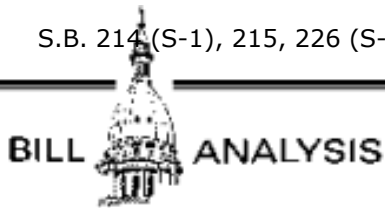




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Senate Bill 214 (Substitute S-1 as passed by the Senate)
Senate Bill 215 (as passed by the Senate)
Senate Bill 226 (Substitute S-1 as passed by the Senate)
Senate Bills 227, 228, and 229 (as passed by the Senate)
Sponsor: Senator Bev Hammerstrom (S.B. 214, 215, 226, & 227)
Senator Alan Sanborn (S.B. 228)
Senator Patricia L. Birkholz (S.B. 229)
Committee: Natural Resources and Environmental Affairs

Date Completed: 11-24-03

RATIONALE

Aquatic nuisance species have been identified as the primary threat to the health of the Great Lakes, and some people believe that genetically engineered fish could become a similar menace. Aquatic nuisance species are nonnative, or exotic, species that reproduce and spread rapidly because they lack the predators, parasites, diseases, competitors, and other natural factors that keep their numbers in check in their native habitats. This unchecked spread can threaten the survival and diversity of native species, change natural habitats, jeopardize public health, damage property, and reduce tourism. Similarly, fish genetically engineered to grow faster than native species could out-eat or otherwise compete with smaller wild species, resulting in comparable disruptions.

Many aquatic nuisances establish a foothold when a ship discharges ballast water from another body of water into the Great Lakes; the ballast contains mud, plants or seeds, eggs, and, sometimes, small fish and crustaceans. The zebra mussel and the sea lamprey are well-known examples of aquatic nuisances accidentally introduced into the Great Lakes through ballast water, with devastating effects. A new type, the Asian carp, may result in economic and ecological damage to the Great Lakes ecosystem far exceeding that inflicted by the sea lamprey and the zebra mussel, according to the International Joint Commission. The Asian carp has not yet made it into the Great Lakes, but is in the Illinois River and could reach Lake Michigan soon.

A genetically engineered (GE) fish results when biotechnologists take genetic material from one organism and insert it into the permanent genetic code of another fish. Because fish and other aquatic organisms are easier and often cheaper to modify genetically than are terrestrial livestock such as chickens or pigs, researchers initially focused on speeding up the growth in fish farmed for human consumption. Reportedly, some of these GE fish reached market size in one-quarter to half the normal time; these fish also converted food to energy more efficiently because they need less food per unit of growth. Catfish, rainbow trout, tilapia, and carp are among the fish bioengineers are experimenting on for greater potential as human food; tilapia also are being manipulated to become a "biofactory" to produce pharmaceuticals; and algae are being researched as a "bioremediator" to remove heavy metals from water.

Although no fish farms in the United States currently raise genetically engineered (also known as transgenic) fish for human consumption, Aqua Bounty, a private Massachusetts company, has patented a GE salmon that is said to grow at least twice as fast as wild salmon. The U.S. Food and Drug Administration (FDA) is considering approving this salmon for human consumption. California, Washington, and Maryland recently enacted legislation restricting or banning GE fish in their state's coastal waters. Because of the potential threat posed by the introduction of new species of GE fish, some people believe

that Michigan should prohibit the possession and release of nonnative and GE fish without a permit, establish penalties for violations, and further regulate the importation of live game fish.

CONTENT

Senate Bill 214 (S-1) would amend the Natural Resources and Environmental Protection Act (NREPA) to establish a felony penalty for the possession or release of a live "prohibited species", and require restitution for damage to the natural resources from a violation. **Senate Bill 215** would amend the Code of Criminal Procedure to add to the sentencing guidelines the felony of possessing or releasing a prohibited species. The offense would be a Class E property offense, subject to a statutory maximum of five years' imprisonment.

Senate Bill 226 (S-1) would amend NREPA to do the following:

- Prohibit the release of a genetically engineered organism (GEO) or a nonnative fish without a permit from the Department of Natural Resources (DNR).
- Provide that a permit to possess or import live game fish would not include a genetically engineered variant unless it was specifically identified in the permit.
- Include genetically engineered variants in provisions that restrict the importation of live game fish.
- Establish a misdemeanor penalty for a violation involving a GEO or a species not naturalized in this State, and establish a felony penalty for someone who knowingly violated the permit restrictions with respect to a GEO that was a variant.
- Include liability for damages to the natural resources in all of the proposed penalties.

Senate Bill 227 would amend the Code of Criminal Procedure to add to the sentencing guidelines the felonies of knowingly releasing genetically engineered or nonnative organisms, possessing or importing genetically engineered game fish, and planting

genetically engineered aquatic organisms, as proposed by Senate Bill 226 (S-1). These offenses would be Class E felonies against property, with a statutory maximum term of five years' imprisonment.

Senate Bill 228 would amend the Animal Industry Act to prohibit a person from importing into this State a genetically engineered organism that was a variant of an animal species, from an area under quarantine, without the permission of the Director of the Michigan Department of Agriculture (MDA). The bill also provides that an order of the Director prohibiting the importation of a species, or requiring compliance with certain requirements, would apply to a GEO that was a variant of the species identified in the order, unless it provided otherwise.

Senate Bill 229 would amend the Michigan Aquaculture Development Act to provide that, for purposes of the Act, each GEO that was a variant of an aquaculture species would be considered a distinct aquaculture species. The bill also provides that such a GEO would not be included on the list of approved aquaculture species, or covered by an aquaculture research permit, unless it was specifically identified.

Senate Bills 226 (S-1), 228, and 229 would define "genetically engineered" or "genetically engineered organism" as "an organism whose genome, chromosomal or extrachromosomal, is modified permanently and heritably using recombinant nucleic acid techniques". The bills would define "recombinant nucleic acid techniques" as "laboratory techniques through which genetic material is isolated and manipulated in vitro and then inserted into an organism".

Senate Bill 215 is tie-barred to Senate Bill 214, and Senate Bill 227 is tie-barred to Senate Bill 226. A more detailed description of Senate Bills 214 (S-1), 226 (S-1), 228, and 229 follows.

Senate Bill 214 (S-1)

The bill would add Part 413 (Nonnative Organisms) to NREPA to prohibit a person from possessing or releasing a live prohibited

species. A violation would be a felony punishable by imprisonment for up to five years, a maximum fine of \$250,000, or both. The court also would have to order the violator to reimburse the State for damage to the natural resources of the State from the violation and costs incurred to prevent or minimize such damage.

The bill would define "prohibited species" as any of the following, its eggs, or a hybrid of any of the following:

- Bighead carp (*Hypophthalmichthys Nobilis*)
- Bitterling (*Rhodeus Sericeus*)
- Black carp (*Mylopharyngodon Piceus*)
- Grass carp (*Ctenopharyngodon Idellus*)
- Ide (*Leuciscus Idus*)
- Japanese weatherfish (*Misgurnus Anguilli candatus*)
- Rudd (*Scardinius Erythroptthalmus*)
- Silver carp (*Hypophthalmichthys Molitrix*)
- Tench (*Tinca Tinca*)

The term "prohibited species" also would include a fish of the snakehead family (Family Channidae) or its eggs.

Senate Bill 226 (S-1)

Prohibited Release

The bill would add Part 413 (Transgenic and Nonnative Organisms) to NREPA. Under this part, unless authorized by a permit issued by the DNR, a person could not knowingly release or allow to be released into this State a genetically engineered fish or a nonnative fish that was not naturalized in the location of the release.

A person would have to apply for a permit on a form developed by the DNR. The application would have to be accompanied by a fee established by the Department based on the cost of administering Part 413. The DNR could revoke or modify a permit after providing an opportunity for a hearing under the Administrative Procedures Act.

A person who knowingly violated Part 413 or a permit issued under it would be guilty of a felony punishable by imprisonment for up to five years, a maximum fine of \$250,000, or both. The person also would be liable for any damage to the natural resources of the State resulting from the violation.

The DNR would have to promulgate rules to implement Part 413.

Game Fish Importation

Part 459 (Propagation of Game Fish in Private Waters) of the Act prohibits a person from importing into the State any live game fish, including the viable eggs of any game fish, without a license. The bill provides that a license would not apply to a genetically engineered variant of a live game fish species unless the variant was specifically identified in the license.

The DNR may promulgate rules to prohibit or restrict the importation of game fish or other fish when importation of that species would endanger the State's public fishery resources. Under the bill, a prohibition or restriction in these rules would apply to a GEO that was a variant of the species unless the restriction or prohibition specifically provided otherwise. Also, a prohibition or restriction in rules could be limited to a GEO.

A person who knowingly violated the import prohibition or a rule prohibiting or restricting importation with respect to a GEO or any species that was not naturalized in this State, would be guilty of a misdemeanor punishable by up to 90 days' imprisonment and/or a maximum fine of \$1,000. Any license issued to the person under Part 459 could be revoked, and the person would be liable for damage to natural resources resulting from the violation.

Game Fish Permits

Under Part 487 (Sport Fishing) of the Act, the DNR may issue permits to possess live game fish in public or private ponds, pools, or aquariums under rules and regulations prescribed by the Department. This part also prohibits a person from importing live game fish, including viable eggs, into the State, or planting any spawn, fry, or fish in the waters of the State, without a permit issued by the DNR. The bill specifies that a permit issued under these provisions would not include a genetically engineered variant of a species identified in the permit, unless the variant was specifically identified in the permit.

If a person violated the prohibition against possessing live game fish, or importing live

game fish or planting any spawn, fry, or fish without a permit, or violated a permit, with respect to a GEO that was a variant of a species, he or she would be guilty of a felony punishable by imprisonment for up to five years and/or a maximum fine of \$250,000. The person also would be liable for any damage to the natural resources of the State resulting from the violation. The person's fishing license would have to be revoked, and he or she could not receive a license during the remainder of the year in which he or she was convicted or during the next three license years.

Senate Bill 228

The Animal Industry Act prohibits a person from importing into this State an animal species from an area under quarantine for that species for any infectious, contagious, or toxicological disease, unless the MDA Director grants permission. Under the bill, this also would apply to a genetically engineered organism that was a variant of the species.

In addition, the Act prohibits the importation of any species having the potential to spread serious diseases or parasites, to cause serious physical harm, or otherwise to endanger native wildlife, human life, livestock, domestic animals, or property, as determined by the Director. The bill states that an order of the Director under this provision would apply to any GEO that was a variant of the species identified in the order, unless it expressly provided otherwise.

Under the Act, the Director may require compliance with requirements pertaining to physical examination, negative test results, and/or identification, before the importation of a wild animal or an exotic animal species not regulated by the DNR or the Fish and Wildlife Service of the U.S. Department of the Interior. The bill specifies that an order of the Director under this provision would apply to any GEO that was a variant of the species identified in the order, unless it expressly provided otherwise.

Senate Bill 229

Section 5 of the Michigan Aquaculture Development Act establishes a list of approved species for aquaculture production, and states that only the species on the list are allowed for

purposes of aquaculture production. Under the bill, a genetically engineered organism that was a variant of an aquaculture species would not be included on that list unless it was specifically identified on the list or specifically identified in a rule promulgated under the Act as being on the list.

Section 8 provides that research of an aquaculture species not on the approved list is allowed and must be conducted pursuant to an aquaculture research permit in a confinement research facility. Under the bill, a GEO that was a variant of an aquaculture species would not be covered by an aquaculture research permit under Section 8 unless specifically identified in the permit.

Proposed MCL 324.41301-324.41305 (S.B. 214)
MCL 777.13e (S.B. 215)
MCL 324.45901 et al. (S.B. 226)
MCL 777.13e (S.B. 227)
MCL 287.704 et al. (S.B. 228)
MCL 286.872 & 286.874 (S.B. 229)

ARGUMENTS

(Please note: The arguments contained in this analysis originate from sources outside the Senate Fiscal Agency. The Senate Fiscal Agency neither supports nor opposes legislation.)

Supporting Argument

Senate Bills 214 (S-1), 215, 226 (S-1), and 227 would discourage further introduction of aquatic nuisances into the Great Lakes. Since the opening of the Saint Lawrence Seaway in 1959, the number of aquatic nuisance species in the Great Lakes has increased dramatically. According to Michigan's Office of the Great Lakes, this is because the Seaway has significantly increased trade into and from the lakes, and because its deep canals enable ships to take on more ballast water. As a result, one new aquatic invader reportedly has been discovered every seven months on average since the opening of the St. Lawrence Seaway. Since the mid-1990s, the European ruffe and the round goby, two aquatic nuisances, have had a significant environmental and economic impact on the Great Lakes. Both fish have a capacity to reproduce very quickly, and have the potential to disrupt the delicate predator/prey balance vital to sustaining healthy fisheries.

Potentially more alarming is the Asian carp, a fish that has not yet made it to the Great Lakes, but is close. Asian carp were purposefully introduced to the southern United States to control problematic algal blooms and snails that affected the aquaculture industry. The bighead and silver carp species escaped from confinement during major floods in the early 1990s and entered the Mississippi River. Since then, they have moved up through the Mississippi River system and now are found in the Illinois River and are approaching the Chicago Ship and Sanitary Canal, which is connected to the Great Lakes. The International Joint Commission believes that the Asian carp poses a tremendous threat to the biological integrity of the Great Lakes. This fish consumes large quantities of food and can grow to an immense size (over four feet long, and up to 110 pounds), becoming so large that it is no longer vulnerable to native predators. Asian carp are extremely prolific, and could quickly decimate native fish populations and put native mussel populations at risk. In some backwaters of the Mississippi River system, according to the International Joint Commission, surveys during seasonal fish kills have documented populations of 97% Asian carp and only one of each of four native species. The full force of the State must be put behind efforts to stop the spread of the Asian carp and other aquatic nuisance species in the Great Lakes.

Supporting Argument

Senate Bills 226 (S-1) to 229 would help protect against accidental or intentional introduction of GE fish into the Great Lakes. The bills would correctly recognize genetically engineered species as distinct from their wild counterparts, and would appropriately penalize anyone who released or imported a GE organism or fish without a permit from the DNR or the MDA. It is unlikely that the DNR would issue any permits in the near future for the release of GEOs into Michigan waters, but the bill would leave the door open in the event a GEO was found to be beneficial to the aquaculture and the environment.

Although no transgenic fish are currently used in fish farms or have been approved for use as human food, it is possible the FDA will approve the Aqua Bounty GE salmon for consumption. If the fish are raised on fish farms in netted pens in open waters, some are bound to escape: Reportedly, approximately 15% of all

fish on fish farms escape during storms or floods, or as a result of damage to their pens. Escape of even one GE salmon could be disastrous because it could trigger extinction of the native salmon species (already considered endangered) in just 40 generations, according to a computer simulation conducted by Purdue University. That simulation predicted that male GE salmon would attract more mates than wild salmon do because the GE fish are larger at sexual maturity. The offspring of a GE salmon and a wild salmon, however, would be less likely to survive in the wild because genetic mutations are bound to result. In this scenario, both wild Atlantic salmon and GE salmon would quickly reach extinction.

Because no Federal laws specifically govern the regulation of GE animals grown for human consumption, it is important that Michigan follow the lead of Maryland, Washington, and California by strictly regulating the release of genetically engineered fish into the waters of the Great Lakes.

Response: The general opposition to genetically engineered food, especially salmon, is largely unfounded. Transgenic salmon contain the same amount of hormones as regular fish do; they just grow faster: At maturity, they are the same size as non-GE salmon. This genetic change, which is achieved by inserting a gene from the Chinook salmon and the ocean pout fish, allows the salmon to use its growth proteins more efficiently. Much greater genetic changes have been produced in almost all fruits, vegetables, grains, and animals through artificial crossbreeding. Few of the foods eaten today resemble their original, wild forms.

To prevent any possibility of environmental harm, GE salmon could be sterilized and raised in secure, land-based pens, eliminating the chance of escape and crossbreeding with wild salmon. Genetically engineered salmon raised in this way would prove beneficial to the environment, because they would limit the expansion of fish farms located in netted pens in open waters. Currently, these large-scale fish farms produce a great deal of waste and pollute the environment. Transgenic fish consume less food, which reduces waste and makes it possible for more of them to be raised in closed pens (currently an expensive alternative to raising fish in open waters).

Raising transgenic, sterile salmon in closed pens could be an economical way to save wild salmon from extinction while providing a cheap source of nutritious food to millions of people.

Legislative Analyst: Claire Layman

FISCAL IMPACT

**Senate Bills 214 (S-1), 215, 226 (S-1),
and 227**

The bills would have an indeterminate fiscal impact on State and local government.

There are no data to indicate how many offenders would be convicted of possessing or releasing a prohibited species, or of knowingly releasing, possessing, or importing a genetically engineered or nonnative fish. Offenders would receive a sentence with a minimum range of 0-3 months to 24-38 months and would be subject to probation or incarceration in a local or State facility. Local units would incur the cost of incarceration in a local facility, while the State would incur the cost of felony probation estimated at \$4.80 per day, and the cost of incarceration in a State facility at an average annual cost of \$27,000.

Senate Bills 228 and 229

The bills would have no fiscal impact on State or local government.

Fiscal Analyst: Jessica Runnels
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This analysis was prepared by nonpartisan Senate staff for use by the Senate in its deliberations and does not constitute an official statement of legislative intent.