

Waterways Advisory Committee

Marco Island, Florida

Water Quality Status & Trends

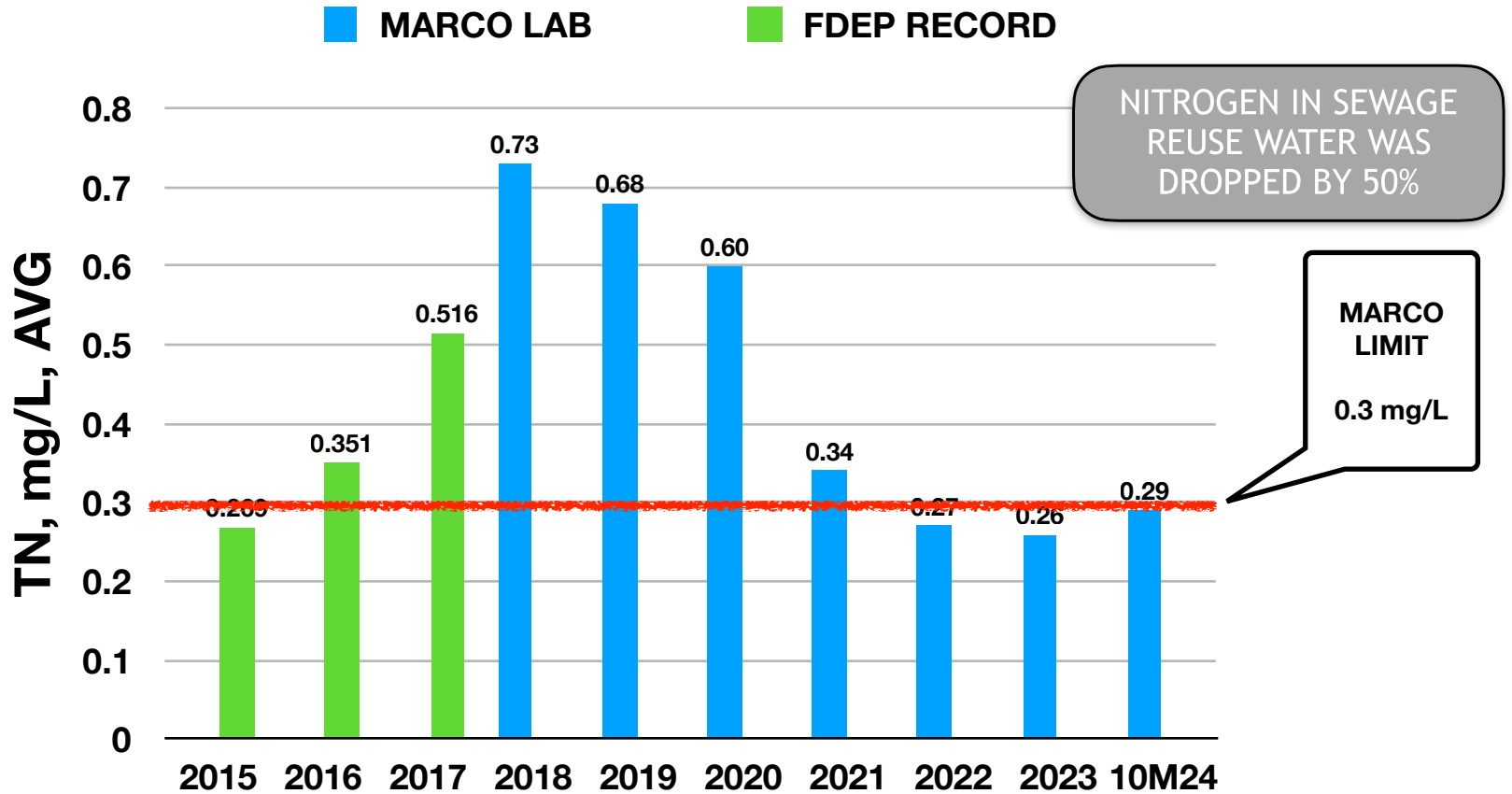
November 21, 2024

Summary

- **Marco on the FDEP impaired list for Total Nitrogen (TN)**
 - **Marco TN below impairment limit for three (3) years now**
 - **FDEP delisting Marco TN impairment**
- **Marco now on FDEP impaired list for "Decreasing Trend in Dissolved Oxygen Levels"**
- **Concern: Total Phosphorus (TP) increasing in canals**
 - **TP is a "causal variable" - causes algal blooms**
- **Concern: Chlorophyll-a (CHLA) is increasing in canals**
 - **CHLA is a "response variable" - measures algal biomass**
- **Connection seen between high canal phosphorus (TP) and low canal oxygen (DO)**

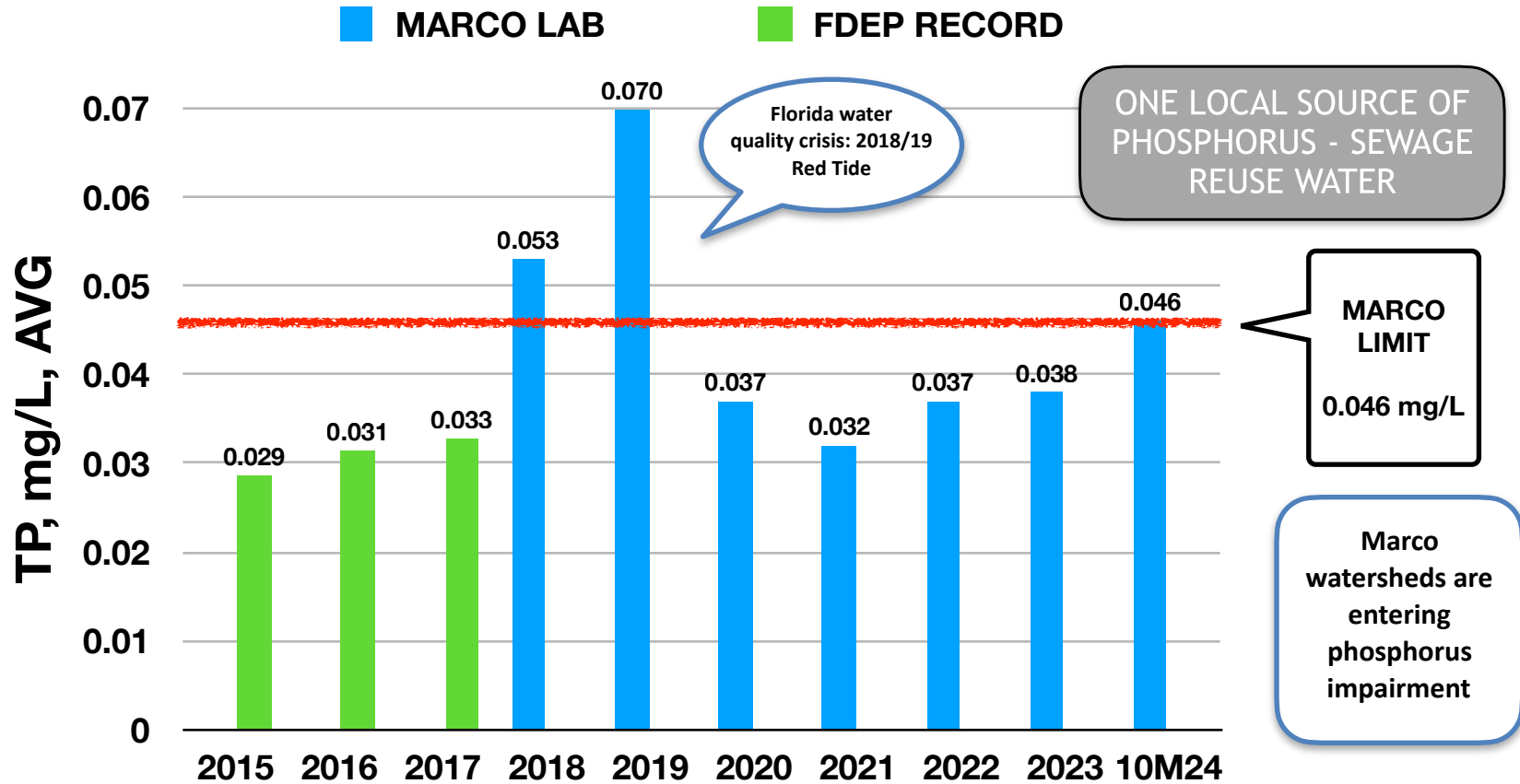
Key Water Quality Parameters

Marco Total Nitrogen (TN) Trend



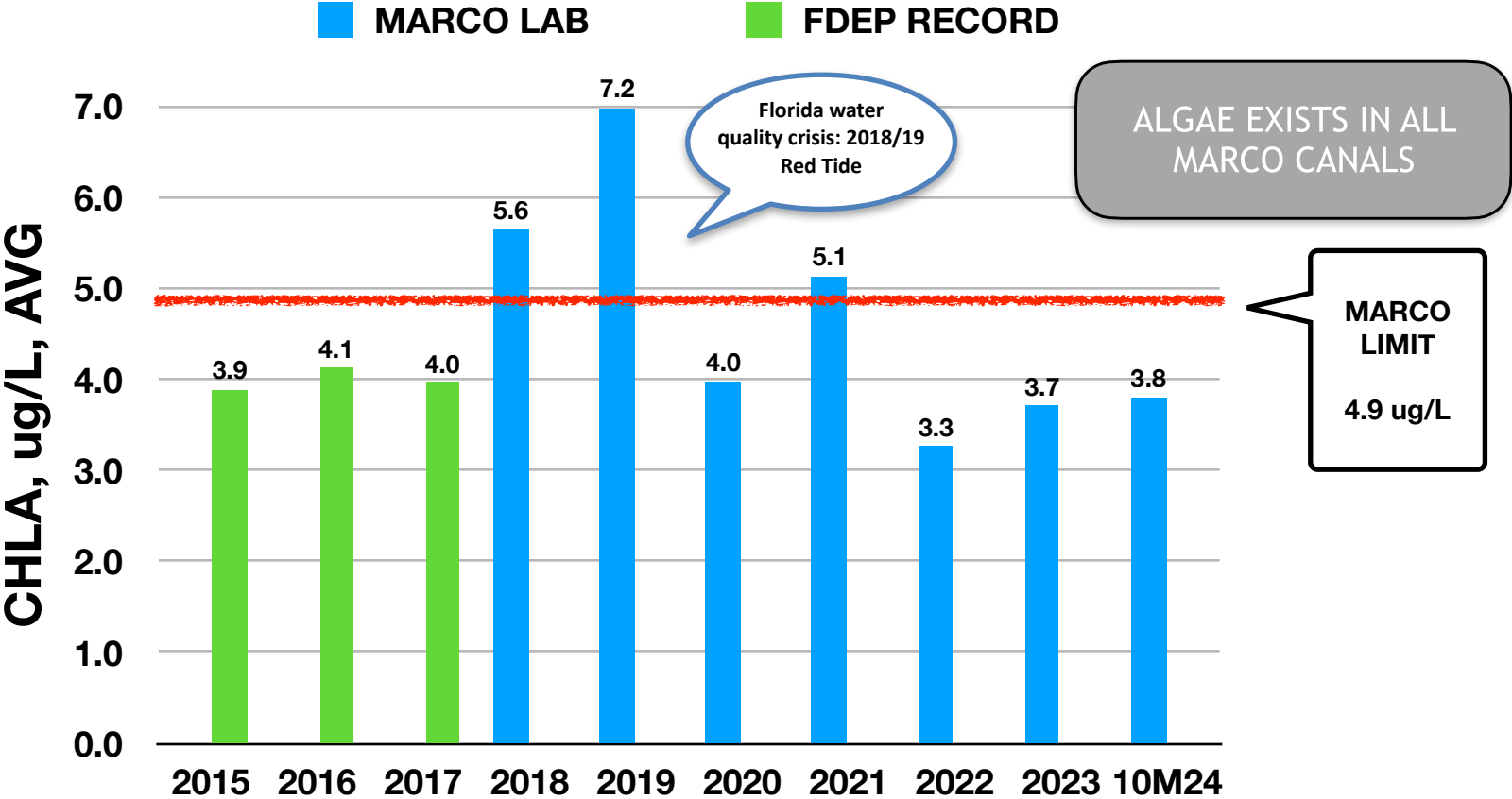
Nitrogen Below Limit - Stable

Marco Total Phosphorus (TP) Trend



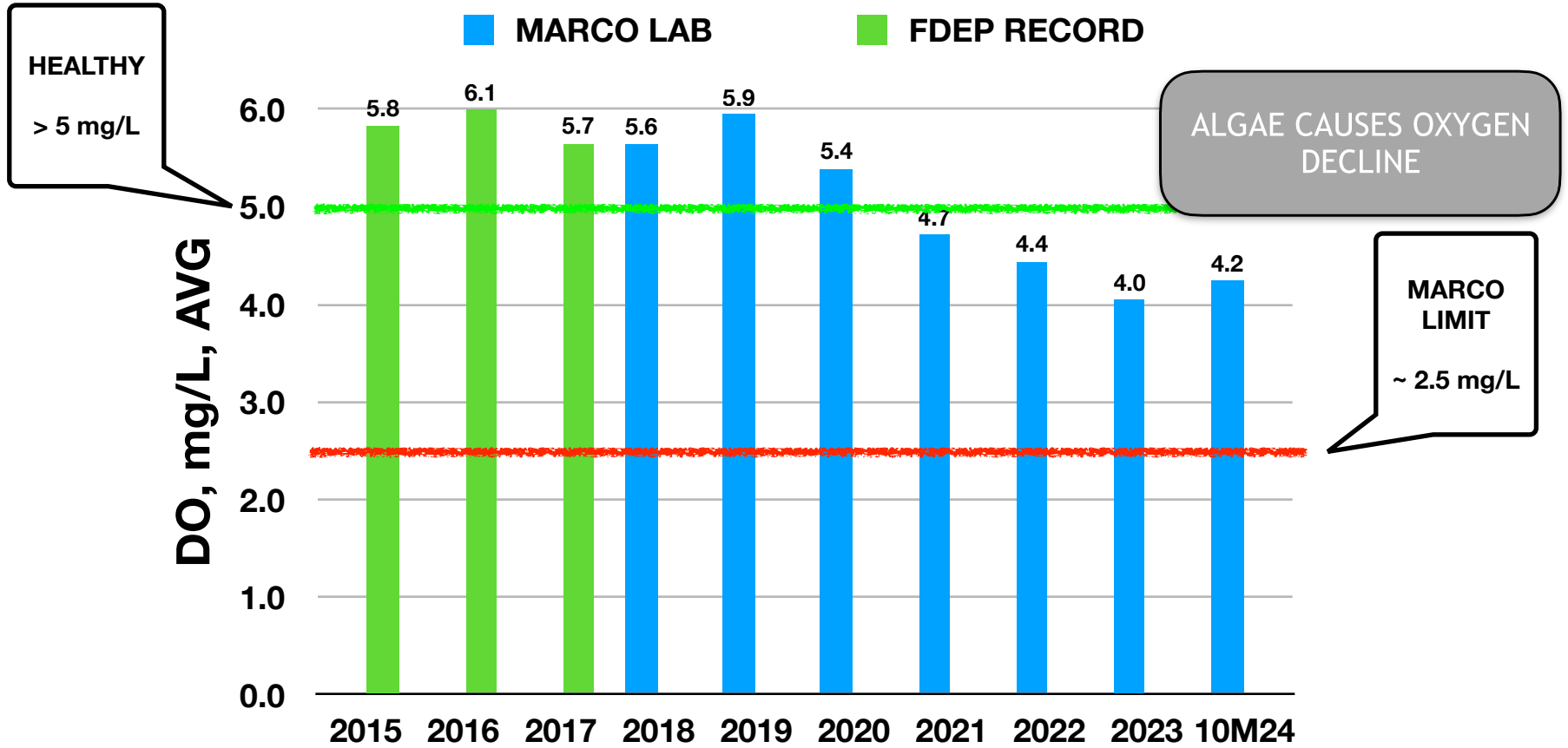
Phosphorus at Limit - Increasing

Marco Chlorophyll a (CHLA) Trend



Chlorophyll Below Limit - Increasing

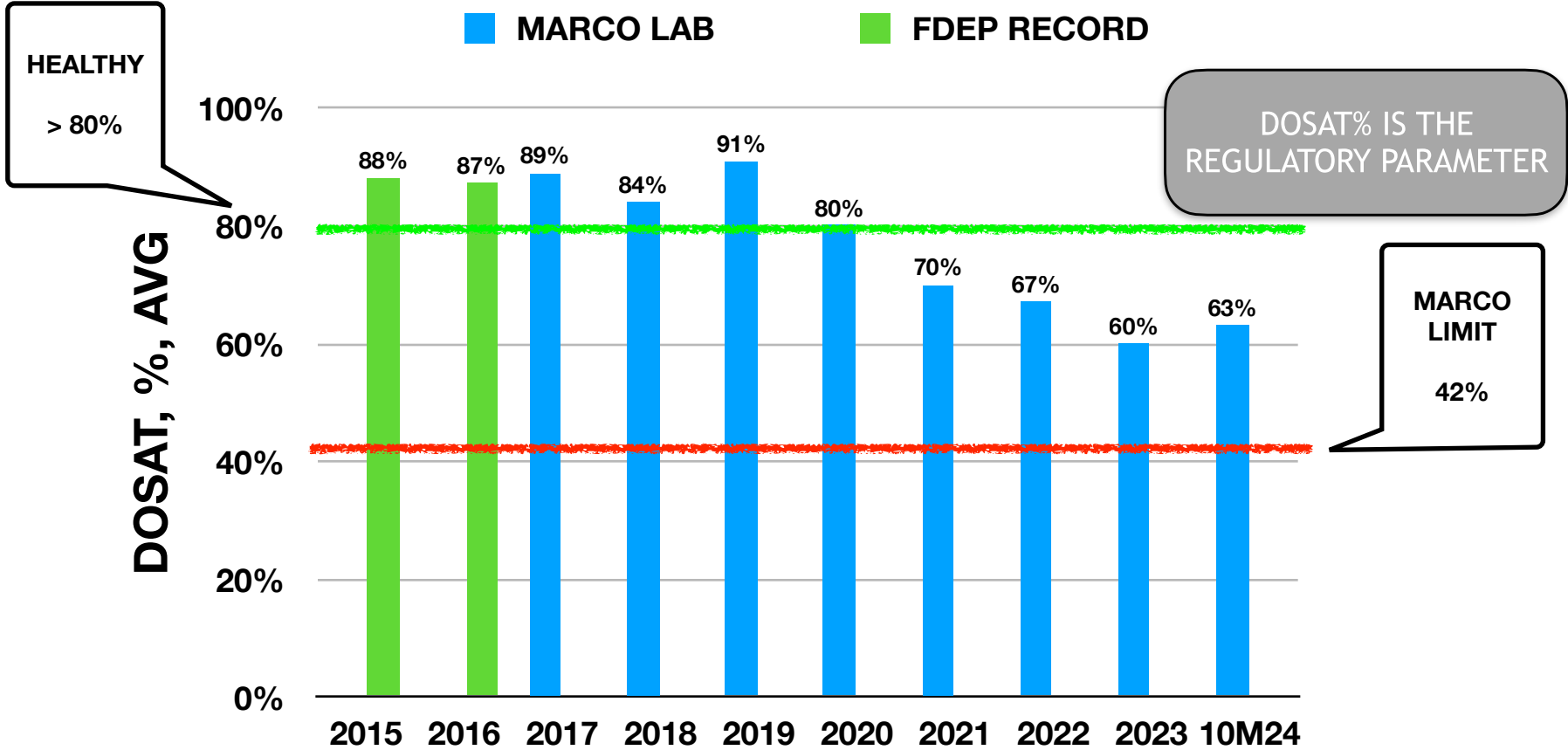
Marco Dissolved Oxygen (DO) Trend



Oxygen Above Limit - Decreasing

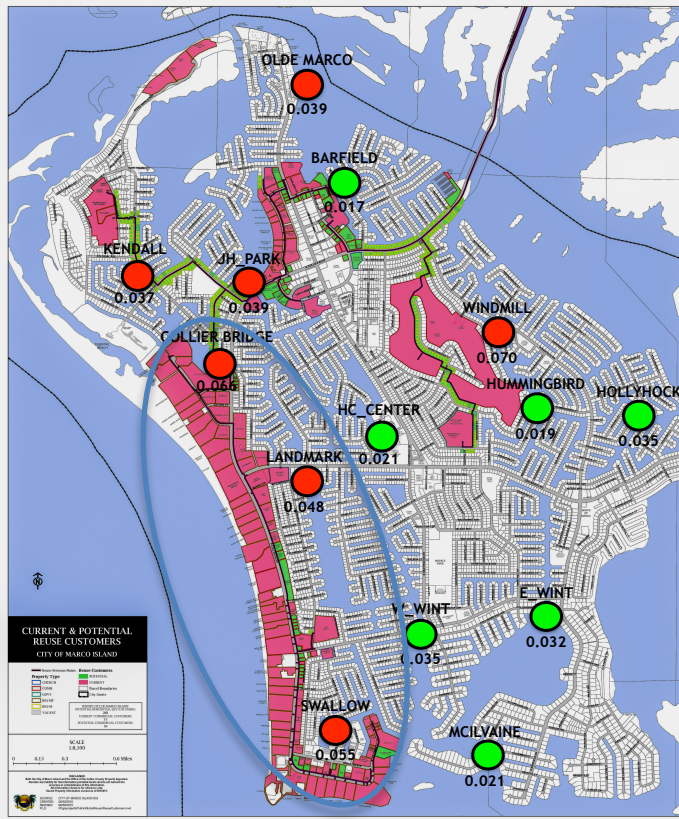
Marco DOSAT% Trend

MARCO LAB FDEP RECORD



Oxygen Above Limit - Decreasing

Marco Water Quality Status Total Phosphorus (TP) 2023

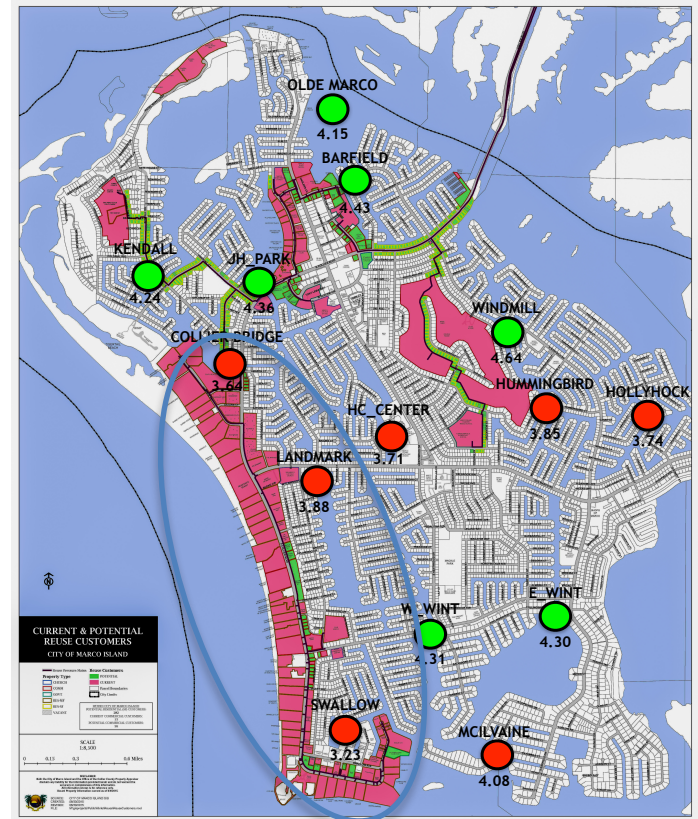


● ABOVE MEDIAN > 0.036 mg/L
 ● BELOW MEDIAN < 0.036 mg/L

Highest phosphorus along Collier Boulevard

Source: City of Marco Island, Water Quality Sampling Reports

Marco Water Quality Status Dissolved Oxygen (DO) 2023



● BELOW MEDIAN < 4.115 mg/L
 ● ABOVE MEDIAN > 4.115 mg/L

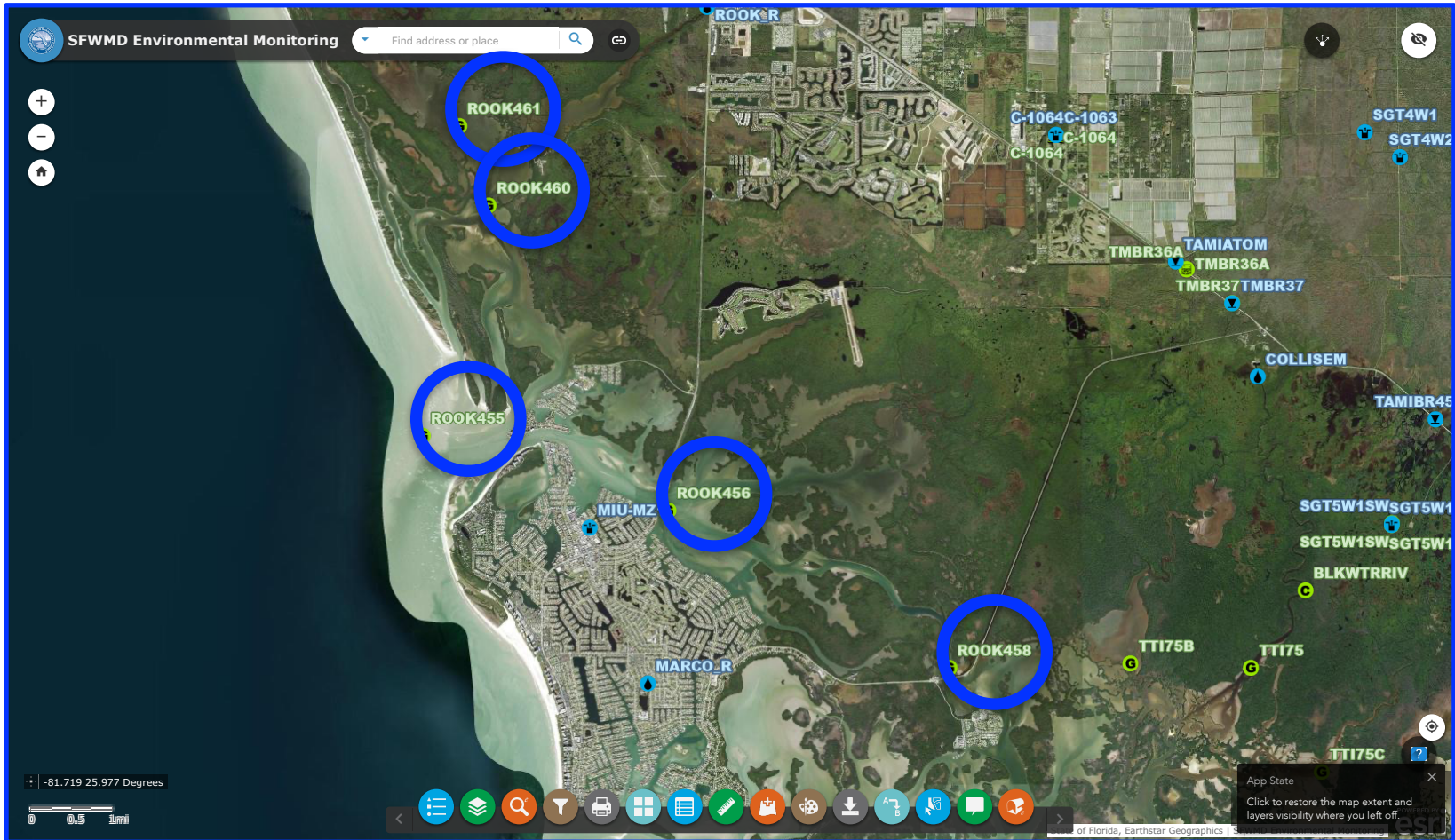
Lowest oxygen along Collier Boulevard

Source: City of Marco Island, Water Quality Sampling Reports

Strong relationship between high phosphorus and low oxygen

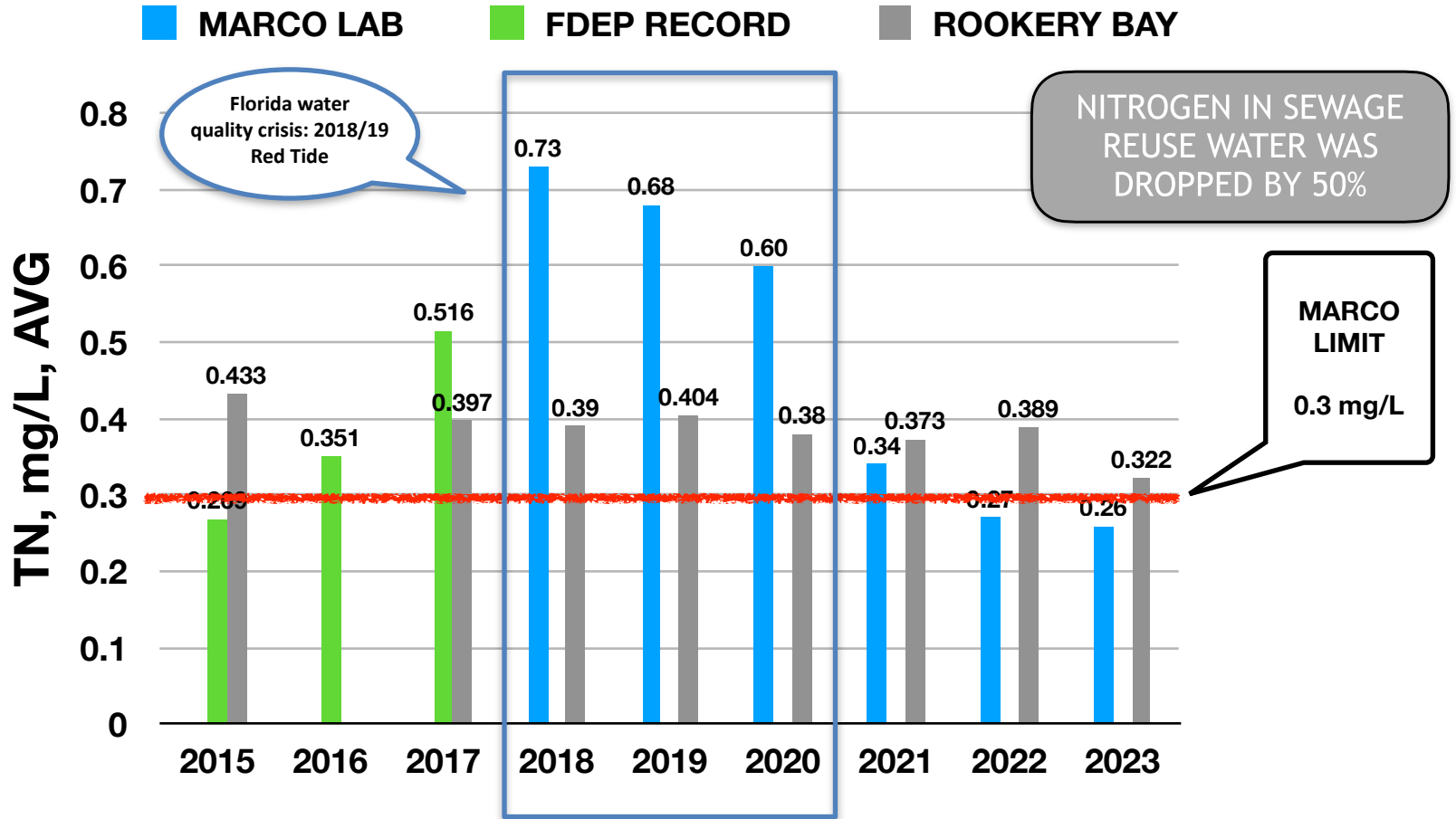
**MARCO ISLAND
VS.
ROOKERY BAY**

DBHYDRO - Rookery Bay



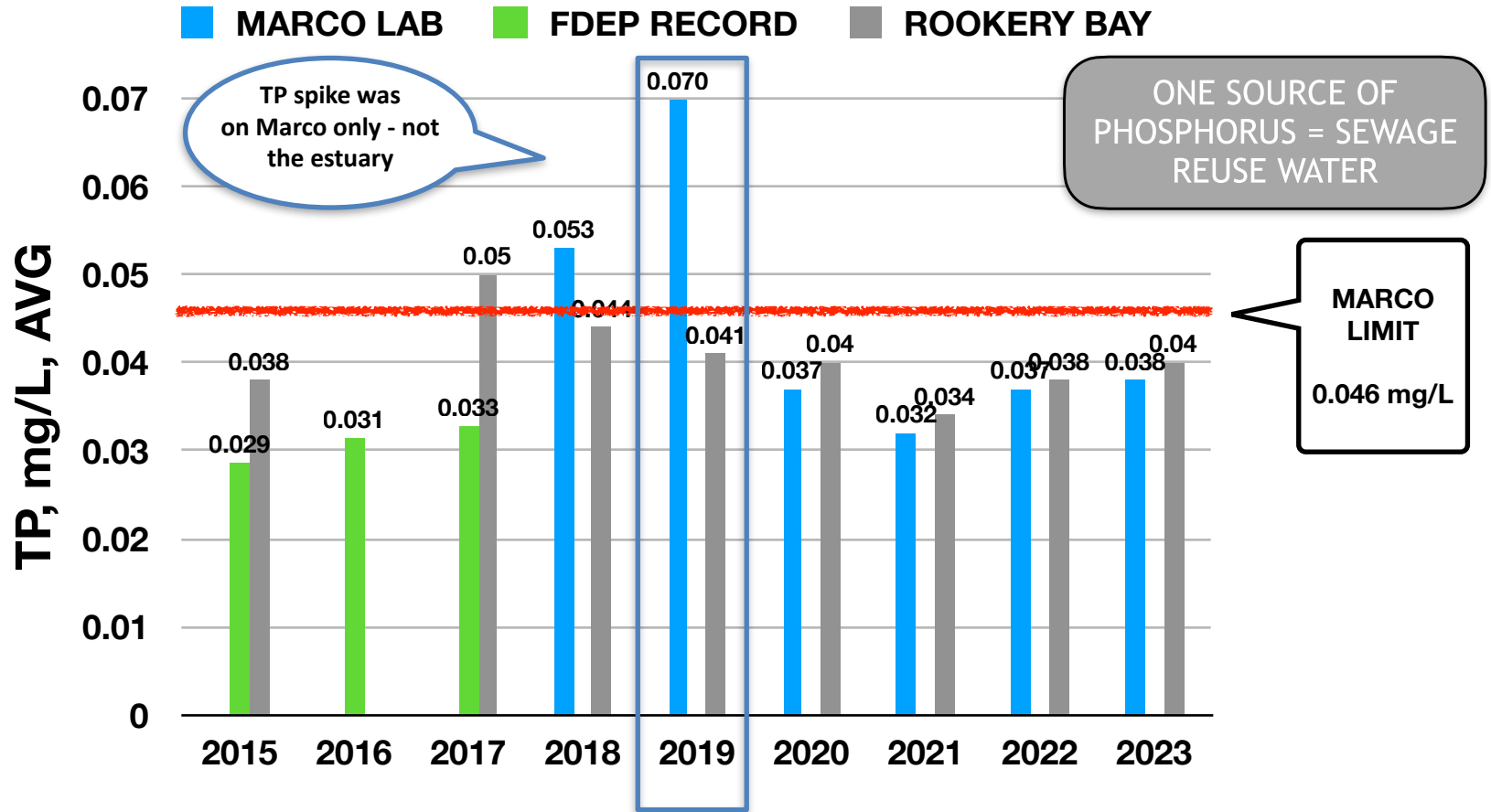
5 DBHYDRO stations around Marco

Total Nitrogen (TN) Trend



Nitrogen spike only on Marco

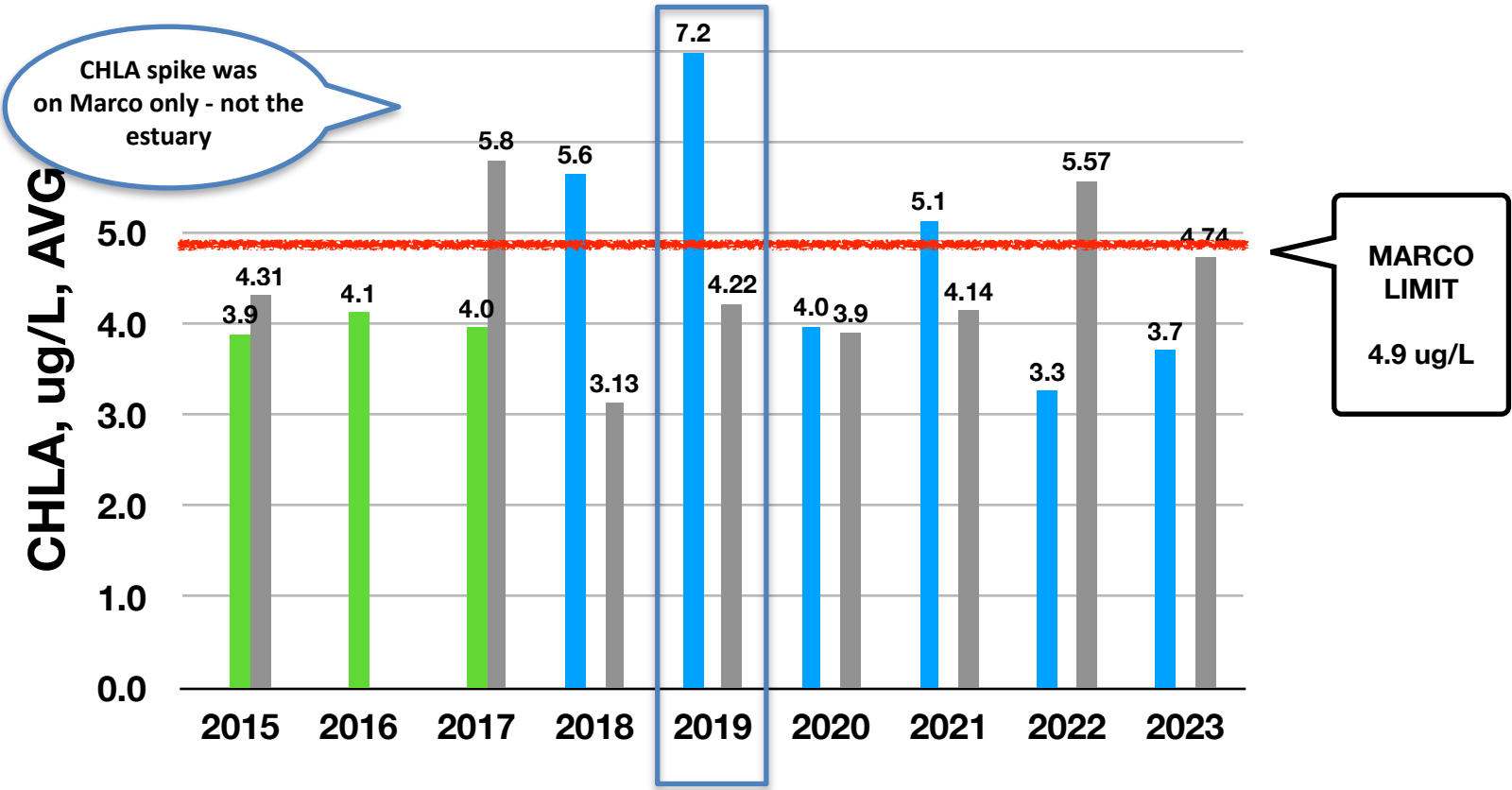
Total Phosphorus (TP) Trend



Phosphorus spike only on Marco

Chlorophyll-a (CHLA) Trend

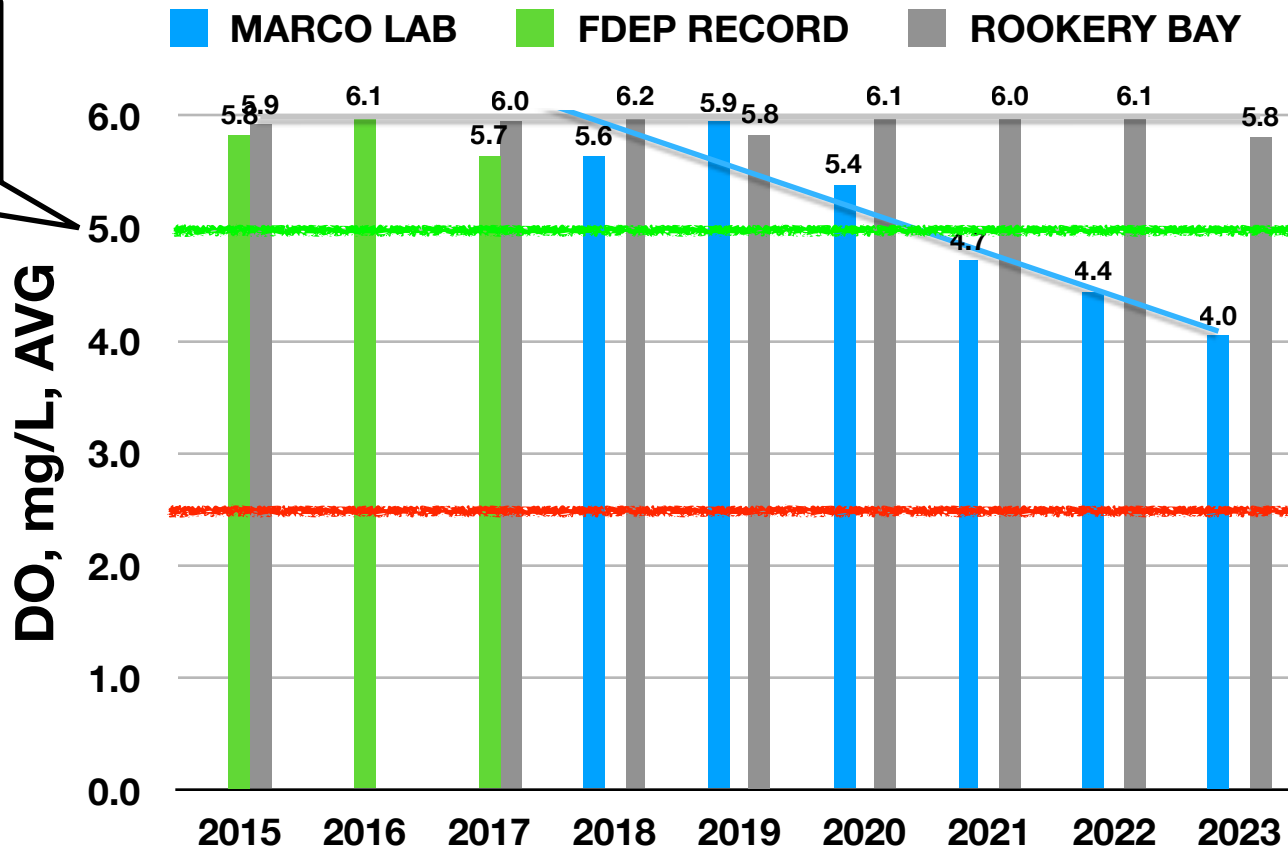
MARCO LAB FDEP RECORD ROOKERY BAY



CHLA spike only on Marco

Dissolved Oxygen (DO) Trend

HEALTHY
> 5 mg/L

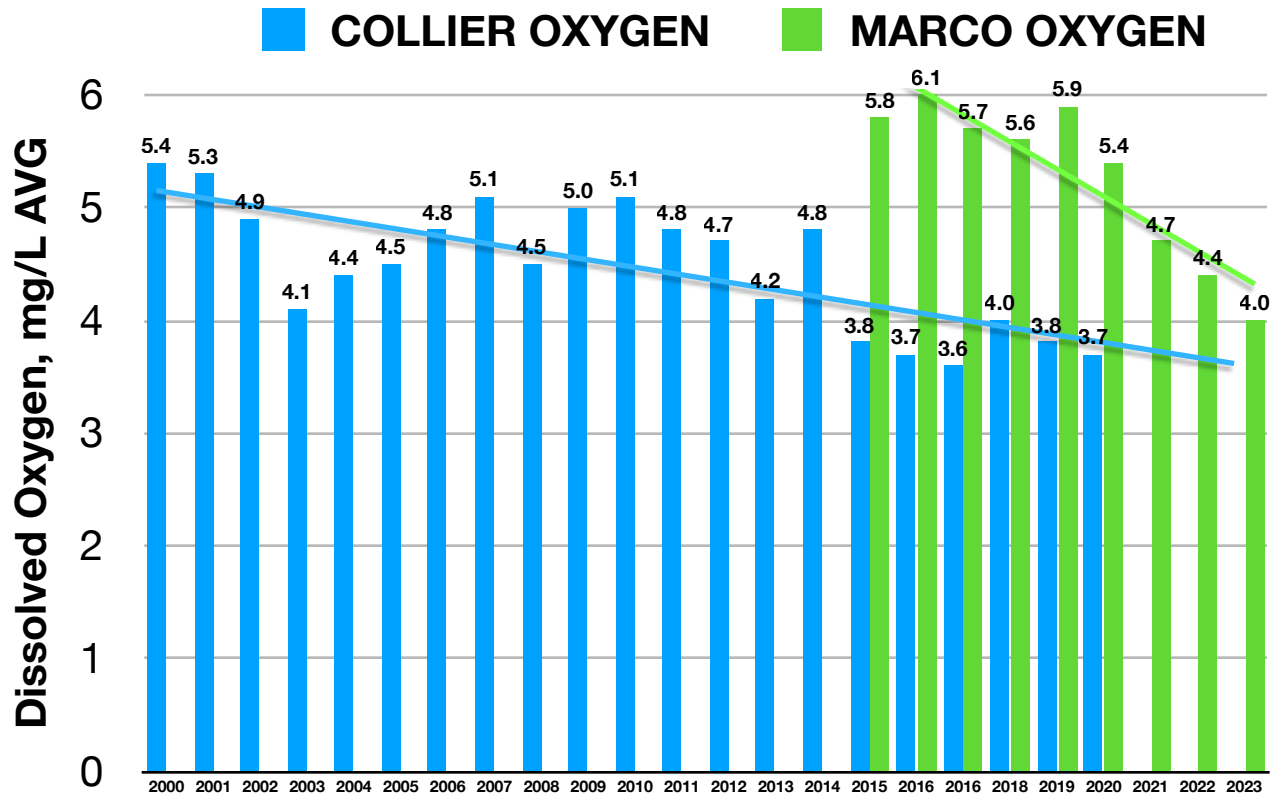


MARCO
LIMIT
~ 2.5 mg/L

Oxygen decline only on Marco

**MARCO ISLAND
VS.
COLLIER COUNTY**

Marco Island vs. Collier County



What took 20 years in the county - took 4 years on Marco

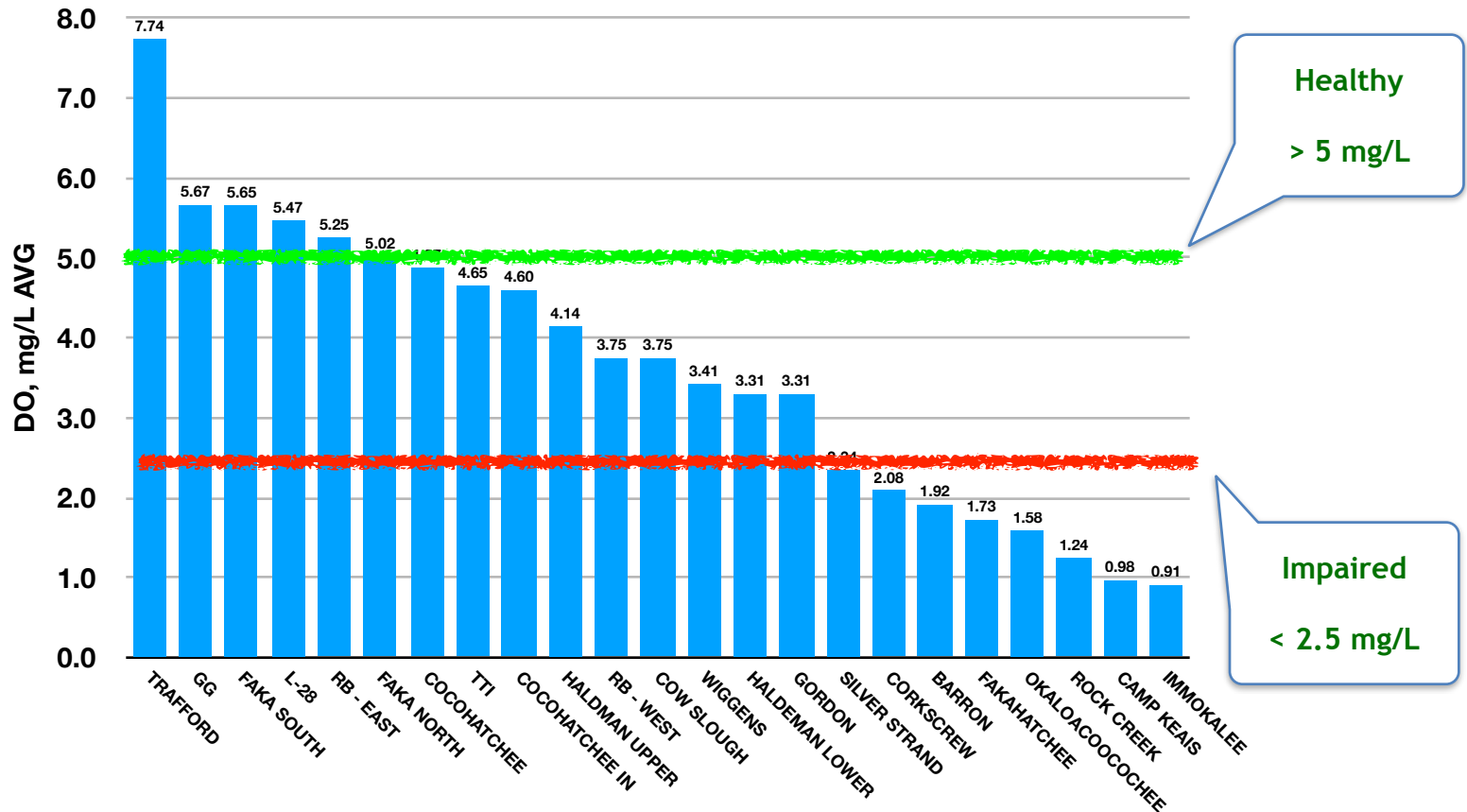
Collier eco-system has collapsed - Marco eco-system is collapsing

Population includes Naples, Marco Island, Everglades City while oxygen is for 23 county watersheds

Source: "Surface Water Quality Assessment and Trend Report for Collier County Pollution Control", Janicki, 2023

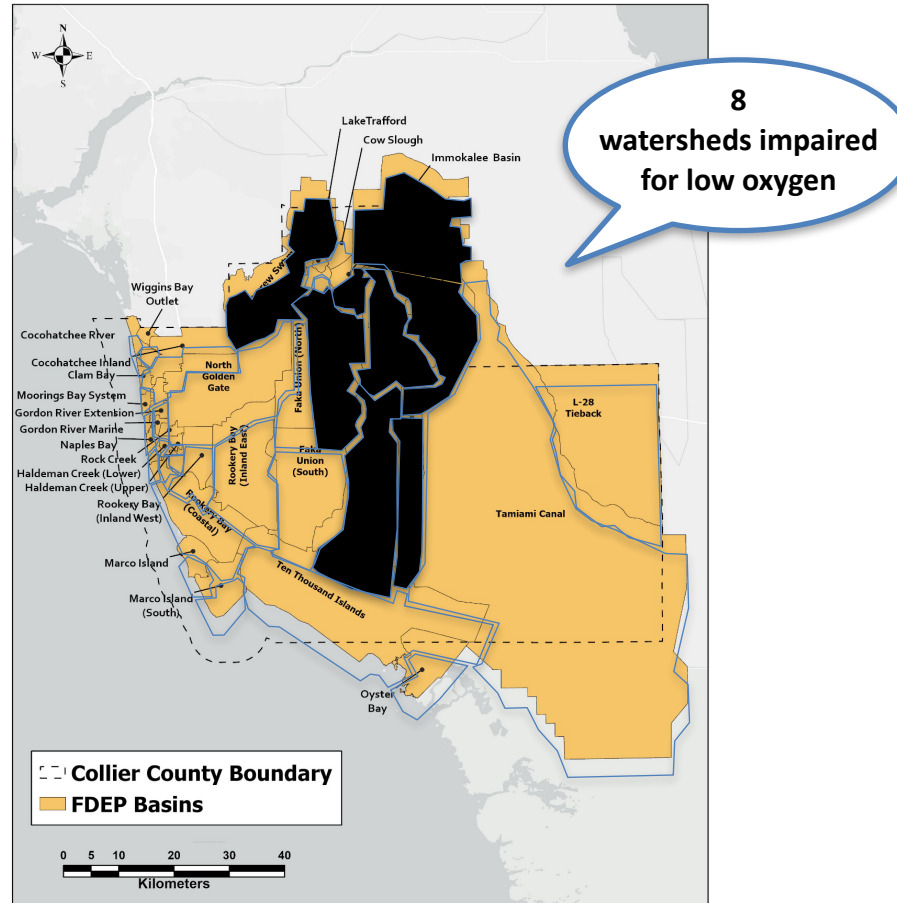
**Collier oxygen declined 30% in 20 years
Marco oxygen declined 32% in 4 years**

Collier County Dissolved Oxygen (2020)



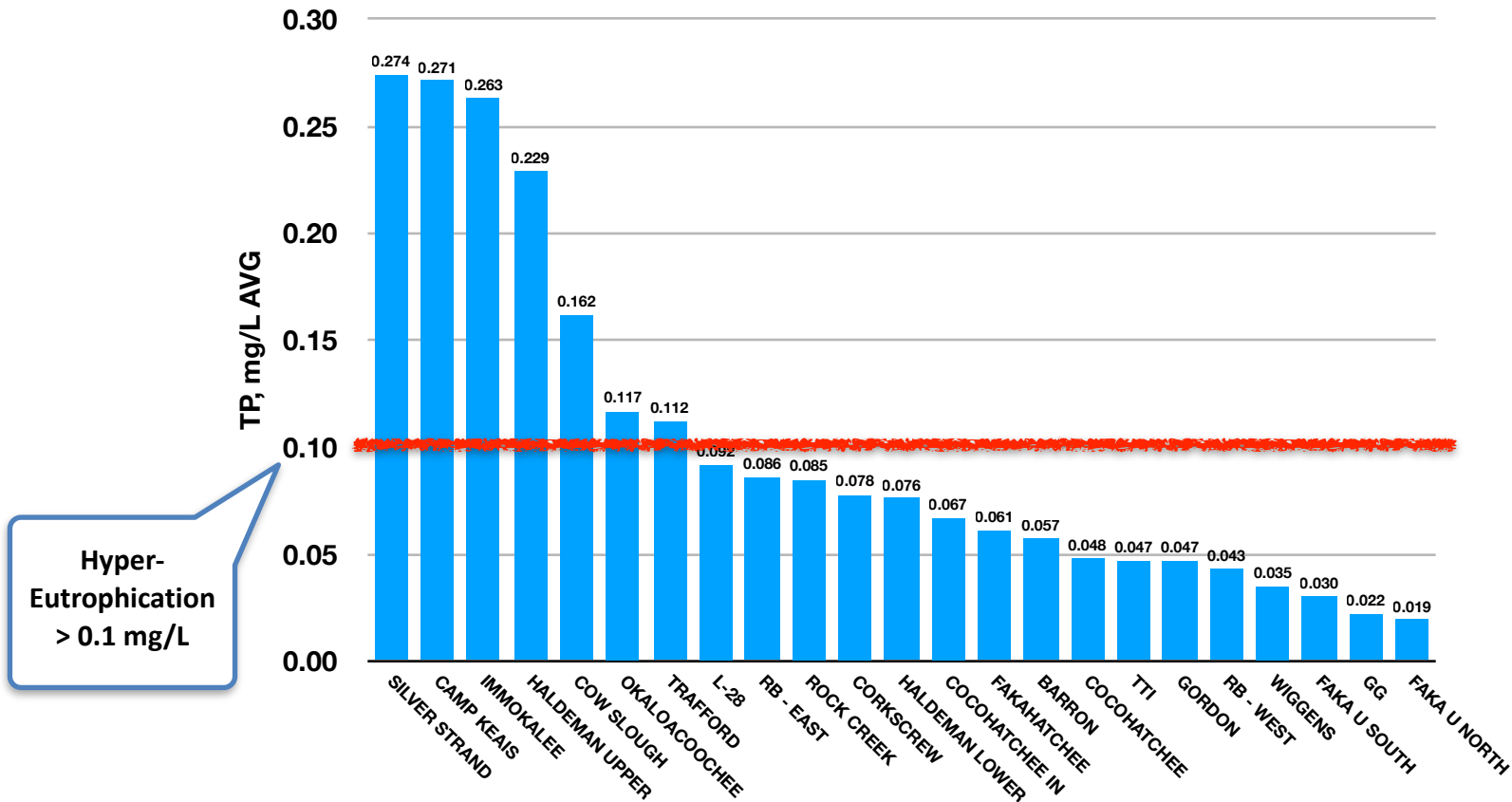
8 Impaired Watersheds

Collier County Dissolved Oxygen (2020)



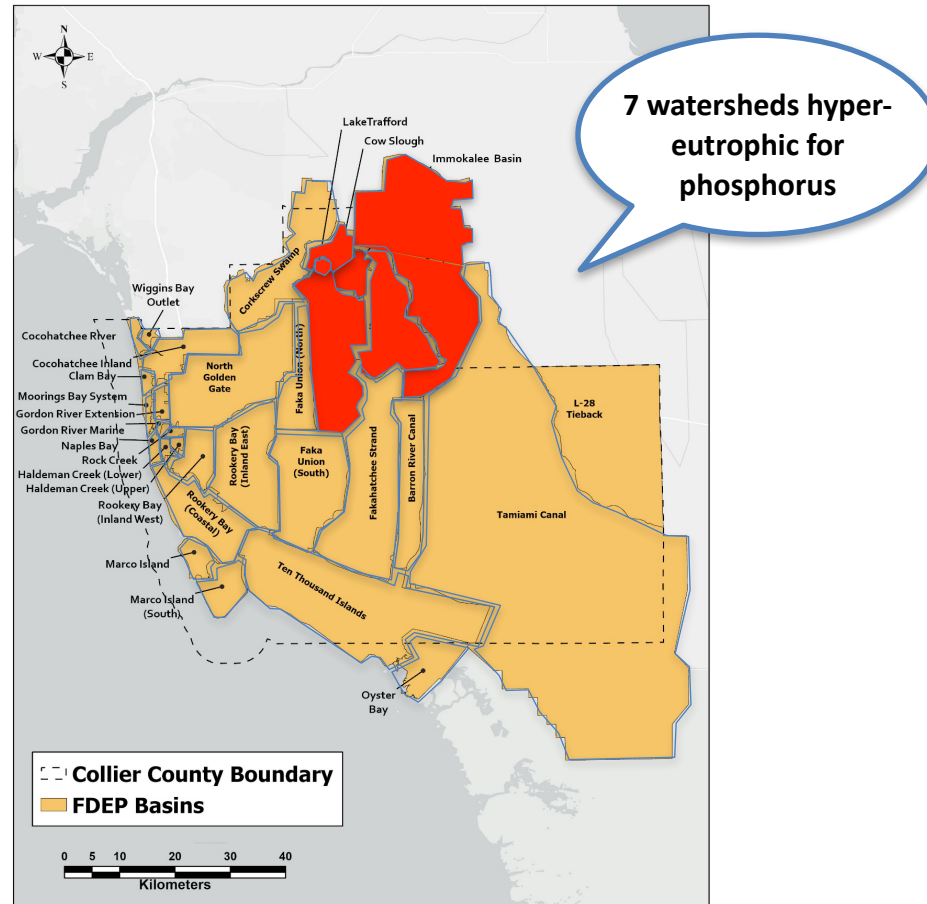
Hypoxic "dead zone" has formed

Collier County Total Phosphorus (2020)



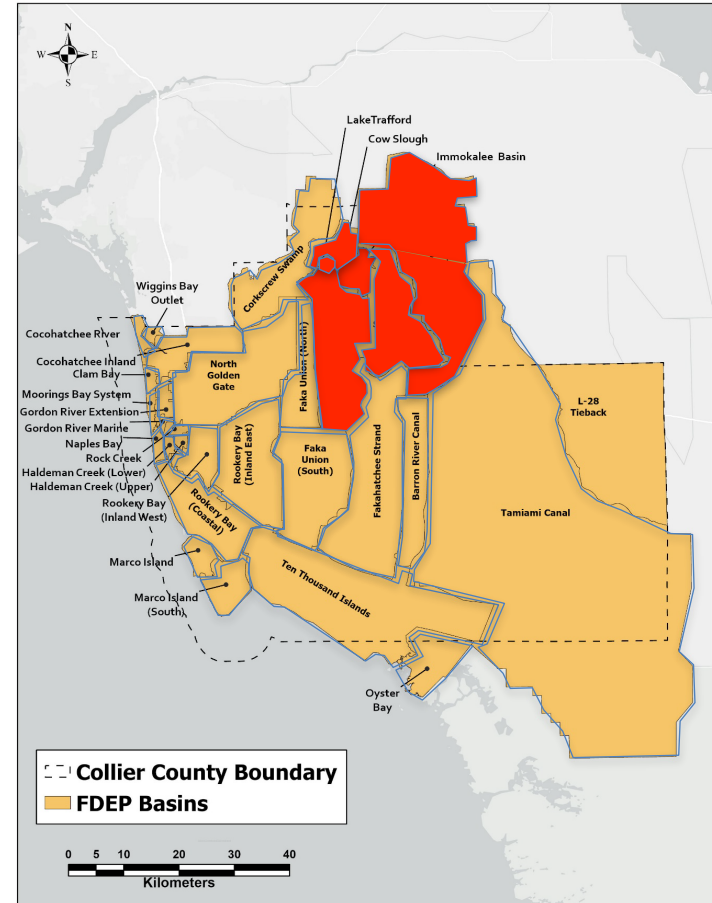
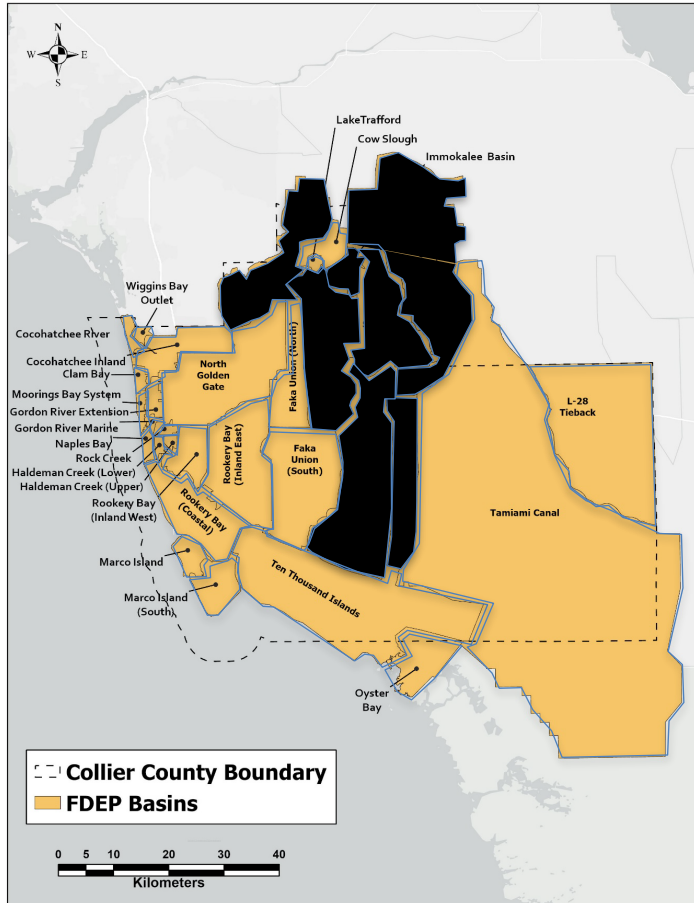
7 watersheds hyper-eutrophic for phosphorus

Collier County Total Phosphorus (2020)



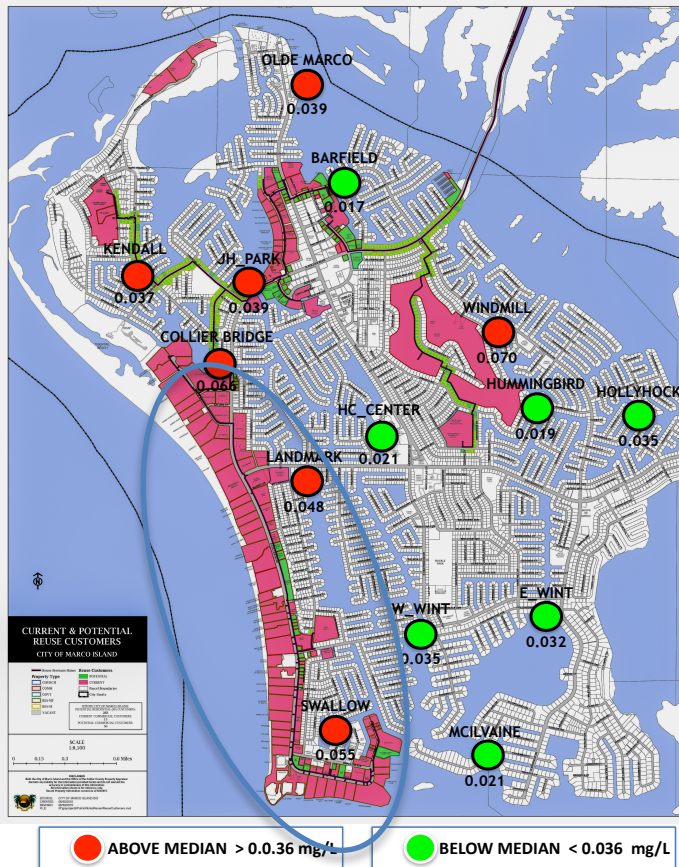
Phosphorus "hot spot" has formed

Collier County TP vs. DO (2020)



Strong relationship between high phosphorus and low oxygen

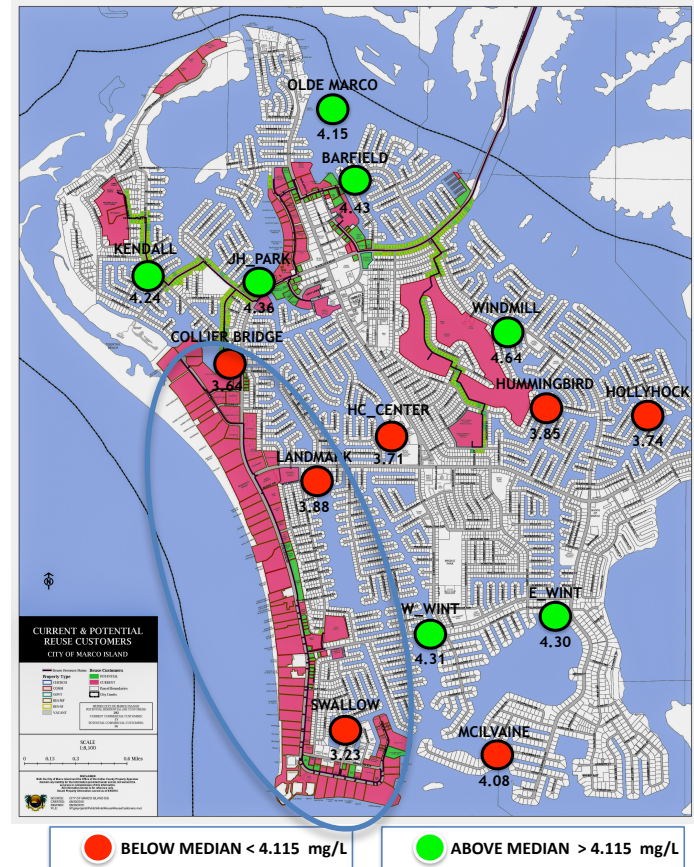
Marco Water Quality Status Total Phosphorus (TP) 2023



Highest phosphorus along Collier Boulevard

Source: City of Marco Island, Water Quality Sampling Reports

Marco Water Quality Status Dissolved Oxygen (DO) 2023



Lowest oxygen along Collier Boulevard

Source: City of Marco Island, Water Quality Sampling Reports

Strong relationship between high phosphorus and low oxygen

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