Kansas Department of Wildlife & Parks
Striped Bass Hybrid
Species Management Plan

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Executive Summary

A quick glance at the Resource and Research Needs list of this report clearly shows there are more questions than answers about how to best manage the striped bass hybrid in Kansas waters and how they affect other fishes. There is a shortage of research on the striped bass hybrids, which makes our task more difficult.

The Department of Wildlife & Parks (KDWP) has stocked striped bass hybrids in impoundments ranging from small (Garnett Kids Pond, 0.5 acres) to large (Milford Reservoir, 16,000 acres). Since 2003 KDWP has stocked striped bass hybrids in 13 federal reservoirs, 7 state fishing lakes and 38 community lakes using fry, fingerlings and intermediates either alone or in various combinations (KDWP fisheries division stocking database). All three sizes of fish stocked have been successful in establishing populations of varying densities.

KDWP has shown the capability to produce, stock and establish striped bass hybrids in Kansas waters, now we need to determine how they can best benefit Kansas anglers and fisheries resource managers.

The striped bass hybrid may have a bad reputation with some anglers because they feel the large predator eats their favorite fish. The research papers found in preparing this report don't support those fears. The "wiper" most often prefers gizzard shad that are about 3 inches in length even though it can and does eat larger prey. Being a predator the striped bass hybrid does compete with other predators for food, which is why the district fisheries biologist annually monitors the fish populations in their lakes. By doing so and using condition of the fish sampled, they can determine if the predators are growing at an acceptable rate and adjust stocking rates to allow for adequate growth for all predators present.

Introduction

The purpose of this Species Management Plan is to standardize the approach taken by the Kansas Department of Wildlife and Parks (KDWP) and its district fisheries biologists for management of striped bass hybrids in Kansas waters.

Striped bass hybrids are artificially produced offspring of the striped bass (*Morone saxatilis*) and the white bass (*Morone chrysops*).

The majority of striped bass hybrids stocked in Kansas have been **palmetto bass** (*M. saxatilis* ♀ x *M. chrysops* ♂) considered the "original" cross. Some **sunshine bass** (*M. chrysops* ♀ x *M. saxatilis* ♂) or "reciprocal" cross have also been stocked. Kansas anglers most often refer to the striped bass hybrids as "wipers" which is a common name that includes both crosses.

The striped bass hybrid has become an important tool for management biologists in Kansas to provide a pelagic predator to help manage abundant gizzard shad (*Dorosoma cepedianum*) populations and to provide fishing opportunities for Kansas anglers. However, Dettmers et al. (1998) found hybrid stripers less than 250 mm preferred gizzard shad $\leq$ 40 mm, and that they preferred prey smaller than predicted by models and gape size. Ott and Malvestuto (1984) found hybrid striped bass seldom consumed gizzard shad > 65 mm. Although Jahn et al. (1987) found striped bass hybrids prefer gizzard shad, Neal et al. (1999a) found hybrids fed mainly on small ($\leq$ 15 mm) bluegill *Lepomis macrochirus*, redear *Lepomis microlophus*, and black crappie *Pomoxis nigromaculatus* in ponds. Neal et al. (1999a) found that *Wr* and lengths of bluegill, redear sunfish and black crappie increased in the presence of hybrid striped bass in ponds, but Layzer and Clady (1982) found changes in bluegill population structure could not be attributed to predation by striped bass hybrids.

History

The first striped bass hybrids were stocked in Kansas during the 1970's. In 1977, sunshine bass were produced at a temporary hatchery at Wilson Reservoir, and 160,000 fry were stocked in Marion Reservoir. Also 10,000 fry were stocked at the Farlington Fish Hatchery for fingerling production, and 9,500 fingerlings from Farlington were later stocked in Sebelius Reservoir.

Kansas has sporadically produced fry since 1977 using wild caught striped bass. Between 1977 and 1989, Kansas produced approximately 4 million striped bass hybrid fry at the temporary hatchery at Wilson Reservoir, the Pratt Hatchery and the Milford Hatchery. During this time frame small numbers of fry were received from Texas and Virginia on an irregular basis. Starting in 1990 KDWP and the Oklahoma Department of Wildlife Conservation began a fish trade agreement where Kansas provided Oklahoma with 3 million walleye fry in exchange for 3 million palmetto bass fry.

Because Kansas had no spawning populations of striped bass it was extremely difficult to locate and collect male and female striped bass to produce striped bass hybrid fry. In 1992 KDWP experimented with creating a domestic striped bass brood fish (adult fish that could be maintained on an artificial diet). Efforts to spawn the domestic brood fish and produce striped bass hybrid fry started in 1997 at the Milford Hatchery and resulted in the production of 372,000 fry. Improvements in technique resulted in production of almost 4 million fry from the domestic brood fish in 2005. During the first years the domestic brooders were used to produce the palmetto bass. Starting in 2006 both palmetto bass and sunshine bass were produced using the domestic striped bass brood fish. Those efforts resulted in the production of 4.67 million palmetto bass and 2.7 million sunshine bass fry.

The fish culture section improved its ability to provide fingerlings and phase II (150-250 mm) or intermediate striped bass hybrids to the management biologists. Between 1977 and 1989 KDWP hatcheries produced just over 600,000 striped bass

hybrid fingerlings to stock in Kansas waters. Since then, KDWP hatcheries produced over 6 million striped bass hybrid fingerlings. The palmetto bass fry from the Byron Hatchery in Oklahoma provided for the increased fingerling production in the KDWP hatcheries.

Phase II fish were first reared in 1985 when 825 fish were reared on artificial diets at the Farlington Fish Hatchery. Improvements in technique and greater availability of fingerlings allowed the hatcheries to produce an average of 31,800 Phase II fish per year from 2002 through 2005.

The current state record striped bass hybrid (22.39 pounds and 31.1 inches long) was caught in July 2005 below Perry Reservoir.

Population Evaluation

Standardized sampling procedures for striped bass hybrids are outlined in Fish Survey Techniques for Small Lakes and Reservoirs, Fourth Edition (Mosher et al. 2004).

Striped bass hybrids are effectively sampled in October with monofilament gill nets. One compliment consists of four 100- by 8-feet nets (1.0-, 1.5-, 2.5-, and 4.0-inch bar measure) as described by Mosher et al. (2004). The effort recommend by Mosher et al. (2004) is determined by surface acres as follows:

Surface Acres	Minimum Effort	Recommended Effort
<300	1	2
300-2000	2	3
2000-6000	4	5
6000-9000	5	8
>9000	6	9

Each gill net compliment should be located on a main stem point adjacent to a channel break. Net sets that are half on the point and half over the channel break are quite effective. This requires the use of a depth finder. Once a reliable location is discovered, GPS can be used to return to the same spot for catch rate comparison between years.

Two optional techniques are available for sampling:

1. If excessive mortality of striped bass hybrids in overnight gill net sets is a concern, short set gills nets as described in “Fish Survey Techniques for Small Lakes and Reservoirs” Fourth Edition (Mosher et al. 2004) could be used to reduce such mortality.
2. Night electrofishing in mid-September has been used to sample YOY that will not be large enough to be caught in standard fall gill net compliments. Catch per hour would be a measure of stocking success.

Population Assessment

A good population of hybrid striped bass should provide anglers with a reasonable expectation of catching some "preferred" individuals (380 mm– 509 mm); and good numbers of harvestable individuals, but is unlikely to catch any "lunker" individuals (510 mm +) (KDWP fishing forecast).

Hybrid striped bass are generally found in open water areas. Although these open water predators are stocked in various Kansas waters to help control expanding adult gizzard shad (*Dorosoma cepedianum*) populations, Dettmers et al. (1996; 1998) found striped bass hybrids to be of little value for this purpose. Some control of gizzard shad is achieved when hybrid stripers were stocked in densities greater than 350/ha and gizzard shad populations are lower than $25/m^3$ (Dettmers et al. 1998).

Hybrid striped bass do have the potential to compete with other predators for prey (Neal et al. 1999a). However, in most instances these predators tend to stop feeding when prey are lacking or in low densities. When this occurs, condition values decline resulting in death if prey is not restored (Fourt et al. 2002).

Hybrid striped bass are best known for their rapid growth occurring when water temperatures are above 15˚ C. However, optimum growing conditions occur when water temperatures are between 25 to 27˚ C (Douglas and Jahn 1987). Hybrids in Kansas impoundments grow quickly and are relatively long-lived. The oldest documented was nine years of age from Milford Reservoir (Freeman & Schultz, unpublished data). Hybrids grow rapidly during their first two years of life. Growth to 275-375 mm and 225-350 grams in the first year and 450-550 mm and 1,000-1,500 grams in the second year is common (Dr. Peter Perschbacher UAPB, Aquatic Fisheries Center). Growth rates decline rather rapidly with age after the second year.

Hybrid striped bass normally reach trophy size by age 6. Gablehouse (1984) suggested that hybrid striped bass are trophy size if they are between 584 and 633 mm. Hybrids in Cedar Bluff, Keith Sebelius (Norton) and Webster Reservoirs attained trophy size by age five and hybrids in Milford and Lovewell Reservoirs attained trophy size by age six (Freeman & Schultz, unpublished data).

Kansas fisheries managers are still trying to assess whether creel limits for hybrid striped bass are sufficient, whether length limits are adequate, whether stocking rates are adequate or excessive, due to the lack of data on the age structure and growth of this species (Freeman & Schultz, unpublished data).

Growth of striped bass hybrids has been fairly consistent across the state (Table 1; Freeman and Schultz, unpublished data). Although fish grew slower at Milford Reservoir, they lived longer.

Table 1.--Mean total length (mm) at age of hybrid striped bass collected from six Kansas reservoirs during 1995-2001. Parenthetic values are standard errors; *N* is number per age class.(Unpublished data collected by Freeman and Schultz).

	Age								
Reservoir	1	2	3	4	5	6	7	8	9
Norton	368	452	500	558	599	623	675	675	
	(3.1)	(2.3)	(2.4)	(4.4)	(4.1)	(6.4)	(22.8)	(8.4)	
N	63	67	62	29	26	26	28	11	
Cheney	350	434	483	495	559			572	
	(4.3)	(5.1)	(5.5)	(14.3)	(16.0)				
N	61	49	33	12	2			1	
Lovewell	345	414	456	516	529	624			
	(3.3)	(4.4)	(6.9)	(5.7)	(5.0)	(47.5)			
N	63	62	49	14	16	2			
Cedar Bluff	336	428	505	543	587	602			
	(3.0)	(6.3)	(3.9)	(4.3)	(4.6)	(9.2)			
N	108	50	71	53	38	16			
Webster	333	438	484	526	616	627	715		
	(11.8)	(5.2)	(5.3)	(3.4)	(7.2)	(9.7)	(6.5)		
N	42	57	62	110	53	25	6		
Milford	274	361	458	501	550	599	560	687	720
	(6.0)	(8.6)	(9.0)	(5.7)	(8.1)	(7.9)	(.)	(23)	(.)
N	60	70	62	56	23	16	1	2	1
High	368	452	505	558	616	627	715	687	720
Low	274	361	456	495	529	599	560	572	
Average	334	421	481	523	573	615	650	645	

Management Actions

Stocking

Although hybrid striped bass may occur naturally (Crawford et al. 1987) and are fertile (Avise et al. 1984; Harrell 1984), striped bass hybrids must be artificially produced and stocked to establish and maintain populations in Kansas impoundments. Jahn et al. (1987) found hybrids less than 20 mm stocked in June had higher survival and greater growth than larger and later stocked fish in IL because they could take greater advantage of newly spawned gizzard shad. Stocking may need to be earlier in Kansas to feed on earlier spawning gizzard shad.

A NEPA (National Environmental Policy Act, 1969) form must be filed and stocking approved by Environmental Services before striped bass hybrids may be stocked into a body of water in Kansas. Although there are no restrictions for size of water body, Glass and Maughen (1985) found introductions were more successful in impoundments greater than 2000 hectares. Neal et al. (1999a) found that striped bass hybrids adversely affected largemouth bass when stocked in small impoundments. However, Gilliland and Clady (1982) found diet overlap between largemouth bass and hybrids was limited in a 2185-hectare impoundment in Oklahoma. Flushing should also be considered when stocking hybrid striped bass because they readily leave impoundments with high flushing rates (Turner 1986; Jahn et al.1987; Prophet et al. 1991). Striped bass hybrids prefer water temperature < 25C with dissolved oxygen > 2 mg/l during the summer (Douglas and Jahn 1987), so candidate lakes should have these attributes to enhance stocking success. Stocking methods are left to the discretion of the district fisheries biologist.

Stocking Rate Guidelines are as follows:

SIZE	TYPE	DENSITY	WATER
Fry	Initial/Maintenance	50-200/Acre	No restrictions
Fingerling	Initial	2-10/Acre	No restrictions
Intermediate	Initial	1-10/Acre	No restrictions
Fingerling	Maintenance	1-10/Acre	No restrictions
Intermediate	Maintenance	2-10/Acre	No restrictions

Deviation from these rates requires justification and approval through the normal chain of command.

Stocking rates should be adjusted to provide for a minimum W_r of 85 for fish of greater than stock length.

District fisheries biologists will request only one size of fish per year for each impoundment or a combination of sizes with each size requested limited to one-half of maximum stocking density if there are two sizes requested.

If the 5-year average catch per NCN is below 2 fish, stocking should be discontinued.

Use of the striped bass hybrid in combination with saugeye (*Sander vitrewus x S. canadensis*) has shown promise in improving crappie populations in small Kansas lakes (Ken McCloskey KDWP, personal communication). McCloskey believes the combination improves the crappie population through the saugeye preying upon and reducing crappie numbers and the striped bass hybrid preying on and reducing gizzard shad numbers and providing good numbers of young of the year (YOY) shad for crappie growth. This goes counter to what Dettmers et al. (1996, 1998) concluded in the study of striped bass hybrids effects on gizzard shad populations. Additionally, improvement in the crappie population occurred in Lake Shawnee after several years of walleye and striped bass hybrid stockings (Richard Sanders KDWP, personal communication), and Mosher (2001) noted improved crappie populations in four small Kansas lakes by stocking saugeye alone.

Stocking of triploid striped bass hybrids has been suggested as a way to protect the genetic integrity of Kansas white bass population. The concern is white bass and striped bass hybrid could back cross (Avise and Van Den Avyle 1984). In personal communication with the current KDWP district fisheries biologists, none had observed anything suggesting this is currently taking place. Though it does require concern and monitoring, a rush to stock triploid fish is not necessary.

Length Limits

Currently, district fisheries biologists have three length limit options: No length limit, 18-inch minimum and 21-inch minimum.

Length limits are imposed in an attempt to maintain larger fish in the population for a longer time to provide greater predation on prey fish, reduce over populated fishes, especially aquatic nuisance fish species, or to provide a "trophy" fishery.

Length limits are only effective if the released fish survive. There are no studies of the survival of striped bass hybrids after catch and release. However, studies conducted on catch and release of striped bass, indicate increased mortality as water temperatures increase during the summer months (Hysmith, 1992; Nelson, 1995; Tomasso and Isley, 1996; Wilde, 2000). Increased angling mortality of hybrid stripers has been observed at Milford Reservoir during the summer months (John Reinke, personal communication). Arkansas recommends that any length limit for striped bass or their hybrids "should be removed during July, August and September" because of increased hooking mortality that occurs during that time (Fourt et al 2002).
The Department should inform anglers of the potential for increased angling stress mortalities during the hot months of July, August and September and encourage minimal handling of the hybrids during this time.

Creel Limits

The current statewide creel limit for striped bass hybrids in Kansas is 2 fish per day. District Fisheries Biologists do have the option to increase the creel limit to 5 fish per day under conditions such as:

1. Wr's of the hybrid population are below 75.
2. CPUE of stock fish consistently exceeds target level.

Research and Resource Needs

- Determine if white perch are effectively preyed on by striped bass hybrids in Cheney Reservoir.
- Continued development of "Domestic" striped bass brood fish year classes every four to five years.
- Compare growth and survival of sunshine bass to palmetto bass to determine most efficient cross to stock in Kansas lakes.
- Some concern has been expressed that F_2 hybrids between stocked F_1 fish and natural white bass could cause genetic introgression that could be detrimental to natural white bass populations (Avise and Van Den Avyle 1984). *Morone* populations should be monitored to ensure this does not occur in Kansas.
- Consider use of triploid induced fry for stocking in Kansas waters.
- Hybrid striped bass have been shown to be detrimental to largemouth bass populations in small impoundments (Neal et al. 1999); populations in Kansas should be monitored to ensure this does not occur.
- Hybrid striped bass have a tendency to escape impoundments with high flow rates (Jahn et al. 1987; Prophet et al. 1991). Determine what impoundments most effectively retain hybrid striped bass in Kansas.
- Hybrid striped bass prefer waters with temperature <25ºC with DO > 2 mg/l during the summer (Douglas and Jahn 1987). Profiles of Kansas waters should be conducted to ensure preferred habitat before stocking is completed.
- Determine if hooking mortality during the months of July through September is significant in Kansas's impoundments.
- Do length limits for hybrid striped bass achieve their goals?
- Determine if hybrid striped bass, used in combination with saugeye, can promote healthier populations of crappie in small lakes in Kansas.
- Survey anglers to determine current use of striped bass hybrid populations.
- Determine what density of forage is required to support healthy populations of striped bass hybrids.

STRIPED BASS HYBRID STOCKING SCORE SHEET

Region _____ Lake/Rearing Facility _____Date

STRIPED BASS HYBRID RANKING CRITERA

1. Ownership _____
   A. KDWP, Federal or enhanced CFAP: (5 points and continue)
   B. Not enrolled in Enhanced CFAP: (Automatic Zero Score, don't continue)

2. Habitat (maximum 20 pts) _____
   A. Storage Ratio/Drainage Index
      i. <2 (0 pts)
      ii. 2-4 (10 pts)
      iii. >4 (15 pts)
   B. Average Lake Clarity (Secchi disk/average)
      i. >12" (5 pts)
      ii. <12" (-5 pts)

3. Population Dynamics (maximum of 45 pts) _____
   A. Forage Availability
      i. Shad Present (10 pts)
      ii. Shad Absent (0 pts)
   B. Forage Density (use 3-year mean)(select only one)
      i. Shoreline Seining Shad YOY
         1. >75 (10 pts)
         2. 40-75 (5 pts)
         3. <40 (0 pts)
      ii. Gill Net Shad / NCN
         1. 25 (10 pts)
         2. 10 – 25 (5 pts)
         3. <10 (0 pts)
   C. Predator Population (Morone/Percid Average)
      (Wr of fish > stock length)
      i. >85 (10 pts)
      ii. <85 (0 pts)
   D. Stocking Success (use 5-year mean when possible)
      i. Catch per NCN > 5 (15 pts)
      ii. Catch per NCN 2-5 (5 pts)
      iii. Catch per NCN <2 (discontinue stockings if 5-year mean)(0 pts)

4. Angling Pressure (maximum 10 pts) _____
   (population density)
   A. 20,000 w/in 25 mile radius (10 pts)
   B. 20,000 w/in 50 mi radius (5 pts)
   C. 20,000 w/in 100 mi radius (2.5 pts)

5. Special Management (maximum 15 pts) _____
   (beyond standard sampling and documented in P&M Reports)
   A. Yes (15 pts)
   B. No (0 pts)

6. Fish Screen Present (maximum 10 pts) _____
   (DWR approved w/ 10 yr flood event capacity)
   A. Yes (10 pts)
   B. No (0 pts)

Striped Bass Hybrid Total Score: _____
(Maximum 100 pts)

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