the most part be subject to the jurisdiction’s aquaculture laws. Many lake operators, however, stock their ponds with fish obtained elsewhere. This type of operation would be subject to laws restricting stocking only if the operation were conducted in public waters, which most by definition are not. Thus, the scenario of concern is a non-breeding pay lake operation conducted in a private pond that does not block egress to public waters, and which stocks a potentially invasive species (either a foodfish such as tilapia or a service fish such as Asian Carp). We know of no operations that fit this particular description, but its unpermitted existence is possible under the legal systems evaluated.

A few states have limited, non-substantive licensing requirements associated with pay lakes that mirror those in place for fish and baitfish dealers (Arkansas, Illinois, Missouri). Tennessee’s licensing provision requires that the facility be constructed to prevent movement of fish into or out of the facility; and specifies a list of species approved for fee fishing.

## **9. ENFORCEMENT**

This section addresses provisions in states' regulatory regimes in aid of enforcement, *i.e.*, governing entry and inspection and penalties. Larger issues pertaining to enforcement, such as the availability and willingness of enforcement officers, are addressed throughout the preceding sections.<sup>28</sup>

Nearly every jurisdiction surveyed affords enforcement officers some right to enter a facility to inspect it and review records. Some provisions are more sweepingly worded than others, and a few do not mention this authority at all. No agency personnel interviewed mentioned any legal constraints on entry onto permittees' premises or operations for enforcement purposes.

Non-federal penalty provisions, by contrast, are almost universally inadequate. Most of these jurisdictions impose some type of misdemeanor penalty on violators of various live fish commerce laws, but none of them are sizeable enough to be a meaningful deterrent – particularly not to a large-scale aquaculture operation. The fines for non-aquacultural offenses – importing, unpermitted stocking and release, *etc.* – seem to average roughly around \$100. The fines associated with aquaculture law violations and other infractions associated with large commercial operations (*e.g.*, bait dealers) in a few instances top out technically at up to \$5,000, and carry with them possible short jail terms (Illinois, New York, Pennsylvania, Wisconsin). However, even fines of this magnitude (we have not heard of an state-law based imprisonment being imposed) are probably insufficient to deter violations at multi-million dollar aquaculture operations. In most cases license revocation or suspension is also an available remedy, but a largely meaningless one because a large aquaculture operator could simply change the identity of the permittee.

A particularly egregious example of inadequate state enforcement authority was reflected in the incident in Iowa, described in Section II.A.1.b. and the Iowa jurisdictional summary, wherein a large-scale aquaculture operator flagrantly violated the state's restrictions on species importation by importing thousands of black carp. The state's only enforcement tools were license suspension (in which case the violator would simply have turned the operation over to his son, according to the enforcement official interviewed) and a \$25 fine. The solution used in that case – calling on federal officials to enforce under their Lacey Act powers -- may be the only one currently available to ensure that meaningful penalties are imposed.

### **C. SUMMARY OF PROGRAM GAPS**

To a large degree, the gaps, loopholes, and vulnerabilities inherent in the various legal systems surveyed are described in the preceding sections. However, for ease of reference, we summarize those gaps at the end of each of the individual jurisdictional summaries; and summarize below the deficiencies most often found in the programs surveyed:

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<sup>28</sup> Not every state laid out express penalty provisions associated with aquatic species violations. However, a full description of the more generally applicable penal laws in each jurisdiction is beyond the scope of this report.

1. *Express and de facto exemptions for the aquarium pet trade.* The pet trade is frequently unregulated under otherwise protective laws either by omission – i.e. where other activities involving live fish are expressly regulated but the pet trade is not mentioned – or by express exemption.
2. *De facto exemptions for the live foodfish trade.* Although live fish markets are not given express exemptions, they are sometimes not covered by regulations governing importation live fish.
3. *Inability to proactively enforce import bans.* Resource officials agree that prohibiting species imports is much like the war on drugs. There is no way to catch any sizeable fraction of determined violators, and the best that can be hoped for is the deterrent effect of catching a few.
4. *Lack of inspections at aquaculture facilities.* A substantial number of states purport to impose various protective restrictions on aquaculture, but fail entirely to inspect facilities to ensure that they are being implemented.
5. *Allowing aquaculture in public waters.* Unless a jurisdiction has well-written and tightly enforced restrictions on species that may be cultivated, conducting aquaculture in cages or pens in public waters invites potentially invasive escapes.
6. *Inadequate triploidy requirements.* Triploidy only works as a protective measure if every fish is blood tested, given the failure rate of the process that creates triploidy; but many states do not require such testing, and/or allow it to be done by their owners without oversight.
7. *Failure to regulate species of concern.* Not all jurisdictions' prohibited lists include the known, dangerous invasive species such as Asian carp. This is particularly a concern where those states also lack more general prohibitions on import of unlisted species, or do not enforce them.
8. *Regulation through dirty lists only.* Jurisdictions that restrict importation and possession only of a short list of known invasive species risk invasion but as yet undiscovered species.
9. *Failure to regulate transportation.* Numerous jurisdictions prohibit or tightly restrict importation and possession of exotic species, but do not restrict transportation.

### **III. DEFINING A SUCCESSFUL PROGRAM**

The subject of what constitutes a thorough and successful regulatory program for live fish commerce is largely the subject of Phase II of this report. However, our review of existing law in this report already suggests a number of features that are part of such a program. A short list of such features is as follows:

1. *Effective use of lists.* The best programs make use of both a clean list and a dirty list, and effectively define a process for evaluating proposed imports of other species. These evaluations, in turn, should include opportunities for public notice and comment.
2. *Authority of resource agencies.* Restrictions on species importation and use must be administered by the jurisdiction's resource agency, which has the expertise and will to evaluate the invasive potential of species, and not by a department of agriculture which likely has neither.
3. *Prohibition (or severe restriction) on minnow importation.* Minnow shipments are by nature the most difficult to track and inspect. To the extent constitutionally allowable (a topic for Part II), jurisdictions should ban these imports entirely.
4. *Well-defined operation and inspection requirements for aquaculture.* In order to be truly effective, laws governing aquaculture should define specific parameters for licensing and operation (e.g., distance from floodplain, types of escapement prevention measures), and require pre-permitting inspections and regular site visits thereafter.
5. *Substantive criteria for transportation, fish dealer, and bait dealer licenses.* There is potential to use these types of license for substantive regulatory purposes rather than merely fee generation and recordkeeping.
6. *Ban on live sales.* Chicago's ordinance allowing live markets but prohibiting live sales to the consumer, while not completely protective, addresses the problem of culturally-based intentional releases.
7. *Tip lines.* Some commercial aquaculture enterprises have demonstrated willingness to turn their competitors in for violations. States should make it as easy as possible for them to do so, as well as encouraging tips from ordinary citizens.
8. *Liability.* Those allowing escape of exotic species should be held liable for costs associated with their removal and eradication.
9. *Stringent penalties for violation.* The jurisdiction must have the ability, when necessary, to impose penalties that will be substantial even for a large-scale commercial operator.

No existing state program incorporates all of these beneficial features. However, Minnesota comes quite close. Minnesota's regulations comprehensively cover all aspects of the live fish trade; and the program considers hazards inherent not only the fish themselves but the waters from which they are taken, which may themselves be infested with exotic species. Minnesota's program, and others resembling it, will be discussed at greater length in Phase II of this report as we seek to distill and evaluate their best and most successful features.