Appendix 4-1: Water Year 2010 Supplemental Evaluations for Regulatory Source Control Programs in the Lake Okeechobee Watershed

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INTRODUCTION

The South Florida Water Management District (SFWMD or District) is required under the Lake Okeechobee Operation Permit to report on the status of the District's Source Control Program in the Lake Okeechobee Watershed annually. This appendix provides (1) total phosphorus (TP) data collected at all Lake Okeechobee summary basin structures, (2) Lake Okeechobee Watershed Assessment (LOWA) monitoring stations for Water Year 2010 (WY2010) (May 1, 2009–April 30, 2010) (3), graphical representations of TP loads in relation to land area, and (4) supplemental information from the Florida Department of Agriculture and Consumer Services (FDACS).

LAKE OKEECHOBEE WATERSHED TOTAL PHOSPHORUS LOADS BY SUMMARY BASIN

Consistent with the Lake Okeechobee Watershed Construction Project Phase II Technical Plan (SFWMD et al., 2008), the Lake Okeechobee Watershed is divided into nine sub-watersheds. In Chapter 4 of this volume, the data presented for the Lake Okeechobee Watershed are based on a sub-watershed approach. Of the nine sub-watersheds within the Lake Okeechobee Watershed, four sub-watersheds (Taylor Creek – Nubbin Slough, Fisheating Creek/Nicodemus Slough, South Lake Okeechobee, and East Lake Okeechobee) have intermediate areas within their boundaries where the annual TP load is measured. These areas are known as summary basins. **Table 1** presents observed annual TP loads for each of the 18 summary basins in the Lake Okeechobee Watershed for WY2010.

Table 1. Water Year 2010 (WY2010) (May 1, 2009–April 30, 2010) total phosphorus (TP) loads (in metric tons or mt).

Summary Basin	WY2010 Observed TP Load (mt)
Upper Kissimmee Sub-watershed	
No Summary Basins	N/A
Sub-watershed Total	***109.37***
Lower Kissimmee Sub-watershed	
No Summary Basins	N/A
Sub-watershed Total	***31.94***
Taylor Creek/Nubbin Slough Sub-watershed	
S-191	30.58
S-133	1.04
S-135	0.60
S-154[1]	10.12
S-154C[1]	1.66
Sub-watershed Total	***44.01***
Lake Istokpoga Sub-watershed	
No Summary Basins	N/A
Sub-watershed Total	***22.43***
Indian Prairie Sub-watershed	
No Summary Basins	N/A
Sub-watershed Total	***110.33***
Fisheating Creek & Nicodemus Slough Sub-watershed	
Fisheating Creek	74.43
Culvert 5a	10.32
Culvert 5	0.41
Sub-watershed Total	***85.16***
West Lake Okeechobee Sub-watershed	
No Summary Basins	N/A
Sub-watershed Total	***65.94***

Table 1. Continued.

Summary Basin	WY2010 Observed TP Load (mt)
South Lake Okeechobee Sub-watershed[2]	
715 Farms (Culv 12A)	0.00
East Beach DD (Culv 10)	0.05
East Shore DD (Culv 12)	0.34
S-2	2.89
S-3	1.12
S-4 & Industrial Canal[3]	16.08
South FL Conservancy DD (S-236)	0.11
South Shore/So. Bay DD (Culv 4A)	0.02
S5A Basin (S-352-WPB Canal)	0.00
Sub-watershed Total	***20.62***
East Lake Okeechobee Sub-watershed	
S-308C (St. Lucie-C-44)	48.24
L-8 Basin (Culv 10A)	6.34
Sub-watershed Total	***54.58***

LAKE OKEECHOBEE WATERSHED ASSESSMENT MONITORING NETWORK DATA

In addition to the water quality monitoring that takes place at the Lake Okeechobee Watershed sub-watershed and summary basin-level structures, monitoring is conducted within each sub-watershed and summary basin under several different projects. The District's ambient monitoring network and the U.S. Geological Survey monitoring network are described in Chapter 10 of this volume. LOWA monitoring (TP concentration only) network data are used by coordinating agencies to direct resources to areas exhibiting poor water quality. The site data collected under the program, along with data collected from the District's ambient monitoring network and the Lake Okeechobee inflow sites, are used to identify, prioritize, and direct resources to areas of water quality concern within the sub-watershed. An overview of TP concentrations from the LOWA monitoring network is presented in **Figures 1** through **6.**

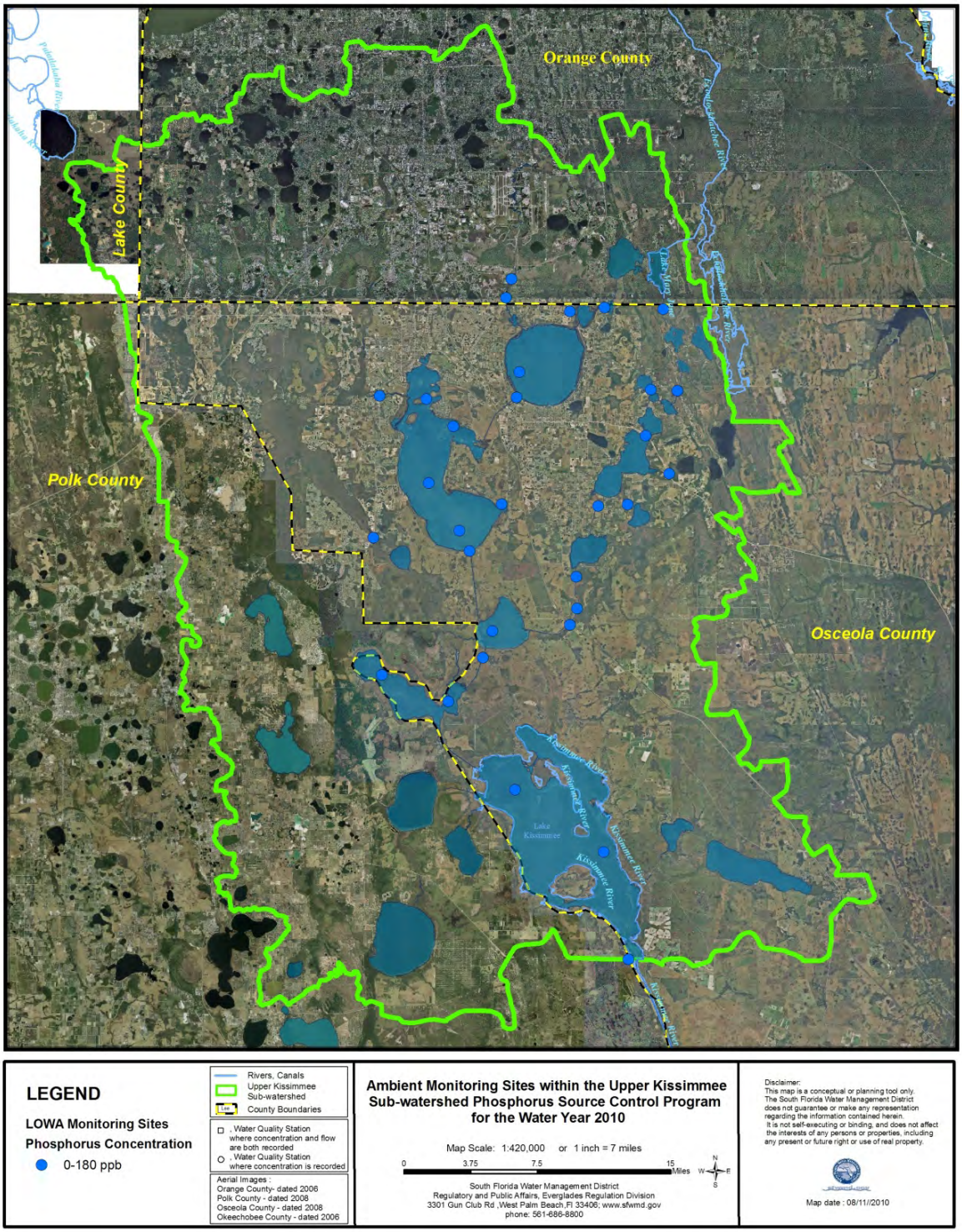


Figure 1. Upper Kissimmee Sub-watershed average TP concentrations (in parts per billion or ppb) for WY2010.

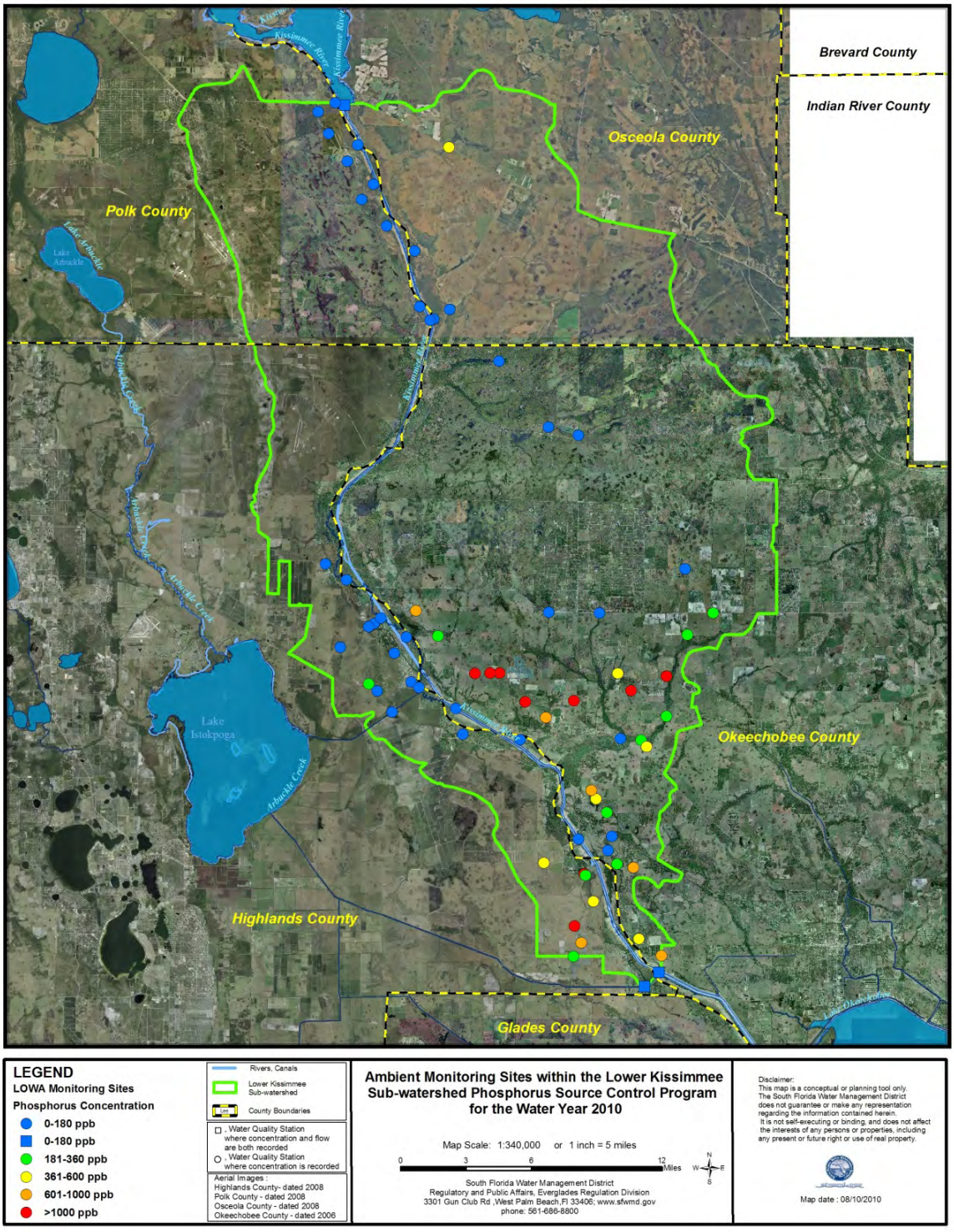


Figure 2. Lower Kissimmee Sub-watershed average TP concentrations (in ppb) for WY2010.

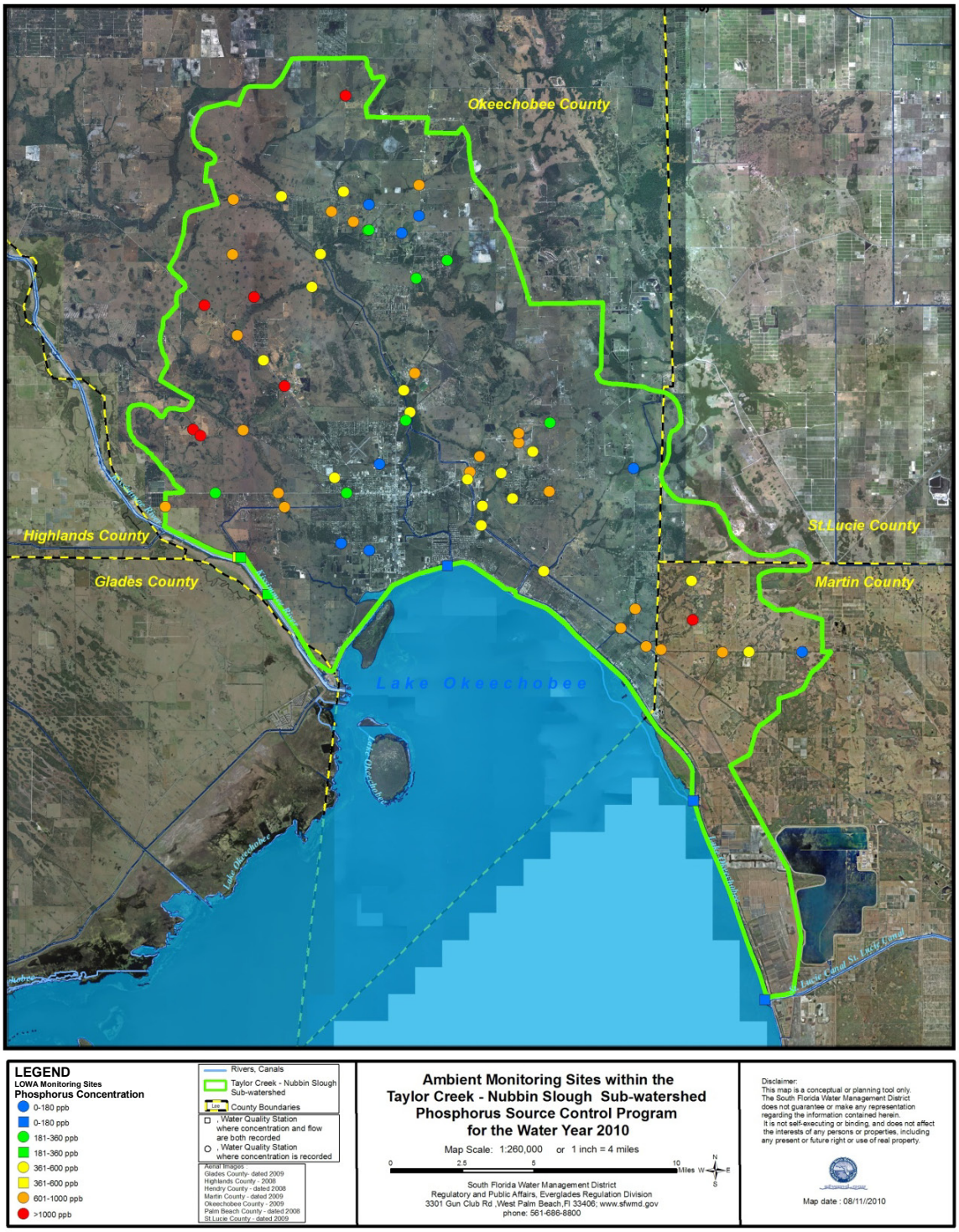


Figure 3. Taylor Creek – Nubbin Slough Sub-watershed average TP concentrations (in ppb) for WY2010.

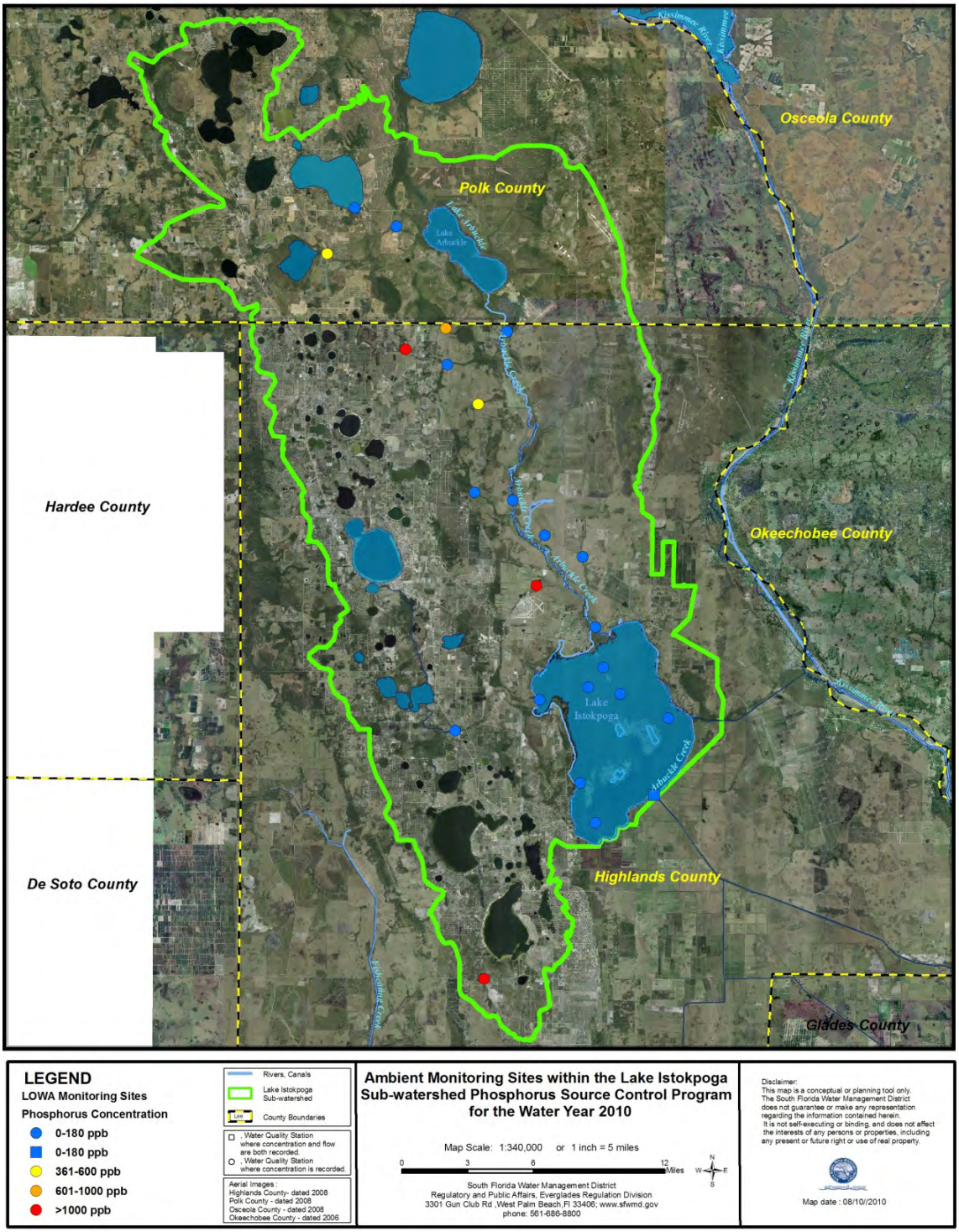


Figure 4. Lake Istokpoga Sub-watershed average TP concentrations (in ppb) for WY2010.

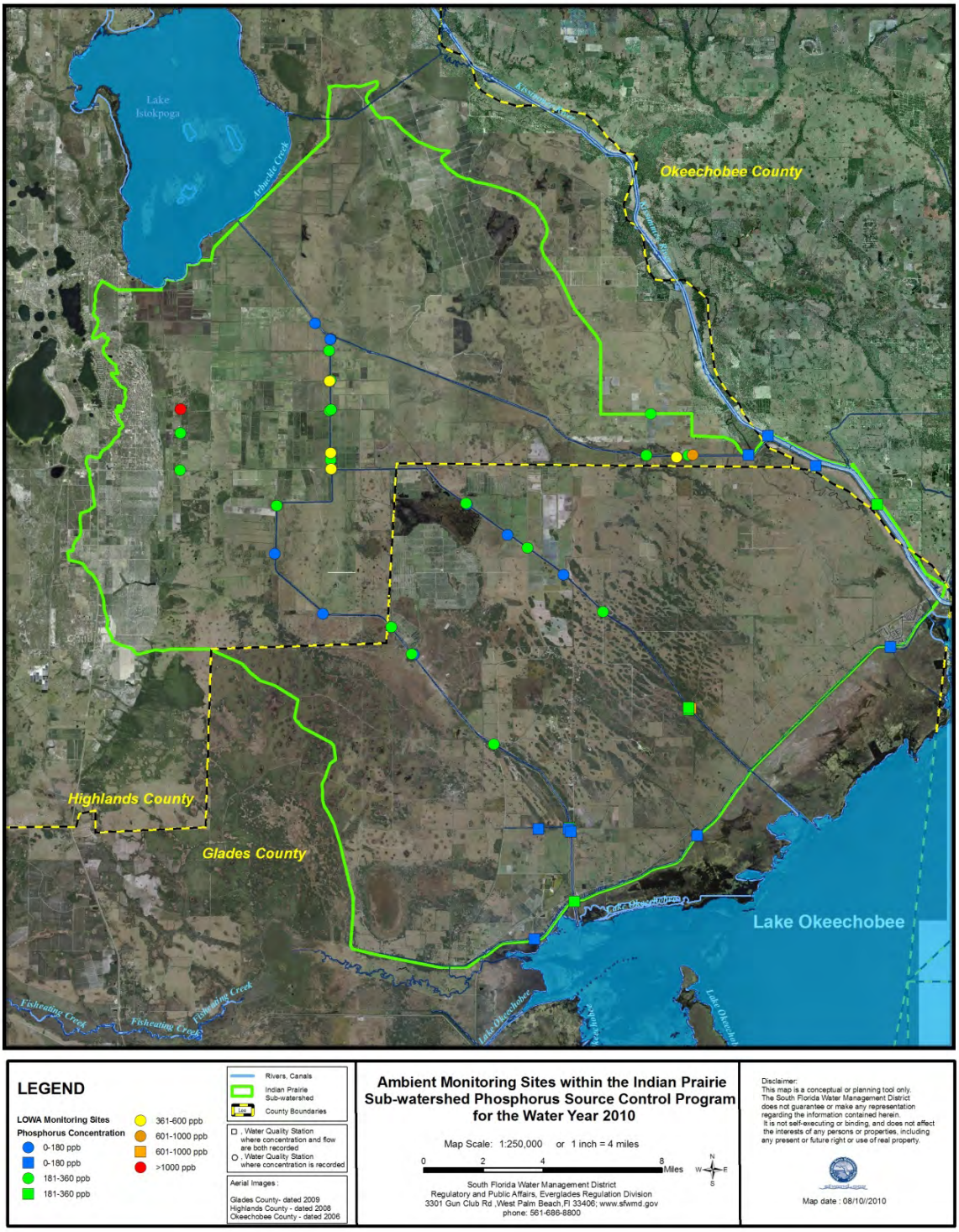


Figure 5. Indian Prairie Sub-watershed average TP concentrations (in ppb) for WY2010.

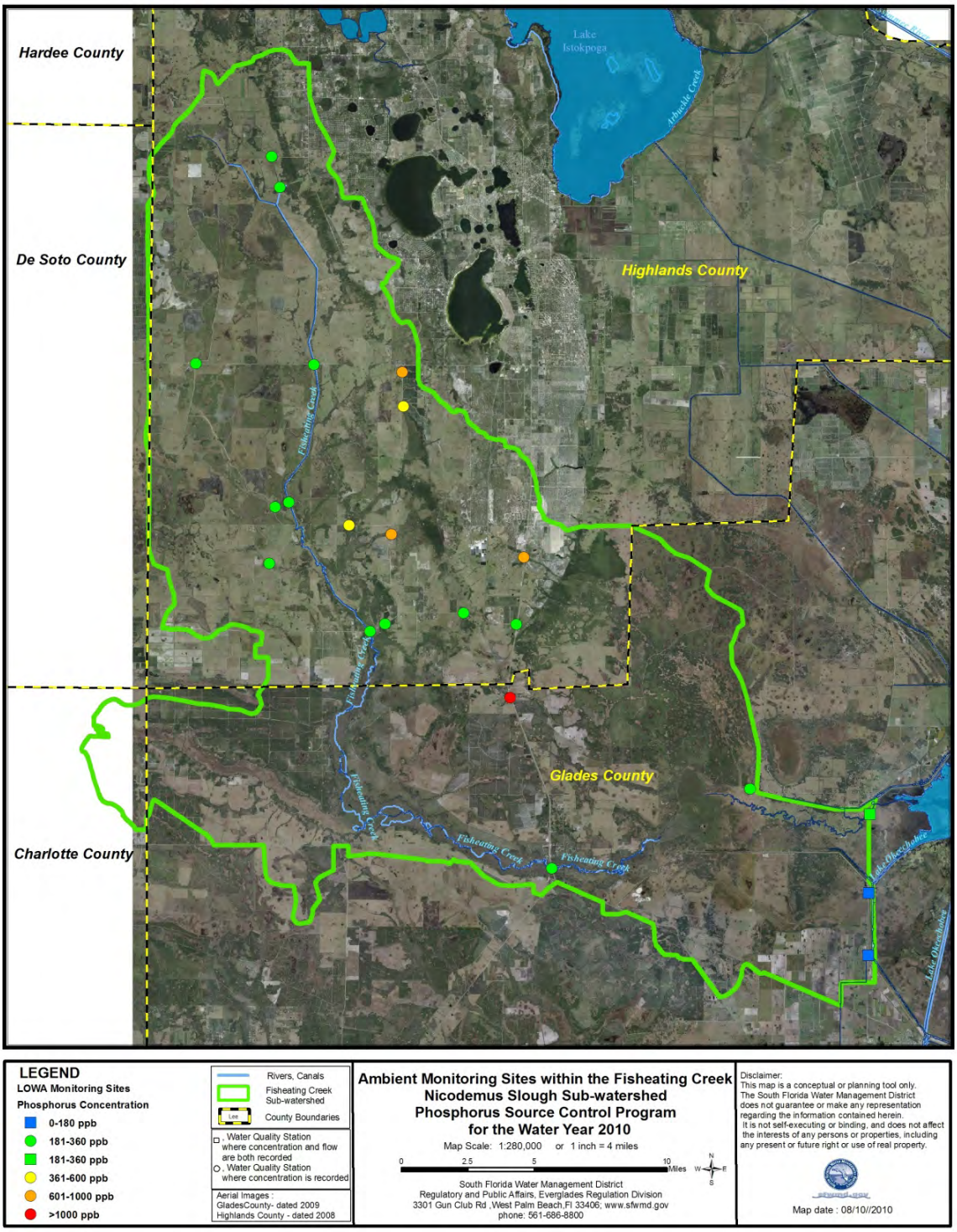


Figure 6. Fisheating Creek Sub-watershed average TP concentrations (in ppb) for WY2010.

SUB-WATERSHED OBSERVED ANNUAL TOTAL PHOSPHORUS LOAD BREAKDOWN

In this section, **Figure 7** depicts the distribution of the observed annual TP load for WY2010 for sub-watersheds in the Lake Okeechobee Watershed. **Figure 8** summarizes the same percentages for WY2010 observed annual TP load, along with the percentages of total land area represented by each sub-watershed**.** Also in this section, **Figure 9** provides a box-and-whisker plot for the nine sub-watersheds. The data used to construct this figure included loading information provided in Chapter 4 of this volume (based on water year) from WY1991 to WY2010.

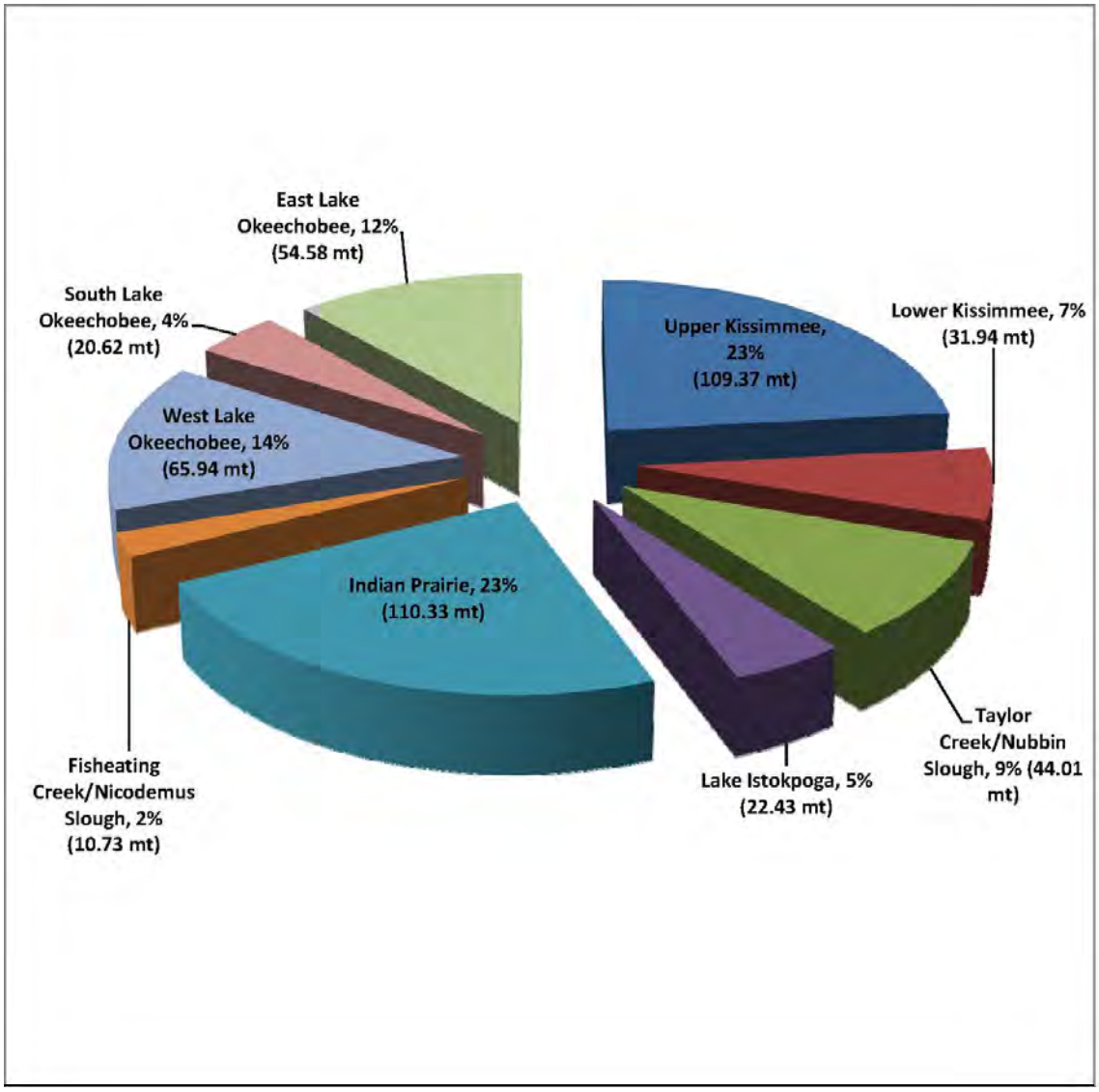


Figure 7. Distribution of WY2010 annual observed TP loads (in mt) within the Lake Okeechobee Watershed.

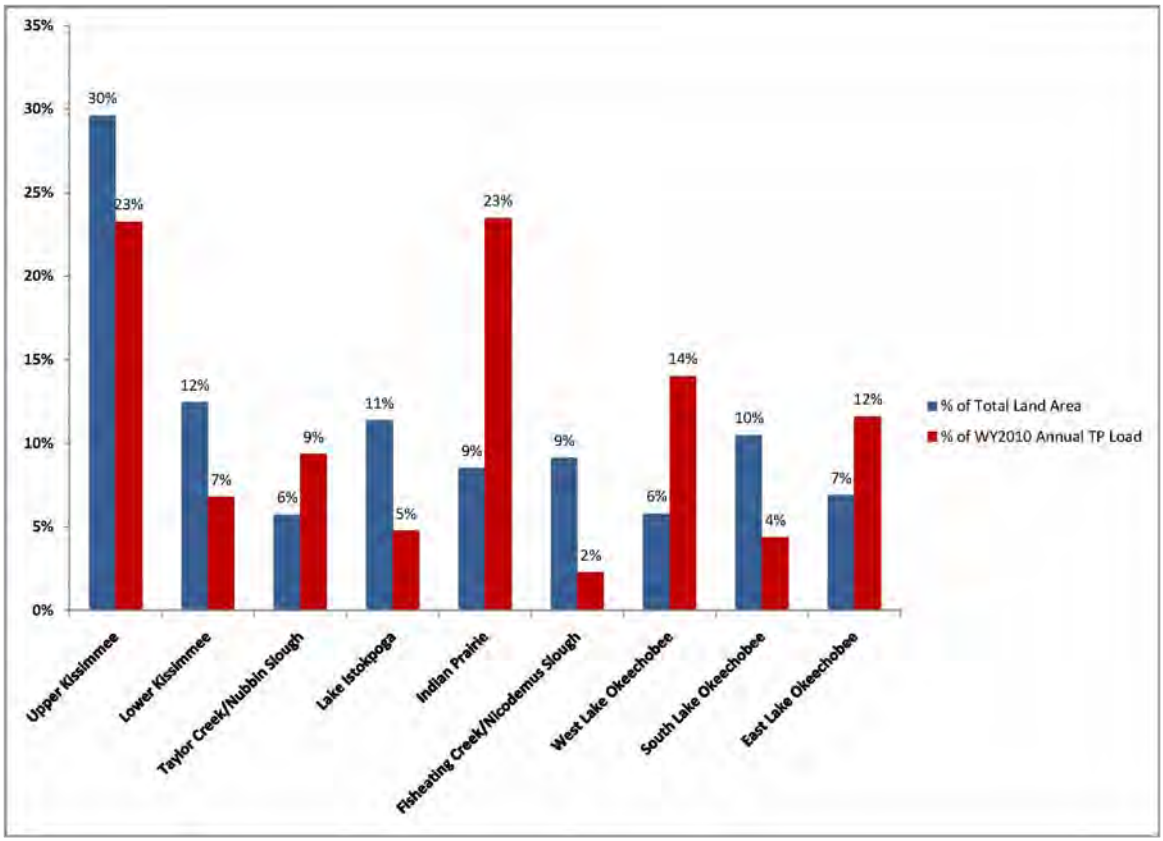
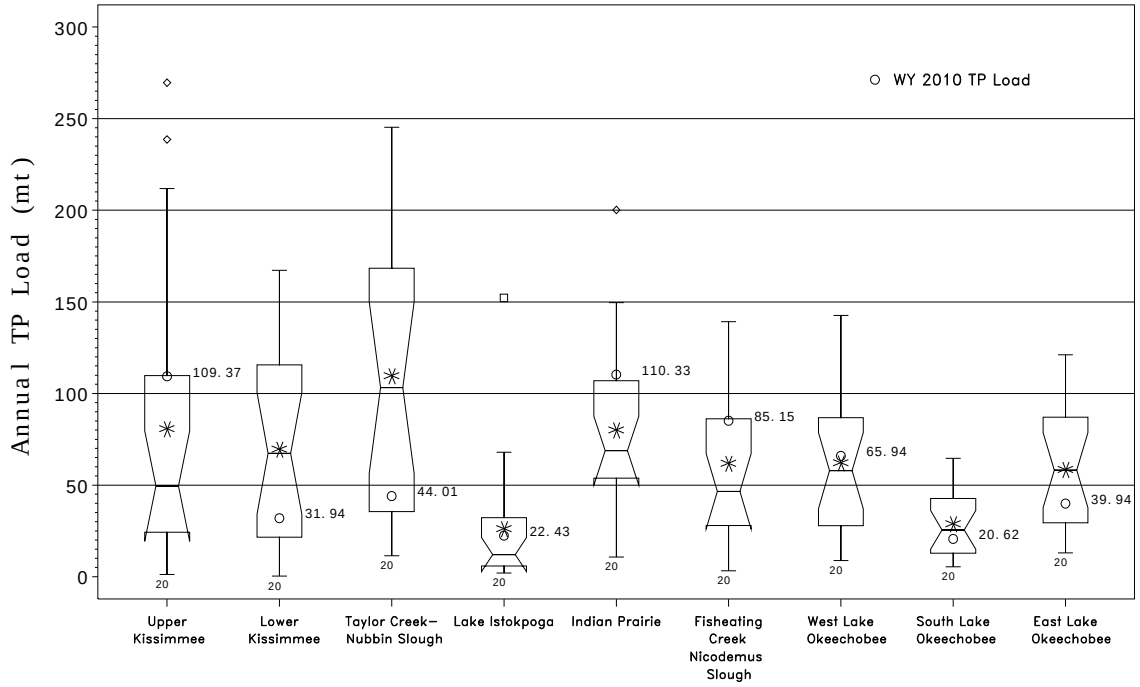


Figure 8. Distribution of WY2010 annual observed TP loads (in mt) and land areas for sub-watersheds within the Lake Okeechobee Watershed.



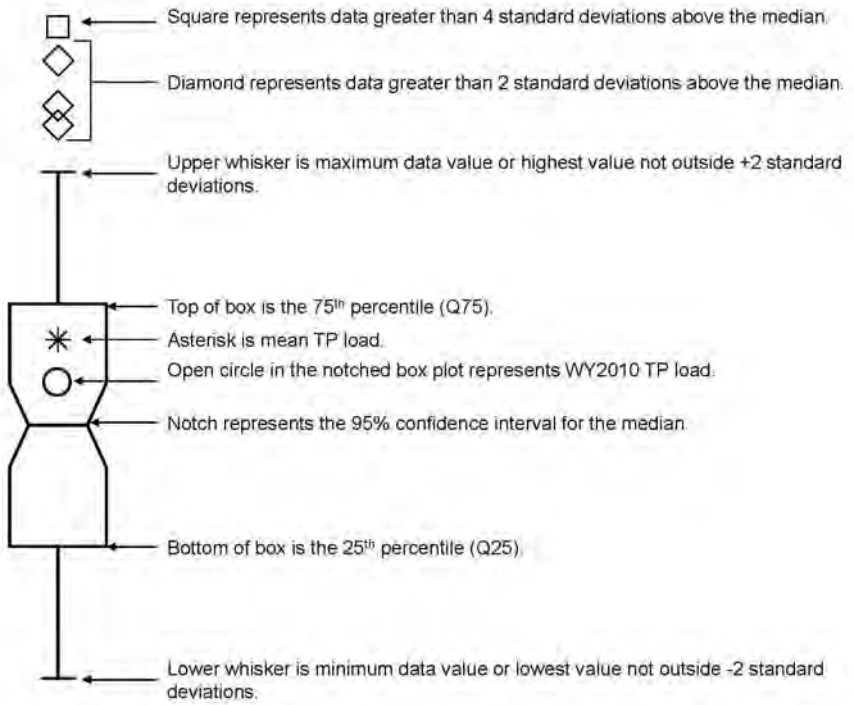


Figure 9. Comparison of TP loads (in mt) for each sub-watershed within the Lake Okeechobee Watershed as a box-and-whisker plot.

SUPPLEMENTAL INFORMATION FROM THE FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES

This section provides information provided by the FDACS. **Table 2** summarizes the state-wide Best Management Practice (BMP) programs that the FDACS has either adopted through rules or are currently under development. **Figure 10** shows agricultural lands within the Lake Okeechobee Watershed that are enrolled in an FDACS-adopted BMP program.

Table 2. Florida Department of Agricultural and Consumer Services (FDACS) agricultural Best Management Practices (BMPs) adopted and under development.

FDACS BMP Programs	Rule	Area(s) of Application	Development/ Revision Status
Ridge Citrus	5E-1	Lake Wales Citrus Ridge area; areas with well-drained soils	Adopted
Citrus Groves in Peace River - Manasota Basin	5M-5	All or part of Manatee, Sarasota, Hardee, DeSoto, and Charlotte counties	Adopted
Gulf Citrus	5M-7	All or parts of Hendry, Glades, Lee, Collier, and Charlotte counties	Adopted
Indian River Area Citrus	5M-2	All or part of Volusia, Brevard, Indian River, St. Lucie, Martin, Okeechobee, and Palm Beach counties	Adopted
Lake Okeechobee Watershed	5M-3	Lake Okeechobee Watershed	Adopted
Container Nurseries	5M-6	State-wide applicability	Adopted
Vegetable/Agronomic Crops	5M-8	State-wide applicability	Adopted
Sod Farms	5M-9	State-wide applicability	Adopted
Land Application of Manure	5M-10	Caloosahatchee and St. Lucie rivers watersheds	Adopted
Cow/Calf Operations	5M-11	State-wide applicability	Adopted
Equine/Horse Farms	TBD	State-wide – commercial equine operations	Under development – Targeted for adoption in 2011
Specialty Fruit and Nut	TBD	State-wide – blueberries, pecans, etc.	Under development – Targeted for adoption in 2011
Conservation Plans	TBD	State-wide – specified operations	Adopted
Silviculture	5I-6	State-wide applicability	Adopted/Implemented by Division of Forestry
Aquaculture	5L-3	State-wide applicability	Adopted/Implemented by Division of Aquaculture

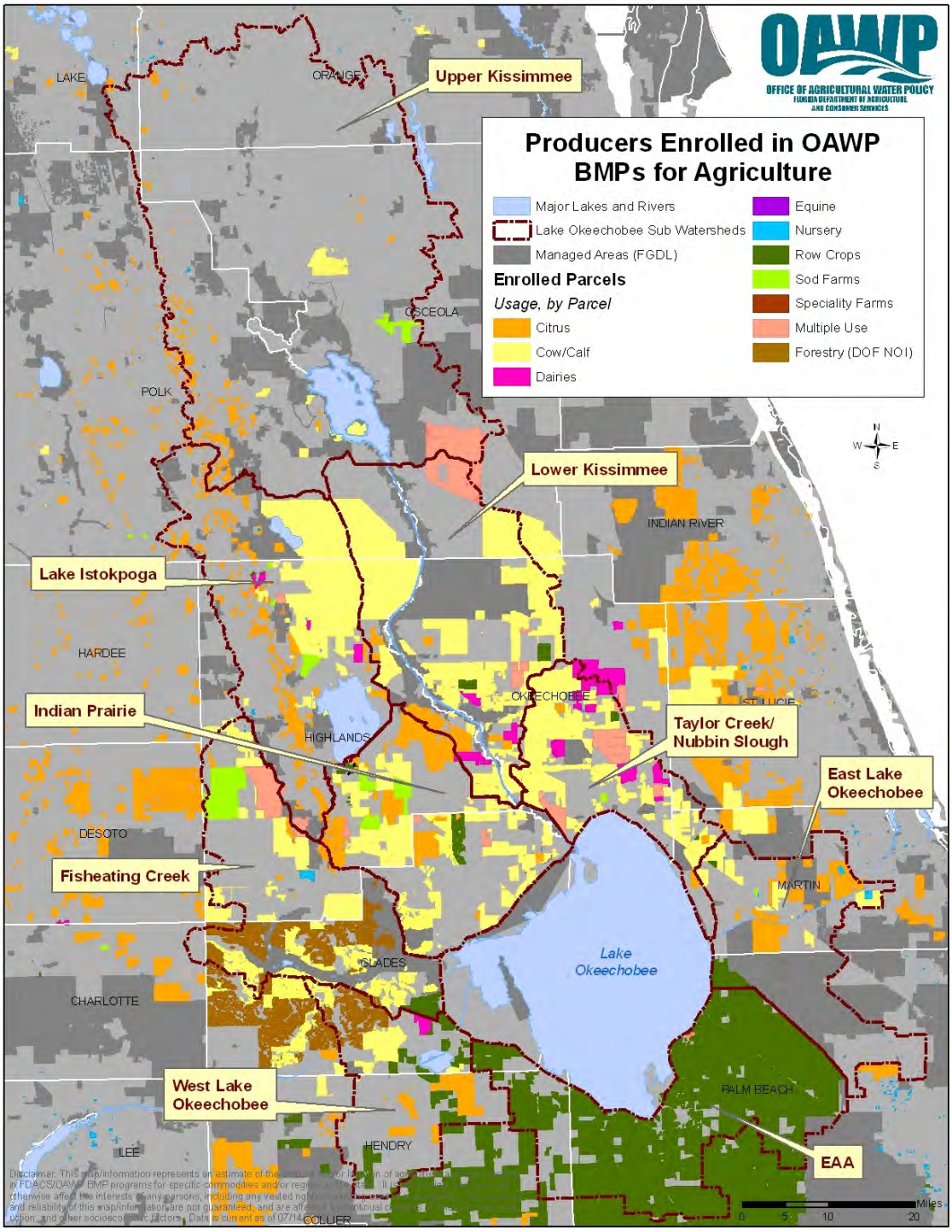


Figure 10. FDACS agricultural BMPs participation in the Lake Okeechobee Watershed, as of March 29, 2010.

LITERATURE CITED

SFWMD, FDEP and FDACS. 2008. Lake Okeechobee Watershed Construction Project Phase II Technical Plan. South Florida Water Management District, West Palm Beach, FL; Florida Department of Environmental Protection, Tallahassee, FL; and Florida Department of Agriculture and Consumer Services, Tallahassee, FL.