Environmental Assessment
for Listing Live Black Carp (*Mylopharyngodon piceus*)
as Injurious Wildlife under the Lacey Act

May 2007

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Abstract

In this environmental assessment, we considered three alternatives for the proposed action to list all forms of black carp (*Mylopharyngodon piceus*) as an injurious species under the Lacey Act: 1) no action, 2) listing as injurious all (diploid and triploid) live black carp, gametes and eggs, and 3) listing as injurious only diploid live black carp, gametes and eggs. One alternative considered but dismissed from further analysis was adding all forms of live and dead black carp, gametes, eggs and hybrids.

This action is being considered in order to protect native freshwater mollusks and native fishes from the potential negative impacts of black carp by listing them as injurious and preventing their importation and interstate movement. The Service's preferred alternative is to list all (diploid and triploid) live black carp, gametes and eggs as injurious under the Lacey Act (Alternative 2).

The Secretary of the Interior is authorized under the Lacey Act (18 U.S.C. § 42, as amended) to prescribe by regulation those mammals, birds, fish, mollusks, crustaceans, amphibians, reptiles, and the offspring or eggs of any of the aforementioned, which are injurious to human beings, to the interests of agriculture, horticulture, or forestry, or to the wildlife or wildlife resources of the United States. The lists of injurious wildlife are at 50 CFR 16.11-15.

If black carp are determined to be injurious, then as with all listed injurious animals, their importation into, or transportation between, States, the District of Columbia, the Commonwealth of Puerto Rico, or any territory or possession of the United States by any means whatsoever is prohibited, except by permit for zoological, educational, medical, or scientific purposes (in accordance with permit regulations at 50 CFR 16.22), or by Federal agencies without a permit solely for their own use, upon filing a written declaration with the District Director of Customs and the U.S. Fish and Wildlife Service Inspector at the port of entry. The interstate transportation of any live black carp, gametes, viable eggs or any hybrids currently held in the United States for any purposes not permitted would be prohibited. An injurious wildlife listing would not prohibit intrastate transport or possession of black carp within States, where possession is not currently prohibited by the State. Any regulation pertaining to the use of black carp within States is the responsibility of each State.

1) Purpose

The purpose of the proposed action to list all forms of live black carp (*Mylopharyngodon piceus*), gametes and eggs as an injurious wildlife species under the Lacey Act is to prevent their further introduction and establishment into natural waters of the United States. This action is being considered in order to protect native freshwater mollusks, native fishes and other animals that rely on mollusks for food from the potential negative impacts of black carp by listing them as injurious, thus preventing their importation and interstate movement. This action will not prohibit the current use of black carp within a state.

2) Need

The need for the proposed action, to add all forms of live black carp to the list of injurious wildlife under the Lacey Act, developed as a result of the increased use of black carp, to control exotic trematodes in fish culture and the potential impacts of black carp on native mollusks. The increased production, use and interstate transportation of triploid and diploid black carp are likely to result in additional introductions into the wild and therefore poses increased risks to native mollusks and fishes. The intent of this environmental assessment is to evaluate the impacts of three alternatives associated with adding black carp to the list of injurious wildlife under the Lacey Act.

The Secretary of the Interior is authorized under the Lacey Act (18 U.S.C. § 42, as amended) to prescribe by regulation those mammals, birds, fish, mollusks, crustaceans, amphibians, reptiles, and the offspring or eggs of any of the aforementioned, which are injurious to human beings, to the interests of agriculture, horticulture, or forestry, or to the wildlife or wildlife resources of the United States. The lists of injurious wildlife are at 50 CFR 16.11-15.

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3) Decisions that Need to be Made:

The Service is the lead agency for the proposed action. The Service's Director will select one of the alternatives analyzed in detail and will determine, based on the facts and recommendations contained herein, whether this Environmental Assessment (EA) is adequate to support a Finding of No Significant Impact (FONSI) or whether an Environmental Impact Statement (EIS) is required.

4) Background

In February 2000, the Service received a petition from the Mississippi Interstate Cooperative Resources Association to list the black carp under the injurious wildlife provision of the Lacey Act. The petition was based on concerns about the potential impacts of black carp on native freshwater mussels and snails in the Mississippi River Basin.

In October 2002, the Service received a petition signed by 25 members of Congress representing the Great Lakes region to add black, bighead and silver carp to the list of injurious wildlife under the Lacey Act. A follow-up letter identified seven additional Legislators that support the petition. Various agencies, organizations and individuals are concerned that escapements of black carp will result in establishment of populations that will impact imperiled, native mussels.

There is a report of black carp escaping into open waters of the United States in the Osage River (Missouri River drainage) in April 1994 during a flood event, though this report is disputed by the facility owner. As early as 1994, black carp fingerlings were delivered with catfish into the state of Missouri. In 2000, black carp were identified in a bait fish dealers' load; at least 300-400 in one week, which were distributed to and sold by bait stores throughout the state.

The first black carp reported captured from the wild was in March 2003 from Horseshoe Lake, Illinois. Analysis indicated that the fish was a 4-year old triploid, and thus could not have escaped in 1994. A 9-year old black carp was captured in lower Red River, Louisiana in April 2004 by a commercial fisher; testing of eye fluid indicated the fish was likely diploid. A 7-year old black carp was captured in the lower Red River, Louisiana in May 2004; this fish was also likely diploid. In June 2004, one black carp was collected in the Mississippi River near Lock and Dam 24 in Clarksville, Missouri; ploidy testing of this specimen was not possible. Another black carp was also collected from the main channel of the Mississippi River in Louisiana, near Simmesport in July 2004. The commercial fisher that captured the specimen sold it as a grass carp. In August 2004, a diploid black carp was collected from the Atchafalaya River at Simmesport, Louisiana. On April 5, 2005, a black carp was found in the White River, just north of DeVall's Bluff, Arkansas; the fish was sold before ploidy could be tested. The source for the introduction of these wild-caught fish is unknown.

These records include only self-reported documentations of black carp found in the wild; other escapes and captures in the wild may have occurred but have not been reported. Recent reports indicate that commercial fishers working in the Atchafalaya river basin have been catching 8-15 black carp per year, of unknown ploidy, since the early 1990's.

The United States has the greatest diversity of freshwater mussels in the world. About 1,000 species occur globally, and 297 species and subspecies are native to the United States. Seventy species of the mussels native to the United States are designated as endangered or threatened species under the Endangered Species Act (ESA), and many other species have declined in abundance and distribution. Within the last 50 years this rich fauna has been decimated by impoundments, sedimentation, channelization and dredging, water pollution, and, more recently, the nonindigenous zebra mussel (*Dreissena polymorpha*).

Freshwater mussels are a renewable resource, providing considerable ecological and economic benefits to the nation. They are ecologically important as a food source for many aquatic and terrestrial animals; they improve water quality by filtering contaminants, sediments, and nutrients from our rivers; and because they are sensitive to toxic chemicals, they serve as an early-warning system to alert us of water quality problems.

The black carp is a freshwater fish that inhabits lakes and lower reaches of large, fast moving rivers which include most major drainages of eastern Asia. Black carp typically grow to more than 1.5 meters in length and weigh, on average, 15 kilograms. They reportedly can weigh up to 70 kilograms. Individuals of the species are known to live to at least 15 years of

age and usually reach sexual maturity from 6 to 11 years of age, but females can mature as young as 3 years of age. Spawning occurs annually in their natural range when water temperatures are at least 65.5 ºF, water levels are rising, and mollusks are available. They spawn upstream in rivers and their eggs drift downstream. The eggs are carried by currents into floodplain lakes, smaller streams, and channels with little to no current. Female black carp can produce an average of 1-3 million eggs each year, depending on body size.

Black carp feed on zooplankton and fingerlings when small. As adults, powerful teeth permit the black carp to crush the thick shells of large mollusks (mussels and snails) and they have a gape width much larger than most native mollusk-eating fish. Reports indicate that the fish can usually handle any food item that it can get into its mouth. Although black carp reportedly have small mouths for their size, they attain sizes much larger than most native mollusk-eating fish. There are no known native fish with the same combination of size, morphology, and diet. Consequently, black carp black carp could put new species not currently subject to fish predation at substantial risk and thus change ecosystem function by altering the existing food web. Rates of consumption vary, but a four year old black carp was shown to eat, on average, 3-4 pounds of zebra mussels per day in pond culture.

Black carp originally entered the United States in the early 1970s as a "contaminant" in imported grass carp (*Ctenopharyngodon idella*) stocks. Young black carp are difficult to distinguish from young grass carp. The second introduction of black carp into the United States occurred in the early 1980s for control of yellow grub (*Clinostomum complanatum* or *C. marginatum,* hereafter referred to as *Clinostomum),* a trematode parasite, in fish culture ponds. The species was also imported by a Mississippi fish farmer during the early 1980s and by a fish farm operation in Missouri during the period 1986-1988. The predominant use of black carp in the U.S. is for biological control of snails that are intermediate hosts in the life cycle of two trematodes, which affect cultured channel catfish (*Ictalurus punctatus*), hybrid striped bass (*Morone saxatilis* crossed with *M. chrysops*) and some baitfish such as the fathead minnow (*Pimephales promelas)*. Yellow grub is a trematode parasite that infects fish, and can cause economic losses to baitfish and hybrid striped bass farmers. The life cycle of the grub involves snails and fishes as intermediate hosts, and fish-eating birds as final hosts. A second trematode parasite, *Bolbophorus damnificus* (previously reported to be *B. confusus)*, has also shown up in snails in channel catfish culture ponds, primarily in the late 1990's and black carp are used to control snails in these ponds. Black carp have been maintained in research and fish production facilities in Arkansas, Louisiana, Mississippi, Missouri, North Carolina, Oklahoma, and Texas.

In addition to black carp, snail populations in fish production ponds may be controlled by hydrated lime, copper sulfate, weed control, Bayluscide®-M 70% WP, crayfish and potentially some native fish species. However, chemical treatment for snails is limited because chemical agents can be detrimental to fish, or it can have decreased effectiveness due to wind, temperature conditions, water chemistry and pond size. Clearing of aquatic plants has been found to be effective in reducing snail numbers, but is time consuming in large-scale operations. Bayluscide® can be used as a molluscicide in aquaculture ponds, but fish from treated ponds cannot be harvested for 12 months. Also, Bayluscide® is toxic to fingerlings and cannot be used near other sensitive fish species, such as paddlefish.

Black carp are used as a biological control because they eat infected snails in ponds but are not susceptible to the trematode. Controlling the trematodes by using black carp is preferable to other methods available for aquaculture producers. Other fishes that are indigenous to the United States, including the redear sunfish, pumpkinseed sunfish, freshwater drum, or the river redhorse hold potential to be used for snail control in aquaculture ponds, but the extensive testing needed to establish the conditions under which they may work has not been completed.

Black carp can either be triploids (presumed sterile) or diploids (capable of reproduction). Triploid fish are created by adding an additional chromosome set (3 total) to induce sterility. Triploidy is one management tool to prevent reproduction and control populations in stocked fish. Externally, triploid fish are indistinguishable from diploid fish. We have received conflicting information on the effectiveness of triploidy induction techniques for black carp, some indicate it's as high as 85-98% effective, while others experienced induction resulting in approximately 60% triploid fish lots. In general, and primarily for other fish species, the literature indicates that triploidy induction techniques usually do not produce 100% triploid fish.

Fish ploidy (the number of sets of chromosomes in a cell or an organism) is most commonly tested during aquaculture production with a particle size analyzer (i.e. Coulter Counter® with channelyzer), which usually tests the red blood cell volume to determine if it a fish is triploid or diploid. This method provides a rapid, relatively easy determination of ploidy. Ploidy can also be tested using flow cytometry, one of the techniques having the greatest accuracy, which measures the amount of DNA in a blood or tissue cell. This method is more expensive and sample preparation takes longer. As in all analytical techniques rigid protocols must be observed to ensure that one can distinguish between triploid and diploid fish. If cell volume overlaps between diploid and triploid fish then there may be an inherent error in the methodology. While testing red blood cell volume has been shown to be effective in verifying ploidy status in other fish (90-93.8% for saugeyes), it has not been shown to be 100% effective for black carp.

Research conducted at the USGS Columbia Environmental Science Center demonstrated that the aquaculture industry standard for determining ploidy (i.e., the Coulter Counter® method) classified 1,000 black carp as triploid but two of them were found to be diploid using flow cytometry. Follow-up sampling produced similar results and additional research is ongoing.

A small percentage of triploid fish produce functional sperm. However it is reported as highly unlikely that viable embryos would be produced (0.17% for grass carp). Extensive research has been conducted on triploid production of grass carp; that same level of research has not been conducted to validate that the grass carp methodology can be transferred to black carp.

Though they may not be able to reproduce, if introduced to natural waters, triploid fish can cause ecological impacts. Triploid black carp, which can live to be 15+ years old, can compete with native fish for food and locally prey on mollusks and fingerlings, including those that are considered threatened and endangered. Black carp are molluscivores (mussel and snail feeders) and have the potential to negatively affect mollusks, fish, turtles, and waterfowl that rely on mollusks as a food source, A single black carp could potentially eat 10-20,000 pounds of mollusks or other food sources during its life (assuming a 15 year life span). This estimate was based on a life span of black carp of at least 15 years and a study of zebra mussel consumption (3-4 pounds daily) by black carp, which we acknowledge may not be accurate for native species and could be an underestimate or an overestimate for black carp.

5) Public Involvement

The Service published a Notice/Review of Information in the Federal Register on June 2, 2000 as the first step in the rulemaking process (Volume 65, pages 35314-35315). The Service received 124 responses during the public comment period that closed August 1, 2000. A Proposed Rule to add black carp to the list of injurious fishes under the Lacey Act was published in the Federal Register on July 30, 2002 (Volume 67, pages 49280-49284). The Service received 82 comments on the Proposed Rule. In an effort to gather additional economic and ecological information, a notice was published in the Federal Register reopening

the public comment period on the proposed rule on June 4, 2003 (Volume 68, pages 33431-33432). The Service received 21 responses during the comment period that closed August 4, 2003. Availability of the draft environmental assessment, draft economic analysis and draft initial regulatory flexibility analysis were announced in the Federal Register (Volume 70, pages 51326-51327) on August 30, 2005 along with a reopening of the comment period on the proposed rule; the comment period closing date was extended to December 16, 2005 (Volume 70, pages 61933-61934). The Service received 89 comments. In total, the Service received 316 comments through the four public comment periods. Most of the comments supported the listing of diploid black carp. Many States and conservation organizations support listing diploid and triploid black carp. Aquaculture industry groups and fish production owners do not support listing triploid black carp, but most were amenable to listing diploid black carp. Attachment 1 includes a synopsis of the comments received on the draft environmental assessment.

6) Alternatives, Including the Proposed Action

Three alternatives are considered in this assessment: 1) no action, 2) listing as injurious all (both diploid and triploid) live black carp, gametes and eggs, and 3) listing as injurious only diploid live black carp, gametes and eggs. As a practical matter, none of the alternatives considered would reduce the risk of environmental impacts in states where black carp are already being used, but Alternatives 2 and 3 would prevent, the establishment of black carp in watersheds where they are not currently being used.

6.1.1) Alternative 1: No Action

The No Action Alternative refers to no action being taken to list live black carp as an injurious species under the Lacey Act, which would allow the continued importation and interstate transport of triploid and diploid black carp, gametes and eggs. Introductions of black carp into natural waters of the United States have occurred and are likely to occur again and the species could become established with or without reproduction in United States waters, threatening native freshwater mollusks, many of which are threatened or endangered under the Endangered Species Act, and potentially degrading habitat for native fishes. Reduced populations of mussels caused by black carp predation could result in reduced biodiversity of freshwater mollusks, degraded water quality, reduced recreational harvest of fish, and decreased mussel shell revenue.

If one black carp enters the rivers and tributaries, the estimated 10 year costs range from $209,636 to $279,515 discounted at 7 percent and range from $245,087 to $326,783 discounted at 3 percent. This estimate represents the freshwater mussel replacement costs and does not quantify ecological, commercial, recreational, and non-use values of freshwater mussels.

If no action is taken, the Service would continue deferring to the States to regulate live diploid and triploid black carp, gametes, and eggs within state boundaries. Many States are asking the Federal government to prohibit the importation and interstate transportation of this species. They are concerned that any use and transport of black carp might enable the fish to be introduced to new waterways through movement across state lines and into connected waterways.

6.1.2) Alternative 2: List as Injurious All (Diploid and Triploid) Black Carp (Proposed Action)

Under this Alternative, the Service would list diploid and triploid live black carp as injurious wildlife under the Lacey Act, which would prohibit importation, and interstate transport of live black carp, gametes or eggs, except by permit for zoological, educational, medical, or scientific purposes. An injurious wildlife listing would not prohibit intrastate transport or possession of black carp within States, where possession is permitted by the State.

Black carp are currently cultured for use in catfish, hybrid striped bass and some baitfish (fathead minnow, for example) fish farms in the United States to control snails that carry a parasite that infects the fish.

If all forms of black carp (diploid and triploid) are listed as injurious wildlife, the 10-year net revenue losses is estimated to range from $3.2 million to $25.8 million discounted at 3 percent or range from $2.7 million to $21.0 million discounted at 7 percent. The potential 10-year benefits per prevented black carp entering the rivers and tributaries are estimated to range from $209,636 to $279,515 discounted at 7 percent and range from $245,087 to $326,783 discounted at 3 percent. This estimate represents the potentially avoided freshwater mussel replacement costs and does not quantify ecological, commercial, recreational, and non-use values of freshwater mussels, and does not take into account values of endangered mussels at risk. The value of native mussels was estimated in 1998 to be $40-$50 million. Black carp may also impact the ability to restore imperiled mussels, snails and fishes and many states and the Service are funding such efforts at this time.

There is concern about the risk of more diploid black carp being utilized in states that currently have diploid black carp if this rule is promulgated and States continue to allow the use of black carp, each State must produce black carp, since shipment across State lines will be banned. States can allow black carp use, diploid or triploid, whether or not this rule is promulgated. Production of black carp for commercial purposes, are limited to facilities in Arkansas at this time, but other States currently possess diploid black carp and are capable of producing these fish. States regulate the fish allowed to be used in fish farming facilities within their State boundaries, however this directly relates to the Service's concern about the inability of fish farm facilities to prevent the escape of black carp from their ponds. The States may assess the risk of permitting the use of diploids in fish farming facilities within their State boundaries.

6.1.3) Alternative 3: List as Injurious only Diploid Black Carp

Under this Alternative, the Service would list only diploid live black carp as injurious wildlife under the Lacey Act, which would prohibit importation and interstate transport of live diploid black carp, gametes or eggs, except by permit for zoological, educational, medical, or scientific purposes. An injurious wildlife listing would not prohibit intrastate transport or any use of diploid black carp within States, where permitted by the State.

Black carp are currently cultured for use in catfish, hybrid striped bass and some baitfish (fathead minnow, for example) fish farms in the United States to control snails that carry a parasite that infects the fish.

If only diploid black carp are listed as injurious wildlife, the interstate transport of triploid black carp will continue and the aquaculture industry would continue to use triploid black carp to manage snail populations. The discounted 10-year costs to the catfish, hybrid striped bass and fathead minnow production industry would be minimal. However, farmers inadvertently shipping diploid black carp could face penalties for Lacey Act violations. The penalty for a Lacey Act violation is not more than six months in prison and not more than a $5,000 fine for an individual, and not more than a $10,000 fine for an organization. If just one black carp escapes, impacts are estimated to range from $209,636 to $326,783 over 10 years. These values do not account for the ecological, commercial, recreational, and non-use values of freshwater mussels, and do not take into account values of endangered mussels at risk. The value of native mussels was estimated in 1998 to be $40-$50 million. Black carp may also impact the ability to restore imperiled mussels, snails and fishes.

Alternative 3 would provide one advantage to those wishing to utilize triploid black carp over the Proposed Action (Alternative 2) and the No Action alternative. Listing only diploid black carp as injurious would mean that triploid black carp could still be imported into the United

States and transported across state lines for use by the aquaculture industry in states including Arkansas, Mississippi, North Carolina and Missouri.

However, implementation of Alternative 3 would result in some disadvantages compared to Alternative 2, the Proposed Action. The Service cannot require that all fish be tested for triploid versus diploid status and some States require certification, while others do not. Because there is no physical distinction between diploid and triploid fish, enforcement would be practically impossible.

While triploidy and sterility may impede breeding of black carp in the natural environment, non-breeding populations are still likely to have substantial negative impacts on native snail and mussel populations through predation. Triploid fish, which can live to be 15+ years old, can compete with native fish for food, and prey on threatened and endangered mollusks, and could have extensive negative impacts in local aquatic areas.

Implementing this alternative may result in an increased risk of escapement of either triploid or (to a lesser extent) diploid fish as compared to the proposed action because it would allow additional facilities in other states to transport black carp and thus increase the possibility of introduction. The risk of escape within the states where this species is already being used is not affected by this alternative.

6.2) Alternative Not Considered For Detailed Analysis:

6.2.1) Adding all Forms of Live and Dead Black Carp, Gametes, Eggs and Hybrids

This alternative was dismissed from further consideration because currently there are no known impacts to wildlife, wildlife resources, humans, agriculture, horticulture or forestry from dead black carp, so there is currently no need to prohibit dead black carp importation or interstate transport.

Preferred Alternative

Because triploid and diploid black carp have escaped or been released into natural waters; are likely to survive and/or become established; are likely to spread if introduced; are likely to compete with native species for food; are likely to feed on native mollusks; it will be difficult to prevent, eradicate, manage, or control the spread of black carp; it will be difficult to rehabilitate or recover ecosystems disturbed by the species; and because even non-breeding (triploid) populations of black carp are likely to have considerable negative impacts on native snail and mussel populations in areas where they are introduced, the Service's preferred alternative is to list all (diploid and triploid) live black carp as injurious under the Lacey Act (Alternative 2). Each of the three versions of the risk assessment conducted by the USGS concluded that the "Organisms Risk Potential" (ORP), which is calculated based on the probability and consequences of establishment, was high for black carp.

6.1 Summary Table of Alternative Actions

Actions	**Alternative 1:** No Action	**Alternative 2: Proposed Action** (List as Injurious All Black Carp)	**Alternative 3:** (List as Injurious only Diploid Black Carp)
Prohibit the importation of live black carp	No	Yes	Yes – Diploids No – Triploids
Prohibit the interstate transport of live black carp	No	Yes	Yes – Diploids No – Triploids
Reduced risk of escapement of diploid black carp into the wild	No	Yes. However, for states where the carp is already in use, risk will not be eliminated	Yes. However, for states where the carp is already in use, risk will not be eliminated
Reduced risk of escapement of triploid and diploid black carp into the wild	No	Yes. However, for states where the carp is already in use, risk will not be eliminated	No – Triploids Yes. However, for states where the carp is already in use, risk will not be eliminated --Diploids
Economic Impacts	Likelihood of reduction in mussel abundance, with unquantified associated loss of value in the mussel shell industry, and costs of mussel population recovery. Many other costs to natural resources, and the economies that they support.	The 10-year net revenue losses is estimated to range from $3.2 million to $25.8 million (3% discount) or from $2.7 million to $21.0 million (7% discount). Because black carp are used, locally, mollusks will likely still be impacted.	Likelihood of reduction in mussel abundance, with unquantified associated loss of value in the mussel shell industry, and costs of mussel population recovery. Many other costs to natural resources, and the economies that they support. Because black carp are used, mollusks may still be impacted. Loss of interstate movement of diploids resulting in impacts to black carp producers and other aquaculture facilities that purchase from those producers.

7) Affected Environment

The native range of black carp includes most of the major Pacific drainages of eastern Asia in the range of latitude from about 22 °N to about 51 °N. Where food is available, the black carp range (survival and/or reproduction) in the United States could include many of the large river systems, including the lower and upper Mississippi, Tennessee, Arkansas-White-Red, South Atlantic Gulf, California and the Great Lakes. Black carp inhabit lakes and lower reaches of rivers and require flowing water to establish self-sustaining populations, and mollusk populations on which to feed. Black carp could be transported via the bait industry and/or for aquaculture purposes from the Mississippi River Basin to the other major river basins in the United States; many of which are connected to other river systems through smaller tributaries.

Aquatic mollusks inhabit almost every conceivable freshwater habitat ranging from small ephemeral seeps and wetlands to the largest rivers at an equally wide range of temperatures (see Figure 1) and are primarily located in the Mississippi River Basin and eastward. Of the 35 families and more than 800 species of fishes known to occur in the fresh waters of the United States and Canada, a very small percentage is known to feed exclusively or primarily on mollusks. The diet of subadult and adult black carp consists primarily of mollusks.

Mussels were an important natural resource for Native Americans, who used them for food, tools, and jewelry. During the late 1800's and early 1900's, mussel shells supported an important commercial fishery; shells were used to manufacture pearl buttons until the advent of plastic buttons in the 1940's. Mussel shells are still used in the button industry, primarily in the southeastern United States. The mussel shells are used in the cultured pearl and jewelry industries, and the shell harvest provides employment to about 10,000 residents, primarily in the Mississippi River basin. The annual shell value to the mussel industry has been estimated at $40-$50 million.

There are over 600 species of freshwater snails widely distributed across the streams, rivers, and lakes of North America, which is about 15% of the world’s diversity of this taxonomic group. The greatest species richness is associated with flowing waters (streams and rivers). Freshwater snails are an important source of food for native wildlife and many species are used as water quality indicators. Freshwater snails can be found living at the bottoms of large lakes and rivers as well as small streams and ponds; some species have been recorded at depths of over 100 feet. Nearly ten percent of all freshwater snails are extinct and 25 freshwater snails (of the 37 freshwater, terrestrial and marine) are listed as threatened or endangered in the United States. This rate of imperilment exceeds every other major animal group in North America, even freshwater mussels. Like mussels, dam construction and other channel modifications, siltation, and industrial and agricultural pollution have all degraded the river habitats on which snails depend. Conservation and recovery efforts for freshwater snails include culture, water pollution control, and most importantly, habitat protection and restoration. Populations of mussels and snails occurring in many large river systems throughout the U.S. could be adversely affected if black carp become introduced or established in those natural water bodies.

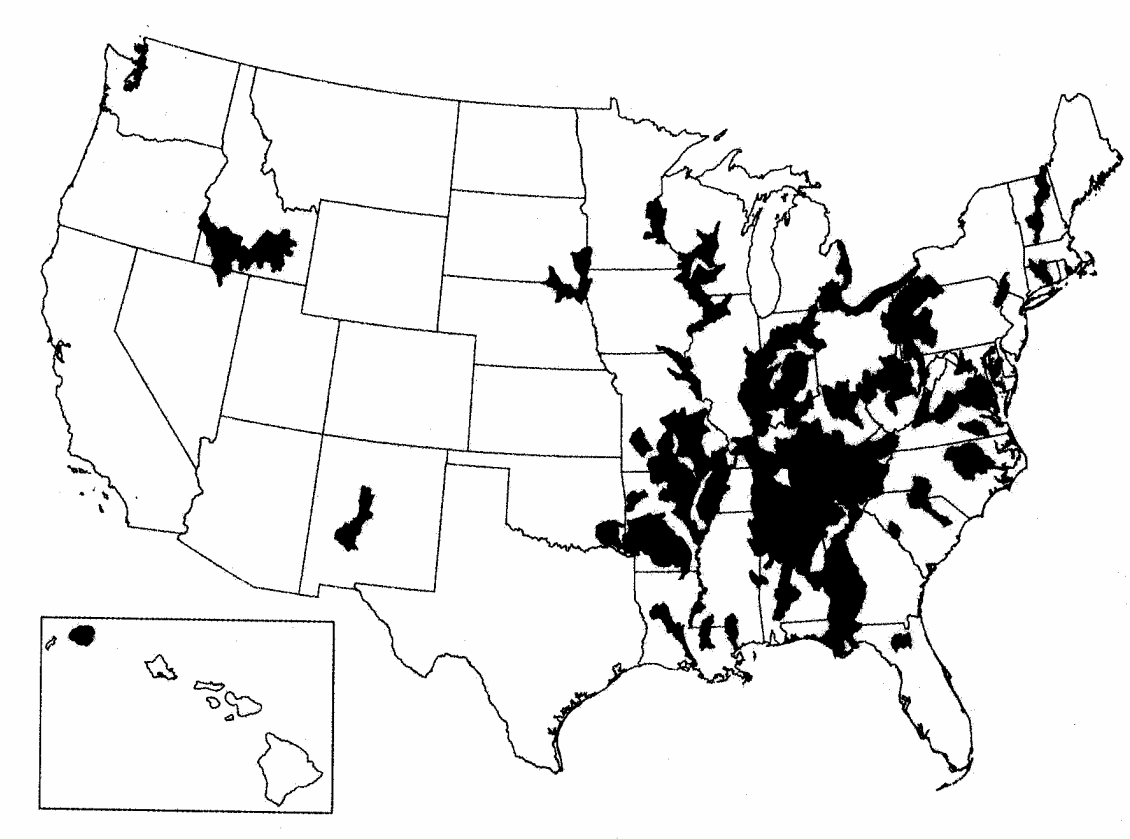

Figure 1. Watersheds of the United States with one or more endangered or threatened (Federal list) aquatic mollusks. Drainages shown at the Hydrologic Unit Code (HUC) 8 level. Coverage is based on a total of 54 freshwater mussels and 17 aquatic snails (Nature Serve, Arlington, VA). (Note: map does not include experimental populations (reintroductions) that are not protected as threatened or endangered species). From Nico et al 2005.

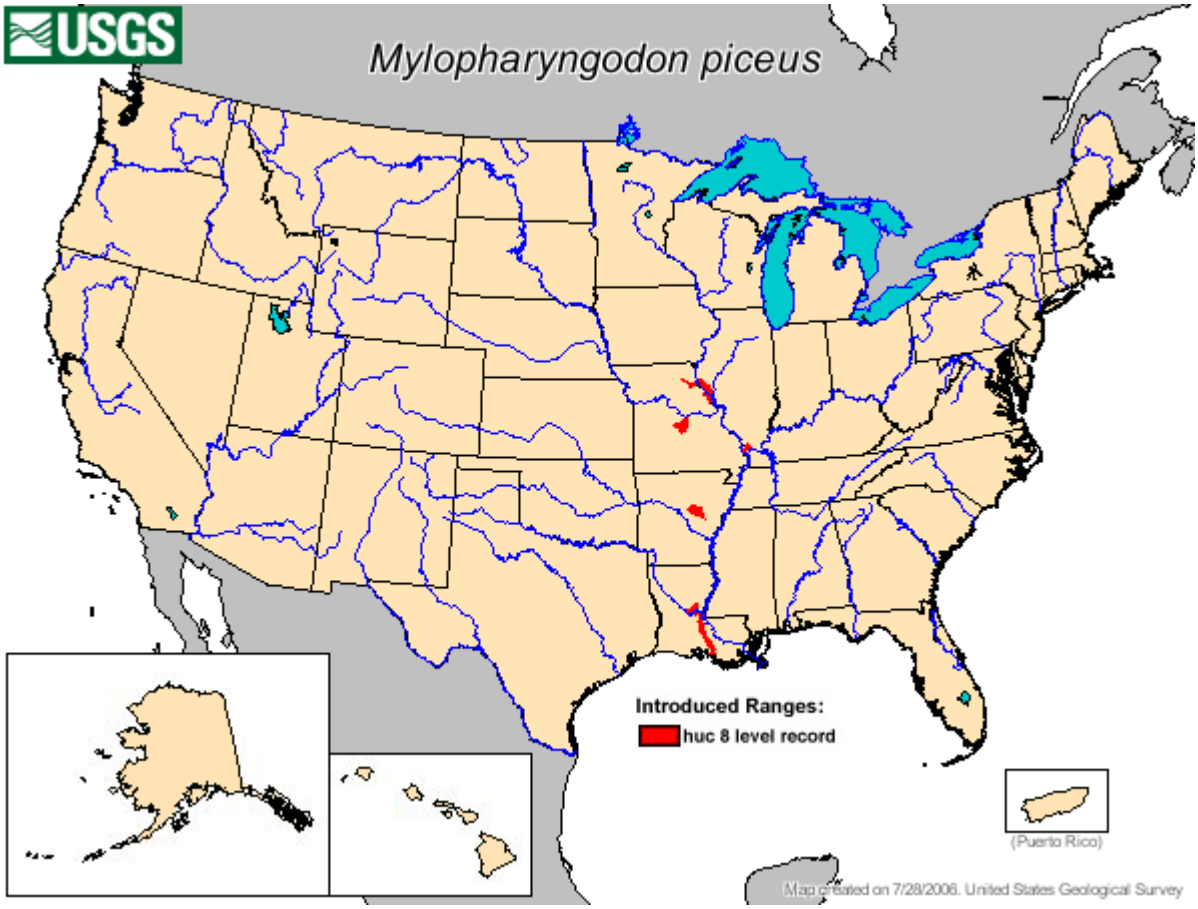

Figure 2. Locations where black carp have been reported captured from the wild. From USGS website.

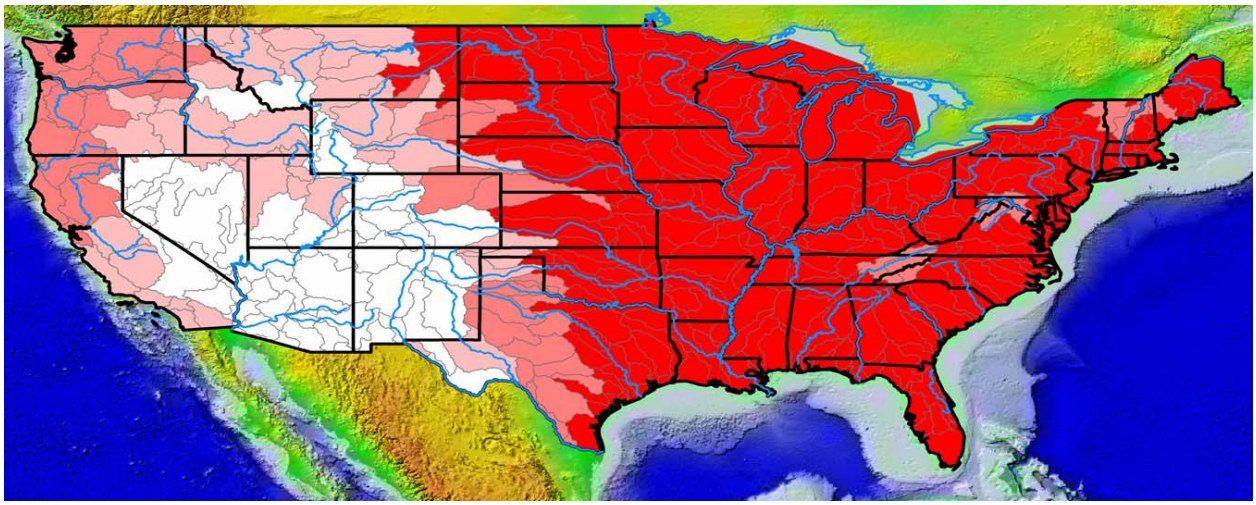

Figure 3. Potential range of black carp in the United States. Red = high potential to establish; Dark Pink = medium potential to establish; Light Pink = low potential to establish. From USGS Species Analyst Model.

8) Environmental Consequences

Alternative 1: No Action

Ecological Impacts

Not adding black carp to the list of injurious wildlife would allow for expansion of their use to states where they are not already found, thus increasing the risk of their introduction and establishment, which would likely threaten native habitats. Black carp are superficially very similar in appearance to grass carp, specifically in terms of body size and shape, position and size of fins, and position and size of the eyes. Juveniles, in particular, are difficult to distinguish from grass carp young. The 1996 biological synopsis and risk assessment for black carp expressed concern that if black carp become more common in United States aquaculture, there will be an increased risk that the species will be misidentified and unintentionally introduced as "grass carp" to some areas where grass carp are stocked. Black carp have become more commonly used and transported since that time. In addition, black carp have been accidentally included in bait fish shipments and distributed to bait stores for sale.

Established populations of black carp with or without reproduction will likely result in substantial reduction of mollusk abundance. Even a few black carp could impact mollusk populations in local areas, as they have been shown to be effective at eating nearly all of the mollusks where they have been stocked. Freshwater mollusks play an important ecological role in maintaining the health of aquatic ecosystems. Black carp could impact stream communities where snails play an important role as grazers of attached algae and mussels act as filters for phytoplankton. Reduction of snail and mussel populations in those ecosystems could facilitate production of algae mats that may upset the natural balance of wildlife habitats. These losses would affect the aesthetic, recreational, and economic values currently provided by native mollusks and healthy ecosystems. Educational values of mollusks would also be diminished through the loss of biodiversity and ecosystem health.

The ability to eradicate or control black carp populations depends on where they are found. If established in large lakes or river systems, eradication and/or control of any fish is likely impossible and black carp would likely become permanent members of the fish community. Additionally, controlling the spread of pathogens that black carp may carry, once they have been introduced in the wild, is practically impossible. There is little risk of any new pathogens being introduced by black carp already in the country, however new pathogens could be carried with new importations. No effective and feasible tools are currently available to manage black carp or other fish species, should they become introduced into river systems. Chemical piscicides are the best available option, but their use on a large scale is prohibitively expensive, can cause mortality to non-target fish and aquatic species, are generally not accepted by the public, and must be used repeatedly. In addition, not all life stages are equally susceptible to piscicides.

Impacts on Native Species

Failure to list black carp as injurious will increase the risk of introduction to states where the carp is not yet used, which may increase the risk of establishment of non-reproducing and reproducing populations in new watersheds. Mollusks are food for a variety of animals including fishes (redear sunfish, pumpkinseed sunfish, freshwater drum, snail bullhead, copper redhorse, river redhorse, robust redhorse and several catfish and sucker species), turtles (sawbacks and musk turtles), birds (snail kite, scaup and canvasback), and mammals (raccoons, otters and muskrats). Reduced mollusk abundance will result in reduced availability of food for these animals and thus provide decreased biodiversity.

Impacts to Threatened and Endangered Species

As molluscivores, black carp have the potential to negatively affect threatened and endangered mollusks, fish, turtles, and waterfowl that rely on mollusks as a food source. Locally, introduced black carp, whether diploid or triploid, could severely deplete mollusks populations and further imperil the 106 mussels and snails designated as threatened and endangered under the ESA. In addition, they could compete with native fish that serve as intermediate hosts for threatened and endangered mussel reproduction. Seventy species of the 297 mussels native to the United States are federally designated as endangered or threatened, and many other species have declined in abundance and distribution. Nearly ten percent of all freshwater snails are extinct and 25 freshwater snails are designated as threatened or endangered species under the ESA in the United States. This rate of imperilment exceeds every other major animal group in North America, even freshwater mussels, due to dam construction, other habitat alterations and pollution. Based on the food habits, habitat preferences and the longevity of the black carp, it could become established with or without reproduction in the habitat supporting most of the federally listed freshwater mussels and about one-third of the federally listed aquatic snails.

Impacts to Humans

If black carp are introduced locally or become established, there will likely be an increased cost for mollusk recovery, if biologically possible.

If one black carp enters U.S. rivers and tributaries, the estimated 10-year costs range from $209,636 to $279,515 discounted at 7 percent and range from $245,087 to $326,783 discounted at 3 percent. This estimate represents the freshwater mussel replacement costs and does not quantify ecological, commercial, recreational, and non-use values of freshwater mussels. If black carp cannot be removed from the aquatic system, then recovery efforts may be futile. There may be a decrease in the biodiversity of mussels and snails in the United States, which could have widespread ecosystem effects as well as reduced diversity for future generations. Predation on mussels by black carp could also financially impact the shell industry resulting in the loss of an undetermined amount.

Cumulative Impacts

Diploid and triploid black carp have been found in the wild (Illinois, Arkansas and Louisiana). Risk of accidental releases from aquaculture farms would continue in states currently using black carp and additional releases may occur from aquaculture farms in those states currently not using this method to control snails if facilities choose to use black carp. Black carp are, or have been in the recent past, maintained in research or production facilities in Arkansas, Louisiana, Mississippi, Missouri, North Carolina, Oklahoma and Texas. Many states either prohibit the possession of live black carp or require a permit for their import, possession and/or distribution including Alabama, Florida, Georgia, Illinois, Indiana, Iowa, Louisiana, Michigan, Minnesota, Nevada, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, Tennessee, Texas, Virginia and Wisconsin.

Since some states allow diploid use of black carp, a reproducing population could become established in United States waters, thereby imperiling recovery of native freshwater mollusks that are threatened or endangered and potentially degrading habitat for native fishes. Reduced populations of mussels caused by black carp predation could result in decreased biodiversity of freshwater mollusks, degraded water quality, reduced recreational harvest of fish, and decreased mussel shell revenue.

Changes in mollusk habitat through human-induced habitat destruction and competition with nonindigenous species has led to alterations in species composition, loss of diversity, and lowered abundance. Within the last 50 years mussels have been decimated by impoundments, sedimentation, channelization, dredging, water pollution, and, more recently, the nonindigenous

zebra mussel. Like mussels, dam construction and other channel modifications, siltation, and industrial and agricultural pollution have all degraded the river habitats on which snails depend. Conservation and recovery efforts for freshwater snails include culture, water pollution control, and most importantly, habitat protection and restoration.

Numerous anthropogenic changes, many of which have been ongoing for more than a century, have combined to make freshwater mollusks the most endangered group of aquatic organisms in the United States. In North America, it is estimated that 43% of the 297 species of freshwater mussels are in danger of extinction and the States of Minnesota, Wisconsin, Iowa, Missouri, Illinois, Indiana, and Ohio list more than half of their 78 known mussel species as endangered, threatened, or requiring special concern. To date, freshwater mollusks in the United States have not experienced introduction of a nonindigenous invasive species in the form of a direct predator. Presence of diploid or triploid black carp could pose a serious threat to many of the remaining populations of endangered and threatened mollusks.

As the prevalence of the yellow grub and *Bolbophorus damnificus* increased in fish culture ponds in the late 1990's, black carp use increased to control these trematode parasites. There are aquaculture facilities in states that do not currently use black carp, but the level of trematode infestation at these facilities is unknown. If an infestation would occur in the future, these facilities may import black carp under the no action alternative or have fish shipped from one of the states that possess black carp. The risk of floods in states where black carp are utilized and may be utilized in the future will continue to exist, as does the potential for introduction through transport accidents or misidentification.

Since effective measures to control or eradicate wild black carp populations are not available, the ability to rehabilitate or recover ecosystems disturbed by the species is low. Considerable risks associated with black carp establishment in the wild relate to endangerment and extinction of native mussels and snails. Re-establishment of extirpated mussel and snail populations, if biologically possible, would be labor and cost intensive and would depend on eradication of black carp within the habitat of the mussels and snails.

The Service continues to work with multiple partners to promote mollusk refugia and recovery, life history research, propagation, reintroduction, damage assessments and contaminant investigations, and habitat restoration as it has done for several decades.

If no action is taken to prohibit the importation and transportation of black carp, the introduction of black carp to the natural waters of the United States will likely add to the cumulative impacts that have already adversely affected native, freshwater mollusks.

Alternative 2: List as Injurious All (Diploid and Triploid) Black Carp (Proposed Action)

Ecological Impacts

Listing diploid and triploid black carp as injurious will help protect biota in large river systems and tributaries. No negative impacts to habitats will result from listing diploid and triploid black carp. Black carp have the potential to negatively affect threatened and endangered mollusk biodiversity, distribution and abundance. Fish, turtles and waterfowl that rely on mollusks as a food source may also be impacted by black carp in natural waters. This alternative would not eliminate the risk to the environment in those states where the carp is already being used.

Under this alternative, there could be increased production and use of diploid black carp within states that can no longer obtain triploids from another state. Increased use of diploid black carp in aquaculture ponds would increase the risk of introduction and establishment of black carp in natural waters, particularly via flooding events. While the Department of the Interior only regulates importation and interstate transport of injurious wildlife under the Lacey Act, listing all forms of black carp as injurious could increase the risk of diploid black carp becoming established in the United States during a flooding event, which could have greater

ecological impacts. However, the states regulate the possession and use of fish within state boundaries; if a state allows the use of diploid black carp, regardless of the injurious listing status, this risk level would not be altered by any listing action.

Impacts on Native Species

Prohibiting the importation and interstate transportation of diploid and triploid black carp will help protect native fishes, turtles, birds and mammals, for which mollusks are food, in large river systems and their tributaries. Only positive impacts to native species will result from listing diploid and triploid black carp. None of the alternatives will eliminate the environmental risks in those states where black carp are currently used; alternative 2, by prohibiting the importation and interstate transportation of all forms, will do the most to protect native species from negative impacts due to black carp introduction.

Impacts to Threatened and Endangered Species

Prohibiting the importation and interstate transportation of diploid and triploid black carp will help protect native threatened and endangered mollusk populations. Only positive impacts to native species will result from listing diploid and triploid black carp. None of the alternatives will eliminate the environmental risks in those states where black carp are currently used; by prohibiting the importation and interstate transportation of all forms, alternative 2 will do the most to protect freshwater mollusks from black carp predation.

As described above, listing all forms of black carp as injurious could increase the risk of impacts to threatened and endangered species, if more states allow the use of diploid black carp. There is no change to the level of risk by any listing action, if additional states do not allow diploids.

Impacts to Humans

Under this alternative, aquaculture farms would need an in-state source of black carp if they have a trematode infestation in the future. In the last six years, no new facilities for triploid black carp production have been established. If there is no in-state source of black carp, and if native fish alternatives are not as effective as black carp, there would be increased costs to aquaculture farms for chemical and manual control of snails in their ponds. If all forms of black carp (diploid and triploid) are listed as injurious wildlife, the 10-year net revenue losses is estimated to range from $3.2 million to $25.8 million discounted at 3 percent or range from $2.7 million to $21.0 million discounted at 7 percent.

Listing both triploids and diploids may increase the use of diploids in states, primarily the Southeast, where triploids are unavailable, which would have farther reaching, negative impacts to shell industry and mussel recovery efforts if diploids are introduced into the natural environment. Mississippi and Missouri have indicated they may allow the use of diploid black carp if triploids are not available. However, one Mississippi hatchery maintains a diploid population of about 20 black carp and this hatchery could potentially produce triploid black carp to use instead of diploids. Missouri is planning to phase out the use and possession of black carp by July 1, 2009 and the Missouri Department of Conservation currently possesses diploid black carp broodstock, so they could potentially produce triploid black carp to use instead of diploids. Louisiana prohibits live black carp. Black carp are prohibited in Alabama and Tennessee. North Carolina has imported triploid black carp twice in the last 5-7 years.

The potential 10-year benefits per prevented black carp entering the rivers and tributaries are estimated to range from $209,636 to $279,515 discounted at 7 percent and range from $245,087 to $326,783 discounted at 3 percent. This estimate represents the potentially avoided freshwater mussel replacement costs and does not quantify ecological, commercial, recreational, and non-use values of freshwater mussels, and does not take into account values of endangered mussels at risk.

Cumulative Impacts

Listing all forms of live black carp (diploid and triploid) as an injurious species will protect the natural resources in areas where black carp are not yet used or have not been introduced to waters of the United States. This alternative would reduce the potential for black carp to be released into additional waterbodies where they are not yet found, through baitfish movement and other pathways. The middle and southeastern United States, where many aquaculture ponds that utilize black carp are located, is important habitat for mollusks designated as threatened or endangered under the ESA. Releases or escapes of black carp into natural waters have occurred and are likely to occur again without any action taken to prohibit their importation and interstate transport.

Alternative 3: List as Injurious only Diploid Black Carp

Ecological Impacts

Listing diploid black carp as injurious will help protect biota in large river systems and tributaries, but these systems will still likely be at risk from triploid introductions. Fish believed to be "triploids" may actually be diploids and could potentially reproduce in natural waters in the United States, if they are introduced to the environment. While triploidy may impede breeding of black carp in the natural environment, non-breeding populations are still likely to have extensive negative impacts on native snail and mussel populations through predation. This alternative would not eliminate the risk to the environment in those states where the carp is already being used.

Only listing diploid black carp as injurious will result in the continued risk of escapement and/or release of triploids in states where they are being used as well as in states where they are not currently being used through interstate transportation. Interstate transport of triploids may still occur with the potential for accidental release even in states that do not permit their use (i.e. highway accident or misidentification).

Impacts on Native Species

Prohibiting the importation and interstate transportation of diploid black carp will help protect native fishes, turtles, birds and mammals, for which mollusks are food, in large river systems and their tributaries. Only positive impacts to native species will result from listing diploid black carp. However, listing only diploid black carp as injurious will not decrease the risk of escapement of triploid fish; the risk of escapement of triploid fish will continue at its current level. Additionally, because interstate transportation of triploid fish would not be prohibited, the risk of expansion into other states where the fish is not yet used will not be reduced.

Impacts to Threatened and Endangered Species

Prohibiting the importation and interstate transportation of diploid black carp will help protect native threatened and endangered mollusk populations. Only positive impacts to native species will result from listing diploid black carp.

However, triploid black carp, if they continue to be introduced to natural waters, are likely to consume threatened and endangered mollusks. Nearly ten percent of all freshwater snails are extinct and 25 snails are listed as threatened or endangered in the United States. This rate of imperilment exceeds every other major animal group in North America, even freshwater mussels.

Impacts to Humans

Under this alternative, fish farms would still be able to transport triploids, if their state allows. The discounted 10-year costs to the catfish, hybrid striped bass and fathead minnow

production industry would be minimal. However, farmers inadvertently shipping diploid black carp could face penalties for Lacey Act violations. The penalty for a Lacey Act violation is not more than six months in prison and not more than a $5,000 fine for an individual, and not more than a $10,000 fine for an organization. There would likely be impacts to the mussel shell industry from triploid black carp that have been introduced into the environment. If just one black carp escapes, impacts are estimated to range from $209,636 to $326,783 over 10 years. These values do not account for the ecological, commercial, recreational, and non-use values of freshwater mussels, and do not take into account values of endangered mussels at risk.

Cumulative Impacts

Listing only diploid black carp as injurious would allow the continued importation and interstate transport of live triploid black carp (but not gametes or eggs), so biota in large river systems and tributaries will still likely be at risk from triploid introductions, although those states where the carp are currently being used already face this risk.

While triploidy and sterility may impede breeding of black carp in the natural environment, non-breeding triploid black carp are still likely to have extensive negative impacts locally on native snail and mussel populations through predation and would likely compete with native fish for food. Black carp have a gape width much larger than most native mollusk-eating fish. Reduced populations of mussels caused by black carp predation could result in reduced biodiversity of freshwater mollusks, degraded water quality, reduced recreational harvest of fish, and decreased mussel shell revenue. Numerous species of mussels and snails are listed as threatened or endangered and many others are experiencing declines due to habitat loss and degradation. This is likely to continue based on current development and land use trends.

Only listing diploid black carp as injurious may result in the continued risk of introduction of triploids into states where they are not currently being used. Interstate transport of triploids may still occur with the potential for accidental introduction even in states that do not permit their use (for example, the discovery of black carp in Illinois, which does not allow black carp).

No effective and feasible tools are currently available to manage triploid black carp, should they become introduced into river systems. Chemical piscicides are the best available option, but their uses on a large scale is prohibitively expensive, causes mortality to non-target fish and aquatic species, are generally not accepted by the public, and must be used repeatedly.

Since effective measures to control or eradicate triploid black carp populations are not available, the ability to rehabilitate or recover ecosystems disturbed by the species, assuming a 15 year life span for the fish, is low. Because triploid black carp are capable of living 15+ years and would eat a substantial amount of mollusks before they die of old age, mussels and snails face considerable risk of further endangerment and extinction if black carp are released or escape into the wild. Entire beds of mussels may be very vulnerable to heavy predation by black carp.

Re-establishment of extirpated mussel and snail populations, if biologically possible, would be labor and cost intensive and would depend on eradication of triploid black carp within the habitat of the mussels and snails.

If no action is taken to prohibit the importation and transportation of triploid black carp, the risk of introduction of triploid black carp to the natural waters of the United States, outside of the states where they are already used, will likely add to the impacts that have already affected native, freshwater mollusks as discussed under Alternative 1.

9) Summary Table of Environmental Consequences by Alternative

Impacts	**Alternative 1:** No Action	**Alternative 2:** *Proposed Action* (List as Injurious All Black Carp)	**Alternative 3:** (List as Injurious only Diploid Black Carp)
Introduction of live diploid black carp	Has occurred and will likely continue to occur	Greatly reduced risk (Note: Some States may continue to allow possession and use of black carp) Some states that currently do not have black carp may decide to allow use. There may be reduced risk in States where they are already found	Greatly reduced risk (Note: Some States may continue to allow possession and use of black carp). There may be reduced risk in States where they are already found
Introduction of live triploid black carp	Has occurred and will likely continue to occur	Greatly reduced risk in states other than those states where they are already found. There may be reduced risk in States where they are already found	No reduced risk.
Establishment of populations of black carp	Likely	Greatly reduced risk in states other than those states where they are already found. There may be reduced risk in States where they are already found	Somewhat reduced risk (less than alternative 2) in states other than states where they are already found. There may be reduced risk in States where they are already found
Ecological impacts	Likely (for example, degradation in water quality due to reduction in mussel abundance)	Greatly reduced risk in states other than those states where they are already found. There may be reduced risk in States where they are already found	Somewhat reduced risk in states (somewhat less than alternative 2) other than states where they are already found. There may be reduced risk in States where they are already found
Impacts to native species	Likely	Greatly reduced risk in states other than those states where they are already found. There may be reduced risk in States where they are already found	Somewhat reduced risk in states (less than alternative 2) other than states where they are already found. There may be reduced risk in States where they are already found
Impacts to Threatened and Endangered Mollusks	Likely reductions in some of the 106 listed mollusks	Greatly reduced risk of population reduction of the 106 listed mollusks in states other than those where they are	Somewhat reduced risk to some of the 106 listed mollusks (less than alternative 2).

		already found. There may be reduced risk in States where they are already found	
Impacts to Humans	Likely increased cost for mollusk recovery. Likely financial impacts to the shell industry	Likely impacts to aquaculture facilities with trematode infestations with no in-state source of black carp. If diploids introduced to waters, likely negative impacts to shell industry and mussel recovery efforts.	Likely impacts to mussel shell industry from any introduced triploid black carp.
Cumulative impacts	Risk of additional impacts to threatened and endangered mollusks	Greatly reduced risk of additional impacts to threatened and endangered mollusks in states other than those where black carp are already found. There may be reduced risk in States where they are already found	Somewhat reduced risk (less than alternative 2) of additional impacts to threatened and endangered mollusks

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Attachment 1: Comments and Responses on the Draft Environmental Assessment for the Black Carp Proposed Rule

The Service is deeply concerned about comments suggesting that diploid black carp may be unintentionally or intentionally released in reaction to any decision to list both diploid and triploid black carp, because such actions would result in greater impacts to native mollusks. The intent of a Lacey Act listing is to prevent or stop spread through interstate movement and importation. Possession and movement within States will not be affected. The Service realizes that intentional release, as indicated in the comments we received, is a personal choice, and we sincerely hope that those releases do not occur as a result of our final determination on this issue.

Issue: One commenter stated that the draft environmental assessment doesn't say whether we considered any additional alternatives; if we have "rejected" alternatives, the letter states it would be a helpful insight as to why we only considered three alternatives.
Response: The Secretary of the Interior can either list a species as injurious wildlife or not list a species under the Lacey Act. However, in the final assessment we have included two additional alternatives that are really sub-elements of the alternatives that were already analyzed. The actions available to us were 1) no action (a decision not to list); 2) list all forms of black carp; or 3) list only diploid black carp.

Issue: One commenter stated that there is increased risk of black carp escapes from recent hurricanes that caused great flooding throughout Gulf Coast and the Southeastern United States and at least two known fish farms using black carp are located in the affected region (Cahoma County, Mississippi and St. Martin Parish, Louisiana). The commenter stated that we must assess the impacts Hurricanes Katrina and Rita had on aquaculture facilities in order to evaluate future risks in the region before we issue final environmental assessment.
Response: While we hope that no black carp escaped during the Hurricane events, the accidental escape of black carp during such events does not affect the regulation of interstate transport or importation of black carp, which is our authority under the Lacey Act. The States may assess the risk of flooding at aquaculture facilities during their permitting processes.

Issue: One commenter stated that listing diploid and triploid carp may have unanticipated but reasonably foreseeable impacts on native species (freshwater fish and mollusks) and we should discuss and assess this impact and possible ways to mitigate it. They noted that there would likely be an increased production of diploid black carp within states that can no longer get triploids from another state, thus an increased risk of release or escape into the wild.
Response: The Service acknowledges that the risk of more diploids being utilized exists. Given our authorities under the Lacey Act, limiting range expansion through human movement is our best alternative. The States may assess the risk of permitting the use of diploids in fish farming facilities within their State boundaries.

Issue: One commenter stated that under the third alternative, diploids would be prohibited from importation and interstate transport, but the use of diploids as brood stock to produce triploids would not be prohibited and this could have significant environmental impacts. As demand for triploids increases, more diploids would have to be farmed to produce triploids and diploids, if triploids were not available to be stocked, and the risk of diploids escaping would increase. Thus listing only diploid black carp as injurious could pose the same risk to native mollusks and fish as not listing black carp at all.

Response: The Service acknowledges that this risk exists. Given our authorities under the Lacey Act, limiting range expansion through human movement is our best alternative. The States regulate the fish allowed to be used in fish farming facilities within their State boundaries.

Issue: One commenter stated that if Mississippi catfish farmers cannot purchase sterile triploid black carp from the only source of these fish, which is in Arkansas, the Service runs the risk of encouraging the use of diploid black carp, which currently are illegal, by Mississippi catfish farmers that have already secured black carp broodfish in anticipation of an injurious listing. The commenter believes that this potential risk is significant enough that the Service should prepare an Environmental Impact Statement.
Response: While we are concerned about the numerous statements that have been made indicating that as a result of our rulemaking increased use of diploid black carp would result in additional, possibly significant, introduction of black carp into the wild, the Service has determined that black carp are injurious. The States are responsible for allowing or prohibiting black carp use, within their boundaries and connected waterbodies, regardless of Federal regulation.

Issue: One commenter noted that some may argue that triploids may aid in controlling zebra mussels and should remain unlisted for these purposes and that the Service should address this issue before it takes the proposed action.
Response: Threats to native species are too great for black carp to be a viable method to control zebra mussels. In addition, there is no evidence that black carp would exclusively feed on zebra mussels and there's been little to no research interest in pursuing this due to the potential for negative impacts to native mollusks.

Issue: One commenter noted that the cumulative impacts for first and third alternatives are thorough, but cumulative impacts analysis for preferred alternative fails to recognize beneficial economic impacts that will result from the proposed action and that we may want to discuss these impacts. The commenter stated that the mussel industry stands to benefit from proposed action and the environmental assessment should discuss economic benefits in its cumulative impacts analysis.
Response: We acknowledge that a discussion of impacts to humans should be included for all of the alternatives and have included them in the final environmental assessment. In addition, there are two cost/benefit analysis documents as part of this rulemaking evaluation.

Issue: One commenter stated that the draft environmental assessment is inadequate. The environmental consequences of the proposed rule seem to be based on one assumption that failure to list as injurious will result in more states using black carp, thus increasing the risks of environmental damage and that this assumption is not supported by the facts. Black carp have been used in aquaculture for several years, giving states and producers sufficient opportunity for use.
Response: Based on comments we have received, the use of black carp as a biological control method has increased since the late 1990's due to trematode introduction and spread. Black carp will be moved among and across permitted States as infestations recur or increase. In addition, several industry comments state that the need for black carp is increasing as the trematode spreads. Therefore, the Service believes that the current range of black carp and black carp use will increase without this action.

Issue: One commenter emphasized that the draft environmental assessment states that the risk of not promulgating a rule is the intentional release of black carp into the wild and that no amount of regulation will deter someone from intentionally introducing black carp into the wild.

Response: The Service agrees with this comment and has amended the final environmental assessment accordingly.

Issue: One commenter stated that he disagrees with the draft environmental assessment that it would not be economically feasible to test every fish. He stated that this is what is done with grass carp and used to be done with black carp and the process was 95% accurate at that time and the same process could be used again.
Response: While producers reportedly test every fish for ploidy status, the Service protocol for certifying triploid grass carp is to test a subsample (120 of 1500 or more fish) of the overall shipment, not to test every fish. In addition, there was voluntary participation by fish farmers in the triploid black carp certification; not every farm participated and bought the more expensive triploids. The Service has not been provided documentation by each State with the use of black carp showing that the State requires testing and certification of every black carp as triploid. The Service does not condone the use of a species which is being evaluated as potentially injurious and does not intend to re-initiate black carp triploid certifications.

Issue: Several commenters stated that the statement that "not all fish are tested for triploid versus diploid status" is not true. They stated that the industry standard is to test all fish individually, that farms test all individual fish and that the Service inspects only a sample of each lot, except in the case of a certain state that requests that all fish be tested to verify triploidy.
Response: The Service is pleased that all farms producing triploid black carp test each fish for ploidy status, though no documentation to this effect was provided by every farm that holds diploid black carp. Additionally, not all states require the verification of ploidy in fish that are shipped.

Issue: One commenter noted that there is no evidence for the statement that diploids will likely be found in otherwise triploid lots of fish and that the lack of reproducing populations of triploid grass carp in states where only triploid grass carp have been stocked is strong evidence to the contrary.
Response: The process of testing ploidy status for grass carp is not 100% certain, as not every fish is verified triploid during the certification process. While we acknowledge that this is not common place, diploids have been found in producer verified "triploid" lots. We extrapolate that if this occurs with the grass carp triploidy program, then it is likely to occur when producing triploid black carp. Research by the U.S. Geological Survey has found diploids in lots presumed to contain only triploids (2 diploids in a lot of 1000). This was retested and similar results were found. Even though this rate is low, risks could be high when thousands of triploid black carp are produced and used. Additionally, the triploid process for grass carp has been researched, tested and published in peer-reviewed literature. The same level of research has not been conducted on black carp.

Issue: One commenter stated that distinguishing risk levels between diploids and triploids is important and that the draft environmental assessment does not consider a number of studies in peer reviewed scientific journals related to grass carp ploidy and distribution, but instead relies on a single fact sheet related to the sterility of triploid black carp. The commenter cites the 1996 black carp risk assessment statements that it is unlikely that a breeding population of black carp would become established or that triploids would revert to their diploid state.
Response: The Service recognizes that research into triploidy on black carp is limited. The peer reviewed studies that have been conducted for grass carp have not been done on black carp. We also recognize that grass carp and black carp are similar animals, but we cannot assume the applicability of the studies for black carp. In addition, where mollusks are available, black carp will feed almost exclusively on them, whether they are diploid or triploid fish. Partially

due to the increased use of black carp in the United States, the updated 2005 biological synopsis and risk assessment states that even non-reproducing (triploid) fish would be expected to persist as much as a decade or more and could locally decimate mollusk populations.

Issue: One commenter stated that the draft environmental assessment has misleading statements about triploid grass carp males producing sperm and triploid, immature grass carp females producing ova that appeared to be maturing and suggests the Service use language provided to the Asian Carp Working Group and from the 1996 black carp risk assessment.
Response: The final environmental assessment includes additional information on the induction of triploid fish and their potential ability to produce sperm.

Issue: One commenter stated that Bayluscide® cannot be used in ponds with fish. Of the fish species mentioned for potential alternative snail control (pumpkinseed sunfish, freshwater drum, copper redhorse, river redhorse, robust redhorse) only freshwater drum have been evaluated and show little promise for effective control. Redear sunfish and blue catfish have not performed well and redear sunfish have been reported to prey on juvenile fish and would not be effective in ponds stocked with fry. Redear reproduction in commercial ponds would become problematic.
Response: The Service understands that Bayluscide® cannot be used to treat ponds with fish in them; however some ponds could be cleared and treated with Bayluscide® on a more frequent basis. We acknowledge that, by themselves, black carp may be more cost effective than any other single control method. Research has shown that copper sulfate and hydrated lime are 90%+ effective in controlling snails in ponds. In addition, several native fish species or their hybrids are still being evaluated as alternatives to black carp, and some have been shown to be moderately effective at controlling snails, although not as effective as black carp alone. Researchers have noted that a combination of biological and chemical control may be most effective as there are instances (high vegetation, for example) where black carp cannot completely control snails.

Issue: One commenter stated that there are limits on effectiveness of chemicals due to water chemistry and toxicity of copper and hydrated lime in low alkalinity waters. The commenter stated that clearing plants (to control snails) is not an economically feasible activity on vast majority of operations. Statement about Bayluscide® doesn't state that it cannot be used in ponds when live fish are present because it will kill fish and it's not economically feasible to drain catfish ponds on frequent basis (usually a 7-15 yr drain cycle).
Response: We acknowledge that black carp may be more effective than any other single method for snail control. Some research shows that a combination of biological, chemical and/or mechanical pulling of vegetation may be most effective. It's not economically feasible to control black carp in the wild. See above for response on Bayluscide® comment.

Issue: Several commenters expressed disagreement with the statement that a single black carp could eat more than 20,000 pounds of mollusks or other food sources during its life and asked for this assumption to be documented and justified.
Response: This estimate was based on a life span of black carp of at least 15 years and a study of zebra mussel consumption by black carp, which we acknowledge may not be accurate for native species. The Service's responsibility is to protect trust resources and research indicates that prohibiting the importation and interstate transport of black carp is the best tool available to us to prevent their potential impacts on native species.

Issue: One commenter stated that no documentation was presented to support the statement that "the ability and effectiveness of measures to prevent escape or establishment of black carp

are believed to be low" and that the majority of aquaculture facilities are constructed in such a way as to prevent escapes.
Response: Substantiation of the ability of facilities to prevent escape of black carp has not been presented in spite of repeated opportunities. The presence of diploid and triploid black carp in the wild demonstrates that fish are escaping or being released into the environment. The commenter's statement that the "majority" of aquaculture facilities are constructed in such a way as to prevent escapes illustrates that not all facilities are required to be constructed or located to prevent escape.

Issue: Several commenters stated that the Service has no basis for recommending a much more expensive alternative of using flow cytometry instead of Coulter Counters® technology and does not present data to show improvements over use of Coulter Counters®. In addition, flow cytometry testing would dramatically increase cost of confirming triploidy; commenter states that the Service protocol for certifying triploid grass carp allows use of Coulter Counter®.
Response: There is substantial literature showing that flow cytometry is one of the most accurate methods for testing ploidy status, behind karyotyping. Particle size analyzers, such as the Coulter Counter® with channelyzer, are much faster at analyzing samples and are highly effective when used correctly, but they are potentially not as accurate as flow cytometry. Since black carp would eat a substantial amount of mollusks before they die of old age, the Service would like to have a higher confidence level in the testing of ploidy status. To our knowledge, a study of the effectiveness on testing ploidy for black carp utilizing the Coulter Counter® has not been published in the scientific literature; assumptions from production of grass carp have been applied. The Service protocol for testing grass carp utilizes the fish farms equipment, usually a Coulter Counter® with channelyzer (i.e. the Service does not bring equipment to the facility to test the fish).

Issue: One commenter stated that there is currently no interstate movement of diploid black carp and listing diploids would have no negative effect on the aquaculture industry. Listing both would have serious effects.
Response: The Service appreciates all comments and evidence we receive and takes all comments into consideration.

Issue: One commenter stated that it is likely that black carp will be able to form self-reproducing populations in not just the Mississippi River Basin, but also in the Missouri and other major U.S. rivers.
Response: The Service agrees and has amended the final environmental assessment to reflect a more accurate picture of the potential range of black carp in the United States.

Issue: One commenter stated that black carp may carry a parasitic form of the Asian mussel (*Anodonta woodiana*) and if this enters United States it may further threaten already imperiled native mussels.
Response: The Service understands that hosts for this mussel include grass, common, bighead, and silver carp, Nile tilapia, and mosquitofish. The Service is not aware that black carp have been shown to be hosts to this mussel, but the comment is noted.

Issue: One commenter stated that biologically exotic fish species that have become established here or internationally have not caused the extinction or extirpation of prey species unless the exotic fish has been a gamefish regularly stocked through public or private efforts. To imply such an outcome or to estimate prey consumption for individual fish is erroneous and without basis in biological fact.

Response: The Service's responsibility is to conserve and protect trust resources and conclusions reached from our black carp evaluation show that this species will injure two of our Nation's most imperiled species: snails and mussels. Scientific studies have shown that the black carp are highly specialized molluscivores and can eat considerable amounts of mollusks.

Issue: One commenter stated that there is no scientific evidence to support statements regarding potential degraded water quality and reduced recreational harvest of fish if black carp reduce mussel populations, that black carp may negatively affect the cultured pearl industry, or that black carp may carry pathogens. The commenter also stated that if zebra mussels are present to filter water in the absence of native mussel populations, then water quality may change very little. The commenter also stated that the pearl industry has several alternatives for raw material for pearl nuclei and that black carp have been in U.S. for over 25 years and no new pathogens have been attributed to them.
Response: The potential risks of harm to native mollusks and their habitats have been presented in peer-reviewed scientific research. There are potential negative impacts to other species such as fish, turtles and nutrient cycles if algae mats develop in the absence of filter-feeding mollusks. Black carp would likely impact stream communities where snails play an important role as grazers of attached algae and mussels act as filters for phytoplankton. Reduction of snail and mussel populations in those ecosystems would likely facilitate production of algae mats that may upset the natural balance of wildlife habitats.
The Service needs confirmation from the cultured pearl industry regarding other alternatives for raw shell material. While no new pathogen introductions are known to be attributed to black carp, Spring Viremia of Carp Virus was recently discovered in the United States from other carps; if infected, black carp introduced to the wild could spread this virus.

Issue: One commenter stated that in the background section, the statement regarding the escape of black carp in 1994 has no reference or validation and there are conflicting reports over this incident. Commenter suggested contacting the fish farmer to validate this statement.
Response: Based on comments we received from the affected fish farmer, the Service recognizes that this report is disputed and has changed the final environmental assessment to reflect this.

Issue: One commenter asked us to verify the trematode name as they believe it is *Bolbophorus damnificus*.
Response: The Service agrees that the trematode that infects catfish and fathead minnows is *Bolbophorus damnificus*, not the previously, widely reported *B. confusus*, and has reflected this in the final environmental assessment. However, there is a second *Bolbophorus* "type 2" species that has also been found in fathead minnows and perhaps hybrid striped bass.

Issue: One commenter stated that there is no evidence that any of the native fish mentioned in the draft environmental assessment can be used successfully for snail control.
Response: We acknowledge that black carp may be more effective than any other single method for snail control. However, several fish species have been shown to consume snails, though not as effectively as black carp, including redear sunfish and hybrid redear sunfish. As previously mentioned, the Service believes that a combination of biological and chemical methods may be more effective at snail control than any one solution. Copper sulfate and hydrated lime have been shown to be more than 90% effective in killing snail populations.

Issue: One commenter noted that the statement that "established populations of black carp will likely result in substantial reduction of mollusk abundance" is speculation.

Response: The potential risk of harm to native mollusks and their habitats has been presented in peer-reviewed scientific research. The potential for black carp predation and extensive control of mollusks in aquatic systems exists, as evidenced by the control provided to fish farms by black carp.

Issue: One commenter noted that the statement that "educational values of mollusks would also be diminished through the loss of biodiversity and ecosystem health" has no explanation.
Response: The Service is charged with protecting trust resources, both for their extrinsic and intrinsic value. There are numerous studies to show that the public values the presence of species, whether or not they are able to actually directly benefit from the species.

Issue: One commenter stated that there is no indication of whose belief the statement that "the ability and effectiveness of measures to prevent escape or establishment of black carp are believed to be low" is or what evidence there is for this statement.
Response: The Lacey Act directs the Service to prohibit importation and interstate movement of injurious species. There is no documentation to show that states require 100% double-escape proof construction of aquaculture facilities. The Service has not been provided maps showing that the locations of fish farm facilities are not sited near natural waters. The discovery of both triploid and diploid black carp in the wild are evidence that black carp are being introduced to the environment, whether through escapes from production ponds or intentionally being released. Therefore, the Service believes that the ability and effectiveness of measures to prevent escape and possible establishment are low.

Issue: One commenter stated that the discussion for alternative 2 on page 12 (of the draft EA) does not point out that all the black carp that have been sold in recent years have been triploid. There has not been any movement of diploid black carp, either within or across state lines in several years.
Response: Under current regulations, the movement across state lines of diploid black carp is allowed. The Service has not been provided evidence (certification letters for example) to show that all black carp that have been sold in recent years have been triploid.

Issue: One commenter questioned why black carp would be more of a risk to endangered and threatened mollusks than the native molluscivores that are so often cited as having potential for snail control.
Response: Black carp will eat mollusks if they are available, as they are highly adapted to eat primarily mussels and snails. Many of the native molluscivore fish do not feed as exclusively on mussels and snails as the black carp have been shown to. Black carp are feeding specialists, but there is a risk that if mollusks become limited, black carp may switch to eating crayfishes and other crustaceans, many of which are imperiled. Black carp have a larger gape width than most native molluscivores and pose a greater threat to native mussels and snails. There are no known native fish with the same combination of size, morphology, and diet. Consequently, black carp could put new species not currently subject to fish predation at substantial risk and thus change ecosystem function by altering the existing food web.

Issue: One commenter noted that in Table 9 for alternative 3, that listing of consequences as "somewhat reduced risk" is implausible for listing diploid black carp only. Allowing functionally sterile fish and not allowing interstate transport of fertile fish would greatly reduce the risk when compared to allowing interstate transport of fertile fish. The grass carp program is excellent example of effect of triploid program in preventing the establishment of reproducing populations of fish.

Response: The Service agrees that the risk of allowing the interstate transport of fertile fish is a great risk. However, the Service disagrees that allowing the interstate transport of functionally sterile fish would greatly reduce that risk. As shown through the 2005 biological synopsis and risk assessment, black carp, whether diploid or triploid, have the potential to feed on large quantities of freshwater mussels and snails before they die of old age.