Florida Department of Environmental Protection

St. Lucie River and Estuary Basin Management Action Plan

Kim Gotwals, Facilitator

SAIC

Welcome and Introductions

- Purpose of Meeting
- Introductions
- House-keeping
- Agenda Review

Florida Department of Environmental Protection

St. Lucie River and Estuary Basin Management Action Plan

Bonita Gorham, Environmental Consultant
Watershed Planning and Coordination Section
Bureau of Watershed Restoration

St. Lucie River and Estuary Basin Management Action Plan

Description of the BMAP Progress to Date

- Kicked-off BMAP in July 2009
- Two technical meetings were held:

(1) March, 2010

(2) August, 2010

(3) March 29th, 2011

The Allocation Approach and Detailed Allocations to be presented at today's technical meeting

St. Lucie River and Estuary Basin Management Action Plan

March 2010 Meeting Summary (1 of 2)

In the March 2010 Meeting, FDEP discussed:

- The St. Lucie TMDL: What is a TMDL? Assumptions made, etc.

- Distributed to Stakeholders the Sunshine Law Summary as it related to BMAP development and future meetings

- Provided to Stakeholders our GIS shape files of basin boundaries

- Discussed the inclusion of Special Districts: Water Control or 298 Districts and provided Special District Map

- Presented to Stakeholders the General Allocation Approach

St. Lucie River and Estuary Basin Management Action Plan

March 2010 Meeting Summary Continued (2 of 2)

- Presented a map of the current information we had (at the time) of agricultural Lands that FDACS had (previously) negotiated agreements (Notice of Intent), relating to the implementation of Best Management Practices on citrus, cattle and other commodity groups, (where BMP manuals had been developed and adopted)

- FDEP provided to our stakeholders a Project Collection Sheet for Structural and Non-Structural Provisional Credits (and including an example project sheet with a few projects listed, e.g., 319 projects by jurisdictions)

- FDEP provided the current Non-Structural or Provisional Credit Information for stakeholders to include in their project collection forms

All above meeting information is available at this link:
http://publicfiles.dep.state.fl.us/DEAR/BMAP/StLucie/Meetings/March2010TechMtg/

St. Lucie River and Estuary Basin Management Action Plan

August 2010 Meeting Summary (1of 2)

- FDEP provided more information on provisional BMAP credits (such as Education and Outreach programs as well as street sweeping, non-structural projects, etc.)

- FDEP discussed project collection and requests for BMAP credits toward allocations, and noted that it includes all projects on the ground or in place since 2000 and beyond

- FDEP provided the Stormwater BMP efficiency information that will be considered BMAP credit toward entity's allocations

- FDEP provided map of Managed and Conservation Lands that will be "excluded" from entity's jurisdictional allocations

All above meeting information is available at this link:
http://publicfiles.dep.state.fl.us/DEAR/BMAP/StLucie/Meetings/August18,2010/

St. Lucie River and Estuary Basin Management Action Plan

Consistency or Cross Walk with the SLRWPP (1 of 2)

• The TMDL watershed boundaries differed significantly from the watershed boundaries used by the SFWMD's (and St. Lucie River Issues Team's) St. Lucie River Watershed Protection Plan (SLRWPP)

•FDEP had defined a larger boundary to consider for the Basin Management Action Plan that would include the ENTIRE St. Lucie River and Estuary Watershed, (rather than just TMDL Waterbodies).

•Thus, FDEP is including in this BMAP the North St. Lucie River, South St. Lucie, and the S-153 sub-watersheds that were a part of the bigger picture for the SLRWPP.

St. Lucie River and Estuary Basin Management Action Plan

Consistency or Cross Walk with the SLRWPP (2 of 2)

- In addition, it was FDEP's goal to have a relatively simple model that could be easily applied and readily duplicated so that we could make refinements, as necessary, during the BMAP process

(Referring now to WBID vs. SLRWPP comparison map)

St. Lucie River and Estuary Basin Management Action Plan

Allocation Approach and Maps

GIS Processing Steps:

(1)Start with Entire Watershed Boundaries

(2)Clip FPL Cooling Ponds from Allocations

(3)Clip Managed and Conservation Lands

(4)Clip WCDs/298 Districts

(5)Clip FDOT Roadways (District 4/Turnpike)

(6)Clip MS-4 areas

(7)Clip Agricultural Lands (as defined by FLUCCS)

(8)Remainder to Counties (St. Lucie, Martin, Okeechobee)

QUESTIONS?

St. Lucie River and Estuary Basin Management Action Plan
Allocation Approach and Maps

Referring Now to the BASE Map on Display and On-Screen

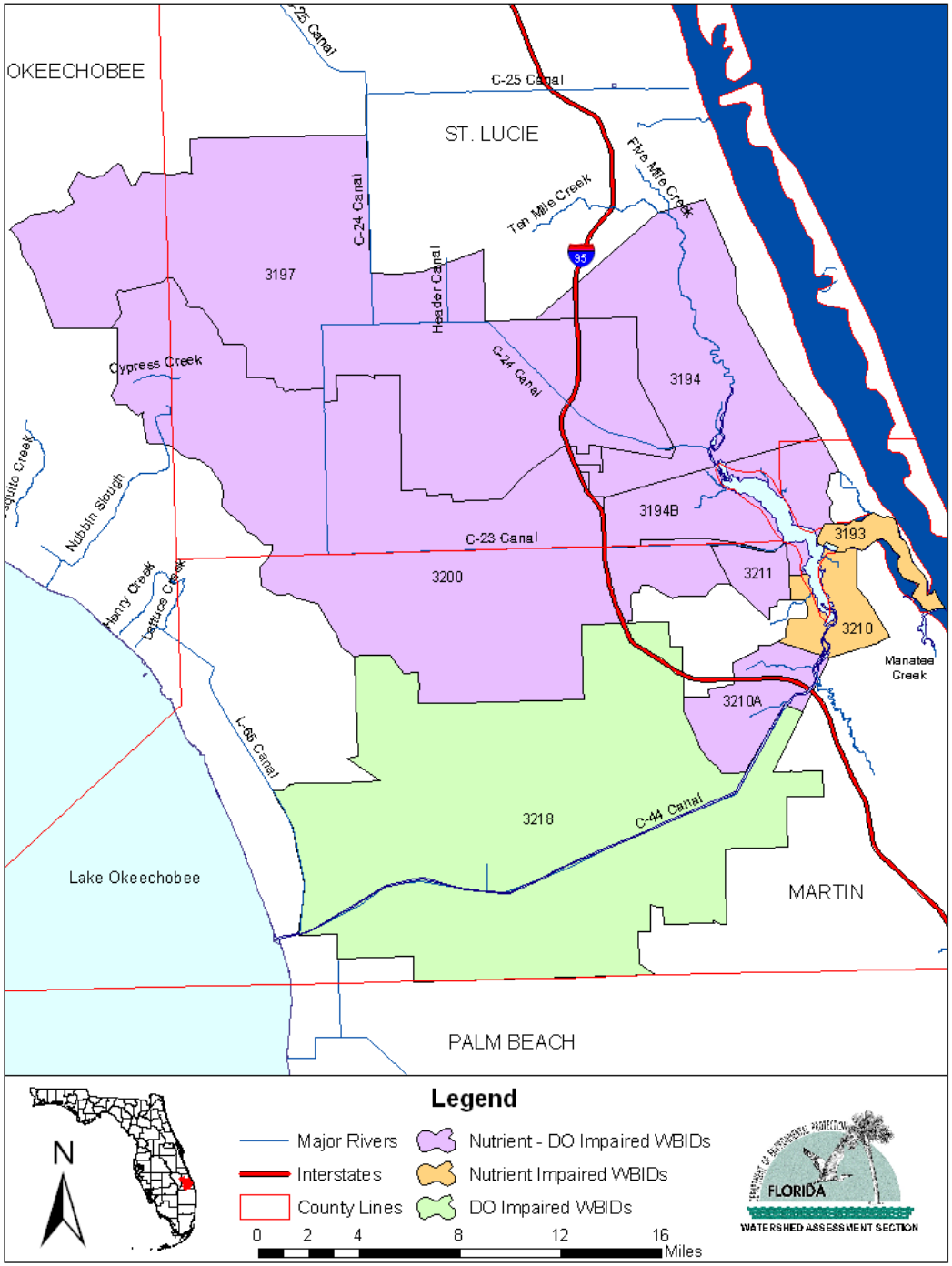
Florida Department of Environmental Protection

Nutrient and Dissolved Oxygen TMDL for the St. Lucie Basin Basis of the BMAP

Wayne Magley, Ph.D.
Watershed Evaluation and TMDL Section
Bureau of Watershed Restoration

Nutrient and Dissolved Oxygen TMDL for the St. Lucie Basin

- Adopted by rule (62-304.705(1)-(9), FAC) in March 2009
- Total Nitrogen and Total Phosphorus reductions in 9 WBIDs
  - St. Lucie Estuary (WBID 3193)
  - North Fork St. Lucie River (WBID 3194)
  - North Fork St. Lucie Estuary (WBID 3194B)
  - C-24 Canal (WBID 3197)
  - C-23 Canal (WBID 3200)
  - South Fork St. Lucie Estuary (WBID 3210)
  - South Fork St. Lucie River (WBID 3210A)
  - BesseyCreek (WBID 3211)
  - C-44 Canal (WBID 3218)
- BOD reductions in 3 WBIDs
  - North Fork St. Lucie River (WBID 3194)
  - C-24 Canal (WBID 3197)
  - C-44 Canal (WBID 3218)


OKEECHOBEE
C-25 Canal
ST. LUCIE
Ten Mile Creek
Five Mile Creek
C-24 Canal
Header Canal
3197
Cypress Creek
3194
3194B
Nubbin Slough
C-23 Canal
3200
3211
3193
3210
Manatee Creek
Henry Creek
Lettuce Creek
3210A
L-65 Canal
3218
C-44 Canal
Lake Okeechobee
MARTIN
PALM BEACH
Legend
Major Rivers
Interstates
County Lines
Nutrient - DO Impaired WBIDs
Nutrient Impaired WBIDs
DO Impaired WBIDs
N
0 2 4 8 12 16
Miles
FLORIDA
WATERSHED ASSESSMENT SECTION

TMDL Development

- Water Quality Targets
  - TN 0.72 mg/L
  - TP 0.081 mg/L
  - BOD 2.0 mg/L
- Data Used
  - WaSh modeled average flow over 1996 – 2005 period
  - Average of TN, TP, and BOD water quality measurements over 1996 – 2005 period
- TMDL Expression
  - Percent reduction based on average concentrations versus target concentrations

Allocation Development

- Loading Spreadsheet
  - Spreadsheet model used to estimate long-term average TN and TP loads and flows from SFWMD sub-watersheds in the St. Lucie River Watershed.
  - Sub-watershed flows calculated based on runoff using 1999 land use/soil type and rainfall average over the 1996-2005 period.
  - Sub-watershed TN and TP loads based on calculated runoff and EMCs for various land uses.

Contact

Wayne Magley

Environmental Manager

Watershed Evaluation and TMDL Section

Bureau of Watershed Restoration

wayne.magley@dep.state.fl.us

850.245.8463

QUESTIONS?

Florida Department of Environmental Protection

Arriving at Allocations

St. Lucie BMAP Meeting, March 29, 2011

Bob Kelly, PhD
SAIC

Requirements for Calculating Allocations

- A method to
  1. Relate land use and rainfall to nutrient loads from sub-watersheds (e.g., C-44)
  2. Determine who is responsible for loads generated
  3. Relate known inputs (nutrient loads) to desired outputs (nutrient concentrations in the estuary)
  4. Determine what nutrient loads will allow estuary target concentrations to be met

The Methods

- Several water quality models are available to calculate allocations, some specifically developed for the St. Lucie Estuary
- DEP's goal, however, was to have a relatively simple model that could be easily applied, and no existing model met this requirement

DEP's Model (1)

- DEP developed a spreadsheet model that allowed for the input of
  - Land uses by jurisdiction (entity) based on Geographic Information System (GIS) input files.
    - Jurisdiction boundaries from jurisdictions, with the exception of 298 districts, whose boundaries came from the South Florida Water Management District (WMD)
    - Land use from WMD 1999 GIS coverage

DEP's Model (2)

- Development started with TMDL watershed boundaries and "typical" runoff coefficients (ROCs) and event mean concentrations (EMCs) for different land uses that had been applied to other basins
- TMDL loads could not be duplicated for several reasons

DEP's Model (3)

- The primary reason: the TMDL area (where there were impaired waterbodies) was smaller than the whole St. Lucie watershed.
- Also, the TMDL watershed boundaries differed in other significant ways from the watershed boundaries used by the WMD in the St. Lucie River Watershed Protection Plan (SLRWPP)

DEP's Model (4)

- So the model was reformulated to use the watershed boundaries used in the SLRWPP
- The model was then "calibrated" against the SLRWPP loadings by sub-watersheds

DEP's Model (5)

- Initial model calculations using ROCs and EMCs from Harper and Baker (2007) resulted in much higher flows, loads, and nutrient concentrations than were reported in the SLRWPP
- So across-the-board reductions were made to ROCs and EMCs to see if model outputs could more closely match the information in the SLRWPP

DEP's Model (6)

- The first cut at reductions was to reduce all ROCs such that the total flow from the basin matched the total flow in the SLRWPP
- The second cut at reductions was to reduce EMCs for both TN and TP so that the total nutrient loading matched the total nutrient loading in the SLRWPP

DEP's Model (7)

- While the overall totals were now correct, there were differences between flows and loadings from individual sub-watersheds in the model and the SLRWPP
- So ROCs and EMCs were adjusted for individual land uses by trial and error until there was a "reasonable" fit between model results and the SLRWPP

DEP's Model (8)

- The result is that for a variety of parameters for each sub-watershed:
  - Flow
  - TN and TP total loads
  - TN and TP loads/acre
  - TN and TP concentrations

  there is agreement within 20% for all parameters for each watershed (with one exception) See handout.

Allocations (1)

- TMDL based target sub-watershed loads on target nutrient concentrations at Roosevelt Bridge
- BMAP allocations based on same target using DEP's model described above

Allocations (2)

- Two allocation methods tried; second one preferred by DEP
  - Straight percentage reduction for each entity based on its contribution to total load from each sub-watershed
  - Reduction based on difference between an entity's load per acre and the target load per acre for each sub-watershed

Allocations (3)

- Follow along on handouts:

Comparison of DEP Model and SLRWPP Results

Allocation Calculation Basis

Allocations Using Target Load per Acre Method

Overall Reductions Required

QUESTIONS?

St. Lucie River and Estuary Basin Management Action Plan
Next Steps

- Continuation of Project Collection from All Stakeholders

- Project Credit Calculations for Structural, non-structural and provisional BMAP credits (at least as a baseline for how far to still go)

- Issues Team Approach

- Future Project Planning

- BMAP Schedule: *Tentatively* Next BMAP date Mid to late May