SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Fisheating Creek Feasibility Report – Phase 1

Working Team Meeting #2
February 13, 2009

sfwmd.gov

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Meeting Agenda

	Topic	Lead
1.	Introductions	A. Ramirez
2.	Meeting Objectives	A. Ramirez
3.	Working Team Meeting #1 Summary	J. Penkosky & Team Members
4.	Document & Data Summary Report Discussion	J. Penkosky & Team Members
5.	WAM Model Tool Briefing	J. J. Zhang, PhD
6.	Schedule Review & Next Steps	A. Ramirez
7.	Comments / Questions	All

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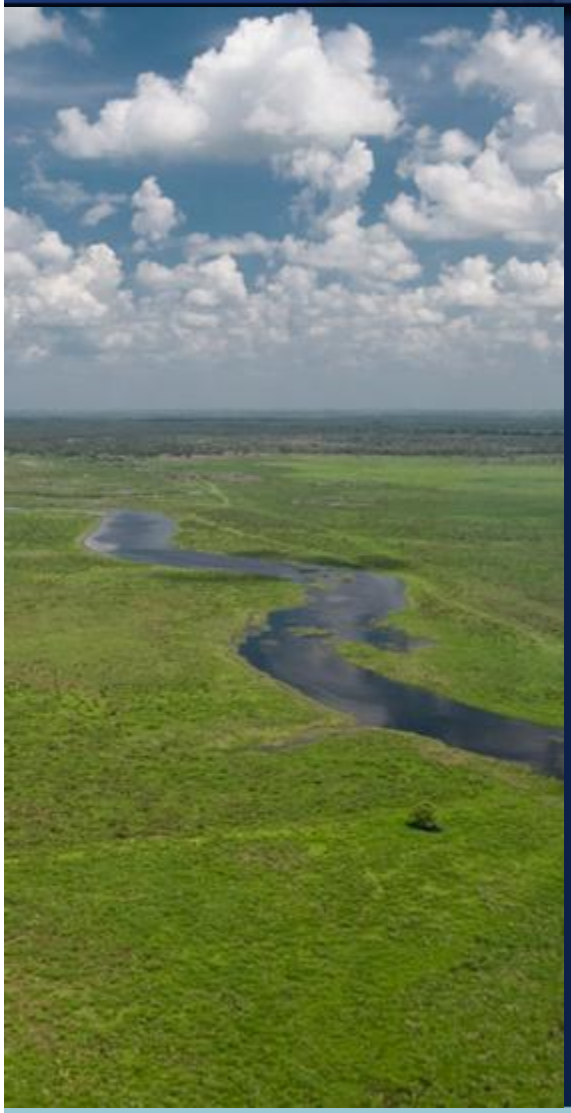

Meeting Objectives

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Project Objectives

Conduct a Feasibility Study of the Fisheating Creek Sub-Watershed to:

- Define the best mix of storage and water quality improvement features
- Identify locations for siting these features
- Develop preliminary engineering design and cost estimates for identified features

FEC Study Area

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Scope of Work

To be completed in 3 phases:

- Phase 1: Investigation of available information and work plan development
- Phase 2: Alternative formulation, evaluation and selection
- Phase 3: Compilation of results and write-up of the feasibility report

We are currently completing Phase 1

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Scope of Work Progress Summary (where we are)

- Completed draft Final Data/ Document Summary Report
- Completed draft Feasibility Criteria Technical Memo
- Completed draft Feasibility Report Work Plan
- Conducted Working Team Meeting #1

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Working Team Meeting #2 Objectives

- Summary review of Working Team Meeting #1
- Provide WAM modeling tool briefing
- Present overall project progress timeline

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Working Team Meeting #1

Additional Findings

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Summary

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Additional Information and Findings

- 2006 Land Use Map
  - More refined categories included
  - Cropland and pastureland: 37.9%
  - Most wetlands are non-forested: 13.1%
  - Hardwood forested wetlands : 5.10%
  - In past 20 years, urban development within sub-watershed varied from 1.3% in 1988 to 1.4% in 2006
- Phosphorus Loadings (map)
- Extremely large flow variations
  - 0 to 400+ cfs at SR 70
  - 0 to 1,500+ cfs at FISHP Station
- Phosphorus loading primarily during high flow periods
- Many ditches in northern section to drain
- Most soils in FEC have limited phosphorus retention capabilities

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- Consultation with USFWS and FWC re: protected species (maps)
  - 11 Federal animal species
  - Over 60 additional state species
- USDA and Nature Conservancy can provide information on wetlands restored or preserved through federal programs
- Precipitation and Evapotranspiration data obtained from FAWN, DBHYDRO and Water Management Information System (WIMS)
- Consultation with local natural resource experts should continue
- Other information as provided by Stakeholders (thank you!)

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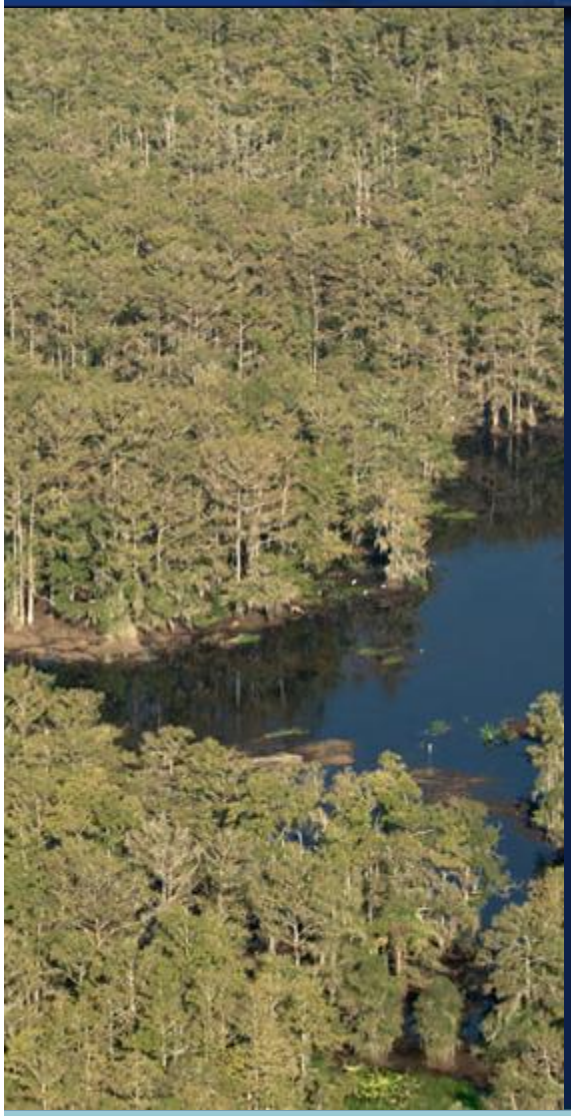

Data Summary
Open Discussion

- Site conditions discussion provided additional information and resources
- Information received was incorporated into Report or identified as ‘Gap Analysis’
- Relevant ‘gap’ information will be important for Phase 2
- draft Final Data/Document Summary Report posted

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WAM Modeling Tool Briefing

1. Major Issues
2. Modeling Tools
3. Watershed Assessment Model (WAM)

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Land Use Data (2006)

- 54% agriculture and rangeland
- 43% wetland and upland forest

Basin/Sub-watershed	Urban and Built Up	Agriculture	Rangeland	Upland Forest	Water	Wetlands	Barren Land	Transportation, Communication, and Utilities	Total (ac)
Fisheating Creek	4,213	125,140	28,138	59,880	1,026	69,718	212	1,040	289,367
Nicodemus Slough	1	16,856	556	3,351	147	4,191	346	193	25,641
Subtotal for Fisheating Creek/Nicodemus Slough Sub-Watershed	**4,214**	**141,996**	**28,693**	**63,231**	**1,173**	**73,910**	**558**	**1,233**	**315,008**
Percentage	1%	45%	9%	20%	0%	23%	0%	0%	100%

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Flow and Loads (baseline 1991-2005)

- Flow: 221,000 ac-ft
- TP load: 55 metric tons
- TP conc.: 200 ppb
- TN load: 415 metric tons
- TN conc.: 1.52 mg/L

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Load Reduction

- About 80% load reduction needed to meet the TMDLs
  - Parcel level BMP implementation
  - Sub-basin level P reduction projects

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Modeling Tool Selection
(obtained from WAM peer review doc)

- WAM
- BASINS/HSPF
- MIKE SHE
- SWAT

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Comparative Capabilities/Properties of WAM and Selected Other Watershed Models

Property/Process	Comparative Levels of Property/Process Simulation			
	WAM	BASIN/HSPF	MIKE SHE	SWAT
Ag BMP Simulation				
Land uses simulated	3	3	3	3
Crop growth	3	1	3	3
Nutrient uptake	2	3	3	2
Irrigation management	2	2	2	2
Nutrient management	2	2	2	2
Other practices	2	2	2	2
Urban BMP Simulation				
Practices simulated	1	2	3	2
Nutrient Transport and Transformation				
Within cell/land phase	2	2	3	2
Within overland flow	1	1	3	1
Within wetlands	1	-	3	-
Within groundwater	1	2	3	?
Within River	1	3	3	2

1. Low: Basic, relatively simple (often empirical) representation/capability
2. Medium: Moderate complexity and usually process based
3. High: Current state-of-the-art, or close to it

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Comparative Capabilities/Properties of WAM and Selected Other Watershed Models

Property/Process	Comparative Levels of Property/Process Simulation			
	WAM	BASIN/HSPF	MIKE SHE	SWAT
General				
Spatial Scale	3	3	2	3
Spatial Discretization	3	2	3	2
Temporal Scale	2	3	3	2
Temporal Discretization	2	3	3	2
GIS Interaction	3	2	3	2
Experience/Applications in FL	3	2	2	1
Availability	Public Domain	Public Domain	Private	Public Domain
Cost	Free	Free	Major Cost	Free

1. Low: Basic, relatively simple (often empirical) representation/capability
2. Medium: Moderate complexity and usually process based
3. High: Current state-of-the-art, or close to it

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WAM Strengths

- The high level of spatial definition provided by the GIS cell-based representation
- The availability of model setup and application for Florida conditions
- The ability to represent flow structures and facilities common to Florida waterways
- The efficiency for modeling BMP scenarios

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WAM Weaknesses

- The lack of physical process representation of in-stream process other than flow routing
- The simple representation of urban land uses with constant water quality concentrations
- Insufficient documentation

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WAM Modeling Effort for the Lake Okeechobee Watershed

- CERP Project (about 25 drainage basins north of the Lake)
- Model Enhancement (entire LOPP area)
  - Model calibration will be completed in March and BMP runs will be completed in May

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Schedule Review

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Next Steps

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Schedule Review

Year	2008				2009												2010		
Month	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
Phase 1																			
Phase 2																			
Phase 3																			

Progress Bar Planned Bar

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Next Steps

- Complete final submittals for Phase 1
- Commence with Phase 2

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Comments / Questions

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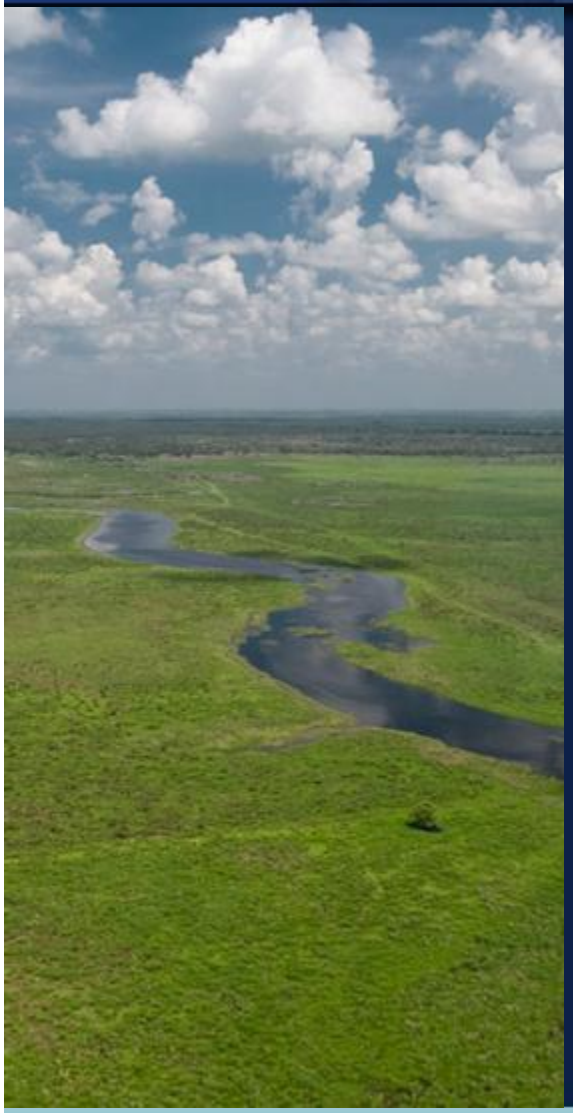
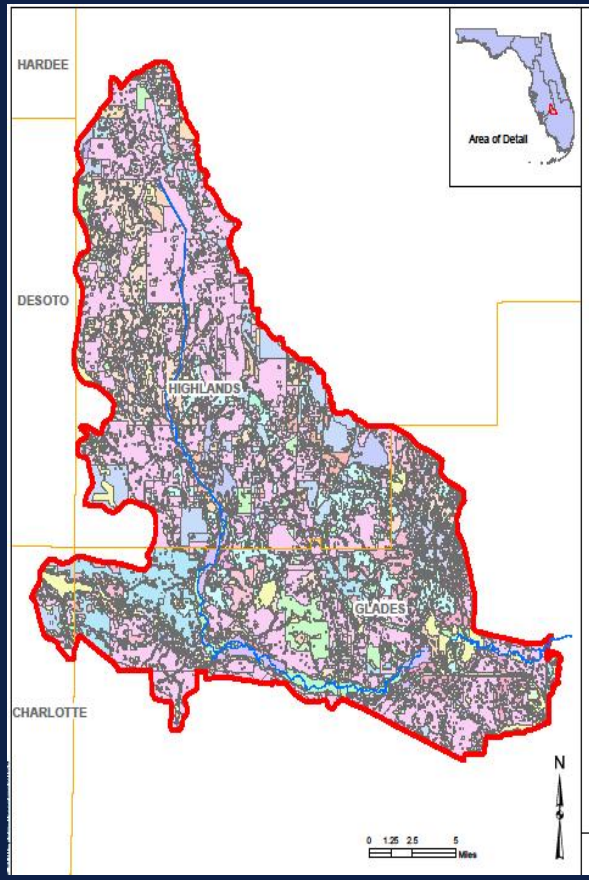


2006 Land Use Map



Legend

- Study Area
- County Boundaries
- Fisheating Creek

Land Use 2006

- 1100, 1200, 1300 Residential
- 1400 Commercial and Services
- 1900 Open Land
- 2100 Cropland and Pastureland
- 2210 Citrus Groves
- 2230 Other Groves
- 2400 Nurseries and Vineyards
- 2510 Horse Farms
- 2520 Dairies
- 2540 Aquaculture
- 2610 Fallow Crop Land
- 3100 Rangeland: Herbaceous
- 3210 Rangeland: Shrub & Brushland: Palmetto Prairies
- 3290 Rangeland: Other Shrubs & Brush
- 3300 Mixed Rangeland
- 4110 Upland Coniferous Forests: Pine Flatwoods
- 4120 Upland Coniferous Forests: Longleaf Pine/Xeric Oak
- 4130 Upland Coniferous Forests: Sand Pine
- 4140 Upland Coniferous Forests: Pine - Mesic Oak
- 4210 Upland Hardwood Forests: Xeric Oak
- 4220 Upland Hardwood Forests: Brazilian Pepper
- 4230 Upland Hardwood Forests: Oak - Pine - Hickory
- 4240 Upland Hardwood Forests: Melaleuca
- 4250 Upland Hardwood Forests: Temperate Hardwoods
- 4270 Upland Hardwood Forests: Live Oak
- 4280 Upland Hardwood Forests: Cabbage Palm
- 4320 Upland Hardwood Forests : Sand Live Oak
- 4340 Upland Hardwood Forests : Hardwood - Conifer Mixed
- 4350 Upland Hardwood Forests : Dead Trees
- 4380 Upland Hardwood Forests : Mixed Hardwoods
- 4410 Tree Plantations: Coniferous Plantations
- 4430 Tree Plantations: Forest Regeneration Areas
- 5100 Streams & Waterways
- 5300 Reservoirs
- 5600 Slough Waters
- 6110 Wetland Hardwood Forests: Bay Swamps
- 6140 Wetland Hardwood Forests: Titi Swamps
- 6150 Wetland Hardwood Forests: Stream and Lake Swamps (Bottomland)
- 6170 Mixed Wetland Hardwoods
- 6171 Mixed Wetland Hardwoods: Willows
- 6172 Mixed Wetland Hardwoods: Mixed Shrubs
- 6210 Wetland Coniferous Forests: Cypress
- 6219 Wetland Coniferous Forests: Cypress with Wet Prairies
- 6220 Wetland Coniferous Forests: Pond Pine
- 6240 Wetland Coniferous Forests: Cypress - Pine - Cabbage Palm
- 6300 Wetland Forested Mixed
- 6410 Vegetated Non-Forested Wetlands: Freshwater Marshes
- 6411 Vegetated Non-Forested Wetlands: Freshwater Marshes: Sawgrass
- 6412 Vegetated Non-Forested Wetlands: Freshwater Marshes: Cattails
- 6430 Vegetated Non-Forested Wetlands: Wet Prairies
- 6439 Vegetated Non-Forested Wetlands: Wet Prairies with Pine
- 6440 Vegetated Non-Forested Wetlands: Emergent Aquatic Vegetation
- 7000 Barren Land
- 8110 Transportation: Airports
- 8120 Transportation:Railroads
- 8140 Transportation: Roads and Highways
- 8160 Transportation: Canals and Locks
- 8320 Utilities: Electrical Power Transmission Lines

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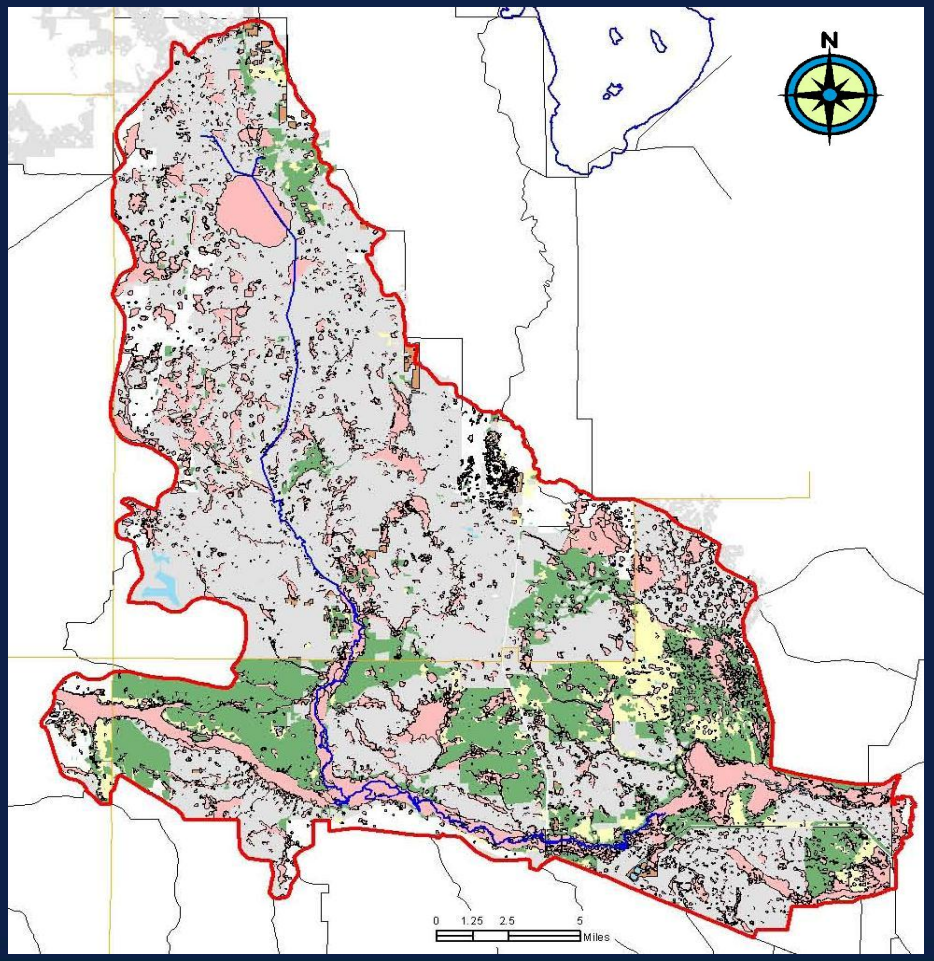
2004 Land Use Map



Legend

- AGRICULTURE
- RANGELAND
- UPLAND FORESTS
- URBAN AND BUILT-UP
- WATER
- WETLANDS
- STUDY AREA
- FDEP MAJOR RIVERS
- COUNTY BOUNDARY

(Source: SFWMD 2008)

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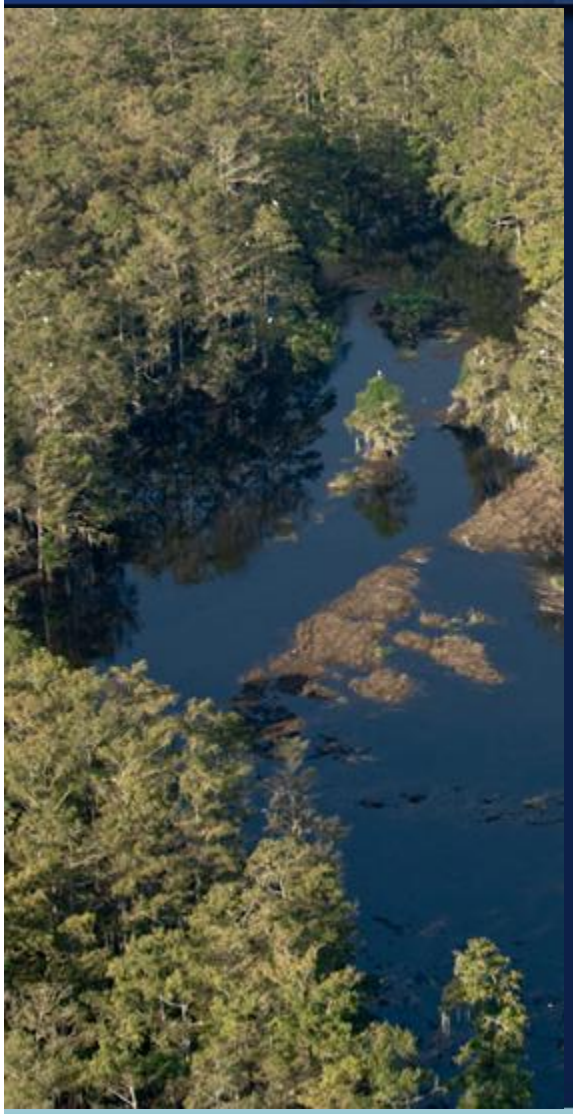
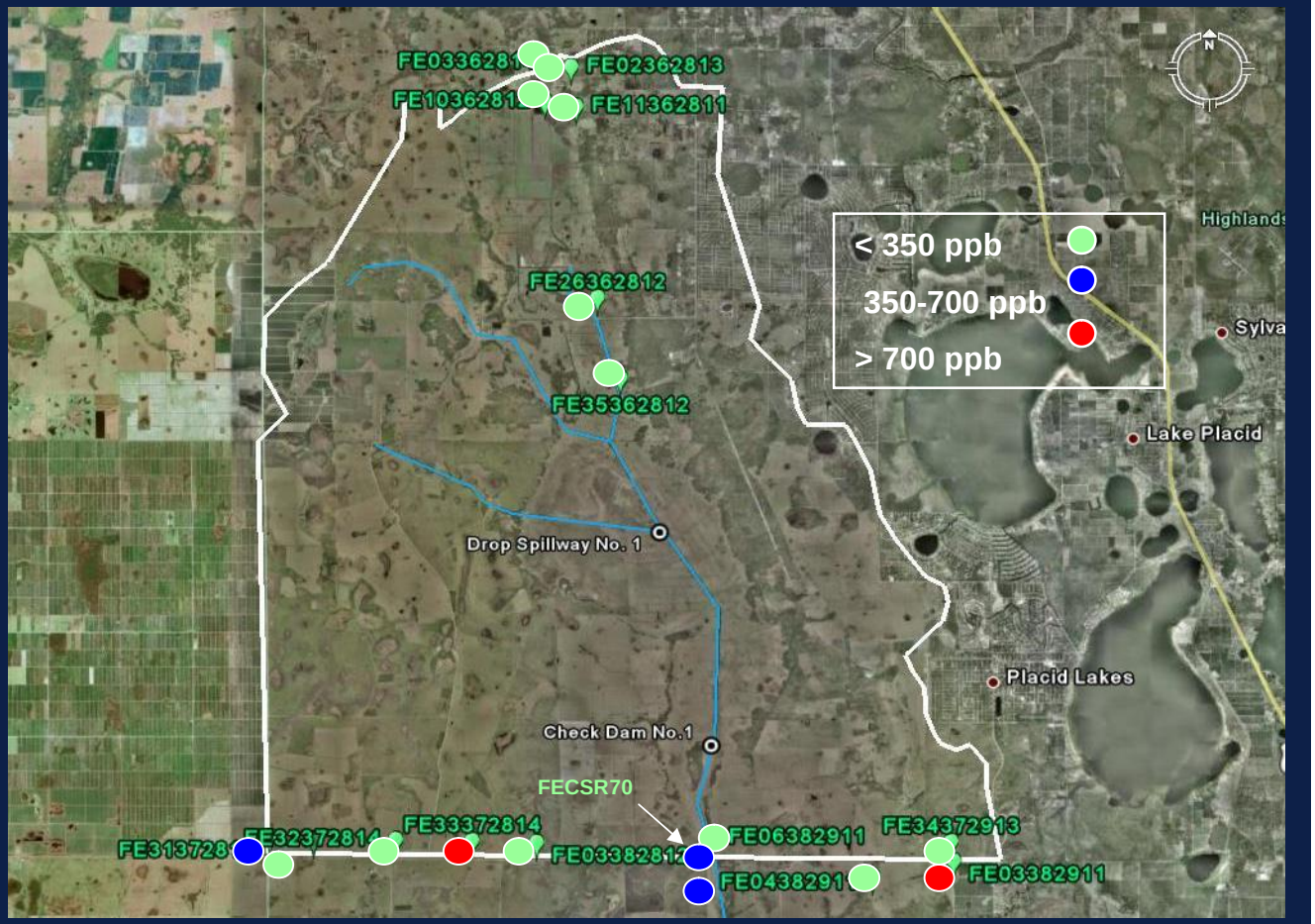


Water Quality



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Phosphorus Data Sources

- Fisheating Creek Basin Water Quality Survey July 26, 2001
- Lake Okeechobee Watershed Assessment Annual Report May 1, 2003 - April 30, 2004
- FDEP 2009 TMDL sites data (upcoming)
- SFWMD DBHYDRO

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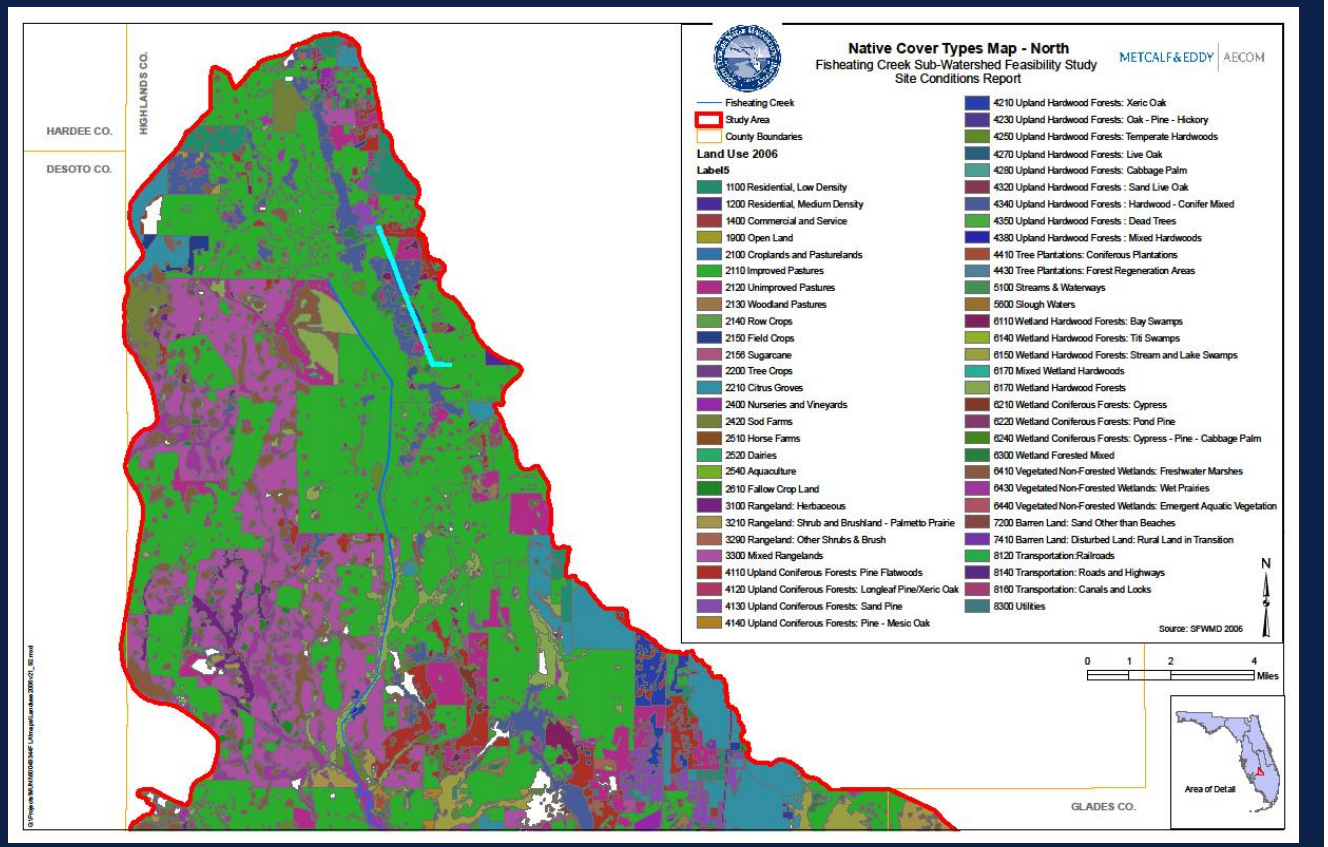
Potential Threatened/Endangered Species Cover Types – Northern Watershed



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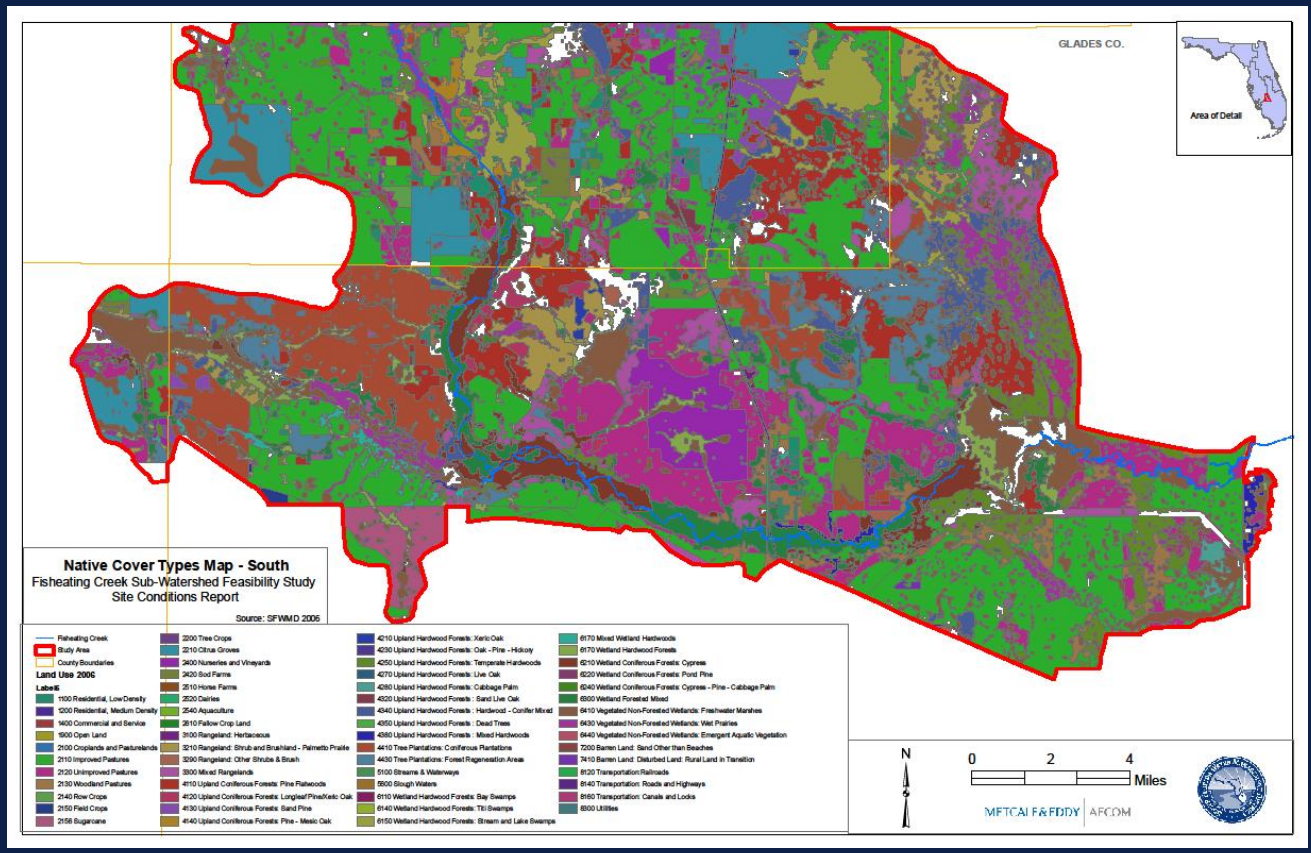
Potential Threatened/Endangered Species Cover Types – Southern Watershed



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Treatment Methods:

Requirements, Effectiveness, Benefits, Cost

- Source Control through Best Management Practices
- Stormwater Treatment Areas (STAs)
- Managed Aquatic Plant Systems (MAPS)
- Chemical Treatment
- Hybrid Wetland Treatment Technology
- Reservoirs
- Alternative Water Storage/ Disposal
- Aquifer Storage and Recovery (ASR)
- Deep Injection Wells
- Reservoir-Assisted Stormwater Treatment Areas (RASTAs)
- Ditch Management

Fisheating Creek Sub-Watershed Feasibility Study – Phase 1
Feasibility Report Working Team Meeting #2
February 13, 2009

DATE: February 16, 2009

TO: Armando Ramirez, SFWMD Project Manager

FROM: Metcalf & Eddy | AECOM project team

RE: Key Meeting Notes and Action Items

Representatives from the South Florida Water Management District (SFWMD) and Metcalf & Eddy | AECOM (M&E) met to discuss project status and planned activities with the Fisheating Creek Stakeholders relevant to M&E's work order and future phases.

The meeting was held on Friday, February 13, 2009 at the Glades County Public Library in Moore Haven, Florida. The meeting began at approximately 10:00 AM with Armando Ramirez's introduction. Attendees introduced themselves prior to the presentation. List of attendees is provided in **Attachment A**.

The following items are key notes from the meeting. Action items are presented following the notes.

Meeting Key Notes

- Armando Ramirez provided dates of completion for reports included under Work Order 1. All reports will be completed by February 20, 2009 with the following week used for project close-out.
- All comments on the draft final Data Document Summary Report to be provided by close of business February 13 so M&E | AECOM can incorporate.
- Steve Schubert mentioned that ground truthing should be conducted on the 2006 Land Use Map. Joyce Zhang and Armando explained the 2006 Land Use Map is ground-truthed and it was also used in the The Lake Okeechobee Watershed Construction Project Phase II Technical Plan. This map is used for consistency (modeling efforts) and is the best information available (Phase I goals). Steve mentioned the 2004 Land Use Map is a level 1 type.
- Steve Schubert has a report on land use (produced by HDR). M&E will obtain the report from Steve.
- Water Quality concentrations (not loadings) were reviewed in northern FEC. It would be beneficial to report on shortcomings of existing datasets available and identify the locations where the collection of water quality and/or flow data would be important to fill the existing data gaps.
- M&E AECOM Team is waiting for 2009 TMDL information to become available.

- Period of Record was discussed. Paul Gray noted that the Lake O Protection Plan (LOPP, 2004) used a period of record from 1991-2000. The update of that plan in 2007 used the same period of record and concluded previous plans were still on track to meet the TMDL for the lake. The Lake Okeechobee Watershed Construction Project Phase II Technical Plan in 2007 used a period of record of 1991-2005 and concluded the LOPP plans were not on track to meet the TMDL most likely due to the fact that the addition of five years (2000-2005) which has been a much wetter time period. This should be acknowledged in regards to the planning efforts for Fisheating Creek as it caused an increase in annual average phosphorus loading about 80 mtons.. It could be mentioned in the Data/Document Summary Report that period of record heavily influences the phosphorus loadings in the area.
- Need to reference disparate periods of record in the report:
  Lake Okeechobee Watershed (CERP): 1965 -2000
  Lake Okeechobee Protection Plan: 1991-2000
  Northern Everglades: 1991-2005
- FDEP representative Jennifer Thera provided a hand out summarizing water quality impairments per FDEP Impaired Waters Rule for Fisheating Creek sub-watershed including water quality sampling locations map. Armando to contact her for existing available water quality information.
- Paul mentioned that round-tailed muskrat is missing from the state list of endangered species.
- Hillary Swain mentioned information from Archbold biological Station's website. Habitat modeling of endangered species etc. that could be useful for the study.
- Two examples of western watershed areas of concern or activity where data may be available:
  Bluehead Ranch Comp Plan
  Tippen Bay (Brian Paul, Owner)
- Joyce Zhang made a presentation on Watershed Assessment Model (WAM) and explained why it is being selected as a tool for Fisheating creek feasibility study alternative evaluation and selection. Joyce stated that WAM was developed for Florida applications and was determined by a panel of experts to be the best modeling tool. Her presentation included baseline flow and loads (period 1991-2005), load reduction targets for Fisheating Creek sub-watershed and WAM peer-review comments. She also discussed TMDLs for the loading and concentrations into Lake Okeechobee.
- Hillary Swain suggested that sloughs on the west of the FEC such as Rainey Slough, John Henry Slough should be taken into consideration during watershed modeling. She also mentioned that reference to the Fisheating Creek easement report should be included in this report. M&E will obtain the settlement agreement and conservation easement report from Don Fox whereas Land Management Plan for Wildlife Management Area can be obtained from the website.
- Sarah Lynch asked if WAM capture dispersed water storage, retention period, flow etc? Joyce responded that WAM is cell based and it can capture parcel sized projects as small as 1 hectare. Joyce also mentioned that the FRESP

(Florida Environmental Ranchland Services Project) is considered as DMSTA.

- Landowners/stakeholders are to be included to help P load reduction by the TMDL efforts from FDEP. Kevin Carter provided a brief TMDL discussion.
- Bonnie provided comments on the draft final Data Document Summary Report including written comments about "natural wetland inventory" to add to the report.
- Hilary stated that SWFWMD has Evapotranspiration (ET) data for this basin. As previously noted, the report is missing data on ET and groundwater. Hilary previously provided the link to this data set but M&E team could not locate it through the link. Hilary offered assistance to M&E to locate the data set.
- Steffany Gornak mentioned that Optimization of Water Quality Data network for Lake Okeechobee will be initiated which includes Fisheating creek sub-watershed next year.
- Lisa Jensen of Blue Head suggested that all agencies should collaborate and reduce their efforts in sampling for phosphorus in the Study Area which would also help landowners.
- Paul provided an Audubon document discussing historic and more recent precipitation trends: Audubon of Florida: Lake Okeechobee – Everything in Harmony/Restoration Needs, undated, prepared by Paul (Lake Okeechobee Science Coordinator), Chris Farrell (Everglades Science Coordinator) and Traci Romine (Everglades Policy Director).
- All information to be provided to Armando who will forward to the M&E | AECOM Team.
- Jim Penkosky stated that the Team will do there best to incorporate all information received either directly addressing the information in the text or by providing a summary of information for further evaluation (due to the project deadlines).

The following are **Action Items** for Key Meeting Notes:

- Obtain additional evapotranspiration (ET) and groundwater data if available (refer to SWFWMD). Hillary Swain mentioned that SWFWMD have ET data for FEC for 1982 to 2005 period and offered to assist the M&E team locating the data.
- Obtain "Greater Ridge Planning Tool" Report – available on the web, if not M&E will contact Hillary Swain.
- Obtain FEC Easement Report, State Lands Management Plan - suggested by Hilary Swain.
- Obtain Documentation Report for the Fisheating Creek Wildlife Management Area – M&E |AECOM to contact Jim Farr of DEP.
- FEC Settlement Agreement - Obtain Settlement Agreement for Fisheating Creek Wildlife Management Area – Hilary indicated that she provided this to Armando.
- Obtain Fisheating Creek Fish and Wildlife Management Plan – available on DEP website according to Hilary Swain.

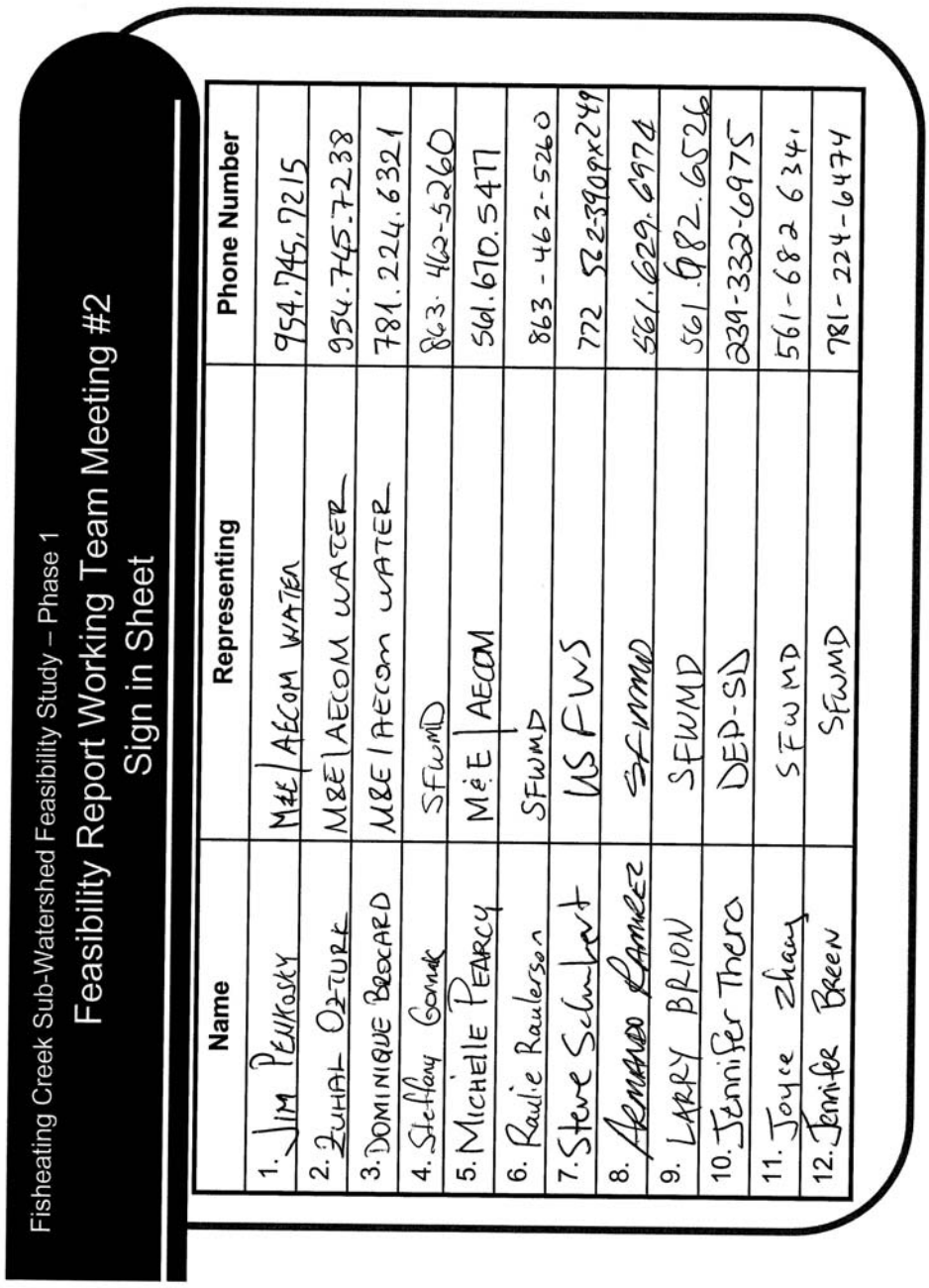
- Data Summary Report should include some discussion of state (i.e. FRESP) and federal initiatives (I.e USDA/NRCS- Wetlands Restoration Enhancement Program) in FEC. John Winfree has provided Pinar with map of lands that may be preserved through the USDA Wetlands Restoration Enhancement Program. These lands are ones that may have the prospective of being preserved/enhanced, although nothing is yet certain as the project has not been finalized. Pinar indicated that she has this information, and can provide to us. John Winfree has also been requested to forward directly to M&E | AECOM.
- Obtain "Frontiers" article, which describes WWF efforts in FEC watershed to preserve/enhance wetlands - Pinar has indicated that she has this article and will send it to M&E.
- Paul Gray will provide a paragraph explaining the issue on period of record for different planning documents (Lake Okeechobee Protection Plan, Lake Okeechobee Phase II Technical Plan, etc.).
- Paul Gray will also provide a write up on the issue of RaSTAs and the CERP Lake Okeechobee Watershed Project. Armando will post these write-ups on the web communication page. The LOWP included construction of a relatively large structure in the channel of Fisheating Creek that was going to divert water to an off-stream storage site in the Cowbone Marsh area east of the intersection of Fisheating Creek and Route 27. Some of the reasons provided at the meeting for why the previous project did not proceed and which needs to be incorporated in the data summary report included the following:
    - Indian mounds in this area could not be flooded
    - Flooding in the area would negatively affect swallow-tailed kites
    - Removing water from the creek would change the nature of the ecology of the waterbody and surrounding area
    - Structure in river would hamper navigability of creek
    - Herbert Hoover Dike is a national monument that cannot be altered in any way
- Compilation of what the Nature Conservancy, Sarah Lynch and a listing of alternative storage activities (projects) and objectives to be provided.
- Bonnie Wolff to provide a report prepared for FEC by Army Corp Engineers (USACE) from 1950's to Armando.
- Joyce Zhang, SFWMD, mentioned that a CD exists with water quality data on it for past three years at the junction of SR 70 and Fisheating Creek (Trish Burke is the contact person) –Joyce will provide the data to the M&E team.
- There is a report by Paul Roos at University of Florida that has some water quality and/or modeling data in it that we should have– Is it the Phosphorus Budget, 2002 Mockroos Report (P imports)?
- Obtain GIS shape files for State Managed Lands (State, federal and privately managed lands) - Hilary to email this to Pinar and/or Armando.
- M&E will contact Steve Schubert, USFWS to obtain information regarding previous UMAM in watershed and previous fine-tuning of FLUCCS codes coverage in watershed- HDR report (Paul Gray referenced page 116 of our current draft final Data/Document Summary Report regarding this issue).

- Cost-share reference data (not only SFWMD, but other partners) to be provided
- USGS is collecting flow and load data (SR 70) should be obtained
- Chad Kennedy will get background of FDEP's position(s) on FEC easement projects
- Joyce Zhang to provide information on the phosphorus and nitrogen budget project she manages.
- District to post modeling peer review document for stakeholders

- **Adjournment**

Meeting adjourned at approximately 12:00 pm.

Attachment A:
Alternatives Workshop Sign-In Sheet



Fisheating Creek Sub-Watershed Feasibility Study – Phase 1

Feasibility Report Working Team Meeting #2

Sign in Sheet

Name	Representing	Phone Number
1. Jim Penkosky	M&E | AECOM WATER	954.745.7215
2. Zuhal Ozturk	M&E | AECOM WATER	954.745.7238
3. Dominique Boccard	M&E | AECOM WATER	781.224.6321
4. Stefany Gomez	SFWMD	863-462-5260
5. Michelle Pearcy	M&E | AECOM	561.670.5477
6. Paulie Raulerson	SFWMD	863-462-5260
7. Steve Schubert	US FWS	772 562-3909x249
8. Armando Ramirez	SFWMD	561.629.6974
9. LARRY BRION	SFWMD	561.682.6526
10. Jennifer Thera	DEP-SLS	239-332-6975
11. Joyce Zhang	SFWMD	561-682 6341
12. Jennifer Breen	SFWMD	781-224-6474

February 13, 2009

Fisheating Creek Sub-Watershed Feasibility Study – Phase 1

Feasibility Report Working Team Meeting #2
Sign in Sheet

Name	Representing	Phone Number
13. John Winfree	TNC	561 732 6550
14. Vanessa Bessey	FDACS	863-462-5991
15. Mike Izzarone	TNC	561-732-6550
16. Wayne Godwin	Westby Corp.	
17. Brian Wolff Relacs	FDACS	863-467-5881
18. DONALD FOX	FFWCC	863-462-5024
19. Scott Hefty	SFWMD	239 338-2929
20. Chad Kennedy	FDEP	561-681-6706
21. Sarah Lynch	Florida Rockland	
22. LISA JENSEN	ABG	863 619-9595
23. Hilary Swain	Archbold	863 465 2571
24.		

February 13, 2009

Fisheating Creek Sub-Watershed Feasibility Study – Phase 1

Feasibility Report Working Team Meeting #2
Sign in Sheet

Name	Representing	Phone Number
25. Davies Mtandu	SFWMD	561-682-6581
26. Kevin Carter	"	
27. Paul Gray	Audubon	863-655-1831
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February 13, 2009