

**Illinois Department of Natural Resources
Office of Resource Conservation
Division of Fisheries**

**Fish Species Management Plan for
Alligator Gar (*Atractosteus spatula*) in Illinois**



The last vouchered Alligator Gar collected in Illinois waters (Cache-Mississippi R Diversion Channel - 1966) Courtesy of Brooks Burr

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Introduction

Alligator Gar (*Atractosteus spatula*) populations have been declining within their historic range for at least the past 50 years, and are considered to be extirpated from much of the northern reaches (Nature Serve 2015). Declines have been attributed to several factors, most notably over-exploitation and loss of important backwater spawning habitats from the construction of levees and lock-and-dams beginning in the early 1900s. While no single factor can be identified as the definitive cause for the decline, it is likely that a combination of these factors over time resulted in the extirpation of the Alligator Gar from Illinois.

The Alligator Gar was not regulated or protected in Illinois prior to 1977. From 1977 to 1994, the species was listed as a state-threatened fish under the Illinois Threatened and Endangered Species Act. In 1994, the Alligator Gar was delisted and considered to be extirpated.

This plan proposes efforts and activities necessary to successfully re-establish and extensively manage Alligator Gar populations in Illinois. The success of the plan will be documented through annual progress and achievement reports for each management objective. The plan is considered to be an evolving document and will be used as an adaptive management tool by Illinois Department of Natural Resources, Division of Fisheries.

Historical Distribution

The Alligator Gar has been documented as far north as the Middle Illinois River generally below Peoria, Illinois (Figure 1, and 2; Poly 2001). Page and Burr (1991) defined the current range of the Alligator Gar as the Mississippi River Basin from southwest Ohio and southern Illinois, south to the Gulf of Mexico, and the Gulf Coastal Plain from the Enconfina River, Florida to Veracruz, Mexico (see Figure 1). Page and Burr (1991) listed the species as uncommon over most of its range, except in swamps and bayous in the extreme southern United States.

A comprehensive account of historic distribution of Alligator Gar in Illinois was published by William J. Poly in the Transactions of the Illinois State Academy of Science (2001). Poly (2001) states that the last Alligator Gar captured in Illinois (prior to reintroduction) was caught on hook and line from the Cache-Mississippi Diversion Channel about 2.5 miles northwest of Klondike, Alexander County in 1966. This specimen was about seven feet in length and weighed approximately 130 pounds and is vouchered in the Illinois Natural History Survey Fish Collection as a photographic record. Poly (2001) included a listing of all known records of Alligator Gar occurrences in Illinois and adjacent waters (Table 1 and Figure 2).

Wilbur M. Luce (1933) produced accounts of Alligator Gar in Illinois in “A Survey of the Fishery of the Kaskaskia River.” He stated that fishermen reported Alligator Gar were common at certain times near the mouth of the [Kaskaskia] river, with individuals measuring 10 feet in length and weighing 300 pounds having been seen in this vicinity. He personally observed Alligator Gar during the first week in August, 1930, seeing several of the gars about the piling at the mouth of the Kaskaskia and another one seen “rolling” on the surface of the water near Chester. Luce (1933) went on to quote the following from Mr. Leslie Crow of Chester, who fished in the lower Kaskaskia River:

“About the first week in June, 1930, 75 to 100 gars entered an overflow pond on the river bottom about two miles above the mouth of the [Kaskaskia] river. The pond was connected to the river by a cut in the bank, through which the fishes entered. The water was two to four feet deep in this pond, which consisted of a number of acres of wooded bottomland with considerable underbrush. Many of these gars were judged to weigh 100 pounds, but a few of them were 10 feet long and may have weighed 300 pounds. The gars were spawning in this place, so that the shrubs, bushes, and other objects in the water were covered with eggs.”

Smith (1979) suggested that the Alligator Gar was never abundant in Illinois waters. However, the account from Luce (1933) and the Annual Report of the Game and Fish Conservation Commission of Illinois (GFCCI) for the Fiscal Year 1913-14 provide evidence that observations of Alligator Gar were occurring in Illinois.

Life History and Ecological Information

Characteristics

The Alligator Gar is the largest of the gar species and second largest freshwater fish in North America, next to the White Sturgeon (*Acipenser transmontanus*). The current all-tackle record is a 302-pound, seven foot, six-inch-long fish taken from Texas in the Nueces River in 1953 (Moore 2007). Smith (1979) reports the largest Illinois specimen to be six feet, eight inches long. Poly (2001) lists several Illinois individuals longer, up to eight feet, seven inches long, with the heaviest individual weighing 176 pounds.

The Alligator Gar is identified from the other gar species by having a short, broad snout, heavier and broader body, and two rows of teeth in the upper jaw. The teeth are canine-like and can become worn and less sharp with age. The teeth can be highly variable with some teeth exposed on the outside of the mouth when closed. The other gar species native to Illinois typically have only one row of teeth in the upper jaw. However, some Shortnose Gar (*Lepisosteus platostomus*) specimens have been reported to have two rows of teeth in the upper jaw, leading to cases of misidentification. In which case, other morphological features are needed to positively identify the Alligator Gar. The color pattern is dark olive green dorsally and fading to gray or white ventrally with scales colored black to white for added camouflage. The dorsal, caudal and anal fins have black spots while pelvic and pectoral fins typically do not (AGTC 2011). Young Alligator Gar possess a blackish band along the mid-side and a narrow white stripe along the midline of the back (Pflieger 1997). Young gars can be difficult to identify to species by color pattern due to similarity and typically require a trained eye to compare all morphological characteristics.

The significantly larger adult size of the Alligator Gar is also a distinguishing characteristic compared to other gar species native to Illinois. The closest native gar species in size to the Alligator Gar would be the Longnose Gar (*Lepisosteus osseus*), which has a very unique long snout and would not be easily misidentified as an Alligator Gar. The state record Longnose Gar in Illinois is 31 lbs., 8 oz from the Ohio River. The current state records for all native gar species from IFish Illinois (2016) are:

Longnose Gar - 31 lbs 8 oz, Ohio River, 2012
Shortnose Gar - 6 lbs 4 oz, Lake Shelbyville, 2014
Spotted Gar – 10 lbs 2.4 oz, Rend Lake, 2010

Morphologically, the closest gar species in Illinois to resemble the Alligator Gar is the Shortnose Gar. The Shortnose Gar is unlikely to exceed even 10 pounds in Illinois and yet, the Alligator Gar can exceed that size in less than two years of age (Grider 2013). The Spotted Gar (*Lepisosteus oculatus*) is dissimilar in having unique spots on the head, snout, and body. Therefore, gar observed by the general public in excess of approximately 10 pounds without Longnose or Spotted Gar characteristics should be suspected as Alligator Gar observations. Gar specimens in which identification is not certain should be reported to a fisheries manager for positive identification.

Diet

Alligator Gar are considered to be an opportunistic feeder with a diet likely dependent on the most readily available food source. It also is a scavenger of dead items when available (Bonham 1941, Goodyear 1967, Seidensticker 1987, Garcia de Leon et al. 2001, Brothers 2007). They are a “lie-in-wait” predator snapping at prey items that venture too close. In a 1987 study in Texas, Gizzard Shad (*Dorosoma cepedianum*) made up 26.4 % of their diet, with lower percentages of Channel Catfish (*Ictalurus punctatus*), Freshwater Drum (*Aplodinotus grunniens*), Bluegill (*Lepomis macrochirus*), Spotted Sucker (*Minytrema melanops*), White Bass (*Morone chrysops*), Largemouth Bass (*Micropterus salmoides*), Spotted Gar, Crappie (*Pomoxis spp.*), Lake Chubsucker (*Erimyzon sucetta*), Common Carp (*Cyprinus carpio*), and American coots (*Fulica americana*) also present (Seidensticker 1987). Todd (2005) states the diet to consist of fish (primarily shad and non-game fish) along with turtles, waterfowl, and small mammals of appropriate size. Although sportfish were abundant, Gizzard Shad were the only identifiable prey items found in diet samples collected from Alligator Gar stocked at Merwin Preserve, IL (Grider 2013). A literature review by Brothers (2007) also adds snakes, blue crabs (*Callinectes sapidus*), and various other invertebrates to the list.

Reproduction

Brothers (2007) noted that spawning times appear to be somewhat variable. Spawning in Oklahoma rivers and lakes was reported to be May through July, July and August in a Mexico reservoir, and April to June during seasonal flooding of bottomland swamps and lowlands by other sources (Brothers 2007). The observed spawning areas were shallow, slow backwaters with thick plant debris. Cattails, bulrush, and Bermuda grass were among the plant species listed as favorable (Brothers 2007). This is consistent with the Kaskaskia River account of them spawning in an overflow pond of bottomland forest with considerable underbrush present (Luce 1933). Brothers (2007) reports age at maturity to be 11 years for females and six years for males. It is also believed that Alligator Gar do not spawn every year (Brothers 2007).

Causes of Decline

The combination of significant habitat modifications in the large rivers, reduced access to spawning sites, and historic eradication efforts are likely the main causes for the extirpation of Alligator Gar in the Mississippi River Basin (MRB), including Illinois' waters. It is likely that Alligator Gar were strongly affected by the draining of backwater lakes and swamps and the extensive construction of levees in the MRB that reduced connectivity to spawning habitats (Brothers 2007). The construction of locks and dams in the MRB has also likely changed backwater habitats important to Alligator Gar by altering natural hydrologic functions, seasonal flood pulses, and linear connectivity within the river systems that impedes fish migration (Kluender *et al.* 2016).

Over-fishing and previous eradication attempts of gar species are also likely key factors in the decline of the Alligator Gar (Scarnecchia 1992). Some overexploitation has been linked to its historical reputation as a huge and voracious animal, earning it names such as “despised pirate” (GFCCI 1914, Luce 1933). Gars, and particularly the large Alligator Gar, were suspected by fishermen and fisheries managers alike for decimating sportfish and commercial fish populations throughout much of the 20th Century. In Iowa, it was once illegal to release a captured gar alive (since repealed, Scarnecchia 1992). Fisheries managers and anglers used nets, electroshocking, dynamite, spears, and traps to kill them by the thousands (Scarnecchia 1992). The best results for such eradication efforts were obtained when gar congregated for spawning and reports indicate as much as 3.5 tons of gar being removed in one day (Scarnecchia 1992). Particularly in Illinois, Luce (1933) explains that it was customary to kill all captured gars. The Game and Fish Conservation Commission of Illinois, in their Annual Report for fiscal year 1913-1914, describe efforts “to seine thousands of these pirates from the water in the spring when they congregate on their spawning grounds.” The report further describes plans to promote and popularize smoked garfish as having similar edible qualities to the expensive sturgeon. Bounties were also paid to commercial fishermen for each garfish caught and placed upon the banks.

Alligator Gar Management in Illinois

Goal

The goal of the Alligator Gar reintroduction program is to re-establish sustainable populations of this fish species in suitable waters within the State of Illinois while providing recreational opportunities to anglers.

Objectives

Objective 1 – Establish Alligator Gar as a sustainable sportfish species for hook-and-line and bow fishermen in Illinois.

Strategy 1 – Identify regulations that may be needed to manage a sustainable sport fishery for Alligator Gar in Illinois.

Strategy 2 – Develop educational and outreach information for the public about alligator gar and their re-establishment in Illinois.

Objective 2 – Re-establish populations of Alligator Gar throughout their native range and in approved locations in Illinois.

Strategy 1 – Identify stocking locations that potentially provide suitable habitat and forage base for the survival of stocked Alligator Gar.

Strategy 2 – Obtain Alligator Gar fry, when available, from the USFWS Private John Allen National Fish Hatchery in Tupelo, Mississippi.

Strategy 3 – Annually stock non-vulnerable (approximately 12-inches and larger) Alligator Gar into approved receiving waters.

Strategy 4 – Annually mark all stocked Alligator Gar prior to their release into any receiving waters that are not permanently separated from open waterways.

Objective 3 – Develop rearing techniques and the associated rearing locations to effectively raise Alligator Gar to non-vulnerable sizes.

Strategy 1 – Use, as reference, the culture knowledge for Alligator Gar developed at the USFWS Private John Allen National Fish Hatchery.

Strategy 2 – Use intensive culture as long as necessary to ensure maximum initial survival.

Strategy 3 – Use extensive culture as long as necessary to produce fast growing, non-vulnerable size fish.

Strategy 4 – Cooperate and use agreements with other university, scientific survey, and private hatcheries in Illinois for the production and research on Alligator Gar culture techniques.

Objective 4 – Develop standardized protocols to accurately collect biological data on survival, growth, habitat usage, and feeding habits of Alligator Gar in Illinois.

Strategy 1 – All Alligator Gar stocked into Illinois waters that have the potential to disperse long distances should be tagged with a passive integrated transponder (PIT) tag near the dorsal fin to allow for individual tracking of fish over time in an effort to determine movement behavior.

Strategy 2 – A standardized sampling event will be conducted annually in an attempt to collect Alligator Gar in each stocking location.

Strategy 3 – All collected Alligator Gar will be measured in total length to the nearest millimeter (mm), pelvic girth to the nearest mm, and weight to the nearest gram.

Strategy 4 – The collection of dietary habit data will be attempted from collected Alligator Gar in an effort to evaluate the role of the Alligator Gar as a keystone species and its ability to influence fish populations in a

positive direction towards greater biodiversity, food web balance, and stability.

Strategy 5 – Coordinate with universities, scientific surveys, and nongovernmental organizations (NGO's) for assistance in tracking stocked Alligator Gar.

Objective 5 – Identify, manage, and protect habitat necessary for Alligator Gar survival and recruitment.

Strategy 1 – Identify and evaluate all aquatic areas in Illinois that have the potential habitat requirements necessary to support the establishment of a self-sustaining population of Alligator Gar.

Strategy 2 – Work with partners, such as the Army Corps of Engineers, to restore important backwater and side channel habitat areas and improve lateral connectivity to these habitats.

Alligator Gar Stocking Plan

Non-vulnerable sizes (approximately 12-inches and larger) of Alligator Gar will be stocked annually into waters approved by the Illinois Department of Natural Resources (IDNR) Fisheries Division at a rate of up to one per acre. The stocking rate used is based on the “Species Management Plan for Muskellunge”. A stocking rate comparable to Muskellunge was used solely as a starting point given the size and life history natures of the two fish species. The stocking rate for Alligator Gar may be adjusted, as needed, based on future research and monitoring. Alligator Gar fry will be obtained, as available, from the USFWS Private John Allen National Fish Hatchery in Tupelo, Mississippi (and possibly other hatchery sources if available in the future) and reared to non-vulnerable size for stocking.

Assessment of Stocking Success

Alligator Gar will be marked prior to their release into any receiving waters with connectivity to open systems. An attempt to sample Alligator Gar will be conducted annually in each stocking location. Alligator Gar sampling is still an evolving science. Current methods use floating, large mesh, multi-filament gill nets constructed of #21 twine and dyed black. Gill net mesh sizes of three inches, four inches and five inches (bar mesh measure) have been used with success to catch larger Alligator Gar (Brinkman 2008, Ferrara 2001, Layher and Phillips 2000). The multi-filament gill nets with three-inch bar mesh proved capable of catching the alligator gar at approximately 34 inches in length. Trap nets with 1.5-inch bar mesh and multi-filament gill nets with three-inch bar mesh measure were used during sampling efforts at Merwin Preserve, IL (Grider 2013). The leads of the 1.5-inch bar mesh trap nets proved capable of catching Alligator Gar at approximately 24 inches in length.

Future monitoring attempts in Illinois will use floating, multi-filament gill nets dyed black. These nets will use bar mesh measurements that include 1.5-inch, three-inch, four-inch and five-inch. The size selection of the bar mesh measurement will correspond to the effective size for the potential length of the year class or classes of Alligator Gar present at the sampling site.

A general guide for mesh size will be 1.5-inch to three-inch for alligator gar from 24 to 34 inches in length. For Alligator Gar over 34 inches in length a range of mesh sizes from three-inch, four-inch, and five-inch should be used for sampling.

Results of previous Alligator Gar sampling suggest water temperatures should be approximately 64° to 73° F in an effort to reduce heat stress and mortality (Grider 2013). Alligator Gar should be collected from gill nets within one hour or sooner, depending on the water temperature. All sampled fish should be measured in length to the nearest mm, pelvic girth to the nearest mm, and weight to the nearest gram. Every fish should be scanned with a PIT tag reader for potential tag identification.

Assessment results will attempt to determine year-to-year survival of Alligator Gar in stocked water bodies. Age and growth data will be used to assess body condition of the stocked Alligator Gar. Each Alligator Gar stocking and sampling location should also have a pulsed-DC electrofishing sample completed to help provide an evaluation of the diversity and density of the fishery present. This data may provide information to help guide decisions regarding stocking rates and forage base suitability within the assessed water bodies. Eventually, assessments will be used to document and monitor spawning success and recruitment dynamics.

The collection of food habit data will be attempted from sampled fish using gastric lavage or dissection if the specimen is deceased. Non-lethal methods to collect diets still need to be perfected for large Alligator Gar as standard lavage techniques have proven difficult in previous studies (Grider 2013). Additional diet studies would provide further information to our knowledge of this species and its feeding habits. This information would help with better selection of stocking sites based on the existing forage available, feeding habits of Alligator Gar, and size selection of Alligator Gar to be stocked.

Coordination with universities, scientific surveys, and NGO's will be sought to help track stocked Alligator Gar by telemetry. Tracking with ultrasonic transmitters would add significantly to the costs of such a study, but it would provide more detailed information on mortality, habitat preferences, spawning, and wintering areas. Telemetry tracking information may also prove useful in helping to define timing and use of critical habitat.

Creel surveys should also be conducted and reviewed on a regular basis to determine angler use and success. The creel surveys may provide information necessary for setting harvest regulations, adjusting stocking rates, and identifying angling pressure. The surveys could be conducted at boat ramps of stocking locations, bow fishing events, surveys by mail, or an electronic form on the IDNR website that can be easily submitted by the public.

Stocking Locations

The priority stocking locations for Alligator Gar would be areas with public access under IDNR management, such as State Fish and Wildlife Areas, within the approximate historic geographic range of the Alligator Gar (see Figure 3) that best reflect the habitats necessary for optimum success. These areas would provide the best access for managers and researchers to conduct surveys of the population and allow angler opportunity. Key habitat characteristics should include large to medium sized rivers and their backwaters or oxbows with seasonal connectivity,

deep water refuge of at least 10 feet for overwintering, macrophytes or seasonal flooded vegetation, and an abundant prey base (such as Gizzard Shad) determined to meet forage criteria and reflect management goals for the site. Large to medium sized river systems of significant interest for stocking include the Big Muddy, Cache, Illinois, Kaskaskia, Mississippi, Ohio, and Wabash rivers. Man-made lakes and isolated waters that best reflect management goals for the site, research needs, and angling opportunity for the general public will be considered by the Fisheries Division on a case-by-case basis.

Public Outreach and Education

A public outreach campaign will be implemented to continue to inform the public about Alligator Gar, including identification and harvest regulations. The Alligator Gar may carry a negative perception with some members of the general public. Outreach and education efforts will address any concerns based on misunderstandings about the species. Although this reputation is unfounded as a destroyer and/or competitor of the mainstream sportfish species, a continuing outreach campaign is needed to educate the public to the benefits of this fish species and the rationale for its reintroduction.

Regulating Alligator Gar in Illinois

The Division of Fisheries will adopt recreational harvest regulations as necessary in future years as population distribution and density dictate. Anglers will be encouraged to report any Alligator Gar harvest or catches to the IDNR. An informational guide will be created for the annual regulation book, bow fishing groups, and the IFISHIllinois.org website. Requested information will help biologists to collect data from anglers and bow fishers regarding fishing pressure and harvest.

In Illinois, commercial fishing of Alligator Gar is not permitted as they are protected under Administrative Rule 830, Section 830.60 a) 10). Gar species in general are seldom targeted as a commercial fish, but are caught incidentally with trammel nets, gill nets, hoop nets and trot lines. Alligator Gar would be more difficult to distinguish from Shortnose Gar at a small size, but would be relatively easy to distinguish once they reach adulthood as discussed previously. One potential solution, should a market develop for gar, would be to put a maximum size limit on all gar species to provide the Alligator Gar with protection once they mature.

Review of Regulations Implemented in Other States

Alabama – Two fish per day. Alligator Gar are currently considered a “Regulated Nongame” fish and a “Species of Moderate Conservation Concern” in Alabama. Before 1992, no limits protected Alligator Gar, which is actually classified as a “nongame” fish. Based on observations by biologists and interviews with commercial and sport anglers alike, the Alabama Department of Conservation and Natural Resources made a decision to place a two fish per angler per day limit on October 1, 1992 (Alabama Regulation 220-2-.45). This conservation tool protects the adult population from excessive harvest by commercial anglers.

Arkansas - Creel limit of one Alligator Gar per 24-hour period. Harvest of Alligator Gar greater than 36 inches is restricted from noon, May 1st until noon, July 1st. The justification for this regulation is to prohibit take of large, adult fish that are vulnerable during the spawn. Anglers must obtain a free permit to harvest any Alligator Gar. Required information associated

with obtaining the free permit will allow biologists to collect data from anglers regarding fishing pressure and harvest (Arkansas Game and Fish Commission 2011).

Florida - Strict no harvest. In 2006, FWC Commissioners decided no one may take or possess Alligator Gar in Florida waters without a special permit. The FWC may issue these permits for scientific research and management efforts.

Indiana – No Protection. Considered an Extirpated species.

Kentucky – No harvest allowed. The Alligator Gar is listed as endangered by the Kentucky State Nature Preserves Commission and is listed as a "Species of Greatest Conservation Need" by the Kentucky Department of Fish and Wildlife Resources Wildlife Action Plan.

Louisiana – No protection, considered a stable population.

Mississippi - Two fish per day. No harvest allowed in specific water areas. Designated as a non-game gross fish.

Missouri – No harvest allowed. Critically imperiled. Create a unique and trophy sport fishery, MDNR recommends angler catch and release.

Ohio – No protection, considered an extirpated population.

Oklahoma – One fish per day. Alligator Gar may be caught by use of rod and reel, trotline, and throwline. Alligator Gar taken by bow and arrow, gigs, spears, or spear guns cannot be released. Alligator Gar caught and placed on a stringer cannot be released (a practice called culling). Harvest must be reported to the Wildlife Department (580) 924-4087.

Tennessee - No harvest allowed, must be returned to water immediately. Species in need of management, Create a sport fishery in selected waters in the future.

Texas – One fish per day, no minimum length. Restrictions to Protect Spawning Alligator Gar: When conditions such as water temperature and flooding events would be conducive for spawning of Alligator Gar, the TPWD Executive Director may temporarily prohibit taking or attempting to take Alligator Gar in a specified area for a period not to exceed 30 days. Conditions that would be used to invoke this action include water temperatures between 68 and 82°F and occurrence of moderate flood levels as defined and reported by U.S. Geological Survey gauges. Notice of this action will be posted on this web page, distributed to print and broadcast media, and shared through appropriate social media accounts. The notice will specify the area to be closed and when lawful fishing for Alligator Gar may resume. During May, fishing for, seeking, or taking Alligator Gar is prohibited in the portion of Lake Texoma within the boundaries of Hagerman National Wildlife Refuge and from the U.S. 377 bridge upstream to the IH 35 bridge. No additional restrictions for Alligator Gar are in effect at this time.

Program Highlights, 2009 - 2016

2009

- A Proposal for the Reintroduction of Alligator Gar (*Atractosteus spatula*) in Illinois was completed by the IDNR Division of Fisheries.

2010

- A total of 9,500 Alligator Gar fry were received from USFWS, Private John Allen National Fish Hatchery. Mortality of 44% occurred at Jake Wolf Fish Hatchery. A total of 5,400 Alligator Gar at two inches long were transferred to rearing ponds at Banner Marsh State Fish and Wildlife Area.
- The Banner Marsh Rearing Ponds were harvested in August, September, and October. Forty-three fish at an average size of 310 mm (12.2 inches) were stocked into Duck Island Little Lake at the Rice Lake SFWA. Twenty fish at an average size of 327 mm (12.9 inches) were stocked into Lake #29 at Banner Marsh SFWA. Thirty-three fish at an average size of 381 mm (15.0 inches) were stocked into the Hennepin-Hopper Lake Restoration Site.

2011

- A total of 8,000 Alligator Gar fry were received from USFWS, Private John Allen National Fish Hatchery. Mortality of 50% occurred at Jake Wolf Fish Hatchery. The Alligator Gar were transferred to two private hatcheries, Logan Hollow Fish Farm and Cordova Exelon. Logan Hollow produced 144 fish with an average size of 536mm (21.1 inches) and 882 grams (1.9 pounds). All fish were PIT tagged and stocked at Spunky Bottoms (100) and Rice Lake SFWA (44). Cordova Exelon produced 45 Alligator Gar and held for overwintering to grow to non-vulnerable size.
- In early June, 83 Alligator Gar were acquired from USFWS at an average length of 560mm (22 inches). All were PIT tagged and stocked at Powerton Lake SFWA.
- Overwinter survival documented at Banner Marsh SFWA with two collected using pulsed-DC electrofishing. This 2010 year class fish reached 38 inches by September 2011.

2012

- The USFWS had a very poor spawn in 2012 and IDNR received no fry.
- Forty-five fish from 2011 fry rearing were overwintered at the Cordova Exelon facility at an average size of 203 mm (8.0 inches). Thirty-seven of these fish survived to 2012 and were raised in raceway culture to an average size of 388 mm (15.2 inches). These fish were stocked into a large connected oxbow complex of the lower Kaskaskia River in southwest Illinois in September 2012. This river is a direct tributary of the Mississippi River south of St. Louis, and one of the last historical known spawning sites in Illinois.
- Two plus (2+) year old survival was documented with the collection of two fish in the Banner Marsh stocking site by D.C. electrofishing. These 2010 year class fish had reached 800 mm (31.4 inches) by November of 2012.

- Public information and education on the IDNR Alligator Gar reintroduction in Illinois was completed with talks at sport shows, radio interviews, and newspaper articles in 2012. The overall attitude of the public has been favorable, curious, and excited about a large predatory fish that might eat Asian carp.
- Thesis research was completed on Alligator Gar reintroduction into Spunky Bottoms by Nate Grider. On September 29, 100 Alligator Gar with an average size of 536 mm and 882 grams (21.1 inches and 1.94 lbs.) were PIT tagged and stocked in Merwin Preserve Spunky Bottoms owned by The Nature Conservancy. This wetland is roughly at the northern extent of Alligator Gars' recorded historic range. The site is approximately 1,200 acres when fully flooded and is separated from the Illinois River by a levee. The habitat consists of abundant emergent aquatic vegetation and a network of “deep” ditches left from previous farming attempts. The goals of the study were to collect baseline data for Illinois on Alligator Gar growth rates, fitness, and diet. Monthly surveys were conducted from May through October with assistance from Rob Hilsabeck, Trent Thomas, and others. Seventeen Alligator Gar were collected (one individual twice), representing 0.25% of total catch (N = 6,912). The largest individual grew from egg to 959 mm and 6,364 g (38 inches, 14 lbs.) in only 17 months. Growth rates from May to September 29 for young-of-year averaged 3.6 mm and 5.9 g per day (before stocking), and 1.8 mm and 7.3 g during the 2012 growing season in Spunky Bottoms. Gastric lavage was used for the diet study. Alligator Gar stomachs were 53% empty, 29% contained Gizzard Shad, and 18% were unidentifiable fish. Overall, the study was successful in providing needed information to aid conservation efforts in the Alligator Gars' historic northern range.

2013

- Illinois received approximately 20,000 fry from the USFWS in 2013. The initial fry mortality was low this year. A total of 5,399 fish were stocked to receiving waters by the fall.
- The levee at Spunky Bottoms was breached during 2013 flooding. A survey was attempted at this site in the fall with gill nets. No Alligator Gars were collected, and this population is believed to have either escaped to the Illinois River, succumbed to low dissolved oxygen during the winter of 2012/2013 (the 2012 drought drastically reduced water levels), or a few may remain at Spunky Bottoms in low numbers. Future surveys should be attempted.
- Ten thousand (10,000) fry were started at the Jake Wolf Hatchery. On July 10, 4,500 of these fish were stocked into a restored Illinois River backwater lake, Hennepin-Hopper. It is currently isolated from the river. These fish averaged four inches in length. Seven hundred (700) additional four-inch fish were transferred to the Cordova Exelon Hatchery for further rearing. In September, 11,657 of these fish at an average size of 12.8 inches were stocked into the Sanganois State Fish and Wildlife Area. This backwater complex is seasonally connected to the Illinois and adjacent Sangamon Rivers. All of these fish were intensively reared on pelleted food.

- Ten thousand (10,000) fry were started at the Logan Hollow Fish Farm. At two inches in length, approximately 7,500 fish remained and were moved to a large rearing pond with Fathead Minnows (*Pimephales promelas*) and Gizzard Shad forage. On November 1, 242 fish at an average length of 19 inches were PIT tagged and stocked into two connected oxbows of the lower Kaskaskia River. It is believed that cannibalism was the major mortality on these fish in the rearing pond.
- The IDNR recaptured the largest stocked Alligator Gar on July 7 while electrofishing for State Fair display fish. The Powerton Lake fish was 49.2 inches long, 19.3-inch girth and 27 pounds. It was initially stocked on May 9, 2011 as a two-year-old fish at 21.4 inches long and three pounds. Powerton Lake is a 1,400-acre warm water reservoir for a coal fired electric plant. Threadfin Shad, Gizzard Shad, and Silver Carp have strong populations in this lake.
- Two Alligator Gar were caught, photographed and released by a gar fishing group (garfishing.com). The fish were from the 2011 stocking into the Rice Lake State Fish and Wildlife Area. Both fish were approximately 715 mm (28.1 inches) in length. The anglers had been directed to this site in an effort to help collect recapture data for the IDNR. The IDNR had made three separate, unsuccessful attempts to recapture Alligator Gar from this site with trap nets and a variety of gill nets. It was the second trip by the anglers to the site.
- Public information and education on the IDNR Alligator Gar reintroduction in Illinois was again completed with talks at sport shows, radio interviews, and newspaper articles in 2013. The Shedd Aquarium in Chicago expressed an interest to develop a public outreach and education display on Alligator Gar in 2014.

2014

- Illinois did not request or receive fry from the USFWS in 2014.
- A complete low oxygen fish kill occurred in the winter of 2013/2014 in a shallow fertile pond that contained a sportfish population and three Alligator Gar. Two of the recovered Alligator Gar were 38 inches long at two years, eight months, and the third was 44 inches long at three years, eight months. The northern half of Illinois experienced a high amount of low oxygen fish kills in fertile, shallow bodies of water over the winter of 2013/2014. An extended period of ice coverage with a snow layer on top made this the highest reported year of winter fish kills since 1977 to 1978. Future management and stockings in Illinois will consider this scenario when evaluating potential stocking sites.
- Two Alligator Gar at approximately 60 inches long were observed in August 2014 while electrofishing the intake ditch at Powerton Lake

2015

- Illinois did not request or receive fry from the USFWS in 2015.

- The USFWS reported an Alligator Gar was captured by a Missouri commercial fisherman in January in Angelo Chute, a side channel area at the confluence of the Mississippi and Ohio Rivers. This fish may have originated from the Kentucky reintroduction program.
- On August 7 a bow fisherwoman harvested an Alligator Gar in the lower Kaskaskia River. It was a PIT tagged fish from the 2013 IDNR Alligator Gar stocking into the lower Kaskaskia River. Fish #0A180D7501 was 18.9 inches long and 1.14 pounds on November 1, 2013 when stocked as a six-month old fish. On August 7, 2015 it was 26.5 inches long and four pounds.
- A total of nine Alligator Gar were collected from Powerton Lake SFWA with an average length of 51 inches and 36.3 pounds each. Eight fish were collected in the first 15 minutes with the new Alligator Gar, multifilament gill nets, and one more with pulsed-DC electrofishing. They were six-year-old fish acquired from USFWS in 2011 (they were age two when acquired). All 78 were PIT tagged when stocked in Powerton Lake in 2011. This collection was more than 10 percent of the original 78 stocked. These fish had moved to an interior intake canal at this warm water power plant lake. This interior canal has no fishing access, and a constant supply of forage of Gizzard Shad and Silver Carp (*Hypophthalmichthys molitrix*). This should serve as an excellent Alligator Gar collection site in the future. Gastric lavage will be attempted on any collected Alligator Gar at this site in 2016.

2016

- Illinois received 20,000 fry from the USFWS on May 3. A total of 10,000 were received at Little Grassy Hatchery and 10,000 at Jake Wolf Hatchery. The 10,000 received at Little Grassy were immediately transferred to Logan Hollow Fish Farm. Both batches of fry suffered complete mortality due to an aggressive fungal or bacterial outbreak. Both hatcheries need to determine a better start plan for the fry and the reason for the outbreak. Initial water temperatures and a treatment protocol need to be discussed with successful hatcheries.
- Illinois received approximately 1,700 six-inch Alligator Gar from the Pvt. John Allen Hatchery on July 13. The fish were raised at the Cordova hatchery on pelleted floating food in raceways until September. On September 20, 1,650 Alligator Gar were transferred from the Exelon Hatchery to Jake Wolf Hatchery for PIT tagging and stocking. The average length was 265 mm and average weight was 84g. Six hundred Alligator Gar were stocked directly into Powerton Lake near Pekin, Illinois with no PIT tags. Three hundred PIT tagged fish were stocked into Horseshoe Lake, at Horseshoe Lake State Park in Madison County. Three hundred PIT tagged fish were stocked into the Lower Kaskaskia River in the State Fish and Wildlife Area near Redbud, Illinois. A large oxbow and wetland complex off of the main navigation channel was the stocking

site. Three hundred PIT tagged fish were stocked into the Sanganois State Fish and Wildlife Area.

- A gar management resolution was passed by the Illinois House of Representatives. The initial proposed resolution was created by the Illinois Environmental Council, the Sierra Club and the Environmental Law and Policy Center. The IDNR Division of Fisheries then worked with these groups to create a resolution that supported the management of gar populations (including the reintroduction of the Alligator Gar) in Illinois by the IDNR.
- Personnel with the IDNR Division of Fisheries and the Exelon Hatchery completed multiple interviews with print and television media on the reintroduction of Alligator Gar in Illinois. The overall response was positive and good biological information was provided to the public. Countering the exaggerated media hype of using Alligator Gar as a control of Asian carp was a part of the public education effort.
- A public meeting was held by IDNR Fisheries on July 21 in New Athens on the Alligator Gar stocking in the Kaskaskia River. The meeting was requested by State Representative Jerry Costello II (D-Red Bud) to provide background information to a local recreational group and marina owner on the Kaskaskia River. A presentation of the history, biology and the reintroduction plan for Alligator Gar was provided to the public attendees. A question and answer session was also held. The most notable questions included potential Alligator Gar attacks on humans and why stock a non-sport fish known to local anglers as a “trash fish.”
- Powerton Lake is a power plant cooling lake with extremely warm water temperatures compared with other water bodies in Illinois. On August 10, a total of 11 Alligator Gar were collected with an average length of 52.4 inches and 41.6 pounds each. Ten fish were collected in the first 15 minutes with the Alligator Gar gill nets, and one more with pulsed-DC electrofishing. These were the seven-year-old fish received from Tupelo, MS. All of the fish were PIT tagged and stocked as two-year-old fish on May 9, 2011. This collection was more than 10 percent of the original 78 stocked fish. Gastric lavage was attempted on two fish with no success. The high water and air temperatures caused us concern for the stress on the fish while attempting to open their jaws. We should be able to sample them at this location for many years to come.

References

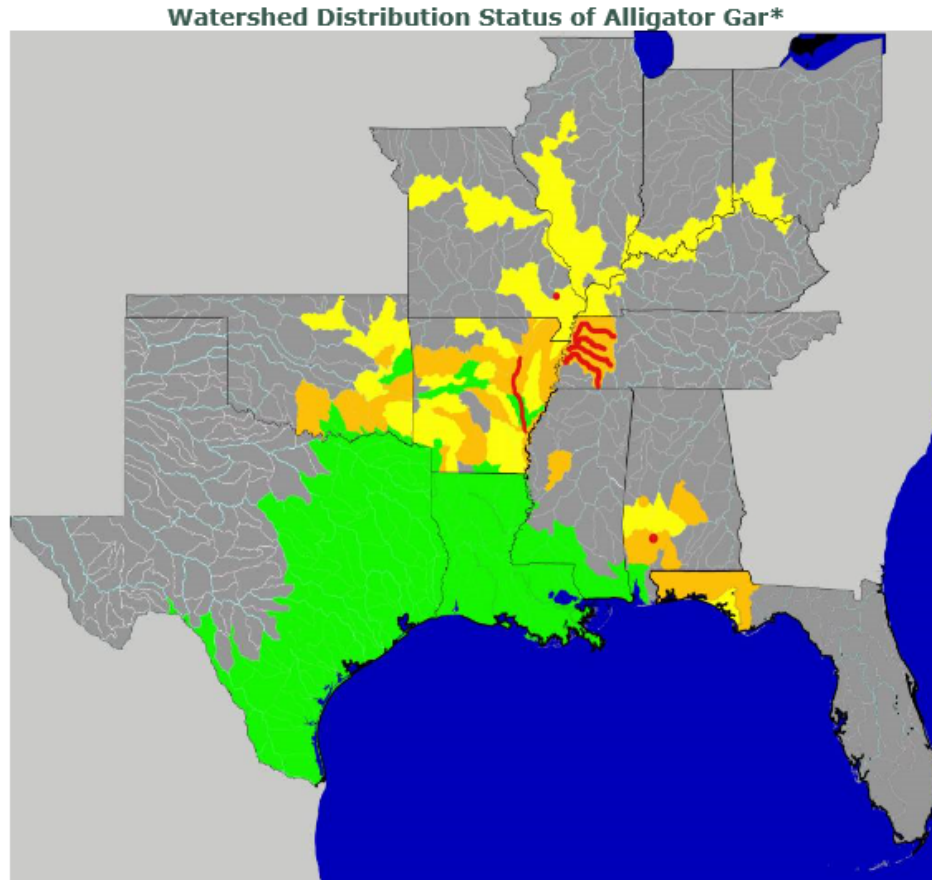
- [AGTC] Alligator Gar Technical Committee. 2011. Alligator gar conservation & status assessment. Southern Division of the American Fisheries Society. [Internet] Accessed October 13th, 2011. Available at: http://www.sdafs.org/alligar/AGar_Maps.html
- Bonham, K. 1941. Food of gars in texas. Transactions of the American Fisheries Society. 70: 356-362.
- Brothers, E.L. 2007. Alligator Gar (*Atractosteus spatula*): A literature review of the species and implications for reintroduction into Mingo National Wildlife Refuge in southeastern Missouri. Missouri Department Of Conservation, Jackson, Mo.
- Brinkman, E.L. 2008. Contributions to the life history of Alligator Gar, *Atractosteus spatula*, in Oklahoma. Master's Thesis, Stillwater, Okalahoma: Oklahoma State University. 37 pp.
- Burr, B.M., K.M. Cook, D.J. Eisenhour, K.R. Piller, W.J. Poly, R.W. Sauer, C.A. Taylor, E.R. Atwood, and G.L. Seegert. 1996. Selected Illinois fishes in jeopardy: New records and status evaluations. Transactions of the Illinois State Academy of Science. 89:169-186.
- Ferrara, A.M. 2001. Life-history strategy of lepisosteidae: implications for the conservation and management of Alligator Gar. Doctoral Dissertation, Auburn, Alabama: Auburn University. 126 pp.
- [GFCCI] Game and Fish Conservation Commission of Illinois. 1914. Annual Report of the Game and Fish Conservation Commission of Illinois for the Fiscal Year 1913-14 To the Governor. Pages 136-139.
- Garcia De Leon, F. J., L. Gonzalez-Garcia, L. M. Herrera-Castillo, K. O. Winemiller, & A. Banda-Valdes. 2001. Ecology of the alligator gar, *Atractosteus spatula*, in the Vicente Guerrero Reservoir, Tamaulipas, Mexico. The Southwestern Naturalist 46(2):151-157.
- Goodyear, C. P. 1967. Feeding habits of three species of gars, *Lepiososteus*, along the Mississippi Gulf Coast. Transactions of the American Fisheries Society 96: 297-300.
- Grider, N.T. 2013. Growth, Condition, and Diet of Alligator Gar (*Atractosteus spatula*) Released in Merwin Preserve. Master's Thesis, Springfield, Illinois: University of Illinois, Springfield
- I Fish Illinois. 2016. Illinois Sport Fishing Awards. Website, Accessed January 5, 2017. Available at: http://www.ifishillinois.org/awards/open_award.html
- Kluender, E.R., R. Adams, and L. Lewis. 2016. Seasonal habitat use of Alligator Gar in a river-floodplain ecosystem at multiple spatial scales. Ecology of Freshwater Fish. doi:10.1111/eff.12270

- Layher, W.G. and J.W. Phillips. 2000. Status and distribution of Alligator Gar, *Lepisosteus spatula*, in several large river systems in Arkansas Contract No. 0019869. Arkansas Game and Fish Commission. Layher BioLogics RTEC, Inc. Pine Bluff, Arkansas. 32 pp.
- Luce, W.M. 1933. A survey of the fishery of the Kaskaskia River. Ill. Nat. Hist. Surv. Bull. 20: iii, 71-123, 1 foldout map.
- Moore, C., Jr. 2007. Garzilla: The Alligator Gar, Texas' largest freshwater fish, may not be as tough as it looks. Texas Parks & Wildlife Magazine.
- Nature Serve. 2015. *Atractosteus spatula*. [Internet] Accessed January 5, 2017. Available at: http://explorer.natureserve.org/servlet/NatureServe?sourceTemplate=tabular_report.wmt&loadTemplate=species_RptComprehensive.wmt&selectedReport=RptComprehensive.wmt&summaryView=tabular_report.wmt&elKey=102977&paging=home&save=true&starIndex=1&nextStartIndex=1&reset=false&offPageSelectedElKey=102977&offPageSelectedElType=species&offPageYesNo=true&post_processes=&radiobutton=radiobutton&selectedIndexes=102977
- Page, L. M. and B. M. Burr. 1991. A field guide to freshwater fishes of North America north of Mexico. The Peterson Field Guide Series. Houghton Mifflin Co., Boston. 432 pp.
- Pflieger, W.L. 1997. The fishes of Missouri. Missouri Conservation Commission. 371 pp.
- Poly, W.J. 2001. Distribution of the Alligator Gar, *Atractosteus spatula* (Lacepede, 1803), in Illinois. Transactions of the Illinois Academy of Science 94(3): 185-190.
- Scarnecchia, D. L. 1992. A reappraisal of gars and bowfins in fishery management. Fisheries 17(5): 6-12.
- Seidensticker, E. P. 1987. Food selection of alligator gar and longnose gar in a Texas reservoir. Preceeding Southeastern Association of Fish and Wildlife Agencies 41: 100-104.
- Smith, P. W. 1979. The fishes of Illinois. University of Illinois Press, Urbana. 314 pp.
- Todd, R.M. 2005. Tennessee Alligator Gar Management Plan. Tennessee Wildlife Resources Agency. Nashville, Tenn.

Appendix of Tables and Figures

Table 1. Records of the Alligator Gar's occurrence in Illinois and adjacent waters from Poly (2001).

Water body	Location	Size	Date	Reference
Big Muddy River	Jackson Co., IL	---	---	Forbes, 1884
Wabash River	New Harmony, Posey Co., IN	---	---	Jordan, 1890
Illinois River	Naples, Scott Co., IL	8 ft., 7 in.	1922	Weed, 1923
Mississippi River	Grafton, Jersey Co., IL	~6 ft. (87 lb.)	1922	Weed, 1923
Mississippi River	Grafton, Jersey Co., IL	~7 ft., 6 in. (176 lb.)	---	Weed, 1923
Mississippi River	Grafton, Jersey Co., IL	6 ft., 6.5 in.	---	Weed, 1923
Illinois River	Meredosia, Morgan Co., IL	8 ft., 6 in.	Rcd. 1922	FMNH 9926
Kaskaskia River	Randolph Co., IL	---	1930	Luce, 1933
Illinois River	specific locality unknown	---	Rcd. 1935	INHS 64422
Mississippi River	Columbia, Monroe Co., IL	58.5 kg., ~2 m.	1937	INHS 48200
Mississippi River	[floodplain 3 mi. west of Columbia; collectors: W. Lopinot & P. Lopinot; photographic record]			
Mississippi River	[near] Cairo, Alexander Co., IL	---	May 1944	Barnickol & Starrett, 1951
	[n=80, total weight=182.3 lb.]			
Mississippi River	Cape Girardeau, MO	1.7 lb.	May 1944	Barnickol & Starrett, 1951
Mississippi River	Grand Tower, Jackson Co., IL	---	June 1944	Barnickol & Starrett, 1951
	[n=2, total weight 58.9 lb.]			
Mississippi River	Chester, Randolph Co., IL	2.4 lb.	June 1944	Barnickol & Starrett, 1951
Mississippi River	Grafton, Jersey Co., IL	26.8-27.7 in., 4.1 lb.	July 1944	Barnickol & Starrett, 1951
Mississippi River	Grand Tower, Jackson Co., IL	~1750 mm.	1955	Burr et al., 1996
	[in Nine-Mile Shute, SIUC photographic record, caught by C.E. Nickles]			
Mississippi River	[near] Batchtown, Calhoun Co., IL	>2 m.	1963	Burr et al., 1996
	[below Lock & Dam No. 25, caught on hook and line by Roy C. Heidinger]			
Horseshoe Lake	Alexander Co., IL	67 in. (1.7 m.)	1964	Burr et al., 1996
	[caught in trammel net by commercial fisherman, recorded by Ora M. Price]			
Mississippi River	[near] Chester, Randolph Co., IL	49 kg. (110 lb.)	1965	Smith et al., 1971
	[caught by commercial fisherman, photographic record furnished by Ora M. Price]			
Mississippi River	[near] Cairo, Alexander Co., IL	58 kg. (130 lb.)	1965	Smith et al., 1971
	[caught by commercial fisherman, photographic record furnished by Ora M. Price]			
Cache-Mississippi Div.	Channel NW Klondike, Alexander Co., IL	~7 ft., 130 lb.	April 1966	INHS 48182
	[at State Route crossing, caught on hook and line, photographic record]			
Ohio River	Shawnee Power Plant, McCracken Co., KY		---	Hoyt, 1979
	[n=20, total weight=3,375 g. fish were impinged on screens at water intake]		1974-1976	



KEY

- Green - Naturally Sustaining Populations**
- Orange - Remnant Populations or Individual Observations**
- Red - Stocked Population**
- Yellow - Approximate Historic Range (Possible Extirpated)**

*** This map is an estimation of the historic and current range based on available data, habitat, and life history associations.**

Figure 1. Geographic range of Alligator Gar in the United States. Population extending south from Texas into Veracruz, Mexico not shown. Mapped by USFWS 2007).

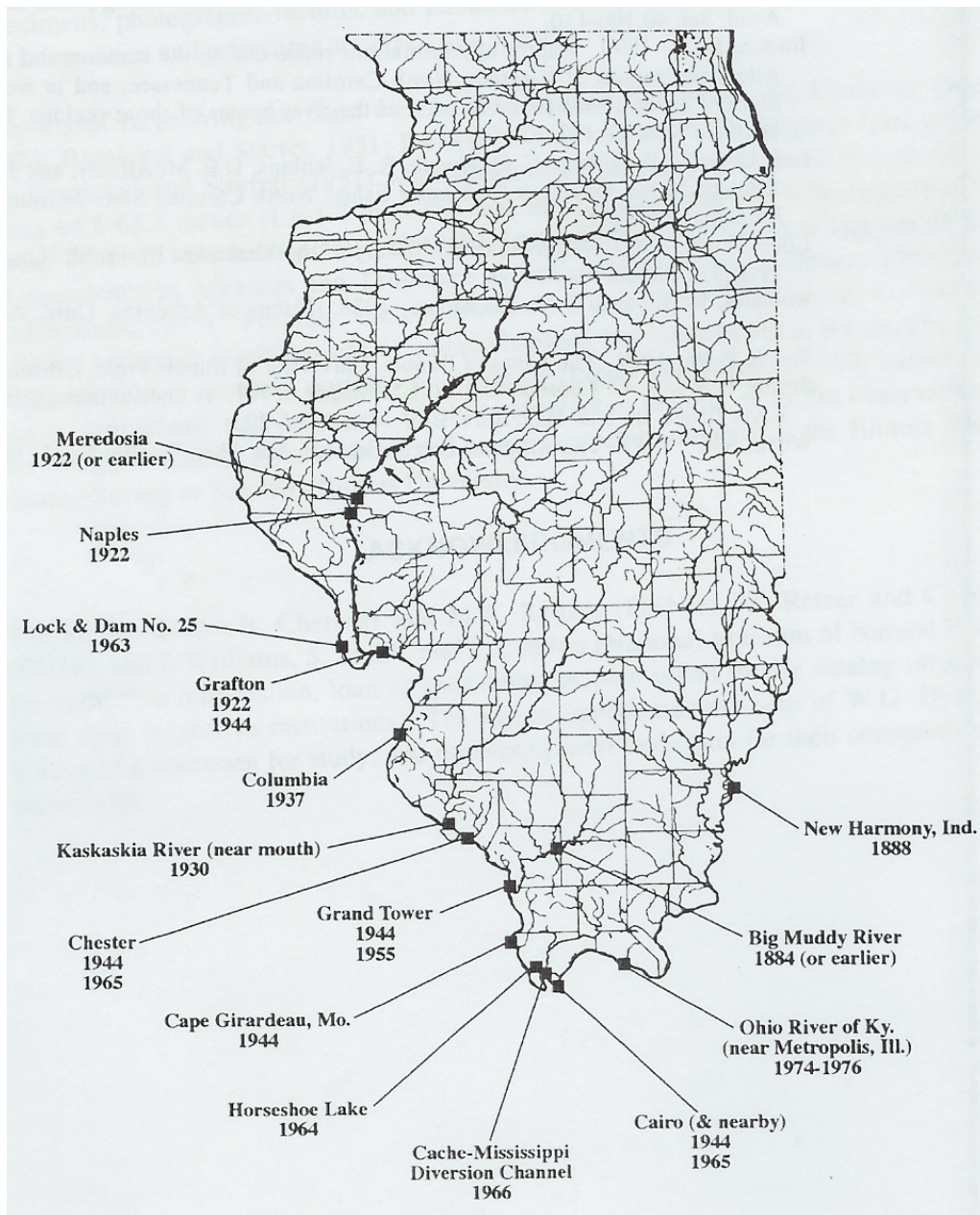


Figure 2. Distribution and chronology of collections of the Alligator Gar in Illinois and bordering waters based on historical records (Poly 2001).

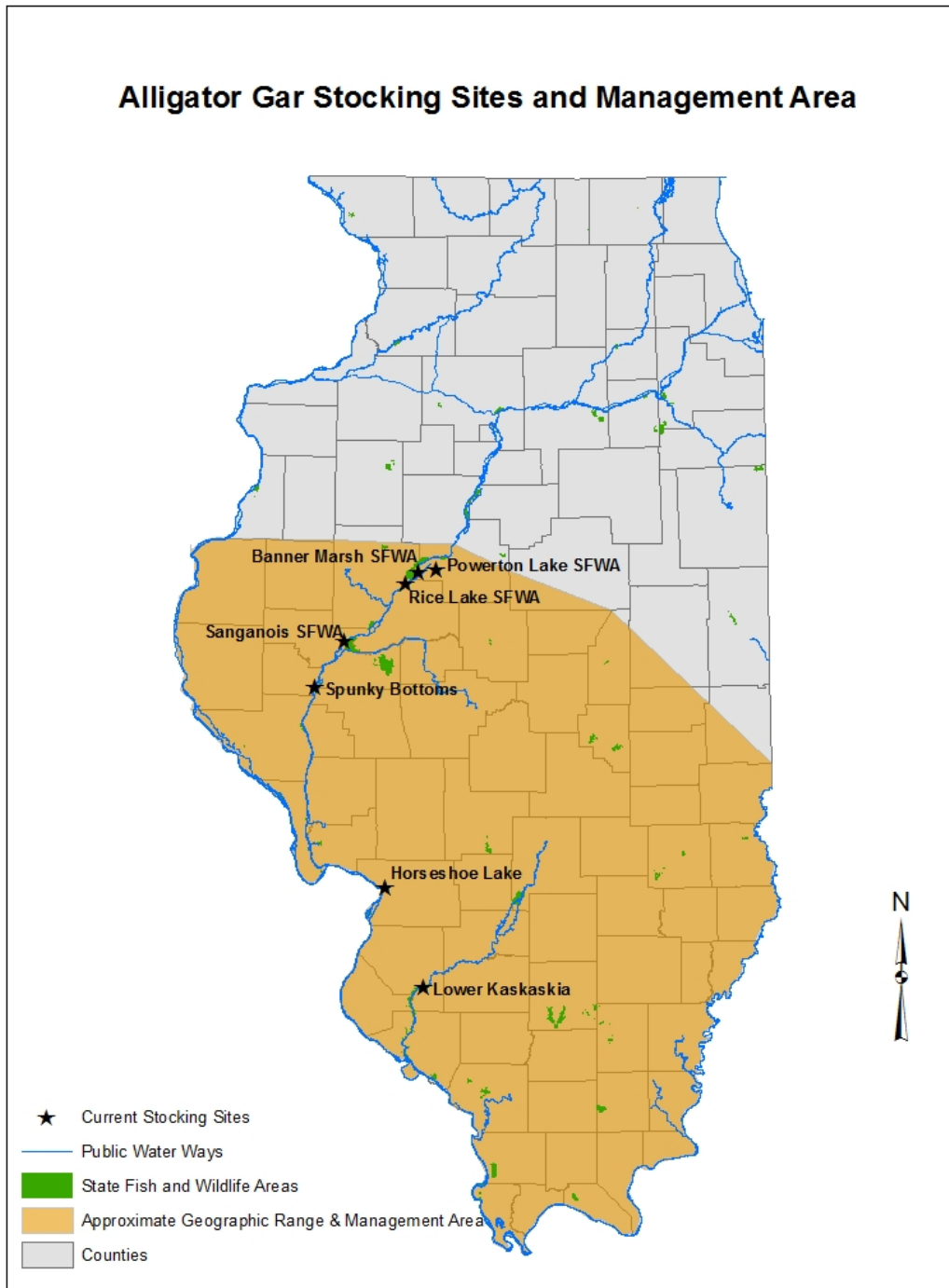


Figure 3: Estimated historic geographic range and focused management area along with Alligator Gar stocking sites to date. This map also shows public waters and State Fish and Wildlife Areas to help aid in identifying additional stocking locations.