



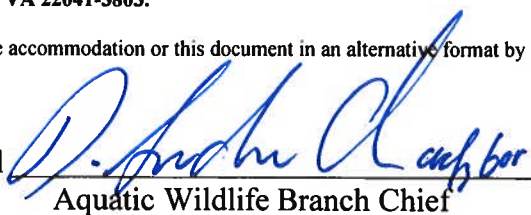
Silverbell Lake Fisheries Management Plan 2019-2029

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Approved [] by Chris Cantrell


Aquatic Wildlife Branch Chief

Date: 6/28/19

Management Prescription

The Arizona Game and Fish Department (Department) has developed concepts under Strategic Vision Documents (AGFD 2019a-b) to help guide fisheries management in Arizona. The Department also developed a Community Fishing Program (CFP) Vision in 2015 to further guide management objectives in CFP waters, for angler catch per unit effort (CPUE; fish caught per hour) and angler satisfaction (AGFD 2015). Target catch rates and angler satisfaction is the same for all CFP waters: Achieve an angler satisfaction rate of at least 85% for each individual water, and overall catch-rates greater than 0.50 fish/hr. The Department has employed an Intensive Use or put-and-take management strategy at Silverbell since the lake was added to the program in 1984.

Based on angler creel survey data, Silverbell had angler catch rates of 0.48 fish/hr in 2000; 0.27 fish/hr in 2005; and 0.33 fish/hr in 2010; and 0.24 fish/hr in 2015. Current approved fish species for stocking include Rainbow Trout, Channel Catfish, Bluegill and Redear Sunfish, and Largemouth Bass.

Rainbow Trout *Oncorhynchus mykiss*: Catchable Rainbow Trout will continue to be stocked every 2 weeks from mid-November to mid-March (9 stockings) at a rate of 30-40 pounds per acre. Stocked Rainbow Trout will average 0.75 pounds and have an average length of 10"-13". An established bag limit of 4 trout per day shall remain until further notice.

Channel Catfish *Ictalurus punctatus*: Catchable catfish will continue to be stocked every 2 weeks from mid-March to mid-June, and late September to mid-November. No stocking shall take place in July or August due to extreme temperatures. Channel Catfish are stocked at a rate of approximately 100 pounds per acre. Stocked catfish average 1.5 to 2.0 pounds and have an average length of 14"-18". An established bag limit of 4 catfish per day shall remain until further notice.

Bluegill *Lepomis macrochirus* and/or **Redear Sunfish** *Lepomis microlophus*: Catchable sunfish are stocked once per year, usually in March or April. Sunfish are stocked at a rate of approximately 30 pounds per acre and have an average length of 5"-8". An established bag limit of 10 sunfish per day shall remain until further notice.

Largemouth Bass *Micropterus salmoides*: Catchable (13 inches or greater) or sub-catchable (less than 13 inches) Largemouth bass are stocked periodically depending upon available funds, but no more than once per year and usually in March or April. Largemouth Bass are stocked at a rate of approximately 20-30 pounds per acre. An established bag limit of 2 Largemouth Bass per day (Minimum length of 13 inches) shall remain until further notice.

Table 1. Silverbell Lake Stocking Management Strategies:

Species	Management Strategy	Regulations	Stocking
Focal Species ¹			
Rainbow Trout	Intensive Use – Winter Months	Limit 4 per day	Frequent; November to March
Channel Catfish	Intensive Use – Summer Months	Limit 4 per day	Frequent; March to November
Sunfish (Bluegill, Redear)	Basic Yield – Year Round	Limit 10 per day	Once per year
Largemouth Bass	Low Yield – Year Round	Limit 2 per day, 13in minimum	Maintenance as needed
Other sport species ²			
Black Crappie <i>Pomoxis nigromaculatus</i>	Low Yield – Year Round	Statewide limits	Maintenance as needed

Table 2. Silverbell Lake Objectives and Adaptive Management Strategies:

Objective 1: Maintain an Intensive Use Rainbow Trout fishery.			
Parameters	Objective Guideline	Trigger point to address unmet Objectives	Strategies if Objectives are Unmet
Angler Catch Rates	Maintain an angler catch rate of 0.5 fish/hour during stocking season.	Catch rates drop below 0.5 fish/hour during assessment of catch rates on a 5 year rotational basis through creel surveys.	<ul style="list-style-type: none"> • Implement changes in daily bag limit. • Increase number of Rainbow Trout stocked to meet target catch rate. • Increase frequency of stocking. • Increase law enforcement patrols to reduce poaching.
Objective 2: Maintain an Intensive Use Channel Catfish fishery.			
Angler Catch Rates	Maintain an angler catch rate of 0.5 fish/hour during stocking season.	Catch rates drop below 0.5 fish/hour during assessment of catch rates on a 5 year rotational basis through creel surveys.	<ul style="list-style-type: none"> • Implement changes in daily bag limit. • Increase number of Channel Catfish stocked to meet target catch rate. • Increase frequency of stocking. • Increase the amount of artificial habitat. • Increase law enforcement patrols.

¹ Species approved for stocking by U. S. Fish and Wildlife Service.

² Species is present, but future stocking would require a new environmental analysis (EAC) and consultation.

Objective 3: Maintain an Intensive Use Water for Bluegill and/or Redear Sunfish.			
Parameters	Objective Guideline	Trigger point to address unmet Objectives	Strategies if Objectives are Unmet
Angler Catch Rates	Maintain an angler catch rate of 0.5 fish/hour.	Catch rates drop below 0.5 fish/hour during assessment of catch rates on a 5 year rotational basis through creel surveys.	<ul style="list-style-type: none"> • Implement changes in daily bag limit. • Increase number of bluegill stocked to meet target catch rate. • Increase frequency of stocking. • Increase the amount of artificial habitat. • Increase law enforcement patrols. • Suppress predators.
Objective 4: Maintain satisfaction rate of at least 85%.			
Angler Satisfaction	A minimum of 85% of anglers rate fishing as fair, good or excellent.	Creel census shows less than 85% of anglers rate fishing as fair, good or excellent.	<ul style="list-style-type: none"> • Increase stocking rates. • Increase size of fish stocked. • Increase or modify efforts for angler education, preferably at the lake. • Increase law enforcement efforts.

Background

Silverbell is an artificially constructed lake located on the northern fringe of the Tucson metro area, immediately adjacent to the Santa Cruz River at Christopher Columbus Park: 4600 N Silverbell Rd, Tucson, AZ 85745.

The lake is approximately 13 acres in surface area, and has an average depth of 1 meter. Silverbell is directly adjacent to Archer Lake, a small but hydrologically connected lake that flows into Silverbell. Water is pumped from an on-site underground well into Archer Lake, and the water flows into Silverbell. Walker (2008) estimated retention volume of the lake to be approximately 114 acre-feet. Fishing in Archer Lake is prohibited by the City since the lake is primarily used for model remote-controlled boat operation.

Silverbell has been designated as a Community (Urban) Fishing water since 1984, when it was substituted for Lakeside Lake after the dam failed (Watt, 1989).

Fish stocking records are incomplete and located in more than one data source. Records indicate Rainbow Trout were stocked in 1987, followed by Largemouth Bass in 1988, but then records are missing until late 2003. Since 2004 stocking has been routine with catchable catfish during the summer months (March-November) and Rainbow Trout during the winter months (November-March). Sunfish were often stocked twice per year around March and October.

Regulations and bag limits have remained unchanged since the 1980's.

Productivity/Water Quality

Walker (2008) did a detailed survey of the water quality in 2008. Analysis of water as well as algae indicated that the lake received nitrogen-rich water, but levels of phosphorous were considered to be limiting algal growth in both lakes.

In terms of algae, the genus *Microcystis* was the dominant algae along with Cyanobacteria or Blue Green algae. The Cyanobacteria can be noxious to most zooplankton and are not grazed, therefore they tend to out-compete other forms of algae. Hence, algal biodiversity was relatively low in the lake. Walker (2008) indicated that it is possible for biomass to be greater if more phosphorous were introduced into the system.

The Tucson City Parks and Recreation Department manages the emergent aquatic vegetation around the lake perimeter via periodic application of herbicides. Staff from the Community Fishing Program have conducted a few snapshot investigations into water quality in 2001, 2002, and another in Archer Lake in 2012 with nothing remarkable noted. Since the University of Arizona is local and they have a limited limnology program, it might be possible to ask University of Arizona to continue monitoring water quality (nutrient) and algae/zooplankton changes on a regular basis.

Forage/Prey

Watt (1988) conducted an electrofishing and netting survey in September 1988 and found Threadfin Shad as well as Mosquitofish combined with Bluegill Sunfish and Redear Sunfish made up the fish forage base. Watt conducted an electrofishing survey in November 1990 and found similar results for forage fishes. Staff from the Department of Environmental Quality conducted a survey in September 2015 (Samuel Rector) and found Carp, Largemouth Bass, Channel Catfish, and Black Crappie. Very little additional data has been collected by the Department on forage or prey species assemblage from Silverbell Lake since those surveys.

Habitat

According to the Regional Fisheries Program Manager, Silverbell is relatively void of fish habitat and structure. Aquatic plants and algae are periodically problematic, and the City of Tucson routinely stocks White Amur *Ctenopharyngodon idella* to control submerged vegetation. Emergent vegetation (mostly cattails) is periodically controlled through herbicide applications by City of Tucson Parks staff. Cumulative sediment buildup over the past 30 years has reduced average depth to about 4-6 feet and there are no known plans to renovate the lake basin.

Access

Access to Silverbell is via the entrance to Christopher Columbus Park on the west side of the lake off Silverbell Road. Access to fishing along the shoreline is generally good and unrestricted. There are boat ramps at the north and south ends of the lake; however, the lake prohibits gas-powered motors. Although the park posts open times from 6am to 10:30pm, the park gates usually remain open 24 hours per day, so public access at this lake is very generous.

Species

As mentioned above, little data has been collected on fish species assemblage from Silverbell Lake in the past 32 years. Based on stocking records as well as observations the lake is known to harbor Largemouth Bass, Channel Catfish, Bluegill, hybrid sunfish, Redear Sunfish, Rainbow Trout, White Amur, Common Carp, and Black Crappie. Data from the 2015 angler creel survey indicate that anglers are targeting any fish most frequently, followed by the focal species being stocked at the time. During November to March, that primary target species was trout, and from March to November the primary target species was catfish.

The CFP has conducted extensive angler creel surveys every 5 years to monitor target species, catch rates, angler satisfaction, harvest rates, and expenditures that can be used to evaluate the economic importance of the lake. Fish community surveys have not been completed with the exception of Arizona Department of Environmental Quality.

Invasive Species

There are no confirmed records of aquatic invasive species at Silverbell Lake. The risk however, remains high because of its intensive public use. There was an isolated but unconfirmed report in 2006 or 2007 of an African Birchir *Polypterus retropinnis* captured at Silverbell and another unconfirmed report of American Eel *Anguilla rostrata*. It is highly possible that other ornamental aquatic species are found in or around Silverbell lake. ADEQ found small white leeches in the lake in September 2015, which have been reported in the past according to Joann Hill (former CFP Specialist).

Catch

Our target catch rates and angler satisfaction is the same for all CFP waters: Achieve an angler satisfaction rate of at least 85% for each individual water, and overall catch-rates greater than 0.50 fish/hr.

Data collected from comprehensive creel surveys in 2010 and in 2015 shows that overall catch rates fall short of the target. Anglers typically target the species being stocked at the time; catfish in the summer and trout in the winter. Despite overall catch rates in 2010 of 0.33 fish per hour, angler satisfaction moved-up from previous years. In 2013, Angler Use Days were estimated at 129,115 based on license sales, which is likely an extreme overestimate. Overestimate or not, it highlights the popularity of this fishery in the City of Tucson. In 2015, the catch rate was measured at 0.24 fish per hour, and angler user days were estimated to be 73,900 (Arizona Game and Fish Department 2017).

Satisfaction

Angler satisfaction is of paramount importance to the Department. We measure angler satisfaction via two different methods. The first is by the median score on a 10-point scale; and the second is by the percentage of anglers giving a satisfactory score (6-10) on the same scale. Both indicators of satisfaction increased from 2005 to 2010 but decreased in 2015.

During Creel surveys and interactions with anglers, Department staff will ask a standardized question regarding an angler's satisfaction with the fishery. Angler satisfaction of 85% is the goal of the fishery and for the program as a whole.

Literature Cited

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Walker, D. 2008. Limnological Survey of Christopher Columbus and Archer Lakes with Recommendations for Water Quality Improvements and Management. Report prepared for the City of Tucson, Parks and Recreation Department.

Watt, B. 1989. Silverbell Lake 1988 Fish Management Report. Arizona Game and Fish Department. 2222 W Greenway Road. Phoenix AZ 85023.

Tables and Figures

Table 3. Catch rates and angler satisfaction by year for Silverbell Lake.

Lake and Year	Catch Rate Overall	Catch Rate RBT	Catch Rate CCF	Angler Satisfaction Median Score	Angler Satisfaction % Giving 6-10	AUD's
SI 2000	0.48	0.38	0.59	7	75	64,600
SI 2005	0.27	0.46	0.21	7	80	54,900
SI 2010	0.33	0.37	0.36	8	93	64,000
SI 2015	0.24	0.30	0.24	8	78	73,900