Approved 2/22/89
Date

MINUTES OF THE Senate COMMITTEE ON Energy and Natural Resoures.

The meeting was called to order by Senator Ross Doyen at
Chairperson

8:02 a.m./~~p.m.~~ on February 14, 1989 in room 423-S of the Capitol.

All members were present except: Quorum was present.

Committee staff present:
Don Hayward, Revisor
Raney Gilliland, Research
Lila McClaflin, Committee Secretary

Conferees appearing before the committee:
Charlene Stinard, Kansas Natural Resource Council, Kansas Chapter of the Sierra Club, Kansas Wildlife Federation, Kansas League of Women Voters and Kansas Audubon Council
Senator Gerald Karr
Gary Bruch, Past President, Kansas Commercial Fish Growers
Sidney Corbin, Chairman, Legislative Matters, Kansas Commercial Fish Growers
Mark Hajek, President, Kansas Commercial FIsh Growers
Charles Wallace, Wallace Fish Farm
Bob Meinen, Secretary, Wild Life and Parks
Joe Kramer, Chief of the Fisheries and Wildlife Division

List of other present is on file.

Chairman Doyen continued the hearing on S.B. 120 - relating to penalties for unlawful discharge of sewage. He called on Charlene Stinard.

Ms. Stinard presented written testimony and offered an amendment, if this amendment was adopted they would support the bill (Attachment I).

Chairman Doyen closed the hearing on S.B. 120.

The hearing on S.B. 158 - relating to prohibition of certain fish from waters of the state, was opened.

Senator Gerald Karr sponsor of the bill presented written testimony explaining why he had requested introduction of the bill (Attachment II).

Gary Bruch presented written testimony supporting S.B. 158 (Attachment III).

Sidney Corbin presented written testimony supporting S.B. 158 (Attachment IV).

Mark Hajek gave written testimony supporting S.B. V).

Charles Wallace presented written testimony supporting S.B. 158 (Attachment VI).

Bob Meinen gave a few remarks stating his agency opposes S.B. 158. He introduced Joe Kramer.

Mr. Kramer's written testimony opposing S.B. 158 is (Attachment VII). Included with his testimony is a copy of a letter from Frank Cross, Curator/Ichthyology, Museum of Natural History, University of Kansas.

Bob Meinen's closing remarks stated they would be willing to work with the people from the Commercial Fish Growers Association.

Chairman Doyen stated Clark Duffy had requested a bill relating to minimum streamflows. A motion was made by Senator Daniels to introduce the legislation. Senator Martin seconded the motion, and the motion carried.

Attachment VIII

Unless specifically noted, the individual remarks recorded herein have not been transcribed verbatim. Individual remarks as reported herein have not been submitted to the individuals appearing before the committee for editing or corrections.

CONTINUATION SHEET

MINUTES OF THE Senate COMMITTEE ON Energy and Natural Resources,

room 423-S, Statehouse, at 8:02 a.m./p.m. on February 14, 1989

Department of Commerce requested three bills be introduced concerning the coal commission. Senator Hayden made the motion to introduce the legislation. The motion was seconded by Senator Daniels and the motion carried.

The meeting adjourned at 8:57. The next meeting will be on February 15, 1989.

1989 SENATE ENERGY AND NATURAL RESOURCES COMMITTEE

Date February 14, 1989

GUEST LIST

NAME	REPRESENTING
JOE KRAMER	Dept. of Wildlife & Parks
Bob Meinen	" " " "
Charlie Wallace	Kansas Commercial Fish Growers
Sidney L Cochran	KANSAS Commercial Fish Growers Towanda, KS
David L. Pope	Kansas Board of Agric. - Div of Water Res.
Gary Brueck	Kansas Commercial Fish Growers
Mark L. Hajek	Kansas Commercial Fish Growers
Colleen Hajek	Kansas Commercial Fish Growers Assoc.
Emma Marx	Kansas Commercial Fish Growers
George Marx	" " " "
Charlene Steinert	Kansas Natural Resource Council
Galen L Lukens	Kan. com. Fish Growers
Robert E Mitchell	State Representative 101st Dist
Spencer Tomb	Kansas Wildlife Federation
Darrell Montei	K. Dept. Wildl. & Pks.
Leland E Rolfs	DWR - KSBA
John Strickler	Governor's Office
Debbie McCaskill	K. Dept. of Commerce
Brenda Brueck	Kansas Commercial Fish Growers
Stanley Gibb	" " "

1989 SENATE ENERGY AND NATURAL RESOURCES COMMITTEE

Date February 14, 1989

GUEST LIST

NAME	REPRESENTING
Kathleen Warren	DOB
Tom Taylor	KPL Gas Service
[illegible]	KPL

Senate Bill 158
1989 Session
February 21, 1989

The Honorable Ross Doyen, Chairperson
Committee on Energy and Natural Resources
Senate Chambers
Third Floor, Statehouse

Dear Senator Doyen:

SUBJECT: Fiscal Note for SB 158 by Senator Karr

In accordance with KSA 75-3715a, the following fiscal note concerning SB 158 is respectfully submitted to your committee.

SB 158 would amend existing state law that allows the Secretary of the Department of Wildlife and Parks to prohibit the Bighead Carp from the waters of the State by removing the prohibition. Existing rules and regulations issued by the Department of Wildlife and Parks prohibit the introduction, importation, or culture of the Bighead Carp in Kansas waters.

The Department of Wildlife and Parks expressed a concern that the introduction of the Bighead Carp to Kansas waters could result in increased fisheries management expenditures by the Department to maintain current populations of sport fish. The Bighead Carp may under certain conditions proliferate and exclude the sport fish from certain waters. The Department has not submitted an estimate for such cost in FY 1990. Any increased expenditures resulting from the passage of this bill would be in addition to amounts contained in the FY 1990 Governor's Budget Report.

Michael F. O'Keefe
Director of the Budget

MFO:REK:meh

5854

Testimony before the Senate Energy and Natural Resources Committee
SB 120: penalties for unlawful discharge of sewage

Charlene A. Stinard, Kansas Natural Resource Council

February 14, 1989

My name is Charlene Stinard, and I represent members of the Kansas Natural Resource Council, a private, non-profit organization promoting sustainable natural resource policies for the state of Kansas. I have been asked to speak on behalf of the Kansas Chapter of the Sierra Club, the Kansas Wildlife Federation, the Kansas League of Women Voters, and the Kansas Audubon Council.

SB 120 would bring Kansas into compliance with US Environmental Protection Agency requirements to operate the state's National Pollution Discharge Elimination System (NPDES) program. One essential element in protecting water from pollution under Clean Water Act provisions has been the right of citizens to intervene in enforcement actions.

The right to intervene (in any civil or administrative actions) under section 2 (b) of this bill must be extended to include injunctive actions -- actions to **stop** violations. Such an amendment would allow citizens to intervene to stop unlawful discharges, preventing further contamination of our waterways.

With this addition, SB 120 would bring us into compliance for regulation of the NPDES program in Kansas. In addition, it is good public policy to offer citizens the opportunity to participate in pollution abatement and prevention.

We urge your support for SB 120, bringing Kansas into compliance with federal pollution discharge regulations.

SE&NR
Attachment I
2/14

1516 Topeka Avenue • Topeka, Kansas 66612 • (913) 233-6707

STATE OF KANSAS

GERALD "JERRY" KARR
SENATOR, SEVENTEENTH DISTRICT
CHASE, LYON, MARION, MORRIS,
OSAGE COUNTIES
R. R. 2, BOX 101
EMPORIA, KANSAS 66801

TOPEKA

SENATE CHAMBER

COMMITTEE ASSIGNMENTS
MEMBER: AGRICULTURE
ASSESSMENT AND TAXATION
FINANCIAL INSTITUTIONS AND INSURANCE
ECONOMIC DEVELOPMENT
EDUCATION
JOINT COMMITTEE ON ADMINISTRATIVE RULES AND REGULATIONS
LEGISLATIVE EDUCATIONAL PLANNING COMMITTEE

DATE: February 14, 1989

TESTIMONY: Senate Energy and Natural Resources Committee

FROM: Senator Gerald "Jerry" Karr

SUBJECT: Senate Bill 158 (Big head carp act)

Thank you, Mr. Chairman, for the opportunity to appear before the Energy and Natural Resources Committee to introduce a concern that has been forwarded to me by the Kansas Commercial Fish Growers Association. The concern of the fish growers involves the prohibition of use of the big head carp which is, in their estimation, an excellent companion fish for commercial production of catfish.

The historical background of this limitation goes back to KSA 32-164a which became effective on May 1, 1978. In that particular legislation, the then Commissioner of Fish and Game was permitted to draw up rules and regulations regarding the importation and possession of certain wildlife. The rules and regulations that went into effect shortly thereafter did identify three types of fish that were prohibited from being imported, propagated, sold, purchased, possessed or released in the state of Kansas. They included the walking catfish, the silver carp, and the big head carp. In that same set of rules and regulations, the Commissioner also prohibited the monk parakeet. The debate on the big head carp has been a point of discussion over the past two or three years. Specifically, members of the Kansas Commercial Fish Growers Association believe that if they can effectively utilize this species with their catfish operations it would be not only an excellent management tool, but also it is very safe as far as infestation into Kansas waters. There are members of the Association here today to explain it.

Obviously, this has been a point of tension between the current Department and the Association, and questions are still unanswered regarding the ability of the big head carp to reproduce in Kansas waters as well as the possible movement of the big head carp in from adjoining states, specifically Missouri.

As I understand it, bordering states such as Missouri permit these big head carp in their public waters. I certainly am not an expert in the biological aspects of the big head carp, but I do believe the Legislature should provide an opportunity for members of the industry to discuss this particular ongoing problem they have had with the Department regarding this species.

I will be glad to try to answer any questions regarding the reason the bill has been introduced, or other aspects you consider relevant.

Thank you Mr. Chairman.

SE&NR
2/14/89
(attachment II)

BIG HEAD CARP - (Hypophthalmichthys Nobilis)

Gary Bruch, Past President, Kansas Commercial Fish Growers

The Big Head Carp is recognized throughout the world primarily because of its versatility in aquaculture operations. It is native to Eastern China, and has been introduced worldwide as an important food fish, to improve water quality and increase fish production, both in culture facilities and natural systems.

It has been promoted for use in aquaculture in at least 32 countries world wide, and is now being used for production and water quality improvement in many natural water ways and water storage lakes.

Spawning and reproduction are explained in detail on the hand out sheets. Their reproduction is basically the same as the grass carp which are legal in Kansas and problems have not arisen from them.

Big Head have gill rakers which are very fine. They filter zooplankton, phytoplankton, and detritus out of the water.

In our catfish ponds where we feed heavily, the water has a tendency to take on a heavy bloon or becomes dark green with algae. When this algae dies, we have an oxygen depletion which is the greatest cause of fish motality that we are faced with. The Big Head eats this green soup and improves our water quality.

Jeff Racy, representing Ozark Hatchery of Missouri, spoke at our 1989 Fish Convention. He stated he doesn't know how they help "scientifically", but they get the job done for them and in the long run, that is what they want. They save the expense of costly chemicals and are much safer to use in our environment.

This fish enables the fish farmer to have better water quality, and at the same time, produce a marketable product at virtually no added cost.

As you will see, here is a fish that is in 32 foreign countries, has been successfully used in the U.S. since 1972, has been throughly researched, and is a useful and profitable tool that can be used by the Kansas Fish Farmer. We ask your sincerest efforts in legalizing the Bighead for the Kansas fish farmers to use in their polyculture production.

The duplicated sheets I have included were taken from the study done by Dawn P. Jennings, U. S. Fish and Wildlife Service, National Fisheries Research Center, Gainesville, FL, 32606, Biological Report 88(29), 9/1988. Published by the U.S. Department of the Interior, Washington, DC.

SE&NR
2-14-89
attachment III

Table 4. *Introductions of bighead carp.*

Country	Origin	Date	Purpose	Reference
Brazil	China	1979	Assessment for culture	Welcomme 1981
Bulgaria	–	1964	Culture	Krupauer 1971; Anon. 1974
Costa Rica	Taiwan	1976	Culture	Welcomme 1981
Cuba	–	–	–	Welcomme 1981
Czechoslovakia	Hungary	1963	Inadvertent	Holcick and Geczo 1973
England	Austria	1975	Inadvertent	Stott and Buckley 1978
Figi	Malaysia	1968	Culture/ weed control	Mastrarrigo 1971
Germany FR.	Hungary	1964	Culture	Welcomme 1981
Hong Kong	–	–	–	Chaudhuri 1968; Man and Hodgkiss 1977
Hungary	China Soviet Union	1963–1964 1968	Culture	Molnar 1979 Pinter 1980
India	–	–	Culture	Alikunhi et al. 1963; Tubb 1966
Indonesia	Japan	1964	Culture	Welcomme 1981
Israel	Germany	1972 1973	Culture Culture	Rothbard 1981 Tal and Ziv 1978
Japan	China	1915–1945	Culture	Kuronuma 1954
Korea	Taiwan	1963	Culture	Welcomme 1981
Laos	Japan	1968	Culture	Chanthepha 1969
Maylaysia	China	1800's	Culture	Welcomme 1981
Mexico	Cuba	1975	Culture	Welcomme 1981
Nepal	Hungary	1972	Culture	Anon. 1973
Panama	Taiwan	1978	Culture	Welcomme 1981
Peru	Israel	1979	Culture	Welcomme 1981
Philippines	Taiwan	1968	Culture	Welcomme 1981
Poland	Soviet Union	1964	Culture	Opuszynski 1979
Rumania	–	1959	Culture	Chanthepha 1969; Huet 1970
Singapore	–	–	Culture	Tubb 1966
Taiwan	China	–	Culture	Tang 1960

3-2

Table 4. *Continued.*

Country	Origin	Date	Purpose	Reference
Thailand	China	1913	Culture	Welcomme 1981; Chaudhuri 1968
Turkey	Rumania	1972	Culture	Anon. 1973
United States	Taiwan	1972	Culture/ research	Henderson 1979; Cremer and Smitherman 1980
Soviet Union	China	1949 +	Culture/ water quality improvement	Bardach et al. 1972; Huet 1970
Vietnam	China	–	Culture	Chaudhuri 1968; Welcomme 1981
Yugoslavia	Rumania, Hungary, Soviet Union	1963 +	Culture	Welcomme 1981

Japan imported bighead carp fry from Shanghai between 1915 and 1945 (Kuronuma 1954). In 1930, young bighead carp were identified in the River Tone, and later in Lake Kasumi. The bighead carp is believed to be established in these waters (Tsuchiya 1979).

In the Philippines, the bighead carp reportedly reproduces in the Pampanga River (Datingaling 1976); however, there is no record of its permanent establishment there.

Tang (1960) collected bighead carp fry from the Ah Kung Tian Reservoir in Taiwan, suggesting natural reproduction; however, this incident could have been caused by unusual hydrological and climatic conditions.

Bighead carp have been introduced into several countries in central and eastern Europe (Table 4). In these countries it is used for food production and water quality control (Krupauer 1971).

Bighead carp were introduced into England with a consignment of grass carp imported from Austria in 1975, which was found to contain both bighead and silver carp (*H. molitrix*). These species are being studied for use in cultivation and nutrient removal from eutrophic waters in the United Kingdom (Krupauer 1971; Stott and Buckley 1978).

Bighead carp also were introduced inadvertently into Hungary in 1963, mixed with a purchase of grass carp and silver carp. Since 1964, this species has been intentionally introduced from the Soviet Union. It is now the most popular fish used in pond farming practice and the second most important fish species (after the common carp, *Cyprinus carpio*) in Hungarian fish farming (Pinter 1980).

The bighead carp was first introduced into the United States in 1972 (Henderson 1979). It was brought into Arkansas by a private fish farmer in an attempt to improve water quality in fish production ponds (Henderson 1976, 1978, 1983). In 1974, the Arkansas Game and Fish Commission began evaluating the bighead carp and other Chinese carps to determine their potential impact on the environment and to assess their beneficial characteristics. Restrictions were enforced to prevent the fish from being stocked into public waters from private sources, and methods to control accidental populations were investigated (Henderson 1975; Marking and Bills 1981). Fisheries personnel from Auburn University, AL, also obtained stocks of bighead carp in 1974 to assess their potential in polyculture systems with existing cultured species in the United States (Cremer and Smitherman 1980).

There are records of bighead carp from open waters in the United States. In 1981, a single specimen was caught in the Ohio River at mile marker 919, below the Smithland Dam, Kentucky (Freeze and Henderson 1982); it was assumed that the fish escaped from an aquaculture facility. Other reports include one adult from Chain Lake, Schuzler County, IL, in September 1986, and two adults from the Mississippi River in Illinois – one at mile marker 364 in Hancock County, December 1986, and the other 4.5 miles NNW of Gadstone in Henderson County in January 1987.

3-3

Trematodes reported to parasitize bighead carp include *Dactylogyrus* sp., which infects the gill filaments; *Diplostomum* sp., the metacercariae of which parasitize the eyes; and *Posthodiplostomum* sp., in which the larva infects the skin and subcutaneous tissue, depositing a black pigment around the cyst it forms in the skin. This infection is termed black-spot disease (Bauer et al. 1973; Musselius 1979).

The bighead carp also may be parasitized by cestodes, including *Ligula intestinalis* and *Diagrama interrupta*, which occur in the body cavity. Diagrammosis is reported in culture situations in the Soviet Union (Bauer et al. 1973). In China, the bighead carp is reported to be a carrier of *Bothriocephalis gowkongensis*, an intestinal parasite that causes mass mortalities of numerous pond cultured species (Bauer et al. 1973).

Several species of crustaceans parasitize fish in culture situations, causing disease outbreaks and mortalities. The bighead carp is parasitized by the copepod *Lernaea*, which attaches to the body surface, musculature, or gills, forming a deep ulcer, abscess, or fistula at the point of attachment. Harding (1950) first described this infection in bighead carp from Singapore, and Shariff (1981) reported its occurrence in the eyes and on the body surface of bighead carp in Malaysia. The copepod *Sinergasilus lieni* parasitized the gill filaments of bighead carp, compressing and rupturing the gill tissue and resulting in embolism and necrosis (Bauer et al. 1973).

One abnormality reported in bighead carp is "pugheadedness" (Shariff et al. 1986). This condition is characterized by a shortened upper jaw resulting in incomplete closure of the mouth and therefore decreased feeding efficiency. Its cause may be related to genetic factors, abnormal embryonic development, or environmentally induced larval abnormalities.

3.4 *Nutrition and Growth*

3.4.1 Feeding

The bighead carp is very efficient at using the food it ingests. Because of its gill raker size (section 1.3.2), it can filter plankton organisms from the upper and middle water layers it inhabits (Chen 1934; Verigin and Makeeva 1972; Cremer and Smitherman 1980). Aldridge et al. (personal communication), documented the presence of a translucent mucous coating on the gill rakers, allowing bighead carp to collect food particles as small as 20 μm in diameter. This mucous aggregation mechanism apparently serves a size selective function; large food particles (50 μm) such as zooplankton, large colonial algae, and large detrital particles, have sufficient bulk to pass over the top of the gill raker coat directly to the gullet. Smaller food particles become embedded in the mucus, and form aggregates that increase in size toward the distal end of the raker assembly, and then pass to the gullet. Pharyngeal teeth grind plankton to allow for the more efficient digestion of usable protein (Chen 1934; Nikol'skii 1954; Henderson 1976).

Feeding levels of 13-d-old larval bighead carp in the Soviet Union were highest at 1800 h and lowest at 0400 to 0600 h (Lazareva et al. 1977). In underyearling bighead carp (68 d old), feeding was highest at 1000 h and 1600 h and lowest at 1800 h and between 0400 and 0600 h. According to Sifa et al. (1980), the rhythm of feeding may be influenced by the intensity of illumination, dissolved oxygen, and water temperature. In China, bighead carp fed most intensely during July and August, for about 18 h each day; diurnal feeding peaked between 1200 and 2000 h. The daily ration (relation of total weight of food taken in one d to the weight of the fish) for bighead carp was 6.6%.

Moskul (1977) found that the feeding rate of 2-yr-old bighead carp in the Soviet Union increased toward evening, peaked at 2000 h, and was lowest at 0600 h.

3.4.2 Food

3.4.2.1 Larvae

The food particle size calculated as most suitable for larval bighead carp starting to feed is 150–200 μg (Dabrowski and Bartega 1984). Larvae 7–9 mm long eat primarily protozoa and zooplankton, including rotifers and nauplii, copepodites, *Bosmina,* and young *Moina* (Chang 1966; Bardach et al. 1972; Marciak and Bogdan 1979). At 10–17 mm, the larvae include Cladocera in their diet. At lengths between 18 and 23 mm, they begin to eat phytoplankton and at 24–30 mm they readily consume both zooplankton and phytoplankton (Ling 1967).

Korniyenko (1971) reported that larvae in Soviet Union culture fed on infusoria for 3–4 d after their transition to exogenous feeding, and then fed mainly on phytoplankton and zooplankton.

Lazareva et al. (1977) found that early larval stages of bighead carp in the Soviet Union ate phytoplankton (Protococcaceae), diatoms, blue-green algae, and infusoria. Between 0.009 and 0.015 g body weight, the larvae ate about 100% zooplankton (Rotatoria and Cyclopoida nauplii). Phytoplankton (diatoms) accounted for less than 0.1%. Between 0.010 and 0.047 g, zooplankton represented 69% of the food consumed and included copepodite stages of Cyclopoida, small Cladocera, and small chironomid larvae. Phytoplankton represented only 2% to 18% of the food and was composed mainly of diatoms. As the larvae increased in size, there was a gradual shifting of the food eaten from zooplankton to phytoplankton. Larvae between 0.014 and 0.125 g body weight ate only 39% zooplankton, mainly *Cyclops* and *Moina*. In ponds with low zooplankton biomass, blue-green and euglenoid algae accounted for most of the stomach contents.

3-4

4.6 *The Population in the Community and the Ecosystem*

In its native range, the bighead carp is associated with other phytophagous species such as the silver carp, grass carp, common carp, mud carp (*Cirrhina molitorella*), and black carp. Selected combinations of these fishes have been used internationally in natural waters and aquaculture facilities to increase total fish production and improve water quality.

Due to their diverse food habits, the bighead carp, silver carp, and grass carp have been used extensively in the management of inland waters of the Soviet Union (Aliev 1976; Vinogradov 1979). In the Khauz Khan reservoir, the bighead carp and silver carp have been responsible for preventing intensive blooms of phytoplankton, particularly blue-green algae, and in combination with grass carp have had an appreciable effect in increasing the biomass of zoobenthos, particularly Chironomidae (Nikol'skii and Aliyev 1974; Aliev 1976). These fish also were responsible for increasing the total fish productivity of this reservoir to 54.6 kg/ha in 1973. Similar increases in productivity due to the introduction of these fishes was reported in Turkmenistan, Soviet Union (Aliev 1976). Galinskiy et al. (1973) suggested using bighead carp to provide more effective use of available food resources in the Dneprodzerzhinsk Reservoir, Soviet Union.

In pond culture in the Soviet Union, production increases from 170 kg/ha in 1965 to 490 kg/ha in 1969 and 700 kg/ha in 1973 were directly related to the introduction of the combined species of phytophagous fish bighead carp, silver carp, and grass carp (Nikol'skii and Aliyev 1974).

There are reports in pond situations of competition for food between bighead carp and common carp (Woynarovich 1968; Anon. 1970; Opuszynski 1981), and bighead carp and silver carp when zooplankton biomass is reduced (Moskul 1977; Buck et al. 1978a). Negonovskaya (1980), however, reported that in reservoirs in the Soviet Union, bighead carp generally utilize food that does not result in competition with native species.

Water quality improvement by bighead carp and silver carp also has been documented under experimental conditions. Henderson (1978, 1983), who reared bighead carp and silver carp in wastewater treatment lagoons in the United States to evaluate their effect on water quality, reported that the addition of these fish stimulated 'controlled' phytoplankton growth, increased oxygen demand due to photosynthesis, and decreased biological oxygen demand (BOD) by preventing plankton die-offs and decay. The increase in algae production caused by these fish created a subsequent increase in pH, which in turn is believed to have caused a reduction of coliform bacteria in the system.

Germany is also using the bighead carp in combination with grass carp and silver carp for biological control of undesirable aquatic vegetation in management ponds (Bohl 1971).

5. EXPLOITATION

5.1 *Fishing Equipment*

In China, before the advent of induced spawning (section 7), traps were placed along river embankments to collect drifting bighead carp fry (Lin 1949). The most popular devices used were long, conical, fine-mesh bag nets fastened to bamboo or China fir poles (Lin 1949; Dah-Shu 1957; Bardach et al. 1972). Adult bighead carp, generally brood stock, were captured by trolling with bait, or in gill nets, or in triangular nets hung from fishing vessels (Chang 1966). There are also reports of fishermen using tamed otters and cormorants to capture fish.

5.2 *Fishing Areas*

5.2.1 General geographic distribution

In China, bighead carp fry and fingerlings are collected downstream from their major spawning grounds, including the middle and lower reaches of the Yangtze River (Dah-Shu 1957; Chang 1966), as well as the West, Hwai, and Chientang rivers (Chang 1966). Adult bighead carp are distributed in rivers in the North China Plain and South China (section 2.1.1). Welcomme (1981) reported that the bighead carp is caught by angling in the basin of the Danube River in Europe.

5.2.2 Geographic range

In the Soviet Union the bighead carp has been successfully acclimatized in waters located at a latitude of 45 °N and further south. North of this latitude the commercial catch is small or non-existent (Negonovakaya 1980).

5.2.3 Depth ranges

Bighead carp fry and fingerlings are captured in conical nets at the surface of the water. Adults are generally taken with nets at a depth of about 2 m or by trolling with bait at slightly lower depths (Dah-Shu 1957; Chang 1966).

5.3 *Fishing Seasons*

In China, bighead carp fry, fingerlings and adults are generally collected during the reproductive season, from May to June (Chang 1966).

5.4 *Fishing Operations and Results*

5.4.1 Effort and intensity

No available information.

5.4.2 Selectivity

No available information.

Henderson (1979) found that a combined polyculture system of bighead carp, silver carp, and channel catfish in Arkansas (Table 15,F) resulted in the same yield of channel catfish as in monoculture systems, and water quality of the ponds was improved. Newton et al. (1978), who compared a low-density polyculture system (bighead carp, silver carp, grass carp, largemouth bass, and channel catfish) to a channel catfish monoculture system, reported significantly greater net production from the polyculture ponds (Table 15,F). In a study to evaluate Chinese carp production methods for recycling swine manure, Buck et al. (1978b) combined bighead carp, silver carp, common carp, and grass carp with largemouth bass, channel catfish, and hybrid buffalo (bigmouth buffalo × black buffalo) in ponds receiving a constant supply of swine manure from pens placed directly above the ponds (Table 15,F). After 173 d, bighead carp gained an average of 6.5 to 6.9 g/d. The total biomass gained was 429–439 kg/ha, an average of 2.48–2.54 kg/ha per day. Henderson (1978) stocked 12,764 silver carp fingerlings/ha and 255 bighead fingerlings/ha, in a sewage treatment lagoon. After 16 mo, bighead carp production totaled 175 kg/ha; the average weight of the fish was 726.4 g.

7.9 *Harvest and Transport*

7.9.1 Harvest

In traditional culture of mixed-age fish, bighead carp are generally harvested three times a year. Fingerlings stocked in September of the previous years are cropped three times within 50 d, starting in June. Those stocked from February to March of the same year are cropped three times starting in August, and fingerlings stocked in June are cropped starting in October (Anon. 1978). The fish are harvested by gradually lowering the pond and using a seine or cast net, or by using dividing fish traps installed in the outlet structure to capture and aid in sorting the fish (Anon. 1970; Bardach et al. 1972; Tapiador et al. 1977; Green and Smitherman 1984). In polyculture ponds, the fish must be sorted to species. When the pond is lowered gradually, the species separate naturally. Bighead carp and silver carp concentrate at the surface; the bighead carp ascending after the silver carp. Grass carp and black carp concentrate at the bottom, and are the last to ascend (Lin 1949; Dah-Shu 1957; Vinogradov 1979).

7.9.2 Transportation

One of the most commonly used materials for transporting bighead carp is the hermetically sealed polyethylene bag, filled with water and oxygen in equal proportions. Density of fry placed in each bag depends on the length of transport. For shipments lasting up to 5 h, 100,000 larvae can be placed in a 40-L bag. Up to 50,000 fry can be placed in a 40-L bag for transportation between 5–24 h (Anon. 1970; Vinogradov 1979). Chen (1976) suggested that a bag 40 × 30 × 120 cm (144 L) can hold 500 fingerlings 7 cm long, 1,000 fingerlings 5 cm long, or 8,000 to 10,000 fry 2.5 cm long in 10 L of water for less than 10 h.

Before transport, the fish should be conditioned to crowding to reduce injury and mortality, and given no food so their guts will be empty (Chen 1976). Adults should be transported in well-oxygenated water (5 to 8 mg/L) at the lowest feasible temperature. At a temperature of 1 ° to 6 °C, the fish are semidormant, but above 10 °C they become very excitable. If fish must be transported at high temperatures, anesthesia may be used. Bardach et al. (1972) recommended 6.7 to 7.7 μg/L solution of sodium barbital or 1 to 4 g/L solution of urethane as effective at temperatures of 25.5 ° to 32 °C.

8. UTILITY

Henderson (1978, 1983) evaluated the potential of bighead carp and silver carp in improving the water quality of a sewage treatment lagoon in Arkansas. Results indicated that these fish have the ability to effect plankton removal, stimulate nutrient uptake, and generally improve the treatment efficiency of a conventional lagoon system, while simultaneously providing an annual production of more than 7,200 kg of fish/ha to offset water treatment costs. He suggested that further investigation should be conducted for finding ways of using these fishes. Examples include using them as biological filters for general water quality enhancement and in water supply reservoirs where plankton produces taste and odor problems, and as an additional source of protein produced from an unused resource.

The desirability of bighead carp as a marketable food fish was evaluated in the United States (Crawford et al. 1978). Fish raised at Auburn University, Alabama, yielded wholesale prices (live weight basis) of $0.55 to $0.99/kg to fish wholesalers and $1.10/kg to other persons. The wholesale price of completely dressed fish at supermarkets was $1.65/kg. Retail prices ranged from $2.18 to $3.06/kg at supermarkets and $3.04 to $5.26/kg from fish wholesalers. The bighead carp was marketed under the names "fish," "carp," "speckled amur," and "Chinese bass." Results from supermarket sales indicated that bighead carp weighing 3.6 to 5.4 kg could be successfully marketed at retail.

In Arkansas, marketability tests revealed that the palatability of bighead carp flesh was comparable to or better than that of channel catfish or bigmouth buffalo (Henderson 1976). The bighead carp has potential value in the United States as either a food fish for human consumption, for use in organic fertilizer or as a fish meal by-product. The market value for this fish could be profitable for any of the described uses because production costs are low.

50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO. Biological Report 88(29)	2.	Recipient's Accession No.

4. Title and Subtitle

Bighead carp (Hypophthalmichthys nobilis): a biological synopsis

5. Report Date

6.

7. Author(s)

Jennings, D.P.

8. Performing Organization Rept. No.

9. Performing Organization Name and Address

National Fisheries Research Center-Gainesville
U.S. Fish and Wildlife Service
Gainesville, FL 32606

10. Project/Task/Work Unit No.

11. Contract(C) or Grant(G) No.

(C)

(G)

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National Fisheries Research Center-Gainesville
U.S. Fish and Wildlife Service
Gainesville, FL 32606

13. Type of Report & Period Covered

14.

15. Supplementary Notes

16. Abstract (Limit: 200 words)

The bighead carp is recognized throughout the world because of its versatility in aquaculture operations. Although endemic to eastern China, it has been introduced throughout the world as an important food fish. It has also been use with other fish to improve water quality and to increase fish production, both in culture and natural systems. This literature summary follows the Food and Agricultural Organization of the United Nations (FAO) species synopsis format.

17. Document Analysis a. Descriptors

Bighead carp, Hypophthalmichthys nobilis, Cyprinidae, aquaculture, exotic, food fish, water quality

b. Identifiers/Open-Ended Terms

Region 8, Research and Development

c. COSATI Field/Group

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(See ANSI-Z39.18) See Instructions on Reverse

OPTIONAL FORM 272 (4-77)
(Formerly NTIS-35)
Department of Commerce

☆ U.S. Government Printing Office 1988—573-205/80040

January 16, 1989

Dear Sirs:

We'd like your help in the following items in creating new laws:

1. Define aquaculture as agriculture.

2. Stop Fish and Game Commission from giving fish to private enterprises.

3. Make big head carp legal in the state of Kansas.

4. Make stealing of fish a felony.

I'm enclosing information to help you determine the effects of these items on the Kansas Commercial Fish Growers Association.

Sincerely,

Sidney Corbin, Chairman
for legislative matters
Telephone 316-775-2621

P.S. I will be in Topeka sometime next week.

SE&NR
2/14/89
(attachment IV)

These are the addresses for which we sent letters:

Leon Hill - 605 Park, Lonoke, Ark. 72086
William Easterling - Clio, Alabama, Box 576 83017
Soth Alabama Fish Hatcheries- RR # 4, Box 224 Andalusia, Alabama 36420
Jack Herring, Dept. of Wildlife-Southport Mall, Jackson, Mississippi 39205
James B. Fry, Dept. of Game and Fish, Jefferson City, Mo. 65102
Division of Game and Fish, 2 Natural Resource Dr., Little Rock, Ark. 72205
Dept. of Game and Fish 64 North Union St. Montgomery, Alabama 36130
Univerity of Missouri, St. Louis, Missouri
Mississippi State University, Starkville, Mississippi
University of Mississippi, University, Mississippi
Jackson State College, Jackson, Mississippi
University of Arkansas, Fayetteville, Arkansas
Auburn University, Auburn, Alabama
Agricultural Mechanical and Normal College, Pine Bluff, Arkansas
Alabama Agricultural and Mechanical College, Normal, Alabama
University of Alabama, Tuxcaloosa, Alabama
Jim Karrs, Osage Fisheries, Box 1500, Osage Beach, Mo. 65065

Of these letters sent, 6 letters were received back.

Sidney Corbin

Judge socks convict

By George Stanley
Staff Writer

One of 18 men arrested in June for poaching has been fined $18,000 in Elk County District Court.

Robert E. Moerer Jr., of rural Longton, was fined $250 each on 72 counts of selling deer, possessing deer without a permit and possessing deer during closed season.

Each crime was a misdemeanor carrying a maximum penalty of $500 and six months in jail. Moerer is appealing the decision by Judge Darlene Bradley.

Moerer was one of 18 people arrested in several counties at daybreak on June 30. In a yearlong investigation, undercover conservation officers observed the men killing fish and wildlife for a black market. They were charged with 300 game-law violations.

Deer were being sold for $20 to $100, mostly for their meat, while catfish were being sold for $1 a pound, said Omar Stavlo, chief of law enforcement, Department of Wildlife and Parks. It's illegal to sell or buy any type of wildlife.

Outdoor Notes

After the June arrests, Wildlife and Parks Secretary Robert Meinen said that poachers were operating on an alarming scale in Kansas, and that he would ask the 1989 Legislature to make commercial poaching a felony crime.

"Being able to bring felony charges against certain violators would be an important tool for protecting the state's wildlife resources," he said.

• • •

Jim Karrs
Osage Fisheries
Box 1500, Osage Beach, Mo. 65065

Towanda, Kansas
Novemver 22, 1988

Dear Sirs:

I am chairman of a committee for the Kansas Commercial Fish Growers Association and I have been asked to gather information on the pros and cons of big head carp. I would like for you to answer the following questions to the best of your ability and return your answers to me as soon as possible to be used in our evaluation of legalizing big head carp **in our** state. If I do not hear from you, I will assume that you have no positive or negative evaluation.

Thanking you in advance for your immediate attention. Enclosed is a self-addressed envelope.

Sincerely,
Sidney Corbin
Towanda, Kansas 67144
Telephone 316-775-2621

1. Are big head carp legal in your state? yes
2. If so, how many years have they been legal? yes 8-10 years
3. Are they in public waters? yes, Bighead were released from ponds in historic flood of 1986.
4. If they are in public waters, have you seen any damage or help to other species? None that I am aware of.

5. If so, name the species and evaluate the damage or benefit to other species.

6. If you had the option would you make them legal or ban them from your state?

7. If you are a private business and have them for sale, have they been an asset to your business? Explain.

Big head have an asset to us in helping to maintain good water quality & in polyculture production and we have not had difficulty marketing our production. However, this will likely change due to our production as some of the southern states, in fact,

4-3

Steve N. Wilson
Director

Scott Henderson
Assistant Director

Arkansas Game & Fish Commission

December 8, 1988

Mr. Sidney Corbin
RR# 1
Towanda, Kansas 67144

Dear Mr. Corbin:

This is in response to your questionnaire concerning the culture of bighead carp in Arkansas.

It is legal to culture bighead carp in Arkansas. However, it is unlawful to place these fish into any body of water where ingress into public waters is not entirely blocked. Also, you must register as a vendor before engaging in the rearing or sale of bighead carp.

Bighead carp have been in Arkansas about 18 years. Once in a while a bighead is caught by a commercial fisherman, but this is a rare occurrence. We have no evidence to verify or suggest that natural reproduction of bighead carp has occurred in Arkansas.

We feel our current regulations have done an adequate job of protecting Arkansas' public waters, while not being too restrictive to fish farmers wishing to culture the bighead carp.

If you have any further questions, please contact me.

Sincerely,

Michael D. Gibson/kc

Michael D. Gibson
Assistant Chief, Fisheries Division

MDG:kc

4-4

2 Natural Resources Drive Little Rock, Arkansas 72205
(501) 223-6300

Towanda, Kansas
Novemver 22, 1938

Dear Sirs:

I am chairman of a committee for the Kansas Commercial Fish Growers Association and I have been asked to gather information on the pros and cons of big head carp. I would like for you to answer the following questions to the best of your ability and return your answers to me as soon as possible to be used in our evaluation of legalizing big head carp **in our** state. If I do not hear from you, I will assume that you have no positive or negative evaluation.

Thanking you in advance for your immediate attention. Enclosed is a self-addressed envelope.

Sincerely,

Sidney Corbin
Towanda, Kansas 67144
Telephone 316-775-2621

1. Are big head carp legal in your state? Yes
2. If so, how many years have they been legal? — Since
3. Are they in public waters? — I don't know.
4. If they are in public waters, have you seen any damage or help to other species?

5. If so, name the species and evaluate the damage or benefit to other species.

6. If you had the option would you make them legal or ban them from your state? We raise big head fingerlings, the market looks good & I personally think other States will legalize them soon.
7. If you are a private business and have them for sale, have they been an asset to your business? Explain.

Yes. I sell several thousand dollars worth of them each year. They are a good fish for water quality control. They have been a good fish for me to sell. The Oriental market is very large.

4-5

Regards
Leon Hill
Lonoke, Ark.

Auburn University
203 Swingle Hall
Auburn University, Alabama 36849-5419

Towanda, Kansas
Novemver 22, 1988

Dear Sirs:

I am chairman of a committee for the Kansas Commercial Fish Growers Association and I have been asked to gather information on the pros and cons of big head carp. I would like for you to answer the following questions to the best of your ability and return your answers to me as soon as possible to be used in our evaluation of legalizing big head carp in our state. If I do not hear from you, I will assume that you have no positive or negative evaluation.

Thanking you in advance for your immediate attention. Enclosed is a self-addressed envelope.

Sincerely,
Sidney Corbin
Towanda, Kansas 67144
Telephone 316-775-2621

1. Are big head carp legal in your state? YES
2. If so, how many years have they been legal? 1975
3. Are they in public waters? YES
4. If they are in public waters, have you seen any damage or help to other species?

NO

5. If so, name the species and evaluate the damage or benefit to other species.

N A

6. If you had the option would you make them legal or ban them from your state?

NOT PROMOTE - BUT ARE CONSTITUENTS ARE

7. If you are a private business and have them for sale, have they been an asset to your business? Explain.

ADDITIONAL INCOME

auburn University
alabama
4-6

Dept. of Wildlife
Southport Mall
Jackson, Mississippi
39205

RECEIVED
DEC 1 '88
E & W

Jackson State College Mississippi

Towanda, Kansas
Novemver 22, 1988

Dear Sirs:

I am chairman of a committee for the Kansas Commercial Fish Growers Association and I have been asked to gather information on the pros and cons of big head carp. I would like for you to answer the following questions to the best of your ability and return your answers to me as soon as possible to be used in our evaluation of legalizing big head carp in our state. If I do not hear from you, I will assume that you have no positive or negative evaluation.

Thanking you in advance for your immediate attention. Enclosed is a self-addressed envelope.

Sincerely,
Sidney Corbin
Towanda, Kansas 67144
Telephone 316-775-2621

1. Are big head carp legal in your state?
Permits are required
2. If so, how many years have they been legal?
3. Are they in public waters?
Not to our knowledge (controls on fish farming screens etc)
4. If they are in public waters, have you seen any damage or help to other species?
5. If so, name the species and evaluate the damage or benefit to other species.
6. If you had the option would you make them legal or ban them from your state?
Each Fish Farm is evaluated for facility & operations using bighead carp.
7. If you are a private business and have them for sale, have they been an asset to your business? Explain.

4-7

University of Arka s
Fayetteville, Arkansas

RECEIVED
DEC 01 1988
FISHERIES DIVISION

Towanda, Kansas
November 22, 1988

Dear Sirs:

I am chairman of a committee for the Kansas Commercial Fish Growers Association and I have been asked to gather information on the pros and cons of big head carp. I would like for you to answer the following questions to the best of your ability and return your answers to me as soon as possible to be used in our evaluation of legalizing big head carp in our state. If I do not hear from you, I will assume that you have no positive or negative evaluation.

Thanking you in advance for your immediate attention. Enclosed is a self-addressed envelope.

Sincerely,
Sidney Corbin

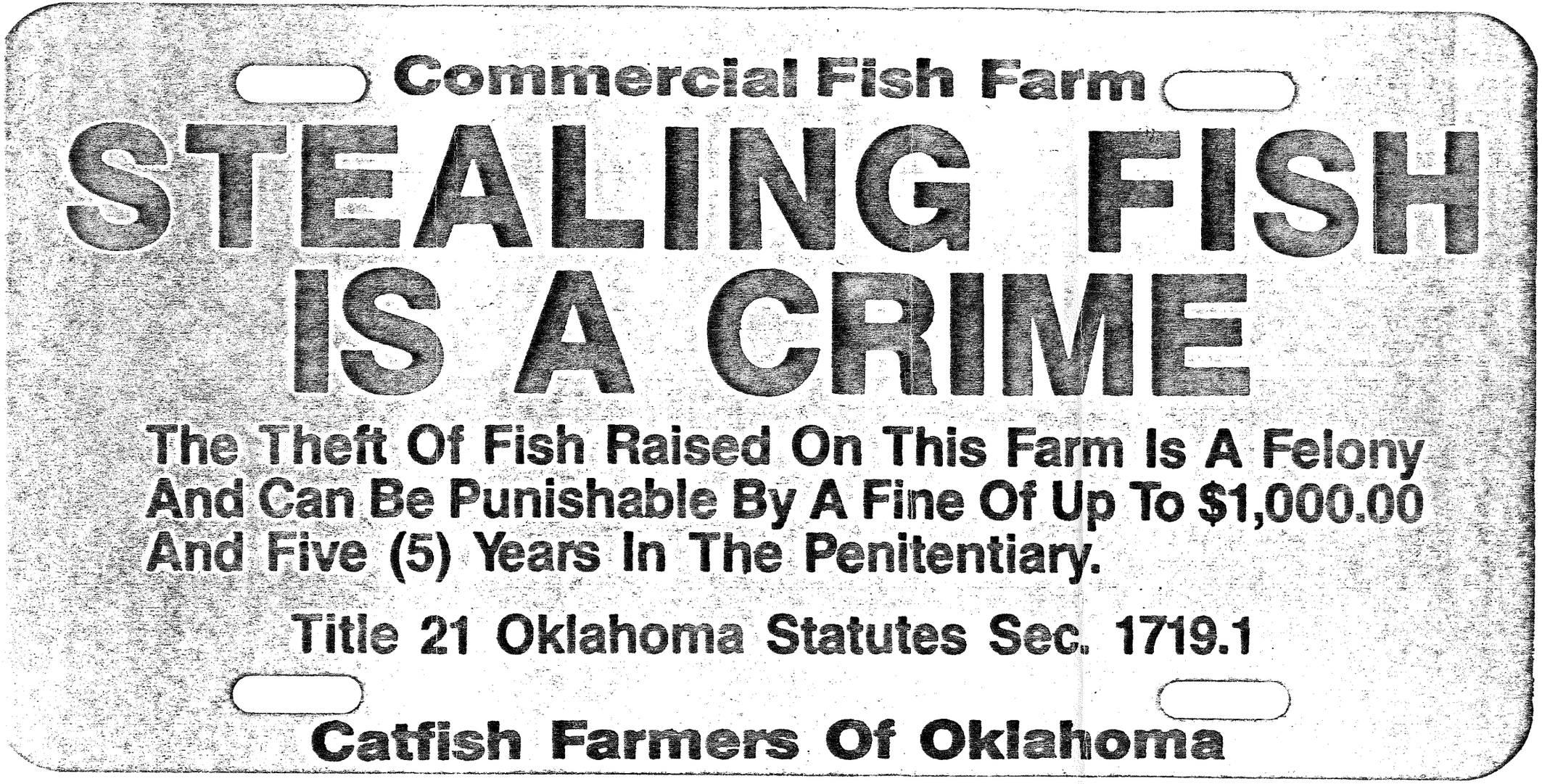
Sidney Corbin
Towanda, Kansas 67144
Telephone 316-775-2621

1. Are big head carp legal in your state? Yes - but may not be released to the wild,
2. If so, how many years have they been legal? never banned
3. Are they in public waters? Yes
4. If they are in public waters, have you seen any damage or help to other species? Recently observed. Unknown damage to other species.
5. If so, name the species and evaluate the damage or benefit to other species.
6. If you had the option would you make them legal or ban them from your state? Individual state bans appear to be ineffective, based on past experience with ban on grass carp. Control at national level is needed.
7. If you are a private business and have them for sale, have they been an asset to your business? Explain.

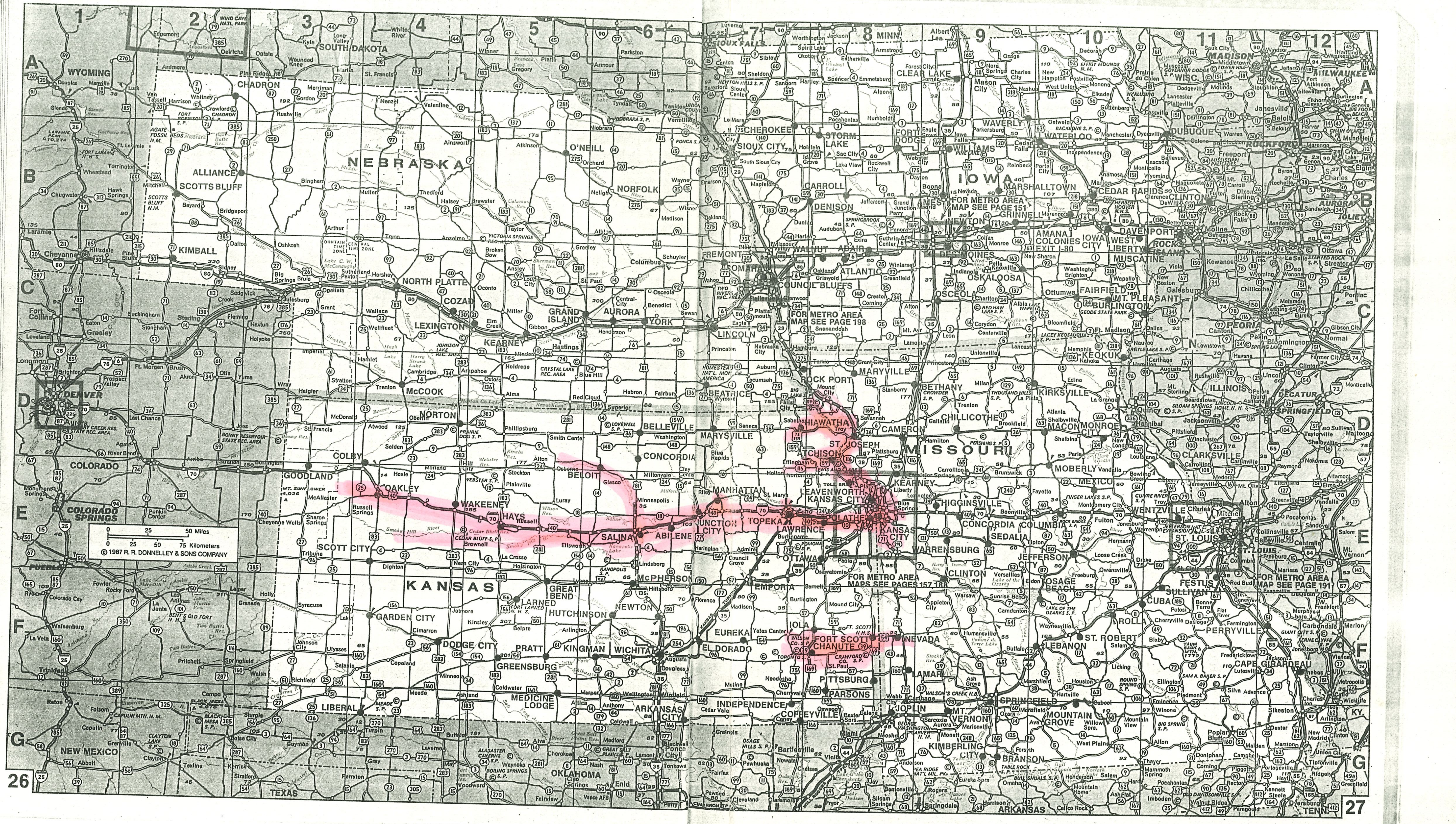
STEALING FISH IS A CRIME

The theft of fish raised for sale is a Class C felony punishable by a prison term and/or fines up to $5,000. Sec. 570.030, RSMO 1985

MISSOURI FISH FARMERS ASSOC.



This is a copy of the sign we had made up for our CFO members.


NEBRASKA
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OKLAHOMA
TEXAS
NEW MEXICO
ARKANSAS
DENVER
COLORADO SPRINGS
OMAHA
COUNCIL BLUFFS
LINCOLN
DES MOINES
KANSAS CITY
TOPEKA
WICHITA
ST. LOUIS
SALINA
ABILENE
JUNCTION CITY
MANHATTAN
LAWRENCE
OLATHE
LEAVENWORTH
ATCHISON
HIAWATHA
ST. JOSEPH
FORT SCOTT
CHANUTE
HAYS
WAKEENEY
OAKLEY
GOODLAND
COLBY
0 25 50 Miles
0 25 50 75 Kilometers
© 1987 R. R. DONNELLEY & SONS COMPANY
FOR METRO AREA MAPS SEE PAGES 157,158
26
27

4-9

BIGHEAD CARP LEGALIZATION

With the recent controversy concerning the use of chemicals in farming, the use of the Bighead Carp is an ideal way to improve the quality of the water in catfish farming. Chemicals are one means by which to control algae bloom in ponds, but the use of Bighead Carp would be, by far, a better and environmentally safer way to improve the water quality of our ponds.

John Jensen, fisheries specialist with the Alabama Cooperative Extension Service at Auburn University, has stated that bighead Carp is a filter eater. It feeds on plankton, so farmers can actually recycle the fertility that comes from feeding the catfish, therefore the Bighead Carp improve the water quality of the ponds.

The bighead carp raised alongside catfish add diversity to the system; they not only improve the water quality, you get a free by-product. There is a growing demand for bighead carp in the Asian communities as a food fish. There are large communities of Asians in metropolitan cities like New York, Las Angeles, Kansas City, and Wichita. This would be a boost to the Kansas economy with another Kansas grown product.

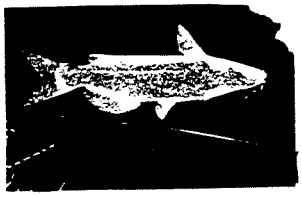
With the backing of National government and President Bush's efforts to reduce the applications of chemical use, I urge our State officials to consider legalizing the bighead carp in Kansas as an excellent and envlronmentally safe way to maintain good water quality in our ponds.

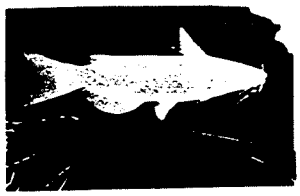
Thank You

Mark L. Hajek : President
Kansas Commercial Fish Growers Association

SE&NR
2/14/89
attachment K

WALLACE FISH FARM
R.R. 1, BOX 22
ALLEN, KS. 66833
(316) 443-5528





Kansas Commercial Fish Growers Association

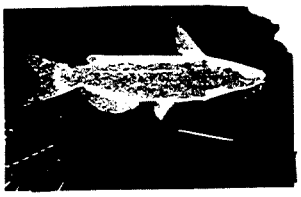
Aquaculture is the fastest growing area of agriculture. Several states, including Kansas, have either already or are presently employing various task forces to explore the possibilities of further developing aquaculture.

The oriental countries have been practicing aquaculture for centuries. There is nothing terribly complicated about it. They use several species of fish in combination in the same body of water. Each fish has its job to do. This system is refered to as polyculture.

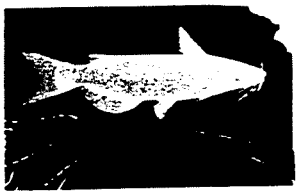
Grass Carp are one of the fish used in polyculture. They eat the rooted aquatic vegetation. Silver carp eat the microscopic plants (Phytoplankton). Big Head Carp eat the microscopic animals (Zooplankton) as well as some of the larger phytoplankton. Finally, the mud Carp feed upon the debris found along the bottom.

Grass Carp are presently legal in Kansas as well as many other States. They did not become legalized however without a considerable amount of debate. Aren't Bighead Carp in the same position Grass Carp were in at one time? Grass Carp are now present in virtually all waters within the State. They are a helpful tool in aquaculture. I no longer hear the controversy surrounding Grass Carp. Lets not limit ourselves to the use of only Grass Carp in aquaculture. We need Bighead Carp as well.

SENR
2/14/89
Attachment IV



WALLACE FISH FARM
R.R. 1, BOX 22
ALLEN, KS. 66833
(316) 443-5528

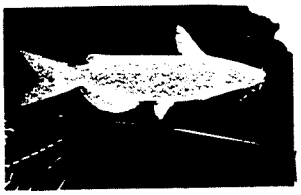


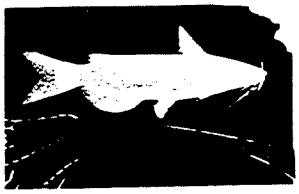
Kansas Commercial Fish Growers Association

According to a 1982 article found in the North American Journal of Fisheries Management entitled Distribution and Status of the Bighead and Silver Carp in Arkansas, the Bighead Carp was first introduced into the United States in 1973 by a private fish farmer in Arkansas. Bighead Carp are presently legal in the following states: Mississippi, Missouri, Arkansas, Alabama and Texas.

The only rationale for the denial of Bighead Carp usage in many states, including Kansas, seems to be, "better safe than sorry". If furnished with some information regarding the reproductive requirements of these fish maybe some people would consider them with more of an open mind. From the Commerce Departments Joint Sub-Committee on Aquaculture, the April 1980 issue entitled The Method of Cultivation of Grass Carp, Black Carp, Silver Carp and Bighead Carp reads as follows. "They grow rapidly in water rich in plankton. They have few diseases and are easy to grow. Sexual maturation is unattainable in quiescent water."

WALLACE FISH FARM
R.R. 1, BOX 22
ALLEN, KS. 66833
(316) 443-5528





Kansas Commercial Fish Growers Association

Why not use the native fish (Buffalo)? They used to be cultured in this country. The price for these fish has remained low over the years. Although they are harvested in the wild in certain northern states, they are not practical in a system of polyculture. They quite simply do not bring enough money to justify the extra work involved. Bighead carp are much more practical.

Bighead carp are referred to as filter feeders. They obtain their food by sifting microscopic food particles out of the water column. They improve water quality thus helping to prevent low oxygen problems. There is evidence to suggest that the immature free-swimming stages of certain aquatic parasites are filtered out of the water by these fish. They grow fast. Weights of up to eight pounds in three years are not uncommon. There is an increasing market for these fish in urban and metropolitan areas among Oriental populations.

To deny the commercial fish grower the use of Bighead carp is to retard the development of aquaculture. In what other areas of agriculture are exotics not found. I would not hesitate to say that there are no such areas. Why then should we be discriminated against?

6-3

TESTIMONY IN OPPOSITION TO S.B. 158

PRESENTED TO: SENATE ENERGY AND NATURAL RESOURCES COMMITTEE
SENATOR ROSS DOYEN, CHAIRMAN
FEBRUARY 14, 1989

Chairman Doyen and committee members, I am Joe Kramer, Chief of the Fisheries and Wildlife Division for the Kansas Department of Wildlife and Parks.

I am here to speak for the Agency in opposition to S.B. 158; specifically, to the proposed addition to paragraph 1 of K.S.A. 32-164a that would remove the current prohibition of Bighead Carp introductions into Kansas waters.

The 1976 legislature provided the State's wildlife resource agency the obligation and authority to restrict and regulate importation, introduction, and potential establishment of biologically and ecologically disastrous foreign exotic wildlife. The Bighead Carp, Aristichthys nobilis, and the Silver Carp, Hypophthalmichthys molitrix, along with the walking catfish, were the only fish species considered, at that time, to pose an immediate threat to Kansas' aquatic ecosystems and fisheries. That threat is even more prevalent today!

Both of these exotic Asian Carp are known to more effectively compete for food, principally plankton, at the bottom of the food chain than most of our native fishes. They are also more adept at competing for space. Direct reductions in production, recruitment, and growth of our most important sport fishes can be expected to result from successful establishment of these carp in our waters; lest we forget the common (European) carp and its aftermath! The potential ecological hazards resulting from the introduction of either of these two carp is well recognized among the nation's fisheries resource managers and ichthyological academicians.

Kansas rivers, reservoirs, lakes, and ponds currently support an annual recreational fishery valued at $248.3 million and involve over 554,000 sports anglers who spend more than 10.2 million

SE&NR
2/14/89
Attachment VII

recreational days fishing. Support services and industries, including bait and tackle, recreational and marine equipment, recreational vehicle and lodging, as well as the restaurant trade and fuel supplies, are impacted. Both of these exotic Asian Carp are capable of severely degrading all of these important Kansas economies.

The proposed change contained in S.B. 158 is specifically designed to promote the short term gain of Kansas Commercial Fish Producers at the potentially long-term loss of much of Kansas' established recreational sportfisheries economy. The proposed change implies that ALL waters in the state will be open to introduction of this species. No consideration is given to limiting the fish to controlled or regulated culture installations. No assurance is given that escapes will be controlled, or that each installation will assume responsibility for subsequent damage to either private or public trust fisheries resources.

Further, no mention has been made of the use of alternate native fish species. Our recent experience indicates that several native fish groups are capable of effectively using the same frequently unutilized food stores and offer similar growth, production, and market value potential. This potential specifically includes the coastal outlets of oriental fresh fish consumers.

Kansas natural resources do not need another disaster to further impair and degrade already stressed ecosystems and economies, neither for the short term, nor over the extended future. The quality of angling in Kansas is contained in this bill. Passage of the bill will severely limit that future.

OCT 1 1987

The University of Kansas

Museum of Natural History

October 12, 1987

Robert F. Hartmann
Department of Wildlife & Parks
Box 54 A
Pratt, Kansas 67124-9599

Dear Bob:

I am satisfied that the fish Billy Cox brought me on September 25 is a bighead carp, Aristichthys nobilis. Its characters fit that species with respect to body form and pigmentation, extent of the ventral keel, form of the gill rakers, and scale and finray counts. Frankly I hoped to find some indication of hybrid relationship, but I can't reach that conclusion. The specimen has been preserved in formalin and transferred to ethanol. We'll retain it here pending further instructions.

I also have your request for my assessment of the potential impacts of bighead and/or silver carp introductions to fish faunas in Kansas (your letter of October 2). My response follows.

If these species became established "in the wild" the eventual impact on native species will be harmful, probably severely so. The bighead and silver carps are large, relatively long-lived fishes capable of reaching high population densities. They are effective planktivores. Their feeding efficiency and high food consumption rates are, basically, the reason for interest in their introduction. This presents a problem because nearly all native fishes depend on plankton as a food source at some stage of their life history. Even major game fishes (walleye, largemouth bass, white bass, and others) are planktivorous initially; later, they depend on prey species many of which are planktivorous throughout their lives. Competition between bighead carp (or silver carp) and native fishes would certainly be expected. The effects of competition would not be limited to one or two native species; successful introductions rarely result only in single-species substitutions. The entire fauna would be affected in various ways, depending on the abundance of the exotics. Competition for space as well as food, habitat alteration, and reproductive interference have occurred following other introductions (Taylor et al., 1984) and could occur here. The full extent of the effects might not be apparent until many years after the introduced species become established. That has been the history of other introductions -- common carp, Tilapia spp., grass carp, Gambusia spp. (among fishes) and many terrestrial animals.

The harmful effects that bighead and silver carp could have on natural fish communities are compounded by the occurrence of common carp and grass carp in this region. Common carp are omnivores, feeding on aquatic insects, other bottom-dwelling organisms, and algae; grass carp feed mainly on the larger aquatic plants; bighead carp feed mainly on zooplankton and silver carp largely on phytoplankton (Shireman, 1984, and other literature). This combination of species occupies all the basic lines of production (food chains) that sustain

Dyche Hall • Lawrence, Kansas 66045-2454 • (913) 864-4540

2/14189

2-2

the natural fish fauna. Their combined impact on native species could be disastrous if all became established in open stream and lake systems, as common carp have done, and grass carp are now in the process of doing. Grass carp, first introduced into the U.S. less than 25 years ago, now occur in open systems from South Dakota and Minnesota to New York state, south to Florida and Texas; evidence of natural reproduction has been recorded in the Trinity, Atchafalaya, Mississippi, and Missouri rivers (Courtenay et al., 1984, 1986; Pflieger, pers. comm.).

It must be recognized that the ecological status of these species in uncontrolled, natural systems differs vastly from their status in controlled fish-culture systems where the numbers and sizes of fish as well as the species-combinations used can be manipulated at will. There is no question about the utility of bighead and/or silver carp as companion species with subadult channel catfish in rearing ponds, or about the value of grass carp in intensive culture of bait minnows. Other examples where use of these exotics is advantageous can certainly be cited. But to assume that the same advantages apply in open, unmanaged, natural systems is plainly wishful thinking.

Whether the exotics can be prevented from escaping into open systems from fish-culture operations is problematical. This would impose design constraints on the production facilities, and restrictions on the way the facilities are operated and the ways in which the fish produced can be used. For instance, if fish were sold for stocking ordinary ponds and lakes (public or private), some would surely escape with overflow and disperse through stream systems. It might be argued that bighead carp and silver carp are not likely to reproduce, establishing self-sustaining populations in the wild. But precedents involving other exotic fishes (including most recently the grass carp) are not reassuring.

In short, I believe that legal restraints on use of bighead carp and silver carp are justified. Some accommodation with the commercial fishing industry that would allow use of these species under carefully regulated conditions merits discussion because of their internal value to such operations. I am not optimistic that the necessary safeguards can be established, however.

Sincerely,

Frank Cross

Frank B. Cross
Curator/Ichthyology

P.S. The publications cited are in two volumes: Distribution, biology, and management of exotic fishes, John Hopkins Press, 1984 (various chapters); and the zoogeography of North American freshwater fishes, Wiley Interscience, 1986. Information was drawn from numerous other publications and reports also, including those dealing with the biology and culture of bighead and silver carps specifically.

FBC/kc

PROPOSED BILL NO. _____

By

AN ACT concerning water; relating to minimum streamflows; amending K.S.A. 1988 Supp. 82a-703c and repealing the existing section.

Be it enacted by the Legislature of the State of Kansas:

Section 1. K.S.A. 1988 Supp. 82a-703c is hereby amended to read as follows: 82a-703c. In accordance with the provisions of K.S.A. 82a-703a, and amendments thereto, the legislature hereby establishes the following minimum desirable streamflows:

Table--MINIMUM DESIRABLE STREAMFLOWS (cfs)

Watercourse	Month											
Marais des Cygnes	J	F	M	A(a)	M(a)	J(a)	J	A	S	O	N	D
Ottawa ...	15	15	15	15(40)	20(50)	25(50)	25	25	20	15	15	15
LaCygne...	20	20	20	20(50)	20(150)	25(150)	25	25	20	20	20	20
Neosho												
Americus..	5	5	5	5(20)	5(30)	5(30)	5	5	5	5	5	5
Iola.....	40	40	40	40(60)	40(200)	40(200)	40	40	40	40	40	40
Parsons...	50	50	50	50(100)	50(300)	50(300)	50	50	50	50	50	50
Cottonwood												
Florence..	10	10	10	10(30)	10(60)	10(60)	10	10	10	10	10	10
Plymouth..	20	20	20	20(60)	20(150)	20(150)	20	20	20	20	20	20
Little Arkansas												
Alta Mills	8	8	8	8	8	8	8	8	8	8	8	8
Valley Center..	20	20	20	20	20	20	20	20	20	20	20	20
Arkansas River												
Kinsley (b)	2	2	3	3	5	5	3	1	1	1	2	2
Great Bend (b)	3	3	3	3	10	10	5	3	2	2	2	3
Hutchinson	80	80	100	100	100	100	80	80	60	60	60	80
Rattlesnake Creek												
Macksville (b)	5	5	10	10	10	10	5	1	1	1	5	5
Zenith.....	15	15	15	15	15	15	5	3	3	3	10	15
North Fork Ninnescah												
Above Cheney....	40	50	50	50	40	30	10	5	5	10	40	40
South Fork Ninnescah												
Pratt.....	10	10	10	8	8	8	5	5	5	5	10	10
Murdock....	80	90	90	90	90	50	30	30	30	50	80	80

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Attachment VIII

Ninnescah												
Peck.....	100	100	100	100	100	70	30	30	30	50	100	100
Saline												
Russell...	5	5	15	15	15	12	2	2	2	5	5	5
Smoky Hill												
Ellsworth(c)	20	20	25	30	35	45	35	15	15	15	20	20
Medicine Lodge												
Kiowa.....	50	55	60	60	40	30	6	1	1	4	40	50
Chikaskia												
Corbin....	30	45	50	45	40	30	16	5	5	8	30	30
Big Blue												
Marysville	100	100	125	150	150 (d)	150 (d)	80	90	65	80	80	80
Little Blue												
Barnes....	100	100	125	150	150 (d)	150 (d)	75	80	60	80	80	80
Republican												
Concordia (e)	100	125	150	150	150	150	150	150	80	65	80	100
Clay Center	125	150	200	250	250	250	200	200	100	90	100	125
Mill Creek												
Paxico.....	8	8	8	25	30	35	10	5	5	2	5	8
Delaware												
Muscotah...	10	10	20	20	20	20	5	3	3	2	10	10
Walnut River												
Winfield.	30	35	40	65	100	100	30	25	20	20	20	30
Whitewater River												
Towanda..	10	15	15	20	25	25	10	5	5	5	6	10
Spring River												
Baxter Springs (f)	175	200	250	300	450	350	200	160	120	120	150	175
Chapman Creek												
Chapman..	10	15	15	15	15	15	10	10	10	10	10	10
Solomon River												
Niles....	40	50	60	60	90	90	50	50	40	40	40	40

(a) Spawning flows to be managed if reservoirs in flood pool; otherwise use lower flows.

(b) Subject to subsequent assessment of lagged effects of extensive groundwater appropriations in regional aquifer.

(c) Subject to subsequent assessment of lagged effects of upstream depletions.

(d) Subject to the stateline flows contained in the Blue River Compact.

(e) Subject to subsequent assessment of Harlan County reservoir operations, development of compact stateline flows and lagged

effects of upstream depletions.

(f) Flows measured at Quapah, Oklahoma; may need review if a new station is established.

Sec. 2. K.S.A. 1988 Supp. 82a-703c is hereby repealed.

Sec. 3. This act shall take effect and be in force from and after its publication in the Kansas register.