

GLENWOOD ACRES

Survey Results and Management Recommendations

08-2019

**LOCHOW RANCH
POND AND LAKE MANAGEMENT**

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Introduction

Thank you for giving Lochow Ranch Pond and Lake Management Services the opportunity to manage your fishery resources this year. We are pleased to report the results of our annual survey and an overview of management recommendations for the coming year. As always, the goals of our recommendations are to manage for a well-balanced fishery.

General Lake Observations

North Lake--This lake was measured using satellite maps at 13.75 acres at full water level. At the time of the survey, the lake was approximately 12 inches low. The average water depth was approximately 6 feet and the maximum depth was approximately 24 feet. The chart below summarizes the types of aquatic vegetation found during the survey. The water visibility was 54 inches and tannic.

West Lake--This lake was measured using satellite maps at 12.5 acres at full water level. At the time of the survey, the lake was full. The average water depth was approximately 7 feet and the maximum depth was approximately 22 feet. The chart below summarizes the types of aquatic vegetation found during the survey. The water visibility was 108 inches and clear/stained in color.

Vegetation Chart

SPECIES	TYPE
Filamentous	Algae
Planktonic	Cyanobacteria
S. Naiad	Submerged
Water Primrose	Emergent
Pennywort	Emergent

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Survey Results

Electro-fishing surveys are one of the most effective lake-management tools available today. This type of sampling is an accurate way to determine the species and amounts of fish in a lake. With the information gathered during our electro-fishing survey, we calculate the relative abundance and condition of all species. We also determine the overall health of the largemouth bass fishery by taking length and weight measurements on a sample of fish. While this sampling method does not measure and analyze every fish in your pond or lake, it is the best way to get an accurate snapshot of how the fishery as a whole is doing.

Largemouth Bass

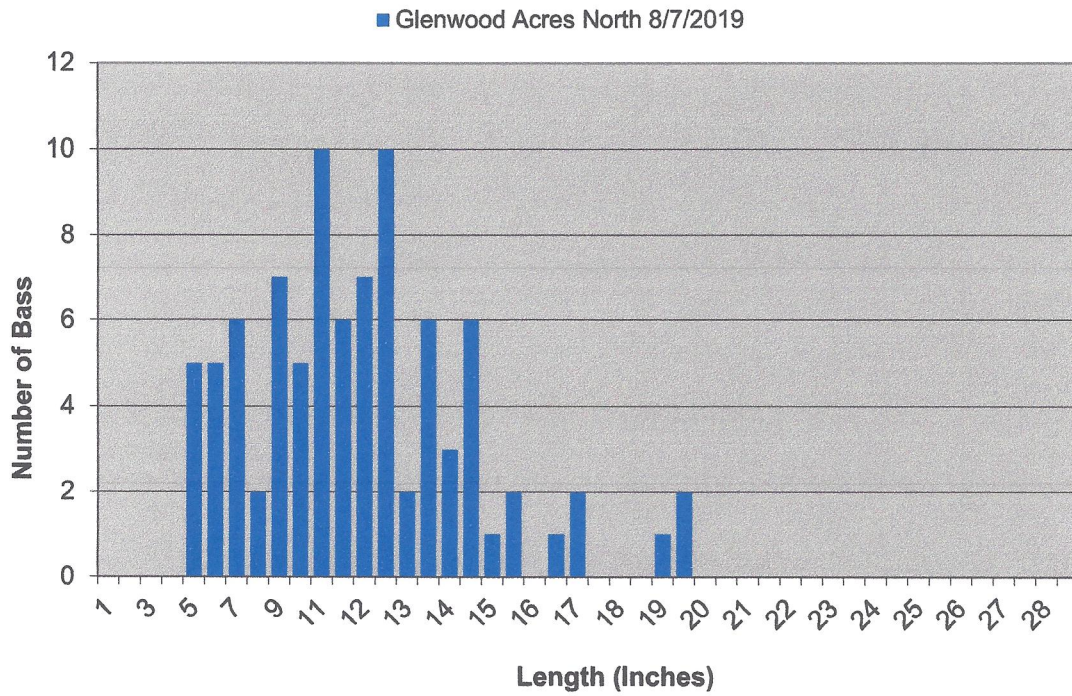
Because largemouth bass are the number one freshwater sport fish in the southern U.S., most of our management is geared toward quickly growing these bass to their greatest potential. When managed properly, bass in lakes managed by Lochow Ranch Pond and Lake Management grow, on average, 2 pounds per year. We have seen some bass grow up to 4 pounds in a single year. Bass have incredible appetites and require 10 pounds of live forage (fish) to grow 1 pound. For this reason, adequate forage diversity is important to maintain a healthy bass population. Not only are the number of forage species and number of individual fish important, but the size of the available forage is also important.

The first graph shows the number of bass sampled in each inch class. This information is important because it allows us to determine whether the bass population is well balanced or stunted at certain sizes.

The second graph shows the relative weight of the sampled bass. These data are found by comparing the weight of the sampled bass to the weight of a healthy, well-fed bass of the same length. These data are significant because they show the relative health of the sampled fish as a percentage. With this information, we can determine which sizes of bass lack forage or are overpopulated. These two graphs are shown for all lakes that were surveyed and in which bass were weighed and measured.

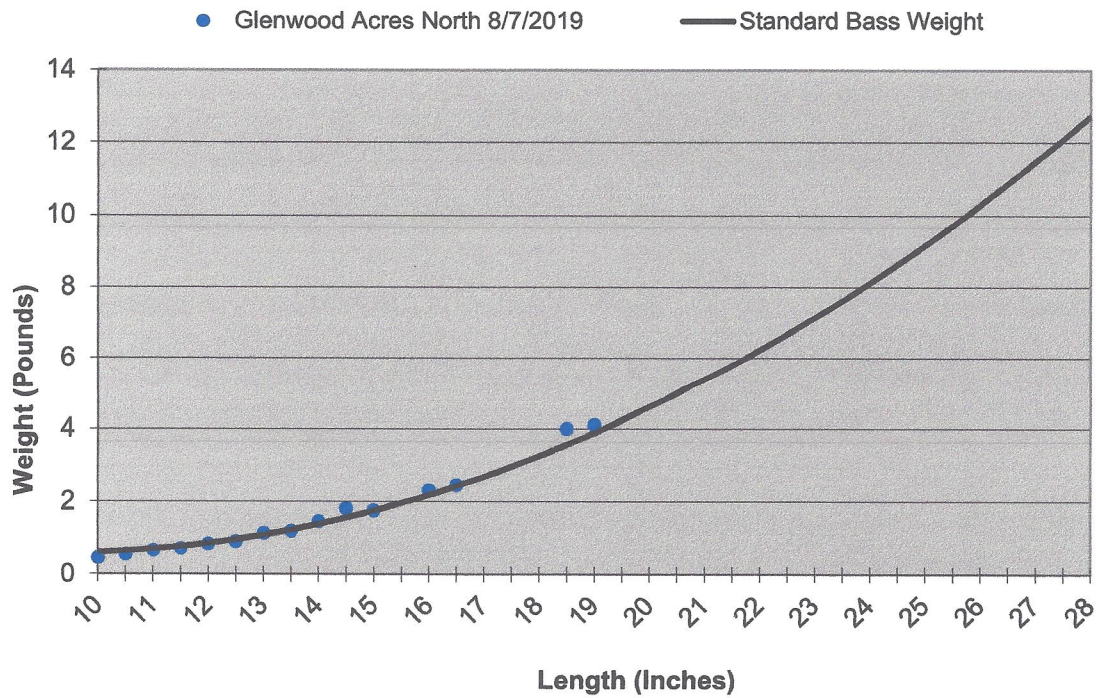
North Lake-Length Distribution

Bass Distribution by Length



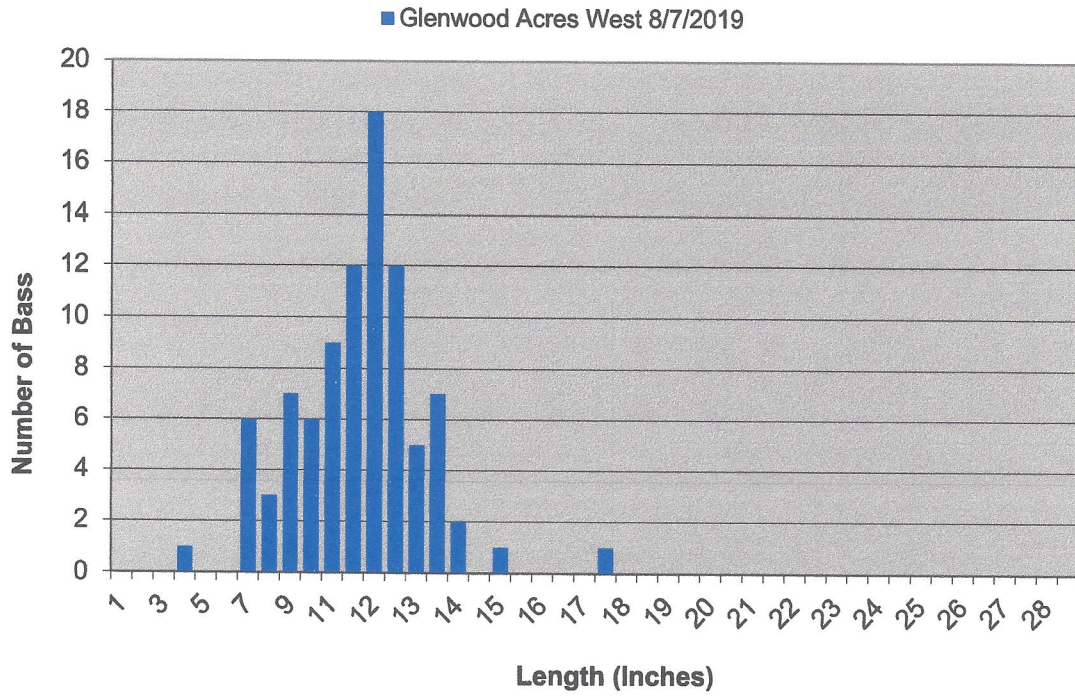
North Lake-Relative Weight

Bass Relative Weight



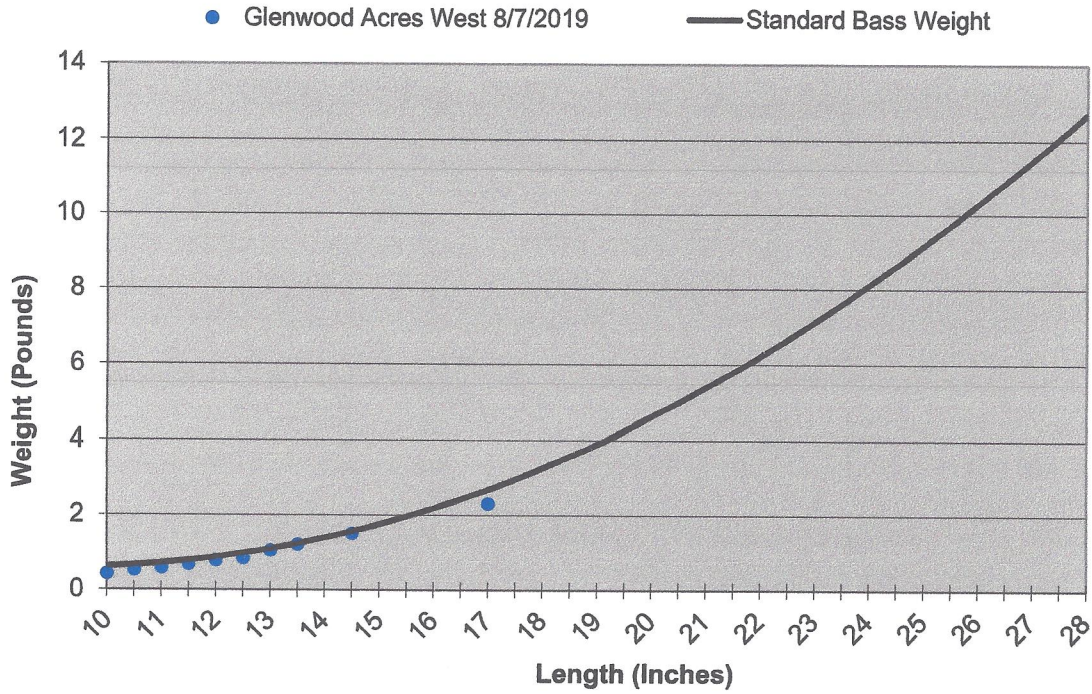
West Lake-Length Distribution

Bass Distribution by Length



West Lake-Relative Weight

Bass Relative Weight



Forage

Keep in mind that when managing a pond or lake for largemouth bass, we are actually managing for the forage fish the bass will eat to provide the greatest amount of forage possible with the greatest range of sizes. Bass should eat the largest meal they can and will expend less energy when chasing one large forage fish than when chasing many small forage fish. The energy saved is converted directly to growth. The following charts show the types of forage fish found and comparative sizes.

North-Forage Chart

FORAGE SPECIES RELATIVE ABUNDANCE					
Species	Fry	Small	Medium	Large	Jumbo
Coppernose Bluegill		Occasional	Common	Common	Occasional
Redear Sunfish			Occasional	Occasional	
Warmouth Sunfish		Occasional	Occasional	Occasional	

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West-Forage Chart

FORAGE SPECIES RELATIVE ABUNDANCE					
Species	Fry	Small	Medium	Large	Jumbo
Coppernose Bluegill		Occasional	Occasional	Occasional	Occasional
Redear Sunfish			Occasional	Occasional	

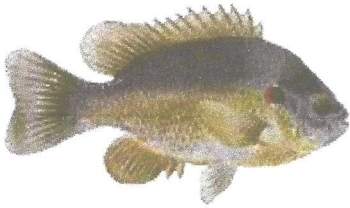
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Bluegill



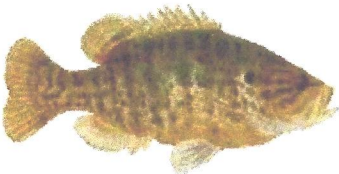
Bluegills are the quintessential forage fish species in the southeastern United States and are foundation of Largemouth Bass fisheries. Bluegills feed on insects, crustaceans, zooplankton and small fish. Bluegill can reach sexual maturity as yearlings; mature females can spawn up to five times each year producing up to 25,000 eggs during a spawning event. The reproductive prowess and advanced predator avoidance behavior allows Bluegill to almost always establish resident populations when stocked at appropriate densities.

Redear Sunfish



Redear Sunfish are often stocked in private lakes along with Bluegill to help reduce the prevalence of aquatic parasites. Redear Sunfish can reach sexual maturity as yearlings but have modest fecundity; females can produce up to 10,000 eggs during a spawning event. Unlike other sunfish redear primarily feed on gastropods and bivalves. Many species of snails serve as an intermediate host in the life cycle of aquatic parasites that infect fish, when redear consume these snails it interrupts the cycle and thus reduces the parasite load.

Warmouth Sunfish



Warmouth Sunfish are similar to Green Sunfish in terms of their morphology/ feeding behavior and wide distribution in Texas. Warmouth Sunfish are higher level predators feeding on small fish, crustaceans and gastropods. Because small fish constitute such a large portion of their diet they are considered to be undesirable as they compete with desirable sportfish for resources. At low densities Warmouth Sunfish can be controlled by a well-established Largemouth Bass population however all should be harvested when collected.

Other Species

When managing for largemouth bass, the bass and forage fish are not the only important items. Other species can have a positive or negative impact depending on types of certain fish, abundance of certain fish and combination of certain fish. In most cases, occasional occurrences of other species in lakes do not affect the management greatly. Only when certain species are extremely abundant are drastic management actions required to ensure the success of the bass fishery.

North-Other Species Chart

FORAGE SPECIES RELATIVE ABUNDANCE					
Species	Fry	Small	Medium	Large	Jumbo
Crappie		Occasional			

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West-Other Species Chart

FORAGE SPECIES RELATIVE ABUNDANCE					
Species	Fry	Small	Medium	Large	Jumbo
Crappie			Occasional		

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Crappies



There are two species of crappie that can be observed in Texas, White Crappie and Black Crappie; both species are common throughout most of the state. They are differentiated most definitively by counting the number of dorsal spines (white 5-6, black 7-8). Crappies are demersal preferring deeper structure in open water; they exhibit a vertical migration pattern foraging near the surface at night feeding on small fish (with a strong preference for shad), aquatic insects and zooplankton. Crappie and Largemouth Bass can coexist quite harmoniously with proper management. Special considerations should be made to habitat and forage fish diversity, especially Golden Shiners and Threadfin Shad.

Fisheries Discussion

Overall the fisheries are in fair condition. Implementing core management practices and corrective stockings are recommended to improve the fisheries moving forward.

North Lake-

During the electrofishing survey 89 Largemouth Bass were collected, on average the bass were one percent below target weight when compared to state averages. Bass less than 13 inches were eight percent below target weight on average while bass greater than 13 inches were three percent above target weight on average. This suggests the bass population is somewhat imbalanced and would benefit from additional bass harvest.

When bass are below target weight there is some aspect of resource availability and or elevated competition for resources that results in underweight fish; typically in established lakes it is a combination of these two factors. When bass fall well below target weight for an extended period of time they can become stunted. This happens because the relationship between predator and prey abundance is imbalanced and there are too many fish competing for the same resources. The bass stop increasing in length as there is just enough resources to maintain them. Additional electrofishing surveys are recommended for harvest purposes.

Crappies and Warmouth Sunfish were observed in moderate densities during the survey. Both species are intermediate predators; they will compete with Largemouth Bass for resources and should be harvested when collected to reduce competition.

The forage fish population was in fair condition in terms of overall density but low in species diversity. Bluegills and Redear Sunfish of multiple age classes were observed in fair densities during the survey. Establishing a feeding program to maximize forage fish production should be considered; adult Bluegill that are fed an appropriate diet can produce over 25,000 eggs during a spawning event and spawn up to four times each year. When resources are inadequate fish have just enough resources for sustenance, growth and reproductive output are limited.

To diversify the forage fish population it is recommended that Threadfin Shad be stocked next spring. Shad are schooling fish that inhabit open water areas of the lake. Shad provide good contrast when compared to Bluegills which primarily occur along the shoreline providing the bass with potential prey items throughout the lake. This will allow the lake as a whole to carry a greater number of forage fish per acre. Before stocking the shad it is important that the lake be fertilized to stimulate a phytoplankton bloom. The phytoplankton bloom will give the water a green hue and will help shade out vegetation in deeper water. Phytoplankton are microscopic plants and are the foundation of aquatic ecosystems. Shad are filter feeders that feed on phytoplankton so improving their food resource will promote growth and reproduction. Fish fry also feed on the phytoplankton so the recruitment of newly spawned fish will be greater.

West Lake-

During the electrofishing survey 90 Largemouth Bass were collected, on average the bass were 12 percent below target weight when compared to state averages. The bass population is considerably more imbalanced here compared to the north lake-some individuals were 20 percent below target weight. Additional surveys aimed to harvest stunted bass are recommended.

The forage fish population was low in density and diversity. Bass harvest will be the most impactful management practice to help increase forage numbers, once the bass population is more desirable a Coppernose Bluegill stocking is recommended; this could be done in the fall. In addition it is recommended that the feeding program be established maximize forage fish production. Stocking Threadfin Shad to diversity the forage fish population should also be considered.

Also be advised that River Otters have become increasingly prevalent throughout Texas (especially east Texas). Otters are highly elusive nocturnal predators; they focus hunting efforts on larger individuals and can eat over seven pounds of fish each day. If any evidence of otters is detected immediate action is required.

We have not received the results from the water quality analysis. It is common for water in your region of Texas to be poor and need some level of corrective action. We will discuss the status of the water when the analysis is complete and make a recommendation if necessary at that time.

Management Recommendations

Our recommendations are summarized and listed in priority of importance in the following table. Management activities marked with an asterisk are of utmost importance and should be addressed before any other management occurs. A description of all recommended management activities appears below the table.

Lake	Harvest	Stock	Other Recommendations
North	400 bass <13"	Threadfin Shad (300#) Coppernose Bluegill (optional)	Fertilize spring 2020 Trap river otters Add fish feeders (optional)
West	650 bass <13"	Coppernose Bluegill (12,500) Threadfin Shad (optional)	Fertilize spring 2020 Trap river otters Add fish feeders (optional)

Costs

Lochow Ranch Pond and Lake Management offers a yearly management program that takes away all inconvenience for the landowner. Once a retainer client, we will come to the property once a month on average to service fish feeders, stock fish, clear ponds, fertilize and complete any other lake management chores including electro-fishing surveys and vegetation control. Our base fee of \$550 per month covers all labor and mileage charges with only materials being an additional cost. We can also provide services on a per-trip basis, which could be more economical if only a few visits per year are needed. Our current per-trip service rates and product prices mentioned are shown in the following tables.

SERVICE TYPE	RATE
Vegetation control	250.00 hour
Electro fishing	400.00 hour
Consulting	200.00 hour
Other management	200.00 hour
Mileage (one way)	4.00 per mile

ITEM	DESCRIPTION	PRICE
Coppernose Bluegill	Medium (2"-3")	0.60/fish
Threadfin Shad	Adult (2"-7")	25.00/pound
Automatic Fish Feeder	250 pound capacity	978.00

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Conclusion

Thank you for choosing Lochow Ranch Pond and Lake Management. We strive to provide the best service and advice to manage your fishery to its full potential. We hope that you will follow our plan and run the course with our long-term trophy-growing strategies. If so, you will have a quality, well-balanced fishery that continues to add value to your property.



Water Analysis Report

Customer	Glenwood Acres
Lake	North
Water Source	Lake
Water Use	Aquaculture

Parameter analyzed	Results					
	8/2/2019					
Calcium (Ca) ppm	3.0					
Magnesium (Mg) ppm	1.0					
Sodium (Na) ppm	11.0					
Potassium (K) ppm	5.0					
Boron (B) ppm	0.03					
Carbonate (CO3) ppm	0.00					
Bicarbonate (HCO3) ppm	44.0					
Sulfate (SO4) ppm	4.0					
Chloride (Cl) ppm	2.0					
Nitrate-N (NO3-N) ppm	0.18					
Phosphorus (P) ppm	0.03					
pH	6.4					
Conductivity umhos/cm	76.0					
Hardness grains CaCO3/gal.	1.0					
Hardness ppm CaCO3	13.0					
Alkalinity ppm CaCO3	36.0					
Total Dissolved Salts (TDS) ppm CaCO3	71.0					

ppm=parts per million=milligrams per liter



Water Analysis Report

Customer	<u>Glenwood Acres</u>
Lake	<u>West</u>
Water Source	<u>Lake</u>
Water Use	<u>Aquaculture</u>

Parameter analyzed	Results					
	8/2/2019					
Calcium (Ca) ppm	3.0					
Magnesium (Mg) ppm	1.0					
Sodium (Na) ppm	16.0					
Potassium (K) ppm	5.0					
Boron (B) ppm	0.03					
Carbonate (CO3) ppm	0.00					
Bicarbonate (HCO3) ppm	42.0					
Sulfate (SO4) ppm	5.0					
Chloride (Cl) ppm	3.0					
Nitrate-N (NO3-N) ppm	0.15					
Phosphorus (P) ppm	0.03					
pH	6.4					
Conductivity umhos/cm	83.0					
Hardness grains CaCO3/gal.	1.0					
Hardness ppm CaCO3	12.0					
Alkalinity ppm CaCO3	35.0					
Total Dissolved Salts (TDS) ppm CaCO3	75.0					

ppm=parts per million=milligrams per liter