Lee County
SOUTHWEST FLORIDA

INTEROFFICE MEMORANDUM
FROM
PUBLIC WORKS
NATURAL RESOURCES MANAGEMENT

Date: June 30, 2010

TO: Lynda Thompson
Conservation 20/20 Program Coordinator

From: Lee Werst and Tony Pellicer
Title: Natural Resources Division Hydrogeologist and Operations Manager

SUBJECT: Nomination 471 - Leeland Lake Sink Hole

Some necessary background to understand how sinkholes are formed.

Sinkholes are a common feature of Florida's landscape. They are only one of many kinds of karst landforms, which include caves, disappearing streams, springs, and underground drainage systems, all of which occur in Florida. Karst is a generic term which refers to the characteristic terrain produced by the erosion process associated with the chemical weathering and dissolution of limestone or dolomite, the two most common carbonate rocks in Florida. Dissolution of carbonate rocks begins when they are exposed to acidic water. Most rainwater is slightly acidic and usually becomes more acidic as it moves through decaying plant debris.

Limestone in Florida is porous, allowing the acidic water to percolate through the strata, dissolving and carrying it away in solution. Over eons of time, this persistent erosion process has created extensive underground voids and drainage systems in much of the carbonate rocks throughout the state. Collapse of overlying sediments into the underground cavities produces sinkholes. Water is nature's universal solvent. More minerals and compounds dissolve in water than any other solvent. Rain contains less minerals than groundwater. It has little buffering capacity due to its low mineral composition. The effect of the solubility of soft rock into rainwater is subtle. As water contacts the soft limestone, small amounts of the limestone dissolves into the water making the groundwater more mineralized.

Sinkholes can occur in the beds of streams, sometimes taking all of the stream's flow, creating a disappearing stream. Over time, as water flows over any given rock structure, it carries away small, even minute amounts of dissolved rock with it. Over hundreds of years the cumulative effect is small openings are formed in the soft rock. The effect carried out over millions of years is the formation of connected openings to form small tunnels or channels. These channels allow more water to move across the exposed rock face which results in a more rapid dissolution of the rock and larger tunnels into what we see today as caves. Dry caves are parts of karst drainage systems that are above the water table.

Reasons to protect this regionally unique geological feature:

The nomination of this parcel of property is not only good for the scientific value it has to offer not only to the Lehigh Acres residents but the rest of Lee County and visitors. The Leeland Lake is a window to a potable aquifer system utilized by a majority of Lehigh Acres and the all users within the DRGR. This Sink was created as Florida rose from the ocean and is not a result of drought and extreme conditions that are usually man and nature induced, similar to what we hear about in the Orlando area. As the southern section of Florida was rising out of the ocean there were record level change in the oceans, that combined with persistent erosion from rainfall created a karst condition.

This unique occurrence is not as common in South Florida, with that in mind it may have not been afforded the protection previously that it deserves. This open window to our drinking water supply is open to pollutants also. I would ask you to think about a parking lot or a golf course and the pesticides, fertilizers and herbicides that are associated with them, then add a stormwater event. Would you want to drink water that came from potable wells that surround the sink? If 20/20 dollars purchased this parcel you would be doing your part to help protect this rare natural occurrence and the future water supply for our residents of Lehigh Acres and the Density Reduction Groundwater Resource (DRGR) area.

I support the nomination of this parcel of property for the following scientific, aesthetic and public purposes:

1. This is a distinctive occurrence in South Florida
2. This is a unique feature in Lee County
3. It has not previously been afforded the protection it deserves
4. It is an open window directly connecting surface pollutants to the drinking water supply