

S U M M A R Y R E P O R T



Lehigh Spring

Lee County, Florida

HISTORIC LEHIGH SPRING

Located in the Lehigh Acres area of Lee County, Florida, Lehigh Spring is an historic sinkhole dating back to at least 1943. Formerly called Still Lake, it is the only known natural sinkhole in Lee County. The lake was depth sounded in May of 1943 at 208 feet.

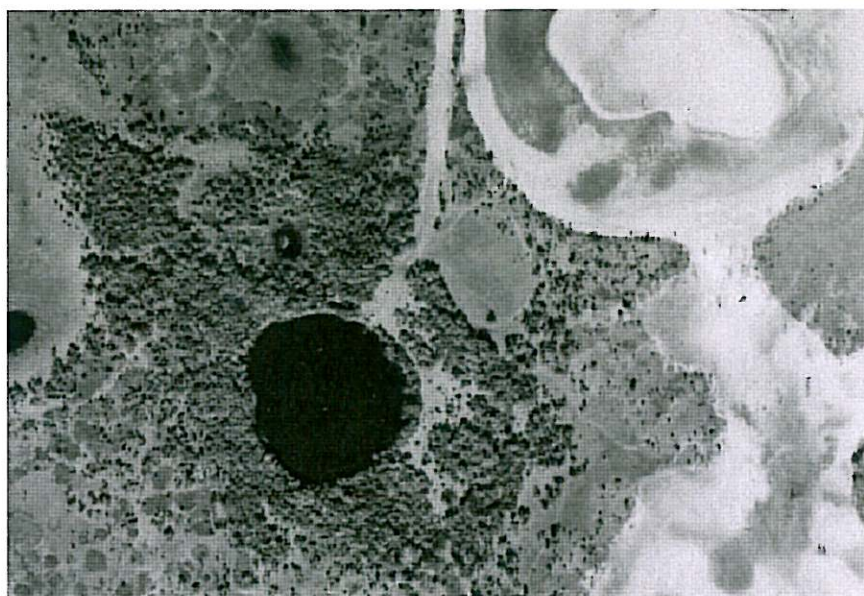
The site is currently undeveloped but has been approved for up to 100,000 square feet of commercial development. This report contains information from a recent exploration of the lake. Evidence supports the age of the lake going back thousands of years and further investigation appears warranted.

The property has the potential for passive recreation and is dominated by mature growth oaks. Unfortunately, the air potato vine has taken hold and has covered portions of the existing native vegetation. If left unchecked, this invasive vine could smother much if not all of the old growth trees on site.

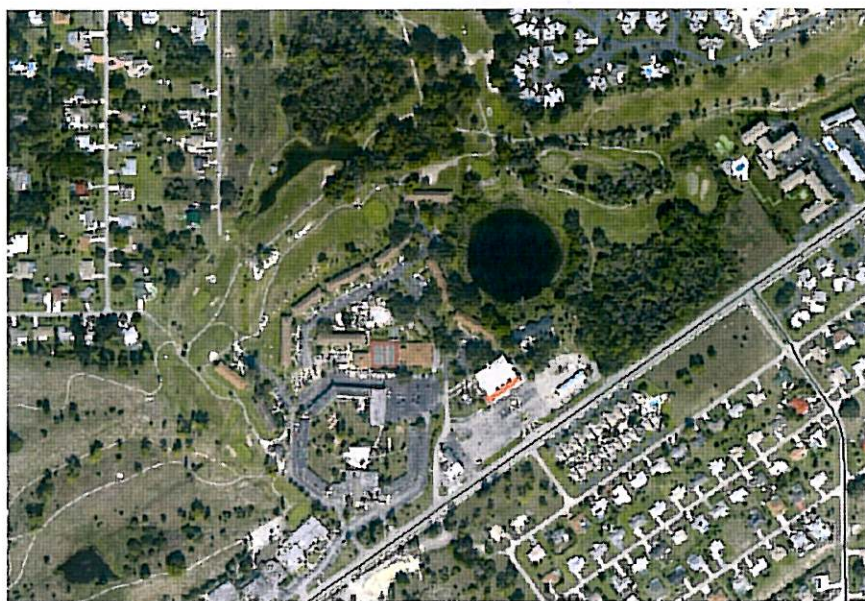
As a historic inland source of fresh water, to a marketing opportunity in the development boom of the 50's and 60's, the potential for Historic Lehigh Spring is waiting to be unlocked.



1944



1953

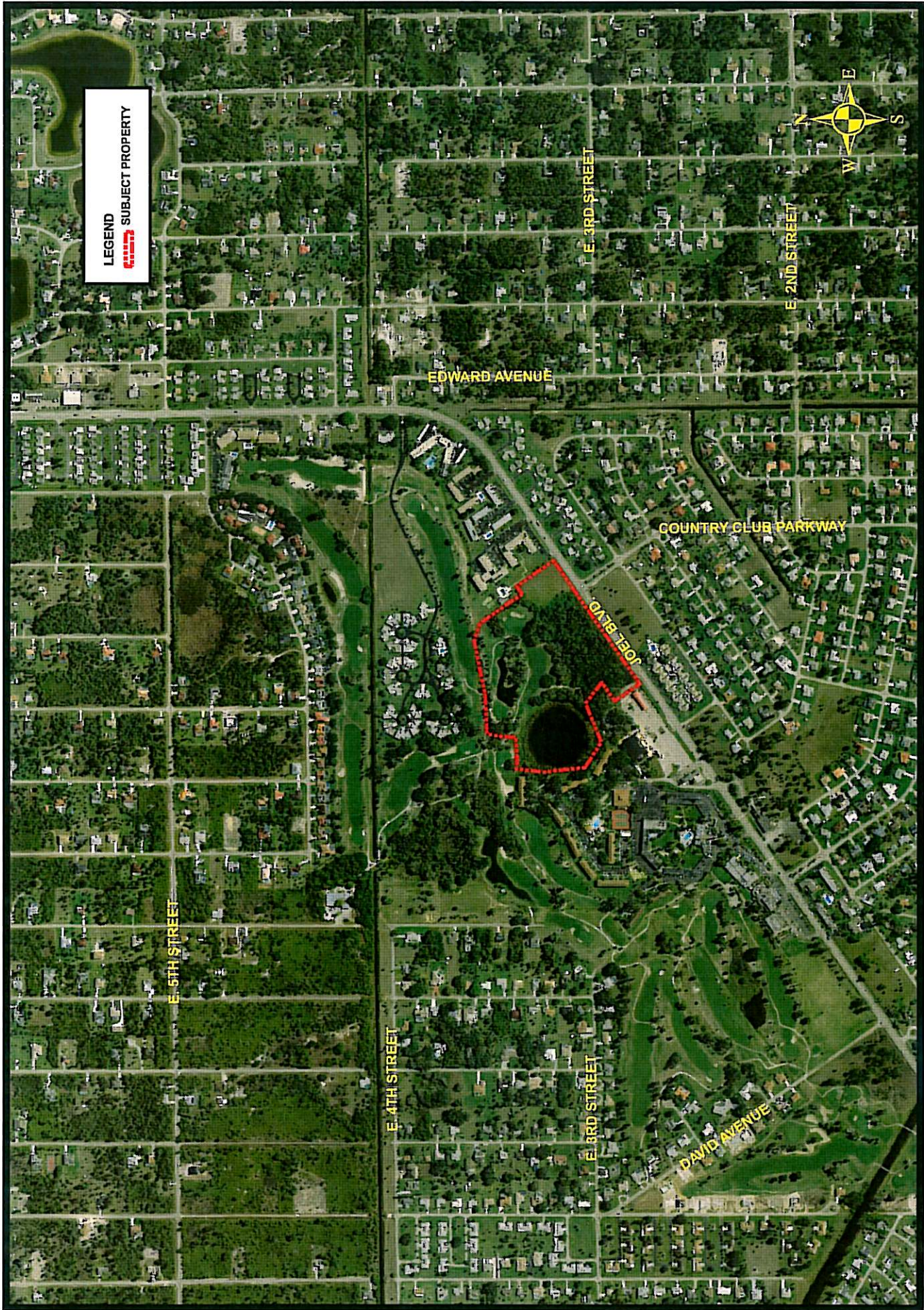


2008

Recreational opportunities on **Lehigh Spring** as depicted on this postcard
(date unknown)



LOCATION MAP



FLINT'S PAVILION AREA LOCATION MAP

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 3530 KRAFT ROAD, SUITE 301 NAPLES, FLORIDA 34105
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 DAVIDSON COMPANY ID. NO. 00009496

0 700 1,400 Feet

AERIAL PHOTO



1975 USGS REPORT
(Excerpts with references to Lehigh Spring,
fka Leeland Lake)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

A RECONNAISSANCE OF HYDROGEOLOGIC CONDITIONS IN
LEHIGH ACRES AND ADJACENT AREAS OF
LEE COUNTY, FLORIDA

By

D. H. Boggess
and
T. M. Minner

Open File Report

75-55

Prepared by the
U.S. GEOLOGICAL SURVEY
in cooperation with
THE FLORIDA DEPARTMENT OF NATURAL RESOURCES,
BUREAU OF GEOLOGY
and the
BOARD OF COUNTY COMMISSIONERS OF LEE COUNTY

Tallahassee, Florida
1975

SURFACE WATER

Three natural streams, the Orange River, Hickey Creek and Bedman Creek, drain most of the report area. Each of these streams discharge into the Calposahatchee River. Since 1958, more than 150 miles (241 kilometres) of drains (canals) have been constructed by the East County Water Control District. These drains are connected to the natural streams. Figure 16 shows the location of the drains, surface-water sampling sites, and other monitoring stations.

Fig. 16
near
here

Topographic maps define numerous shallow basins in the report area. Many of these basins contained water when these maps were prepared. The largest of the basins, Halfway Pond, is in the southern part of the report area. A small circular pond, Leeland Lake (fig. 16), is a sink-hole, the only one known in Lee County. This lake has been sounded to a depth of 208 feet (64 metres).

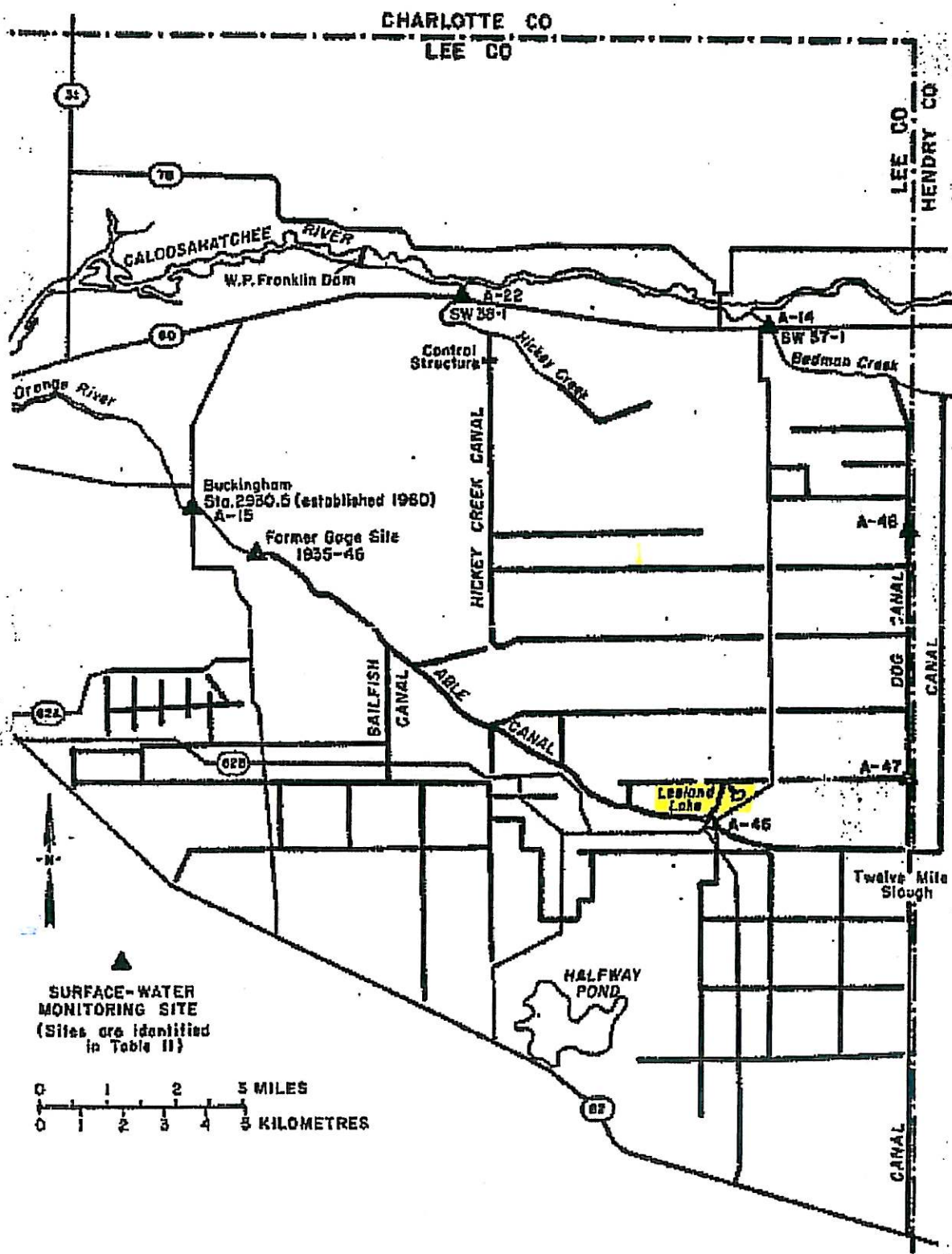


Figure 16.--Lehigh Acres and adjacent areas showing surface water features and monitoring sites.

Leeland Lake

Leeland Lake, formerly called Still Lake, is a funnel-shaped, nearly circular sink (fig. 16). It is the only known sinkhole lake in Lee County. In May 1943, the lake was sounded to a depth of 208 feet (64 metres) and was about 600 feet (185 metres) in diameter. Aerial photographs show that in April 1972 the diameter of the lake was only about 420 feet (130 metres). The decrease in diameter reflects a lower lake level.

Miscellaneous measurements of the lake stage indicate a seasonal range in fluctuation similar to the water table. Between October 30, 1969 and April 29, 1971, the lake stage declined about 5.6 feet (1.7 metres). Records for well L-728 (water-table aquifer) show a water-level decline of 4.9 feet (1.5 metres) over the same period. Between April 29 and June 28, 1974 the lake level rose about 6.2 feet (1.9 metres) and the water level in well L-1137 (water-table aquifer) rose 5.3 feet (1.6 metres) as a result of heavy rainfall in May and June.

The water in Leeland Lake is of good quality (table 12). The water is more nearly similar to water from the sandstone aquifer than from the water-table aquifer. The concentrations of most chemical constituents were higher in 1974 than in 1943, the greatest increase occurring in the sulfate concentration.

Table 12.--Chemical analyses of water from Leeland Lake.
(Chemical constituents in milligrams per litre)

	May 11, 1943/ ¹	Feb. 13, 1974
Silica (SiO ₂)	6.7	9
Iron (Fe)	.03	.11
Calcium (Ca)	52	77
Magnesium (Mg)	9.9	22
Sodium (Na)	30	53
Potassium (K)	1.4	4.2
Bicarbonate (HCO ₃)	192	165
Sulfate (SO ₄)	6.3	120
Chloride (Cl)	52	93
Fluoride (F)	0.1	0.2
Dissolved solids	253	460
Hardness as CaCO ₃		
Calcium-magnesium	170	280
Non-carbonate		150
Specific conductance		814
pH	7.1	7.1
Color	22	10

¹A Kenner and Brown, 1956, p. 66

Leeland Lake, because of its depth, could be hydraulically connected to both the water-table and sandstone aquifers. At the lake, the water-table aquifer probably extends to a depth of about 20 feet (6 metres) and the sandstone aquifer probably occurs between 60 and 120 feet (18 and 37 metres) below land surface.

Inasmuch as the water level in the water-table aquifer is several feet higher than the water level in the sandstone aquifer, water should move from the water-table aquifer into the lake and from the lake to the sandstone aquifer. The available evidence, however, indicates a lack of such movement. Temperature measurements made on May 11, 1943 showed a general decrease in temperature from 22°C (72°F) at 18 feet (5.5 metres) beneath the surface to 20°C (68°F) at a depth of 165 feet (51 metres). The distribution of chloride concentrations, ranging from 51 to 55 mg/l through the same depth interval, was relatively uniform. Measurements made on October 17, 1973 indicated the same general conditions as earlier, but a greater difference in temperatures with a decrease from 28°C (83°F) at a depth of 15 feet (4.6 metres) to 20.5°C (68°F) at a depth of 150 feet (46 metres).

Most lakes and ponds in Lehigh Acres are hydraulically connected to the water-table aquifer. Thus, factors which affect one, also affect the other. In 1974, the water level in Halfway Pond the largest shallow pond in the area, apparently declined at a rate similar to well L-730 where the water table fell nearly 5 feet (1.5 metres). The pond, nearly dry in April 1974, recovered to a high level in July as a result of heavy rainfall in May and June.

Leeland Lake, the only known sinkhole lake in Lee County, is about 208 feet (64 metres) deep. The lake stage apparently fluctuates seasonally similar to the water table. The long-term range in fluctuation is about 6 feet (1.8 metres). Because of its depth, Leeland Lake may be hydraulically connected to both the water-table and sandstone aquifers. The water quality however, is more nearly similar to water from the sandstone aquifer.

Theoretical drawdown curves developed for conditions in Lehigh Acres, indicate that drainage canals could affect ground-water levels for a distance of 6,000 feet (1,800 metres). However, these theoretical curves provide no information on the actual water-level declines resulting from the construction of canals.

The available information on the hydrology and geology of Lehigh Acres and adjacent areas is inadequate for many purposes. Information is needed to define the source and area of recharge to the sandstone aquifer, to define the aquifer characteristics of transmissivity and storage, and to determine water quality. More detailed information is required to evaluate the effects of canal construction on ground-water levels and the flow regime and water quality of streams in the area.

THREATS

The site is heavily vegetated but is threatened by the invasive air potato vine. The site was investigated by arborist Ralph Jimison on September 9, 2008 and a detailed analysis of the existing heritage trees as well as the existing exotic infestation was performed.

Air potato is an herbaceous, twining vine that can grow to lengths exceeding 60 ft. (18 m). It invades open areas in the sub-tropical southeastern United States. The leaves are alternate, 8 in. (20.3 cm) long, broadly-heart shaped with prominent veins that resemble greenbrier leaves. The rounded stems are thin and wiry. The chief means of reproduction are aerial, potato-like tubers (bulbils) located at the leaf axils. The vine rarely flowers. *Air potato can form dense masses of vines that cover and kill native vegetation including trees within a variety of habitats such as forest edges, hammocks, and many disturbed areas.* It was introduced from Africa for food and medicinal purposes in the early 1900s and is a common, widespread food crop throughout most tropical regions of the world.



View from Joel Blvd.



Mature Oak



Early Stage of Air Potato growth



Advancing Stages



Starting to cover tree Canopies



Nearing domination of Native species

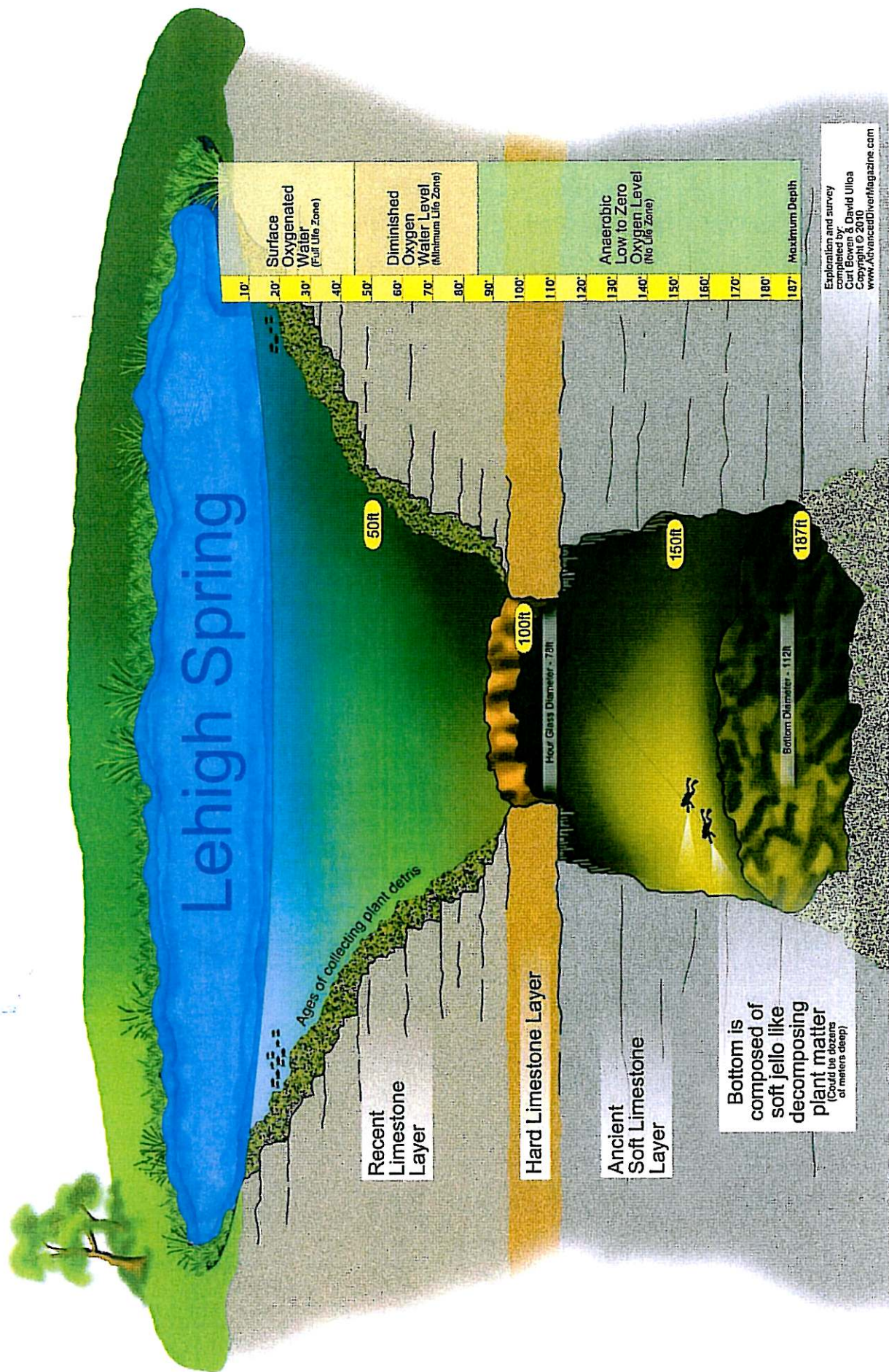


Domination of Natives—Note the lack of any Canopy

SITE EXPLORATION

A team consisting of professional divers and videographers along with representatives of Davidson Engineering performed a cursory exploration of the sinkhole in April of 2010. Recent documents uncovered by the project engineer indicated an approximate depth of 208 feet and identified the site as the only sinkhole known to exist in Lee County. Sinkholes of this size and depth are very rare in Florida with no other known locations in Southwest Florida.

Divers trained to work at extreme depths and low visibility conditions were brought in to document the physical characteristics of the sinkhole. The depth and general dimensions of the hole were established as part of the dive, resulting in the graphic you see on the next page. The second graphic is most telling when viewed in concert with information provided in an e-mail (attached) by Curt Bowen, CEO of Advanced Diver Magazine. Mr. Bowen's vast experience with sinkholes in Florida led him to believe after the initial dive on the site that this sinkhole may be one of the oldest open sinks known.



Exploration and survey
conducted by
Carl Beards & David Ullio
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www.AdvancedDiverMagazine.com

Jeremy C. Sterk

From: Curt Bowen [curtbowenadm@gmail.com]
Sent: Monday, April 19, 2010 12:00 PM
To: Jeremy C. Sterk
Subject: Another Leeland Lake Illustration

http://curtbowen.smugmug.com/Cave-Exploration/Leeland-Lake/11852565_oCcpv#841576936_HoCFH

Above is a url for some illustrations I created of the underwater survey we conducted at Leeland Lake. (please pass on to others)

All possible discoveries would actually be determined on how old the sinkhole is?

From my extensive experience over the last 25 years exploring places such as this sink I am thinking it could possibly be one of the oldest open to surface sinks known.

I draw this from the flat bottom that has been completely filled in with plant sediments. All newer sinks develop a debris cone in their center from falling in material of the generations. This sink has been open long enough for the debris to overtake and bury the cone. Of course this could be assisted from the anaerobic conditions of the water and the lack of plant breakdown or if the original subsurface cavern was small to begin with.

But, other sinks that contain the same anaerobic nature as Leeland Lake still contain a large cone, such as warm mineral springs and little salt springs located in Northport, Florida.

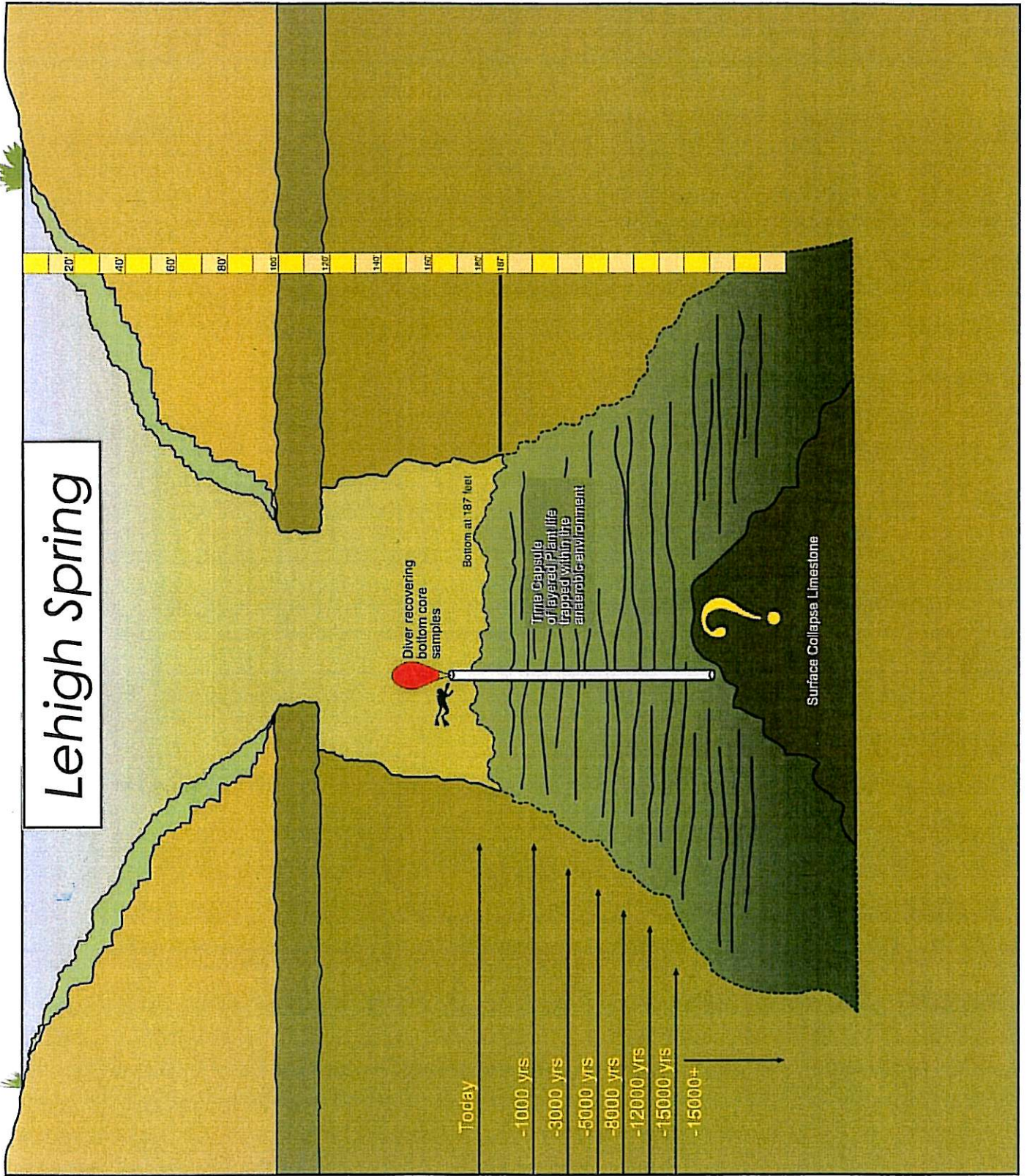
I feel a core sample from the bottom may teach us many things about the age of this sink and possibly the climate of Florida over the past 15,000 years or more?

If the sink were dated prior to the ending of the last ice age, it would definitely contain extinct animal remains deep within the bottom sediment.

--

Curt Bowen
Publisher CEO-ADM
Owner - CEO Rebreatherworld.com
www.AdvancedDiverMagazine.com

Lehigh Spring





Sunfish and Turtles living near the surface of the sinkhole.

Diver using rebreather to permit increased bottom time at extreme depths.

Initiating survey of the sinkhole to prepare a profile drawing.



Touch-probe of silt on slopes and bottom of sinkhole. Detris is very thick and of unknown depths in most areas of the sinkhole.



Edge of Limestone wall at 90' depth. Beginning of opening into lower cave, rock layer is approximately 12' thick before opening into the larger cavern below.

Algae growth feeding on sulphur in lower cavern.



Bottom of sinkhole at 184 feet. Actual depth may be much greater due to accumulation of detritus on the bottom.



Survey method along the bottom and other areas to create a profile of the sinkhole.

Fossils discovered at 20' depth near exposed rock. Further exploration of detris is likely to yield additional findings providing clues to the age and function of this sinkhole.



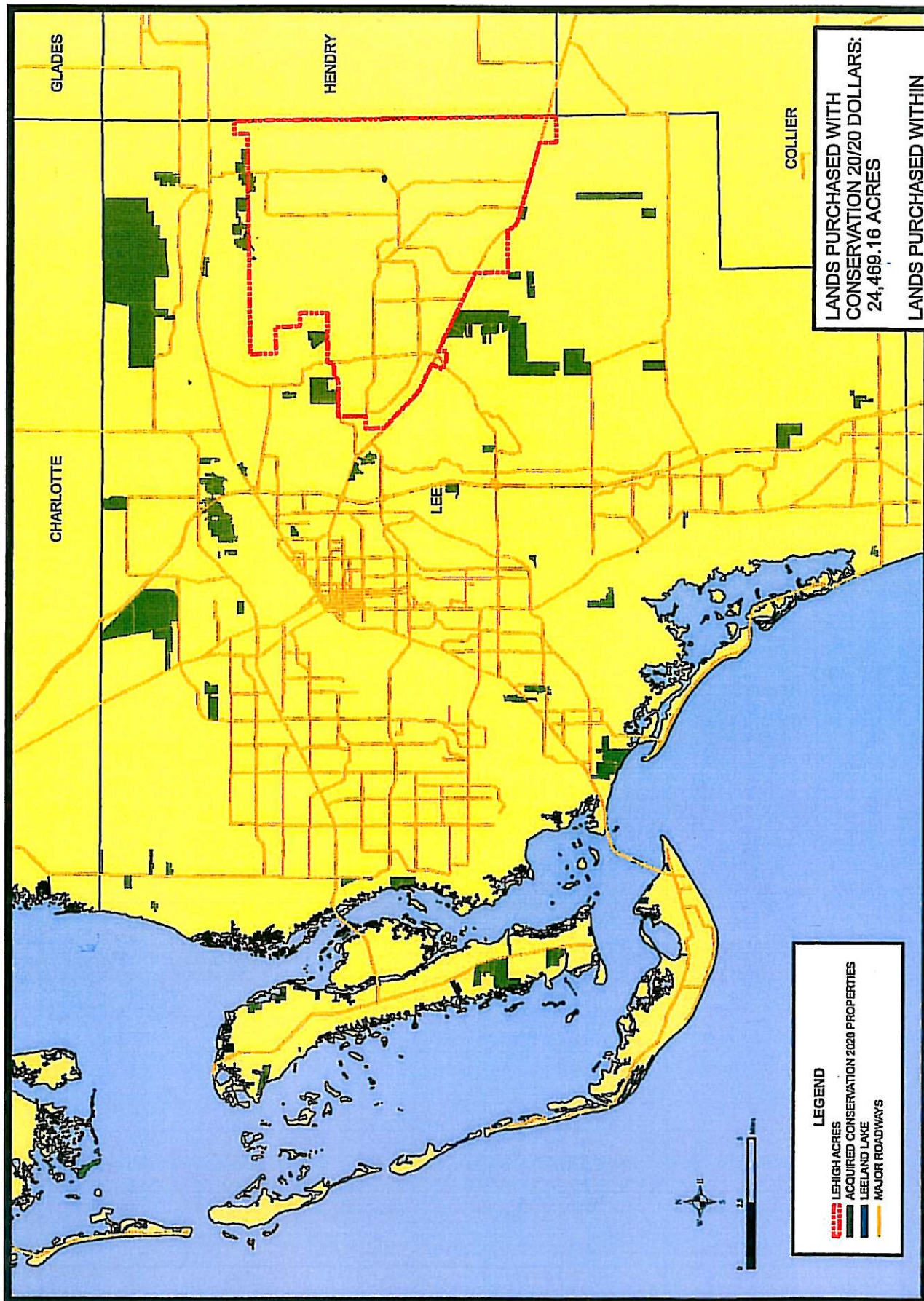
Final decompression stop at end of dive.

CONCLUSIONS

Lehigh Spring may very well be a forgotten gem lying quietly in East Lee County, waiting to be rediscovered - again. With a history dating back thousands of years, it represents a rare opportunity to secure something that has been a part of the physical landscape longer than even the wetland systems we strive to preserve today. Once viewed as a recreational opportunity during the infancy of Lehigh Acres, Lehigh Spring's depths may very well contain items of far greater significance, unlocking the history of the area for years or even decades to come.

It is a long standing natural resource and potentially one of cultural significance. Whether as a recreational opportunity as it was intended in the 50's and 60's or something even more significant to the history of Lee County, Lehigh Spring represents the opportunity to preserve and secure for generations a natural asset that pre-dates all of us here in Southwest Florida.

Combined with the adjacent open area (a former golf hole) and the mature growth oaks on site, the site represents a unique opportunity to provide for both passive and active recreation for the citizens of Lee County.



LANDS PURCHASED WITH
CONSERVATION 20/20 DOLLARS:
24,469.16 ACRES

LANDS PURCHASED WITHIN
LEHIGH ACRES:
115.27 ACRES OR 0.0029%

LEGEND

- LEHIGH ACRES
- ACQUIRED CONSERVATION 20/20 PROPERTIES
- LEELAND LAKE
- MAJOR ROADWAYS

CONSERVATION 20/20 ACQUISITIONS

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