Final Report

Missouri Commercial Fish Harvest

2000-2012

Missouri Department of Conservation

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EXECUTIVE SUMMARY

- This report contains a summary of Missouri's commercial fishery data for 2000 - 2012 and a synthesis of the harvest trends for the last 68 years (1945-2012).
- From 2000-2012, the number of commercial permits issued and the number of licensed commercial fishers that reported harvest has generally declined for both resident and non-resident fishers.
- The majority of the commercial harvest reported was caught by relatively few fishers each year and the top 25 fishers each year accounted for 70 to 83% of the annual harvest from 2000 to 2012.
- From 2000-2012, commercial harvest peaked at 914,721 pounds in 2001, and has on average declined since that year, with a low of 244,491pounds of fish harvested in 2010.
- During the thirteen year period from 2000 to 2012, over 50% of the total pounds harvested were taken from the Mississippi River, except for 2006 where 51% of the pounds harvested came from the Missouri River.
- Combined across all rivers, buffalofishes, catfishes, common carp, and Asian carp average 86% of the total harvest from 2000-2012 and account for the largest groups of fish that are harvested commercially in Missouri.
- Over the last thirteen years, the harvest of Asian carp has increased to 15% of the total harvest in 2012, making them the third most harvested fish group.
- Since the Similarity of Appearance provision of the Endangered Species Act was enacted in 2010, we have not observed a shift in harvest effort from the open rivers portions to the pooled portion of the Mississippi River.

ABSTRACT

In Missouri, rivers open to commercial fishing include the Missouri River, Mississippi River and the portion of the St. Francis River that forms a common boundary between Arkansas and Missouri. Data obtained from the reports of commercial fishers have been compiled and analyzed since 1945 to provide harvest trend information to help the Missouri Department of Conservation (MDC) monitor, evaluate, and better understand the rivers' commercial fisheries. Commercial fishers return monthly reports indicating river fished, pounds harvested by species, and the type and quantity of gear used. The total annual harvest is calculated within species groups, individual species and individual rivers. The total number of commercial fishers who purchased gear licenses have decreased overall from 2000-2012. The top four groups of fish harvested from 2000 -2012 were buffalofishes, catfishes, common carp, and Asian carp. Buffalofishes were the most numerous species group caught and comprised 22 to 45% of the total annual harvest from 2000-2012. The three catfish species (flathead, blue, and channel) were also commonly harvested and accounted for 17 to 41% of the total annual harvest from 2000-2012. While, harvest of common carp has fallen from 113,436 pounds (19% of the total annual harvest) in 2000 down to only 14,528 pounds (4% of the total annual harvest) in 2011; annual harvest of Asian carp (typically bighead, silver, and grass) has increased from 8% in 2000 to 15% of the total annual harvest in 2012. The total annual harvest of shovelnose sturgeon was highest in 2001 at 77,811 pounds and lowest in 2012 with 159 pounds harvested. Shovelnose sturgeon harvest has drastically declined potentially because of the Similarity of Appearance (SOA) provision of the Endangered Species Act which closed commercial harvest of shovelnose sturgeon in the Missouri River and in the open river portion of the Mississippi River (below Locks and Dam 26). During this time period, paddlefish annual harvest was highest in 2002 at

21,427 pounds and lowest in 2012 with 1,590 pounds. The commitment that is made by commercial fishers and MDC to reporting on and maintaining the commercial fishing program continues to provide interaction between each group and provide relevant information about research and management of our commercial fishery resources.

INTRODUCTION

Seines, gill nets, trammel nets, hoop nets, and trot lines may be commercially fished in the Missouri River, the Mississippi River and the portion of the St. Francis River that forms a common boundary between the states of Arkansas and Missouri subject to certain restrictions (Wildlife Code of Missouri). A commercial fisher must purchase a permit (resident or non-resident) and license each gear that is fished. In order to harvest roe bearing species (shovelnose sturgeon, paddlefish, or bowfin) a resident or non-resident roe fish commercial harvest permit has been required since July of 2009.

Since 1945, data have been compiled and analyzed to provide harvest trend information to help us monitor, evaluate, and better understand each river's commercial fishery. This report contains commercial fishery data for 2000-2012, and a discussion of harvest trends for the last 68 years (1945-2012).

METHODS

Commercial fishers are required to report their daily harvest monthly, indicating river fished, pounds harvested by species, and type and quantity of gear used. When harvest is mentioned in this report, we are referring to the harvest that is reported to the Missouri Department of Conservation, fully understanding that there may be harvest occurring that may not be reported. Data from the reports are entered into spreadsheets for summarization and analysis. The number of fishers, amount and type of gear used (seine, trammel net, gill net, hoop net, and trotline) and percent of total harvest by the top 25 fishers are quantified each year. Annual catch was summarized by species for the Mississippi, Missouri, and St. Francis Rivers.

Information for some fish species was collected by species groups rather than individual species. These species groups represent the following species in this report.

- Buffalofishes: bigmouth buffalo, smallmouth buffalo, black buffalo
- Catfishes: flathead catfish, channel catfish, blue catfish
- Suckers: blue sucker, shorthead redhorse, river redhorse, golden redhorse, black redhorse, spotted sucker
- Carpsuckers: river carpsucker, quillback, highfin carpsucker
- Gars: longnose gar, shortnose gar, spotted gar
- Bullheads: black bullhead, yellow bullhead
- Asian Carp: bighead, silver, and black carp
- Softshell Turtles: midland smooth softshell, eastern spiny softshell

FINDINGS

Numbers of Fishers

From 2000-2012, the number of commercial permits issued has generally declined, with a high of 356 commercial permits issued in 2000 to a low of 216 in 2011 (Figure 1; Table 1). The number of licensed commercial fishers that harvested fish has also declined from a high of 250 in 2002 to a low of 126 in 2011 (Figure 1; Table 1). The number of non-resident commercial fishers that have been issued a commercial fishing permit, as well as the number of licensed non-resident commercial fishers that have harvested fish, has also declined over the thirteen year period (Table 1).

Gear Used

In 2000 and 2001, hoop nets were the most commonly used gear in all three commercially fished rivers. In 2002, there was a shift from hoop nets to trammel nets on the Missouri and Mississippi rivers (Table 2-14) except during the floods in 2010 when hoop nets were again more frequently used. During this time on the Mississippi river, gill nets and trotlines were more frequently used. On the St. Francis River from 2002 – 2012, hoop nets and trotlines were the most frequently used commercial fishing gear.

Harvest

The majority of the commercial harvest was caught by relatively few fishers each year (6-13 fishers harvested 50% of the annual total) and the top 25 fishers each year accounted for 70 to 83% of the annual harvest from 2000 to 2012 (Figure 2-14). From 2000-2012, commercial harvest peaked at 914,721 pounds in 2001, and has on average declined since then, reaching a low of 244,491pounds of fish harvested in 2010 (Figure 15). However, within the last two years (2011-2012) harvest has increased slightly (Table 15-27, Figure 15). The average total harvest for this thirteen year period was 505,639 pounds. During the thirteen year period from 2000 to 2012, with the exception of 2006, over 50% of the total pounds harvested were taken from the Mississippi River (Table 15-27, Figure 16). Less than 1% of the total pounds harvested were taken from the St. Francis River annually.

Across all rivers, buffalofishes, catfishes, common carp, and Asian carp account for the largest groups of fish that are harvested commercially in Missouri (Figure 17). Combined, these four groups average 86% of the total harvest from 2000-2012. Buffalofishes consistently rank at the top for the greatest percent of total harvest each year with only one exception in 2010. Over the thirteen year period buffalofishes averaged 38% of the total harvest. Catfishes as a group

averaged 26% of the total harvest when the St. Francis and Mississippi Rivers were combined during 2000-2012. Despite catfish harvest being prohibited on the Missouri River since 1992 a small amount of commercial harvest is still reported (Protection Division was contacted in each case). Common Carp have fallen in the ranking from the third most harvested fish with 19% of the total harvest in 2000 to the fourth most harvested fish in 2012 at 4% of the total harvest. Asian carp (bighead and silver carp) harvest has only been reported since 1992, but over the last thirteen years the harvest of Asian carp has increased to 15% of the total harvest in 2012, taking over third place on the list (Figure 17).

Shovelnose sturgeon, paddlefish, and bowfin are all targeted for the caviar market; however bowfin harvest is minimal and accounts for less than 1% of the total harvest each year. From 2000-2012, a total of 258,949 pounds of shovelnose sturgeon were commercially harvested from Missouri waters. Sturgeon harvest peaked in 2001, at 77,811 pounds and was lowest in 2012 with only 159 pounds being reported (Figure 18). This drastic decline coincides with the SOA provision of the Endangered Species Act which closed commercial fishing for shovelnose sturgeon in the Missouri River and in the open river portion of the Mississippi River (below Locks and Dam 26). Before SOA, the open river portion of the Mississippi River accounted for 88% of the shovelnose sturgeon pounds harvested from 2000 through 2009. Since SOA was instated in 2010, we have not observed a shift in harvest effort from the open rivers portions to the pooled portion of the Mississippi River (above Lock and Dam 26) (Figure 18). Paddlefish harvest reached a high in 2002 at 21,427 pounds and was lowest in 2012 at 1,590 pounds (Figure 19). The supply and demand of the caviar industry may have an impact on roe fish species harvest. Record high flooding events in 2010 and a record low drought in 2011may also be influencing this trend.

TRENDS IN THE COMMERCIAL FISHERY PROGRAM DATA, 1945-2012

Numbers of commercial fishers

The number of fishers purchasing commercial permits has fluctuated annually over the 68 years when harvest was required to be reported. Overall, there was a general decline in total number of purchased commercial fishing permits from 1948 until 1969, after this time period the number of permits issued increased until 1982 with a peak of 1,801 permits purchased. Numbers declined sharply in the 1980's, and since 1993, the number of commercial fishers has remained below 400, reaching an all-time low in 2011 at 216 commercial fishing permits purchased (Figure 20 and 21). Traditionally, more commercial fishers have fished the Missouri River than the Mississippi and St. Francis Rivers (Figure 21). After 1990, the decline in numbers of commercial fishers was more pronounced relative to the declines observed on the Mississippi River. The reasons for decline in purchase of commercial permits are not specifically known; however, several factors potentially contribute to these yearly fluctuations. For instance, increases in fees, health advisories on fish consumption, removal of certain species (i.e., paddlefish and catfish from the Missouri River and shovelnose sturgeon from the Missouri River and the open portion of the Mississippi River) from the allowable commercial harvest list, fluctuating river conditions, implementation of special permits for roe harvester and roe dealer, and demand for fish and roe can all affect the number of permits sold each year.

Total Harvest

The first year of recorded commercial harvest was in 1945.There was a general decline in commercial harvest from 1945 through 1966, when an all-time low was reached with 235,116 pounds being harvested (Figure 22). After 1967, the method of estimating commercial harvest was changed from yearly reporting to recommended monthly reporting, which resulted in an

increase in harvest and likely more accurate estimation of harvest (Figure 22). In addition, the reported harvest again increased after 1975, due to another change in the reporting method which required monthly reports to be submitted (Robinson 1977). Harvest peaked in 1990 at an all-time high of 1,936,996 pounds. Since 1990 harvest has fluctuated yearly peaking again in 2001 at 914, 721 pounds and then declining to 244,419 pounds in 2010. Harvest has slightly increased in the last two years with 336,614 pounds being harvested in 2012.

Proportion of total harvest by river fluctuated during the 68 year period (Figure 22), but in 60 of the 68 years of reported harvest (1945 – 2012) over 50% of the yearly harvest was taken from the Mississippi River. Historically, 57% (55 year average) of the harvest came from the Mississippi River, 41% from the Missouri River, and 2% from the St. Francis River. Since 1999, the proportion of harvest that occurs on the Mississippi River has increased to 66% (13 year average) of the total harvest. In the past 6 years, nearly 76% of the total reported harvest has occurred in the Mississippi River. Missouri River harvest has continued to decline with only 33% of the total harvest in the past 13 years. St. Francis River harvest continues to remain low and comprised only 1% of the total harvest since 1999 (Figure 22).

The reasons for fluctuation in the total pounds harvested throughout the years are not specifically known; however, many of the same factors that potentially contribute to inconsistent license sales also could affect the yearly variations in harvest. For instance, in the Missouri Commercial Fish Harvest Report 1999, Robinson mentions that changes in reporting requirements, river levels and clarity, health advisories on fish consumption, removal of certain species from the commercial fish list in specific areas, and demand can all affect the amount of pounds harvested each year.

Harvest of Selected Species

Twelve species or groups of fish have consistently contributed to the yearly commercial harvest over the last 68 years. Since reporting began in 1945, a few species have been added to the list of commercially harvested fishes. In 1975, grass carp were first reported as being harvested and have remained a staple species in the harvest. Asian carp harvest began in 1992 and has been increasing since that time. Over the 68 years of reported harvest, three groups of fish (common carp, buffalofishes, and catfishes) have comprised the majority of the total harvest; however in recent years Asian carp have become one of the top three harvested groups, moving common carp down to the fourth harvested species group. Shovelnose sturgeon and paddlefish have consistently supported a limited fishery and are highly valued because the roe is processed to make caviar.

Common carp historically dominated the total harvest from 1945 to 1980. During this 35 year time period, common carp comprised the greatest percent of harvested fish in all but two years and averaged 43% of the total harvest. Since 1980, Common carp have only accounted for 17% (33 year average) of the total harvest (Figure 23). Annual pounds of common carp harvested have varied considerably, ranging from 558,945 pounds in 1945 to 14,528 pounds in 2011 (Figure 24). Predominately common carp were harvested from the Missouri River; however in 1965-1981 and 1983 through 1985, more Common carp were harvested in the Mississippi River than in the Missouri River (Figure 24). Before 1980, common carp harvest averaged 275,000 pounds (35 year average), but since the invasion of Asian carp in 1992, common carp harvest declined to an average of only 82,000 pounds. Asian carp have since increased in the total percentage of pounds harvested each year to nearly 18% of the harvest in 2008 and 16% in 2012 (Figure 23) becoming the third most harvested fish

group. The most pounds of Asian carp were harvested in 2002, with 103,217 pounds being harvested; which was 12% of the total harvest. During the flood of 2010, Asian carp harvest was at the lowest level since 1992 with only 9,268 pounds harvested (4% of the total harvest); however by 2012 Asian carp harvest had rebounded to 52,064 pounds and 16% of the total harvest (Figure 25). The majority of Asian carp were initially harvested from the Missouri River, but since 2007 Asian carp harvest has increased in the Mississippi River and surpassed the Missouri River harvest. Asian carp are seldom harvested from the St. Francis River (Figure 25). When we consider the three groups of invasive carps; common (referred to as carp in historic harvest), grass, and Asian carp (bighead and silver carp), they have collectively made up on average 27% (21 year average since Asian carp have been harvested) of the total harvest. In the 20 years in which all three invasive carp groups have been harvested, they have comprised as much as 40% of the total pounds harvested (Figure 23). The presence of invasive carps in the top three harvested groups is concerning given the limited information regarding how these invasive species effect native fishes.

Buffalofishes were the second most harvested fish from 1945 through 1993 except for four years (1978, 1980, 1981, 1982) in which they were the top harvested fish in Missouri. Since 1994, buffalofishes have been the most harvested commercial fish group except for 2010 when they were the second most harvested fish group; second to catfishes. Percent contribution of buffalofishes to the total harvest has in general increased from 16% in 1948 to 45% in 2003 (Figure 26). Annual pounds of buffalofishes harvested fluctuate yearly. However there was a general decrease in pounds harvested from 203,266 pounds in 1945 to 146,774 pounds in 1967. Since 1967, harvest has continued to increase for several years with harvest peaking in 1969 at 304,222 pounds, 339,540 pounds in 1978, and reached an all-time high in 1990 at 534,785

pounds (Figure 27). After 1990, pounds harvested have decreased with a few peaks in harvest in 1996 and 2002, reaching a low of only 83,631 pounds harvested in 2010. The past two years, harvest has increased again with 135,049 pounds harvested in 2012 (Figure 27). In the 68 years of reported commercial harvest, the majority of buffalofishes have been harvested in the Mississippi River except for 11 years in which more were harvested in the Missouri River (Figure 27). They are the most harvested species in the St. Francis River with 234,375 pounds being harvested over the 68 year period; however the pounds harvested account for only 1% of the harvest yearly.

Catfishes have historically been considered a group of three commercially harvested species (channel, flathead, and blue catfish). Over the last 68 years, catfishes have accounted for on average 20% of the total pounds harvested each year. From 1945 through 1983, catfishes were the third most harvested group. However, during a ten year period from 1984 to 1993, catfishes became the most harvested group of commercially harvested fishes comprising an average of 30% of the total harvest (Figure 28). After 1993 and for the next 20 years, catfishes dropped down to the second most harvested commercial fish group; except for 2010 when catfishes were again the most harvested group accounting for 41% of the total harvest that year (Figure 28). The combined harvest of the three species of catfishes declined from 164,303 pounds in 1945 to 96,256 pounds in 1967 (Figure 29). From 1968 until 1992, when harvest of catfishes was closed on the Missouri River, the harvest of the catfishes increased and peaked in 1990 at 598,049 pounds. Yearly catfishes harvest declined with one small peak in 2001 at 197,814 pounds (Figure 29). There was concern that the closure of catfishes harvest on the Missouri River might result in increased fishing pressure and harvest of catfishes from the Mississippi River; however this does not appear to have happened. The average pounds of

catfishes harvested in the Mississippi River during the twenty year period prior to the Missouri River closure was 131,653 pounds while the average pounds harvested in the twenty years after the closure declined to 125,565.

Relative to other commercial species or groups, the commercial harvest of shovelnose sturgeon over the 68 years has been minimal. On average, commercial harvest of shovelnose sturgeon has accounted for less than 2% of the total pounds harvested each year. During this time, reported harvest of shovelnose sturgeon remained fairly consistent with an average of 10,901 pounds taken yearly. However there were a few increases in harvest: in 1987 there were 26,089 pounds harvested; in 1989 there were 29,537 pounds harvested, and in 2001 a record high was reached, with 77,811 pounds of shovelnose sturgeon harvest reported (Figure 30). Since this time, harvest has declined. In 2012, only 159 pounds were reported as harvested (Figure 30). One reason for the decline in harvest after 2010 is the SOA provision of the Endangered Species Act which closed commercial fishing for shovelnose sturgeon in the Missouri River and in the open river portion of the Mississippi River (below Locks and Dam 26). Typically the Mississippi River has accounted for 60% of the shovelnose sturgeon harvest; however during the periods1981 through 1987, 1991, and 2005 through 2010 the Missouri River comprised the majority of the shovelnose sturgeon harvest (Figure 30).

Paddlefish have sustained a relatively small fishery which has accounted for an average of 2% (9,021 pounds) of the total pounds harvested each year from 1945 to 2012. Paddlefish harvest remained steady from 1945 through 1962. After the mid 1960's, there was a general increase in harvest which peaked in 1989 at 57,180 pounds (Figure 31). After the record high harvest in 1989, reported harvest declined to a low of 2,324 pounds in 1997. Harvest increased slightly peaking again in 2002 at 21,427 pounds reported and has continued to decline since

reaching a record low of 1,590 pounds in 2012 (Figure 31). In the 45 years leading to the closure of paddlefish harvest on the Missouri River in 1990, the majority of paddlefish harvest occurred on the Mississippi River (Figure 31). However after the closure, the harvest that was occurring on the Missouri River did not appear to shift to the Mississippi River. In the 20 years prior to paddlefish harvest closure on the Missouri river, the average yearly harvest on the Mississippi River was 11,698 pounds and in the 21 years after the closure 9,235 pounds were harvested on average annually.

RECOMMENDATIONS

The commercial fishery program recommends to:

- Continue to collect, compile, and analyze monthly reports to monitor and track trends in harvest.
- Communicate with surrounding states to promote and encourage cohesive management strategies along the commercially harvested waters.
- Monitor catfishes and paddlefish populations in both the Missouri and Mississippi rivers to evaluate the population changes resulting from the ban of commercial harvest of catfishes and paddlefish from the Missouri River.
- Monitor harvest trends in the Mississippi River to determine if harvest that once occurred in the open river portion of the Mississippi River (below Lock and Dam 26) and the Missouri River shifts to the pooled portion of the Mississippi River (above Lock and Dam 26).
- Continue monitoring the shovelnose sturgeon population in all reaches of the Mississippi River and the Missouri River to further our understanding of the impacts of SOA.

- Monitor the harvest trends for the four invasive carp species separately (common carp, grass carp, silver carp, and bighead carp). Determine if the increased biomass of invasive carps has an effect on our native species. Enhance reporting of fish species that are important to agency needs (e.g. alligator gar) or are expected to influence the commercial fishery resources (e.g. black carp).
- Continue to interact with commercial fishers by supporting periodic meetings, newsletters, and relevant information about research and management of our commercial fishery resources.

LITERATURE CITED

Robinson, J. W. 1977. Collection of Commercial Fisheries Harvest Data in Missouri for 1975. Missouri Department of Conservation, National Marine Fisheries Service Project 2-291-R-1, Study A, Progress Report. 15 pp.

Robinson, J. W. 2001. Missouri's Commercial Fishing Harvest, 1999. Missouri Department of Conservation, Non Federal Aid Project, Final Report. 39 pp.

Wildlife Code of Missouri. . Rules of the Conservation Commission issued March 1, 2013. 218 pp.

Table 1. Number of commercial fishing permits issued (resident and non-resident) in each fiscal year and the number of licensed commercial fishermen (resident and non-resident) that harvested pounds of fish and contributed to the total pounds harvested in each year.

	Permits Issued			Fishermen that Harvested Pounds of Fish		
Permit Year	Total	Resident	Non-Resident	Total	Resident	Non-Resident
2000	356	347	9	239	232	7
2001	343	333	10	237	231	6
2002	351	345	6	250	245	5
2003	331	326	5	199	195	4
2004	296	291	5	194	190	4
2005	313	306	7	175	170	5
2006	313	302	11	186	178	8
2007	298	289	9	171	166	5
2008	310	298	12	146	142	4
2009	304	292	12	168	163	5
2010	318	311	7	136	133	3
2011	216	213	3	126	126	0
2012	246	239	7	143	139	4

Table 2. Amount of gear used on Missouri's commercial rivers in 2000.

Gear	Missouri River	Mississippi River	St. Francis River	Total
Days of Seine Use	1			1
Days of Trammel Net Use	638	776	19	1433
Days of Gill Net Use	30	747		777
Days of Hoop Net Use	16431	43915	2964	63310
Days of Trotline Use	16	4552	24	4592
Total	17116	49990	3007	70113

Table 3. Amount of gear used on Missouri's commercial rivers in 2001.

Gear	Missouri River	Mississippi River	St. Francis River	Total
Days of Seine Use	203	5		208
Days of Trammel Net Use	613	1248	14	1875
Days of Gill Net Use	28	1494		1522
Days of Hoop Net Use	16366	30676	6816	53858
Days of Trotline Use	31	5121		5152
Total	17241	38544	6830	62615

Table 4. Amount of gear used on Missouri's commercial rivers in 2002. In June of 2002 the method of reporting effort was changed on the commercial fishing reports. The top table reflects the number of days each gear was fished from January to June. The bottom table reflects the amount of gear fished from June to December.

Gear	Missouri River	Mississippi River	St. Francis River	Total
Days of Trammel Net Use	449	458	2	909
Days of Gill Net Use	774	145		919
Days of Hoop Net Use	14662	7719	6041	28422
Days of Trotline Use	1378	10	4	1392
Total	17263	8332	6047	31642

Gear	Missouri River	Mississippi River	St. Francis River	Total
Yards of Seine		285		285
Yards of Trammel Net	20467	20475		40942
Yards of Gill Net	468	33900		34368
Number of Hoop Nets	3587	8059	1446	13092
Number of Hooks	1659	57390		59049
Total	26181	120109	1446	147736

Table 5. Amount of gear used on Missouri's commercial rivers in 2003.

Gear	Missouri River	Mississippi River	St. Francis River	Total
Yards of Seine	300			300
Yards of Trammel Net	42598	34665	140	77403
Yards of Gill Net	1418	80010	14	81442
Number of Hoop Nets	5600	9826	3344	18770
Number of Hooks	871	55379	545	56795
Total	50787	179880	4043	234710

Table 6. Amount of gear used on Missouri's commercial rivers in 2004.

Gear	Missouri River	Mississippi River	St. Francis River	Total
Yards of Seine	300			300
Yards of Trammel Net	39016	36720	70	75806
Yards of Gill Net	1980	108544		110524
Number of Hoop Nets	7028	12148	1872	21048
Number of Hooks	621	60381	184	61186
Total	48945	217793	2126	268864

Table 7. Amount of gear used on Missouri's commercial rivers in 2005.

Gear	Missouri River	Mississippi River	St. Francis River	Total
Yards of Seine	400	800		1200
Yards of Trammel Net	24131	27080		51211
Yards of Gill Net	5272	110776		116048
Number of Hoop Nets	7424	11573	2173	21170
Number of Hooks	12	58694	40	58746
Total	37239	208923	2213	248375

Table 8. Amount of gear used on Missouri's commercial rivers in 2006.

Gear	Missouri River	Mississippi River	St. Francis River	Total
Yards of Seine				
Yards of Trammel Net	29234	21765		50999
Yards of Gill Net	1335	59667		61002
Number of Hoop Nets	8093	11018	1385	20496
Number of Hooks	6	52572	150	52728
Total	38668	145022	1535	185225

Table 9. Amount of gear used on Missouri's commercial rivers in 2007.

Gear	Missouri River	Mississippi River	St. Francis River	Total
Yards of Seine				
Yards of Trammel Net	13640	8485		22125
Yards of Gill Net	3015	121232		124247
Number of Hoop Nets	7731	10490	155	18376
Number of Hooks	352	39332		39684
Total	24738	179539	155	204432

Table 10. Amount of gear used on Missouri's commercial rivers in 2008.

Gear	Missouri River	Mississippi River	St. Francis River	Total
Yards of Seine				
Yards of Trammel Net	8065	7235		15300
Yards of Gill Net	933	50152		51085
Number of Hoop Nets	6870	7152	374	14396
Number of Hooks		68217		68217
Total	15868	132756	374	148998

Table 11. Amount of gear used on Missouri's commercial rivers in 2009.

Gear	Missouri River	Mississippi River	St. Francis River	Total
Yards of Seine				
Yards of Trammel Net	9984	5200	600	15784
Yards of Gill Net	114	15372		15486
Number of Hoop Nets	6523	8944	325	15792
Number of Hooks	60	39873		39933
Total	16681	69389	925	86995

Table 12. Amount of gear used on Missouri's commercial rivers in 2010.

Gear	Missouri River	Mississippi River	St. Francis River	Total
Yards of Seine				
Yards of Trammel Net	3709	13890	300	17899
Yards of Gill Net	460	23512		23972
Number of Hoop Nets	6969	6732	386	14087
Number of Hooks		55488	800	56288
Total	11138	99622	1486	112246

Table 13. Amount of gear used on Missouri's commercial rivers in 2011.

Gear	Missouri River	Mississippi River	St. Francis River	Total
Yards of Seine				
Yards of Trammel Net	4246	4245	500	8991
Yards of Gill Net	300	35005		35305
Number of Hoop Nets	2217	8671	410	11298
Number of Hooks		46455	1000	47455
Total	6763	94376	1910	103049

Table 14. Amount of gear used on Missouri's commercial rivers in 2012.

Gear	Missouri River	Mississippi River	St. Francis River	Total
Yards of Seine			200	200
Yards of Trammel Net	13165	6400	3	19568
Yards of Gill Net	2330	29560		31890
Number of Hoop Nets		7405	494	10409
Number of Hooks		43627	950	44577
Total	15495	86992	1647	106644

Table 15. Total harvest of fish from Missouri's commercial rivers in 2000.

Species	Missouri River	Mississippi River	St. Francis River	Total
Carp	67927	45113	396	113436
Buffalofishes	114062	110362	1423	225847
Flathead catfish	1775	58013	759	60547
Channel catfish	1140	54178	1281	56599
Blue catfish	918	78787	205	79910
Freshwater drum	5293	15467	184	20944
Bullheads		538	4	542
Carpsuckers	8533	10923		19456
Shovelnose sturgeon	5855	20744		26599
Paddlefish	243	13656		13899
Suckers	1241	825	148	2214
Gars	846	1622	648	3116
American eel		96		96
Bowfin		72	20	92
Grasscarp	19288	6988		26276
Asian carp	34806	9942		44748
Total	261927	427326	5068	694321

Table 16. Total harvest of fish from Missouri's commercial rivers in 2001.

Species	Missouri River	Mississippi River	St. Francis River	Total
Carp	70933	59514	437	130884
Buffalofishes	141647	137122	3966	282735
Flathead catfish	73	58907	656	59636
Channel catfish	124	46693	1411	48228
Blue catfish	723	89158	69	89950
Freshwater drum	9861	31940	393	42194
Bullheads		936	1	937
Carpsuckers	9807	15787		25594
Shovelnose sturgeon	12595	65216		77811
Paddlefish	490	19632		20122
Suckers	161	647	541	1349
Gars	1919	2095	173	4187
American eel		182		182
Bowfin		285	36	321
Grass carp	27181	15300		42481
Asian carp	41972	46138		88110
Total	317486	589552	7683	914721

Table 17. Total harvest of fish from Missouri's commercial rivers in 2002.

Species	Missouri River	Mississippi River	St. Francis River	Total
Carp	55109	50785	115	106009
Buffalofishes	157754	177643	2014	337411
Flathead catfish	410	65565	1562	67537
Channel catfish	397	36336	2190	38923
Blue catfish	952	71445	23	72420
Freshwater drum	5698	21358	134	27190
Bullheads	21	401		422
Carpsuckers	9782	17509		27291
Shovelnose sturgeon	5301	38075		43376
Paddlefish	389	21038		21427
Suckers	1167	1375	12	2554
Gars	2413	1307		3720
American eel	117	30		147
Bowfin	50	555		605
Grass carp	23455	15960		39415
Asian carp	60385	42832		103217
Total	323400	562214	6050	891664

Table 18. Total harvest of fish from Missouri's commercial rivers in 2003.

Species	Missouri River	Mississippi River	St. Francis River	Total
Carp	42098	24691	53	66842
Buffalofishes	154370	118413	1875	274658
Flathead catfish		42179	2962	45141
Channel catfish		16078	2998	19076
Blue catfish		36664	31	36695
Freshwater drum	4191	9718	92	14001
Bullheads		342		342
Carpsuckers	11521	6842	20	18383
Shovelnose sturgeon	6856	17273		24129
Paddlefish	1	15396		15397
Suckers	795	146	70	1011
Gars	2409	72	18	2499
American eel		24		24
Bowfin	169		5	174
Grass carp	17393	7500		24893
Asian carp	39877	20609		60486
Total	279680	315947	8124	603751

Table 19. Total harvest of fish from Missouri's commercial rivers in 2004.

Species	Missouri River	Mississippi River	St. Francis River	Total
Carp	39074	27918	10	67002
Buffalofishes	131111	160199	1588	292898
Flathead catfish	32	50882	2208	53122
Channel catfish		23713	2078	25791
Blue catfish	130	47769	66	47965
Freshwater drum	2946	7967	40	10953
Bullhead		202	62	264
Carpsuckers	9186	5208		14394
Shovelnose sturgeon	6171	24538		30709
Paddlefish	529	16269		16798
Suckers	87	301	60	448
Gars	1386	62		1448
American eel		12		12
Bowfin		485		485
Grasscarp	13837	8161		21998
Asian carp	48067	25195		73262
Total	252556	398881	6112	657549

Table 20. Total harvest of fish from Missouri's commercial rivers in 2005.

Species	Missouri River	Mississippi River	St. Francis River	Total
Carp	27463	19716	25	47204
Buffalofishes	83888	129795	3499	217182
Flathead catfish	177	33388	1766	35331
Channel catfish	52	23029	2606	25687
Blue catfish	26	43679	210	43915
Freshwater drum	2177	6522	189	8888
Bullheads		804		804
Carpsuckers	9492	3950		13442
Shovelnose sturgeon	6939	3452		10391
Paddlefish	1023	9853		10876
Suckers	236	16		252
Gars	625	123		748
American eel	600	30		630
Bowfin		112		112
Grass carp	7043	5663		12706
Asian carp	32606	23093		55699
Total	172347	303225	8295	483867

Table 21. Total harvest of fish from Missouri's commercial rivers in 2006.

Species	Missouri River	Mississippi River	St. Francis River	Total
Carp	22362	16575	20	38957
Buffalofishes	101525	58297	750	160572
Flathead catfish	39	43649	837	44525
Channel catfish		17627	1054	18681
Blue catfish		28443	139	28582
Freshwater drum	1609	6792	5	8406
Bullheads		700	5	705
Carpsuckers	9909	2014		11923
Shovelnose sturgeon	7709	2016		9724
Paddlefish		8977		8977
Suckers	1223	17		1240
Gars	2328	74		2402
American eel	10			10
Bowfin				
Grass carp	15321	4503		19824
Asian carp	42927	6656		49583
Total	204962	196340	2810	404111

Table 22. Total harvest of fish from Missouri's commercial rivers in 2007.

Species	Missouri River	Mississippi River	St. Francis River	Total
Carp	18020	17634		35654
Buffalofishes	45387	93462	274	139123
Flathead catfish	442	50381	160	50983
Channel catfish	6	13094	236	13336
Blue catfish	552	32729	6	33287
Freshwater drum	2252	5456	26	7734
Bullheads		313		313
Carpsuckers	5600	1724		7324
Shovelnose sturgeon	5914	2258		8172
Paddlefish	450	11029		11479
Suckers	59	28		87
Gars	1510	315		1825
American eel	81			81
Bowfin		1953		1953
Grass carp	8328	5466		13794
Asian carp	14133	42019		56152
Total	102734	277860	702	381297

Table 23. Total harvest of fish from Missouri's commercial rivers in 2008.

Species	Missouri River	Mississippi River	St. Francis River	Total
Carp	11626	17702	41	29369
Buffalofishes	36029	91949	1136	129114
Flathead catfish		36966	570	37536
Channel catfish		13290	583	13873
Blue catfish	100	50073	32	50205
Freshwater drum	997	4363	86	5446
Bullheads		5857		5857
Carpsuckers	2394	2591		4985
Shovelnose sturgeon	11627	356		11983
Paddlefish		7997		7997
Suckers	129	69		198
Gars	168	60		228
American eel				
Bowfin	38	1336		1374
Grass carp	3458	11730		15188
Asian carp	7363	60997		68360
Total	73929	305335	2447	381711

Table 24. Total harvest of fish from Missouri's commercial rivers in 2009.

Species	Missouri River	Mississippi River	St. Francis River	Total
Carp	10445	9419	89	19953
Buffalofishes	37797	54639	1820	94256
Flathead catfish	20	48740	822	49582
Channel catfish	25	18270	534	18828
Blue catfish	162	22525	53	22740
Freshwater drum	1211	3081	42	4334
Bullheads		542	4	546
Carpsuckers	1538	219		1757
Shovelnose sturgeon	6476	583		7059
Paddlefish		8683		8683
Suckers	78	43	16	137
Gars	308	413	6	727
American eel	38	0		38
Bowfin		242		242
Grass carp	2606	1892		4498
Asian carp	8797	7704		16501
Total	69501	176993	3385	249879

Table 25. Total harvest of fish from Missouri's commercial rivers in 2010.

Species	Missouri River	Mississippi River	St. Francis River	Total
Carp	6533	14827	585	21945
Buffalofishes	21836	60114	1681	83631
Flathead catfish		35062	1321	36383
Channel catfish	4	13569	1107	14680
Blue catfish	62	49641	143	49846
Freshwater drum	473	2722	53	3248
Bullheads		5408		5408
Carpsuckers	333	268		601
Shovelnose sturgeon	7372	944		8316
Paddlefish		2907		2907
Suckers	20	85	12	117
Gars	12	175	82	269
American eel				
Bowfin		438		438
Grass carp	1479	5771	112	7362
Asian carp	2437	6831		9268
Total	40561	198762	5096	244419

Table 26. Total harvest of fish from Missouri's commercial rivers in 2011.

Species	Missouri River	Mississippi River	St. Francis River	Total
Carp	6088	8151	289	14528
Buffalofishes	36823	91659	3052	131533
Flathead catfish	50	33687	1131	34868
Channel catfish		21106	1381	22487
Blue catfish		47548	442	47990
Freshwater drum	1308	3774	439	5521
Bullheads		692		692
Carpsuckers	789	98		887
Shovelnose sturgeon		521		521
Paddlefish		6738		6738
Suckers	24	82		106
Gars	507	550		1057
American eel				
Bowfin		625		625
Grass carp	3713	12246		15959
Asian carp	10585	35309		45894
Total	59887	262785	6734	329406

Table 27. Total harvest of fish from Missouri's commercial rivers in 2012.

Species	Missouri River	Mississippi River	St. Francis River	Total
Carp	15421	8220	14	23655
Buffalofishes	60630	72386	2034	135049
Flathead catfish	82	36424	936	37442
Channel catfish	26	21534	2189	23749
Blue catfish	2259	42519	268	45046
Freshwater drum	993	3947	23	4963
Bullheads		55	54	109
Carpsukcers	1467	244		1711
Shovelnose sturgeon		159		159
Paddlefish		1590		1590
Suckers	38	13		51
Gars	86	12		98
American eel				
Bowfin				
Grass carp	4976	5953		10929
Asian carp	9823	42241	0	52064
Total	95801	235297	5517	336614

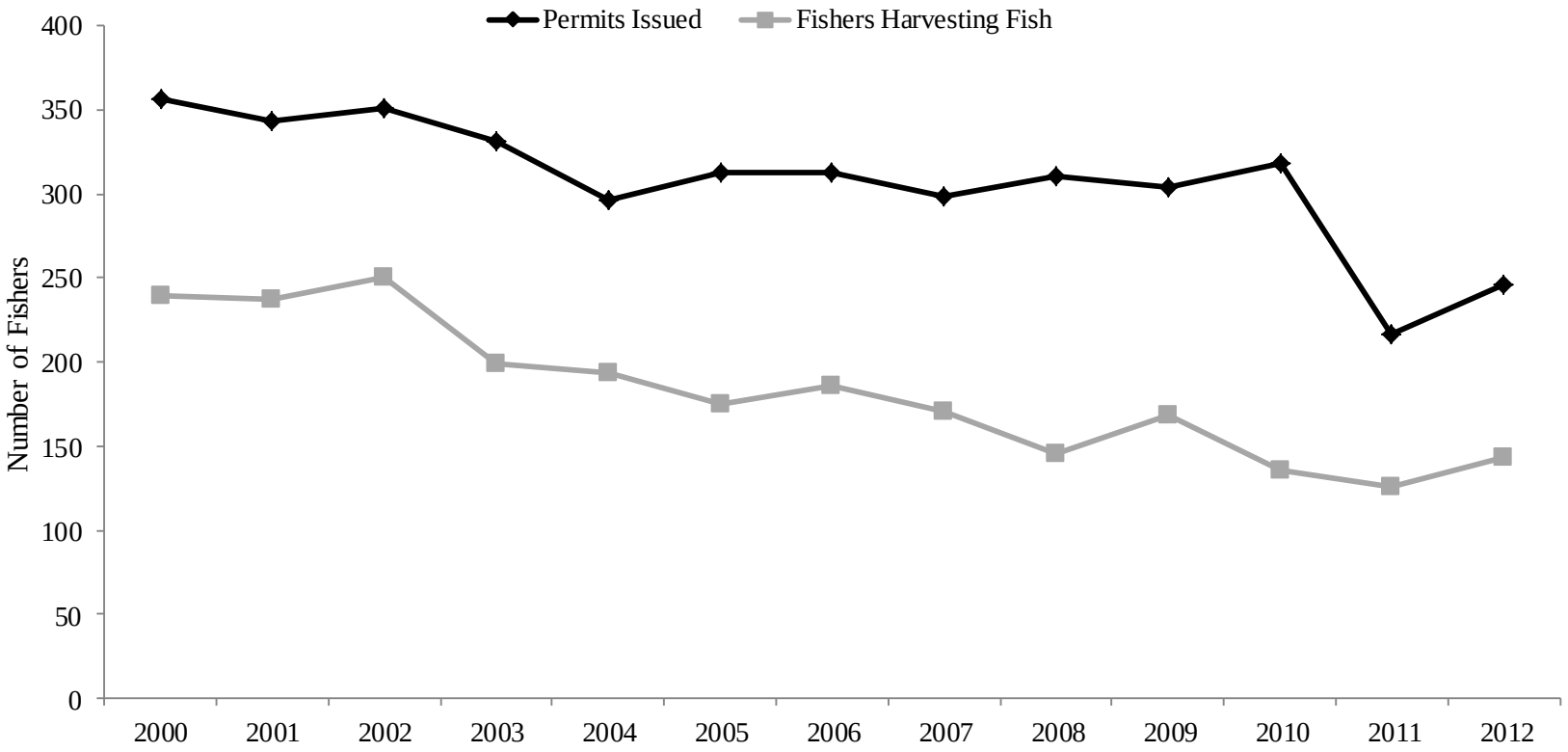

Figure 1. Total number of commercial fishing permits issued and the number of fishers harvesting fish from 2000-2012.

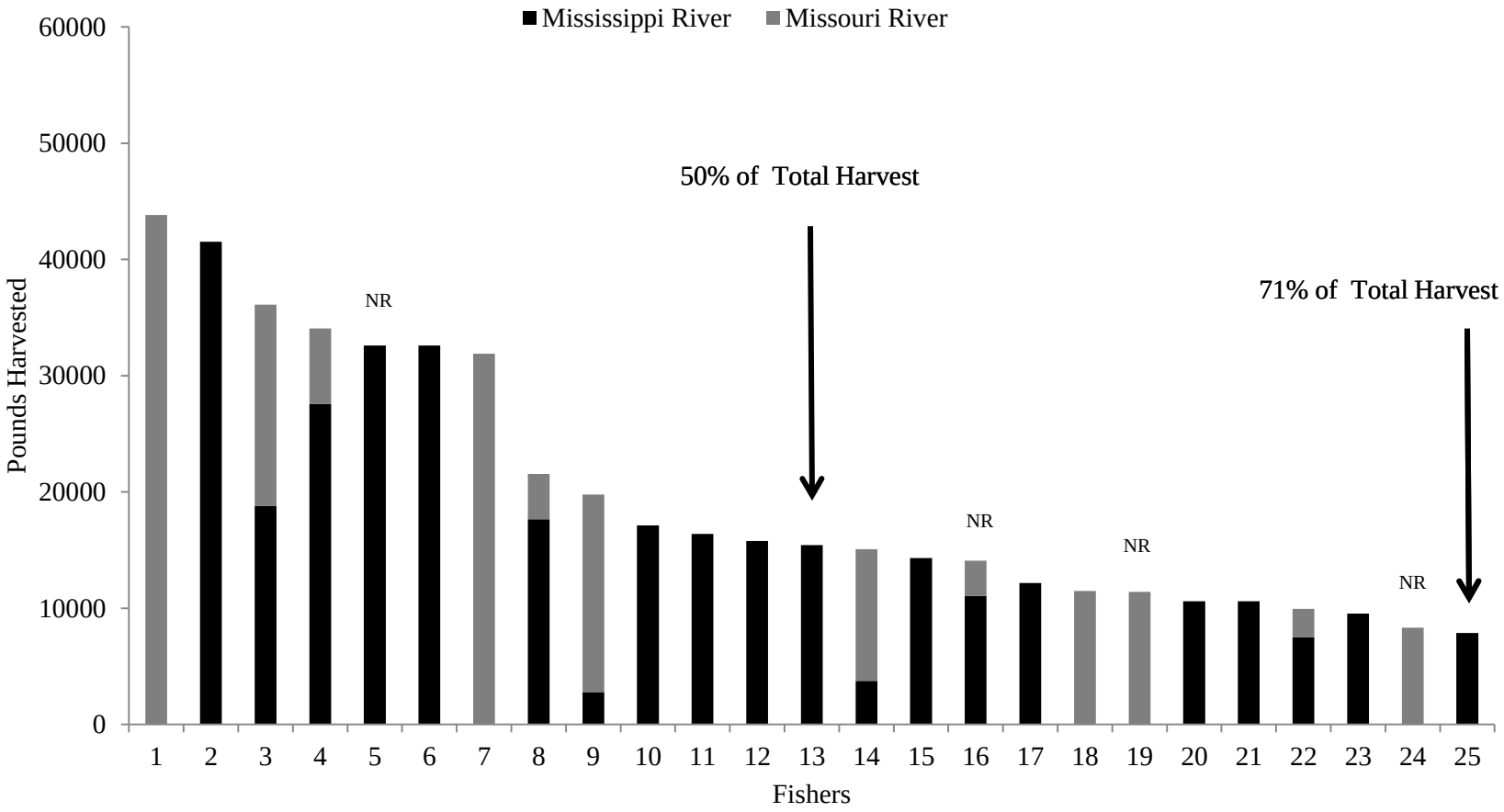

Figure 2. Pounds harvested by the 25 commercial fishers with the greatest harvest in 2000, NR represents those commercial fishers that were non-residents.

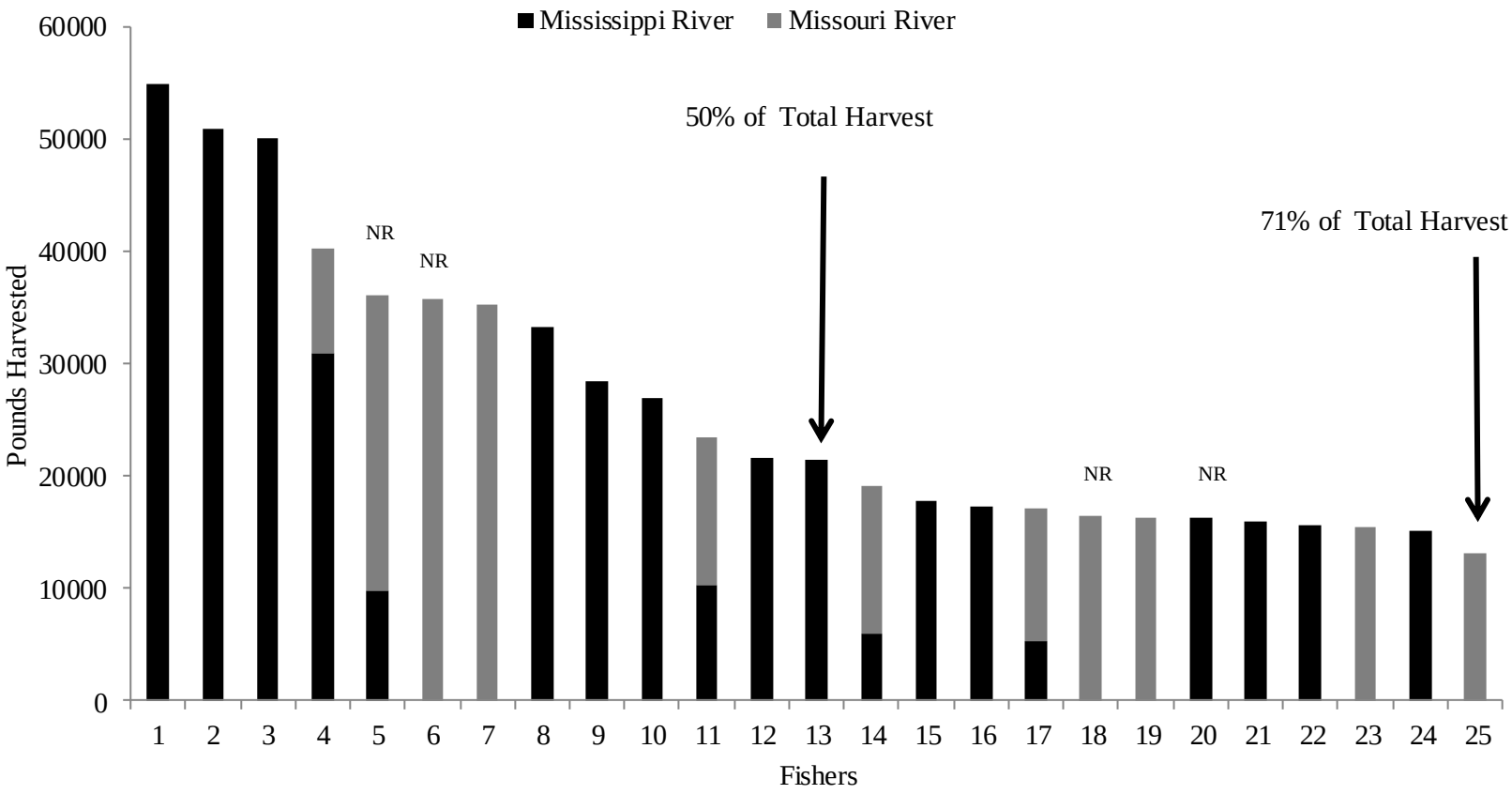

Figure 3. Pounds harvested by the 25 commercial fishers with the greatest harvest in 2001, NR represents those commercial fishers that were non-residents.

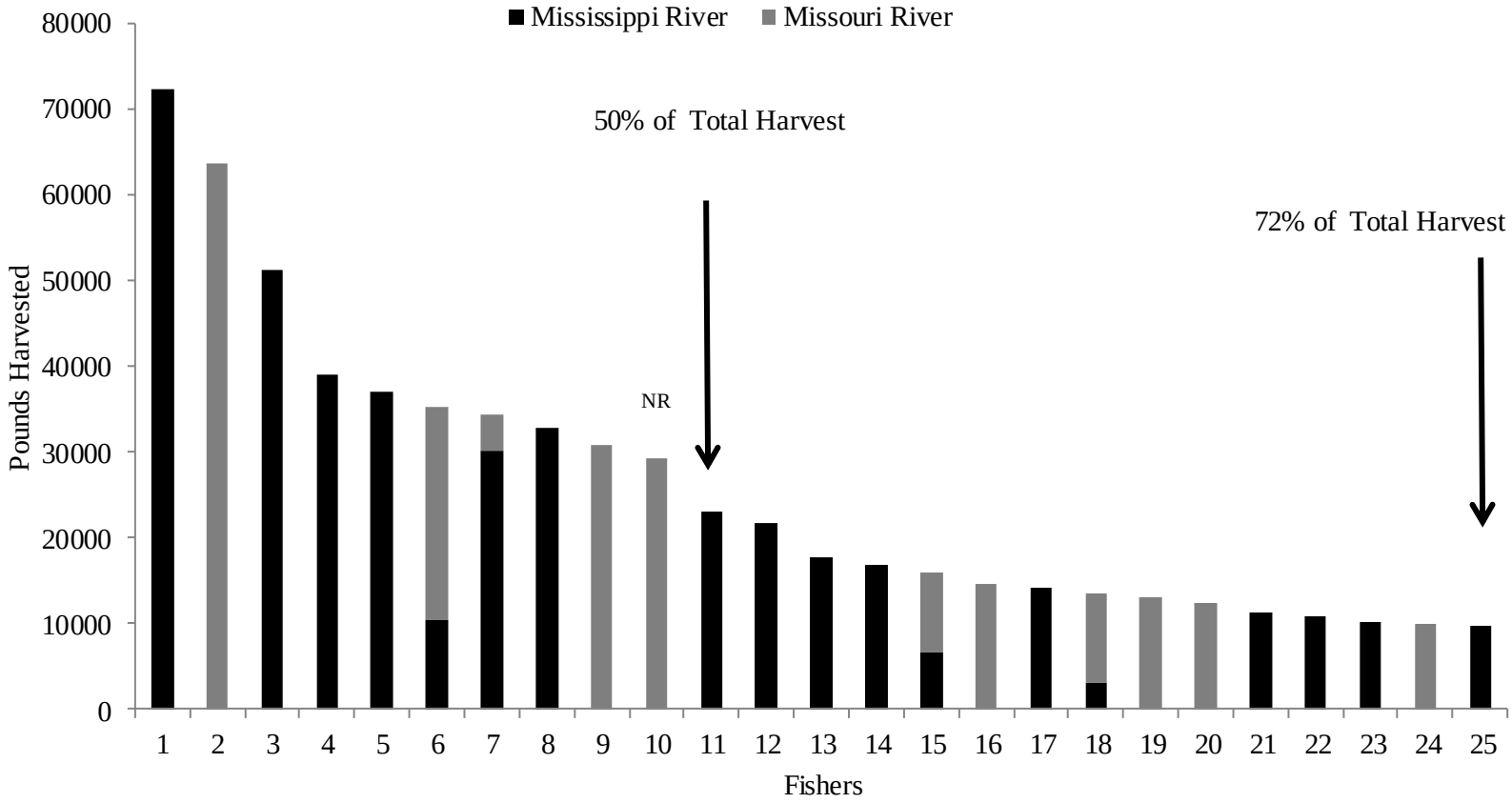

Figure 4. Pounds harvested by the 25 commercial fishers with the greatest harvest in 2002, NR represents those commercial fishers that were non-residents.

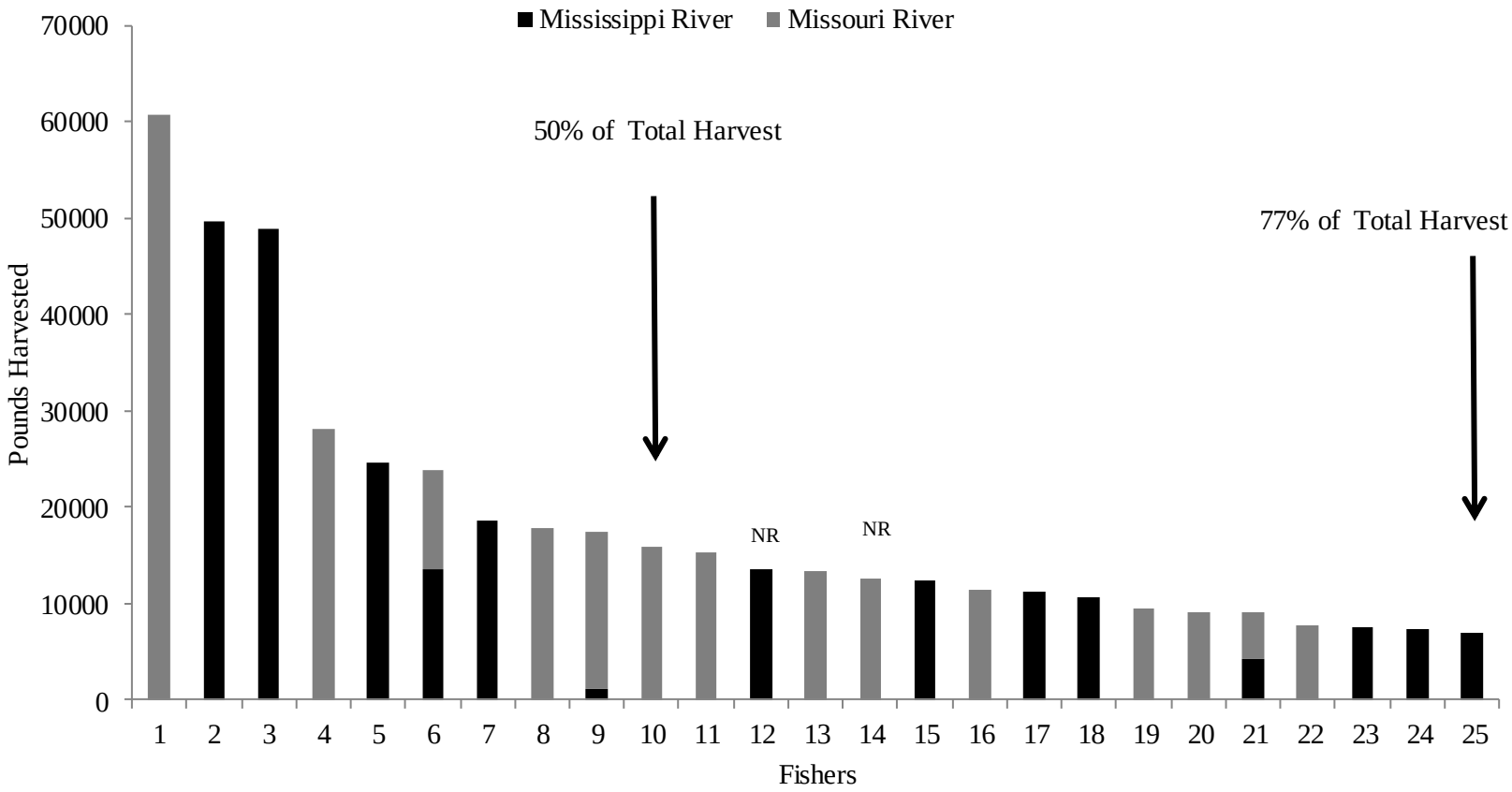

Figure 5. Pounds harvested by the 25 commercial fishers with the greatest harvest in 2003, NR represents those commercial fishers that were non-residents.

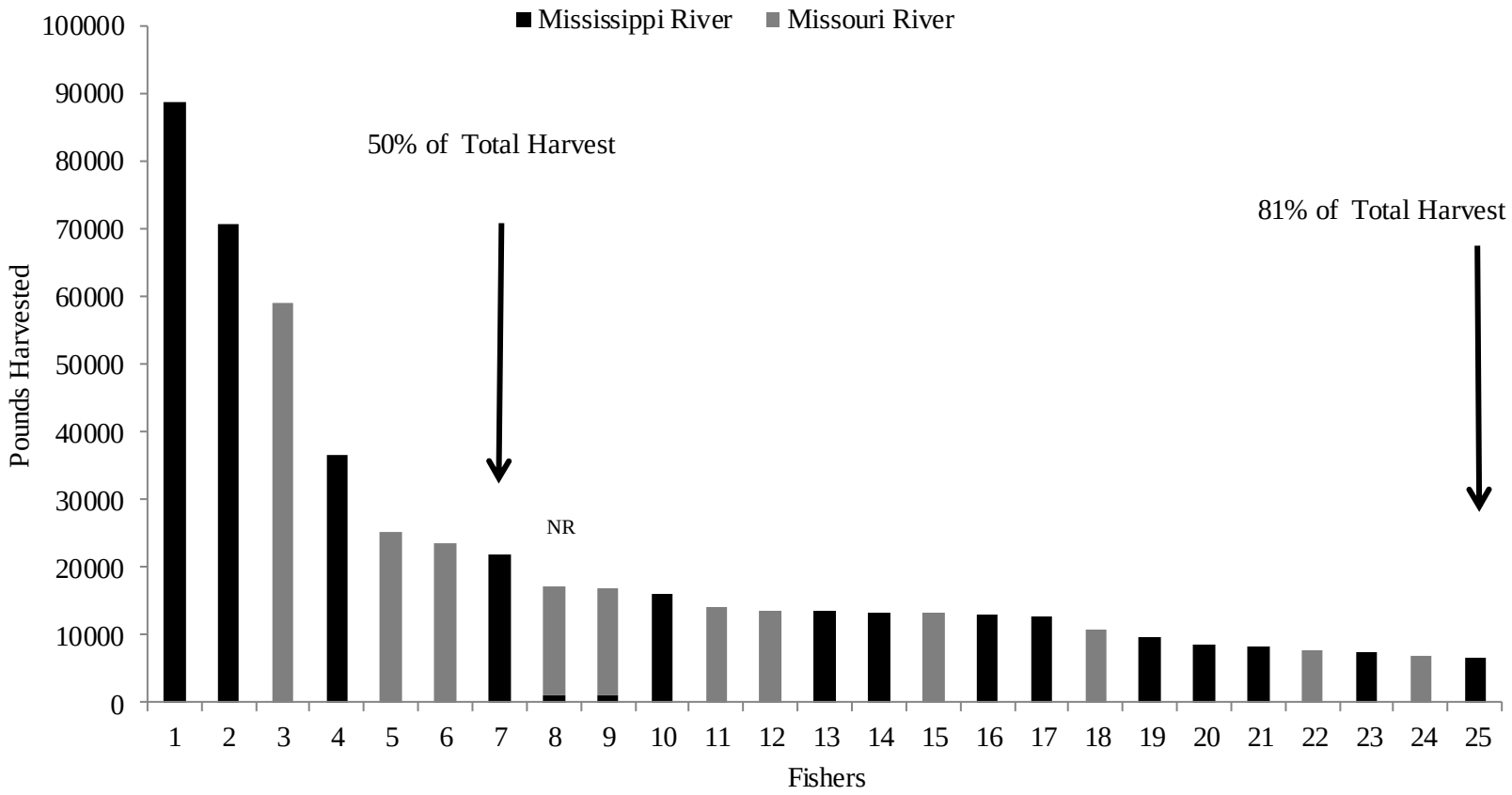

Figure 6. Pounds harvested by the 25 commercial fishers with the greatest harvest in 2004, NR represents those commercial fishers that were non-residents.

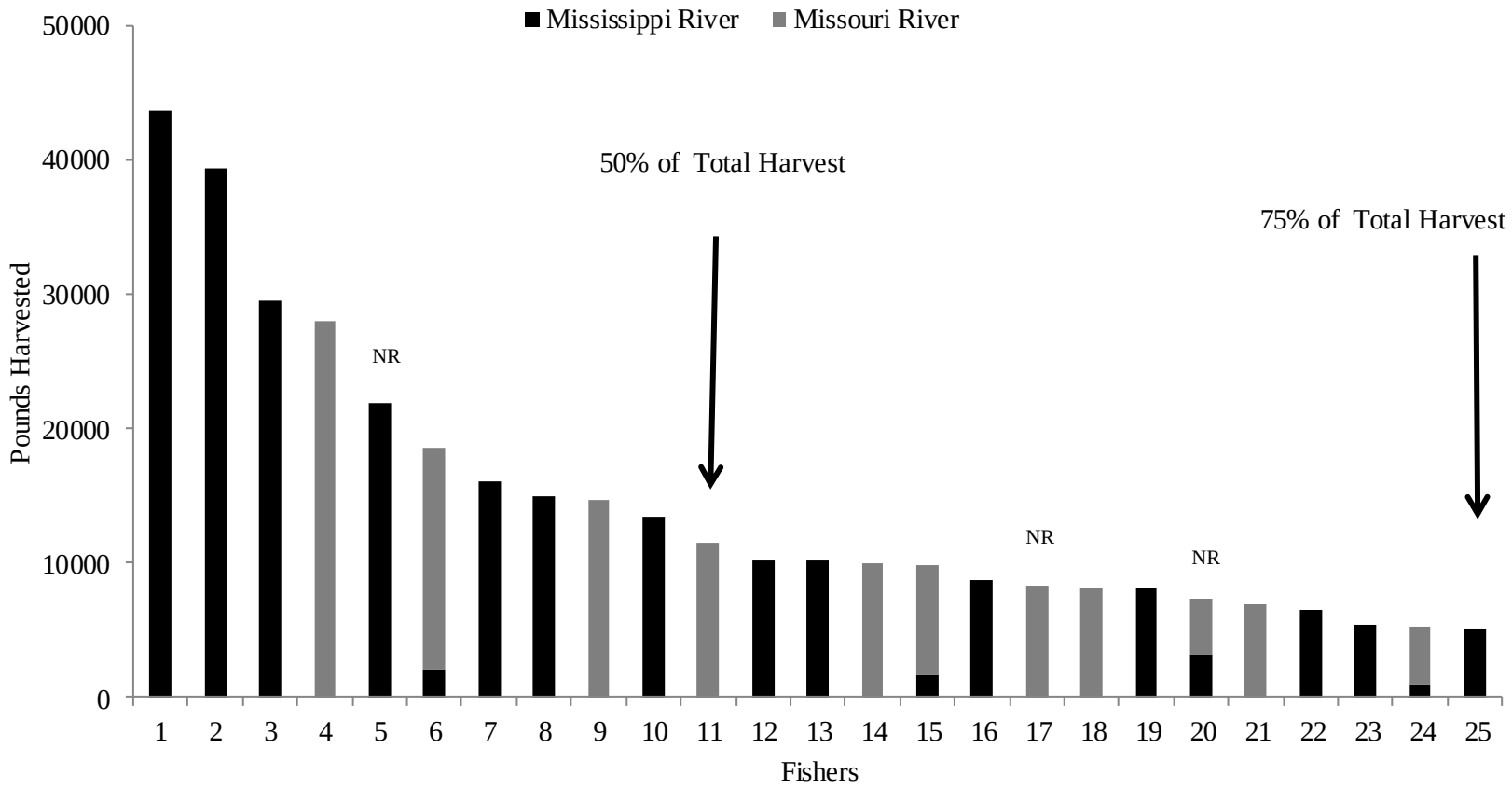

Figure 7. Pounds harvested by the 25 commercial fishers with the greatest harvest in 2005, NR represents those commercial fishers that were non-residents.

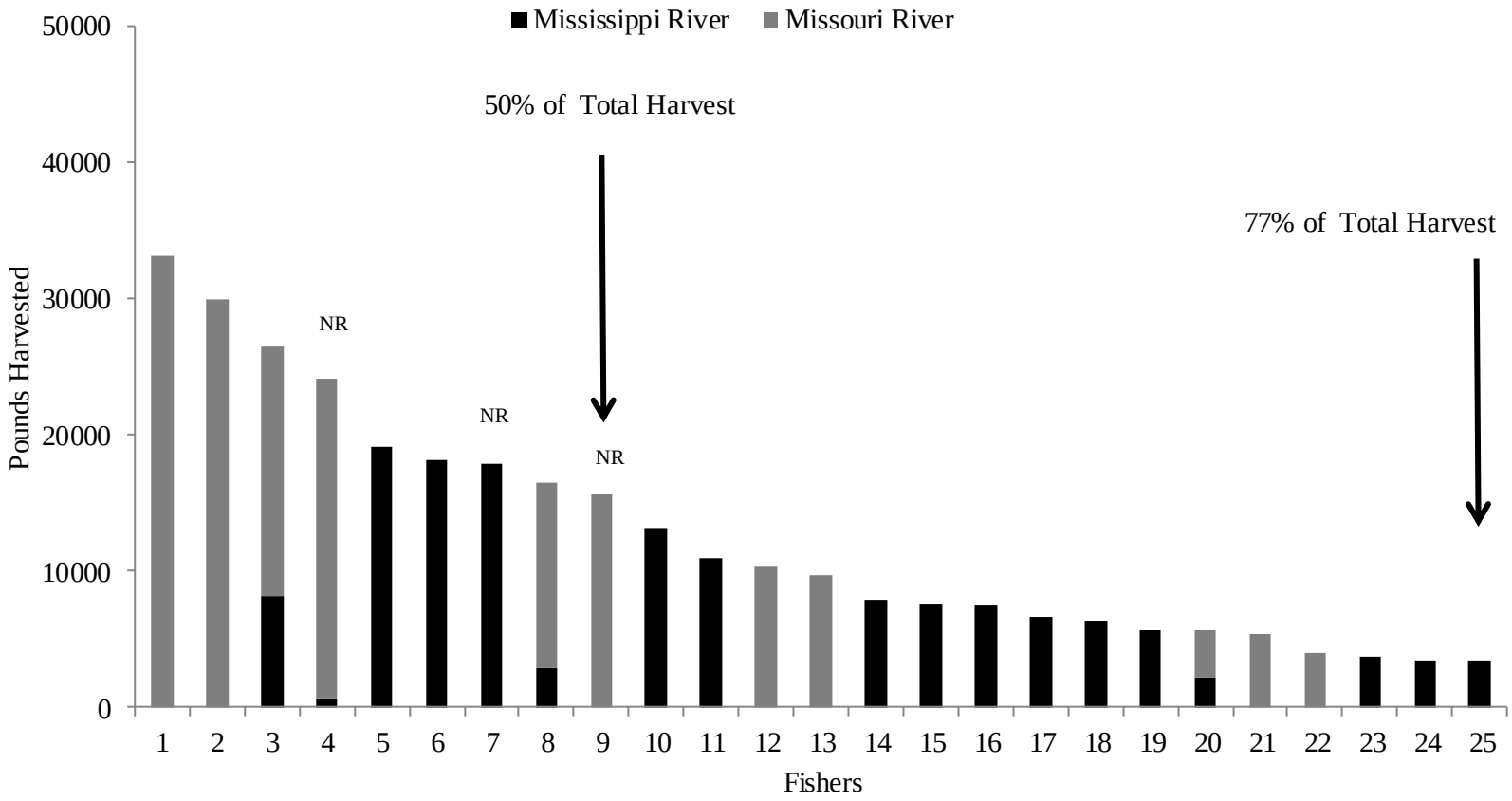

Figure 8. Pounds harvested by the 25 commercial fishers with the greatest harvest in 2006, NR represents those commercial fishers that were non-residents.

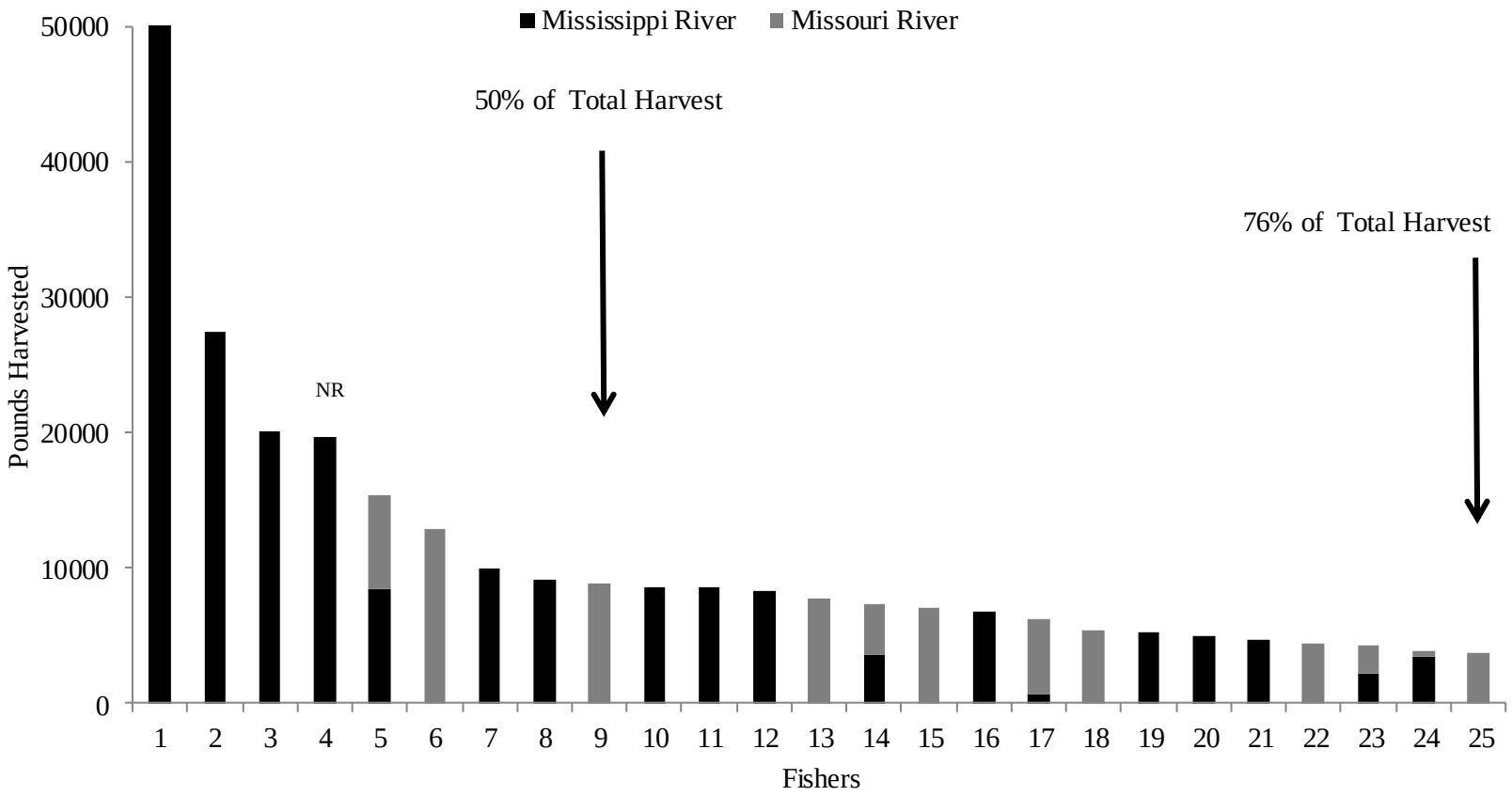

Figure 9. Pounds harvested by the 25 commercial fishers with the greatest harvest in 2007, NR represents those commercial fishers that were non-residents.

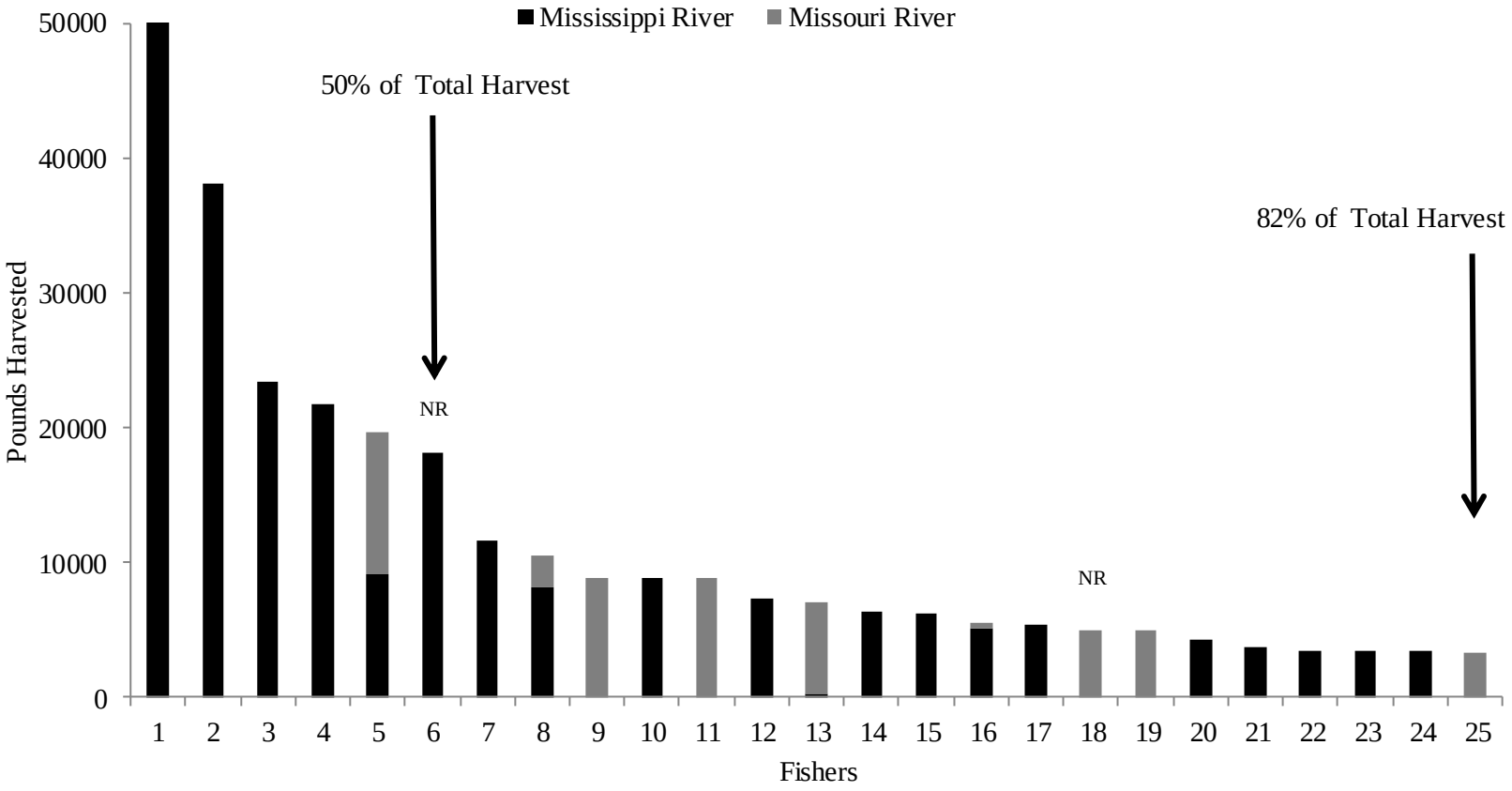

Figure 10. Pounds harvested by the 25 commercial fishers with the greatest harvest in 2008, NR represents those commercial fishers that were non-residents.

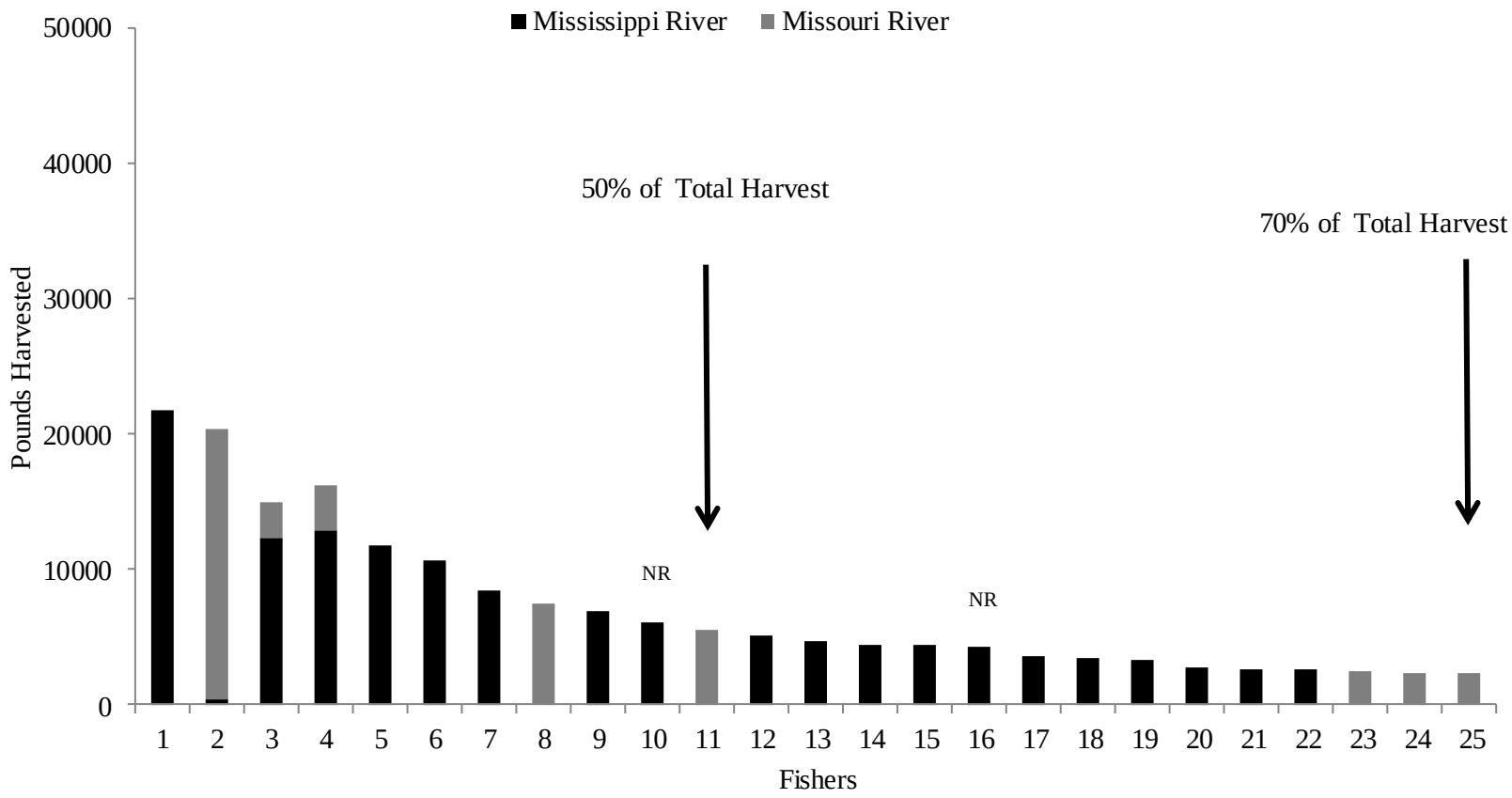

Figure 11. Pounds harvested by the 25 commercial fishers with the greatest harvest in 2009, NR represents those commercial fishers that were non-residents.

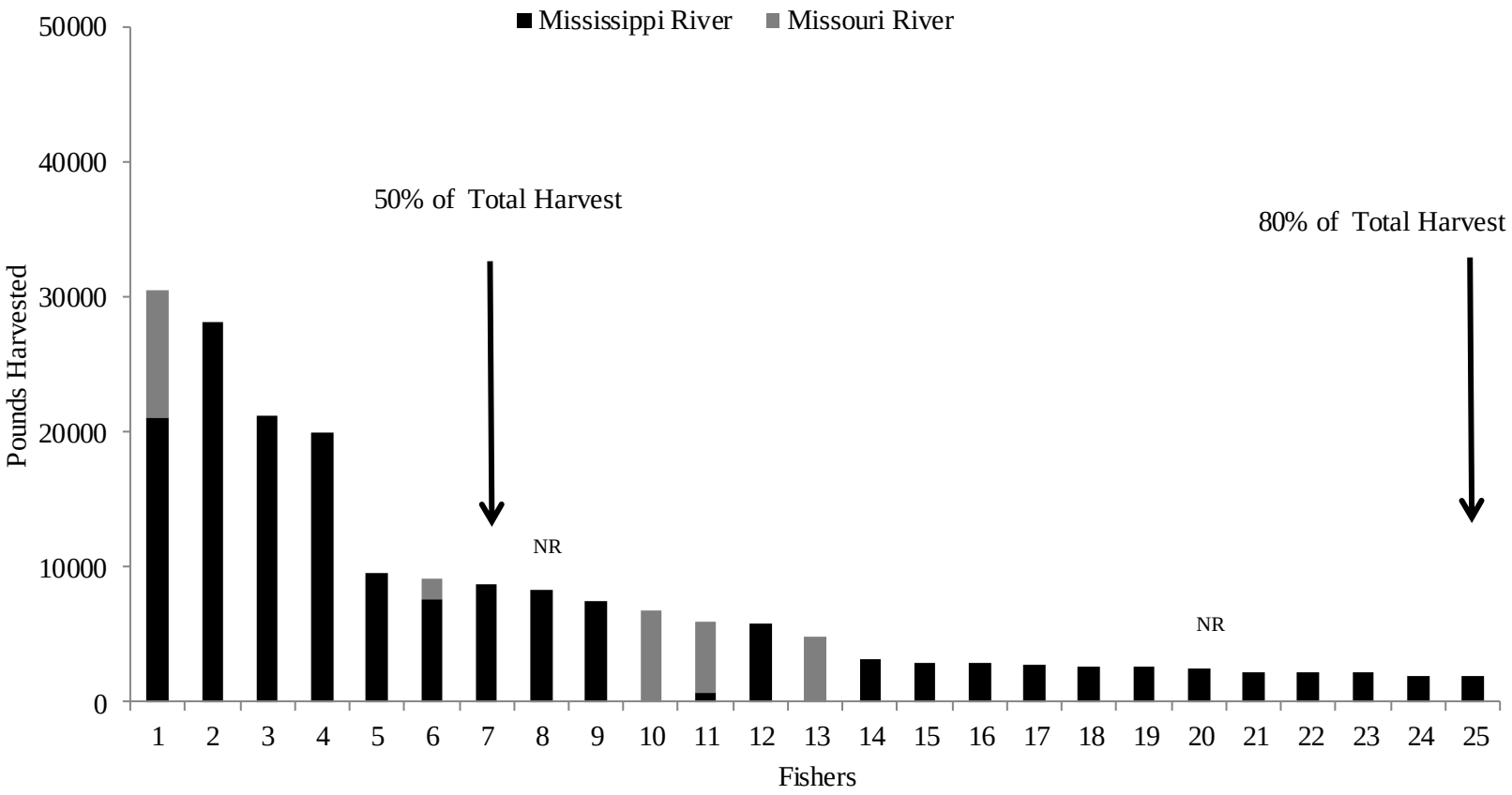

Figure 12. Pounds harvested by the 25 commercial fishers with the greatest harvest in 2010, NR represents those commercial fishers that were non-residents.

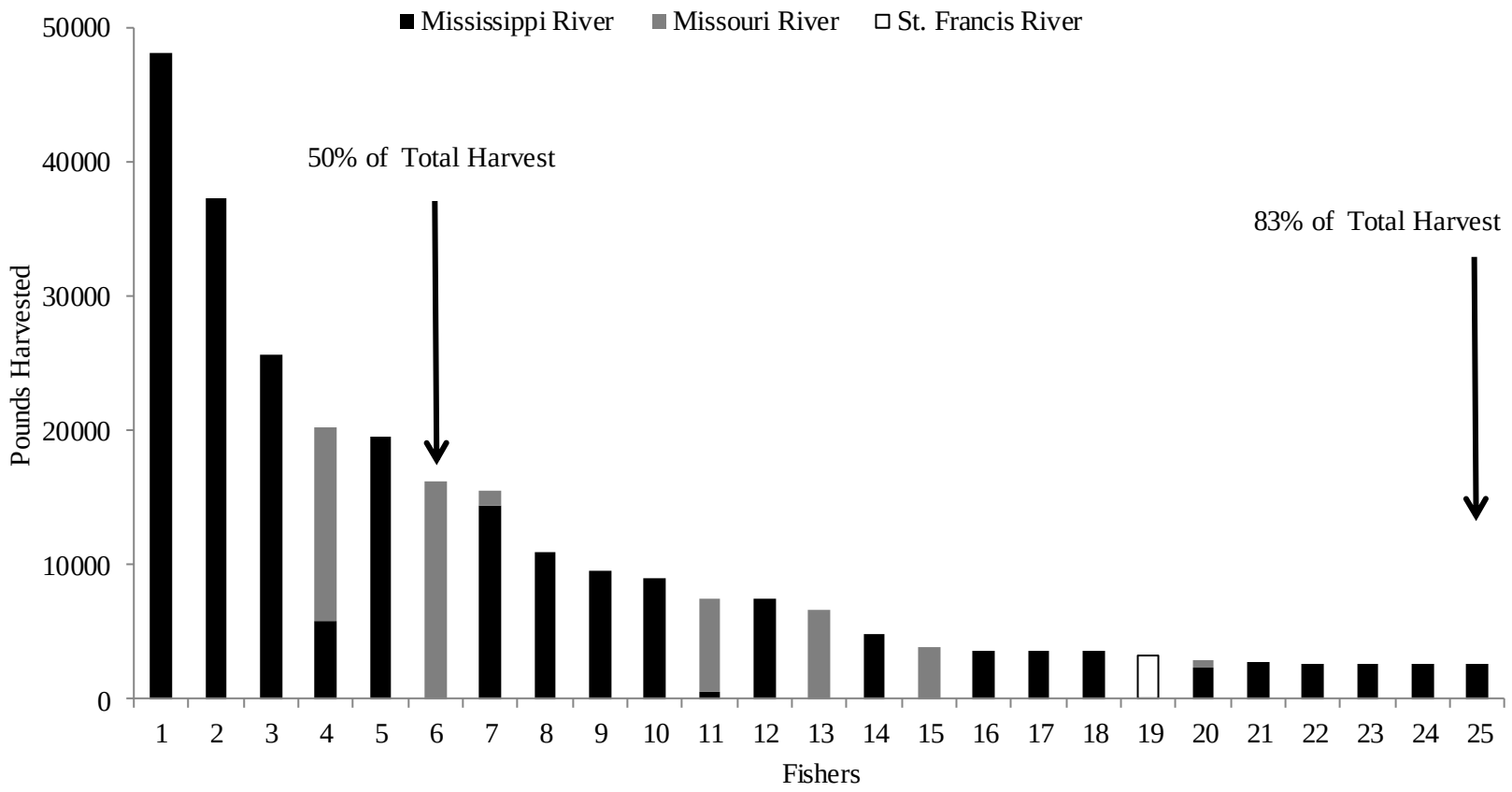

Figure 13. Pounds harvested by the 25 commercial fishers with the greatest harvest in 2011, NR represents those commercial fishers that were non-residents.

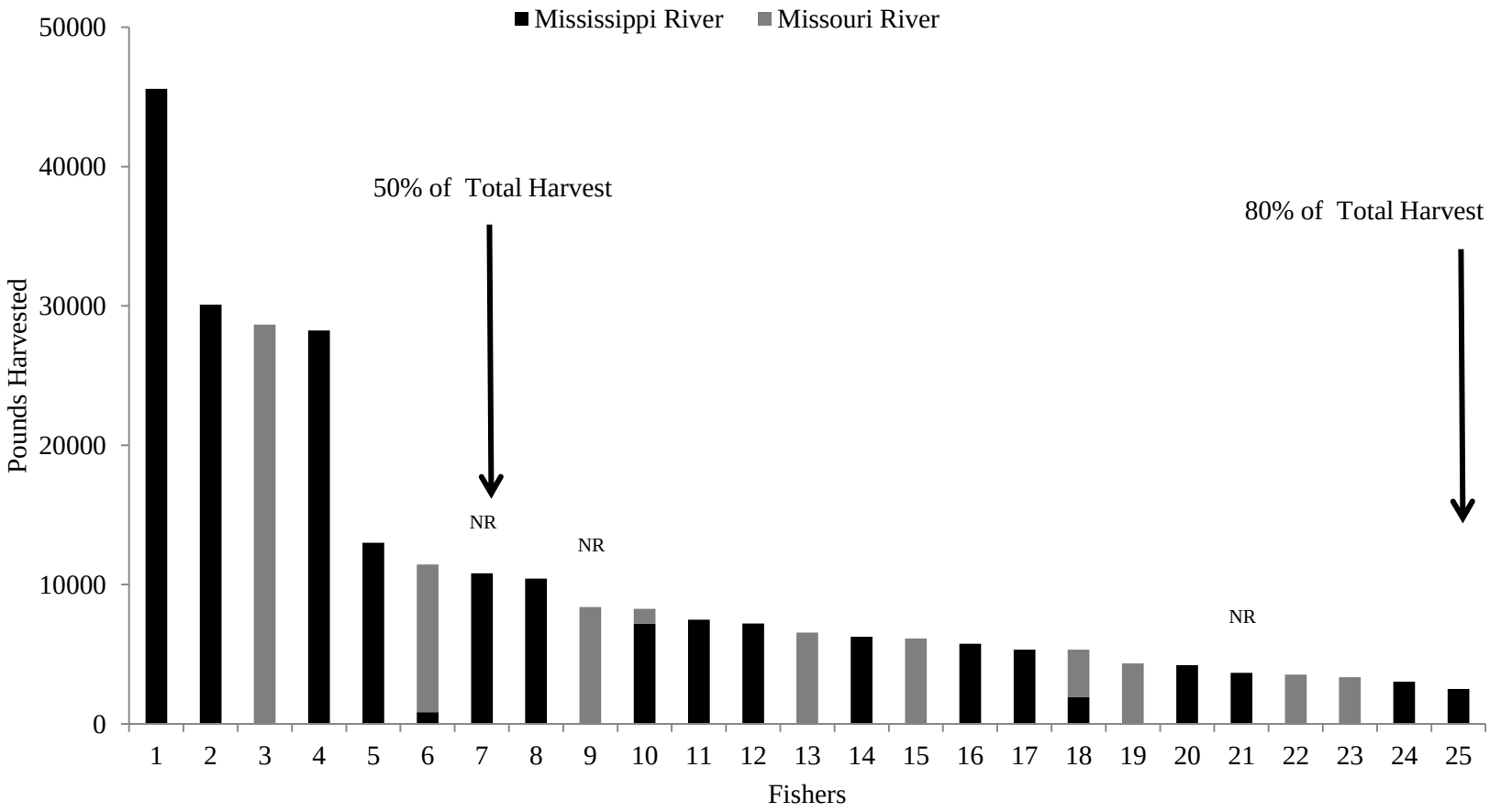

Figure 14. Pounds harvested by the 25 commercial fishers with the greatest harvest in 2012, NR represents those commercial fishers that were non-residents.

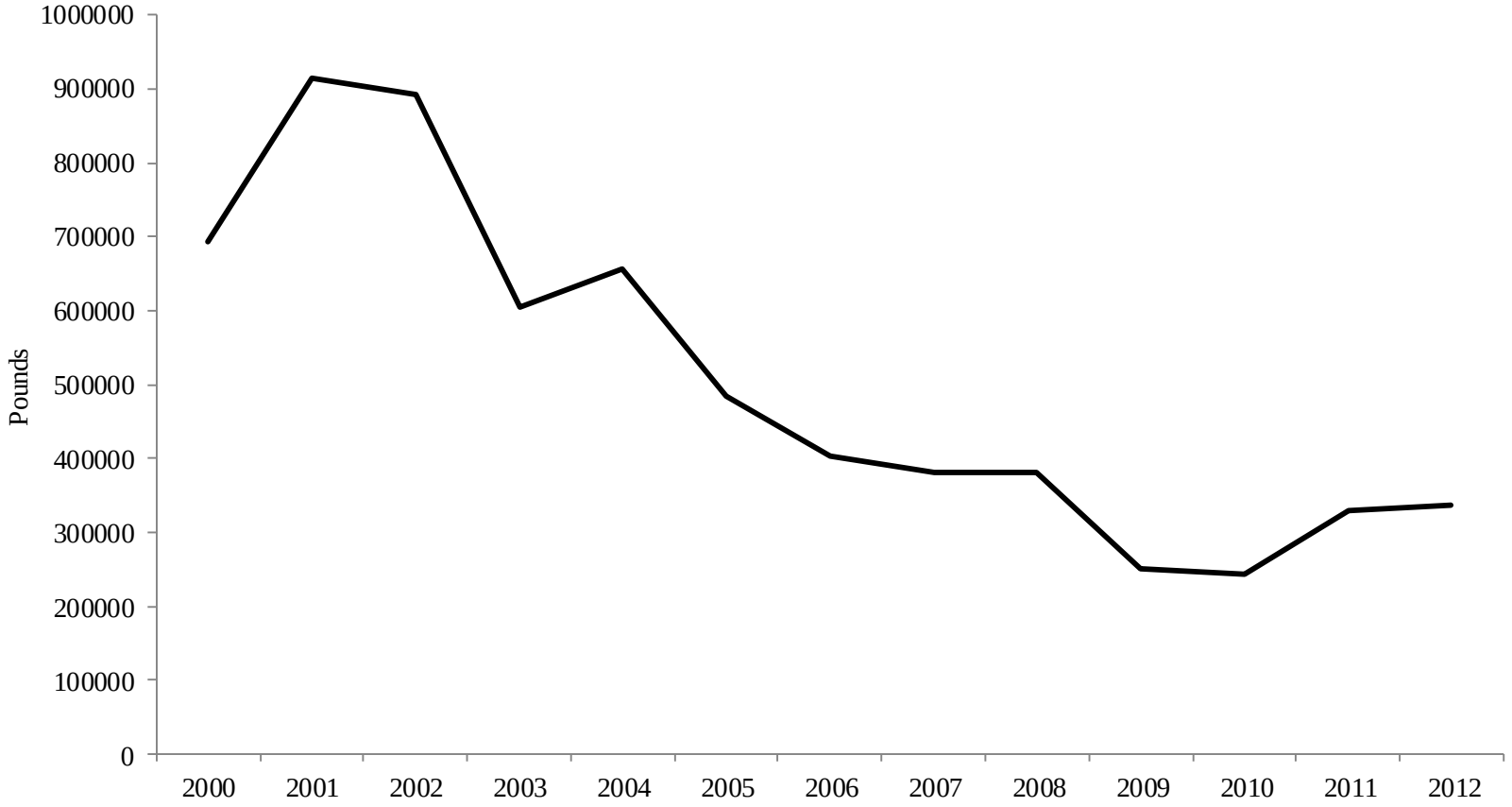

Figure 15. Total pounds harvested by commercial fishers for the three commercial waters in Missouri from 2000-2012.

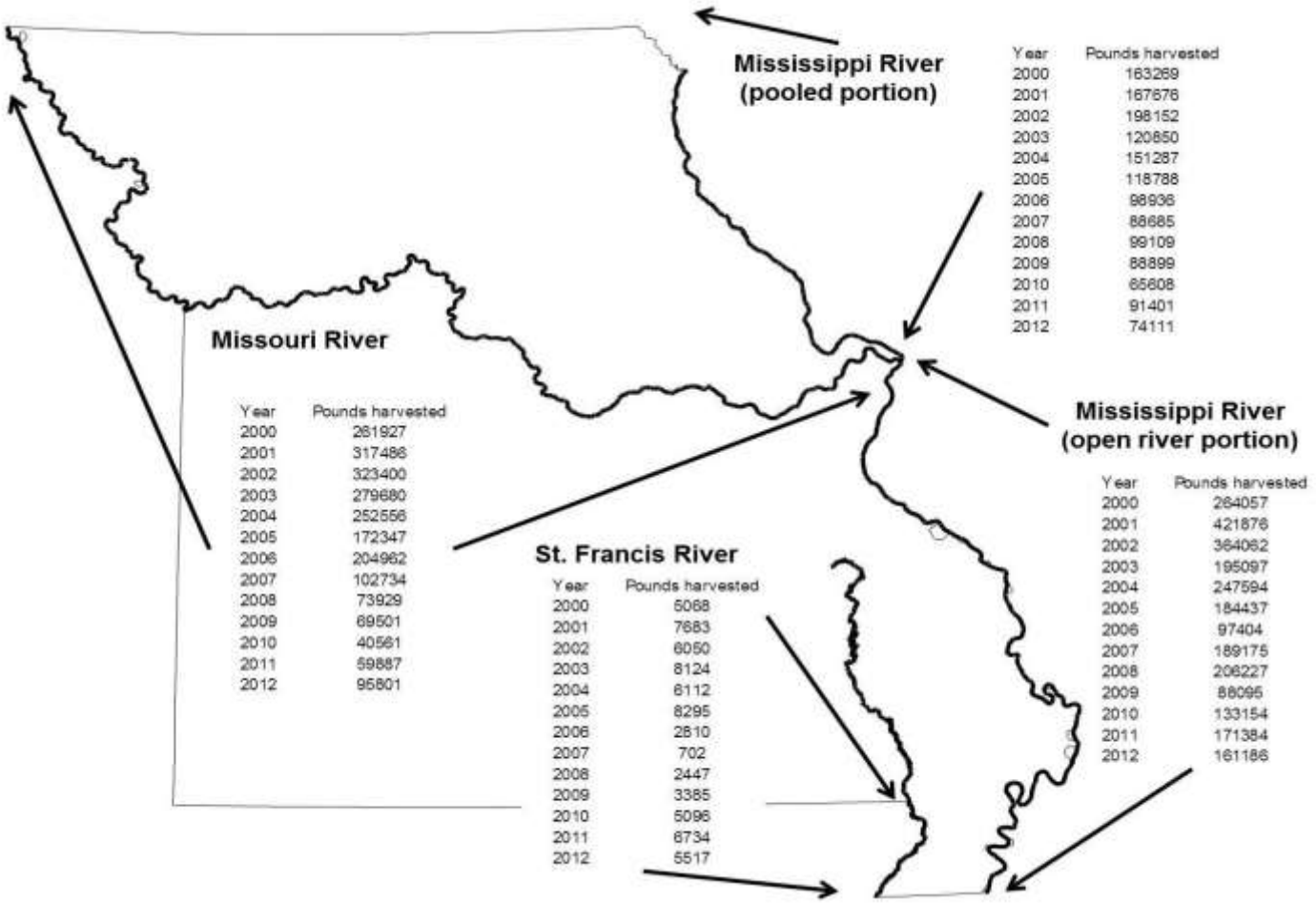

Figure 16. Harvest of commercial fishes in pounds by portion of river fished and year. For the harvest that occurred in the Mississippi River, we broke harvest down into two categories the open river portion (below Lock and Dam 26) and the pooled portion (above Lock and Dam 26).

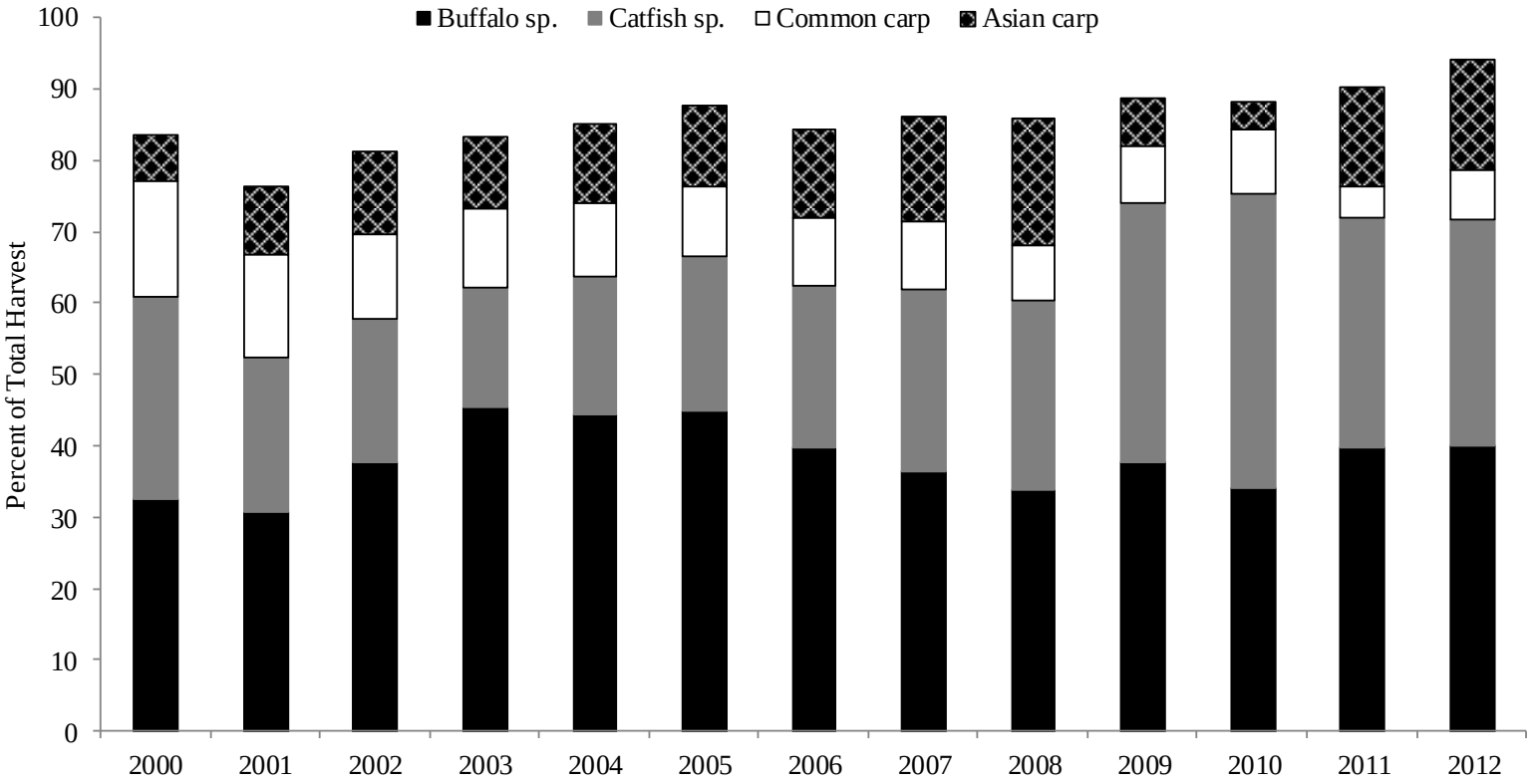

Figure 17. Percent of total harvest for the four groups of fish that consistently account for the majority of the pounds harvested.

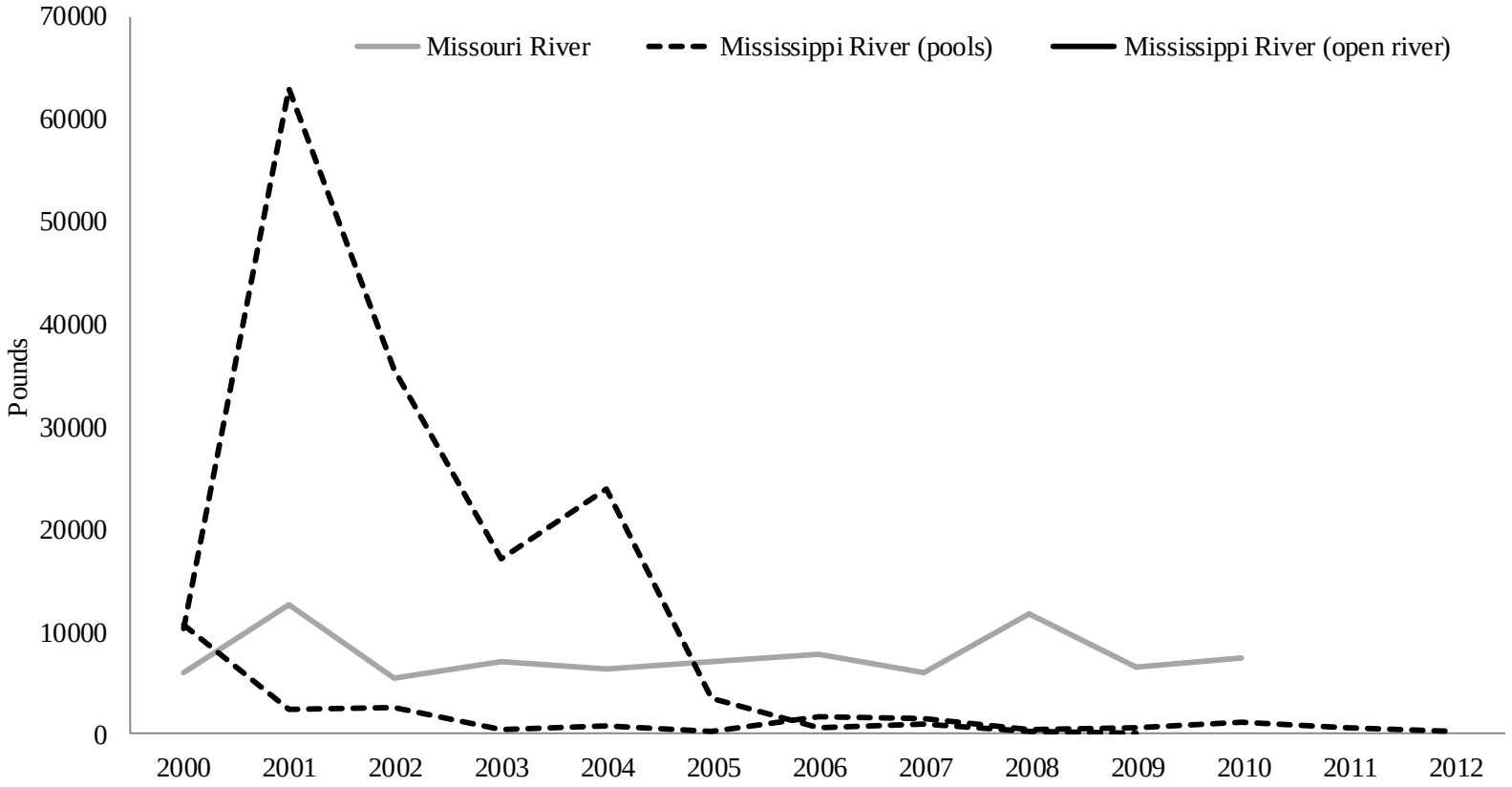

Figure 18. Pounds of sturgeon harvested from Missouri's commercial waters from 2000-2012. Note harvest of shovelnose sturgeon was closed in 2010 on the open river portion of the Mississippi River and in the Missouri River.

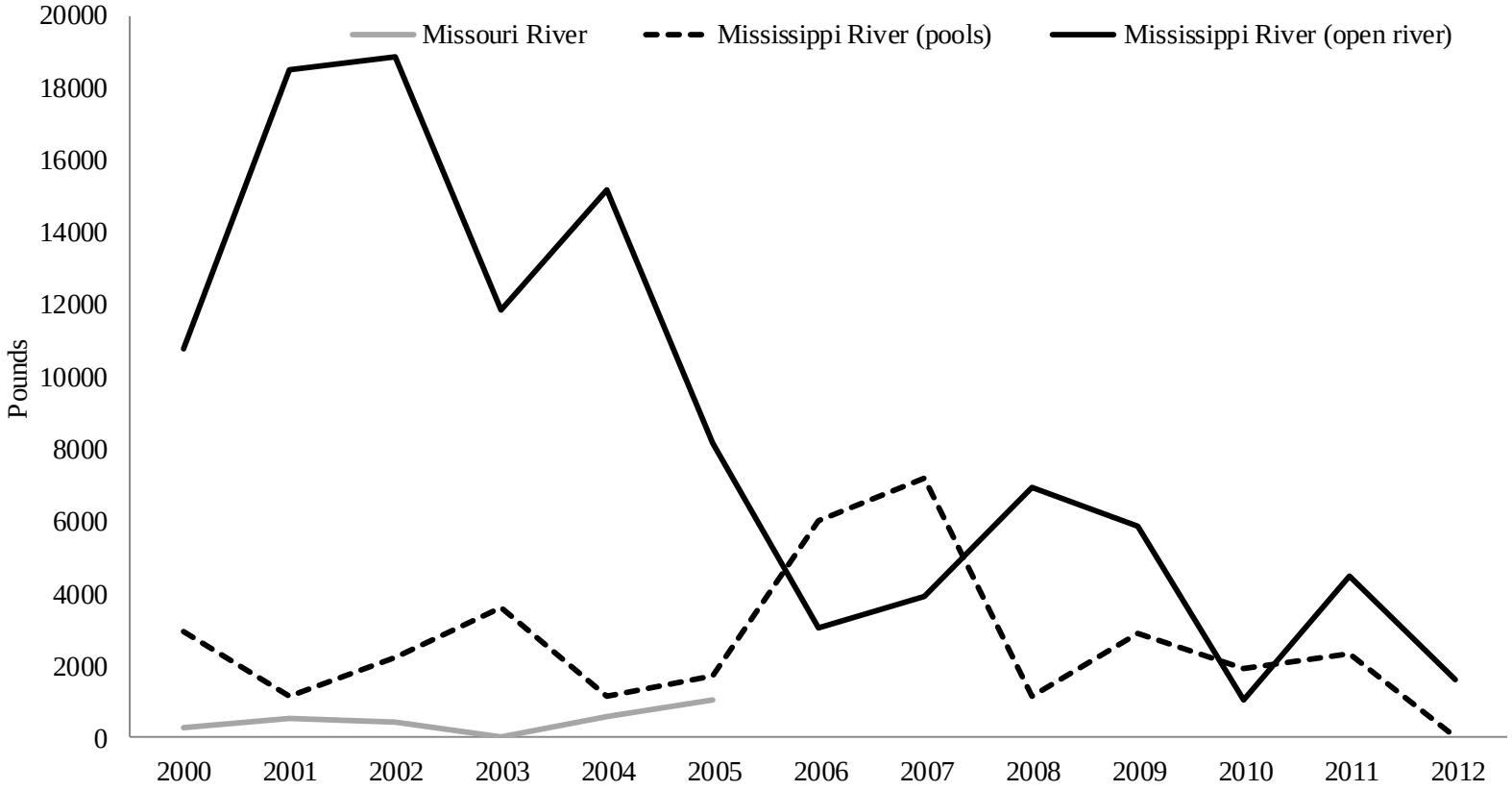

Figure 19. Pounds of paddlefish harvested from Missouri's commercial waters from 2000-2012. Note harvest of paddlefish was closed in 1990 on the Missouri River.

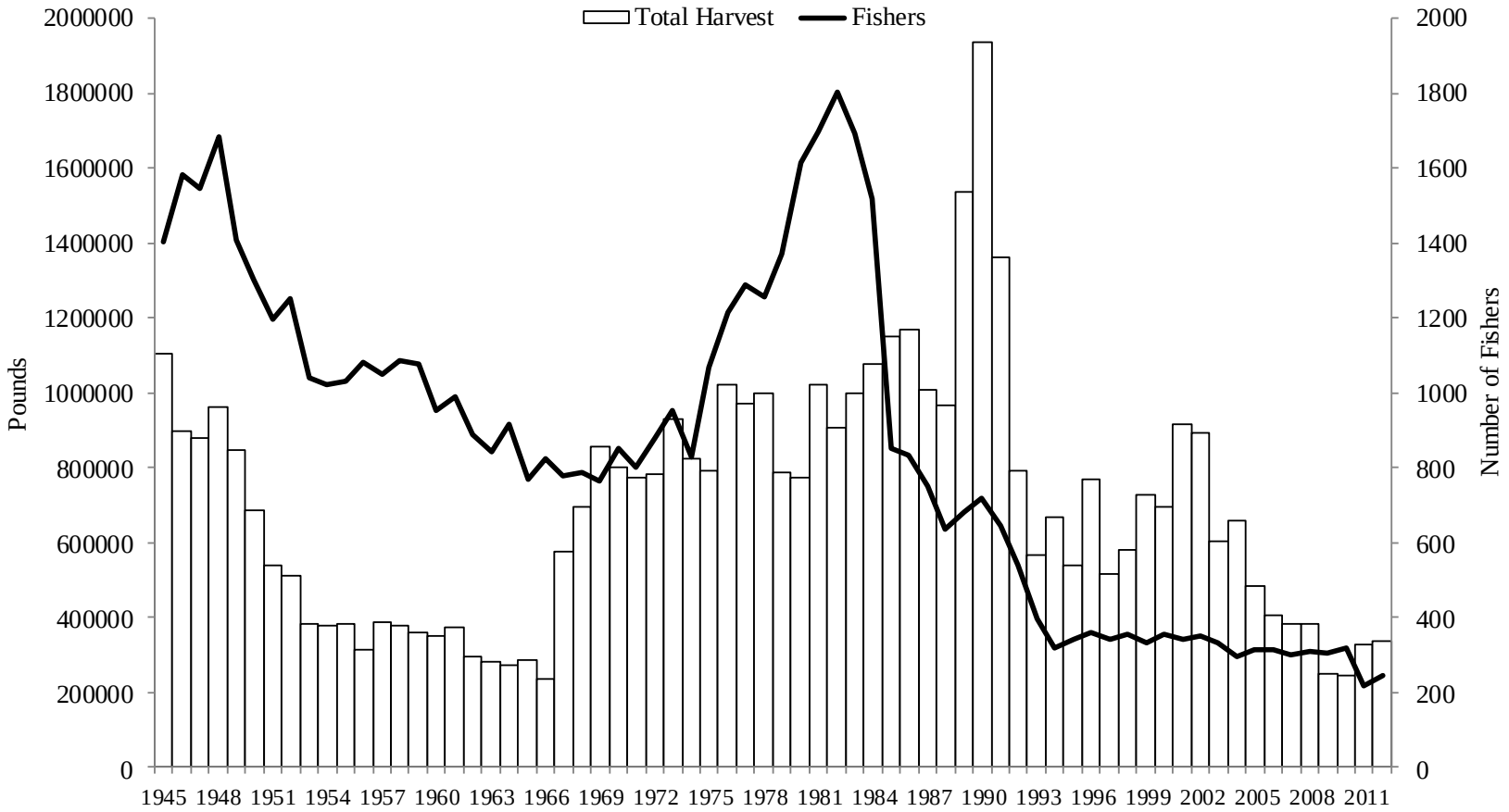

Figure 20. Number of commercial fishers and their harvest from the Missouri, Mississippi, and St. Francis rivers combined from 1945 to 2012. Note commercial harvest of paddlefish was closed in 1990 on the Missouri River, harvest of catfish was closed on the Missouri River in 1992, and harvest of shovelnose sturgeon was closed in 2010 on the open river portion of the Mississippi River and in the Missouri River.

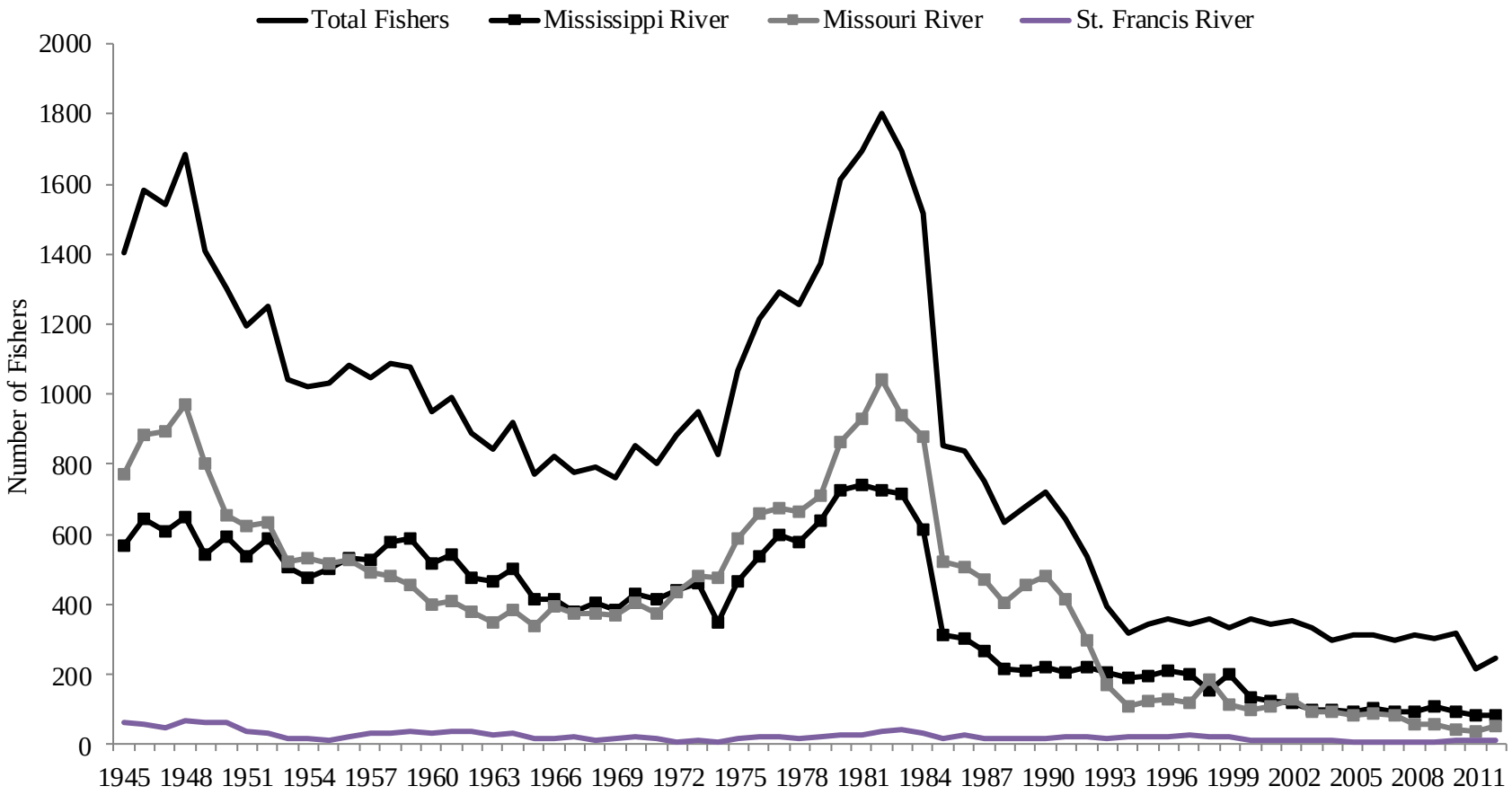

Figure 21. Number of total commercial fishers and the number of fishers from the Missouri, Mississippi, and St. Francis rivers from 1945 to 2012. Note commercial harvest of paddlefish was closed in 1990 on the Missouri River, harvest of catfish was closed on the Missouri River in 1992, and harvest of shovelnose sturgeon was closed in 2010 on the open river portion of the Mississippi River and in the Missouri River.

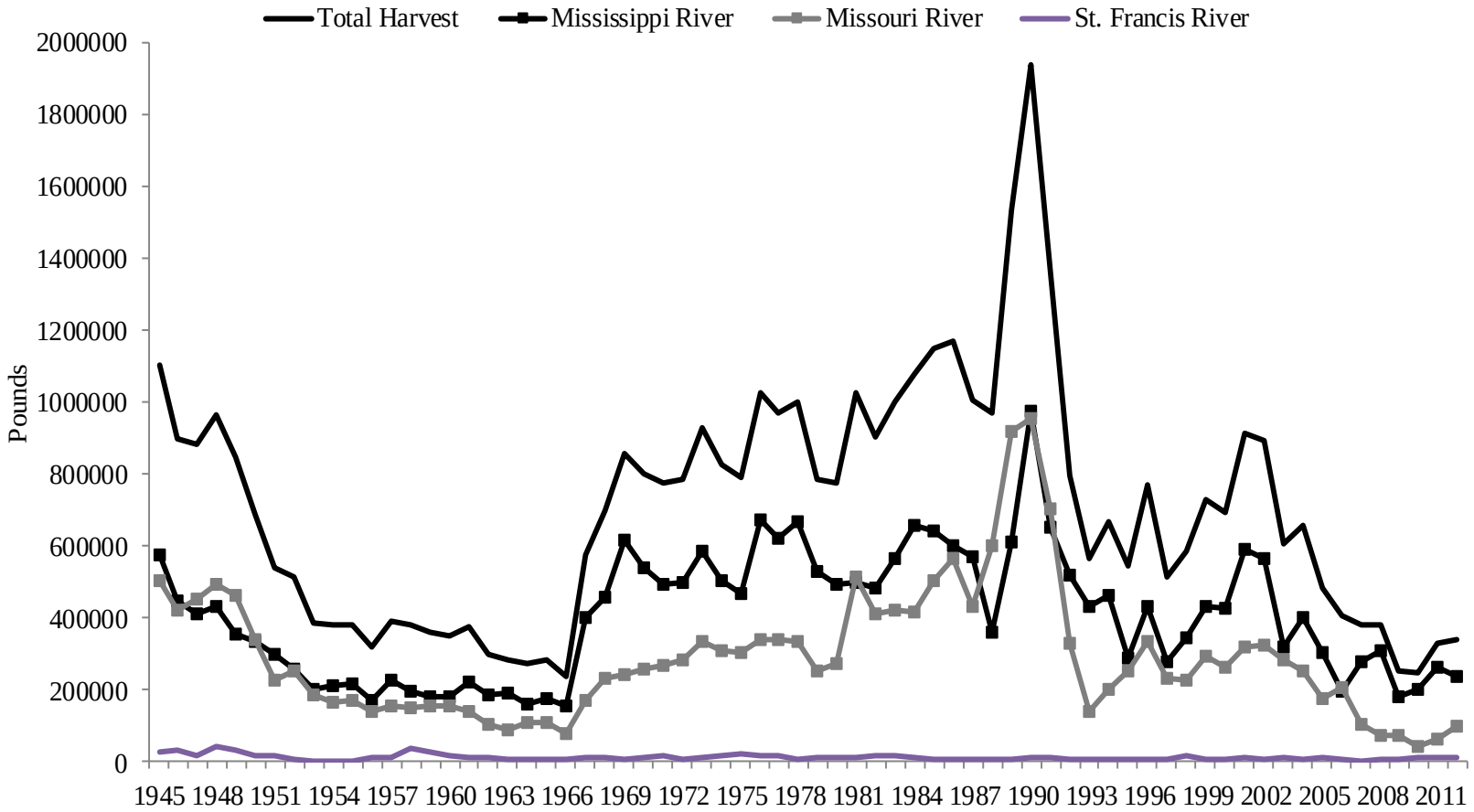

Figure 22. Commercial harvest, combined and individual, from the Missouri, Mississippi, and St. Francis rivers from 1945 to 2012. Note commercial harvest of paddlefish was closed in 1990 on the Missouri River, harvest of catfish was closed on the Missouri River in 1992, and harvest of shovelnose sturgeon was closed in 2010 on the open river portion of the Mississippi River and in the Missouri River.

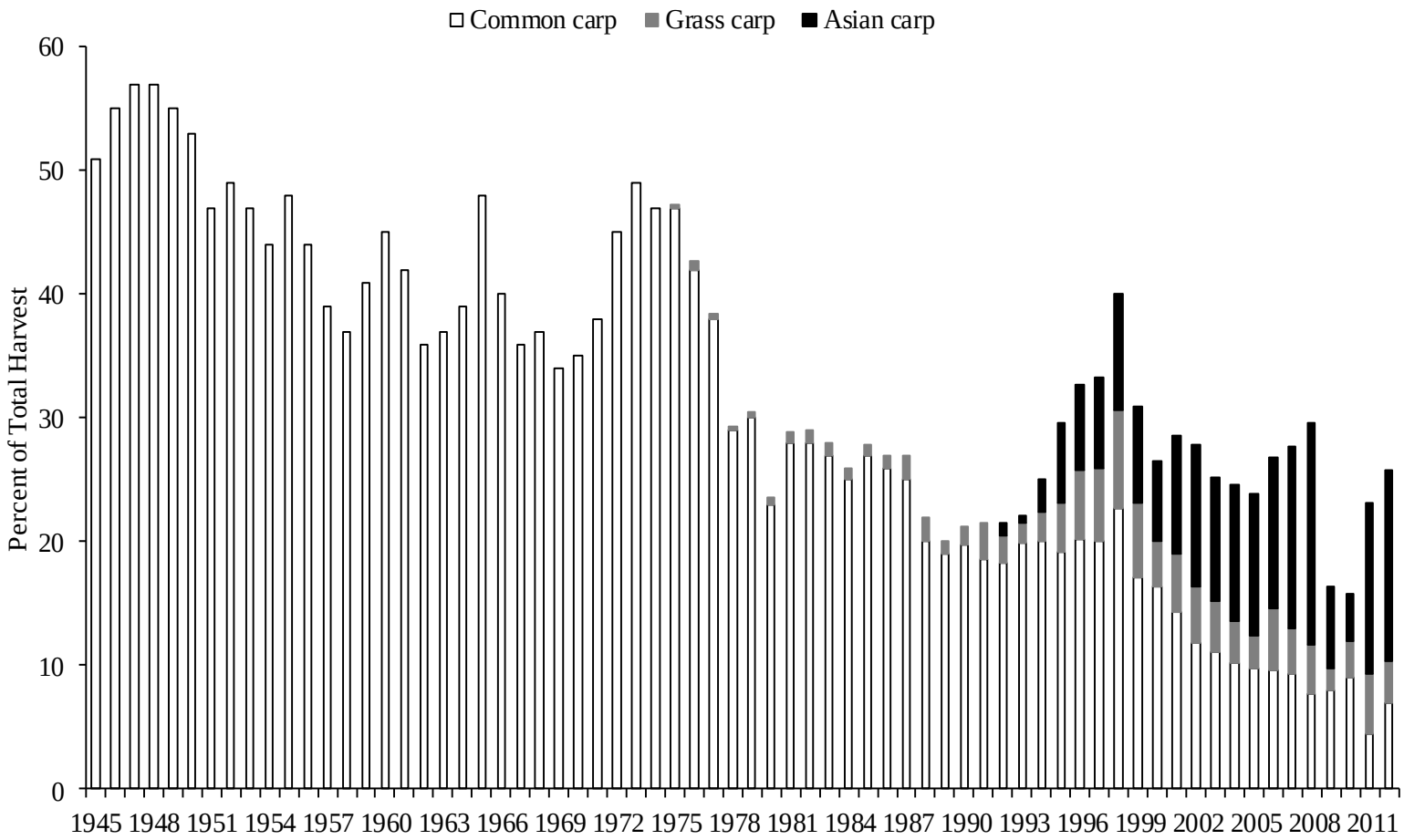

Figure 23. Percent of total harvested pounds of three groups of invasive carp harvested from Missouri's commercial waters from 1945 to 2012.

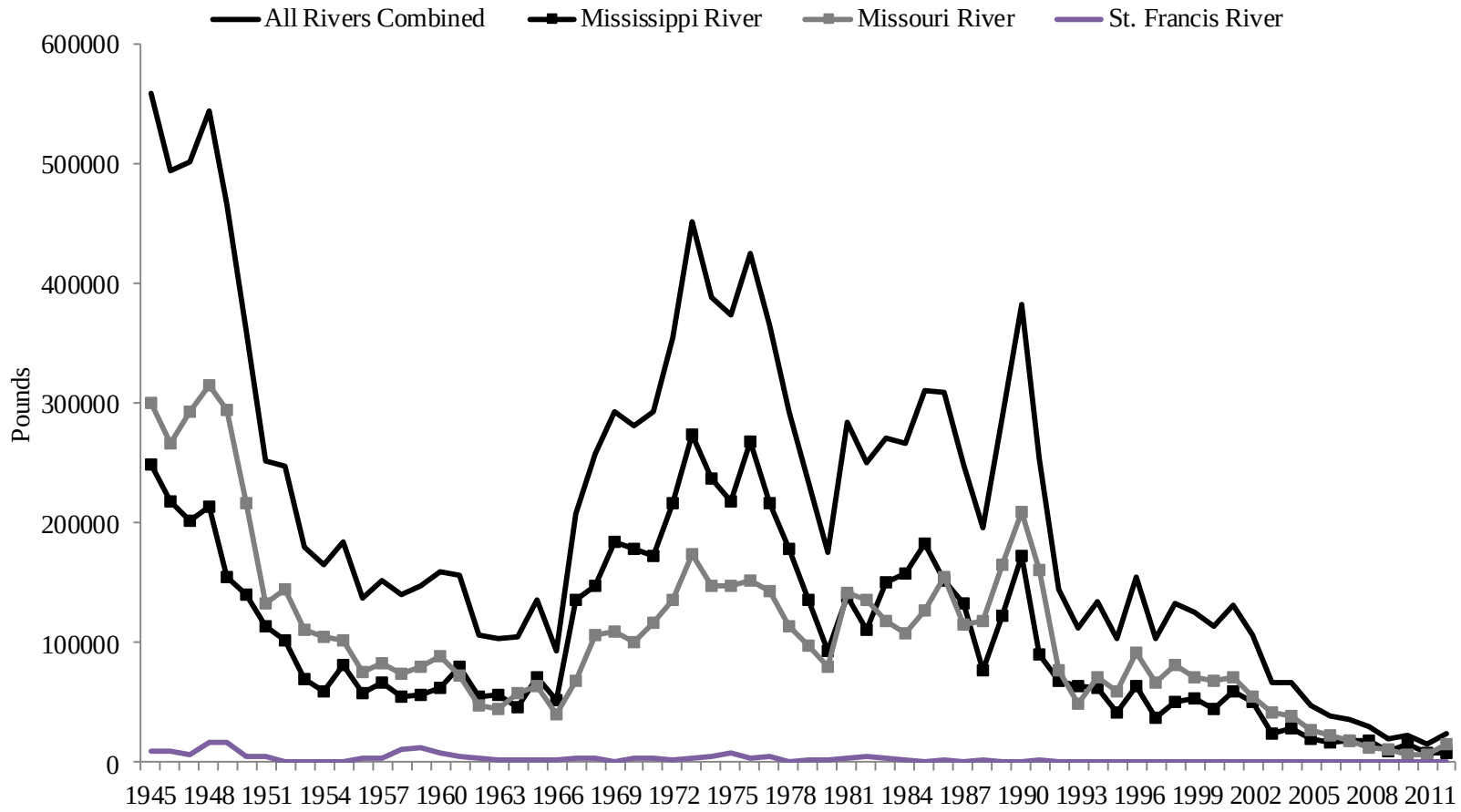

Figure 24. Pounds of common carp harvested from Missouri's commercial waters from 1945-2012.

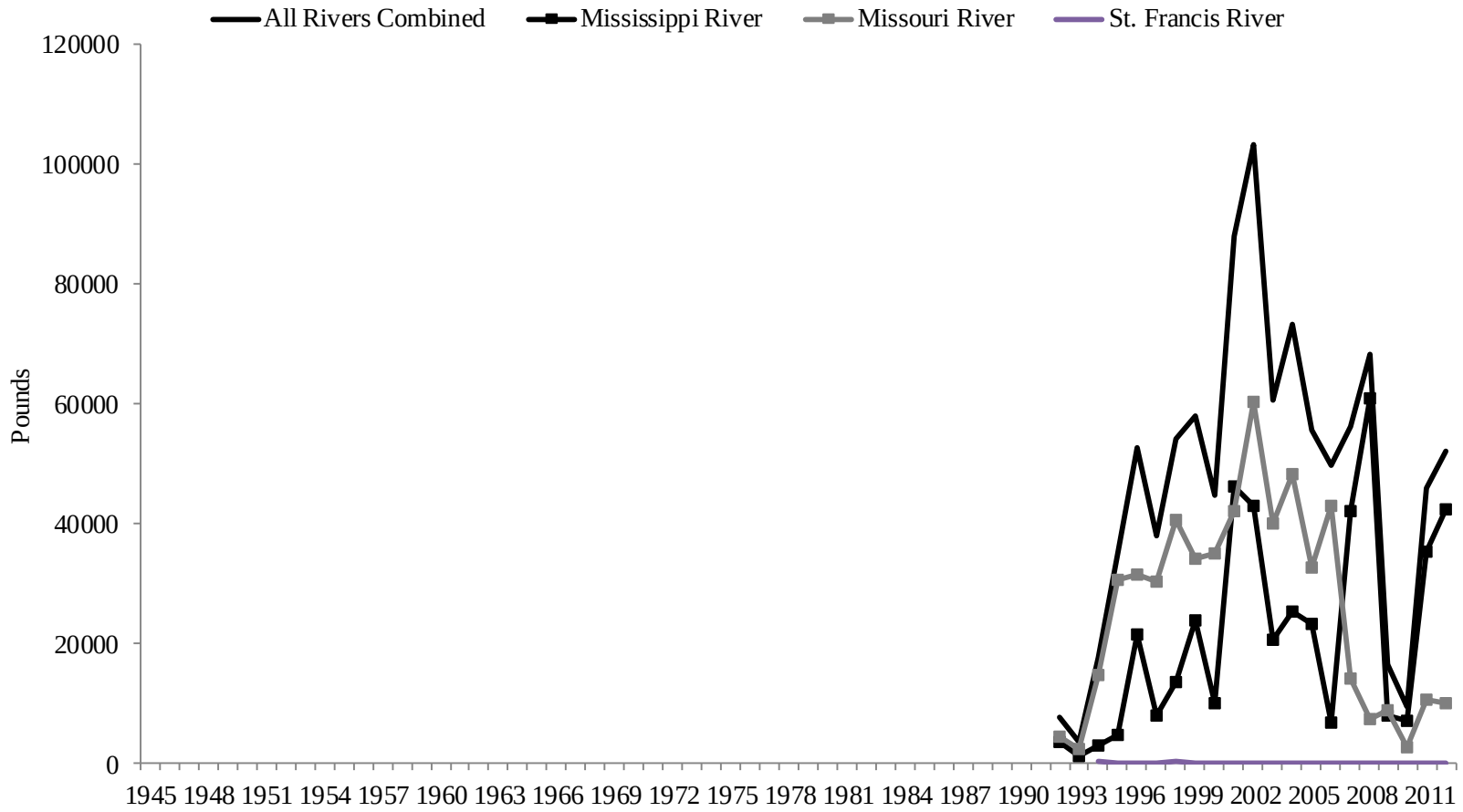

Figure 25. Pounds of Asian carp harvested from Missouri's commercial waters from 1945-2012.

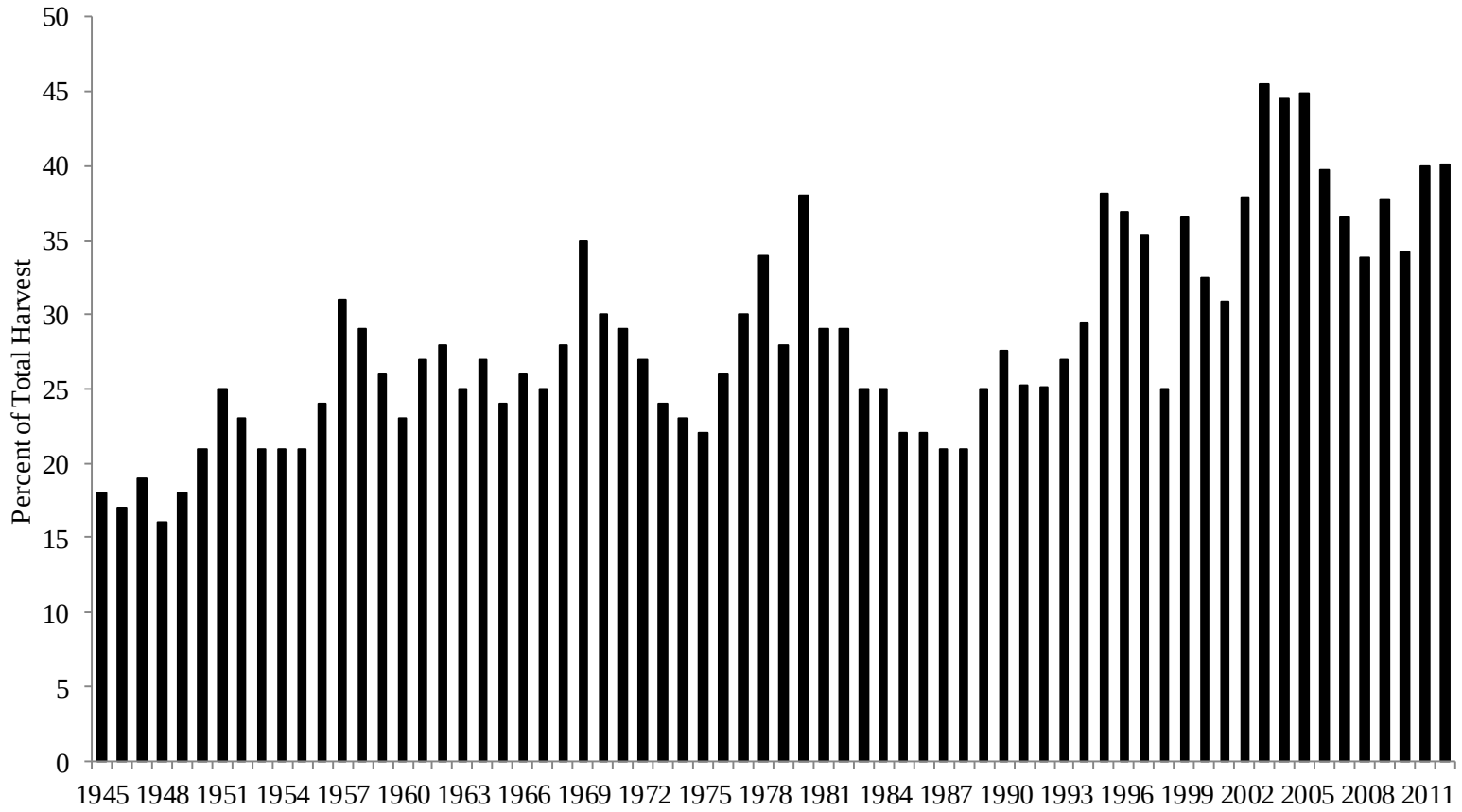

Figure 26. Percent of total harvested pounds of buffalofishes harvested from Missouri's commercial waters from 1945 to 2012.

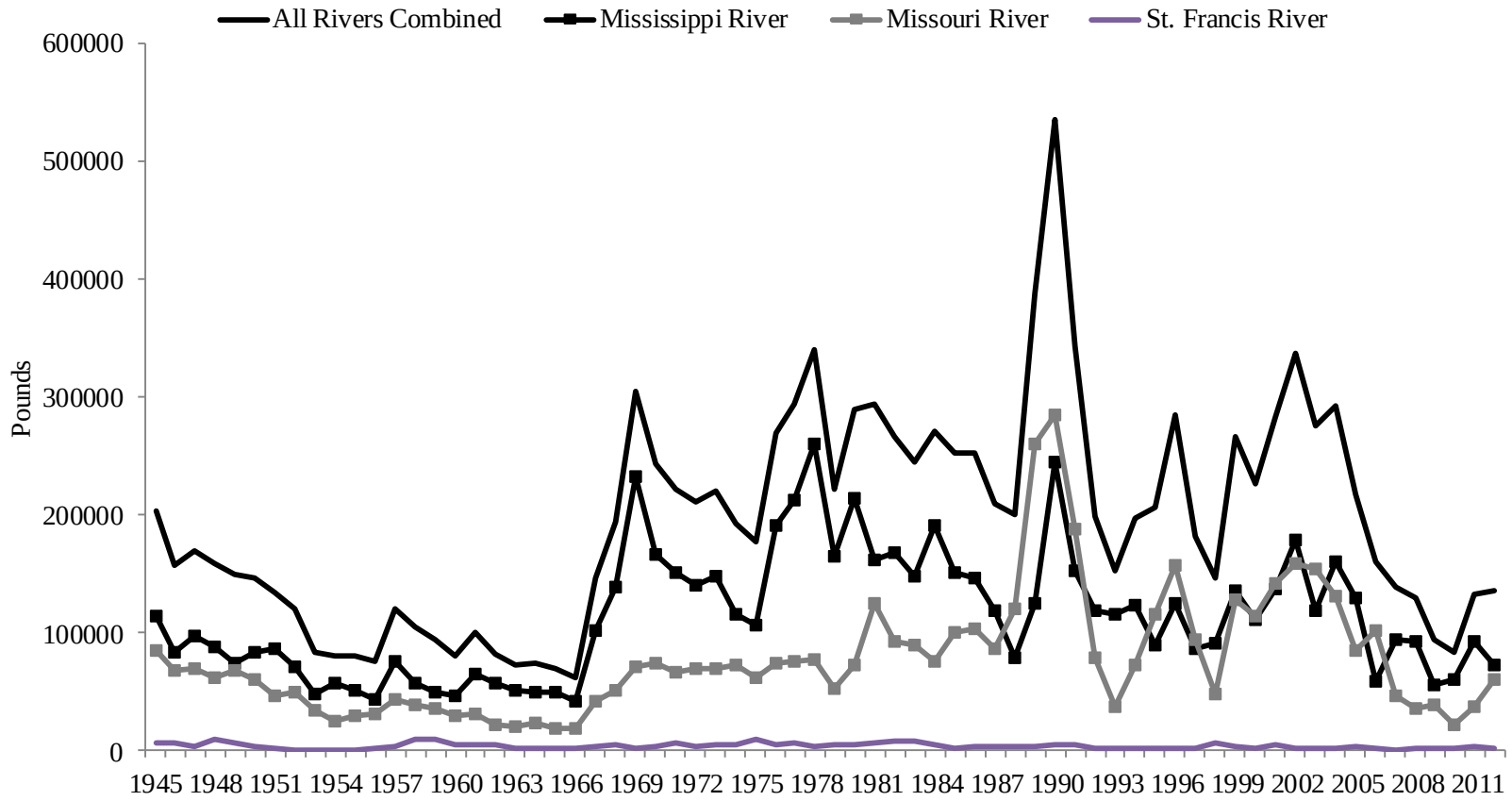

Figure 27. Pounds of buffalofishes harvested from Missouri's commercial waters from 1945-2012.

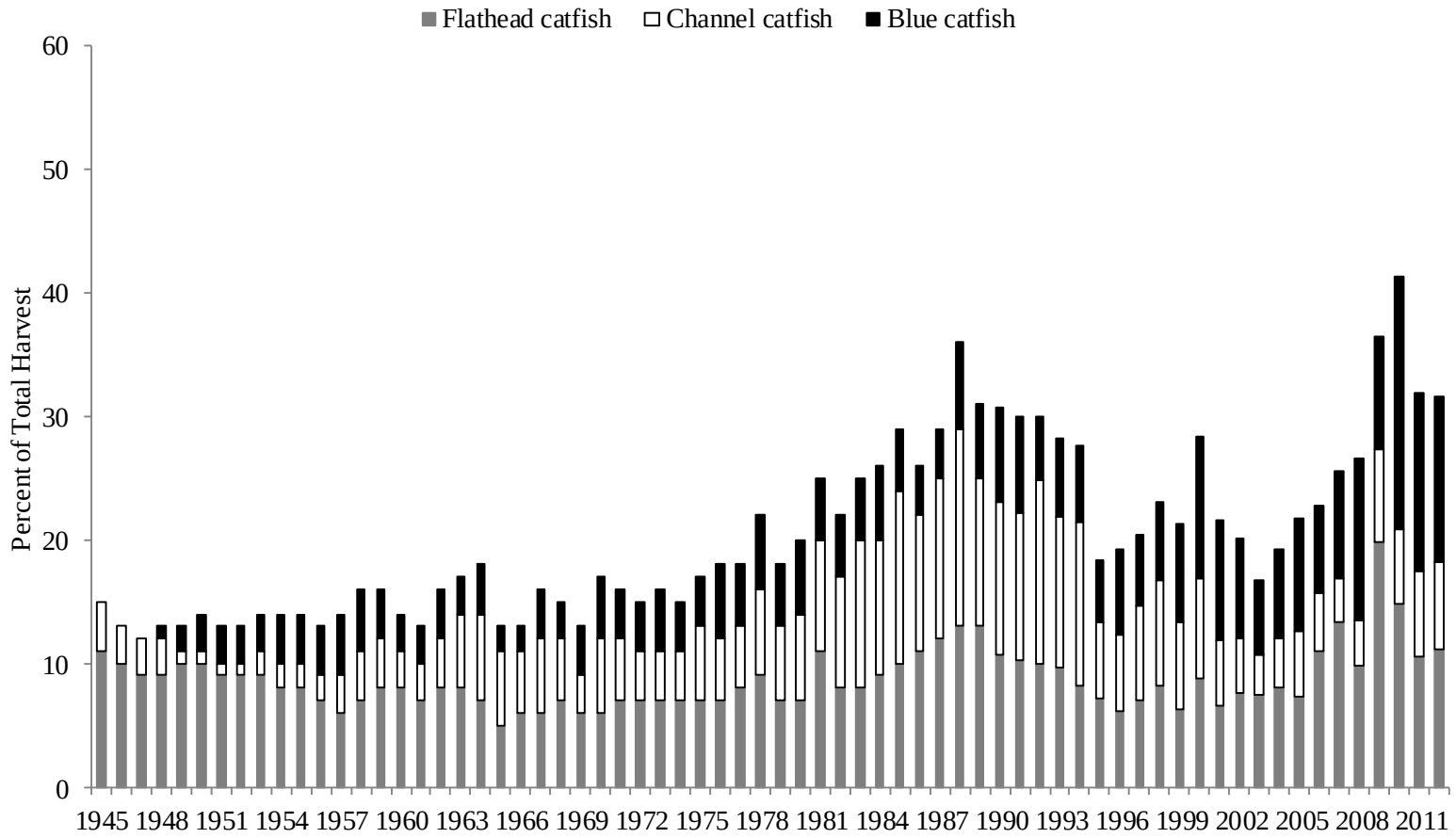

Figure 28. Percent of total harvested pounds of three catfish species harvested from Missouri's commercial waters from 1945-2012. Note commercial harvest of catfish was closed on the Missouri River in 1992.

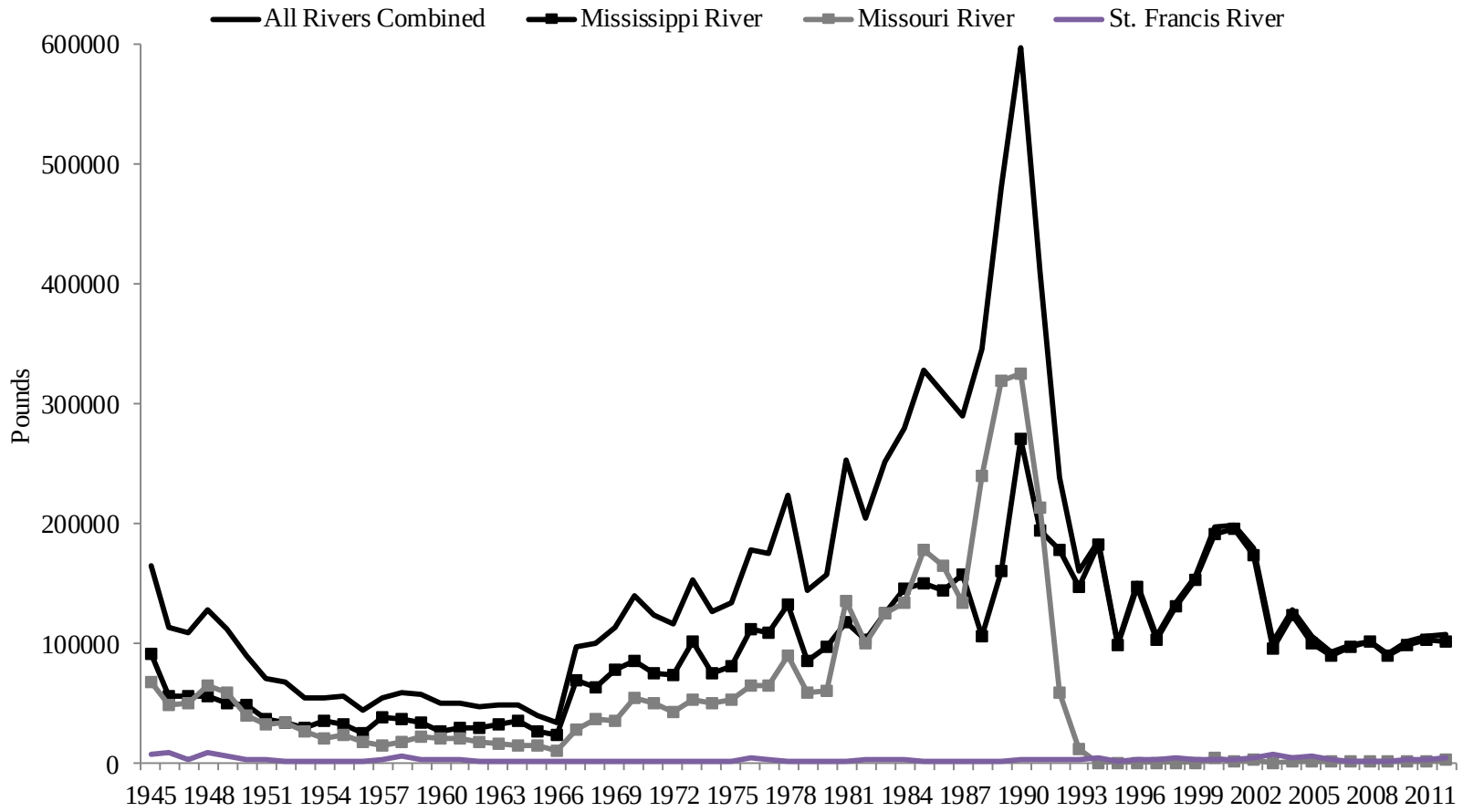

Figure 29. Pounds of catfishes harvested from Missouri's commercial waters from 1945-2012. Note commercial harvest of catfish was closed on the Missouri River in 1992. Reported catfish harvest after 1992 on the Missouri River could either be illegal harvest or recreational harvest reported on the commercial report.

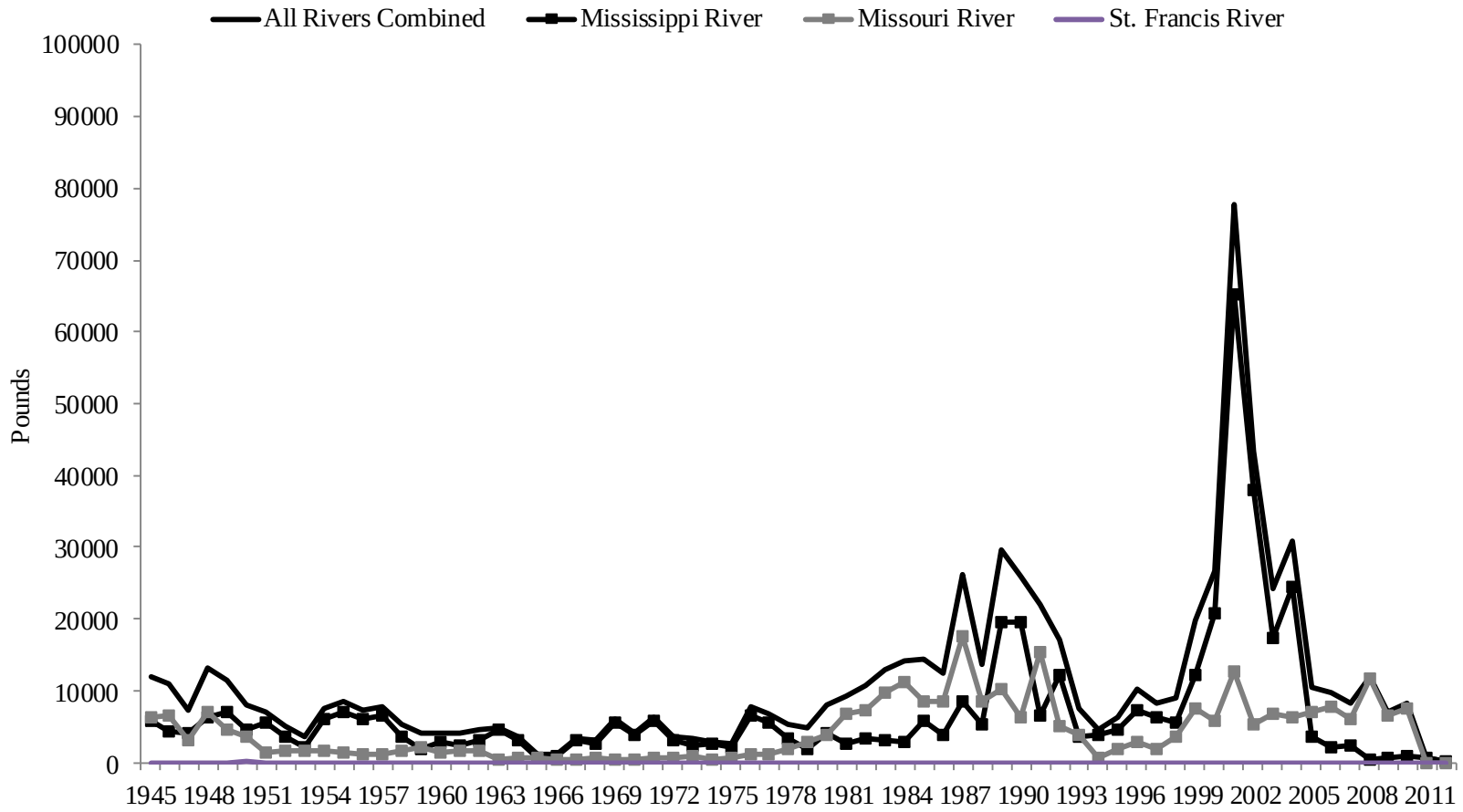

Figure 30. Pounds of sturgeon harvested from Missouri's commercial waters from 1945-2012. Note harvest of shovelnose sturgeon was closed in 2010 on the open river portion of the Mississippi River and in the Missouri River.

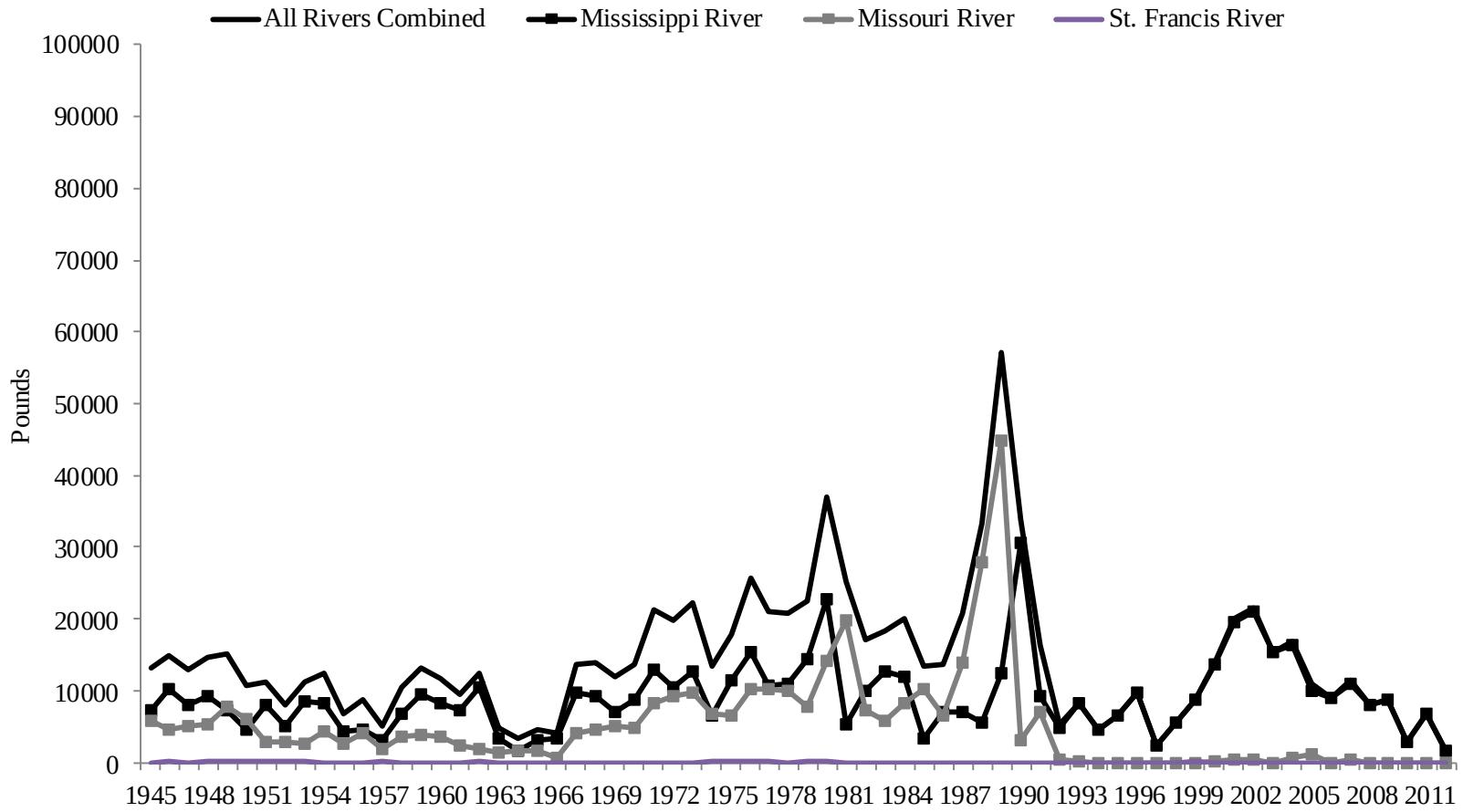

Figure 31. Pounds of paddlefish harvested from Missouri's commercial waters from 1945-2012. Note commercial harvest of paddlefish was closed in 1990 on the Missouri River.