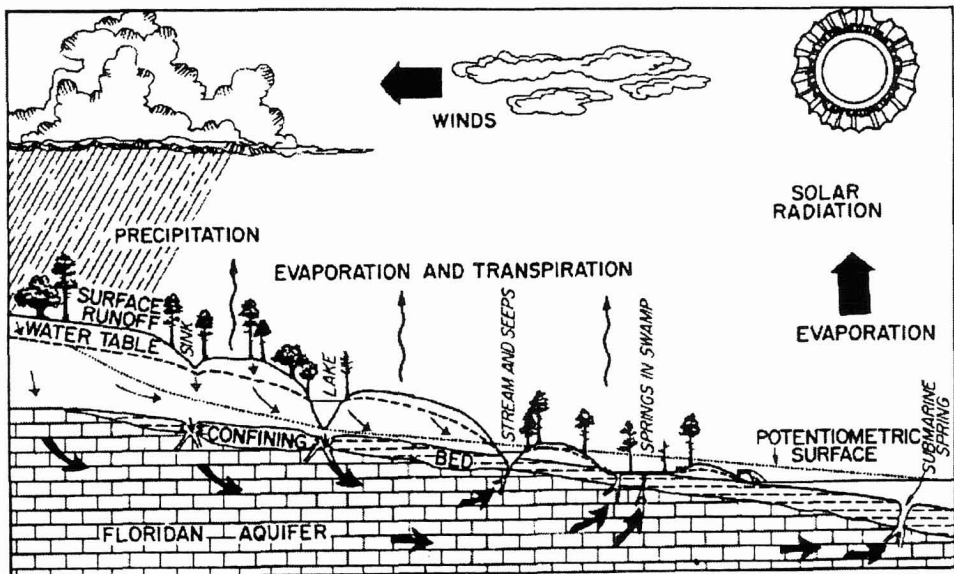


OF FRACTURED EARTH AND LIQUID GEMS: THE SPRINGS OF FLORIDA

Stephanie C. Haas
Digital Library Center
University of Florida Libraries
Gainesville, FL
haas@smathersnt2.uflib.ufl.edu

Springs occur in the fractured karst topography of north central Florida. Karst refers to the characteristic terrain produced by erosional processes associated with the chemical weathering and dissolution of limestone or dolomite: the two most common carbonate rocks in Florida. Over eons, persistent erosional processes have created extensive underground voids and drainage systems in much of the carbonate rocks. Collapse of overlying sediments into the underground cavities produces sinkholes. Water can fill the sinks forming ponds and lakes. When groundwater discharges through natural openings in the ground, it becomes a spring or seep.

Figure 1. Springs, Seeps, and Sinks



Springs are often the headwaters of Florida's rivers. The Wakulla River is created by a 390 cubic feet per second flow from spring vents located directly below the buildings in this photo.

Springs with flows greater than 100 cubic feet per second are called first magnitude springs.

Springs are classified using a discharge system devised by the United States Geological Survey in 1927.

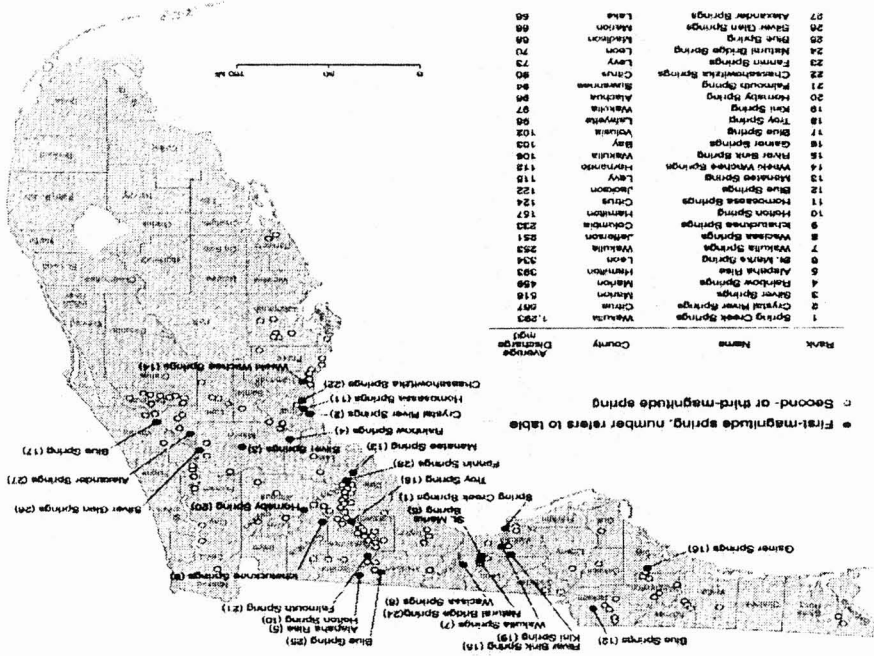


Table 1. Magnitude designations for springs

Magnitude	Average Flow (Discharge)
1	100 cubic feet per second or more
2	10 to 100 cubic feet per second
3	1 to 10 cubic feet per second
4	100 to 448 gallons per minute
5	10 to 100 gallons per minute
6	1 to 10 gallons per minute
7	1 pint to 1 gallon per minute
8	Less than 1 pint per minute

Florida has 27 of the 78 1st magnitude springs in the United States.

Springs



1 First-magnitude spring, number refers to table
 2 Second- or third-magnitude spring

Rank	Name	County	Average Discharge (mgd)
1	Crystal Creek Springs	Volusia	1,283
2	Crystal River Springs	Citrus	247
3	Silver Springs	Marion	418
4	Rainbow Springs	Marion	459
5	Alafia Blue	Hernando	393
6	Dr. Martin's Spring	Leon	324
7	Walrus Springs	Walrus	253
8	Wekiva Springs	Lamont	251
9	Wetland Springs	Collier	223
10	Horton Springs	Hernando	157
11	Pompano Springs	Citrus	124
12	Blue Springs	Lamont	122
13	Manatee Springs	Levy	119
14	White Violets Springs	Hernando	112
15	North Bank Spring	Volusia	105
16	Garner Springs	Bay	102
17	Blue Springs	Volusia	102
18	Troy Springs	Volusia	98
19	Kiss Spring	Marion	87
20	Northey Spring	Marion	86
21	Patrons Springs	Marion	84
22	Chassahowitzka Springs	Citrus	80
23	Fanning Springs	Levy	73
24	Melrose Springs	Leon	70
25	Edwards Springs	Levy	68
26	Blue Springs	Marion	66
27	Alexander Springs	Levy	66

(Source: Water resources atlas of Florida, by Edward A. Fernald, Elizabeth D. Purdum, ed. [Tallahassee, FL] : Institute of Science and Public Affairs, Florida State University, c1998.)

N.C. Landrum's overview of the "Social Value of Florida's Springs" was presented at the Florida Springs Conference held February 8-10, 2000 in Gainesville. Because his abstract presents a succinct overview of the historical aspects of springs, I have taken the liberty of reprinting it here.

Florida's springs rival its beaches as the state's most spectacular natural features and as objects of public fascination. While their importance as water sources was recognized and influenced human settlement even in pre-historic times, over the centuries Florida's springs have taken on much broader significance for their scenic, recreational, scientific and, supposedly, medicinal attributes. Ponce de Leon seems to be dubiously credited with discovering half the springs in Florida in his search for the 'fountain of youth.' More likely, they were happened upon by various explorers and settlers, who found them sufficiently impressive to spread their fame and rouse curiosity through word of mouth. The naturalist John Bartram described Blue Spring (in present Volusia County) as early as 1766, and his son William visited Manatee Spring in 1774. By mid-19th century, many of the springs had become locally popular as swimming holes and picnic spots, and a few had been partially developed either as tourist attractions or for commercial navigation purposes. With the 'rediscovery' of Florida following the War Between the States, however, Florida's springs became the focus of a whole new resort industry. As railroads and river steamers opened up the state's vast hinterlands, Florida became a fashionable wintering spot for affluent Northerners. Major springs, along with beaches and lakefronts, were rapidly developed in fine style to accommodate an increasing number of visitors. Some of the spring waters were reputed to have healing qualities, and many promotional efforts were aimed at the ill and the invalid, promising all kinds of miracle cures. When the luster wore off of the tourism boom of the late 19th and early 20th centuries, most of the spring developments fell into disrepair. Many of them remained popular as local recreation areas, but most suffered physically from mis-use and neglect. By the time Florida initiated its state parks program, in the 1930's, there was a clear need to preserve and protect some of the more spectacular springs, but unfortunately no financial ability to do so.

Three major springs were acquired by the federal government as part of the Ocala National Forest, and several others--most notably Silver Springs--were developed by private enterprise principally as day-use recreational attractions. It was not until 1949, however, with Manatee Springs, that any first magnitude spring was brought under state park protection. Eventually, the state undertook an aggressive park land acquisition program in the 1960's, and over ensuing years nine more major springs have been added to the state park system alone. Today,

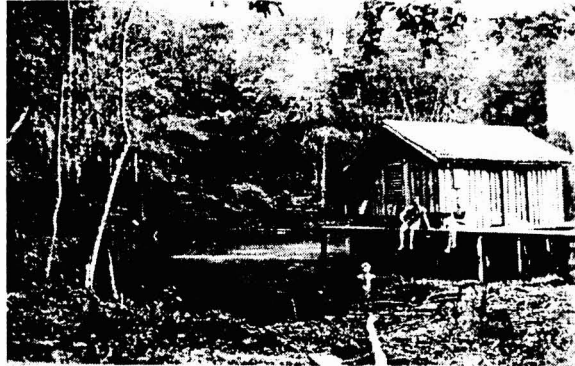
many of Florida's most impressive springs are preserved and available to the public for recreational use and, judging from the increasing visitation, they are more popular than ever. The critical concern now is for the protection of these invaluable resources so they may continue to fascinate and thrill generations to come.

While springs have been the focal point of human activities for centuries, relatively little is known about the biology and ecology of spring communities. At the same conference, Joe Hand, Florida Department of Environmental Protection, addressed the water quality issue of springs:

In a disturbing trend, nitrate levels are increasing in many spring discharges in Florida. This trend is indicative of ground water contamination and the potential for additional nutrient pollution in surface waters. The contamination is a particular concern in waters of the state whose productivity is nitrogen limited and that receive large quantities of ground water. A review of water quality data for springs in Florida, taken from the STORET database, leads to the following observations: chemical sampling in springs is relatively complete; biological sampling to evaluate the impact of nutrient enrichment from springs is needed; and sources for nitrates need to be identified, quantified, and modeled. Water quality data at 70 Florida springs was compared and contrasted with water quality data from 7400 sampling stations in Florida streams; for the 1960-1998 time period, nitrate showed a significant degrading trend.

Concern for Florida's springs is growing. The State recently purchased lands to prevent mining near the Ichetucknee Springs and has purchased Madison County's Blue Springs, the 18th first-magnitude springs to come under state ownership.

Springs are the “real” Florida complete with swimmers, alligators, and mastodon bones...



Kissingen Springs, Polk County, Florida, 1894

Kissingen springs : Polk County, Florida, 1894



**Homosassa Springs gator lagoon:
Homosassa Springs, Florida, 1966**



Men with some recovered Mastodon bones :
Wakulla Springs, Florida, 1930

The classic work on springs *Springs of Florida* [Florida Geological Survey Bulletin 31] is available online at http://www.flmnh.ufl.edu/springs_of_fl/aaj7320/index.html