



Florida Department of Environmental Protection

Florida Keys Water Quality Restoration

April 26, 2017





Current Strategies

**Reasonable
Assurance
Plan**

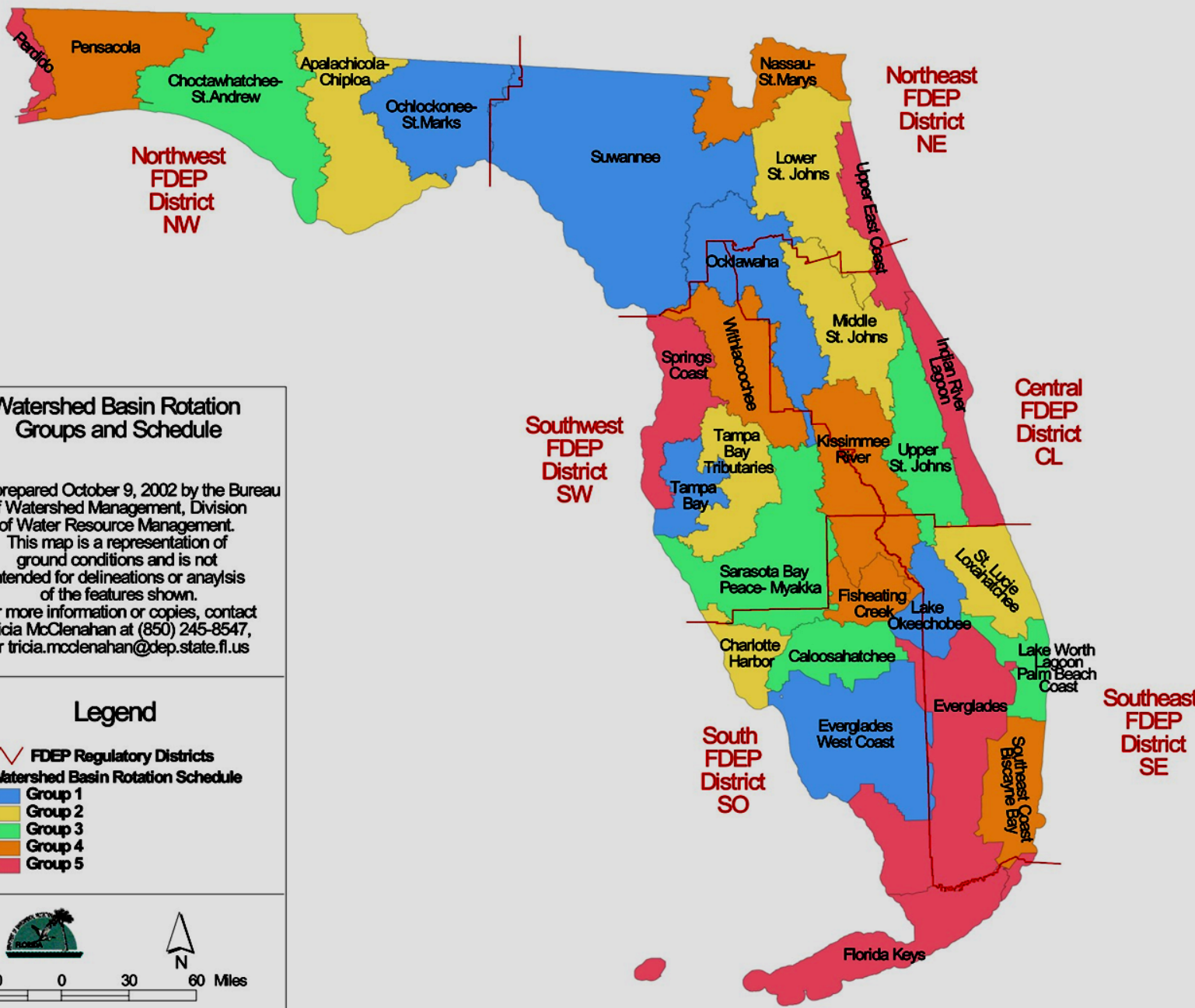
**Canal
Restoration
Projects**

**Water Quality
Improvement**



Canal Restoration






- 2011 – Numerous canals determined to not meet dissolved oxygen water quality standard
- 2012 – Water Quality Protection Plan Canal Restoration Sub-committee initiated Phase 1 of the of Canal Management Master Plan for Monroe County
- 2017 – DEP to assess the waters in the Florida Keys



Watershed Basin Rotation Groups and Schedule

Map prepared October 9, 2002 by the Bureau of Watershed Management, Division of Water Resource Management. This map is a representation of ground conditions and is not intended for delineations or analysis of the features shown. For more information or copies, contact Tricia McClenahan at (850) 245-8547, or tricia.mcclenahan@dep.state.fl.us

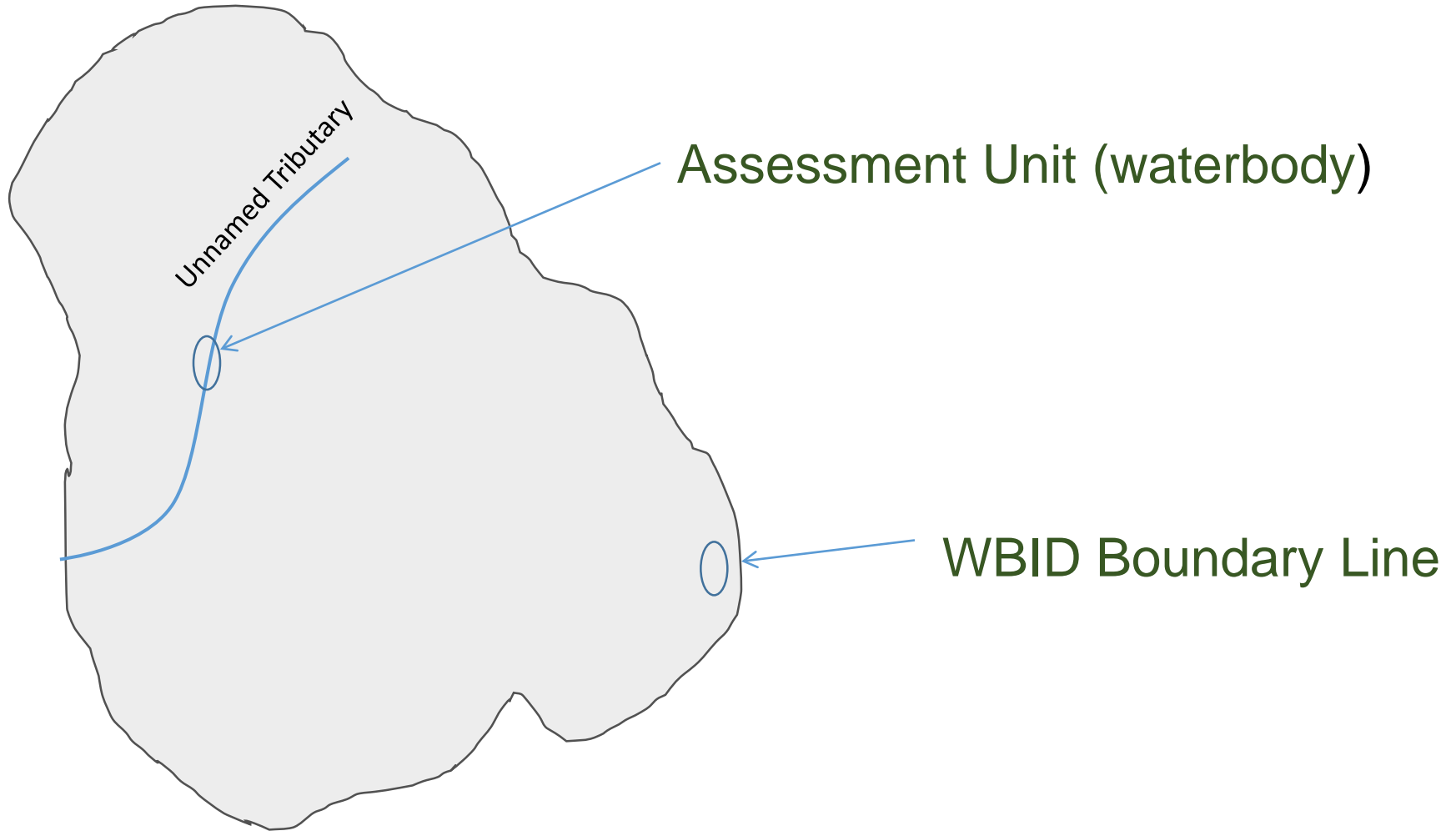
Legend

-  FDEP Regulatory Districts
- Watershed Basin Rotation Schedule**
-  Group 1
-  Group 2
-  Group 3
-  Group 4
-  Group 5





Waterbody Identification Number - WBID





DRAFT Dissolved Oxygen (DO) Assessment

WBID	Waterbody Name	Exceedances/Samples	DO Saturation (DOSAT) Assessment	DOSAT Stations Located Near (or within) Amec-designated Poor Water Quality Canals
6006A	South Key Largo	1/19	Not Impaired	Yes
6006B	Middle Key Largo	0/4	Insufficient Data	No
6009	Plantation Keys	2/19	Not Impaired	Yes
6011A	Vaca Key	0/19	Not Impaired	No
6011C	Grassy Key	1/22	Not Impaired	Yes
6012A	Big Pine Key	0/19	Not Impaired	Yes
6012C	No Name Key	0/5	Insufficient Data	No
6013A	Saddlebunch Keys	0/11	Not Impaired	Yes
6013C	Cudjoe Key	0/16	Not Impaired	Yes
6014C	US Naval Air Station Key West	3/43	Not Impaired	Yes
6017	Upper Matecumbe Key	0/22	Not Impaired	No
6019	Lower Matecumbe Key	0/5	Insufficient Data	Yes

Using the DEP Impaired Waters Rule assessment methodology

WBID 6012A (Big Pine Key) and 6012C (No Name Key) - DO Stations



Canal #266

Canal #290

WBID	DOSAT Assessment	Exceedances/Samples
6012A	Not Impaired	0/19
6012C	Insufficient Data	0/5

● DO Stations
 WBIDs
CMPP_WQ_Sum
 Fair
 Good
 NA
 Poor





DEP Monitoring Strategy

- **Perform statewide preliminary assessment**
- **Does the waterbody meet water quality standards?**
 - No – low priority for monitoring until restoration goals and plan are complete
 - Yes – low priority, because water quality status is known
 - Maybe – Prioritize for sampling until sufficient data are collected
- **What basin is the waterbody in?**
 - What year will this basin be assessed?
- **Is someone other than DEP monitoring the waterbody?**
 - Coordinate with them to collect appropriate data



Monitoring Requirements/Considerations

- **Select representative sampling locations**
 - Don't necessarily focus all monitoring on problem areas (dead-end of canal)
- **Collect samples within different “seasons” or under different conditions during different times of the year**
- **Minimum of 20 samples for DO**
 - Sampling within 7.5 years for DEP assessment
 - Could be done for 4 months after implementation of restorative technology
 - (5 days of continuous monitoring x 4 months = 20 daily average samples)
- **# of locations varies with size of the canal**



Recommendations

- **Review the available data in conjunction with the Amec evaluation**
 - Done for previous data collected, but would like to include new information
- **Implement monitoring based on considerations discussed**
- **Prioritize canal restoration**
 - Amec – canal master plan
 - DEP – water quality status
 - Results of demonstration projects



Prioritizing Canal Restoration

- **Ecological Considerations**
 - Severity of the water quality problem
 - Proximity to coral reefs or species of concern
- **Social Considerations**
 - Recreational use
 - Public input
- **Economic considerations**
 - Types of successful restoration technologies
 - Cost of restoration activity – get the biggest bang for the buck!

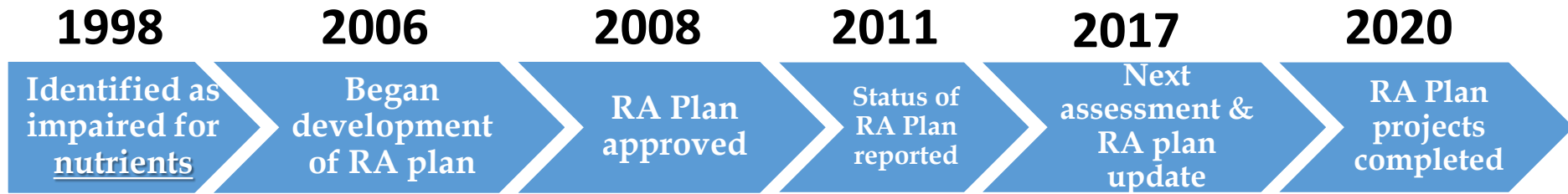


Florida Keys Reasonable Assurance Documentation (RAD) Update & Monitoring





Florida Keys RAD Background

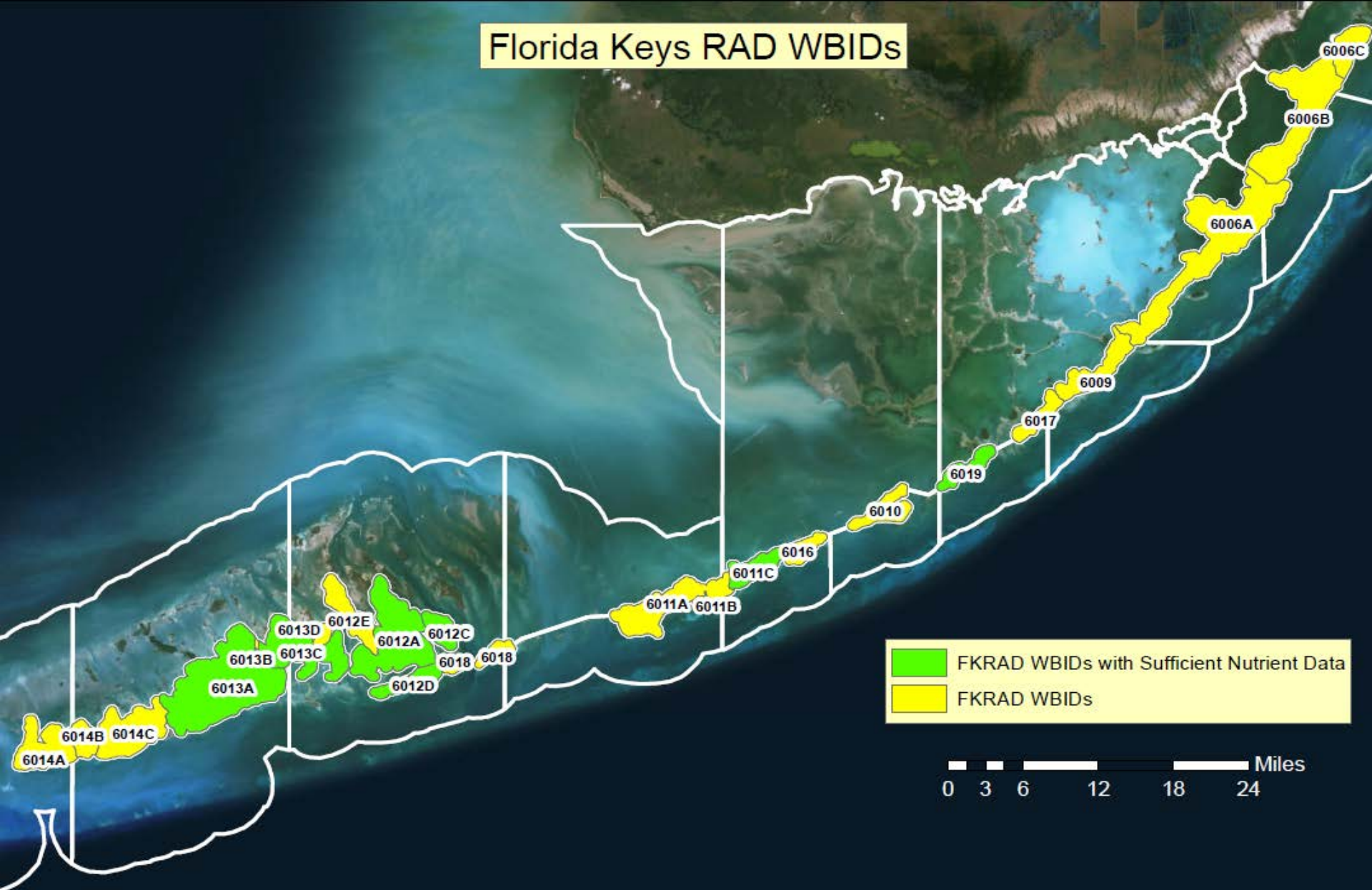




Status of Florida Keys RAD Projects

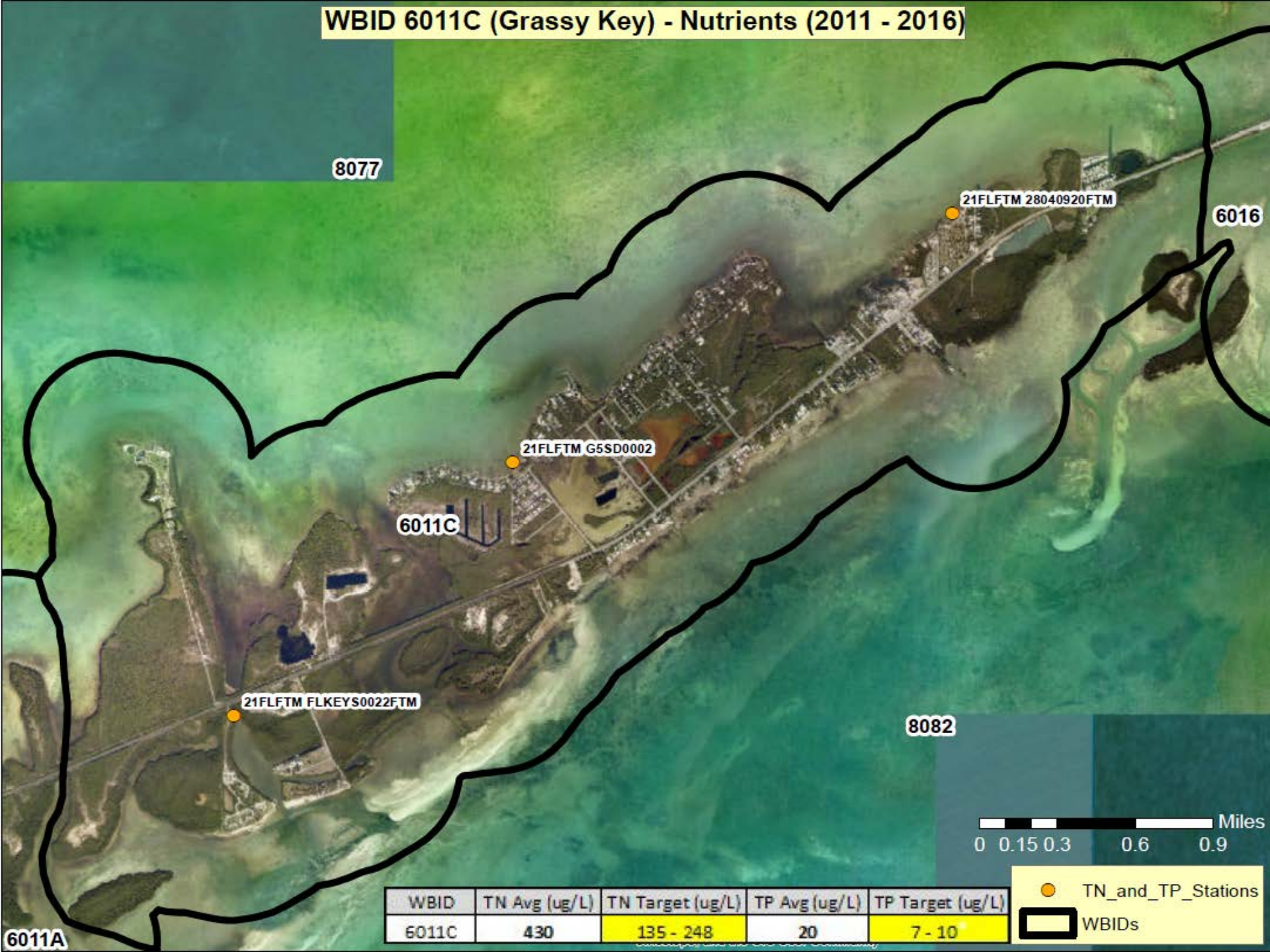
- **Last update performed in 2011**
 - 68 projects were completed
 - 58 projects were not yet complete
- **For the 2017 update**
 - DEP will be requesting updates on the incomplete projects
 - Need to evaluate water quality monitoring
 - Gives indication whether or not the completion of projects and implementation of activities are sufficient to meet the water quality targets

Florida Keys RAD WBIDs



There are 46 total WBIDs (not including beach WBIDs) in the Florida Keys. The FKRAD includes 23 WBIDs (representing the island waterbodies). 7 out of the 23 FKRAD WBIDs have sufficient total nitrogen and total phosphorus data.

WBID 6011C (Grassy Key) - Nutrients (2011 - 2016)



8077

6016

21FLFTM 28040920FTM

21FLFTM G5SD0002

6011C

21FLFTM FLKEYS0022FTM

8082



WBID	TN Avg (ug/L)	TN Target (ug/L)	TP Avg (ug/L)	TP Target (ug/L)
6011C	430	135 - 248	20	7 - 10

- TN_and_TP_Stations
- WBIDs

6011A



Schedule for Updating the RAD

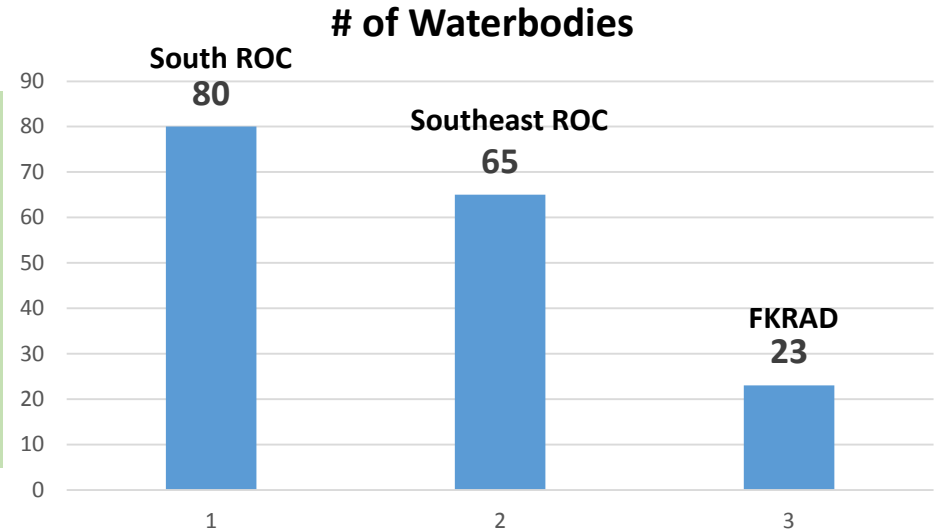
- **April** - Hold a stakeholder meeting to discuss the update
- **May** - Follow up with project workbook via e-mail to gather info
- **July/August** - Draft RA update report and deliver to stakeholders for review
- **September** - Revise update, hold another meeting, if needed
- **October/November** - Finalize report, update assessments
- **December** - Adopt assessments by end of 2017



DEP Sampling vs. Florida Keys RAD Compliance Sampling

DEP ROCs Florida Keys 2016 and 2017 sampling:

- 2016 - 14 WBIDs and 102 samples
- 2017 – 11 WBIDs and 100 samples



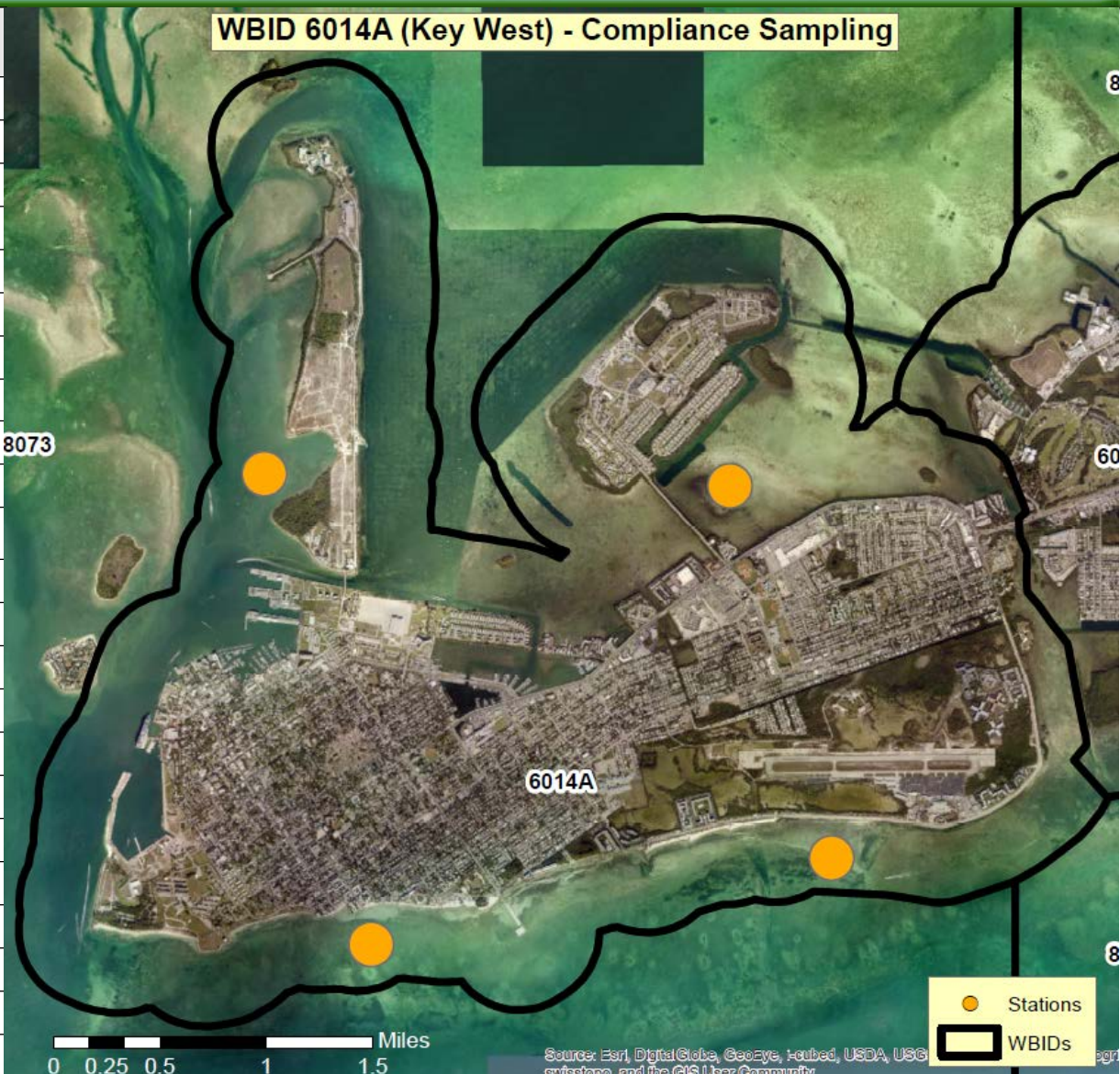
Florida Keys RAP compliance sampling:

- 23 WBIDs (Estuaries)
- Estimate of 252 samples needed to fully assess the 23 FKRAD WBIDs for nutrients (63 estimated number of stations with 4 samples collected in a calendar year).
- Each sampling would require at least 2 staff for sample collection.



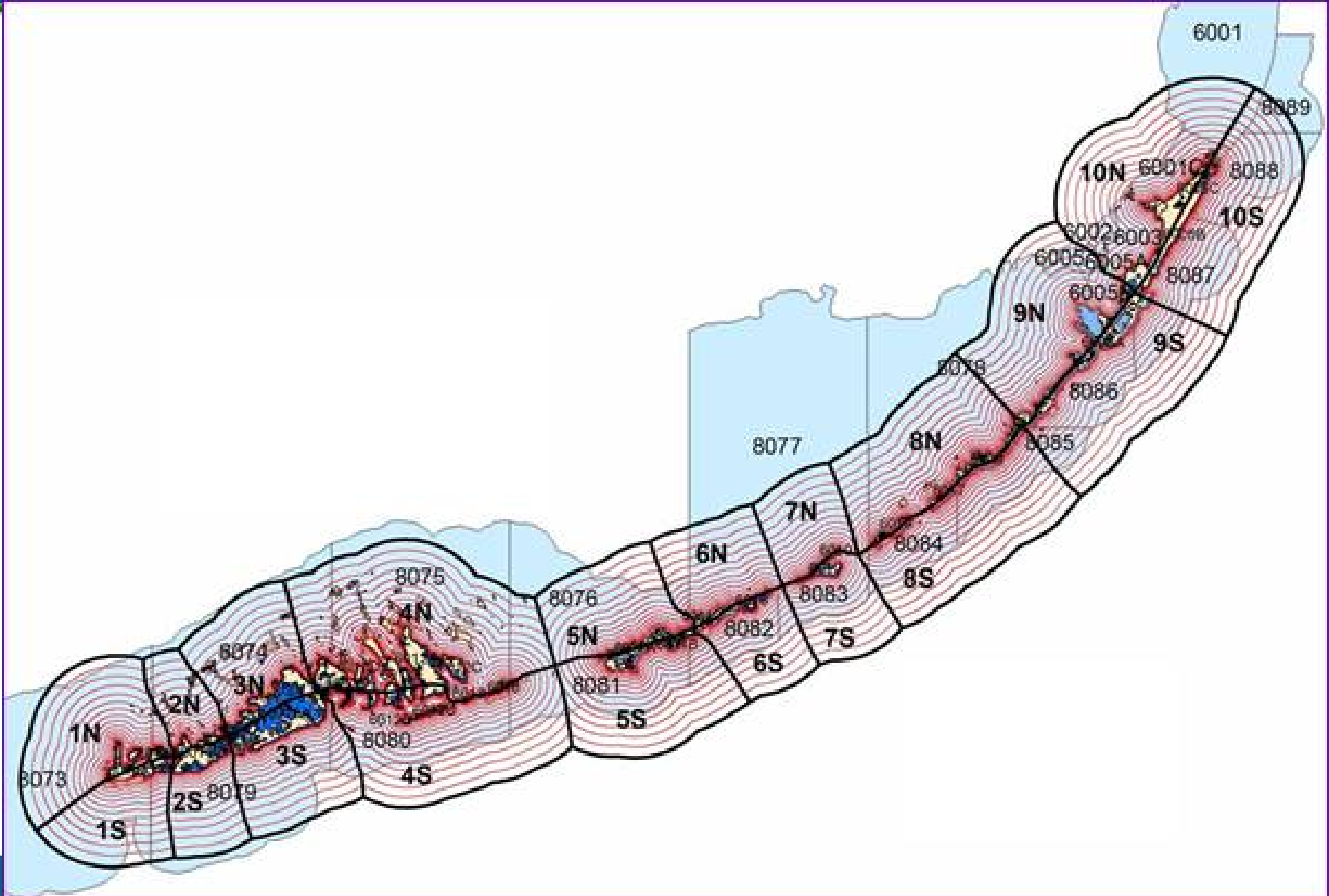
Florida Keys RAD Compliance Sampling

WBID	Waterbody Name	Number of Stations
6006A	South Key Largo	6
6006B	Middle Key Largo	4
6006C	Upper Key Largo	2
6009	Plantation Keys	4
6010	Long Key	2
6011A	Vaca Key	4
6011B	Key Colony	4
6011C	Grassy Key	2
6012A	Big Pine Key	2
6012C	No Name Key	1
6012D	Long Beach	1
6012E	Big Torch Key	1
6013A	Saddlebunch Keys	4
6013B	Sugarloaf	1
6013C	Cudjoe Key	4
6013D	Little Knockemdown Key	1
6014A	Key West	4
6014B	Stock Island	2
6014C	US Naval Air Station Key West	2
6016	Duck Key	2
6017	Upper Matecumbe Key	4
6018	Bahia Honda State Park	2
6019	Lower Matecumbe Key	4





RAD Segments





Monitoring Requirements/Considerations

- **Select representative sampling locations**
- **Collect samples within different “seasons”**
- **Minimum of 4 samples, prefer from each location**
 - **Total nitrogen (TN) and Total phosphorus (TP)**
 - **DEP approved methods**
- **# of locations varies with size of the WBID and land activities**

Do you see the overlap with the Canals Monitoring Needs?



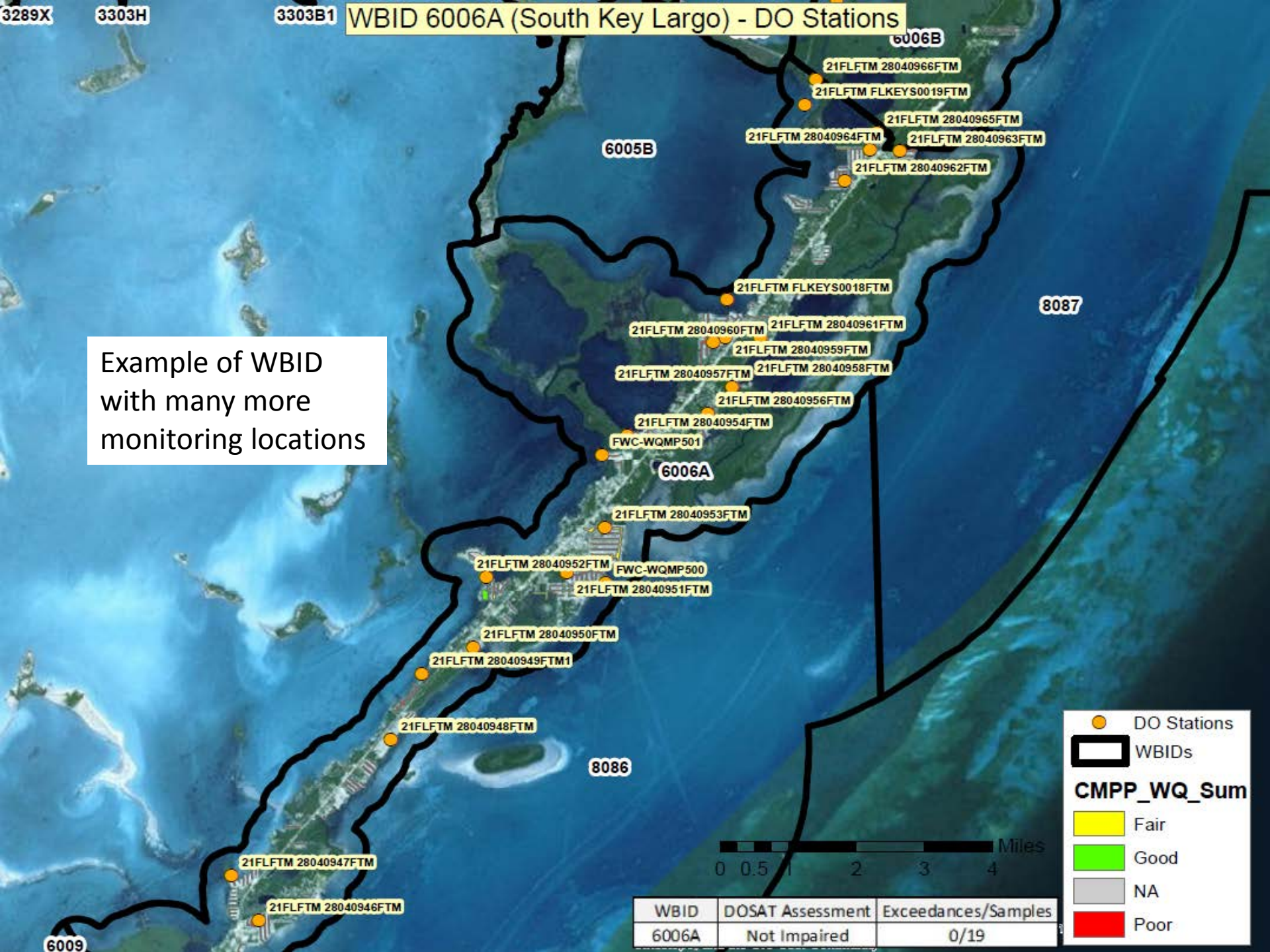
Combined Monitoring Strategy

- **Select representative sampling locations**
 - Canal location + 2-3 locations within RAD boundary
- **Collect samples under different conditions based on restoration activities**
- **Minimum # of samples**
 - 4 for TN and TP = 4 sampling events
 - 4 months = 4 sampling events **OR**
 - 4 stations x 4 events = 16 “grab” DO measurements
- **Rotate through areas to achieve each goal**



Questions?

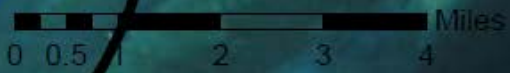




WBID 6006A (South Key Largo) - DO Stations

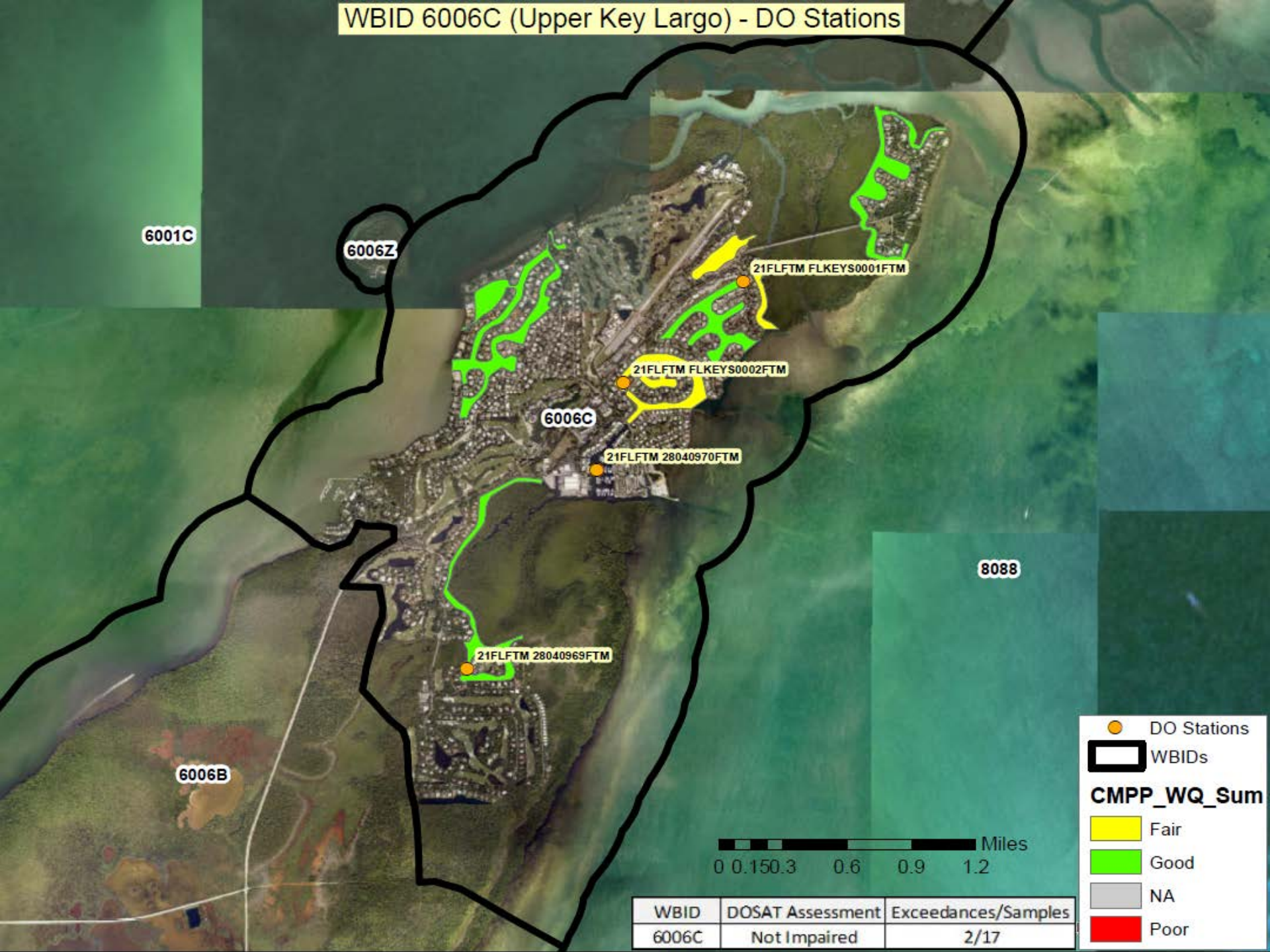
Example of WBID with many more monitoring locations

● DO Stations
 WBIDs
CMPP_WQ_Sum
 Fair
 Good
 NA
 Poor



WBID	DOSAT Assessment	Exceedances/Samples
6006A	Not Impaired	0/19

WBID 6006C (Upper Key Largo) - DO Stations



6001C

6006Z

21FLFTM FLKEYS0001FTM

21FLFTM FLKEYS0002FTM

6006C

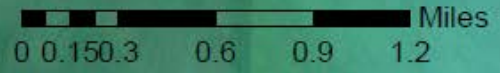
21FLFTM 28040970FTM

8088

21FLFTM 28040969FTM

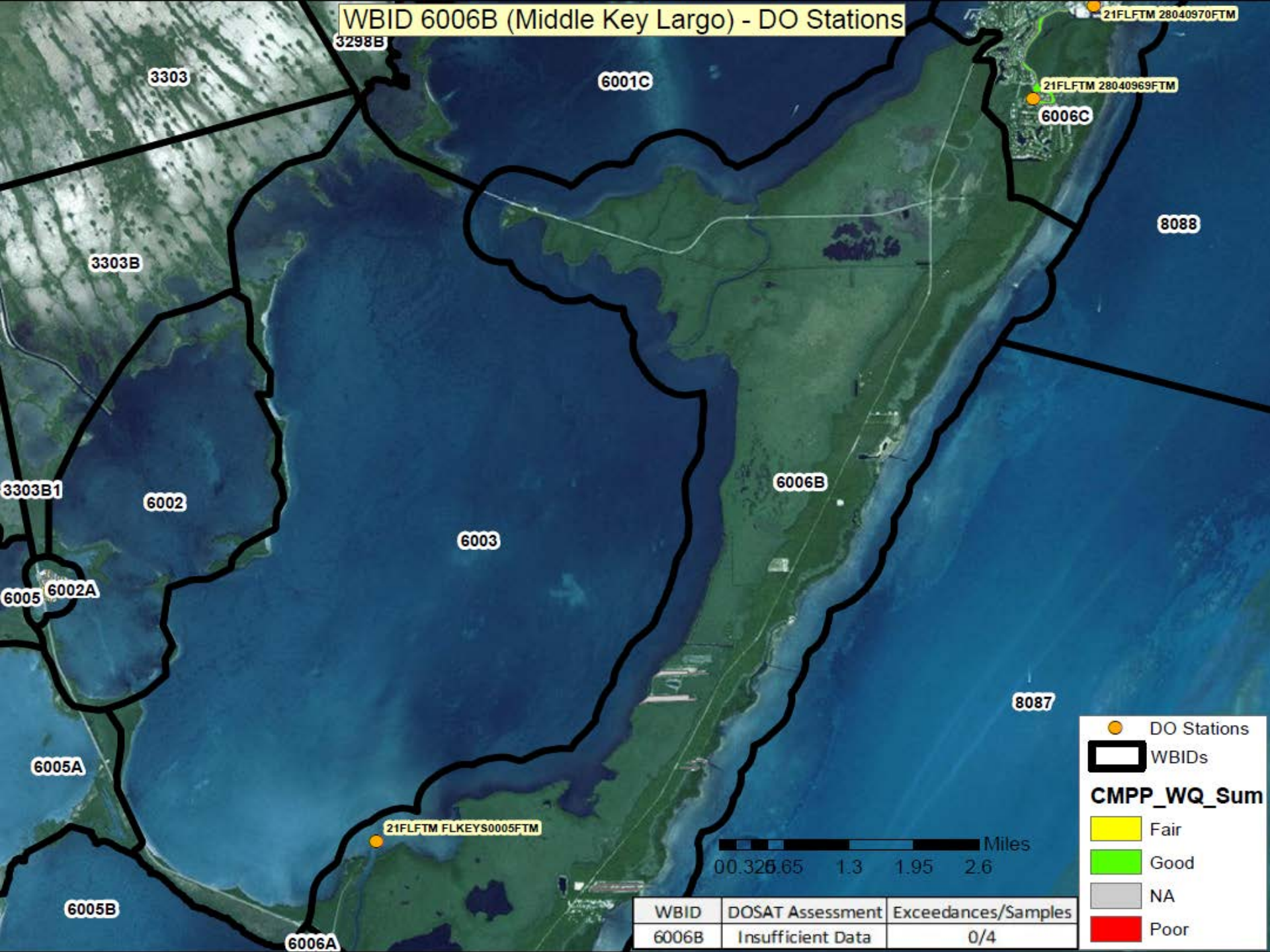
6006B

● DO Stations
 WBIDs
CMPP_WQ_Sum
 Fair
 Good
 NA
 Poor



WBID	DOSAT Assessment	Exceedances/Samples
6006C	Not Impaired	2/17

WBID 6006B (Middle Key Largo) - DO Stations



WBID	DOSAT Assessment	Exceedances/Samples
6006B	Insufficient Data	0/4

WBID 6019 (Lower Matecumbe Key) - Nutrients (2011 - 2016)



WBID	TN Avg (ug/L)	TN Target (ug/L)	TP Avg (ug/L)	TP Target (ug/L)
6019	330	124 - 764	10	8 - 11

● TN_and_TP_Stations
 WBIDs

0 0.150.3 0.6 0.9 Miles

21FLFTM G5SD0073

8078

8077

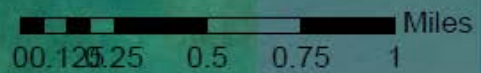
6019

8084

8083

WBID 6011C (Grassy Key) - DO Stations

Example of a monitoring location within "poor" canal



- DO Stations
- WBIDs

CMPP_WQ_Sum

- Fair
- Good
- NA
- Poor

WBID	DOSAT Assessment	Exceedances/Samples
6011C	Not Impaired	1/22