RED HILLS
FISHERY

REPORT

G240220

Date: 10/20/24

Client: Holly's Fish Management Co.

Total samples: 35

How to Use This Report

This report is designed to serve as a tool for anglers and fisheries managers, offering detailed insights into strain identification, genetic trophy probability, and relatedness/diversity within Largemouth bass populations. By investigating these genetic factors, our report aims to empower you with the knowledge to make informed decisions about stocking strategies and management practices to improve your lake or pond. Understanding the genetic makeup and potential of your fish can significantly enhance the quality of fishing experiences, while also ensuring the long-term health and quality of your Largemouth bass population.

Each section of this report offers a brief discussion of methods and how to interpret results. The last section summarizes data for individual samples. As every lake or pond is a different ecosystem, it is always recommended to discuss these results with a management professional to build a plan tailored to your goals. Your feedback is invaluable in shaping our continued research and refining our efforts to better serve the bass community. We invite you to engage with us, share your experiences, and join us in working to ensure the preservation of bass fishing for generations to come.

For more details on genetic testing provided by Red Hills Fishery, please visit us at www.titanbass.com.

The results provided are only for use in lake and pond management strategies. Red Hills prohibits the use of this information in any breeding program without express written consent. For details on terms and conditions, please see www.titanbass.com/terms.

Summary

A total of 35 tissue samples were submitted for analysis. Below is a table highlighting findings for each category of analysis.

| **Strain Assignment**	**Trophy Probability**	**Relatedness & Diversity**
• 23 fish meet criteria as pure Florida. • 12 fish are hybrids. • Average hybrid is 65.7% Florida.	• Average likelihood for Florida bass is 8.6. • Maximum likelihood is 62.0. • 8 fish had high likelihoods. • 11 had elevated likelihoods. • 16 fish had average likelihoods.	• High level of relatedness observed with 27.4% of individuals being unrelated. • Diversity plot shows clustering among Florida bass.

Strain Assignment

Individual strain assignment for your Largemouth bass population is detailed at the end of this report with attention to three strains. Red Hills follows the State of Florida reporting standards and shows information on Northern Largemouth Bass (NLMB), Southern Largemouth Bass (SLMB), and Florida bass (SFLB). To be considered pure, an individual must be a minimum of 98.5% for a single strain. Traditionally, NLMB and SLMB have been grouped into a single category. For many managers NLMB (blue) and SLMB (yellow) can be combined as an overall classification of Northern bass.

Of your samples, 23 exhibit genetic purity as pure Florida Largemouth Bass. The remaining samples exhibited hybridization with a mean Florida genetic contribution of 65.7%. As the graph on the right shows, Florida genetics dominate your overall population. If your goal is to manage your water for more Florida influence, you are well on your way.

Strain by Population

■ NLMB ■ SLMB ■ SFLB
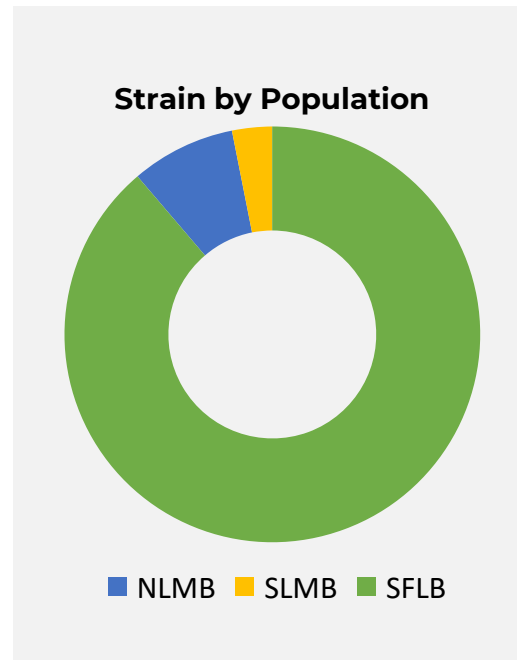
Trophy Probability

Red Hills has pioneered the development of 12 Single Nucleotide Polymorphism (SNP) markers specifically designed to identify the genetic trophy potential in Florida bass. These markers serve as a roadmap to gauge. the likelihood of trophy characteristics for a given fish and population. In genetics, likelihood refers to the probability of traits being exhibited in a population. For Trophy probabilities, Red Hills has developed likelihood scores that range from 0-100 with the average fish as 1. The table to the right shows categories designated for scores. To interpret likelihoods for your fish, consider the category. For instance, a score of 22 is 22 times more likely to be a trophy than the average fish and falls into the High likelihood category... which is good! **Currently, Red Hills considers these markers valid within pure strain Florida bass as their interaction with Northern genes is not fully understood**.

The Trophy potential of your fish is shown in the graphs on the right. For your overall population, 22.9% of your fish showed high, 31.4% showed elevated and 45.7% showed average likelihoods. The average likelihood of the pure Florida fish was 29 compared to an average of 11 for hybrids. Individual trophy potential is plotted in the final graph where colored lines mark thresholds for Elevated and Trophy categories. Your bass population exhibits good trophy potential with several fish above average, but there is always room for improvement. If your goal is a trophy fishery, you may want to explore management strategies to enhance your potential.
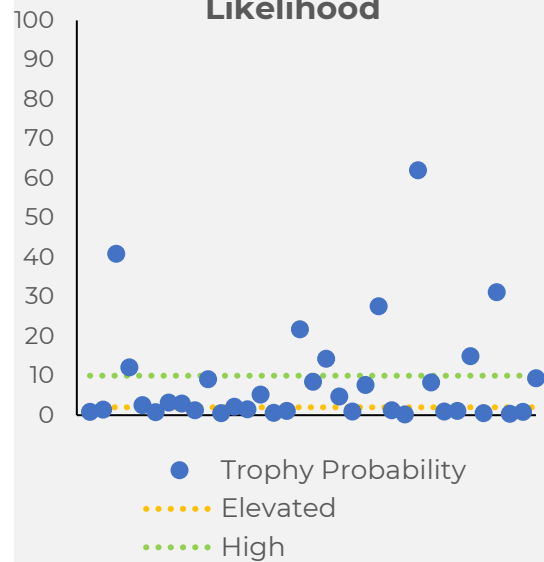
Score	Category
0-3	Average
3-15	Elevated
15-100	High

Population Trophy Likelihood
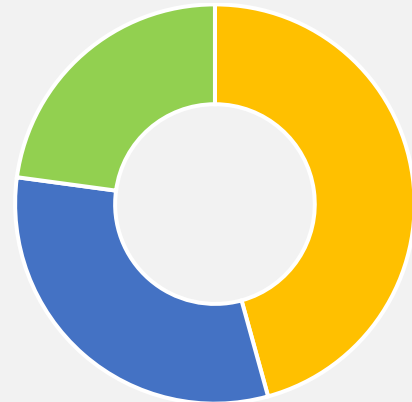
■ Average ■ Elevated ■ High

Individual Trophy Likelihood

● Trophy Probability
····· Elevated
····· High

The charts below are designed to give an indication of your population's Trophy Potential as compared to other private lakes and ponds Red Hills has analyzed in the Southeastern US. As Red Hills continues to analyze samples from customers, these charts will be updated to reflect additional information.

The overall data for samples from the Southeast is shown in green below and organized by strain. The means for your samples are shown in blue. Florida fish from your lake fall into the 94th percentile and the hybrids are in the 62nd. No pure Northern fish were observed in the sample set.

Florida Percentile Ranking
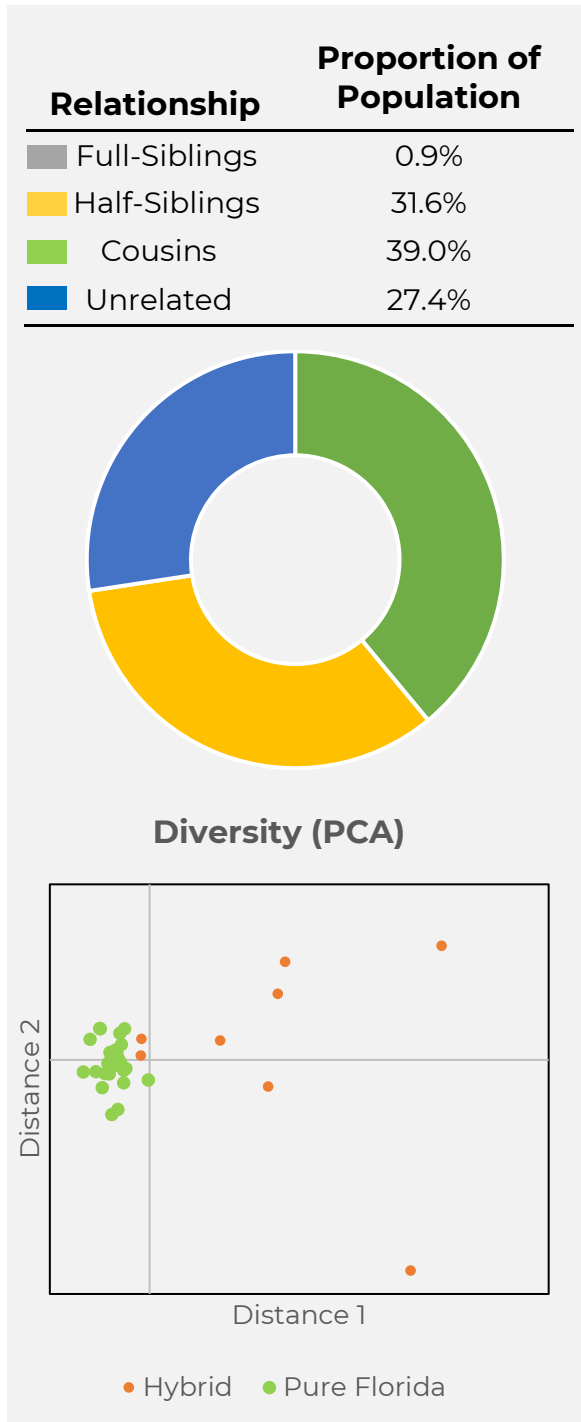

Hybrid Percentile Ranking
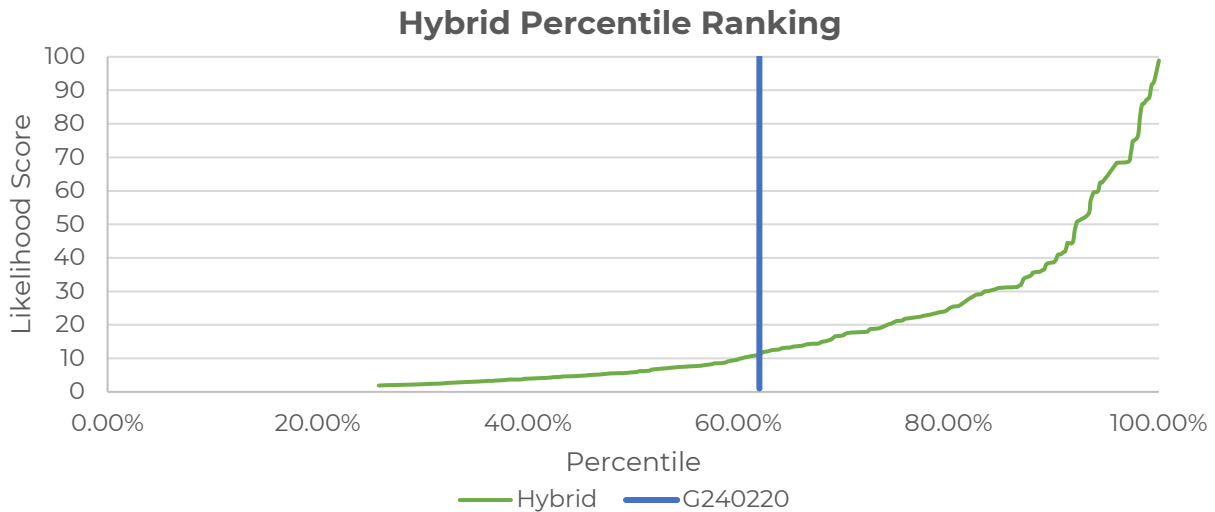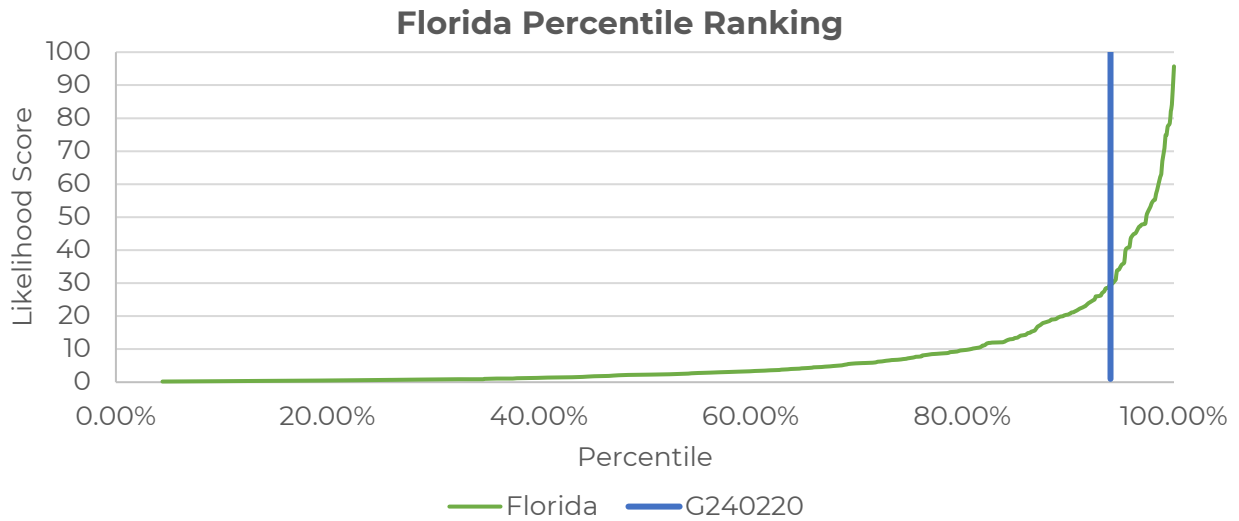
Relatedness and Diversity

Relatedness and Diversity are important metrics for managing any population. Too much relatedness among individuals can lead to inbreeding and decrease the long-term health of your bass. On the other hand, too much diversity can wash out desired traits over generations. The table to the right shows how your fish are related and proportions for the population. The Diversity plot at the bottom gives an indication of genetic distance for each individual analyzed.

Overall, your fish are predominately related with 72.6% displaying family connections. This is typical of a water body that has been stocked with a low diversity source. The diversity plot shows the two general populations of fish in your lake with Florida fish being tightly clustered to the left side of the graph and Hybrid fish loosely distributed throughout. Given this information, it is likely that native or long existing population of hybrid fish has recently been stocked with pure Florida genetics.

For managers interested in a long-term sustainable population, it is recommended that actions be explored to increase genetic diversity.

Relationship	Proportion of Population
Full-Siblings	0.9%
Half-Siblings	31.6%
Cousins	39.0%
Unrelated	27.4%

Diversity (PCA)

• Hybrid • Pure Florida

Individual Data

The table below details individual data for your fish and is associated with vial numbers as submitted. Strain percentages are shown according to State of Florida standards for Northen Largemouth bass (NLMB), Southern Largemouth bass (SLMB) and South Florida Largemouth bass markers (SFLB). Typically for all locations outside of Florida, NLMB and SLMB are combined as a single Northern Largemouth bass unit and SLMB is commonly known as a Florida bass. The ratio of markers is shown as a bar chart where NLMB=blue, SLMB=yellow and SFLB=green. Strain assignment is shown as either Pure NLMB, Hybrid or Pure SFLB where threshold for purity is set at 98.5%. Trophy Likelihoods are shown as a multiple of X with a possible range of 0-100. Red Hills denotes likelihoods above 3X to be elevated and above 15X to be a trophy. **Currently, Red Hills considers these markers valid within pure strain Florida bass as their interaction with Northern genes is not fully understood**. Likelihoods are shown with a color scale from red to green with a median value of 2.

Sample ID	NLMB	SLMB	SFLB	Strain Ratio	Strain Assingment	Trophy Probability
LMB2024_1871	19.77%	2.33%	77.90%		Hybrid	0.8
LMB2024_1872	0.10%	0.20%	99.70%		SFLB	1.4
LMB2024_1873	4.97%	20.13%	74.90%		Hybrid	40.9
LMB2024_1874	0.10%	0.20%	99.70%		SFLB	12.1
LMB2024_1875	9.70%	13.87%	76.37%		SFLB	2.5
LMB2024_1876	0.17%	0.30%	99.60%		SFLB	0.7
LMB2024_1877	50.37%	2.83%	46.80%		Hybrid	3.2
LMB2024_1878	0.10%	0.20%	99.70%		SFLB	2.9
LMB2024_1879	64.73%	1.23%	34.07%		Hybrid	1.2
LMB2024_1880	0.10%	0.20%	99.70%		SFLB	9.1
LMB2024_1881	0.30%	0.30%	99.40%		SFLB	0.5
LMB2024_1882	0.30%	0.60%	99.10%		SFLB	2.1
LMB2024_1883	1.37%	9.87%	88.77%		Hybrid	1.5
LMB2024_1884	0.10%	0.20%	99.70%		SFLB	5.2
LMB2024_1885	0.10%	0.20%	99.70%		SFLB	0.6
LMB2024_1886	0.10%	0.20%	99.70%		SFLB	1.1
LMB2024_1887	0.10%	0.20%	99.70%		SFLB	21.7
LMB2024_1888	0.10%	0.20%	99.70%		SFLB	8.4
LMB2024_1889	16.80%	4.93%	78.27%		Hybrid	14.3
LMB2024_1890	0.13%	0.30%	99.60%		SFLB	4.7
LMB2024_1891	0.13%	0.30%	99.60%		SFLB	0.9
LMB2024_1892	0.10%	0.20%	99.70%		SFLB	7.6
LMB2024_1893	3.00%	21.30%	75.70%		Hybrid	27.6
LMB2024_1894	0.10%	0.20%	99.70%		SFLB	1.2
LMB2024_1895	0.20%	0.30%	99.57%		SFLB	0.2
LMB2024_1896	15.17%	16.57%	68.23%		Hybrid	62.0
LMB2024_1897	0.10%	0.20%	99.70%		SFLB	8.3
LMB2024_1898	33.57%	11.80%	54.67%		Hybrid	0.9
LMB2024_1899	1.97%	9.73%	88.33%		Hybrid	1.1
LMB2024_1900	0.10%	0.20%	99.70%		SFLB	14.9
LMB2024_1901	0.47%	1.20%	98.33%		SFLB	0.5
LMB2024_1902	0.10%	0.20%	99.60%		SFLB	31.1
LMB2024_1903	64.73%	1.23%	34.07%		Hybrid	0.3
LMB2024_1904	0.13%	0.30%	99.60%		SFLB	0.8
LMB2024_1905	30.07%	3.57%	66.33%		Hybrid	9.3