Project Title: Control of Invasive Carp in the Arkansas-Red-White River Basin

Geographic Location: White River upstream from RM176 to dam 1 (35.181408 -91.426635 to 35.756854 -91.637350) including tributaries, oxbows and backwaters; Arkansas River upstream from RM63 to the Oklahoma state line (34.248872 -91.904208 to 35.395151 -94.431427) including tributaries, oxbows and backwaters.

Lead Agency: Arkansas Game and Fish Commission (AGFC), Jimmy Barnett (jimmy.barnett@agfc.ar.gov)

Participating Agencies: None

Statement of Need: Invasive carp populations have been increasing in most of Arkansas's rivers. Bighead Carp are present in the Arkansas River from the Oklahoma state line to the Mississippi River and in the White River from Batesville (Dam 1) to the Mississippi River. Silver Carp have not been documented above Dardanelle Lock and Dam on the Arkansas River or above Dam 2 on the White River. Grass Carp are abundant throughout the Arkansas and White Rivers. Black Carp have been documented in the White River up to the Devall's Bluff area and the Arkansas River up to Pool 9. These range expansions suggest population numbers for these species are increasing and will likely continue to increase into the future. Public sightings and subsequent reports are increasing in the Arkansas and White Rivers and their oxbows and tributaries. Increasing invasive carp abundance could impact recreation and commercial actives and is likely impacting the ecological stability of these fisheries. While complete elimination of invasive carp is not currently feasible, management and control of these species is necessary to reduce their impact on native species, the ecosystem, and the economy.

The AGFC will continue to implement an in-house Invasive Carp Removal Program to reduce invasive carp populations in the Arkansas and White River systems, within the Arkansas-Red-White Sub-basin. Removal efforts will help minimize ecological and economic impacts and the likelihood for upstream range expansion. Data collected from fish removed will increase our knowledge of invasive carp distribution, abundance, and size structure and further inform future control efforts.

Project Objectives:

1) Reduce invasive carp population numbers by utilizing dedicated agency personnel to implement invasive carp removal in the Arkansas and White River systems.

Project Highlights:

- The removal program netted a total of 37 days in the Arkansas portion of the ARW.
- A total of 2,728 invasive carp weighing 46,552 pounds were removed from the basin.
- The removal crews ran 33.4 miles of gill net during the year.
- Using an active set method of gill netting resulted in low observed bycatch mortality of native fishes (<1% for all species combined).

Methods:
The Arkansas Game and Fish Commission (AGFC) continued to implement an in-house Invasive Carp Removal Program. Arkansas-Red-White River Sub-basin invasive carp grant funding was used to pay for half the salary of one full-time Invasive Carp Biologist that oversaw the removal program, salaries of at least two part-time employees to catch and remove carp, and to purchase supplies needed to implement removal activities. This project compliments an identical removal project being conducted by the AGFC Invasive Carp Removal Program in the Lower Mississippi River Sub-basin and allows for removal in the full range of Silver Carp within the Arkansas and White River systems.

Invasive carp were targeted and removed from the Arkansas River (Pools 4, 5, 6, 7, 8, and 9) and White River (from Dam 1 in Batesville downstream to the confluence of the Little Red River) and includes backwaters, oxbows, and tributaries of these rivers (Figure 1). Two boat crews were used to conduct removal efforts. Gear used to catch and remove carp primarily consisted of gill nets, but boat electro-fishing was used to complement gill netting on a few occasions. Prior removal efforts using gill nets in the Arkansas and White Rivers demonstrated that gill nets constructed with 4 ¼ or 4 ½ inch square mesh, 7 or 8 ply multi-strand monofilament produced higher catch rates than other gill net designs (i.e., 3-inch, 4-inch and 5-inch square mesh), based on the average size of Silver Carp observed in these rivers. Also, the majority of removal efforts occurred in water depths less than 10 feet. The gill nets used by the removal program were 12 feet deep hobbled to 10 feet, with 4 ¼ or 4 ½ inch square mesh, 7 or 8 ply multi-strand monofilament, with foam core float lines and lead core lead lines.

Removal locations were determined from catch data recorded during prior removal efforts, the AGFC ANS Report Database, information obtained from commercial fishers and other agency staff, and river gauge readings. This information was used to prioritize removal efforts in locations with the highest carp densities. Boat crews identified carp using side-scan sonar and visual observations. Nets were fished in an active manner and were monitored at all times. All species caught during removal efforts were documented. Native species were released immediately upon capture. Invasive carp were removed from the gear and euthanized. Unless other disposal options become available, all Silver, Bighead and Grass Carp carcasses were disposed of in the main channel or deepest portion of the water body being fished. All invasive carp removed from National Wildlife Refuge (NWR) waters were disposed in the main river channel outside of the NWR. Lengths and weights were recorded from all Bighead, Black Carp, and Grass Carp, and a subsample of at least ten Silver Carp at each location fished. Data collected for each net set included: GPS location, date, invasive carp species caught, bycatch species caught, observed bycatch mortality, time in and time out of fishing gear, river gauge reading, water clarity, water temperature, and cloud cover. Data was collected on paper data sheets in the field and entered into the Invasive Carp Removal Program Database on a weekly basis.

Results and Discussion:
The AGFC Invasive Carp Removal Program conducted removals in ARW Sub-basin waters on 37 days, logged 1,295 hours of work, and ran 33.4 miles of gill net (589 100 yard nets) during

2023. This resulted in the removal of 2,728 invasive carp weighing 46,552 pounds, which included 2,519 Silver Carp weighing 41,441 pounds, 181 Bighead Carp weighing 4,525 pounds, and 28 Grass Carp weighing 586. The mean catch (i.e., number of invasive carp per 100 yard gill net) was 4.6.

A total of 1,179 native fishes were caught during removal efforts using gill nets. Observed mortality of native fishes captured during carp removals was 5 individuals (<1%). Also, 147 Paddlefish were caught with four mortalities observed (2.7%). Paddlefish were the only species of Greatest Conservation Need in Arkansas that had any observed mortality resulting from gill net capture during invasive carp removal efforts.

Tables and Figures:

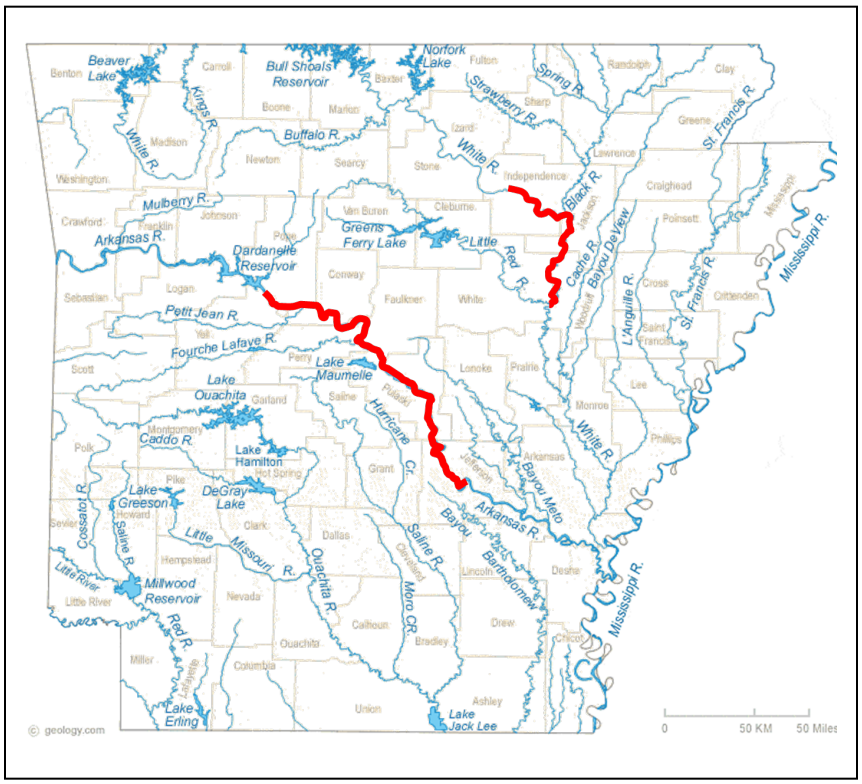

Figure 1. Map illustrating reaches of the Arkansas and White Rivers, within the ARW Sub-basin, where targeted removal of invasive carp was conducted by the AGFC Invasive Carp Removal Program from January 1, 2023 to December 31, 2023. Focus area is represented by red lines.

Recommendation:

- Continue the removal of invasive carp from the Arkansas and White River systems to reduce abundance and slow range expansion.
- Continue to modify fishing gear to maximize catch of invasive carp based on the size structrue of invasive carp observed in various river systems and habitats.

- Information resluting from this program's removal efforts can be used to improve efficiency of future control efforts by identifying locations, water depth, habitats, river gauge levels, water temperature, and time of year where adult invasive carp congregate in the Arkansas and White Rivers, as well as gill net specifications that are most efficient in each river.