

Lake Talquin TMDL

Protecting Downstream Designated Uses

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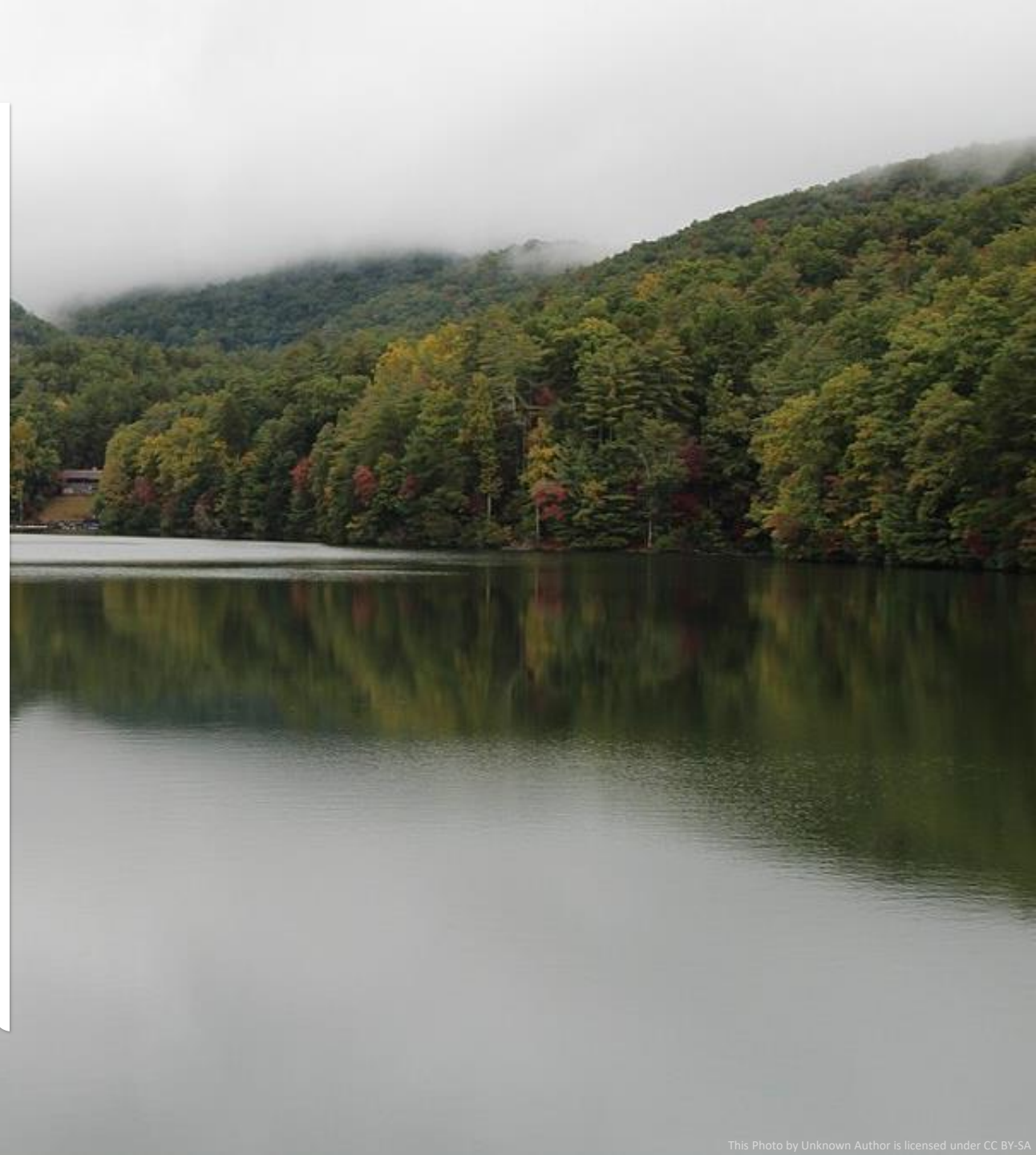
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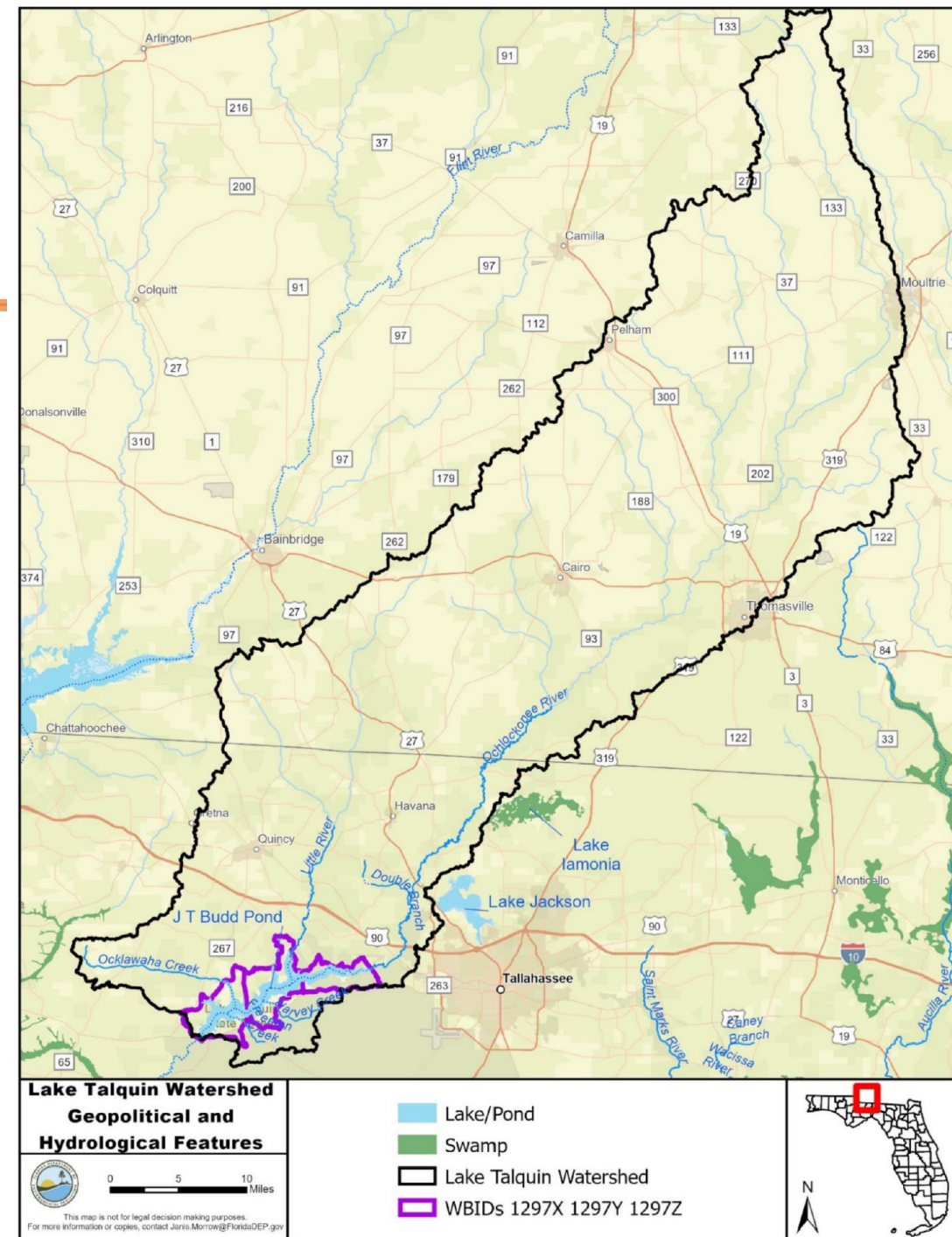
Outline

- Description of the Problem
- Modeling Approach
- Model Development
- Data Requirements
- Model Calibration
- TMDL Reductions
- New Numeric Criteria
- Questions

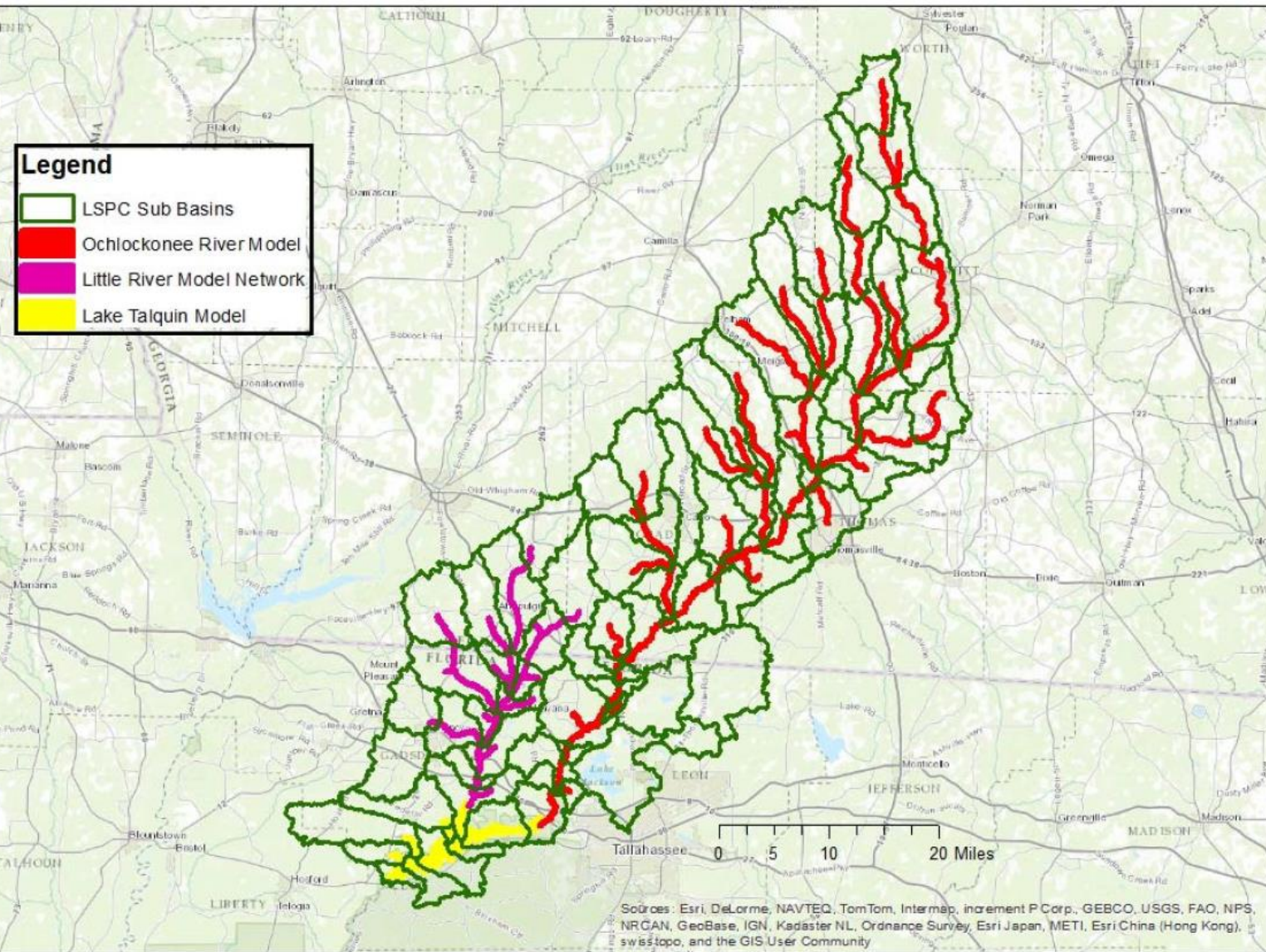


Lake Talquin

- Lake Talquin is located west of Tallahassee, Florida
- Approximately 15 miles south of the Florida-Georgia stateline
- Watershed encompasses over 1,500 square miles
- 73.3% of the watershed is located in Georgia
- Listed for exceedance of the Chlorophyll a, TN and TP criteria



Model Domains for Lake Talquin Model



Modeling Approach

Used three models

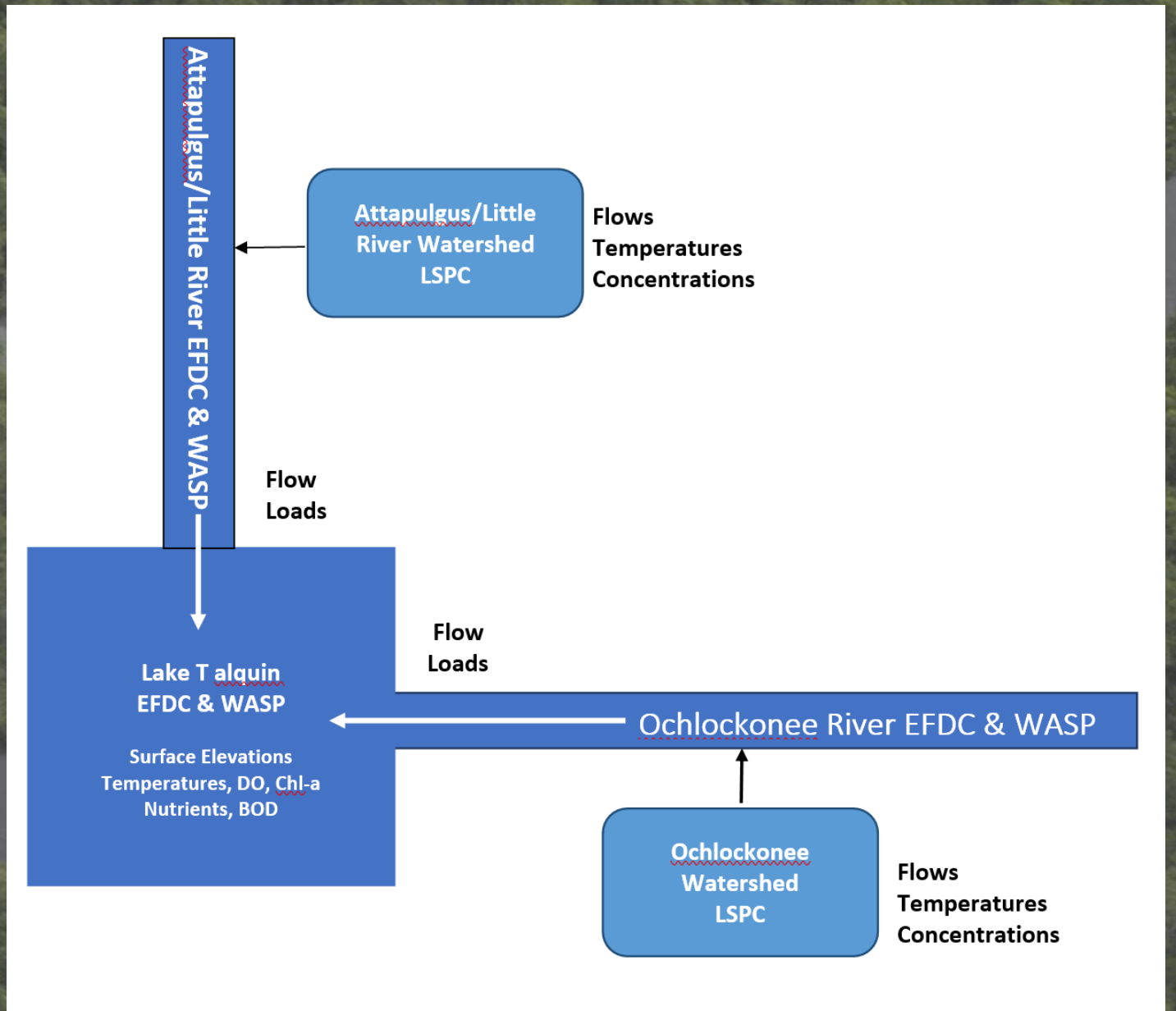
- LSPC Watershed Model
- EFDC Hydrodynamic Model
- WASP Water Quality

Model Network

- Due to size and complexity of the watershed a set of nested models were developed
- Ochlockonee Watershed
 - Watershed and River Models
- Attapulugus River (GA)/Little River (FL) Watershed
 - Watershed and River Models
- Lake Talquin
 - Lake model

Figure 3 LSPC Watersheds and WASP Segments

Model Development



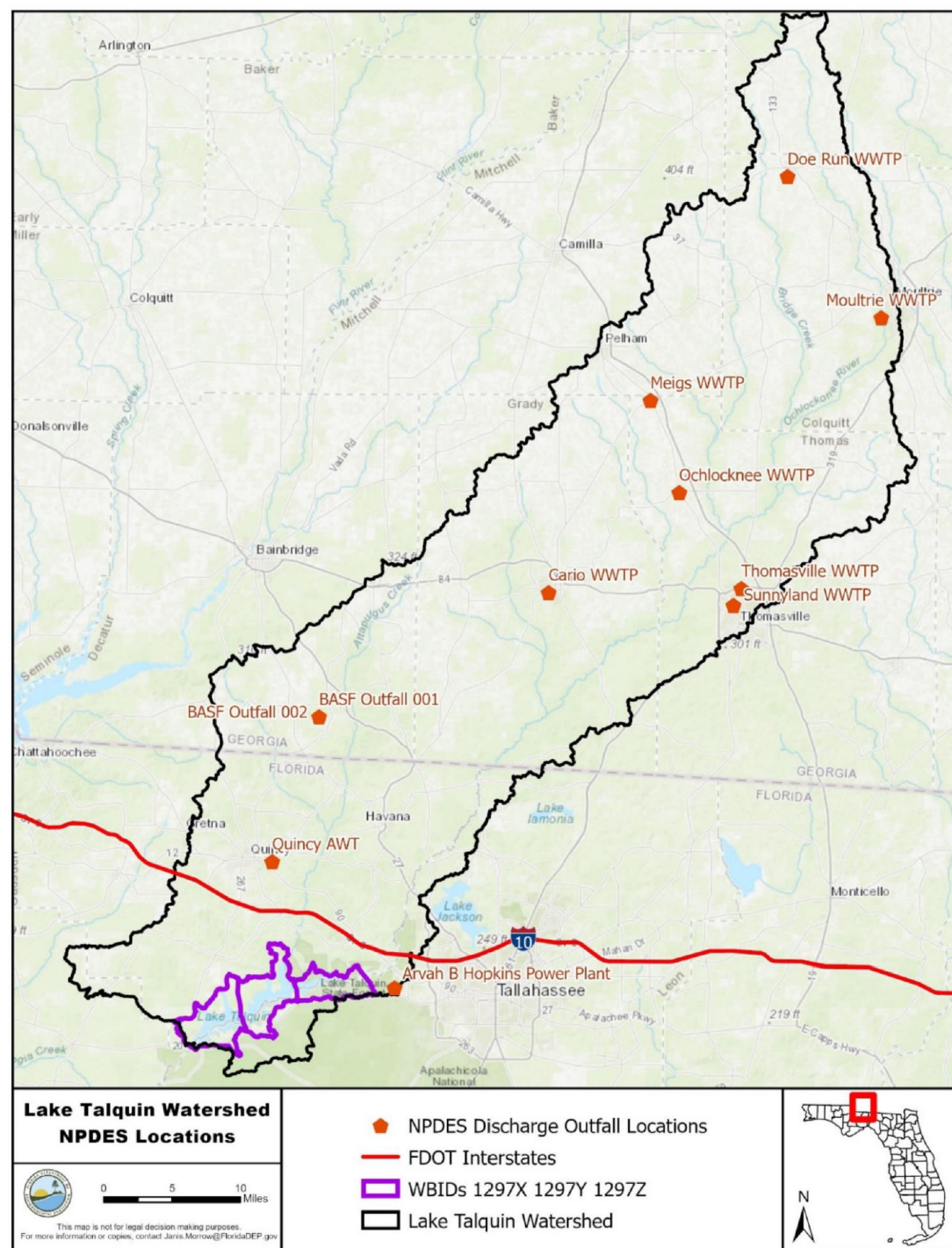
Potential Sources

- Point Sources

- NPDES Point Source
- Municipal Separate Storm Sewer Systems (MS4)

- NonPoint Sources

- Landuses
- Atmospheric Deposition



Model Calibration

- Model was vetted by FLDEP and GAEPD
- Model was reviewed by Stakeholders
- Good calibration of TN, TP and Chlorophyll a
- Model results were evaluated in three zones

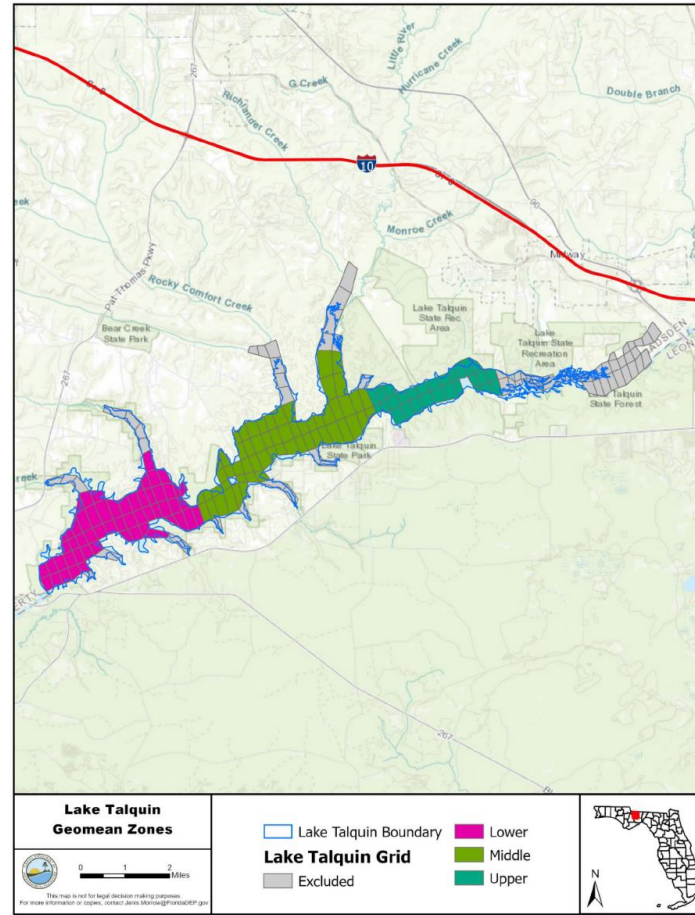
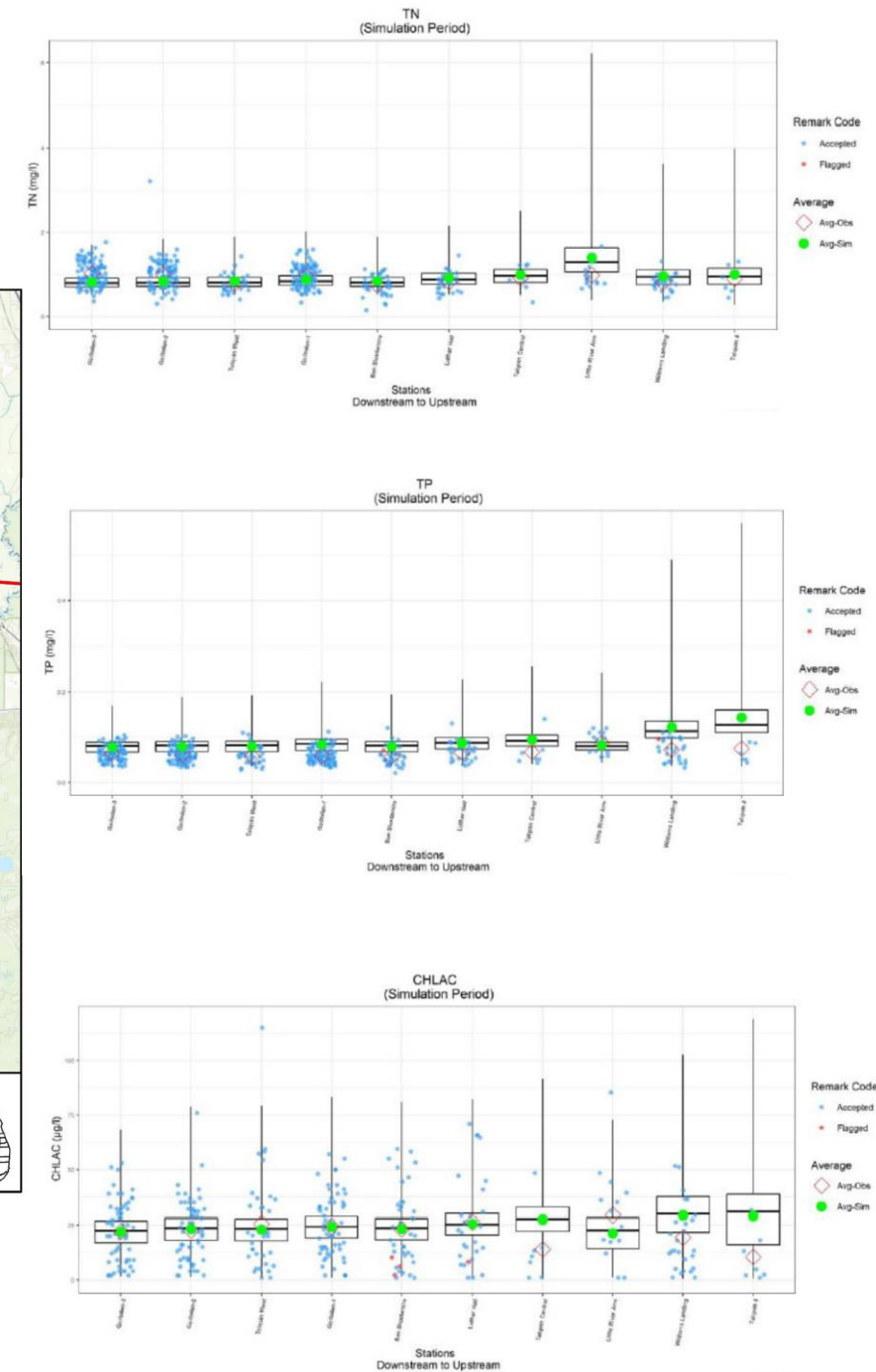


Figure 5.5. Lake Talquin model evaluation zones



TMDL Reductions

- EPD used the models to determine nutrient reductions required to meet annual geometric mean chlorophyll a of 20 ug/L at the three zones in the lake
 - Assumed a 35 percent reduction in nutrients from urban and agricultural landuses
 - Assumed point source TP (Organic P and PO₄) and TN (Organic N, NH₄, and Nox) discharges based on DMR data
 - Determine ammonia limit needed had to be meet to protect mussels
 - If reduction in ammonia was needed, assumed it was converted to NO_x
 - Determined TP and TN reductions needed



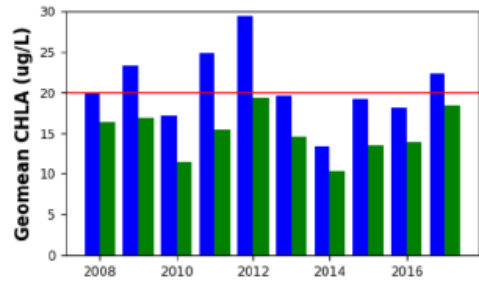
TMDL

Basin	Current TN (kg/yr)	Current TP (kg/yr)	TN TMDL (kg/yr)	TP TMDL (kg/yr)	% TN Reduction	% TP Reduction
Ochlockonee	778,404	109,224	620,706	80,033	20%	27%
Little River	442,812	21,695	350,481	22,051	21%	0%
Little River Runoff	3,595	67	3,559	65	1%	3%
Rock/Comfort Ck	37,548	3,380	31,165	2,468	17%	27%
Ocklawaha	21,982	1,904	20,223	1,619	8%	15%
Hammock Ck	8,053	562	7,489	562	7%	0%
Freeman	16,055	599	15,412	533	4%	11%
Harvey	32,429	1,086	3,145	989	3%	9%
Polk	10,444	325	10,235	296	2%	9%
Upper Lake Runoff	31,085	1,085	30,464	1,013	2%	7%
Lower Lake Runoff	13,066	319	12,647	291	3%	9%
Total	1,395,473	140,250	1,133,864	109,920	21%	28%

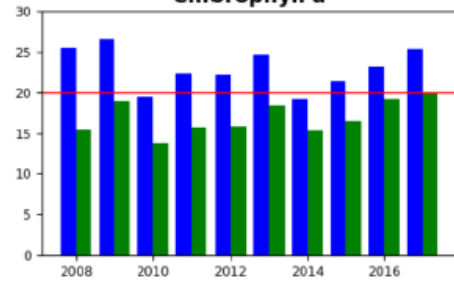
New Numeric Criteria

Geomeans Current Condition vs. Reduction Condition

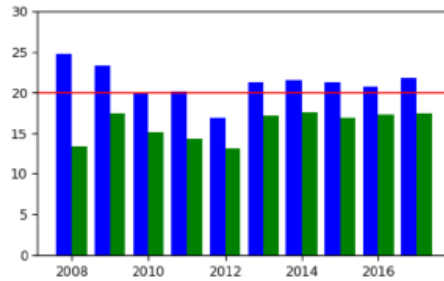
Geomean Upper Zone



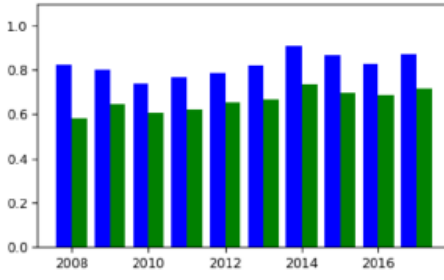
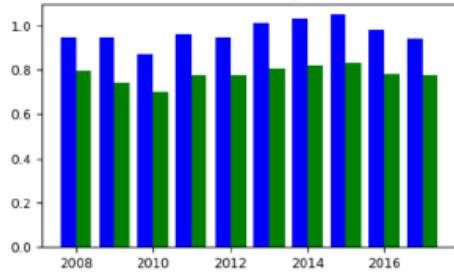
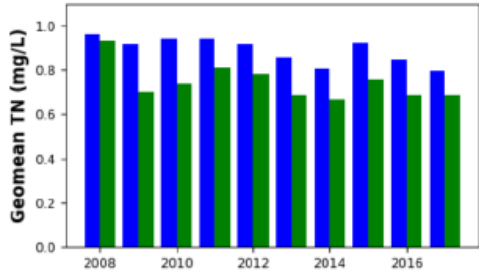
Geomean Middle Zone
Chlorophyll a



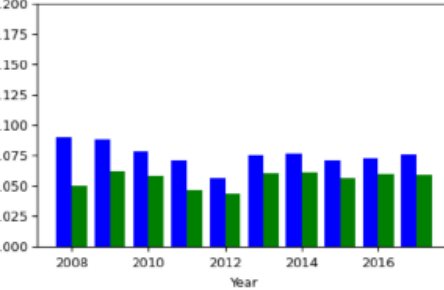
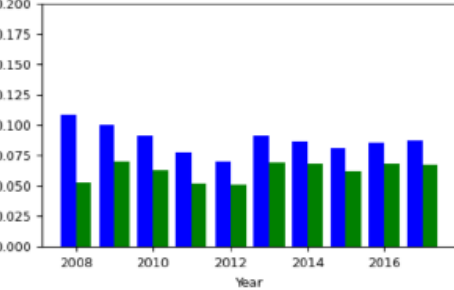
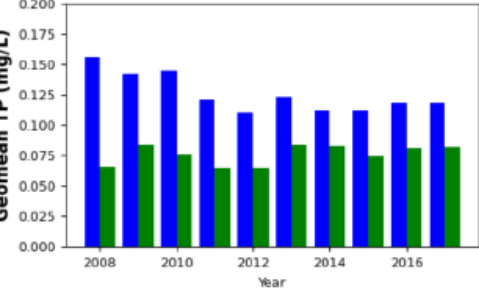
Geomean Lower Zone



Total Nitrogen



Total Phosphorus



■ Current ■ Reduction

Analyte	Criteria
TN (kg/yr) 7-year average load not to be exceeded	1,134,850
TP (kg/yr) 7-year average load not to be exceeded	112,326
Chlorophyll a (ug/L) Annual Geometric Mean	20.0

Analyte	Lower Zone	Middle Zone	Upper Zone
TN (mg/L)	0.73	0.84	0.81
TP (mg/L)	0.062	0.070	0.084
Chlorophyll a (ug/L)	17.5	20.0	19.3



QUESTIONS