2022 Lewis and Clark Lake Fish Sampling Summary
Nebraska Game and Parks Commission

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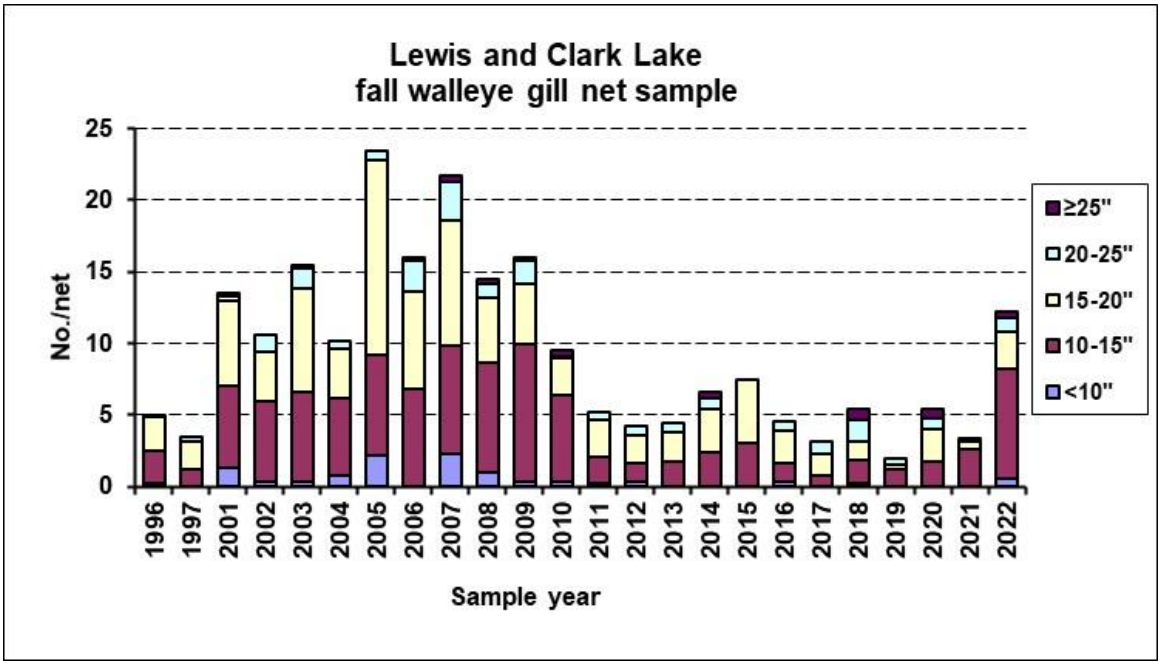
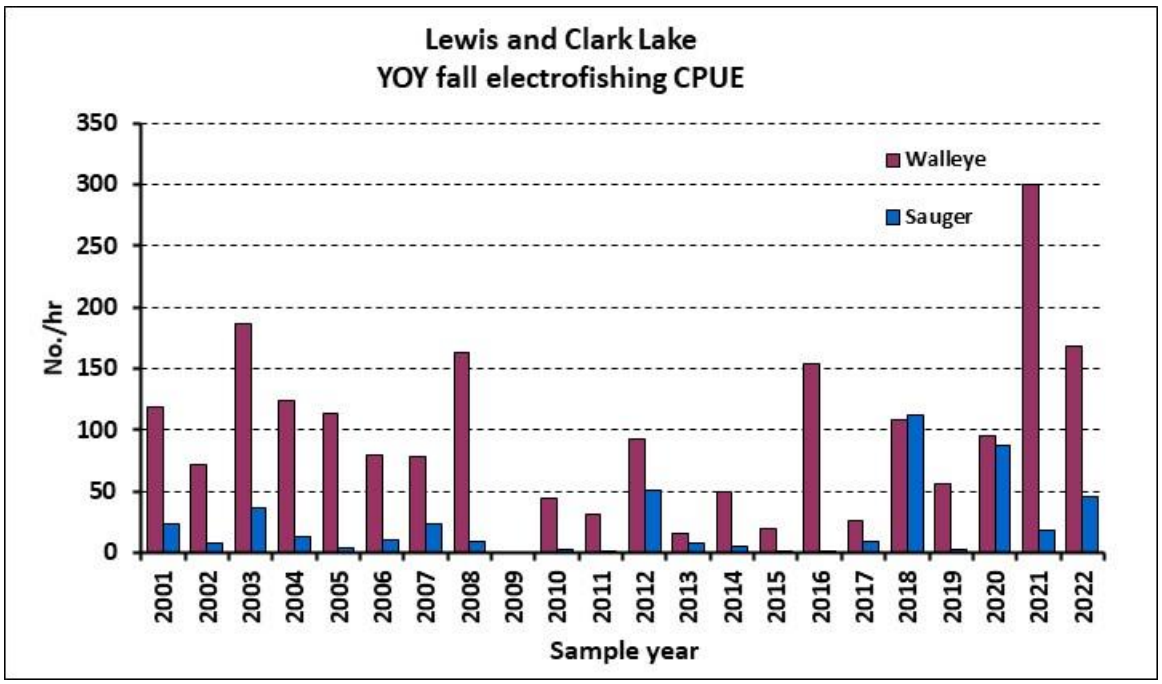
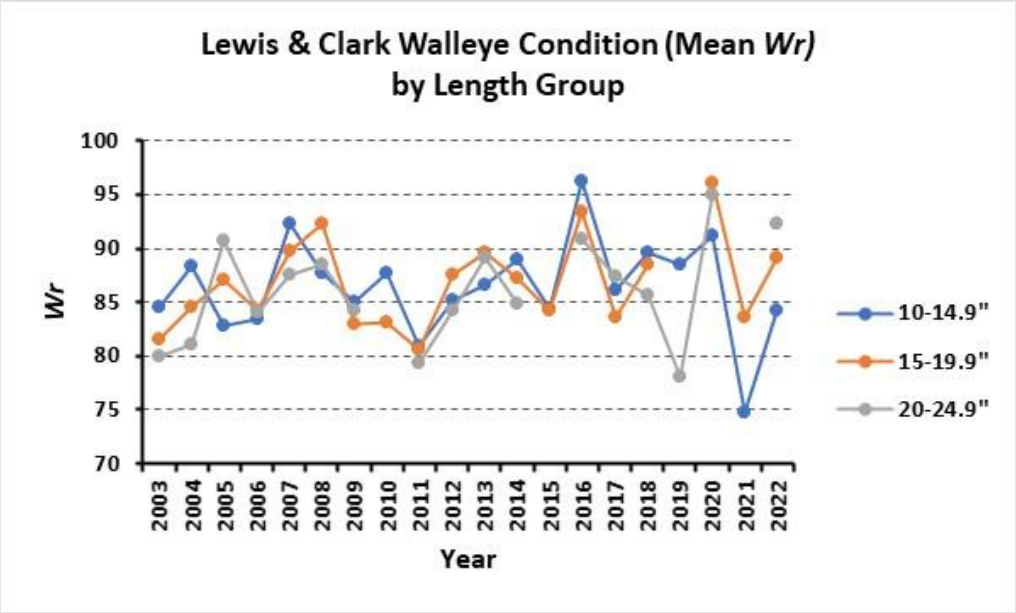
The following text and graphs summarize data from the fall fish survey on Lewis and Clark Lake. Night-time electrofishing for young-of-the-year (YOY) was conducted on September 28 and October 5 and gill netting occurred on October 4. Sampling consisted of two hours of night-time electrofishing and 5 gill nets. Gill nets targeted walleye, sauger, white bass, and channel catfish while electrofishing was used to monitor abundance of YOY walleye, sauger, and white bass as an index of 2022 production and assess stocked fish contribution. Both sampling methods are normally conducted on an annual basis. Historical data has shown that periods of high flows through the dam typically correspond to lower abundance of walleye in the reservoir. As a limited example, through the ten-year period from 2001-2010 the mean outflow was 19,770 cfs with a corresponding mean catch rate of 15.1 walleye/gill net while during the ten-year period from 2012-2021 the mean outflow was 30,070 cfs and the mean catch rate was 4.6 walleye/gill net. Walleye and sauger angling success seemed to improve somewhat on the reservoir proper in 2022 with positive reports coming from various areas of the reservoir throughout the year. Anglers also had some good days fishing the chutes at the upper end of the lake and the riverine portion upstream. White bass fishing seemed to drop off compared to 2021 while catfishing opportunities continued a positive trend.

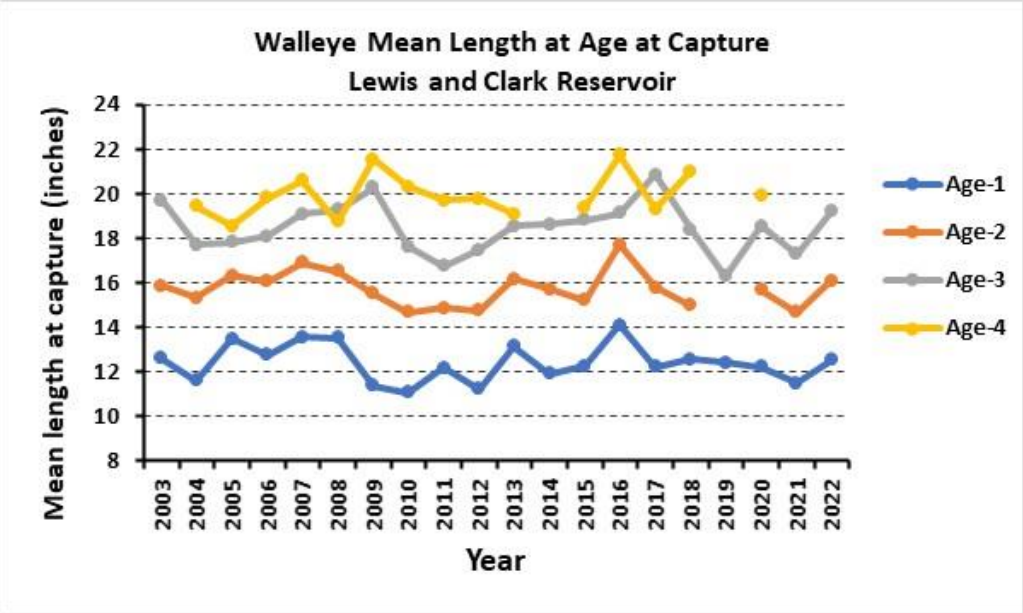
Walleye

Walleye angling opportunity should be noticeably improved in 2023 compared to the last decade in Lewis & Clark. The walleye catch rate had been quite low since the 2011 flood but in 2022 was 2.5 times the average catch rate for 2011 through 2021. The strong 2021 year class comprised the majority of the sample (57%) so anglers will likely encounter mostly sublegal fish early in the fishing season. Most of those fish should reach 15 inches (legal harvest length) at some point in 2023 to provide some good harvest opportunity by late summer and into fall. However, early season angling should also provide a decent chance for harvest as about 1/3 of the walleye sampled were of legal size. Moderate to high catch rates of YOY walleye had not been equating to an increased adult population in the reservoir but two consecutive years of relatively low releases through the dam may have provided conditions for more of those fish to stay in the reservoir. Those reduced releases, coupled with the extremely strong 2021 year class, provided for the substantial increase in overall catch in 2022. Graphs and discussion later in this report provide some background on the relationship between dam releases and walleye numbers. The walleye in the reservoir have exhibited variable condition over the years and the condition indices (mean *Wr*) of fish collected in the fall of 2021 indicated that they were in poor shape, especially those in the smallest group analyzed (10-14.9” fish). Food resources seemed to improve in 2022, however, as condition values improved substantially. As a product of the poor condition of walleye in 2021, their growth rates suffered that year. Growth did recover to what might be considered “average” rates in 2022 and most walleye continue to reach legal harvestable size (15 inches) sometime in their third growing season. Walleye fishing opportunities may also improve below Gavins Point Dam in 2023 depending on what level of escapement occurred by the 2021 year class.


Lewis and Clark Lake
fall walleye gill net sample
No./net
25
20
15
10
5
0
1996
1997
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Sample year
≥25"
20-25"
15-20"
10-15"
<10"


Lewis and Clark Lake
YOY fall electrofishing CPUE
No./hr
350
300
250
200
150
100
50
0
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Sample year
Walleye
Sauger

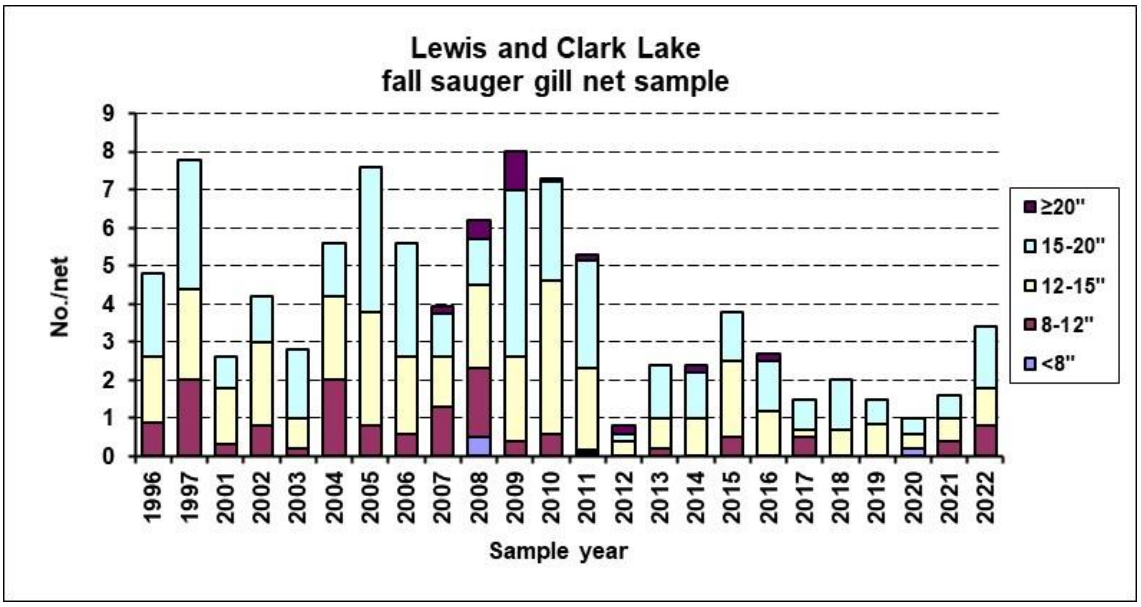


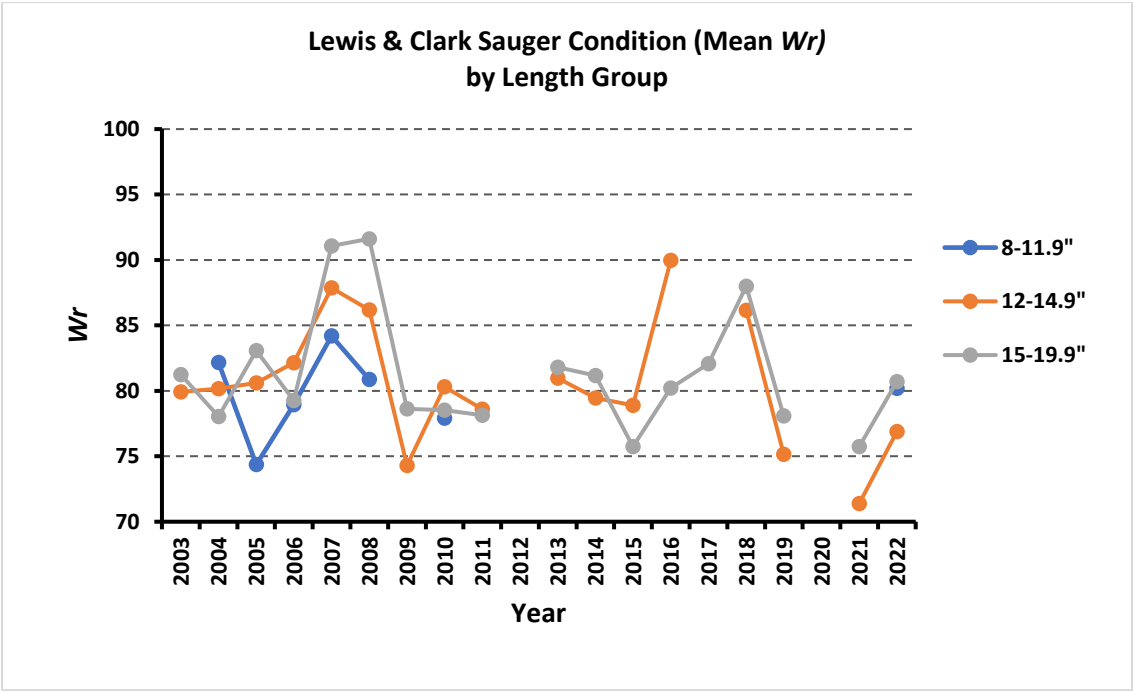


Sauger

Although not as pronounced as walleye, the sauger catch rate also improved notably. The gill net sample was limited to two year classes (2020 and 2021) which will add to the harvest opportunity in 2023 as 50% of the catch was of harvestable size. Another good year class was produced in 2022 and time will tell what they contribute to the fishery. Similar to walleye, 2021 sauger condition values were quite poor when compared among years but recovered in 2022. Sauger growth rates didn't seem to decline as noticeably as those for walleye but the sample size (i.e., the number of individual fish) was small enough to limit the inferences that could be made about sauger growth rates. The limited data did indicate that they are still reaching legal harvestable length of 15 inches sometime in their third growing season. Considering the relatively high flows of

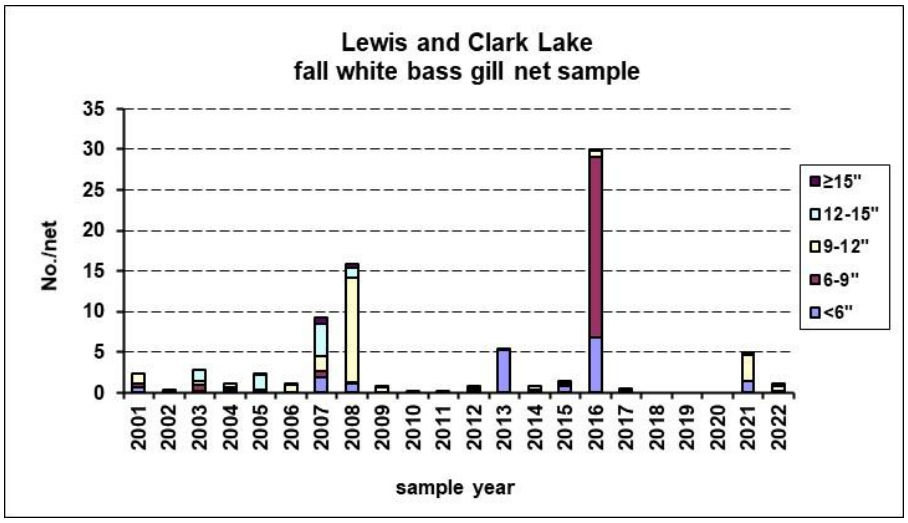
the last few years, they may likely be contributing to the river fishery below Gavins Point Dam. However, they are more adapted to flow than walleye so they could also have moved upstream and are inhabiting the delta portion of the reservoir where sampling just hasn't occurred. This area, often referred to as the "chutes", is in the vicinity of Springfield, SD and Santee, NE and normally provides some of the best angling opportunity for sauger associated with Lewis and Clark Lake. The riverine stretch upstream of the delta also provides good angling opportunity at times.

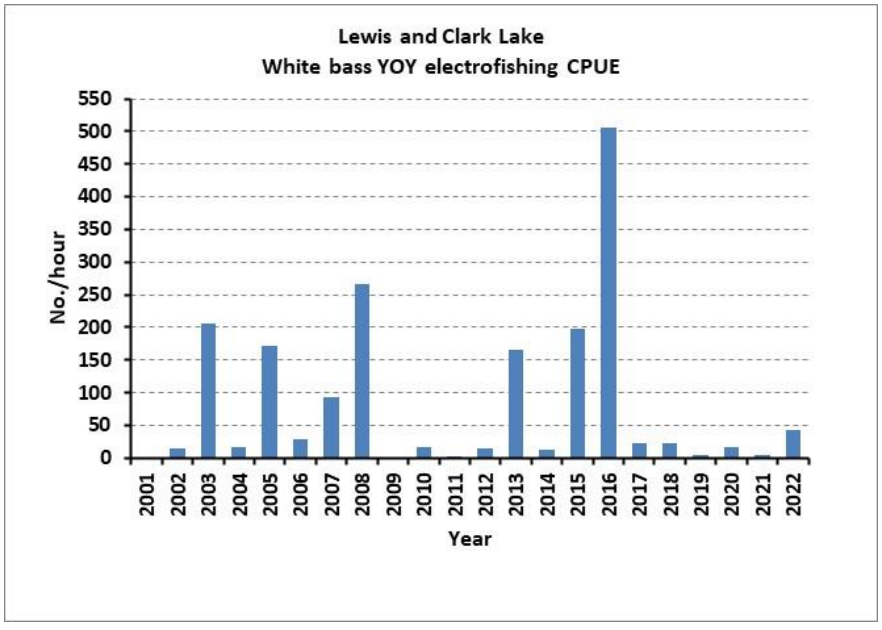




White Bass

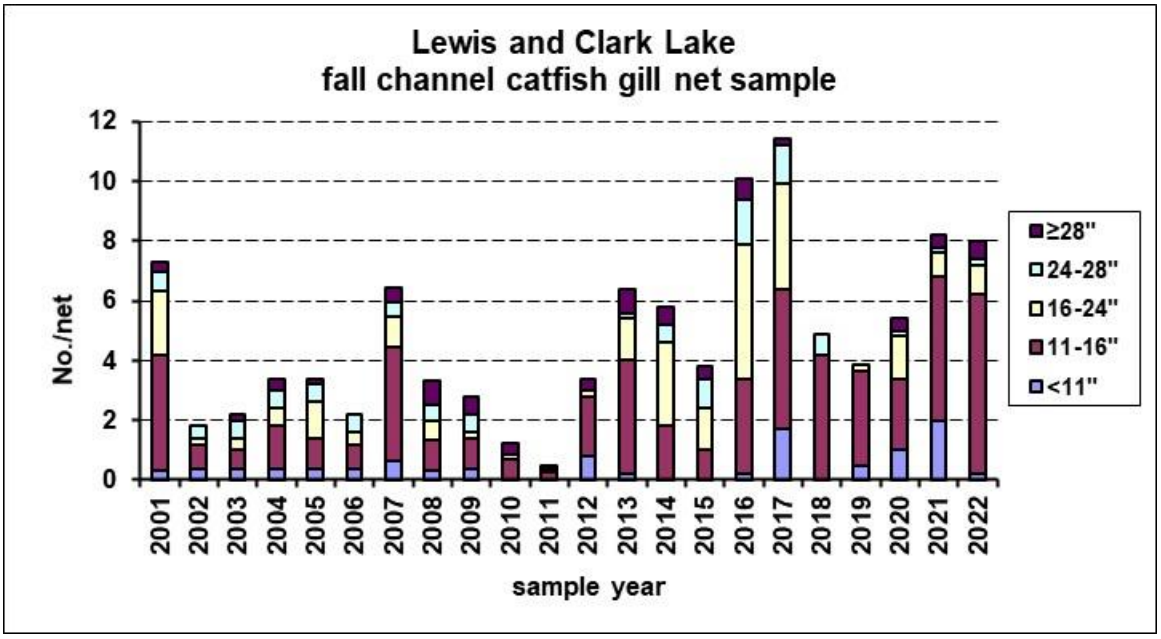
It was good to see the number of white bass in the survey in 2021 after three consecutive years of no observations. The low number observed once again in the 2022 survey may not be completely representative of the population since, as mentioned in previous reports, white bass can be inherently difficult to sample due to their schooling nature (being very "hit or miss"). Anecdotally, this is evident when looking at the gill net catch rates over the last 22 years where sampling resulted in a catch of at least 5 white bass per net only three times. Despite low gill net catch rates in those other 19 years, the white bass fishing was quite phenomenal in some of them. Thus, a catch of 2-3 per net could constitute a pretty good catch rate for white bass in Lewis & Clark. Growth rates have typically been excellent in the reservoir, producing great angling opportunities for white bass over 12 inches, and even exceeding 15 inches, when the fish are present. The relatively low flows through Gavins Point Dam in the latter parts of both 2021 and 2022 may have provided for better retention of fish within the reservoir which could improve white bass opportunities in 2023. Additionally, the bump in white bass production in 2022, as indicated by the YOY catch rate, could boost future numbers in the reservoir.





Channel Catfish

The catch rates of channel catfish over the last ten years are encouraging, but size structure has been less than desired over the last five years with relatively few fish exceeding 16 inches. However, the number of smaller fish coming on is promising and it appears that a fair proportion of those will likely recruit to the next length group (those ≥ 16") to provide somewhat better size structure in 2023. Still, the reservoir does currently provide quality opportunities for anglers as catfish up to 32 inches were observed during our survey efforts. In addition to the reservoir, the delta and river upstream provide some very good catfish angling opportunities. Catfish should provide good catch rates in the reservoir in 2023 with some larger fish available to the angler once again. Often overlooked by fishermen, catfish are fun to catch and possess good fighting ability.

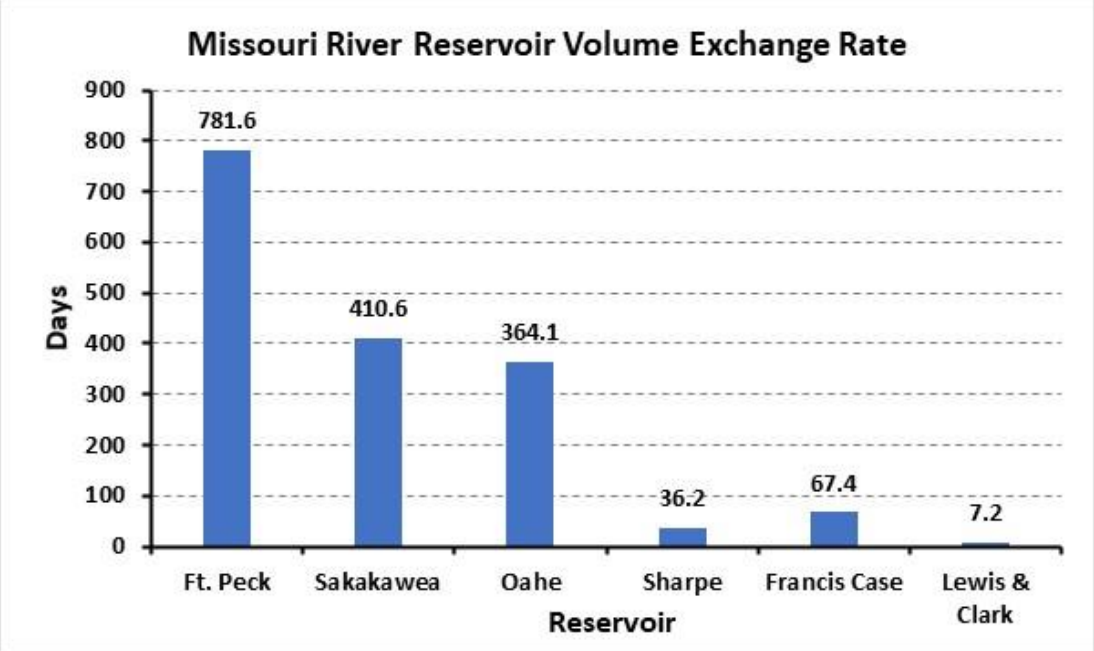


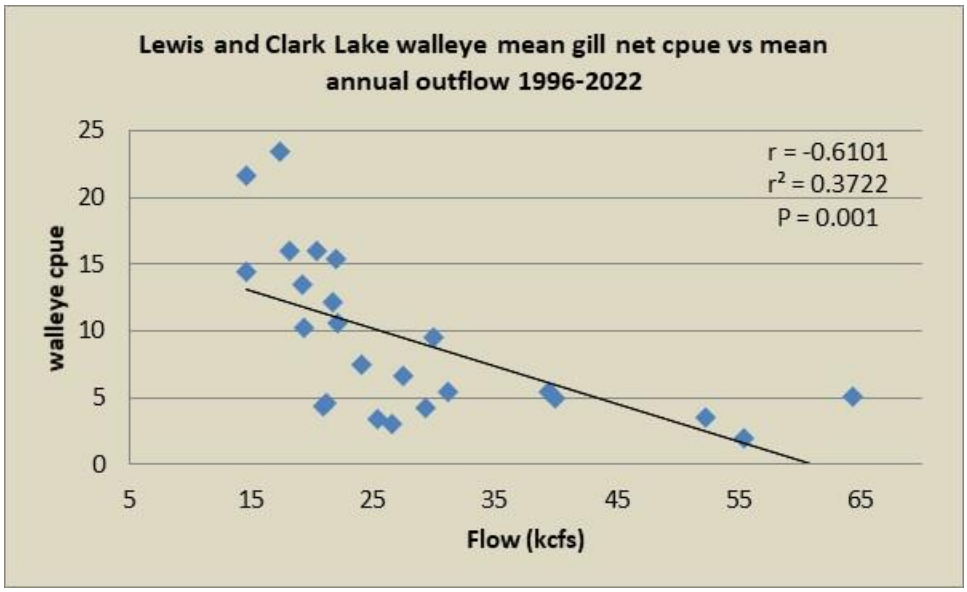
Other Species and Information

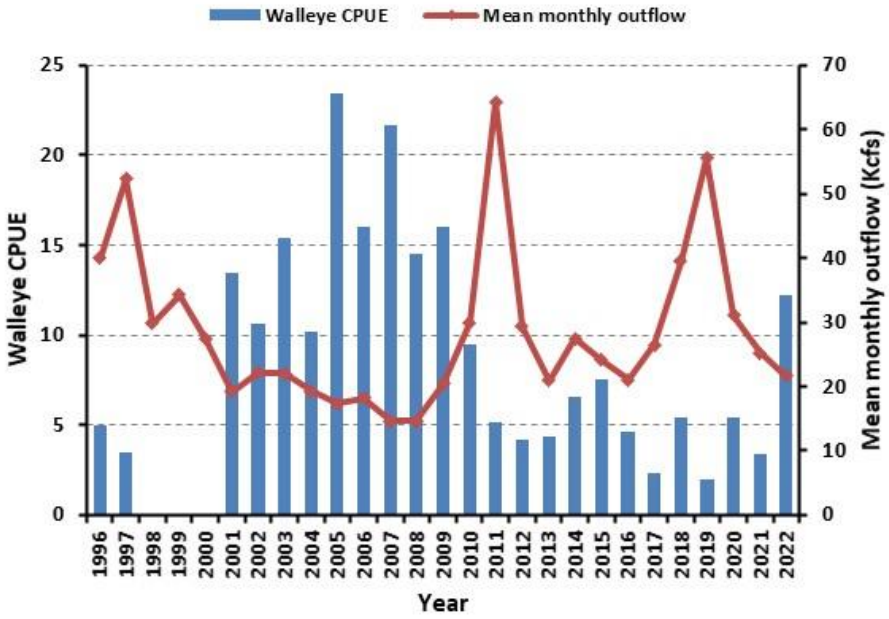
Although no data is presented in this summary report, other species available for anglers to catch in Lewis and Clark include abundant smallmouth bass along with some crappie, bluegill, and northern pike. Smallmouth bass are found throughout the lake and river system, usually associated with rock structure, both natural and man-made. Crappie are typically caught in the bays around the lake, in the delta backwaters, and around docks in the marinas while bluegill can be caught along rocked areas or anywhere one might find stands of vegetation in protected areas such as bays and behind the breakwaters that are present in the reservoir. Northern pike provide an occasional catch throughout the system.

Any discussion of the fishery in Lewis and Clark Lake quickly turns to flows through Gavins Point Dam and turnover time in the reservoir. Fish of all species are highly vulnerable to escapement or flushing through the

dam into the tailwaters. This is a one-way trip since fish cannot get back upstream to the reservoir. The complete barrier is a very good thing to contain the ever-growing invasive carp populations found below Gavins Point Dam and keep them from getting into the lake and river systems above. However, the barrier can lead to depressed sport fish populations in the reservoir if flows and escapement are too high. Consider the adjacent charts. The exchange rate, also known as turn-over time, for Lewis and Clark Lake is very short, especially when compared to the other Missouri River reservoirs. This means a high flow-through at the dam that can lead to high fish escapement. This phenomenon is depicted in the relationship between mean walleye gill net catch-per-unit-effort and mean annual outflow from Gavins Point Dam (mean annual outflow in cubic-feet-per-second). The analysis indicates a significant negative relationship. In other words, the higher the outflow through the dam, the lower the walleye numbers in our reservoir samples. The less the outflow the higher the walleye numbers. This can also be applied to other species such as white bass. Some species are more prone to entrainment than others with walleye and white bass being top candidate species for this downstream movement. This relationship, while not accounting for all variability in walleye numbers, is a major part of the equation. In the mid– to late-2000's the average flow through the dam was less than 20,000 cfs for a five consecutive year period. Consequently, sampling during that period produced the highest catch rates observed through our sampling history on the reservoir. Flows through the dam have been relatively high since that time, with no years of mean annual flow less than 20,000 cfs, and have likely played a substantial role in limiting walleye abundance within the reservoir.



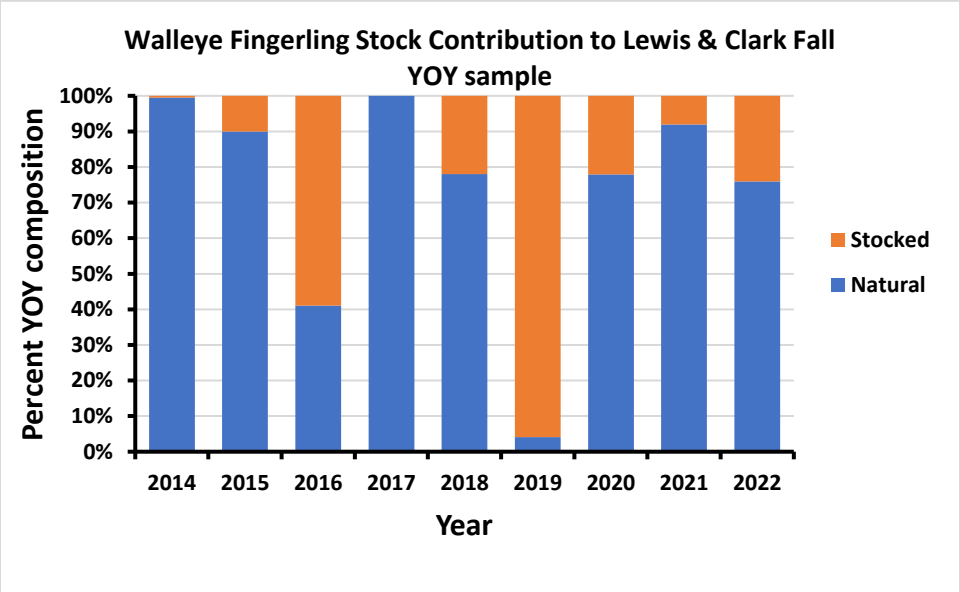




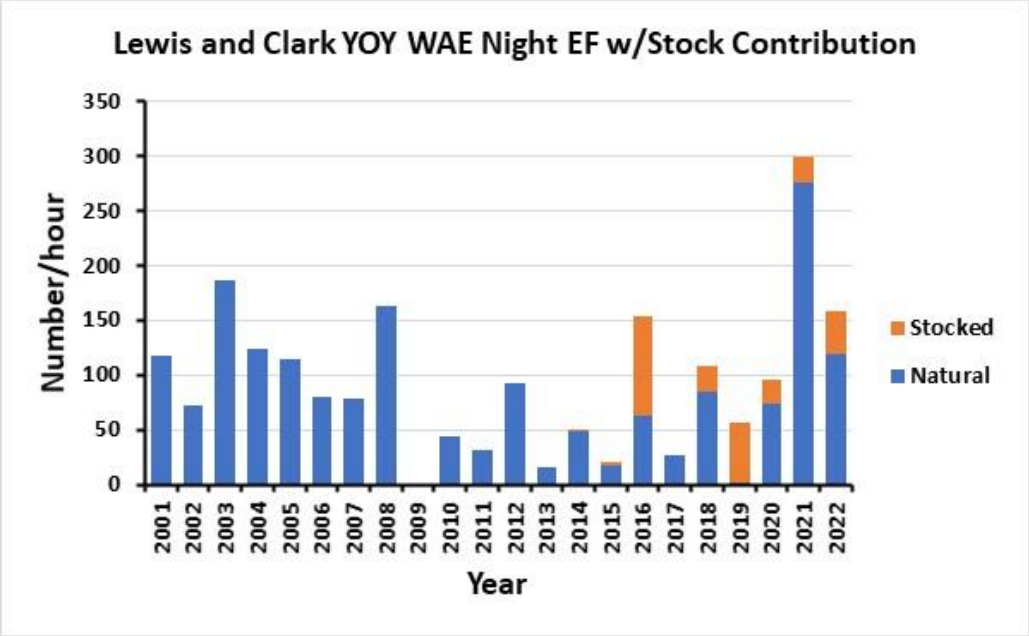
Additional evidence of walleye movement out of the reservoir and through the dam can be found in the evaluation of the various walleye stockings which utilized marked fish. Annual walleye stocking was initiated in 2014 to address the low numbers of walleyes in the reservoir following the 2011 flood. The walleye stocked over that time period have been marked with oxytetracycline (OTC) which allowed us to evaluate not only the contribution of stocked fish to the reservoir population but also document movement of the stocked fish. Walleye stocked above Gavins Point Dam have comprised up to 69% of the young-of-the-year walleye collected below the dam in sampling conducted from 2016 to 2021. These stocked fish are not "lost" but will contribute to the fishery in the river below Gavins Point Dam. Rather, this just illustrates the difficulty in keeping fish in the reservoir proper in a high turn-over, open system.

Stocking Evaluation & Research

Some walleye stockings occurred in Lewis & Clark prior to 2011 but were limited to some "initial" stockings following the closure of Gavins Point Dam and a two-year period in the mid-1980's. The walleye fishery had otherwise been maintained through natural reproduction and recruitment. However, annual walleye stockings were initiated in 2014 (exception: no stocking in 2017) in an attempt to address the low walleye numbers being observed in the reservoir since the major flood year of 2011. As mentioned earlier, all stocked fish have been marked with OTC to allow for stock contribution analysis. Fry stockings were attempted from 2014 through 2016 but proved relatively unsuccessful with stock returns ranging from <1% to 11% for those 3 years. In 2016, South Dakota Game, Fish, and Parks (SDGFP) stocked 1.4 million fingerlings in addition to Nebraska's fry stocking. That fingerling stocking proved much more successful comprising 50% of the 2016 walleye young-of-the-year (YOY) sample in the fall of 2016. Due to the success of the fingerling-stocked fish, fry stocking efforts were abandoned and only fingerlings have been stocked since.



Most years walleye have been stocked at the upper end of the reservoir between Springfield, SD and Charlie Creek on the South Dakota side. In 2018 they were stocked at several locations including the Fort Randall Tailwaters, Running Water boat ramp, and the upper end of the reservoir while in 2021 about 40% were stocked at Verdel and the remainder at Springfield. Stocked fish contributed a substantial proportion to the YOY catch in 2016 and 2019 while other years they comprised less than 25% of the catch. The stocking and associated assessment is planned to continue for a few more years with a goal of stocking around one million fingerlings per year. This will continue to be a combined effort between the Nebraska Game and Parks and South Dakota Game, Fish, and Parks (SDGFP).



Year	Number	Size	Source	In-lake YOY Contribution
2014	14,107,500	Fry	NE	<1%
2015	12,800,000	Fry	NE	11%
2016	13,449,865	Fry	NE	8%
2016	1,400,000	Fingerling	SD	51%
2018	1,047,446	Fingerling	NE	22%
2019	1,819,269	Fingerling	NE	96%
2020	953,360	Fingerling	NE	16%
2021	536,972	Fingerling	NE	8%
2021	356,564	Fingerling	ND	1%
2022	2,101,511	Fingerling	NE	24%

Despite seeing good numbers of YOY walleye during our fall electrofishing in some years, increased catch rates of adult walleye in subsequent gill net samples have not occurred. However, analysis by SDGFP staff of older fish collected during both NE and SD surveys in 2021 on Lewis & Clark Lake indicated that 50% of 2-year old walleye were stocked fish. So, although high YOY catch rates didn't appear to be increasing the numbers of larger walleye in the reservoir, stocking has seemed to help at least maintain the low-density walleye fishery that has been present in the reservoir through some of those high-flow years. Aside from poor catches in 2017, 2019, and now 2021, the gill net catch rate for walleye appeared to be fairly stable since 2011, hovering around 5 per net. That is probably all that we can expect during extended high flow periods, understanding that entrainment/escapement during that time contributes to reduced catch rates in the lake. Thus, that will also be

a consideration to account for when assessing the success and justification of stocking efforts in Lewis & Clark.

Future/Ongoing Research-Movement Study

Additional research initiated in 2021 will continue for the next several years. SDGFP is the lead on a tagging project monitoring movement of walleye and sauger in the Missouri River system downstream of Ft. Randall Dam, primarily between Ft. Randall Dam and Gavins Point Dam. The University of Nebraska at Lincoln has a graduate student (Will Radigan) on the project and NGPC is also involved. Walleye and sauger have been collected from this reach and implanted with acoustic transmitters. The transmitter is placed in the body cavity and thus is not visible to the angler. However, all fish implanted with transmitters have a metal tag placed on their upper jaw so that they are identifiable externally. It is preferred that these fish be released if caught but the angler can certainly harvest it if desired. If the harvest route is chosen, please contact Will or the fisheries personnel in the Norfolk district office (see contact information at the end of this report) as we would like the transmitter back to implant into another fish. The walleye and sauger movement is being monitored by a system of receivers, installed at multiple locations in the river reach and in Lewis & Clark Reservoir, that detect the implanted fish as they pass by them. Among other things, this study will provide movement data including where the adult walleye and sauger that spend time in this stretch of the Missouri River system are ending up; whether it be somewhere between the dams, harvested by anglers, or entrained through Gavins Point Dam. Will is also monitoring entrainment rates of larval fish through both Ft. Randall and Gavins Point dams.

Zebra Mussels and Invasive Species

Anglers and recreational boaters should continue awareness for zebra mussels while using Lewis and Clark Lake and the Missouri River. Zebra mussels were found in Lewis and Clark Lake in 2014 and their numbers increased exponentially in subsequent years. Their abundance appeared to decline somewhat in 2019 and 2020 but exploded again in 2021. As discussed in previous versions of this report, they are likely at the point where they are fully established in the system and their population will oscillate from year to year, some years like 2021 with extremely high abundance and others like 2019 and 2020 when low abundance made them barely noticeable. Despite those visibly reduced adult numbers in 2020, plankton net tows conducted around the lake that year still indicated detectable numbers of veligers, the **microscopic** larval stage of the mussel. Lake water containing veligers can be pumped into livewells and outboard motor cooling systems, used to fill bait buckets, spilled in a boat, etc. and potentially result in 1) zebra mussels being unknowingly transferred to another waterbody or 2) them attaching to and growing in the watercraft and/or boat motor and causing various mechanical issues.

South Dakota Game, Fish, and Parks (SDGFP) discovered zebra mussels in both Lake Sharpe and Francis Case Reservoir in 2019 and NGPC in 2021 observed **high** numbers of adult zebra mussels on samplers at the Verdel and Santee boat ramps, both being locations where they had never been observed prior. Thus, anglers who fish **any** stretch of the Missouri River need to be extra diligent with the Clean, Drain, and Dry protocol prior to leaving associated areas in order to control the spread of zebra mussels. Invasive mussels have also been documented in several other neighboring states including Iowa, Kansas, and Missouri. Zebra mussels are certainly not the only invasive species in Nebraska, or in Lewis and Clark and the Missouri River, so please be diligent and not only drain all water from your watercraft, buckets, etc. but also remove any vegetation. The water has cleared substantially in Lewis & Clark recently and dense vegetation, including the invasive Eurasian watermilfoil, has become an issue in certain areas, most notably in the bays with boat launch facilities. Inadvertent transfer by humans is the major source of new infestation for zebra mussels and other invasives,

primarily by boats, boat trailers, and fishing gear. Anglers and boaters are encouraged to educate themselves on these and other aquatic invasive species. An excellent source of information regarding invasive species can be found on the University of Nebraska's Invasive Species Project website: http://www.neinvasives.com. **Regulations that took effect in 2013 mandate that all vessels and conveyance be drained of water prior to entering or leaving a lake to prevent the spread of invasive species. This means all livewells, baitwells, and boat hulls shall be drained and free of water. Additionally, all aquatic vegetation must be removed from boats and trailers prior to leaving a lake. Boats are subject to inspection by authorized personnel. Regulations will be strictly enforced. Remember to bring ice on your trip to transport your fish home.**
All non-resident boats (those not registered in Nebraska) must have a non-resident AIS sticker affixed to the hull prior to launching at Nebraska boat ramps.

NONRESIDENT AQUATIC INVASIVE SPECIES STAMP

Motorized watercraft registered outside of Nebraska are required to purchase and display an Aquatic Invasive Species Stamp (image on bottom right) before launching from any Nebraska boat ramp.

- The fee for the decal-like stamp is $18, which includes a $3 issuing fee.
- The stamp can be purchased at OutdoorNebraska.org, at Commission offices (see list on page 2), or authorized permit agents.
- At the time of purchase, the purchaser will receive a valid temporary permit. The actual stamp will be mailed within 10 business days.
- The stamp is required annually.
- The stamp must be permanently affixed to the starboard and rearward side of the boat, on the outside of the hull above the water line. (See image on bottom left.)

*****Boat inspections and zebra mussel sampling will continue at Lewis and Clark Lake, the Missouri River, and other waterbodies in the state in 2023. We ask for your cooperation and patience in the boat inspection effort and ask for your assistance in stopping the spread of zebra mussels and other invasive species such as Asian carp, Eurasian watermilfoil, rusty crayfish, red swamp crayfish, etc. All these invasives are found in the Missouri River below Gavins Point Dam.**

For more information on fishing rules and regulations visit the Nebraska Game and Parks website at OutdoorNebraska.org.

For more information on the fisheries at Lewis & Clark Reservoir contact:

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