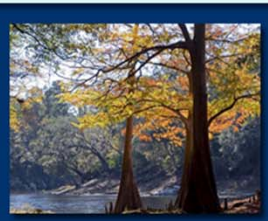
Florida Department of Environmental Protection

Water Quality Evaluation and TMDL Program

Nutrient TMDLs for Caloosahatchee River Basin

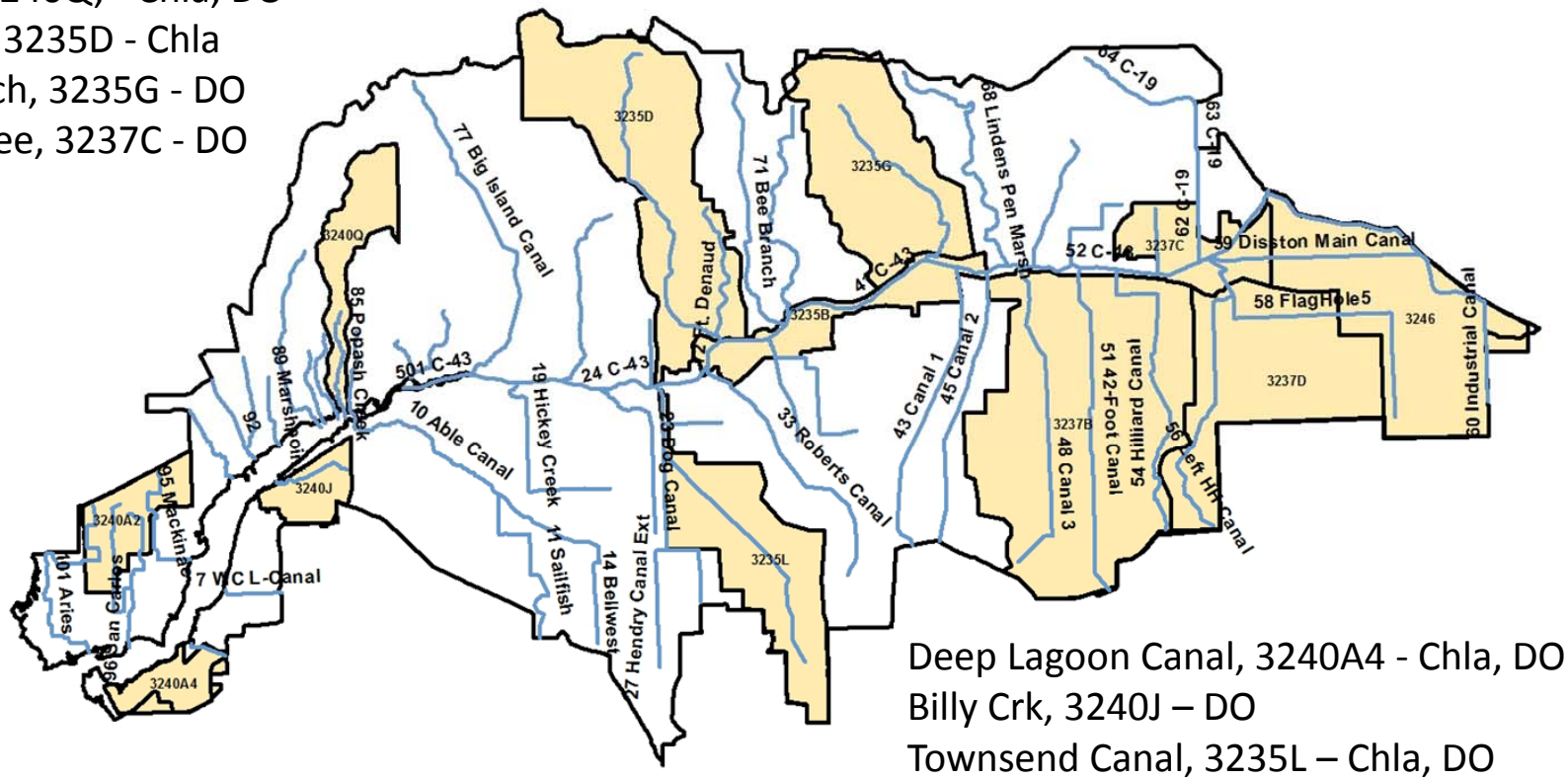
February 21st, 2017




Previous Impairments

Cape Coral, 3240A2 - Historic Chla
Popash Crk, 3240Q, - Chla, DO
Jacks Branch, 3235D - Chla
Cypress Branch, 3235G - DO
Lake Hicpochee, 3237C - DO



Caloosahatchee River (b/w S79 and S78), 3235B - Chla

Deep Lagoon Canal, 3240A4 - Chla, DO
Billy Crk, 3240J – DO
Townsend Canal, 3235L – Chla, DO
Long Hammock Crk, 3237B – Chla
Ninemile Canal, 3237D – DO
S-4 Basin, 3246 – Chla, DO

TMDL Criteria

Dissolved Oxygen Freshwater and Marine (in part)
62-302.533, FAC

DO percent saturation:
Freshwater criterion: No more than 10 percent of the daily average percent dissolved oxygen saturation values shall be below 38%.

Marine criterion (part 1):The daily average percent DO saturation shall not be below 42 percent saturation in more than 10 percent of the values.

TMDL Criteria - Streams

Chla/Nutrient Criteria for Streams

62-302.531 FAC Numeric Interpretations of Narrative Nutrient Criteria

Chla: shall be interpreted as being achieved in a stream segment where information on chlorophyll a levels, algal mats or blooms, nuisance macrophyte growth, and changes in algal species composition indicates there are no imbalances in flora or fauna, and either:

The average score of at least two temporally independent SCIs performed at representative locations and times is 40 or higher, with neither of the two most recent SCI scores less than 35, or

TN < 1.54 mg/L and TP < 0.12 mg/L

Chla must be less than 20 ug/L

These values are annual geometric mean concentrations not to be exceeded more than once in any three calendar year period.

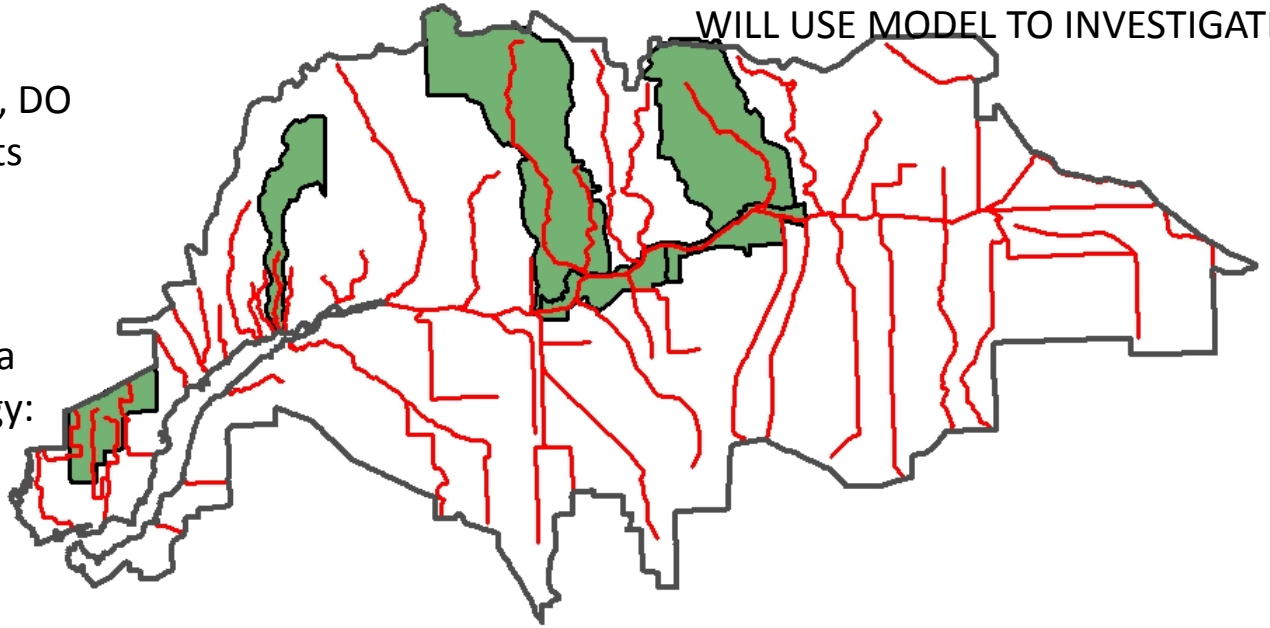
Cycle 3 Delist

Cape Coral, 3240A2 – Historic Chla
Delist Historic Chla: no criterion
Un-ionized Ammonia: under review

Popash Crk, 3240Q, - Chla, DO
TN,TP, Chla, biology: meets standards
DOsat: natural condition

Jacks Branch, 3235D – Chla
TN, TP, Chla, DOsat, biology: meets standards

Cypress Branch, 3235G – DO
TN, TP: need more information
Biology, Chla: meets standards
DOsat: natural condition
WILL USE MODEL TO INVESTIGATE



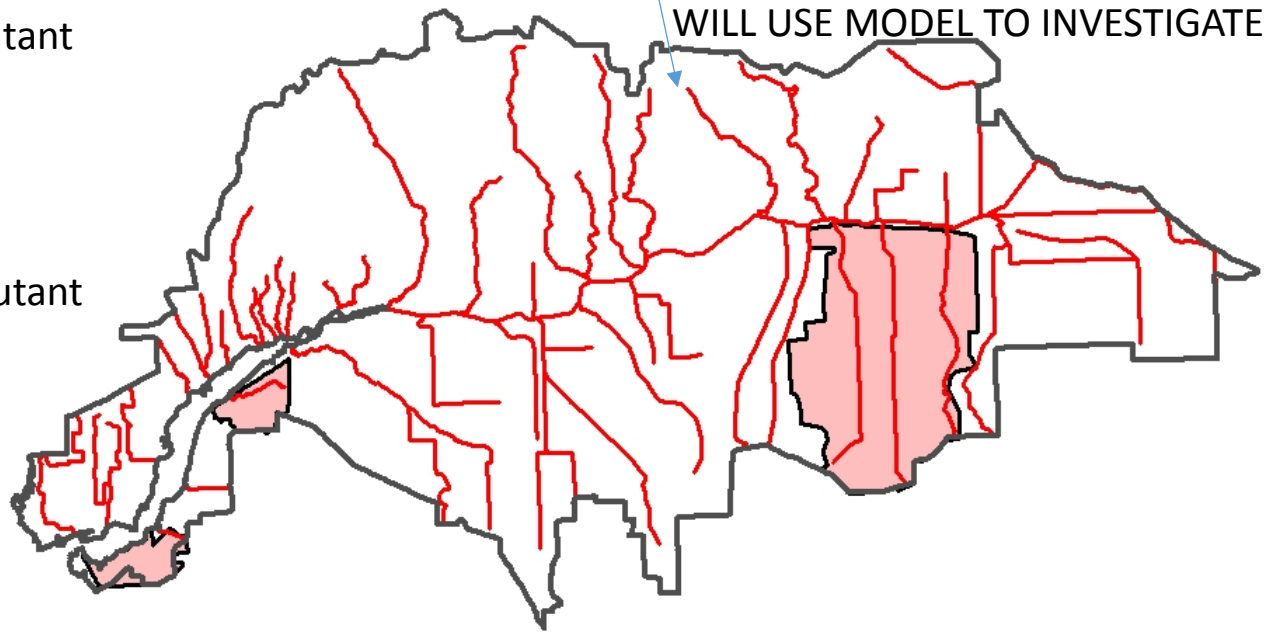
Caloosahatchee River (b/w S79 and S78), 3235B – Chla
New WBIDs (3235B2 Insufficient data)
3235B Biology, DOsat, Chla: meets standards

Cycle 3 Investigate

Deep Lagoon Canal, 3240A4 - Chla, DO
TN, TP: meets standards
Chla: need more data
DOsat: No Causative Pollutant

Billy Creek, 3240J – DO
TN, TP: meets standards
Chla: need more data
DOsat: No Causative Pollutant

Cypress Branch, 3235G – DO
TN, TP: need more information
Biology, Chla: meets standards
DOsat: natural condition
WILL USE MODEL TO INVESTIGATE

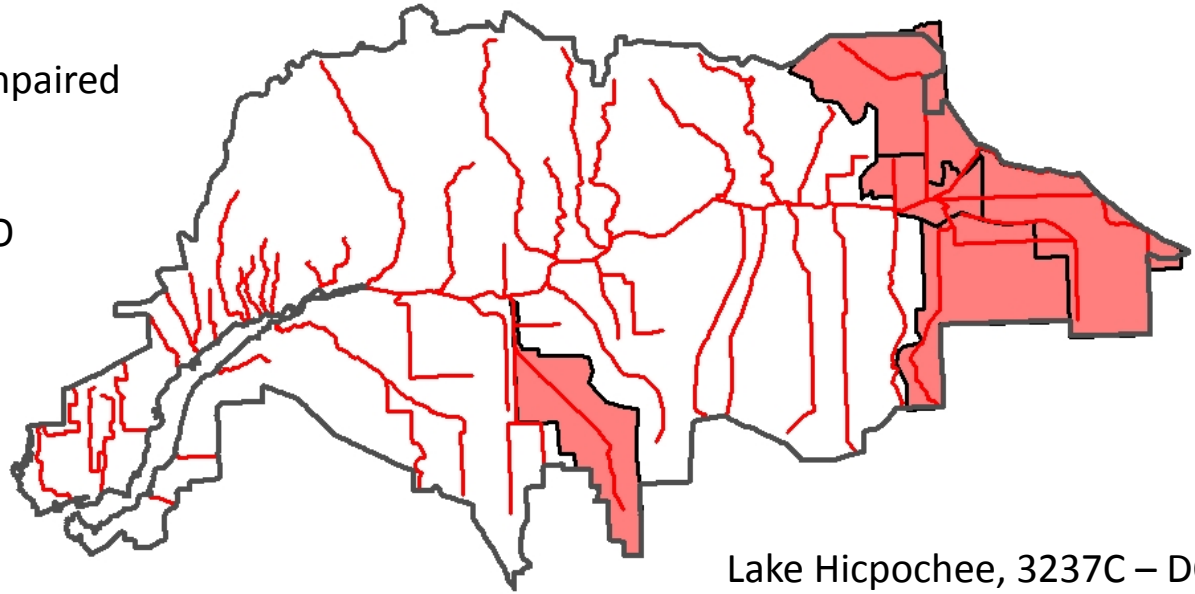


Long Hammock Crk, 3237B – Chla
Chla: needs more data
BOD, DOsat: No Causative Pollutant
Macrophytes: new listing

Cycle 3 Develop TMDLs

C-19 Canal, 3237E – New DOsat, TN
TP, Chla: need more data
BOD, DOsat, macrophytes: Impaired

Townsend Canal, 3235L – Chla, DO
Chla, TN: need more data
DOsat, TP, macrophytes: Impaired



Ninemile Canal, 3237D – DO (Flaghole)
Chla: meets standards
TN, TP: need more data
BOD, DOsat, macrophytes: Impaired

S-4 Basin, 3246 – Chla, DO
TP : need more data
TN, BOD, DOsat, Chla, macrophytes: Impaired

Lake Hicpochee, 3237C – DO
TN, TP, Chla: need more data
BOD, DOsat: Impaired

DOsat TMDL Approach

Use the period 2008 through 2014 (seven years)

First, using
(1) Calibrated Model
(2) Background model with Lake O TN at 1.2 mg/L
(3) Background model with Lake O TN at 1.2 and a 40% reduction SOD

Look at DOsat < 38% freshwater or <42% marine as a 7-year average of the daily average frequency of exceedance for each of the three model runs in each of the impaired waters.

DOsat TMDL Approach cont.

Second;
If the background DOsat is not improved over the Calibrated Model, then no nutrient TMDL is indicated.

If the background DOsat is improved over the calibrated model, then an investigation into the causative pollutant will be conducted for TN, TP, BOD, Chla relationships to the changes in the DOsat. If there is no relationship between the improvements in DOsat and nutrients/Chla/BOD, then no TMDL is indicated.

If nutrients, Chla, or BOD are indicated as causative pollutants TMDLs will be developed using the targets on next slide

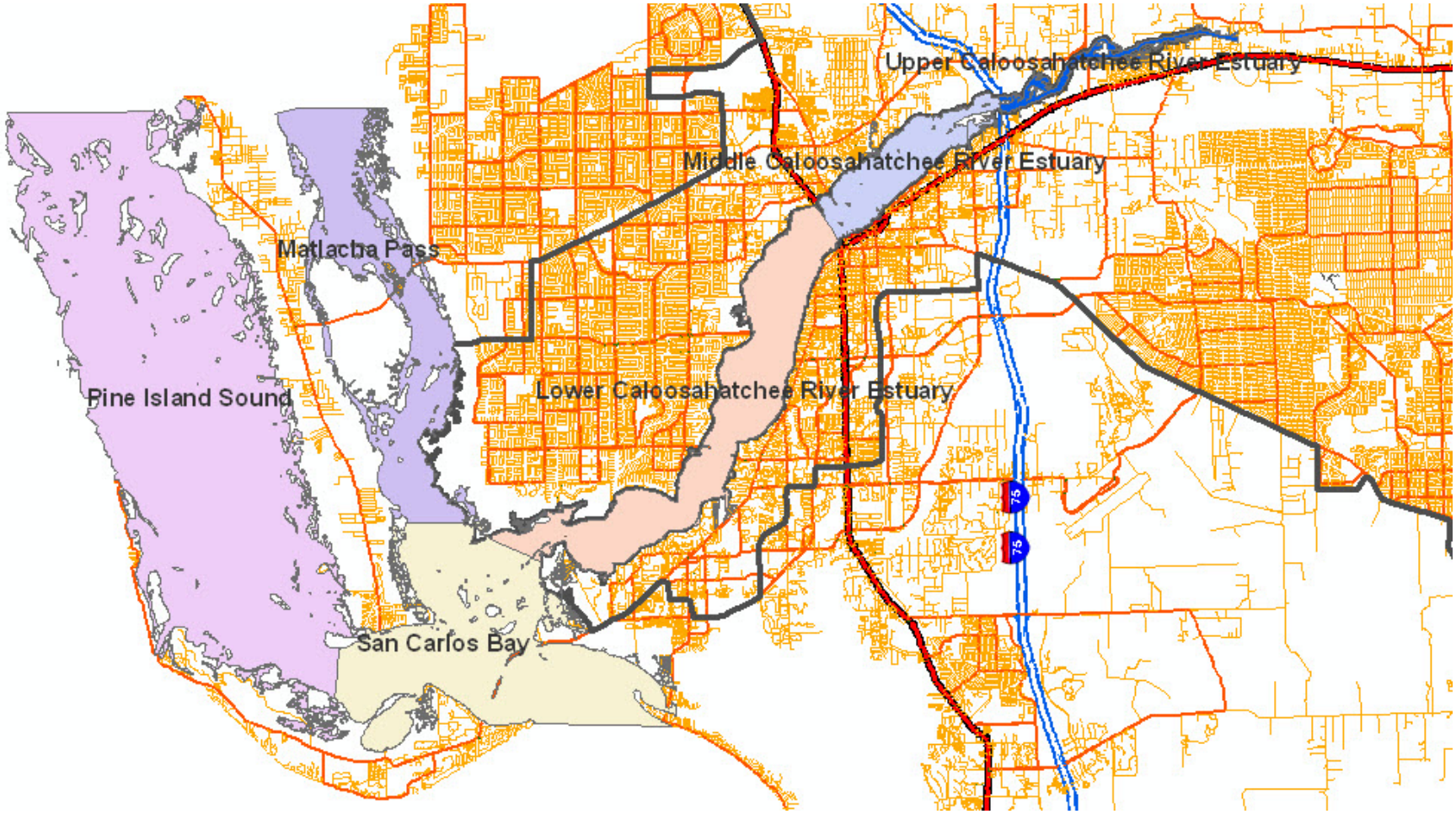
DOsat TMDL Approach cont.

Freshwater DOsat Targets:
If background meets criterion use <10% exceedance of 38% sat.
If background is less than the criterion use (DO of 0.1 mg/l below the DO concentration associated with the background DO saturation level).

Marine DOsat Targets:
If background meets criterion use <10% exceedance of 42% sat.
If background is less than the criterion use a decrease in magnitude of up to 10 percent from the background condition, if it is demonstrated that sensitive resident aquatic species will not be adversely affected.

Caloosahatchee Estuary NNC

62-302.532 FAC
Estuary-Specific Numeric Interpretations of the Narrative Nutrient Criterion.



Caloosahatchee Estuary NNC

NNC for Caloosahatchee			
Location	**Chla (ug/L)**	**TN (mg/L)**	**TP (mg/L)**
Matlacha Pass	**6.1 as AAM**	**0.54 as AAM**	**0.08 as AAM**
Pine Island Sound	**6.5 as AAM**	**0.57 as AAM**	**0.06 as AAM**
San Carlos Bay	**3.7 as LTA**	**0.44 as LTA**	**0.045 as LTA**
Lower (mouth) Caloosahatchee Estuary	**5.6 as LTA**	**TMDL-Load**	**0.04 as LTA**
Middle Caloosahatchee Estuary	**6.5 as LTA**	**TMDL-Load**	**0.055 as LTA**
Upper (S79) Caloosahatchee Estuary	**4.2 as LTA**	**TMDL-Load**	**0.086 as LTA**

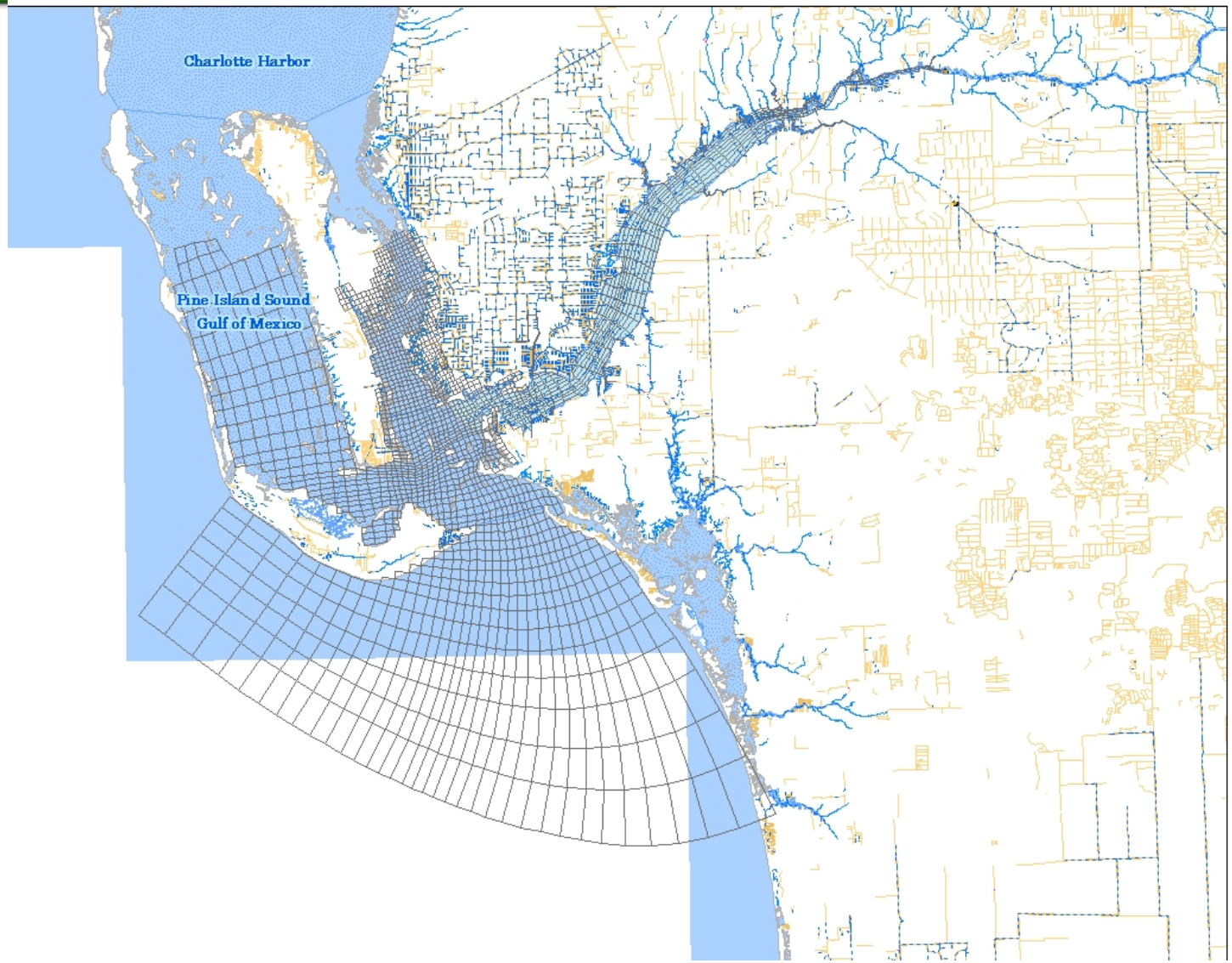
LTA = long-term average
AAM = Annual Arithmetic Average

Caloosahatchee Estuary (TMDL)

The 2009 TMDL for the Tidal Caloosahatchee estuary downstream of the S-79 Franklin Lock is 9,086,094 pounds of Total Nitrogen (TN) per year, which represents, based on model simulated flows and concentrations from 2003 through 2005, a 22.8% reduction. This load reduction will be allocated as follows:

(a) The WLA for point sources discharging to the estuary will remain unchanged from the permits currently in effect as of the date of this rule,
(b) The WLA for discharges subject to the Department's NPDES Municipal Stormwater Permitting Program will have a 22.8% load reduction relative to its overall contribution to the anthropogenic load,
(c) The LA for nonpoint sources downstream of the S-77 lock will have a 22.8% load reduction relative to the contribution to the overall anthropogenic load,
(d) The Margin of Safety is both implicit and explicit (in the form of an added 3% reduction in total nitrogen).

2009 Nutrient TMDL Revisit



2009 Nutrient TMDL Revisit

HSPF (watershed)

HSPF comparisons between 2017 model and 2009 TMDL using calibrated model, background model, and TMDL reductions

For each scenario, evaluate the year by year HSPF nutrient loads from 2003 – 2005 at S79 and directly to estuary from sources below S79.

Compare 2003 – 2005 average nutrient loads (2009 and 2017 models) to 2008 – 2014 nutrient loads (2017 model).

2009 Nutrient TMDL Revisit

EFDC

EFDC (percent light on bottom) comparisons between 2017 model and 2009 TMDL for calibration, background, and TMDL reduction.

Evaluate percent light on bottom in San Carlos Bay as monthly averages of selected cells from years 2003-2005 (2017 model and 2009 model)

Compare 2003 – 2005 results (2009 and 2017 models) to 2008 – 2014 results (2017 model).

2009 Nutrient TMDL Revisit

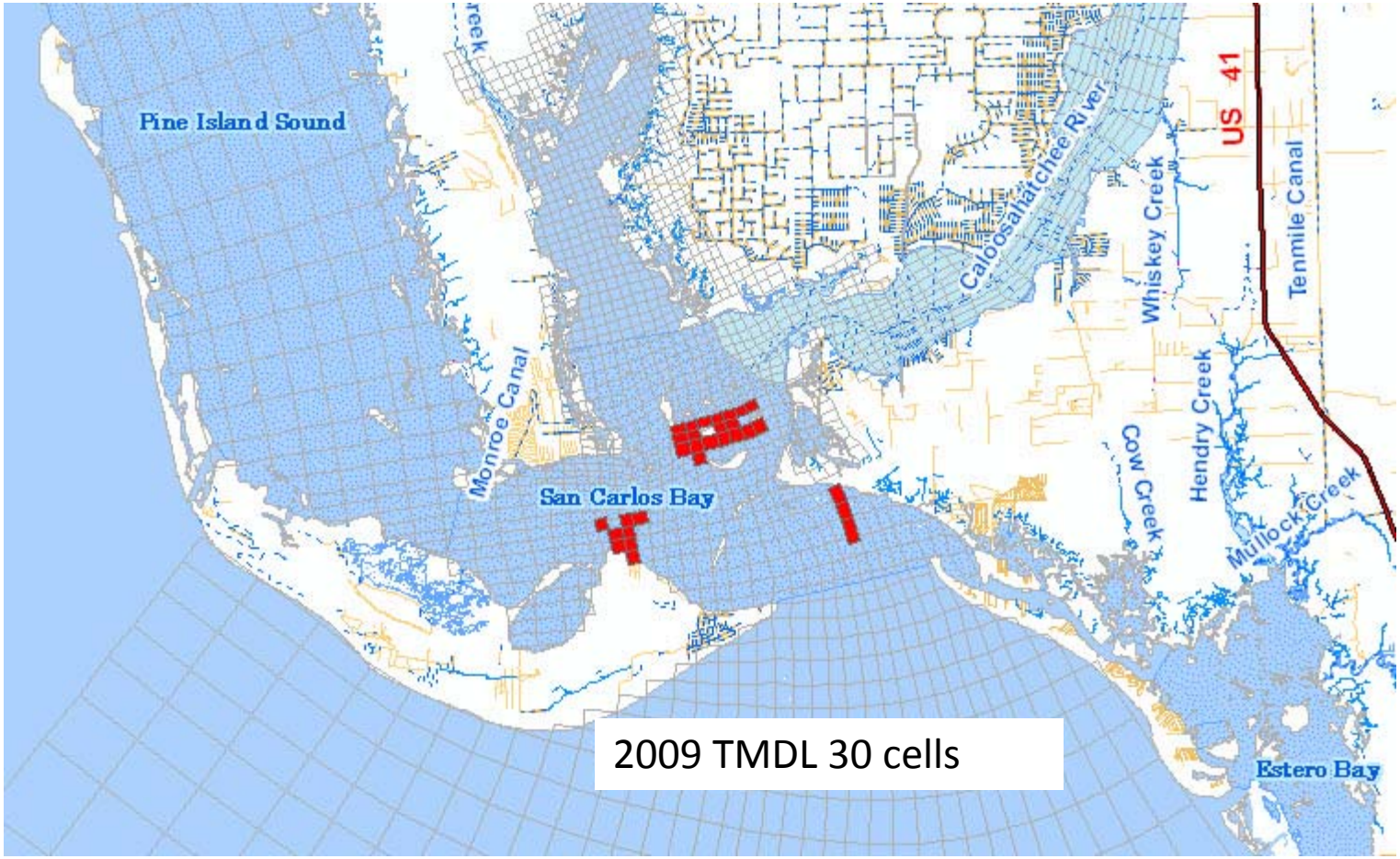
EFDC Approach:

2009 TMDL identified the critical area as San Carlos Bay. Model cells were selected based on the maximum amount of area in San Carlos Bay 2.2 meters deep or less. 30 Cells were selected in the 2009 TMDL.

The results were summarized as the monthly average percent light on bottom for the group of cells selected for each modeled scenario.

Reselect cells for the 2017 model based on the same selection criteria and post process as above. For each scenario, compare the 2009 cell group to the cell group selected from the 2017 model.

2009 Nutrient TMDL Revisit



Stakeholder Involvement in TMDL

We need your help:

Reviewing the Target selection and TMDL approach for both new TMDL development (impaired waters) and the 2009 TMDL revisit.