


What?




- What are the primary anthropogenic sources of Nitrogen?
 - Fertilizer
 - Human Waste
 - Animal Waste
- Often estimate Nitrogen loading based on land use
- Santa Fe River Basin Report analyzed land uses from 2004

TN Loading to Santa Fe River Watershed
Lower Santa Fe Springs Revised Report, 2013

Source	Percentage
Agriculture	73%
Wastewater	18%
Land Development	9%

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What?




- Wastewater - 18%:
 - 1% WWTP
 - 17% septic tanks

TN Loading to Santa Fe River Watershed
Lower Santa Fe Springs Revised Report, 2013

Source	Percentage
Agriculture	73%
Wastewater	18%
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What?




- Agriculture – 73%:
- Combination of fertilizer and animal waste
 - Row crops
 - Field crops / sod
 - Orchards / nurseries
 - Tree plantations (silviculture)
 - Pasture land
 - Concentrated Animal Feeding Operations (CAFOs)

TN Loading to Santa Fe River Watershed
Lower Santa Fe Springs Revised Report, 2013

Category	Percentage
Agriculture	73%
Wastewater	18%
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What?



- Land Development – 9%:
- Fertilizer is the primary source
 - Residential
 - Commercial
 - Institutional
 - Recreational land uses

TN Loading to Santa Fe River Watershed
Lower Santa Fe Springs Revised Report, 2013

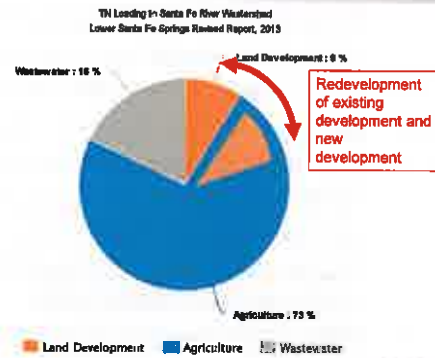
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What?



- Changes in land use affect nitrogen loading
- The proposed Alachua County stormwater manual will only have an impact on new development or redevelopment of existing sites
- Does not reduce nitrogen loading from existing developments



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Case Study: Residential Subdivision



Summary and Conclusion:

What about maintenance?

- Not yet well defined
- Expectation is that BAM will need to be periodically replaced; replacement frequency may be based on limitations of component materials
- Informal data from technical consultant indicates BAM may need to be replaced every 20 years
- If BAM must be replaced in 20 years, then residents (via the HOA) will have to bear the cost of replacing the BAM in the basins at a cost of \$2.1 million (2016 dollars), increased for inflation
- Other alternatives may be developed before the BAM must be replaced

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Santa Fe River BMAP: BMPs



- Lower Santa Fe River is an impaired water body for Dissolved Oxygen and Nutrients
- Santa Fe River BMAP (Basin Management Action Plan) was adopted in 2012
- TMDL (Total Maximum Daily Load) target 0.35 mg/L for Nitrate (vs. 10 mg/L groundwater drinking water standards)
- Nitrate loads from non-point sources needs to be reduced by 35% to meet target
- BMP (Best Management Practice) based
 - *"BMPs are individual or combined management and/or structural practices determined through research, field testing, and expert review to be the most effective and practicable means for improving water quality, taking into account economic and technological considerations."*
 - **BMPs must be cost-effective**

Are the BMPs proposed in the draft manual cost-effective?

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Nitrogen Removal Cost Comparison



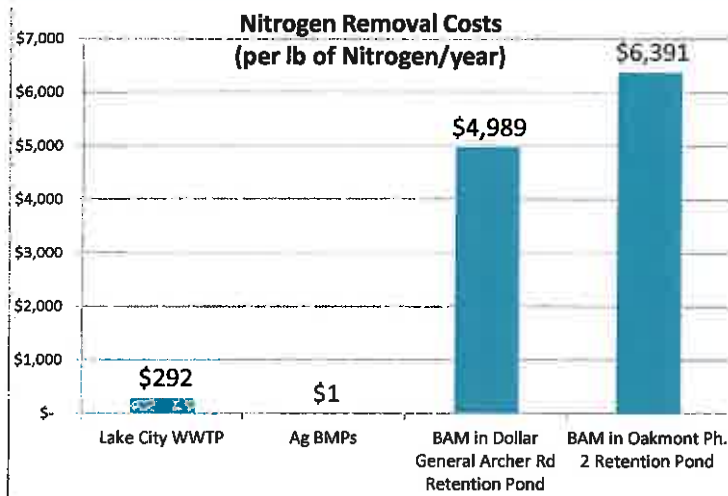
1. Lake City Wastewater Treatment Plant Upgrades*:
 - \$22.5 million / 77,000 lbs TN/yr = **\$292 per lb TN/yr**
2. Agricultural BMPs (FDACS "Fertigation" projects)*:
 - \$990,000 / 964,000 lbs TN/yr = **\$1.03 per lb TN/yr**
3. BAM (Bold & Gold) for Dollar General Archer Rd
 - \$46,500 / 9.32 lbs TN/yr = **\$4,989 per lb TN/yr**
4. BAM (Bold & Gold) for Oakmont Phase 2
 - \$2.32 million / 363.7 lbs TN/yr = **\$6,391 per lb TN/yr**

*Source: 2013 Progress Report for the Santa Fe River BMAP

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Nitrogen Removal Cost Comparison



- Using BAM in a retention pond is a very expensive method for Nitrogen removal
- BAM is required for all retention ponds in SKA, regardless of site soil conditions
- Costs for WWTP and Ag BMPs are partially subsidized
- No proposed subsidies for BAM

