

## Overview of Geneva Lens Water Quality and Levels Monitoring Conducted by the St. Johns River Water Management District (SJRWMD)

The Geneva Lens is a unique hydrologic resource as well as a valuable resource protected through Florida Statutes Chapter 373.4597. It is a portion of the Floridan Aquifer that forms an isolated, freshwater lens surrounded by nonpotable water. The Lens covers approximately 26 square miles and is bounded by the St. Johns River and Lake Harney on the north and east, the Econlockhatchee River to the south, and Lake Jesup to the west. Please see Map 1, which shows the land cover of the Lens from aerials photographed in 2000. In 1993, the Geneva Freshwater Lens Taskforce completed a report to the State Legislature identifying the effectiveness of



existing programs and recommending corrective actions for any deficiencies discovered. These recommendations included water quality and quantity monitoring. The SJRWMD has been monitoring such water data from test wells and has provided this data to Seminole County. The data include results from eleven Floridan Aquifer monitoring wells, shown in Map 2, located in and around the Lens. Table 1 provides information on these wells including casing, well depth and well location. Data collected include chloride (CL) concentrations and water levels. Map 2 also shows additional wells in and

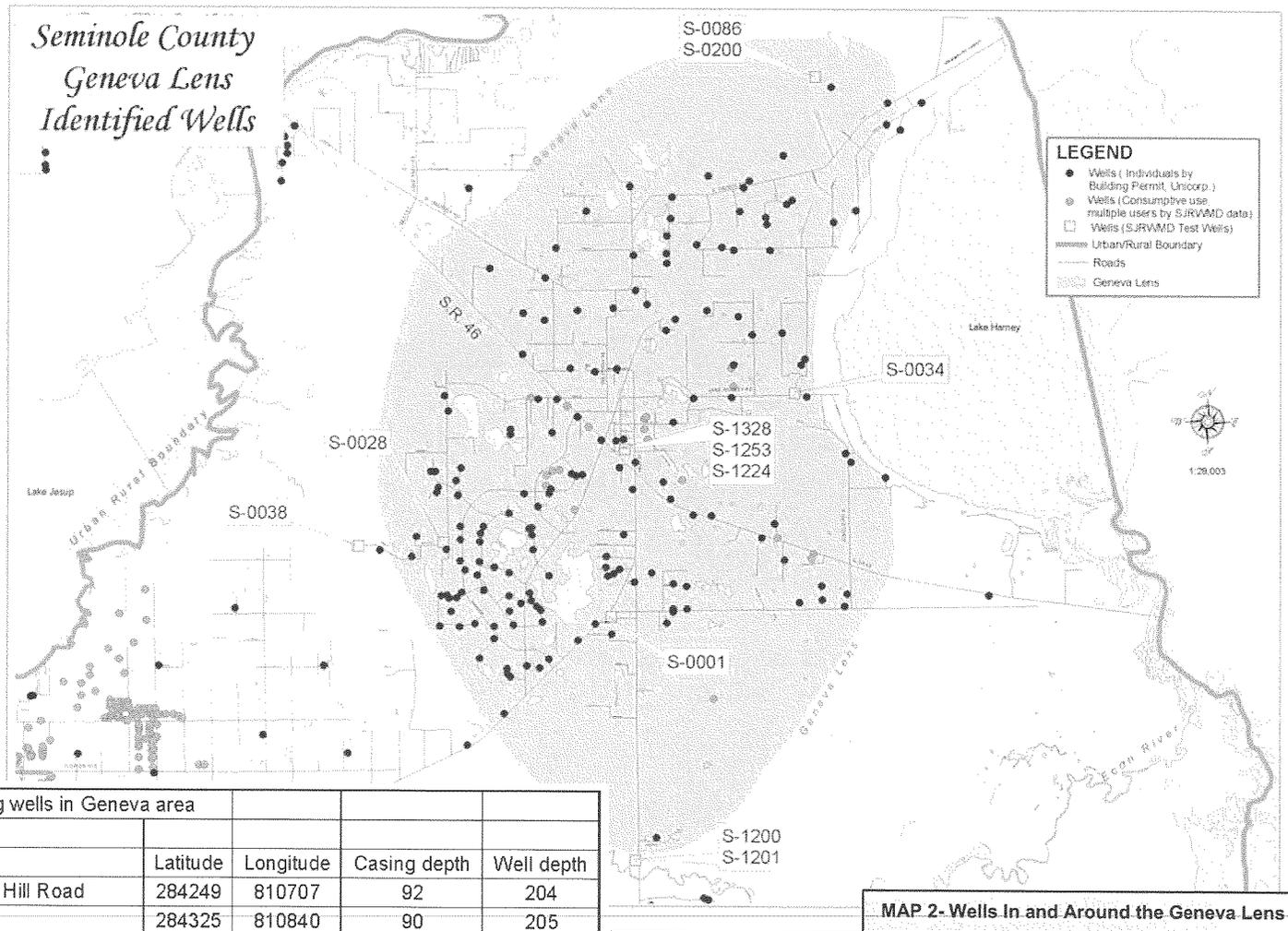


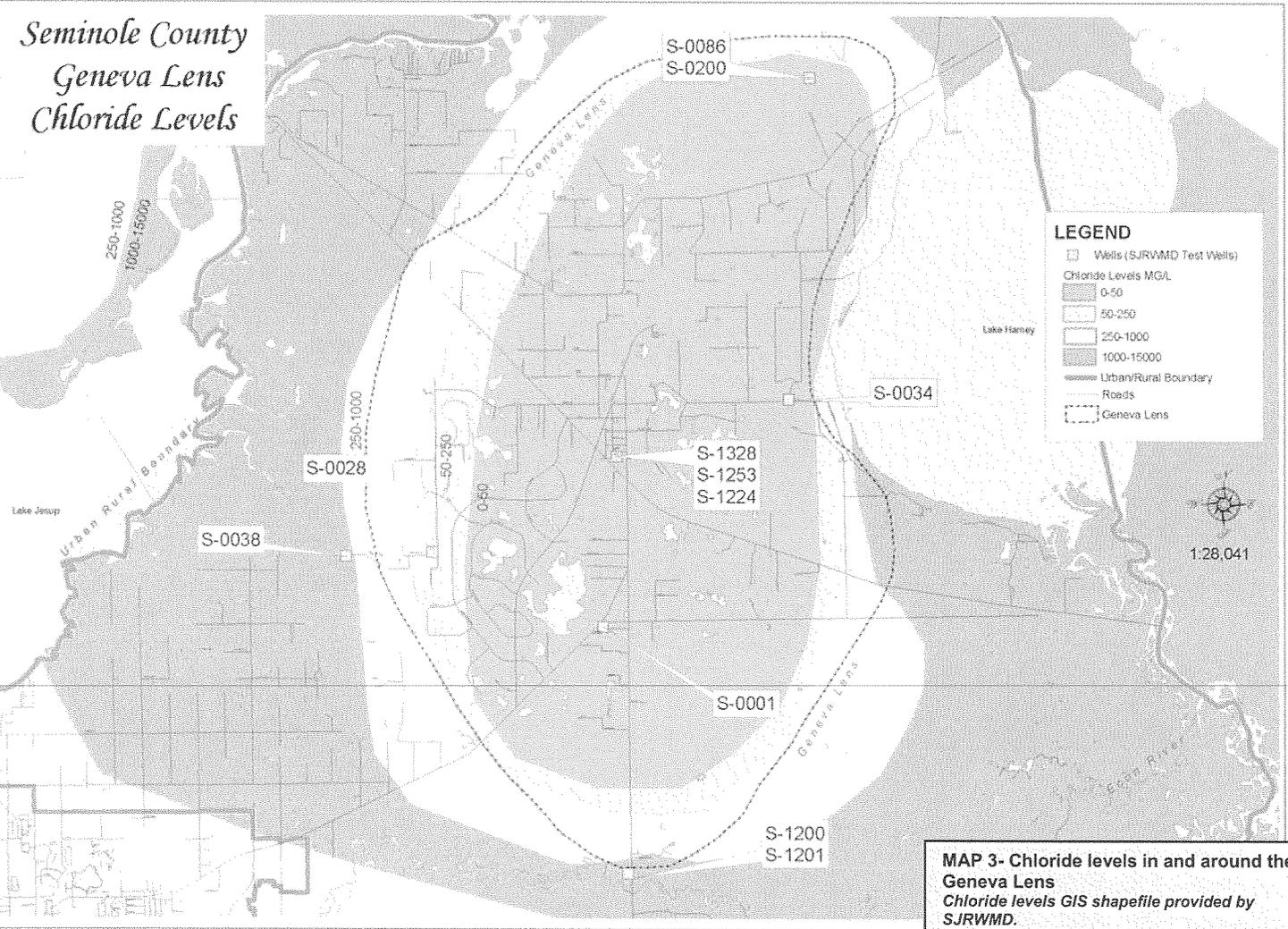
Table 1. Floridan aquifer monitoring wells in Geneva area

Well	Location	Latitude	Longitude	Casing depth	Well depth
S-0001	Geneva - SR 426 near Snow Hill Road	284249	810707	92	204
S-0028	Cochran Forest east	284325	810840	90	205
S-0034	Winona Drive	284439	810526	48	200
S-0038	Cochran Forest west	284323	810927	55	165
S-0086	Osceola landfill	284714	810515	70	225
S-0200	Osceola landfill	284714	810515	500	550
S-1200	Snow Hill Road at Econlockhatchee River	284050	810653	500	600
S-1201	Snow Hill Road at Econlockhatchee River	284050	810653	100	140
S-1224	Geneva fire station	284411	810700	540	570
S-1253	Geneva fire station	284411	810700	132	280
S-1328	Geneva fire station	284411	810700	340	370

around the Lens. These wells represent those that have been permitted by the Seminole County Building Department and the SJRWMD. The violet circles identify wells on record in Seminole County permits and the orange circles represent SJRWMD wells associated with consumptive use permits from 2001 data. Uses of these wells vary but include agriculture, public supply and residential applications.

### Water Quality- Chloride Concentrations

Chloride concentration is used as an indicator of overall groundwater quality and in identifying areas of mixing between freshwater and residual formation seawater. At the center of the Geneva Lens area, freshwater exists only within the top 200 to 300 feet of the Upper Floridan Aquifer, with chloride levels ranging from 0-50 mg/L. The freshwater Lens is surrounded by a naturally occurring section of non-potable saline water with a total chloride concentration greater than 250 mg/L, which is the Environmental Protection Agency (EPA) maximum standard for safe drinking water. Highest concentrations of chloride occur in areas surrounding the Lens and with depth. Table 2 provides a summary of chloride concentration data for each of the wells.



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Wells S-0001, S-0028, S-0034, S-0086, S-1253, and S-1328 monitor the freshwater Lens in the Floridan Aquifer. Each of these wells has a consistent trend of good water quality with very low CL concentrations that do not show any significantly increasing trend.

Wells S-0038, S-0200, S-1200, S-1201, and S-1224 have CL concentrations above 250 mg/L. These wells monitor zones of poor water quality in the Floridan Aquifer below or surrounding the freshwater Lens. Figure 1 is a graph of CL concentrations for the three wells at the Geneva Fire Station.

Table 2. Summary of chloride concentration data				
Well	No. of samples	Period of record	Min - max chloride (mg/L)	Average chloride (mg/L)
S-0001	38	Sep 87 - Jan 04	9 - 21	12
S-0028	37	Oct 87 - Oct 03	19 - 66	45
S-0034	29	Sep 87 - Oct 03	9 - 21	11
S-0038	33	Sep 87 - Oct 03	1060 - 1420	1176
S-0086	35	May 89 - Aug 03	16 - 42	28
S-0200	32	May 89 - Aug 03	7200 - 14370	11004
S-1200	20	Jun 95 - Oct 03	3401 - 4571	3906
S-1201	21	Jan 96 - Oct 03	1610 - 2180	1762
S-1224	11	Apr 99 - Jan 04	2995 - 4390	3902
S-1253	23	May 96 - Jan 04	9 - 20	13
S-1328	19	Apr 97 - Jan 04	9 - 16	11

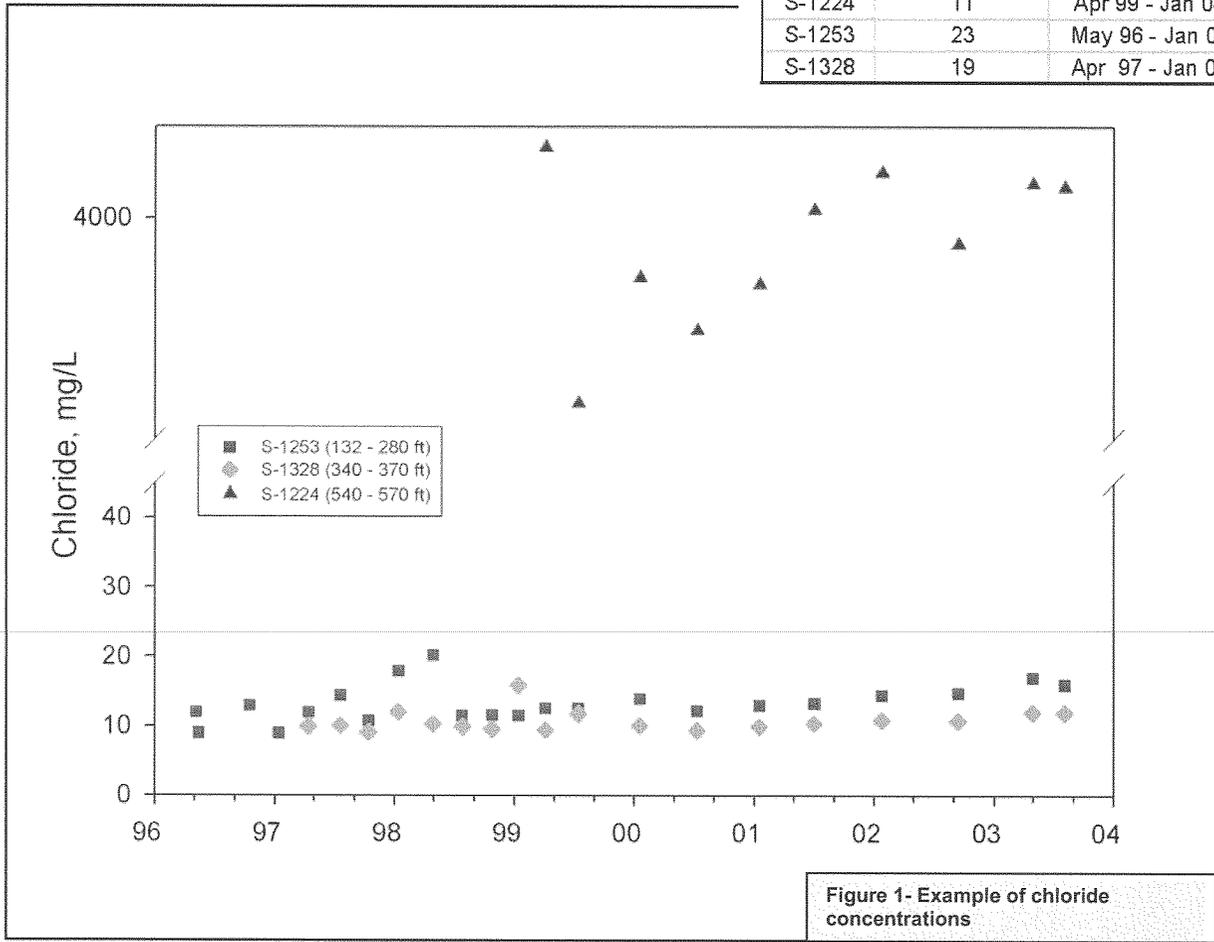


Figure 1- Example of chloride concentrations

These wells will continue to be sampled and evaluated for trends to detect if zones of poor water quality are moving upward into the freshwater. The Floridan Aquifer monitoring wells in the Geneva Lens do not show degradation of water quality in the freshwater zone. If future data collections show that chloride concentrations are on the rise in the freshwater Lens, then concerted evaluation would be warranted in order to determine the probable cause(s) of the increasing chloride concentrations.

## Water Levels

The Geneva Freshwater Lens Task Force also identified the need for continual monitoring of water levels. Significant decrease in the well water levels may indicate an unsustainable rate of water use. Table 3 provides a summary of water level data for each well. Water levels in the Lens area indicate a response to climatic conditions with declines in dry periods and higher levels in wet periods. Figure 2 provides a visual example of historical data for three of the wells (S-1224, S-1253 and S-1328), each at different depths. Figure 2 also provides rainfall data captured at the Osceola landfill. It is clear that when comparing the well water level trends with the rainfall data, there is a consistent correlation between them.

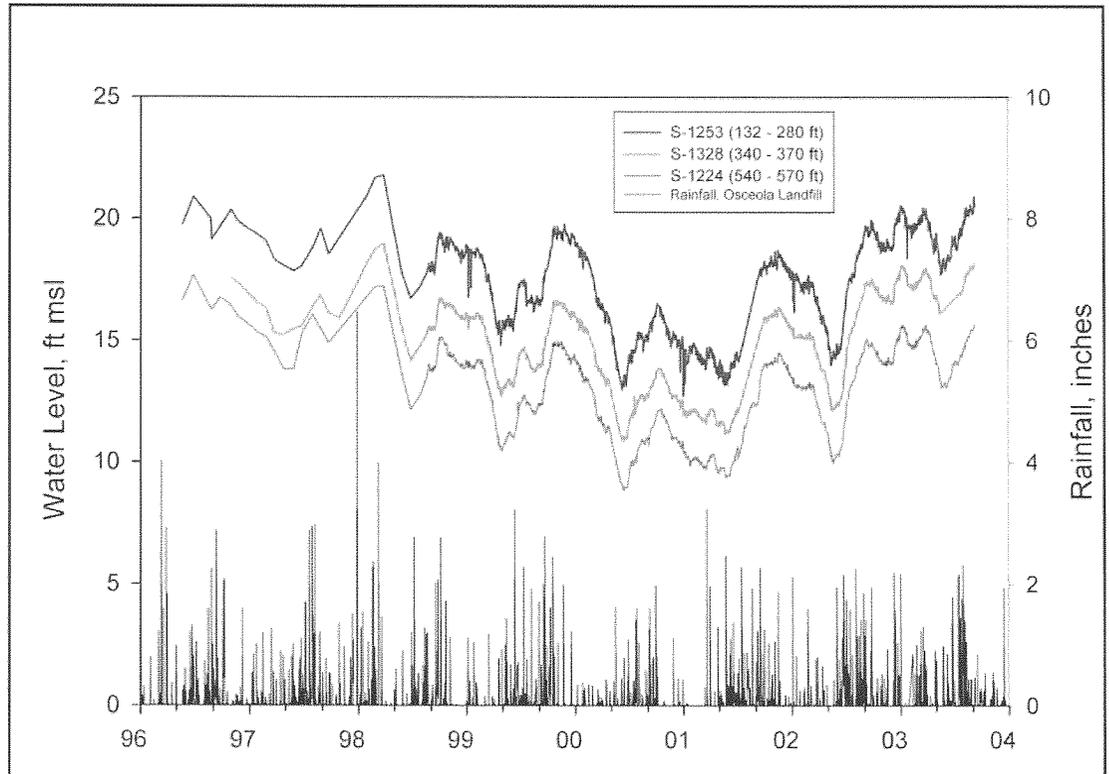


Figure 2- Example of well water levels with rainfall data

Table 3. Summary of water level data				
Well	No. of measurements	Period of record	Min - max water level (ft, msl)	Average water level (ft, msl)
S-0001	3776	Oct 82 - Jul 03	15.0 - 23.9	20.2
S-0028	44	Jun 87 - Apr 98	5.5 - 20.7	17.8
S-0034	17	Apr 95 - Jan 98	12.4 - 15.3	14.0
S-0038	40	Jun 87 - Oct 94	5.0 - 20.5	16.8
S-0086	5304	May 88 - Sep 03	8.1 - 15.3	11.9
S-0200	1690	Nov 88 - Sep 03	3.4 - 10.2	7.4
S-1200	95	Sep 95 - Oct 03	13.2 - 20.6	17.3
S-1201	94	Sep 95 - Oct 03	12.9 - 10.3	17.2
S-1224	1951	May 96 - Sep 03	8.8 - 17.7	12.7
S-1253	1926	May 96 - Sep 03	12.7 - 21.8	17.2
S-1328	1852	Oct 96 - Sep 03	10.9 - 19.0	14.7

## Conclusion

The water quality and levels data from the Geneva Lens monitoring wells shows no degradation of water quality or levels in the freshwater Lens. Monitoring will continue in an effort to manage this valuable resource and ensure continued viability of the Geneva Freshwater Lens as a water supply.