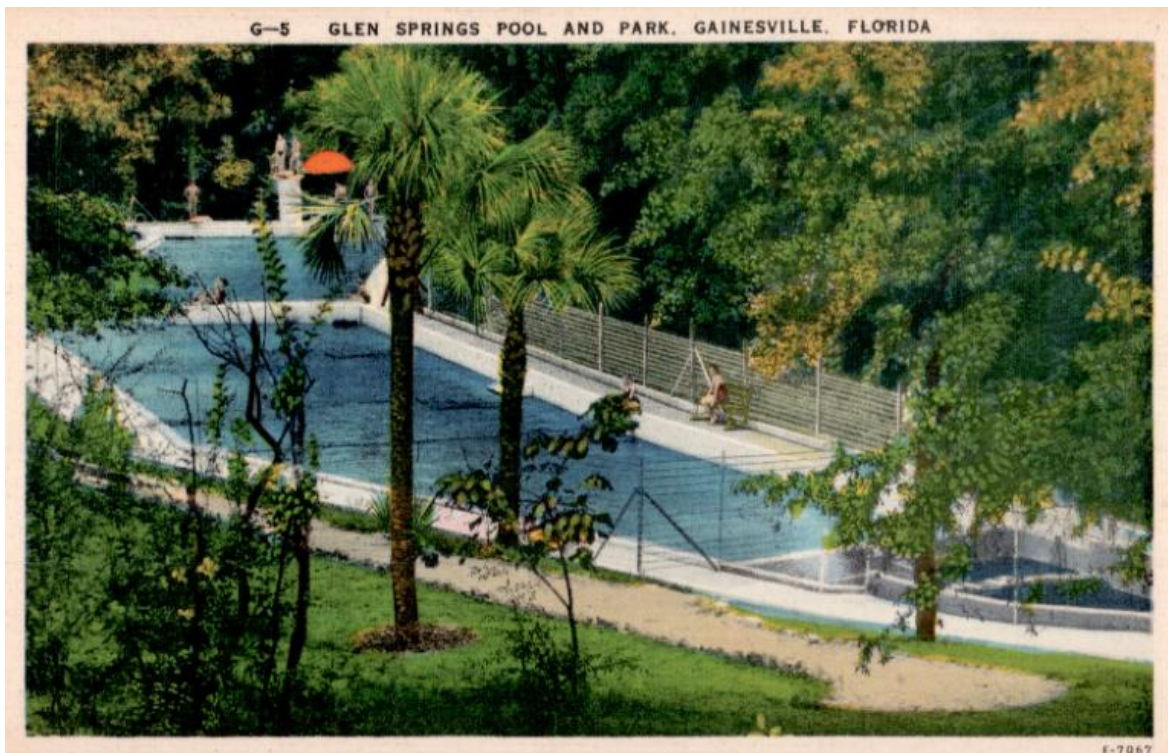


Glen Spring Restoration Plan
Gainesville, FL
By Amy Grossman
for
Spring Systems, Fall 2010
ENV6932K
Dr. Bob Knight



View of Glen Spring Pool Vent facing NE. Photo taken on 11/22/10 by Amy Grossman



Postcard of Glen Spring Pool, taken from the George A. Smathers Library at the University of Florida
Date, artist unknown



View of Glen Spring Pool facing South. Photo taken on 11/22/10 by Amy Grossman

Grossman, Amy
Restoration Plan
ENV6932K



Postcard of Glen Spring Pool, taken from the George A. Smathers Library at the University of Florida
Date, photographer unknown



View of Glen Spring Pool, diving platform, facing SW. Photo taken on 11/22/10 by Amy Grossman

Grossman, Amy
Restoration Plan
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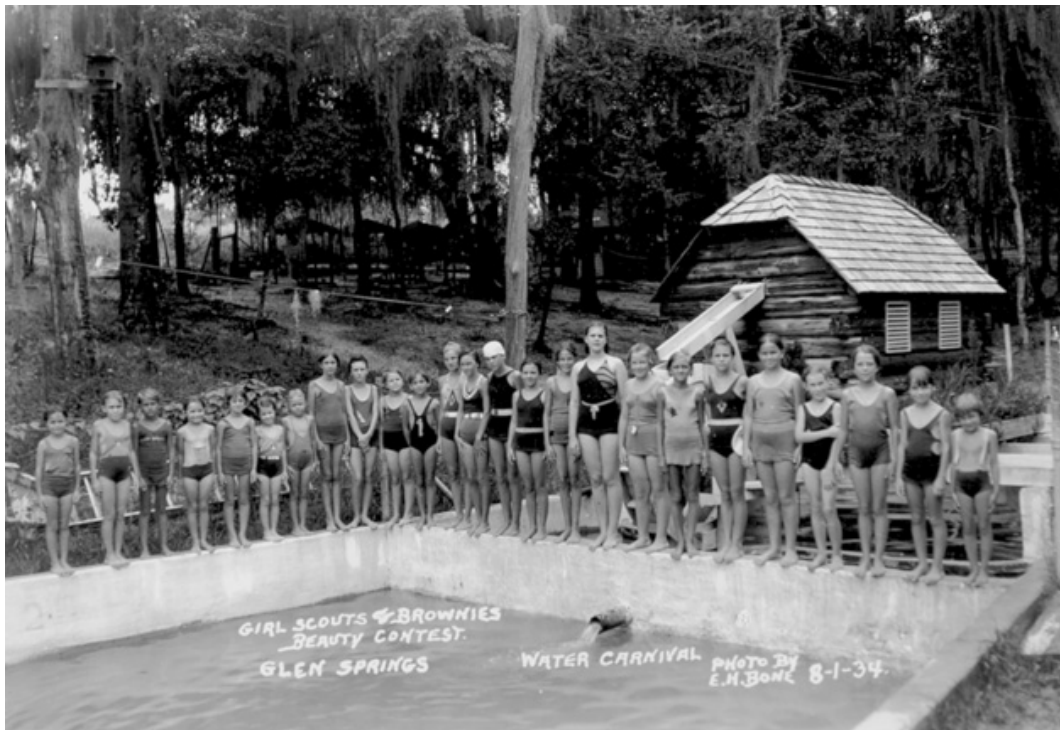


Photo of Glen Spring Pool, taken from the George A. Smathers Library at the University of Florida
 Photo taken on 08/01/1934 by E.H. Bone



View of Glen Spring Pool facing N. Photo taken on 11/22/10 by Amy Grossman



Surface of Glen Spring pool water filled with algae. Photo taken on 11/22/10 by Amy Grossman



View of Glen Spring Pool House, former bar, facing N. Photo taken on 11/22/10 by Amy Grossman

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Executive Summary

The city of Gainesville has many features to be proud of including Paynes Prairie, Devil's Millhopper, the University of Florida campus, and these are advertised to visitors and residents alike. Meanwhile, a spring that should be treasured is currently being ignored. What could be an exceptional natural attraction in the city is known only to the Elks Lodge members, the few spring seekers in the area, and the otters that dine on the fish raised in the pool. The purpose of this restoration plan is to call attention to the plight of Glen Spring. In the following pages, the overview of the spring is recalled along with the reasons why it has fallen into such poor conditions today.

The history of the spring was gathered by reading spring bulletins, newspaper articles, websites, and speaking to a member of the Elks Lodge (the current owners) and an employee of the City of Gainesville Parks and Recreation Department. An examination has been made of the impairments, both chemical and physical, to the spring and the solutions that could be used to repair them. Monetary costs were taken into account for all recommendations and reported per estimated amounts given by the appropriate parties. The ultimate recommendation for the spring is to be bought, restored, and maintained by a governmental agency because the current owners are not fully recognizing the potential of this feature.

Introduction

Glen Spring is a small fourth-magnitude spring located behind the Elks Lodge on N.W. 23rd Avenue in Gainesville, FL. The spring bubbles up into a concrete enclosed pool that measures approximately 25 feet by 150 feet, divided into three distinct segments. The pool had a historic depth range of 2 feet to 10 feet, although it is most likely shallower now due to build-up from fish waste and plant matter. While the main spring pool is clear of any aquatic plants, the other two segments of the pool are completely filled with blue-green algae, probably due to the fish occupying these areas. The water from the spring pool flows out of the pool and into Glen Spring Run, which eventually flows into Hogtown Creek.

The spring has been used primarily as a swimming pool, recreation area, and fish breeding pond. Historically it was a fourth-magnitude spring, but due to recent flow declines it would now be considered fifth-magnitude spring. Water quality has also changed with an increase in nitrates being found in recent years of sampling.

Many residents of Gainesville know of springs and visit them as recreation sites in other cities and counties of Florida. However, most residents have no knowledge that there is a spring located in the heart of the city, some with it located right in their own backyards. I first heard about this spring while researching the internet for nearby springs to visit. I was disappointed to see the state of disrepair that the pool structure and water quality has been allowed to reach. The regret was felt even more after reading the article, "Ghosts of Glen Spring" (Gainesville Magazine 2003). The recollections of citizens who enjoyed their youth swimming in the pool emphasized the difference between how the community used to treasure this pool to how they currently neglect it.

History

According to Max Danford, who holds a position on the House Committee of the Elks Lodge, the spring pool was built in 1924 and there is photographic evidence of the UF swim team practicing in the pool in 1929. It was open to the public and used as a swimming pool until 1970 when codes regarding chlorinated water in swimming pools changed and it became too expensive for the Elks Lodge to maintain the facility.

The pool is currently stocked with catfish, brim, bass, and tilapia for childrens fishing tournaments that the Elks Lodge runs. Mr. Danford stated that about 15 years ago they entered into negotiations with the City of Gainesville to sell the 5 acre property. The city expressed interest in returning the spring to its natural state. Unfortunately, the deal did not go through due to doubts from one city commissioner. The Elks Lodge does not have any future plans for the spring beyond continuing to hold their fishing tournaments. The south end of the spring pool has caution tape across it, preventing access to the diving platform which is in extreme disrepair.

Stephanie Nagid, Program Coordinator for Natural Resource Management at the City of Gainesville Nature Operations, stated that restoration work was completed on the slopes of Glen Spring Run. She said the work occurred about 15 years ago when the property for Alfred A. Ring Park was first bought. A bridge had to be built over the creek and at the same time, the slopes of the spring run were restored to natural habitat. She also stated that about one year ago the Elks Lodge approached the city about purchasing the spring property, but that information and decision was handled by employees in a different division. She indicated that as far as she knew the city was mainly interested in buying the Alfred A. Ring Park parking lot, currently owned by the Elks Lodge. Ms. Nagid confirmed that if the city were to buy the property, they would restore the spring back to its natural state and incorporate it into the adjacent park system. She said that a public pool is not a possibility because of city code requirements that would not be met by the spring.

Impairments and Recommendations

Although the spring is not sampled for water quality on a regular basis, it was initially sampled in 1941 for flow and 1946 for flow as well as other water quality parameters and published in the 1947 Bulletin 31 for the Florida Geological Survey. After that, it was again sampled in 1956, 1960 and 1972 for flow and sampled for general water quality in 1946 and 1972 for the revised 1977 Bulletin 31. The flow stayed constant at about 0.30 cf/s from 1941 to 1972. Then it changed dramatically, falling to 0.13 cf/s in 2000. It spiked in 2005 to 0.852 cf/s, probably a result of the large amount of rain received in the 2004 hurricanes, but dropped even further in 2009 and 2010 to 0.061 and 0.071 respectively.

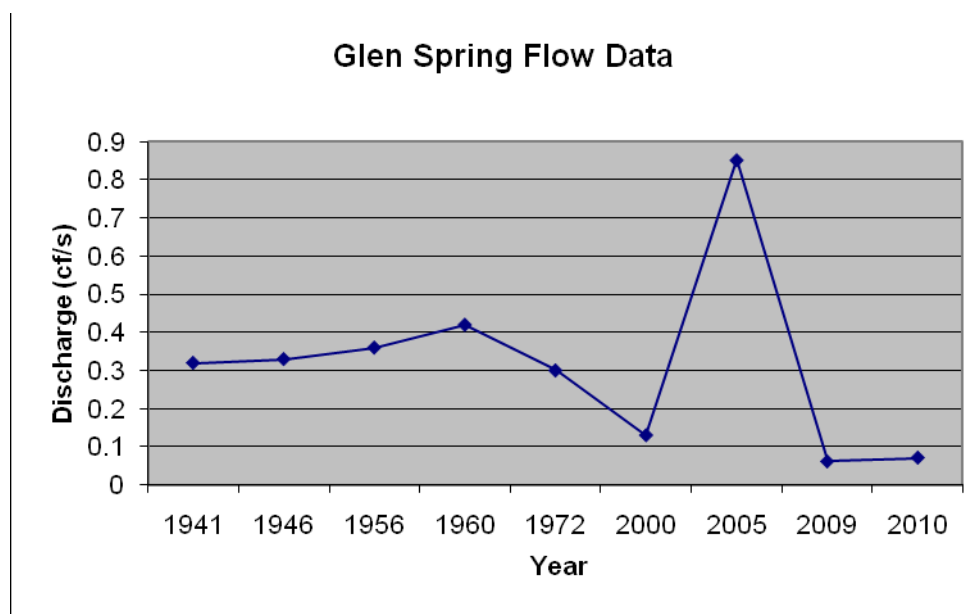


Table 1: Glen Spring Flow Data

The levels of nitrate as nitrogen have also become extremely impaired since 1946. When initially sampled in 1946, the nitrate was 0.41 mg/L and increased slightly in 1972 to 0.87. In 2000 the level almost doubled to 1.46 mg/L and stayed there for the 2009 reading at 1.5 mg/L, with a dip in 2005 at 1.1 mg/L, again probably due to the large amount of rain the year before.

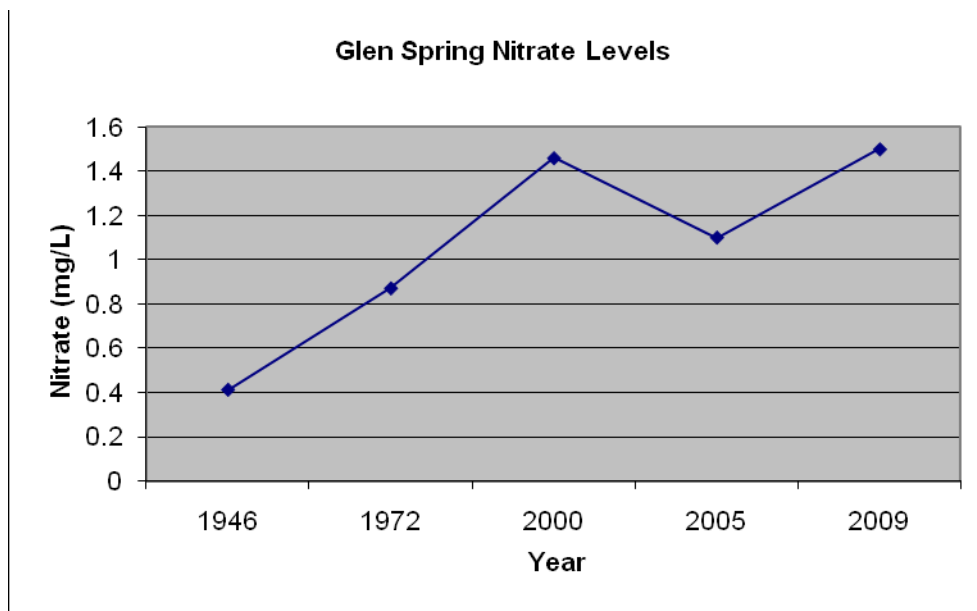


Table 2: Glen Spring Nitrate Levels

From 1946 to 2005, the pH has increased from 7.0 to 7.93. The specific conductance has also increased, but more dramatically, from 143 $\mu\text{S}/\text{cm}$ in 1946 to 200 $\mu\text{S}/\text{cm}$ in 2009. This increased specific conductance could be related to the decline in flow. The other water quality parameters have not been sampled on a regular basis to analyze.

As the population in Gainesville has grown, the land use has changed from forested to agricultural to residential. This means an increase in the installment and construction of septic tanks and private drinking water wells as well as an increase in use of fertilizer on lawns. All of these changes in the area have adversely affected the spring.

Septic tanks or Onsite Sewage Treatment & Disposal Systems (OSTDS) introduce high levels of nitrate into groundwater which eventually makes its way into the spring. The nitrate in the spring feeds the blue-green algae and causes an excessive growth in vegetation that can quickly take over the pool. This is exacerbated by raising fish in the spring pond due to their large amounts of waste. According to Figure 1, there are approximately 50 parcels with septic tanks and wells on them in the recharge area of Glen Spring. The Florida Department of Health (DOH) estimates 29 lb/year loading into a septic tank for an average household. After passing through the drain field, nitrate is reduced to approximately 15 to 26 lb/year. This works out to 750 to 1300 lb/year of nitrate being introduced into the groundwater in the springshed. All septic tanks vary depending on numerous factors, such as the size of the household, lifestyle of residents, the soil around the tank, and the drain field and maintenance of the tank.

One recommendation for the spring's improvement would be to convert the current baseline OSTDS tanks to performance based treatment systems (PBTS). Again, there are many different factors that would affect the amount of nitrate being removed

from the system, including the type of PBTS, but on average the advanced systems would reduce the amount of nitrate entering the drain field by 50%. This would mean nitrate introduced to the groundwater in the springshed would be decreased to between 375 and 650 lbs/year. However, there is a hefty cost associated with upgrading to an advanced septic system. The price of buying and installing PBTS vary by model and region, but generally run \$10,000 per unit. With 50 lots changing over, that would be a \$50,000 price tag associated with converting from basic OSTDS to advanced PBTS.

Another recommendation is to eliminate septic tanks altogether and hook up to the local utility's sewer system. The cost to connect to Gainesville Regional Utilities' (GRU) sewer system is \$2,890 per lot, according to Malone Vincent, Waste Water Senior Technical Support Specialist, at GRU. Nate Bazinet at Sunshine Plumbing and Gas said that the cost to install piping from the house to the street connection would be about \$800. That does not take into account the possibility that the septic system is at a much lower elevation than the sewer line and would need an onsite ground pump to transport the waste to street level. Nate Bazinet at Sunshine Plumbing and Gas said that the cost to install piping from the house to the street connection would be about \$800. The cost of an onsite ground pump would range from \$1,000 to \$5,000 and cost another \$1,000 to install the unit.

Although these are expensive proposals and unlikely to be voluntarily adopted by the homeowners, there are a few ways to encourage the changes. One way is through the application of grant money. Mr. Malone at GRU explained that they have a Connect Free Program in which they will absorb the cost of connection to the sewer if the homeowner is considered to be low-income and cannot afford the connection themselves. An alternative method would be through a county or city ordinance. Currently, the Florida Department of Health inspects and regulates the installment and use of septic tanks. Their purpose is to safeguard the health of the people. Their guidelines do not necessarily protect the health of the environment, especially when it comes to sensitive ecosystems such as springs. Local governments can adopt stricter standards when it comes to septic tank regulations in springshed basins.

One example of this is Wakulla County near Tallahassee, FL. Once a connection was made between the impacts of the septic systems located near Wakulla Spring and the increase in nitrates (and consequently an increase in algae and invasive plants), the community took action. The county commission passed an ordinance in January 2007 that requires any homeowners making updates to their septic system to automatically install a PBTS. It also requires homeowners to connect to sewer if it becomes available to them.

An additional source for nitrate introduction to the spring is the amount of fertilizer being applied to lawns on the residential lots surrounding the spring. Taking into consideration the multiple apartment complexes, there are approximately 400 quarter-acre lots with homes in the recharge area. The Florida Consumer Fertilizer Task Force recommends that a lawn of St. Augustine turf grass in North Florida be applied with 2 to 4 lbs N / 1000 ft² / year. With 400 lots, that allows approximately 4,800,000 to 9,600,000

lb/N/year to be applied to the area of recharge for Glen Spring. This is assuming all homeowners apply fertilizer according to the standards set forth in the report. One recommendation to lower this amount would be to educate and encourage homeowners to practice best management practices (BMPs) when fertilizing and irrigating their lawns. The local extension office offers support for these practices through the Florida Yards and Neighborhoods Program. Another recommendation would be to use native plants on lawns instead of grass like St. Augustine, Bermuda or Bahia grass.

A major impairment to the spring is the drastic decline in flow over the past 60 years. This is almost certainly attributed to the number of private drinking water wells in the area. There are about 50 lots with homes that currently use private wells to obtain water instead of being connected to GRU. A typical private well servicing a 3 bedroom house uses an average of 300 gallons per day (gpd) (FAC 64E-6.008). This means that there is about 15,000 gpd being drawn from the groundwater in the springshed. Since Glen Spring is an intermediate aquifer spring, the numbers might change based on the depth of the wells.

One recommendation for this problem would be to hook up to GRU's city water connection. If this were to happen, there would be approximately 5,475,000 gallons of extra water every year than there currently is making its way into Glen Spring. Since each connection to GRU costs \$1,430, a less drastic solution would be to again educate and encourage the local residents to use BMPs when watering their lawns and swimming pools, fixing leaks, and buying new washing machines, toilets, dishwashers and showerheads.

The final impairment to Glen Spring would be the current state of the spring pool. It has not had any updates to it since before the 1970's and is a hazard to both human safety and the surrounding environment. While it has not been disclosed by any party how much the Elks Lodge would be willing to sell the property for, the price is probably in the range of many hundreds of thousands of dollars. Once the property is acquired, the demolition of the spring pool and deck would cost approximately \$8,000 to \$10,000, according to Brian Herbert of Superior Pool Service. These costs would have to come out of either tax payer money or grants for historical or natural areas.

There is an opportunity for revenue from this property, similar to the set-up at Gainesville's other spring, Boulware Spring. Since the spring pool house is still in good shape with the original flooring from the bar in the 1950's, a porch that was added on in the 1970's, and the Elks Lodge next door, the property could be rented out for special events, with the spring being the main attraction. Given the chance, many people would pay to have their wedding next to a spring or host one of the numerous conferences and retreats that come to Gainesville.

Next Steps

Obviously more research needs to be conducted on this spring. It has received little attention throughout the years and has only been sampled a handful of times. However, the Alachua County Environmental Protection Department (ACEPD) has already been out to the spring twice this year. They have plans to do more investigative work and map the springshed to determine the exact influences to the spring, which is the first proposed step of the restoration plan. The springshed used in this proposal is only a generalized delineation based on the topography. Since it is an intermediate aquifer spring, more information about the intermediate potentiometric levels for the area is needed.

The next step would be to educate the surrounding landowners who own septic tanks, private wells, or highly fertilized lawns about the effects their actions have on this local and unique feature. This could be done by the city, the county, the Institute of Food and Agricultural Science (IFAS) extension office, or even through projects done by University students in classes.

Finally, restoration of the spring pool and spring run are crucial to the improvement of Glen Spring. After speaking to Mr. Danford and Ms. Nagid, the possibility of restoring Glen Spring to a public swimming pool is highly unlikely. There also does not seem to be any interest from the Elks Lodge in doing anything to the spring pool beyond keeping the fish and letting the structure fall into further disrepair. The only hope for the spring now would be to be purchased by the city, the county or an extremely wealthy and ecologically-minded citizen.

The City of Gainesville Parks and Recreation Department and Alachua County Forever, in conjunction with the Alachua Conservation Trust, both have exemplary natural area programs which acquire and maintain land for preservation and protection. It seems only sensible that one of these agencies would buy the land and restore the spring to its natural state. Aside from preserving an ecological gem in the landscape, it would also allow more of the public to become acquainted with springs and aware of the hardships that we put on the environment.

Glen Spring has the opportunity be an educational tool to the citizens of Gainesville. This is a direct connection to the aquifer, to our drinking water supply and to where all of our waste eventually drains. Seeing the spring and the drastic changes from natural swimming pool to abandoned fish pond to a genuine spring right in the middle of a suburban landscape will inspire the local citizens to conserve their water, plant native landscapes, or make upgrades to their septic tanks. They will be able to see a perfect example of how their behavior can affect the environment right in their own neighborhood.

Glen Spring Recharge Area, Gainesville, FL

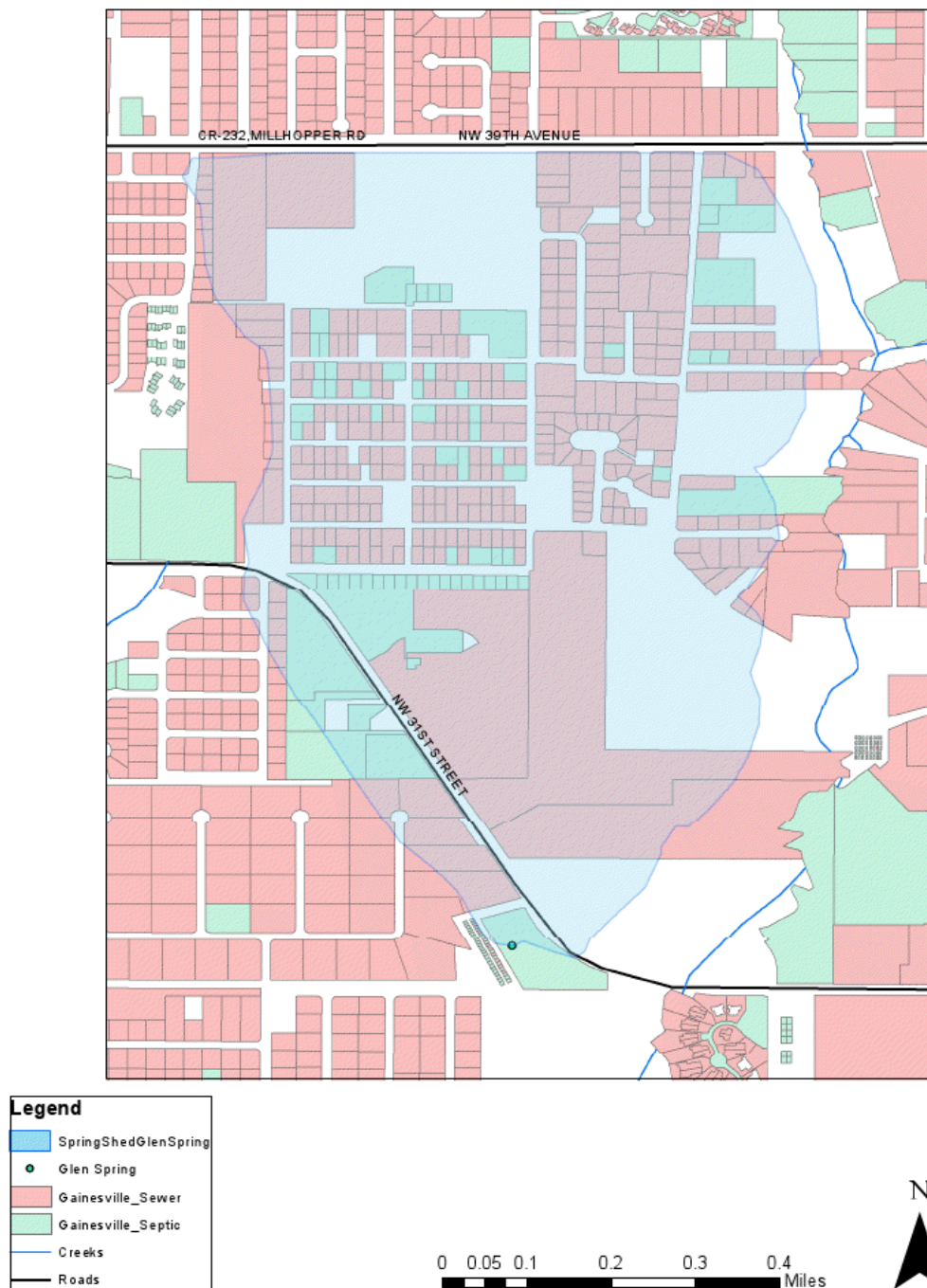


Figure 1: Estimated Septic and Sewer parcels in Glen Spring Recharge area. Grossman 2011.

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Photos from George A. Smathers Library, various dates and authors and from Amy Grossman, 2010.