

MINUTES OF WAKULLA WATER CLARITY MEETING

April 16, 1992

Attendees: Hal Davis (Water Resources section USGS); Jay Johnson (NFWMD), Dana Bryan (DNR Biologist), Alan Whitehouse (Wakulla Biologist), Phil Leeser (District 2 Manager), Jon Dodrill (District 2 Biologist), Wes Skiles (Karst Environmental Services), Steve Irving (Woodville Karst Plain Project), Greg Knecht (Woodville Karst Plain Project), Sherwood Sheily (FSU Academic Diving Underwater Speleology), Dr. Ken Osmond (FSU Geology), Frank Rupert (DNR Geology), Tom Morris (Biologist, cave diver). *Jim Stevenson*

This was the second of a series of meetings to discuss water clarity and quality issues as they may affect Wakulla Springs State Park. Initial discussion centered around what exactly may be causing the color shift from clear to tannic water at Wakulla Springs. FSU Geologist Dr. Ken Osmond briefly summarized the work of his grad student Melana Maceish. She utilized uranium isotopes as a tracer, hypothesizing that there were differences between waters in the wakulla area and waters to the north which could be determined by differences in isotopic ratios. Most isotopic signatures taken from Wakulla 1987 project water samples collected in various Wakulla cave tunnels suggested a deep water source. The exception was "A" tunnel which at times goes tannic. Supposedly the isotopic signature from this tunnel was similar to those in the Leon Sinks area. Some rough estimates Melana made suggested that based on the isotope analysis, A tunnel contributed about 75% of the water and the various other tunnels about 25%. Those present who had dived the tunnels at Wakulla agreed that tunnels B, C, and F were generally clear and were a deep groundwater source. "A" tunnel varied in visibility, suggesting a surface water source. Although D tunnel was observed clear, it was not known if this tunnel varied in visibility. None of the tunnels have been evaluated for comparative visibility during periods of poor visibility in the spring itself.

Jon Dodrill and Hal Davis felt that periodic pulses of tannic water in delayed response to heavy rainfall were events that may have always occurred at Wakulla. Alan Whitehouse said he would attempt to locate the financial records which the Ball Operation must have kept on glass bottom boat revenue generation and try to decipher information on down boat days from before 1987. 1987-1991 rainfall/boat down days data graphed by Alan Whitehouse shows an increase in consecutive down boat days due to poor visibility apparently in delayed response to peak rainfall periods especially during months exceeding 14 inches of rain. This occurred both summer and winter but high rainfall events during winter when evapotranspiration is reduced may have a stronger effect.

There was some discussion about tannic water pulses. A

possible scenario for Wakulla is that when a heavy local and regional rainfall occurs, the spring, in response to the local rainfall component quickly gets darker but then clears up. Meanwhile a plug of tannic surface runoff has entered the system from some distance away at one or more likely multiple points and is pushing the clear water in front of it. Wakulla once again becomes clear until the plug of tannic water shows up, whereupon the spring darkens for days or weeks at a time, depending upon the extent of the pulse. I recall in November 1991 that the boat drivers were complaining about the spring turning greener when there had been no local rainfall in the vicinity of Wakulla.

Davis felt that intermittent streams which flowed from the west out of the Apalachicola National Forest were a possible source of tannic surface water into the system. These streams included Fisher, Black, Lost, and Jump Creek. They may intercept the extensive system of subaquatic conduit known as the Leon Sinks cave network which extends over 50,000 feet continuously from southern Leon County southward in the general direction of Indian or Wakulla Springs. Most of this system periodically goes tannic for varying periods at about the same time as does Wakulla Springs.

Davis felt that there was nothing that could be done to modify natural stream drainages. There was also a general feeling that best forestry management practices in the Apalachicola National Forest are probably better than they were 40 years ago when Wakulla springs was rumored to have been clearer.

The Woodville Karst Plain Project has recently located a new karst window, Turner Sink, and has been able to continue exploration of the Leon Sinks subaqueous cave system. Over the last two years they have pushed the exploration limits of the system another 7,700 ft. southward from the former southern terminus at Whiskey Still Sink. Visibility is currently restricted to 10 feet so they are awaiting better conditions.

Alan Whitehouse reported little success with a regular secchi disc in qualitatively determining cutoff points for glass bottom boats running. He darkened up the disc some since the original disc could still be seen at considerable depth when it wasn't worthwhile running the boats. Wes Skiles said secchi disks and turbidity measurements were no good for looking at variations in water clarity and the human eye could almost do it better. Jim Stevenson asked Whitehouse and Dodrill to look into state of the art instrumentation that could measure color changes in water. Jay Johnson (NFWFMD) said his agency had hundreds of water level readings for the Wakulla at the warehouse and possibly this could be correlated with water clarity in some fashion.

Discussion turned to other water quality issues and the role Munson slough may play in channeling degraded water from

Tallahassee southward. There was mention by cave divers that below 8 mile pond the slough went underground in the vicinity of Ames Sink. Little underground exploration has occurred here because of the difficult conditions. A recommendation was made for the City (Bill Lesman) as well as DER and the Forest Service to be represented at these meetings.

Concern was raised about groundwater removal from the aquifer and effects on flow rates of springs. Wes Skiles said that Homossassa springs was reduced to 50% of its historic flow rate. In coastal areas there is a potential for saltwater intrusion. Historic springs in Tampa Bay have completely disappeared due to flow reduction.

Frank Rupert and Hal Davis felt that tannic pulses may be coming from as far away as southern Leon County. Rupert said that as far back as 1918, the geologist Sellers suggested an association of Fisher Creek with Wakulla. A 1906 soil survey shows Fisher Creek labeled as Wakulla. Fisher Creek is tannic water when it flows but supposedly doesn't flow with enough velocity to carry with it much sediment.

Hal Davis felt there were three main sources of water for the Wakulla Region: the Red Hills drainage running southward along the potentiometric gradient all the way from south Georgia, the pine flatwoods of the Apalachicola National Forest to the West, and rainfall on the Woodville Karst Plain itself. He felt the Tallahassee Red hills were not a source of tannic water. He said that clays 40-100 ft. thick are a good filter. They are semi impermeable and water may take months or even several years to reach the aquifer through the clay lens. The Apalachicola area to the west is also a high recharge area with a moderate amount of clay overlain by sand. Water falling in the Woodville Karst Plain probably moves rapidly through the sand veneer into the aquifer. This may be why upstream Sullivan is consistently clear- because it lies in a big sandy area, with rainfall moving so rapidly through the soil that it doesn't have a chance to pick up organics.

After the formal meeting, Wes Skiles and Tom Morris reported they had been at Jackson Blue testing rebreathers for Bill Stone. Stone will be marketing these commercially "sport" models eventually available to the recreational diving public. The rebreathers are now reduced in size, not redundant, (a conventional scuba tank system will provide the bailout redundancy), and will allow divers to go from trimix, to nitrox, to oxygen, without ever taking the regulator out of their mouths. The next Wakulla Project using these rebreathers will probably be pushed back to 1994.

c: Phil Leeser
Jim Stevenson ✓
Dana Bryan

for Dodwell