Collier County

Watershed Management Plan

December 17, 2010

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Project Objectives

- Develop watershed management plans that will help protect estuaries and wetland systems to
  - Restore historical water quantity and estuarine discharges
  - Improve water quality within the watersheds and estuaries
  - Address flood control and water supply issues
- Project will be completed in April 2010.

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Project Specific Tasks

- Update the BCB hydrologic/hydraulic computer model
- Evaluate watershed and estuarine existing conditions
  - Water quantity
  - Water quality
  - Natural resources
- Define performance measures
- Evaluate alternatives and identify recommended improvement projects and local regulatory changes
- Prepare Watershed Management Plans

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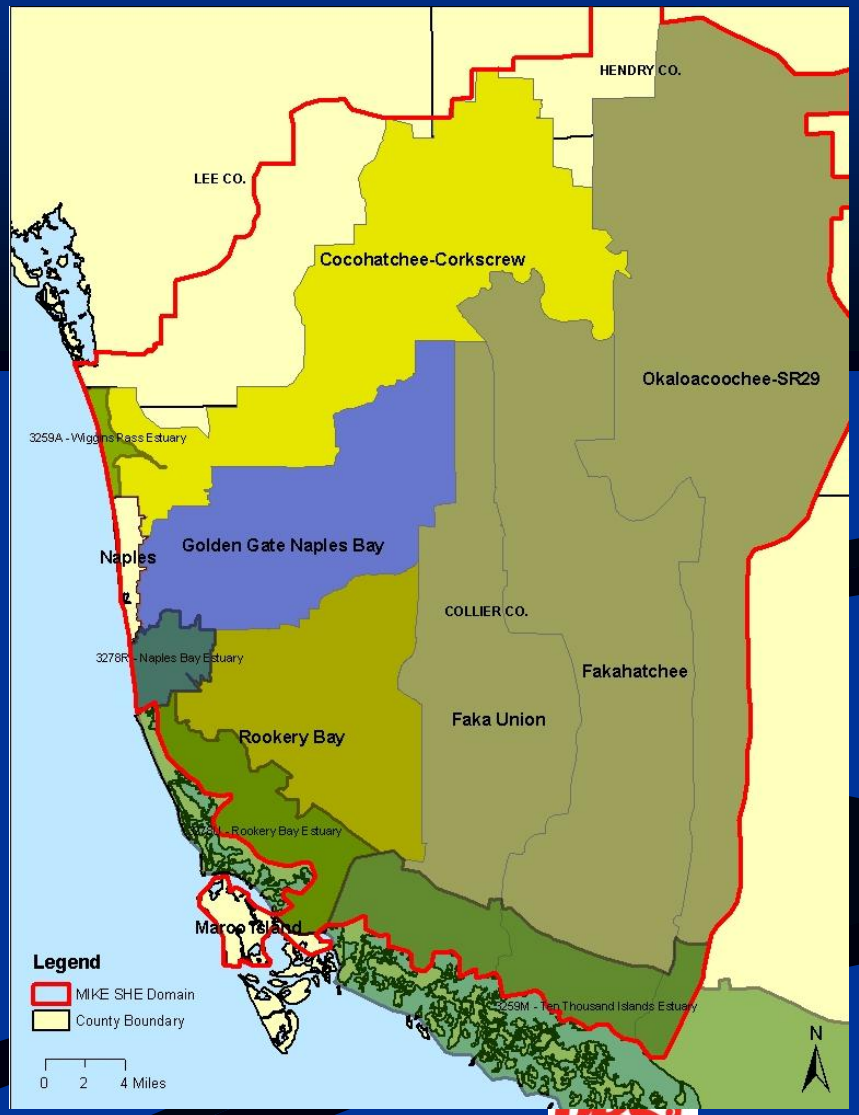
Watersheds

- Top Priority Watersheds
  - Cocohatchee Corkscrew
  - Golden Gate
  - Rookery Bay
- Additional Watersheds
  - Faka Union
  - Fakahatchee
  - Okaloacoochee SR 29
- Estuaries



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Agenda

- Natural Systems Evaluation
  - Revised functional assessment of watersheds
- Regulatory Review
- Proposed Fertilizer Ordinance

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Functional Assessment

- Existing condition evaluated for:
  - Vegetation
  - Hydrology
  - Landscape Suitability Index (landscape position)

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Vegetation Score Methodology

- Concept – assume that pre-development vegetation communities provide optimal functional value
- For watershed-level application
  - 2007 FLUCCS compared to PDVM

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Vegetation Score by Category

Model Land Use Type	MIKE SHE Model Code	FLUCCS Code	Vegetation Score
Citrus	1	221, 222, 223	4
Pasture	2	211, 212, 213, 251, 260, 261, 832	6
Pasture	2	190,192, 193 (urban abandoned)	1
Sugar Cane & Sod	3	2156, 242	4
Truck (Row) Crops	5	214, 215, 216	4
Golf Course	6	180, 182	1
Bare Ground	7	161, 162, 163, 164, 181, 231, 740, 743, 744, 8113, 8115, 835	0
Urban Low Density	41	110, 111, 112, 113, 119, 148, 185, 240, 241, 243, 250	1
Rural Residential Low Density	41	118	3
Urban Medium Density	42	120, 121, 122, 123, 129, 176, 834	1
Urban High Density	43	130, 131, 132, 133, 134, 135, 139, 140, 1411, 1423, 146, 149, 154, 155, 156, 170, 171, 183, 184, 187, 252, 810, 811, 814, 820, 831, 833	0

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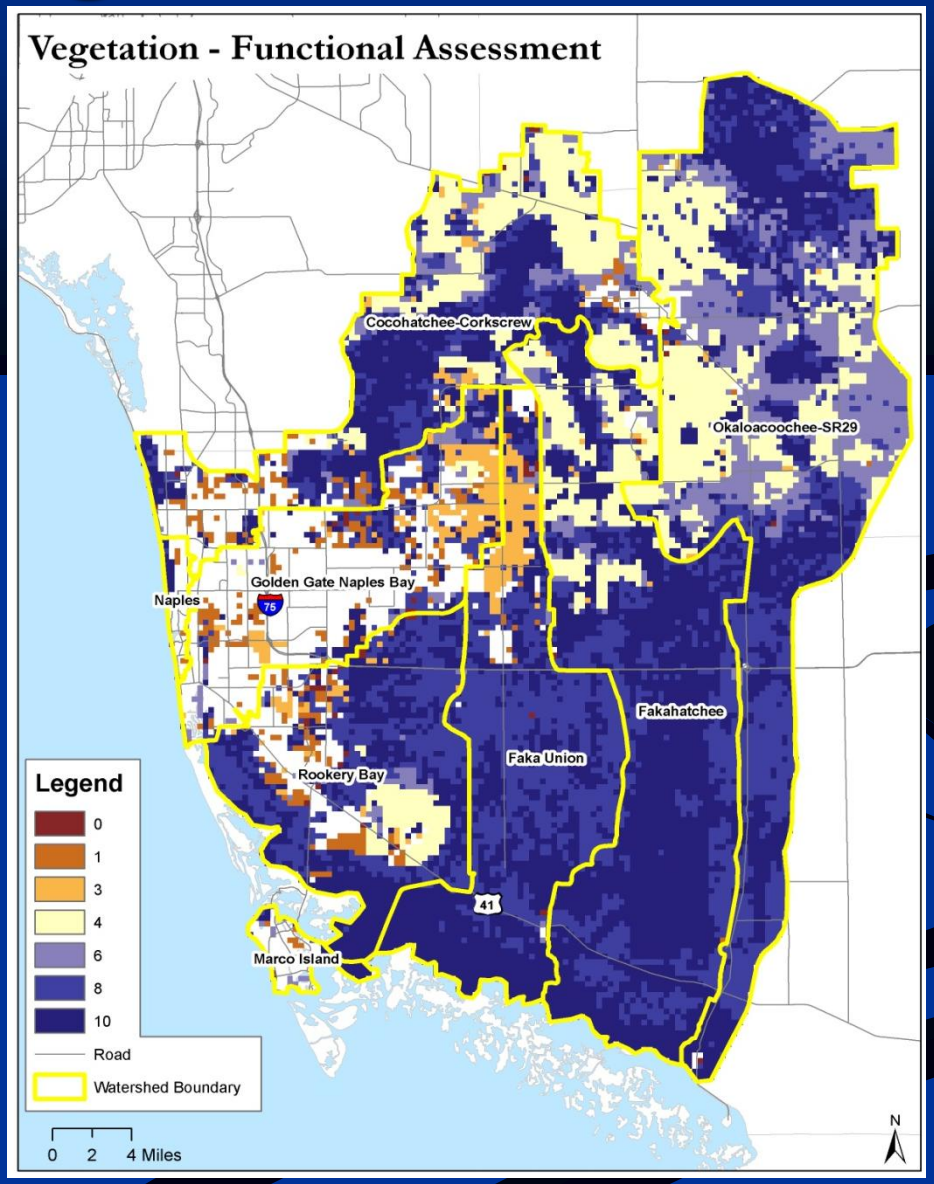
Vegetation Score Results



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Hydrology Score Methodology

- Concept – locations with similar water depths and hydroperiods over time provide optimal functional value
- Process: Compare existing conditions model hydrology against hydrology of PDVM vegetation
- Scoring computer based on:
  - Hydro-period
  - Seasonal Water Level

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PDVM Hydrology (Duever, 2004)

SW Florida Plant Communities	Hydroperiod (months)	Seasonal Water Level (inches)	
		Wet	Dry (1,10)*
Xeric Flatwood Xeric Hammock	0	≤-24	-60, -90
Mesic Flatwood Mesic Hammock	≤1	≤2	-46, -76
Hydric Flatwood Hydric Hammock	1 - 2	2 - 6	-30, -60
Wet Prairie Dwarf Cypress	2 - 6	6 - 12	-24, -54
Freshwater Marsh	6 - 10	12 - 24	-6, -46
Cypress	6 - 8	12 - 18	-16, -46
Swamp Forest	8 - 10	18 - 24	-6, -36
Open Water	>10	≥24	< 24, -6
Tidal Marsh Mangrove Beach	Tidal	Tidal	Tidal
* 1 = average year low water			
10 = 1 in 10 year drought			July 2002

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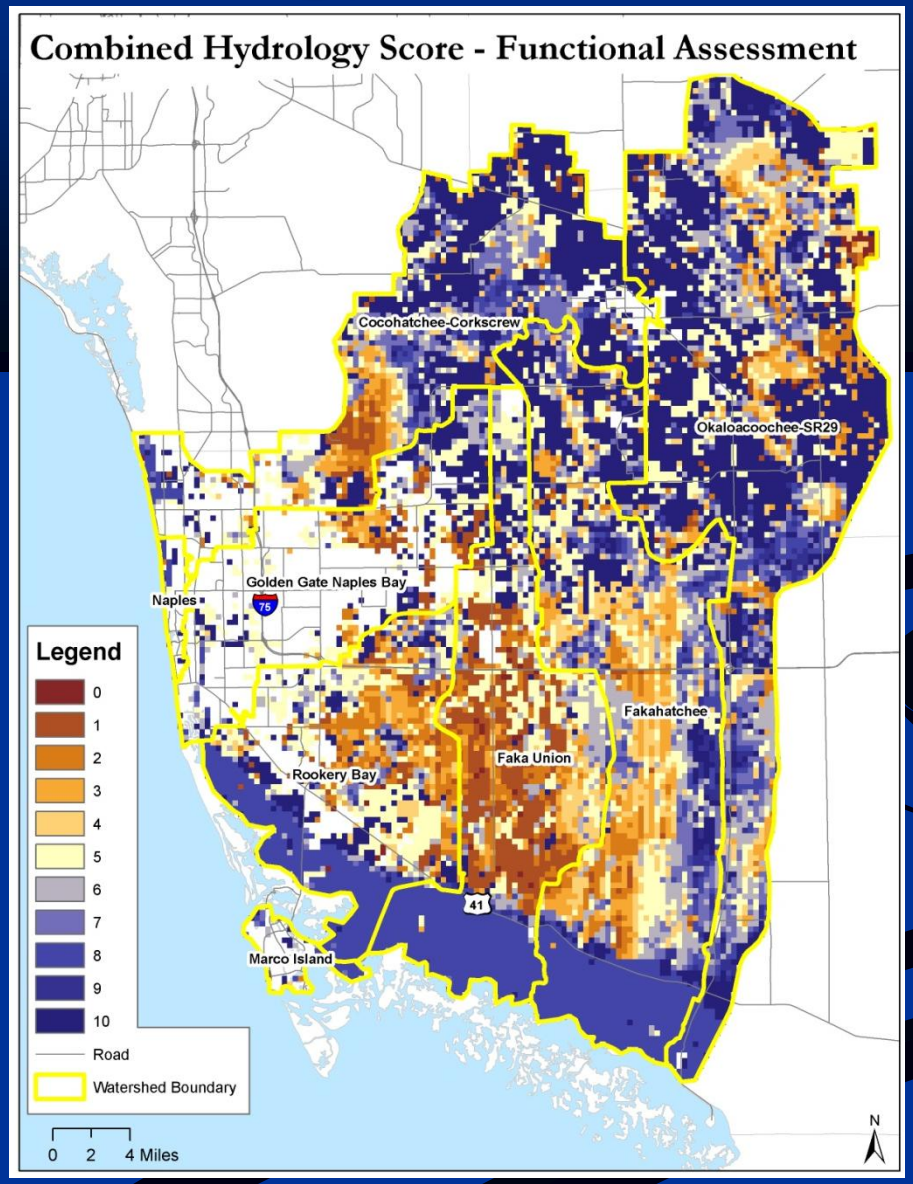
Hydrology Score Results



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Landscape Suitability Index Methodology

- Concept – evaluate habitat based on surrounding landuse
- Developed by Center for Wetlands (UF)
- For watershed-level application
  - 2007 FLUCCS into 1500 x 1500 foot cells
  - LSI for each cell calculated based on scores of adjacent cells
  - Scores reported by WBID and watershed

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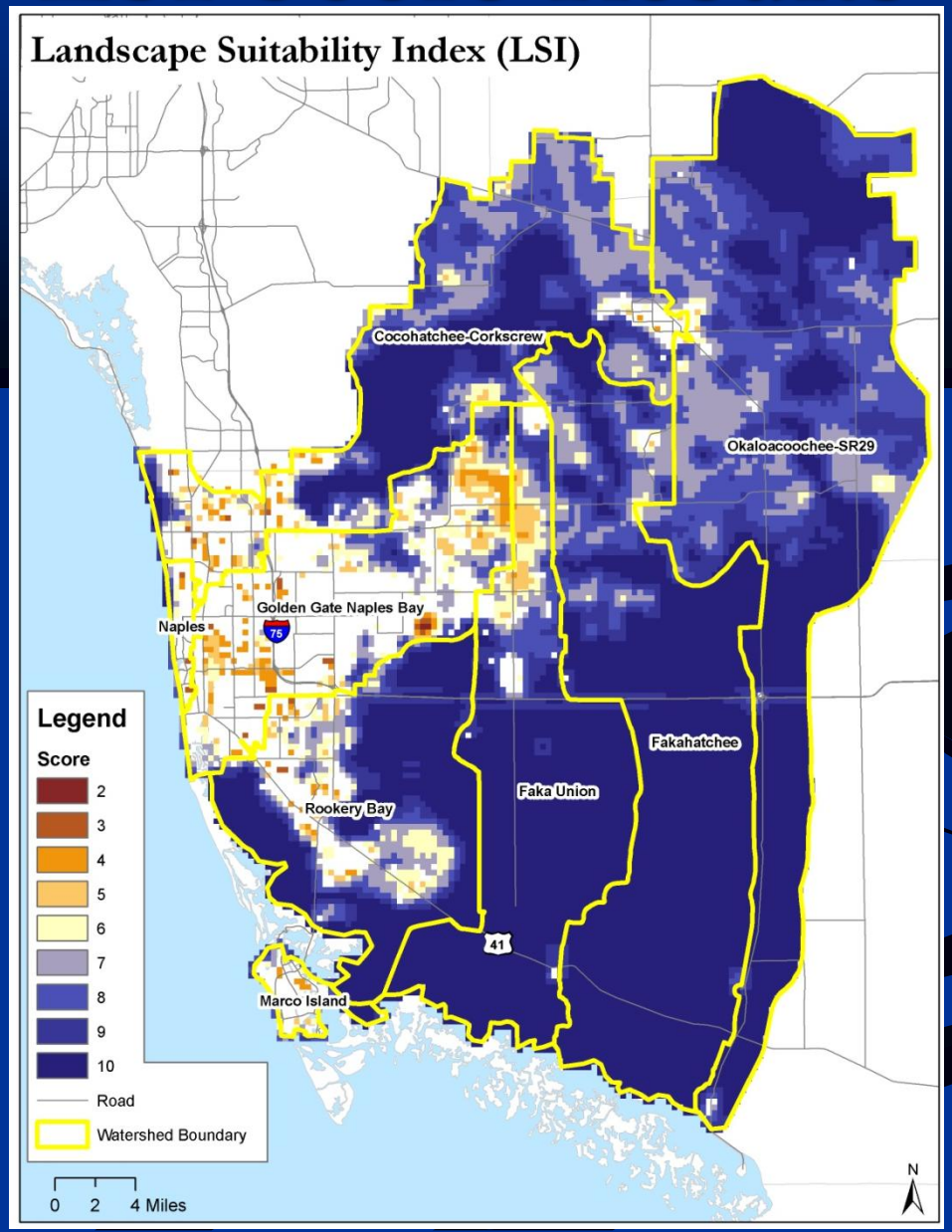
LSI Coefficients

Land Use/Land Cover	LSI Coefficients
Natural System	10.00
Natural Open water	10.00
Pine Plantation	9.36
Recreational / Open Space (Low-intensity)	9.08
Woodland Pasture (with livestock)	8.87
Pasture (without livestock)	8.03
Low Intensity Pasture (with livestock)	7.32
Citrus	7.02
High Intensity Pasture (with livestock)	6.96
Row crops	6.07
Single Family Residential (Low-density)	3.57
Recreational / Open Space (High-intensity)	3.42
High Intensity Agriculture (Dairy farm)	3.33
Single Family Residential (Med-density)	2.81
Single Family Residential (High-density)	2.72
Mobile Home (Medium density)	2.56
Highway (2 lane)	2.43
Low Intensity Commercial	2.22
Institutional	2.14
Highway (4 lane)	1.91
Mobile Home (High density)	1.90
Industrial	1.87
Multi-family Residential (Low rise)	1.49
High Intensity Commercial	0.91
Multi-family Residential (High rise)	0.90
Central Business District (Average 2 stories)	0.64
Central Business District (Average 4 stories)	0.00

LSI Score Results



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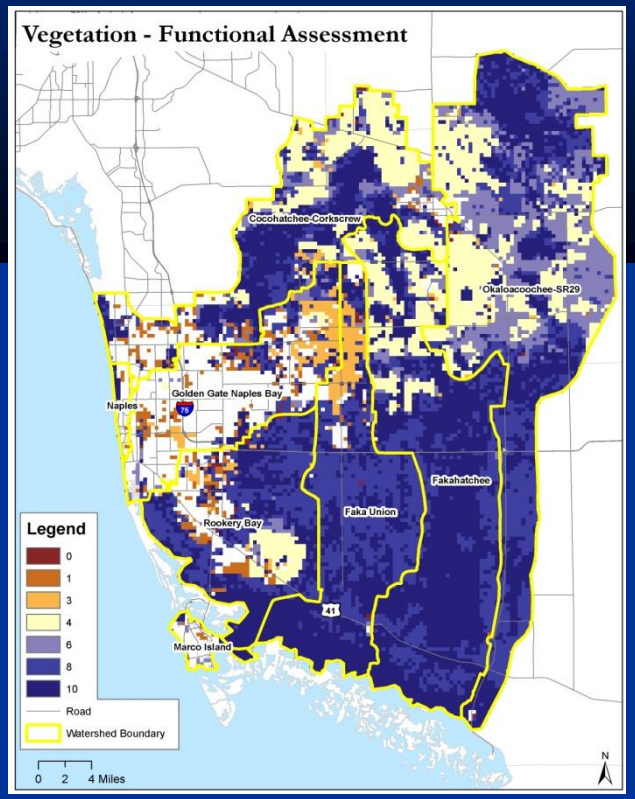
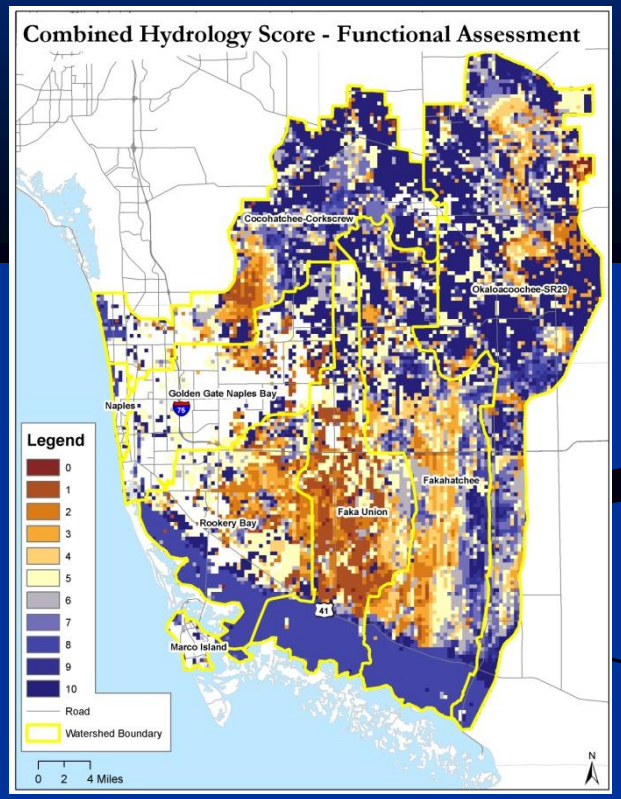
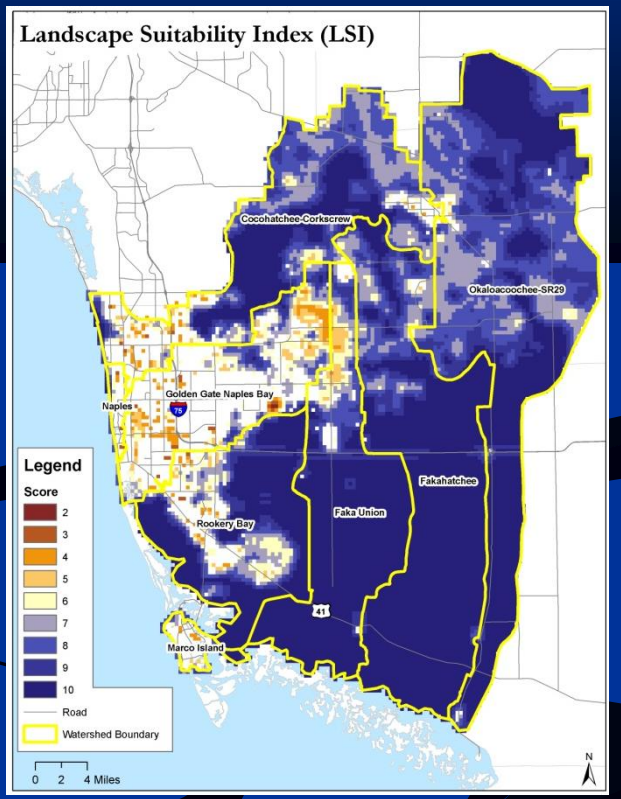
Functional Assessment Scores







Vegetation Hydrology LSI

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Evaluation of Ecologically Valuable Lands

- Based on Vegetation and LSI scores
  - Ecologically Valuable Lands:
    - Vegetation Score = 8 – 10
    - LSI Score = 10
  - Ecologically Supportive Lands:
    - Vegetation Score = 6 – 8
    - LSI Score = 8 – 10
  - Agricultural Supportive Lands:
    - Vegetation Score = 4 – 6
    - LSI Score = 6 - 8

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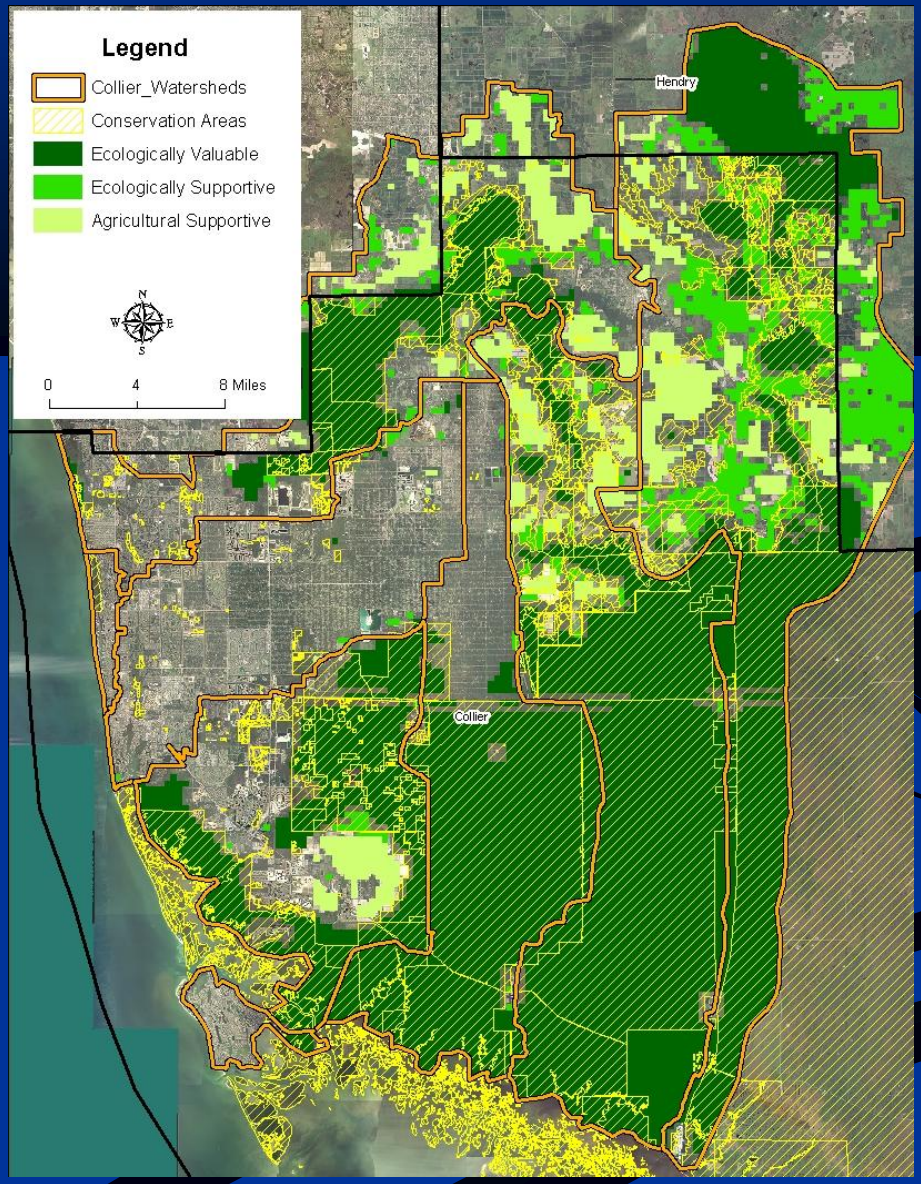
Ecologically Valuable Lands



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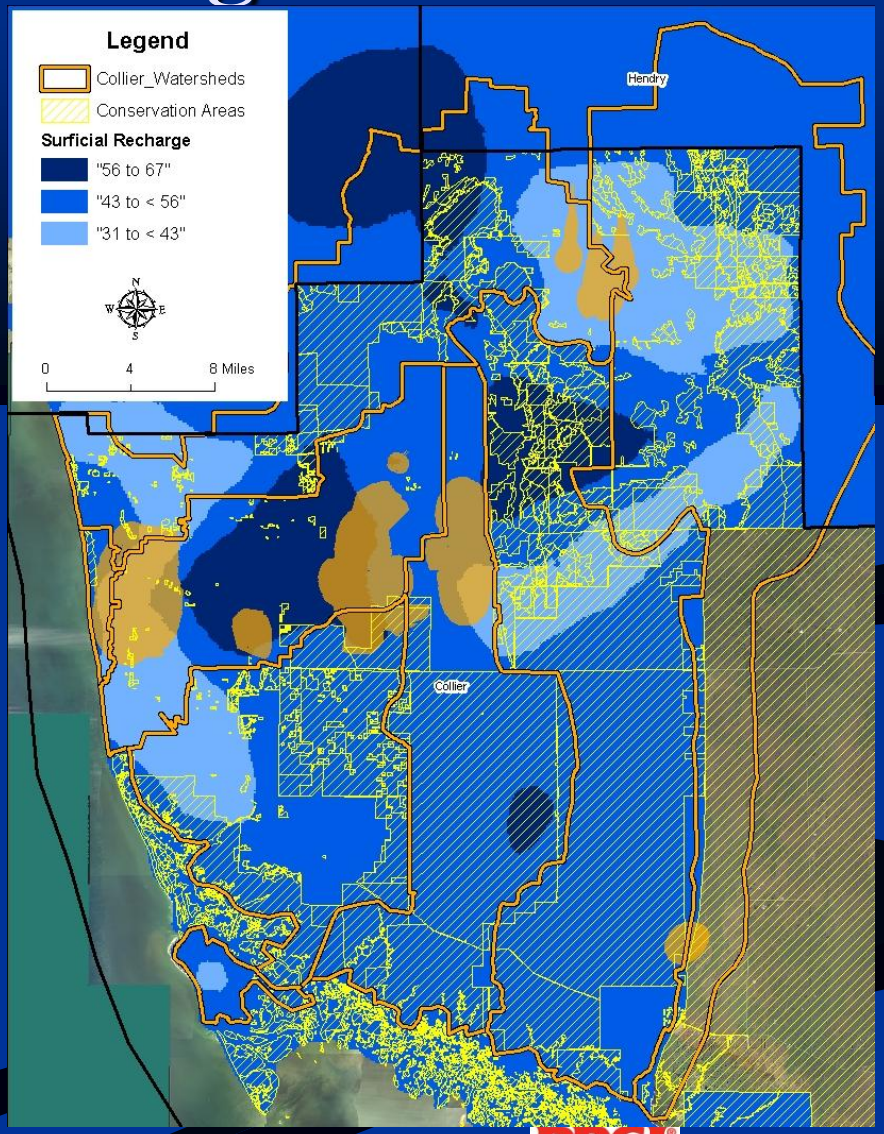
Groundwater Recharge Areas

- Data from SFWMD for surficial aquifer
- High recharge areas located in Golden Gate Estates and Camp Keais Strand
- Important for consideration of future development, including fertilizer ordinance



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Objective of Regulatory Review

- Help implement a Sustainable Stormwater Management Program
- The programs should aim to:
  - Promote more effective site planning to minimize anthropogenic impacts,
  - Promote preservation of the natural system
  - Help reduce development costs
  - Help reduce cost of future drainage system improvements

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Low Impact Development (LID)

- The program is based on the concept of LID
- LID promotes management of stormwater by:
  - Encouraging management of stormwater at the site
  - Minimize the extent of directly connected impervious areas.
  - Minimize site disturbance
  - Maintain or restore a site's natural hydrology
  - Maximize the site's assimilative capacity

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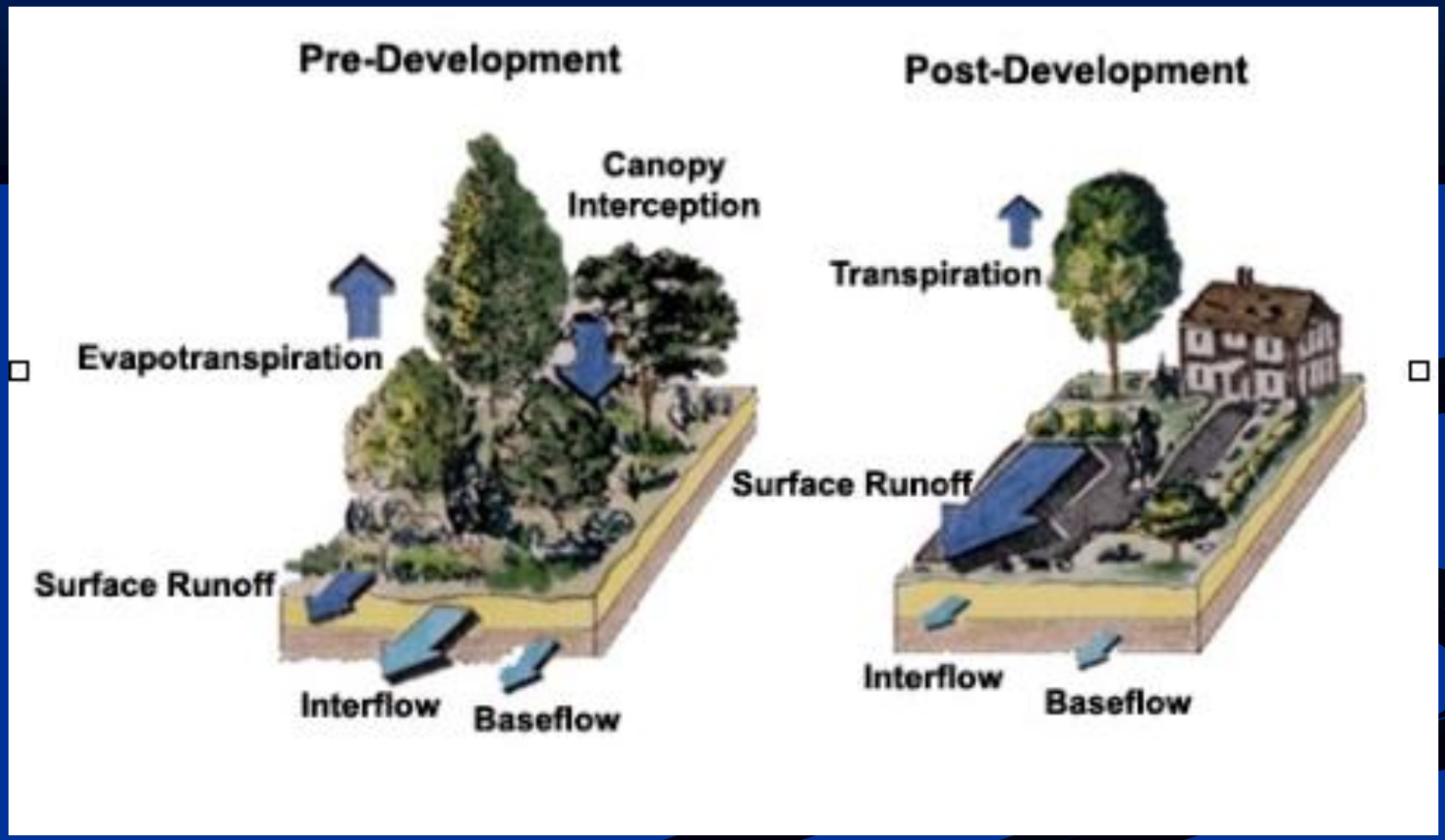
Current Stormwater Management Approach



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Low Impact Development (LID)

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Changes in Land Development Criteria

- Design recommendations
  - Directly connected impervious area
  - Recommended road widths
  - Parking lot design
- Combination of regulations and incentives

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Proposed Fertilizer Ordinance

- Fertilizers contribute to NPS Pollution
- 2009 Legislation Encouraged / Requires Model Fertilizer Ordinance Adoption
- FDEP, DACS, U of F IFAS Collaboration
- Fertilizer Ordinance
  - Protect Water Quality
  - Can be more stringent
  - Farms and Agricultural lands not affected
  - Training and Certification Program

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Model Ordinance Requirements

- Training and Licensing
- Prohibited Period – Watches
- Application Rate – Label requirement
- Fertilizer Free Zone – Voluntary 10 feet
- Low Maintenance Area (buffers)
- Exemptions – Agriculture
- Application Practices – No fertilizer on impervious

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Comparison with Existing Ordinances

Ordinance	FDEP/DACS/UF	City of Naples	SWFRPC	Lee County	CSWF
Trianing	Applicators	Applicators	Applicators	Applicators	Applicators
Certification	Applicators	Applicators	Applicators	Applicators	All Venues
Prohibited Period	Watches	June-Sept	June-Sept	June-Sept	Watches + June-Sept
Application Rate	Label Req: 2-7 lbs N per yr based on species; not > 1 lb N per application; 0.5 lb P per year	50 % slow N, 4 lbs N per yr, <=2 % P,	<=2 % P, 70 % slow N, no blended fertilizer<= 6 times / year	>= 50 % Slow N, 0.50 lbs. P / 1,000 ft2 per yr, 4 lbs. of nitrogen per 1000 ft2 per year	<= 50 % Slow N, 4 lbs. of N per yr No P, 0.50 lbs. P per yr,
Fertilizer Free Zone	10 ft	10 ft	25 ft	10 ft	10 ft
Exceptions	Agriculture, research	Agriculture + vetables	Agriculture	Agriculture; new plants; vegtables	Agriculture + various others
Enforcement	Applicators	Applicators	Applicators	Applicators	Applicators and Property Owners
Others		Sales			Sales

Wrap Up

- If you didn't sign in, please do so
  - Include your E-mail address and Phone Number
- Comments via E-Mail

  machatcher@colliergov.net
- Formal position papers
  - Please mail to Mac Hatcher

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