Marion County: Land Use Planning for Springs Protection

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Aquifer and Springs Protection

Two MCBCC Initiatives

1. Water Resource Assessment and Management Study (50-Year Water Study)

2. Marion County Springs Protection Program
While water quality is generally good, there is both acute and widespread degradation.

Degradation is linked specifically to land uses (urban and rural).

Water “quantity” is becoming a major concern.

Water “quality” is an immediate concern.
Springs Protection Program

- **Aim**
  - Prevent further degradation of Rainbow and Silver Springs
  - Reduce or eliminate existing sources of pollution

- **Motivation**
  - Declining water quality trends
  - If we protect springs, we are protecting the water we drink and the water that fuels our economy

- **Focus**
  - Nitrogen (fertilizers; domestic waste; animal waste)
  - Other pollutants (metals, petroleum-based and other hazardous chemicals)
Springs Protection Program

Action Steps

- Gather scientific research and information
- Draft recommended actions and strategies
- Update Comprehensive Plan
- Update Land Development Code
- Implement
Springs Protection Program

What we know...

- Water quality in Rainbow and Silver Springs is slowly but steadily degrading due to land use.
- Degradation from increasing pollution of groundwater.
- Nitrogen is the pollutant of greatest concern.
- Left unchecked, springs will continue to deteriorate to the point where they are severely harmed.
- Ultimately, the beauty, quality of life and economic prosperity of Marion County will suffer.
Springs Protection Program

Elements
1. Springs Protection Zones (ESOZ)
2. Restrictions, setbacks and special use standards for critical land uses
3. Policies and standards for new development
   - Open space
   - Landscaping
   - Irrigation
   - Stormwater Treatment
   - Domestic Waste Treatment and Disposal, Central WWTF’s, Onsite Sewage Treatment and Disposal
4. Remediation and research projects
Springs Protection Program - How?

1. Develop in a way to require least amount of fertilizer
   - Open space and Florida-Friendly landscaping over high maintenance lawns and landscaping
   - Avoids/minimizes nitrogen imported into springshed

2. Use most effective wastewater treatment possible
   - Central sewer systems over septic
   - Enhanced septic over conventional septic systems
   - Reuse irrigation vs. rapid infiltration or sprayfield

3. Incorporate alternative stormwater practices
   - Grass swales vs. underground conduits
   - Multiple shallow retention vs. single, deep retention
   - Minimize impervious surfaces
   - Collect and reuse stormwater for irrigation
Springs Protection Program - How?

4. Promote best management practices in urban and rural areas
   - Cut back nitrogen use on lawns, use slow-release forms
   - Better manure and pasture management on farms
   - Public education and awareness

5. Improve existing wastewater systems
   - Upgrade central wastewater facilities (especially older plants)
   - Regular inspection and maintenance of septic systems

6. Retrofit existing, outdated stormwater systems
Amendments for Aquifer and Springs Protection – Elements Amended

- Future Land Use (policies and map)
- Potable Water and Sanitary Sewer
- Stormwater
- Aquifer Recharge
- Conservation
- Solid Waste
- Capital Improvements
Land Development Code

2004

- National Pollutant Discharges Elimination System

2009

- New Article
  - 6.4 Springs Protection Overlay Zone
- Updated Article
  - 8.2.10 Landscape Standards and Tree Preservation
Establish Spring Protection Zones

j) Establish a Springs Protection Zone (SPZ), that includes the Primary and Secondary Zone, that are additional, but distinct parts of the ESOZ. The SPZ shall only be regulated pursuant to distinct SPZ standards and criteria and not to general ESOZ criteria set forth in the Comprehensive Plan or Land Development Regulations. Where the ESOZ and SPZ overlap, the more restrictive requirements shall apply.
Comprehensive Plan

Map showing various protective zones and conservation areas around cities such as Ocala, Silver Springs, and Belleview.
Uses and Required Site Analysis:

- **For purposes related specifically to springs protection**, the County shall amend its LDRs to specify land uses and activities that shall be prohibited and or permitted only by special use within the SPZ. The conditions under which a land use and activity is permitted by special use in the SPZ shall be defined in the LDRs, consistent with the applicable goals, objectives and policies of the Comprehensive Plan related to the protection of springs.

- **For any new development that increases density or intensity of use within the SPZ**, the required site analysis shall, in addition to the above, include an assessment of the developments impacts on recharge volume and groundwater quality, with emphasis on nitrogen, to assess whether additional measures are needed and can be provided to mitigate potential impacts.
Prohibited Uses within a Primary SPZ

- Auto Salvage Yard
- Heavy Industrial and Commercial Uses

Conditional Uses within a Secondary SPZ

- Auto Salvage Yard
  - Special Use Permitting
  - Compliance with FDEP Green Yards Program
  - Annual Reporting
Conditional Uses within a Primary or Secondary SPZ when in MCAVA More or Most Vulnerable

- Construction and Demolition Debris Disposal Facilities
  - Additional Geotechnical Information and Soil Sampling
  - Additional Groundwater Monitoring
- Mining Operations
  - Additional Geotechnical Information
  - Vegetative Buffers
2009 Update

Land Development Code

Conditional Uses within a Primary or Secondary SPZ

- New and Expanding Golf Courses
  - Natural Resources Management Plan
  - Irrigation Limitations
- New and Expanding Uses which Store/Stock Fertilizers, Pesticides and Pool/Spa Chemicals
  - Cover and Containment
- Hazardous Materials and Waste Facilities
  - Containment
- Heavy Industrial and Commercial Uses
  - Cover and Containment
Future Land Use Element - Stormwater Management:

- As further defined in the LDRs, new stormwater management system within the SPZ shall incorporate low-impact development principles and other innovative technology to enhance removal and attenuation of nutrients and other pollutants. The LDRs shall also include designed countywide criteria which minimize the threat of sinkhole formation and contamination to the ground or surface water systems consistent with the requirements of FLU Element Policy 4.2.
OBJECTIVE 3.0: * Establish a program to correct existing drainage problems.

In addition to correcting surface drainage problems, the stormwater program shall include identification of projects aimed at addressing groundwater quality concerns resulting from the lack of adequate stormwater treatment measures within the SPZ.

The County shall ... implement enhanced stormwater quality treatment standards and performance criteria aimed at maximizing nutrient removal and attenuation for development within the SPZ,
Aquifer Recharge

Additional requirements for new development shall include requirement for pretreatment, Karst area protection, and other stormwater practices and techniques that maximize nutrient removal in Karst Sensitive Areas and the SPZ.
Required Buffer Areas:

- **Karst features:** The County shall adopt requirements for vegetative buffers around Karst features. The minimum width of the required buffer shall be 150 feet for karst features with a direct connection to the aquifer and 75 feet for karst features with no direct connection to the aquifer. Karst buffers shall be maintained in permanent natural vegetative cover. Buildings, paved surfaces, effluent disposal, drainage retention, and the application of chemicals and fertilizers shall be prohibited within the buffer area.
2009 Update

Land Development Code

- Natural Groundwater Recharge Protection
  - Reuse
  - Landscaping
  - Irrigation
- Prohibitions
  - Use of Lawn Chemicals, including Fertilizers and Pesticides
  - Storage/Release of Petroleum and other Hazardous Materials
  - High Volume Irrigation
  - Structures exceeding 300 SF
2009 Update

Land Development Code

- Stormwater
  - Additional Geotechnical Information
  - Distributed volumes for Recharge and Treatment

Reexamine Drainage Areas

Fit Development to Terrain

Minimize Impervious Area
2009 Update

Land Development Code

• Karst Feature Protection
  • Buffers
    • 150 feet if connected to Aquifer
    • 75 feet if not connected to Aquifer
  • Prohibitions
    • Buildings and Pavements
    • Septic Tanks and Drainfields
    • Other Wastewater Disposals
    • Drainage Retention Areas
    • Irrigation, Fertilizers, Pesticides

• Remediation Plan
Sanitary Sewer Element

- The County shall develop LDRs which specify when existing sewer facilities located within the SPZ, including package plants and cluster community systems, shall either upgrade to meet current treatment and disposal standards established by the County, or connect to a regional or sub-regional sewage treatment facility.

- Marion County shall, ... adopt a water and wastewater service area map series. The map series shall show: existing infrastructure and service areas, proposed new facilities and service areas that will result from approved development projects, a 5-year planned service area boundary, a 10-year planned service area boundary, and other projected long-term service area boundaries, as appropriate.
Sewage Disposal Systems:

- For development where connection to a regional, sub-regional, or alternative sewer system is not required, then an OSTDS will be required. The County shall develop and adopt OSTDS performance standards aimed at achieving a 70 percent or greater nitrogen removal efficiency for new and replacement systems in the SPZ, beginning October 1, 2007, in the Primary SPZ and by October 1, 2008 in the Secondary SPZ. The LDRs shall also address conditions by which exemptions may be granted.
Sanitary Sewer Element

- **OBJECTIVE 6.0:** To help prevent the further degradation of groundwater and springsheds within the SPZ, new and expanding wastewater facilities shall be designed to maximize reuse and conservation and minimize the discharge of nitrogen and other pollutants to groundwater.

- Marion County shall develop and adopt regulations that establish a 106 mg/L TN standard for new and expanding facilities that dispose of effluent through public access reuse systems that offset potable water use, and that limit the use of rapid-rate land systems for back-up purposes only in the Primary SPZ. The regulations shall also include specific requirements for certain types of new development to install reuse lines, and to utilize reuse water when available, based on project size, type, location and other relevant factors. High
2009 Update

Land Development Code

- **Wastewater Systems – Operators**
  - Monitoring
  - Increased Treatment for Total Nitrogen
  - Rapid Rate Land Applicators
    - Change Disposal System

- **Wastewater Systems - Owners**
  - Increased Centralized System Connection
  - Increased Grease Traps and Tank Sizing for Food Ops
  - Enhanced Septic Systems
2009 Update

Land Development Code

- Septic Systems
  - January 2011 – New System Requirements
  - Every 5 years - Pump and Inspection Requirements
Future Land Use Element - Other Agricultural Practices.

- The County shall assist owners in the implementation of voluntary farm BMP’s aimed at proper manure, crop, and pasture management in the SPZ. The County shall also develop and adopt minimum performance standards for agriculture that will apply in cases where voluntary measures to implement BMPs have not been successful.
i. establishing requirements for the preservation of natural recharge areas and limits on the extent to which irrigated and fertilized landscape areas are permitted. The requirements shall encourage preservation of natural vegetation and require at a minimum that spray irrigation and broadcast chemicals, including fertilizers and pesticides, be prohibited on at least 40% of the developable area of a project in the Primary SPZ and on at least 30% in the Secondary SPZ. Natural recharge areas may consist of common open space and or a combination of common open space and private lot areas where restrictions and compliance measures are clearly set forth in development and homeowner documents. ...

j. requiring the use of clustering, natural and drought tolerant landscaping and other conservation design techniques that help to achieve compliance with the above-listed items.
Aquifer Recharge

Policy 6.5: By October 1, 2007, Marion County shall develop and adopt regulations aimed at minimizing need for fertilizer use and irrigation and maximizing natural areas and open space within new development in the SPZ. The regulations shall include requirements for clustering, drought tolerant landscaping, water conservation and reuse, and irrigation systems, ...
2009 Update
Land Development Code

- Reuse
  - Consideration for all projects of 31 or more ERCs
  - Mandatory Connection

- Water Supply
  - Increased Centralized System Connection
Landscape Standards and Tree Preservation

- Greater Emphasis on Preservation and Use of Native or approved Non-Invasive Vegetation and Drought Tolerant Landscapes
  - Marion County List
- Incorporates the Natural Groundwater Recharge Protection Areas into Landscapable Areas
- Limits Turf Areas
- Greater Emphasis on Protection of Existing Plantings
2009 Update

Land Development Code

- Landscape Standards and Tree Preservation
  - Irrigation Design Standards
    - Reduces allowable use of High Volume
    - Increases use of Low Volume
  - Licensing and Training Specifics
    - Landscape Professionals
    - Irrigation and Maintenance Professionals
Fertilizer Ordinance 08-35

- Training for Fertilizer Applicators
  - Florida Yards and Neighborhoods Environmental Landscape Management Course

- Private Homeowners
  - UF - IFAS Florida Yards and Neighborhoods
Fertilizer Ordinance 08-35

TURF
- 0.7 lbs N per 1,000 SF any 1 time
  Grass
  Max N per Year
  Bahia 3 lbs
  Bermuda 4 lbs
  Centipede 2 lbs
  St. Augustine 3 lbs
  Zoysia 4 lbs

- 0.25 lbs P per 1,000 SF any 1 time
2009 Update

Land Development Code

- Manure Stockpiles
  - Size Limitations
  - Cover and Containment
  - Hauling

- Plant Production, Greenhouse or Nursery Operations
  - Compliance with BMPs
  - File with County
Prepare for Growth

- Most of Marion County’s problems (groundwater and otherwise) started in the 1970s and 1980s.
- Between 1970 and 2000 the population increased from 69,030 to 258,916 -- an increase of 189,886.
- Minimal central water and sewer facilities – today the County has over 100,000 septic tanks.
- Still dealing with half-built developments of regional impact and other large scale developments that have left the County with 139,000 vacant lots, many located in remote areas.
Table 2.1.1: Comparison of Marion County and State of Florida Population Growth 1900-2000

<table>
<thead>
<tr>
<th>Year</th>
<th>Marion County Population</th>
<th>Percent Growth</th>
<th>Percent of State Population</th>
<th>State of Florida Population</th>
<th>Percent Growth</th>
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<tbody>
<tr>
<td>1900</td>
<td>24,403</td>
<td>NA</td>
<td>4.62%</td>
<td>528,542</td>
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<td>1910</td>
<td>26,941</td>
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<td>3.58%</td>
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<td>1920</td>
<td>23,968</td>
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<td>2.47%</td>
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<td>1930</td>
<td>29,578</td>
<td>23.41%</td>
<td>2.01%</td>
<td>1,468,211</td>
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<td>1940</td>
<td>31,243</td>
<td>5.63%</td>
<td>1.65%</td>
<td>1,897,414</td>
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<td>1950</td>
<td>38,187</td>
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<td>1.51%</td>
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<td>2000</td>
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<td>32.89%</td>
<td>1.62%</td>
<td>15,982,824</td>
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<td>2007</td>
<td>325,023</td>
<td>79.66%</td>
<td>1.74%</td>
<td>18,680,367</td>
<td>85.56%</td>
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Sources: U.S. Census 1900 to 2000
Prepare for Growth

- Getting central water and sewer in place now will save money in the long run.
- Conversion of OSTDS estimated at $11,000 per household.
- Low Impact Development may not be that different from what you are already doing.
- Marion County was one of the first to initiate springs protection and had to learn as we went. Don’t be surprised if you have to go back and change things.
Prepare for Growth

- Try to educate citizens so that everyone takes ownership – successful aquifer protection benefits everyone.
- Be careful that what you change doesn’t cause a worse problem.
- Be positive in the way you draft your changes to the Comprehensive Plan and land development regulations – Try to avoid “THOU SHALT NOT S...”
- Emphasize education because a lot of this is changing individual homeowner habits
2004 Update

Land Development Code

Preventing Bad Practices & Applying Good Practices

Training & Education

Inspection & Communication
Levy County Springs -- 1947

- **Fanning Springs** *(near Wilcox), Levy County*
- **Discharge** - 88 million gallons per day *(Dec. 17, 1942)*
- **Nitrate** *(NO$_3^-$) - .03 equivalents per million*(July 24, 1946)*
- **Utilization**: The spring has been privately developed. There is a dancing and skating pavilion, bathhouse, diving tower, and boat house. The grounds surrounding the spring have been cleared and are frequented by picnickers and campers.
Levy County Springs -- 1947

- **Manatee Spring** (near Chiefland, Levy County)
- Discharge - 141 million gallons per day (Dec. 17, 1942)
- Nitrate \((\text{NO}_3^-)\) - 0.03 equivalents per million (July 24, 1946)
- Utilization: The spring is intact in its natural surroundings. There is a fish camp 200 feet below the head of the spring. A few new cabins have been built. A sign posted on a tree reads: “Notice: this spring for free public use. No additional fences or buildings permitted. Patterson-McInnis Lbr. Co. (Owners).”
Levy County Springs -- 1947

- **Wekiva Springs** near Gulf Hammock, Levy County
- **Discharge** - 47 million gallons per day (average of 6 measurements from 1917 to 1946)
- **Nitrate (NO$_3^-$)** - Not available
- **Utilization**: The springs are intact in their natural surroundings and are used as a swimming pool by local residents and as a watering place for stock.