

FLORIDA KEYS REASONABLE ASSURANCE PLAN UPDATE



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REASONABLE ASSURANCE PLANS

- The stakeholder-led Reasonable Assurance Plan (RAP) replaces the state-driven Total Maximum Daily Load (TMDL) and Basin Management Action Plan (BMAP) process.
- Allowed by U.S. Environmental Protection Agency (EPA) regulations and the section 403.067, Florida Statutes.
 - Local stakeholders must implement pollution control programs that will ensure water quality standards will be restored.
- Approved RAPs are listed as Category 4b on the department's 303(d) list of impaired waters until the waterbody attains water quality standards.
- Waterbodies with RAPs that attain standards will be placed in Category 2b.



FLORIDA KEYS WATER QUALITY HISTORY

- 1985 – Keys waters established as an Outstanding Florida Water (OFW).
- 1998 – Identified as impaired for nutrients.
- 2008 – State approved RAP.
 - Focused on improving water quality in nearshore waters.
- 2011 – RAP assessed and updated.
 - 68 restoration projects completed.
 - Dissolved oxygen (DO) identified as impaired in several areas.



FLORIDA KEYS WATER QUALITY HISTORY

- 2011 – DEP adopted numeric nutrient criteria (NNC) for Estuary Nutrient Regions (ENRs) outside the 500-meter Halo Zone
 - Rule became effective November 2014.
- 2018 – RAP update.
 - 100 restoration projects completed.
 - Determined more monitoring was needed to assess water quality in nearshore waters.
- 2022 – RAP update.
 - 121 restoration projects completed.
 - Additional supplemental monitoring began in quads not attaining the total nitrogen (TN) target.
- 2024 – RAP update in progress.



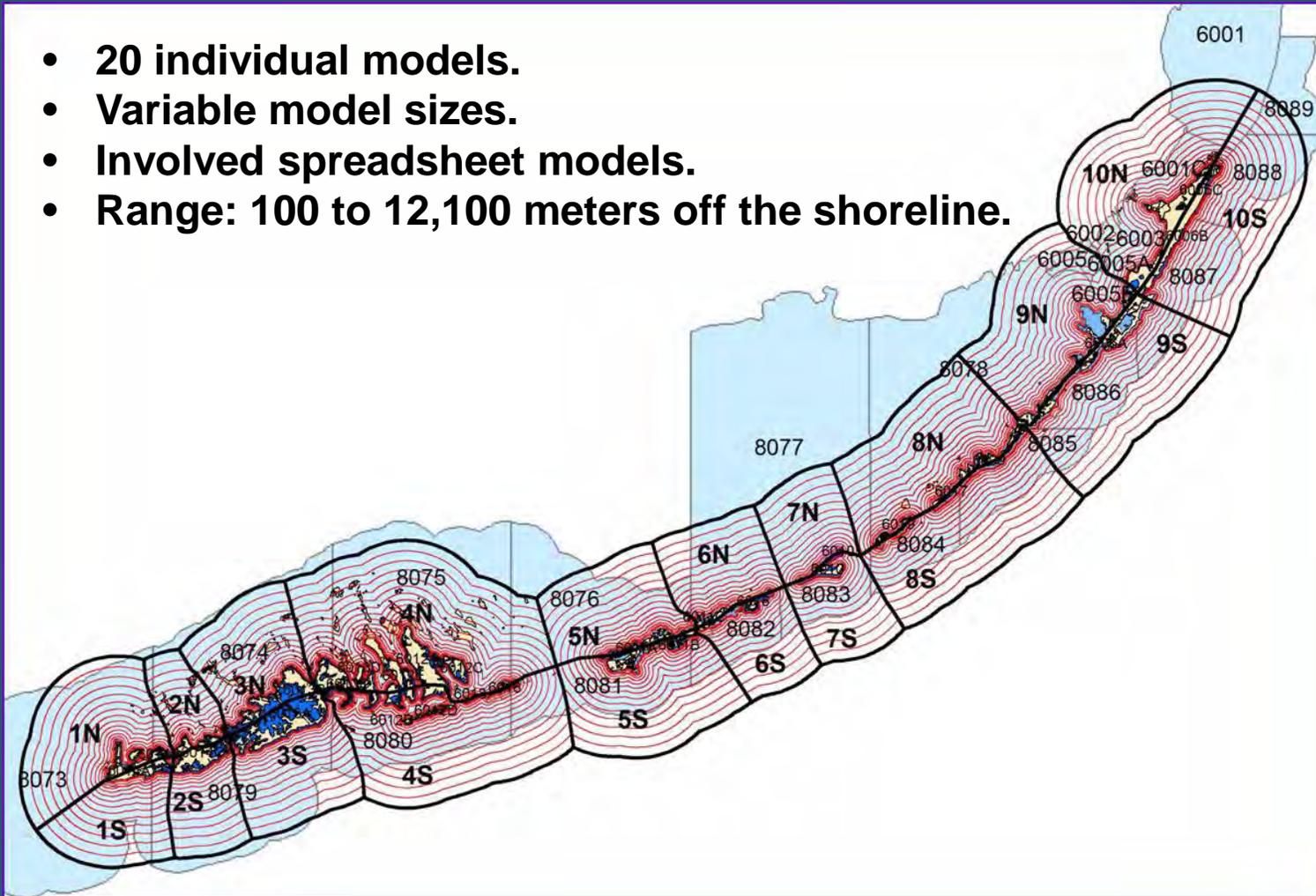
COMPONENTS OF THE FLORIDA KEYS RAP

- Implement sufficient pollution control mechanisms to return the nearshore waters to the water quality targets.
- Targets developed for model quads.
 - Insignificant increase above natural condition within 500 meters of the shoreline.
- Perform monitoring to assess progress.
 - Halo Zone (model quads within 500 meters from shore).
 - Achieve target conditions in the Halo Zone by 2020.
- Report on progress.



MODEL QUADS

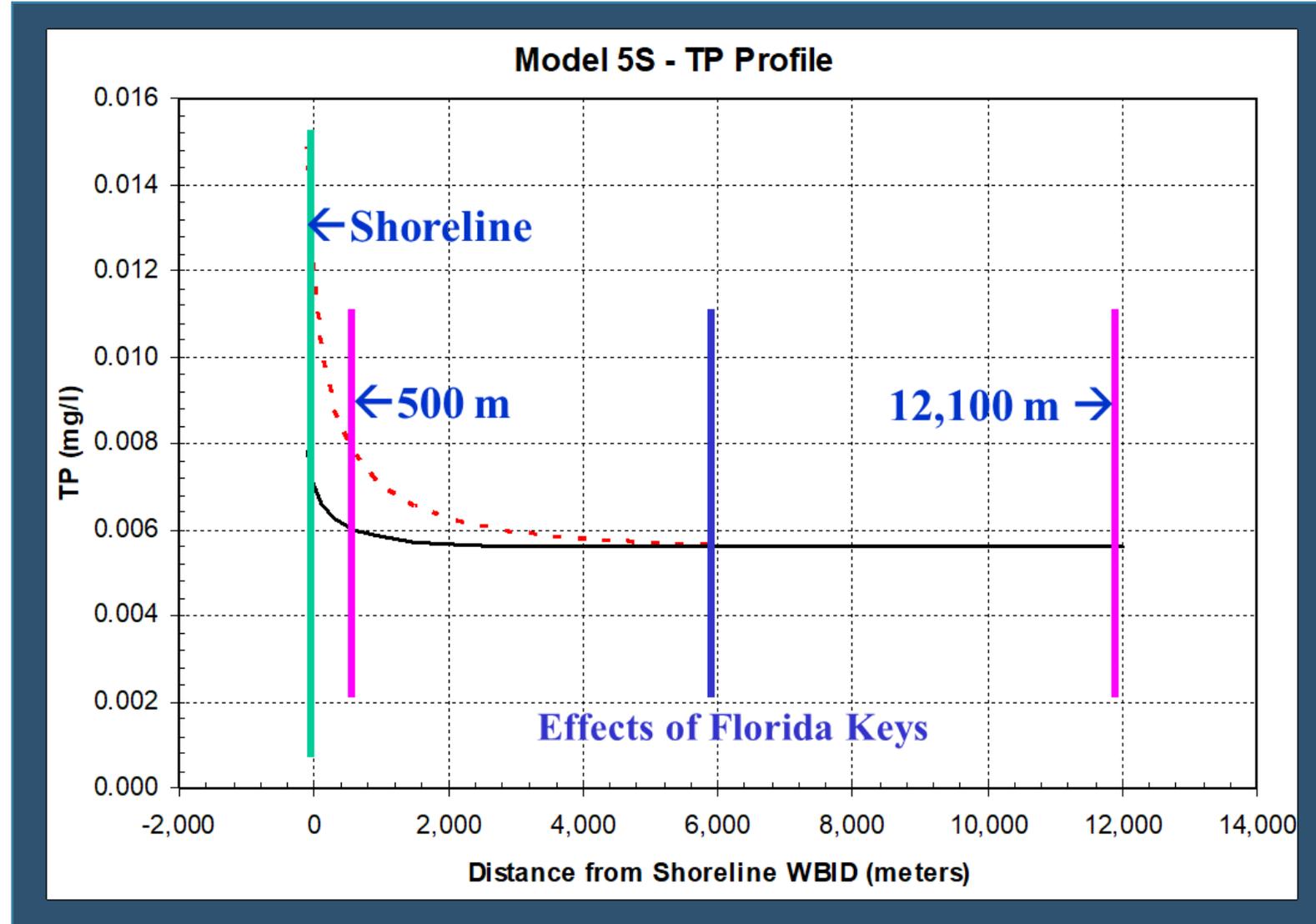
- 20 individual models.
- Variable model sizes.
- Involved spreadsheet models.
- Range: 100 to 12,100 meters off the shoreline.





NUTRIENT TARGETS

- Modelled natural conditions and applied a flushing model to estimate dilution by distance from shore.
- Targets set at “insignificant” increase above natural condition at 500 meters offshore (Halo Zone).
 - 10 $\mu\text{g/L}$ for TN concentration.
 - 2 $\mu\text{g/L}$ for total phosphorus (TP) concentration.
- RAP targets apply at the edge of Halo Zone (500 meters).





MODEL RESULTS AND TARGETS

TN

Total Nitrogen Concentrations						
Community	Model	Natural Condition (µg/l)	1999 Baseline	2020 Projected	TN Target (µg/l)	Boundary Condition (µg/l)
			500 m (µg/l)	500 m (µg/l)		
Key West	1N	169	211	172	179	168
	1S	132	176	140	142	130
Boca Chica	2N	203	206	205	213	194
	2S	132	141	139	142	123
Saddlebunch	3N	208	207	207	218	204
	3S	135	133	133	145	127
Big Pine	4N	215	214	214	225	210
	4S	131	132	132	141	131
Marathon	5N	216	226	217	226	215
	5S	127	138	129	137	125
Marathon	6N	239	242	240	249	238
	6S	125	129	128	135	125
Layton	7N	389	391	391	399	389
	7S	117	116	116	127	115
Islamorada	8N	756	762	756	766	754
	8S	114	122	115	124	114
Key Largo	9N	730	732	730	740	729
	9S	114	119	114	124	112
Ocean Reef	10N	336	326	326	346	321
	10S	126	121	120	136	116



MODEL RESULTS AND TARGETS

TP

Total Phosphorus Concentrations						
Community	Model	Natural Condition (µg/l)	1999	2020	TP Target (µg/l)	Boundary Condition (µg/l)
			Baseline	Projected		
			500 m (µg/l)	500 m (µg/l)		
Key West	1N	9	21	9	11	9
	1S	6	19	7	8	6
Boca Chica	2N	11	13	12	13	10
	2S	7	10	9	9	5
Saddlebunch	3N	11	11	11	13	10
	3S	7	7	7	9	6
Big Pine	4N	10	10	10	12	9
	4S	5	6	6	7	5
Marathon	5N	8	10	8	10	8
	5S	6	9	6	8	6
Marathon	6N	9	10	9	11	8
	6S	5	6	6	7	5
Layton	7N	11	11	11	13	11
	7S	6	5	5	8	5
Islamorada	8N	9	11	9	11	9
	8S	6	8	6	8	6
Key Largo	9N	8	9	8	10	8
	9S	6	7	5	8	5
Ocean Reef	10N	8	7	7	10	6
	10S	7	7	6	9	6



TOTAL PHOSPHORUS ASSESSMENT

BIENNIAL ASSESSMENT 2020–22

			2019	2020	2019 and 2020
Reference Community	Quad	TP Target (µg/L)	TP Aver. (µg/L)	TP Aver. (µg/L)	TP Aver. (µg/L)
Key West	1N	11	5	8	6
	1S	8	3	4	4
Boca Chica	2N	12	4	6	5
	2S	8	3	4	3
Saddlebunch	3N	12	5	6	6
	3S	8	3	5	4
Big Pine	4N	12	4	6	5
	4S	7	3	4	3
Marathon	5N	10	5	5	5
	5S	8	3	4	4
Marathon	6N	10	4	6	5
	6S	7	3	4	3
Layton	7N	13	5	7	6
	7S	7	3	4	3
Islamorada	8N	11	5	6	6
	8S	8	4	4	4
Key Largo	9N	10	4	5	4
	9S	7	3	4	4
Ocean Reef	10N	8	3	4	4
	10S	8	3	4	4



TOTAL NITROGEN ASSESSMENT

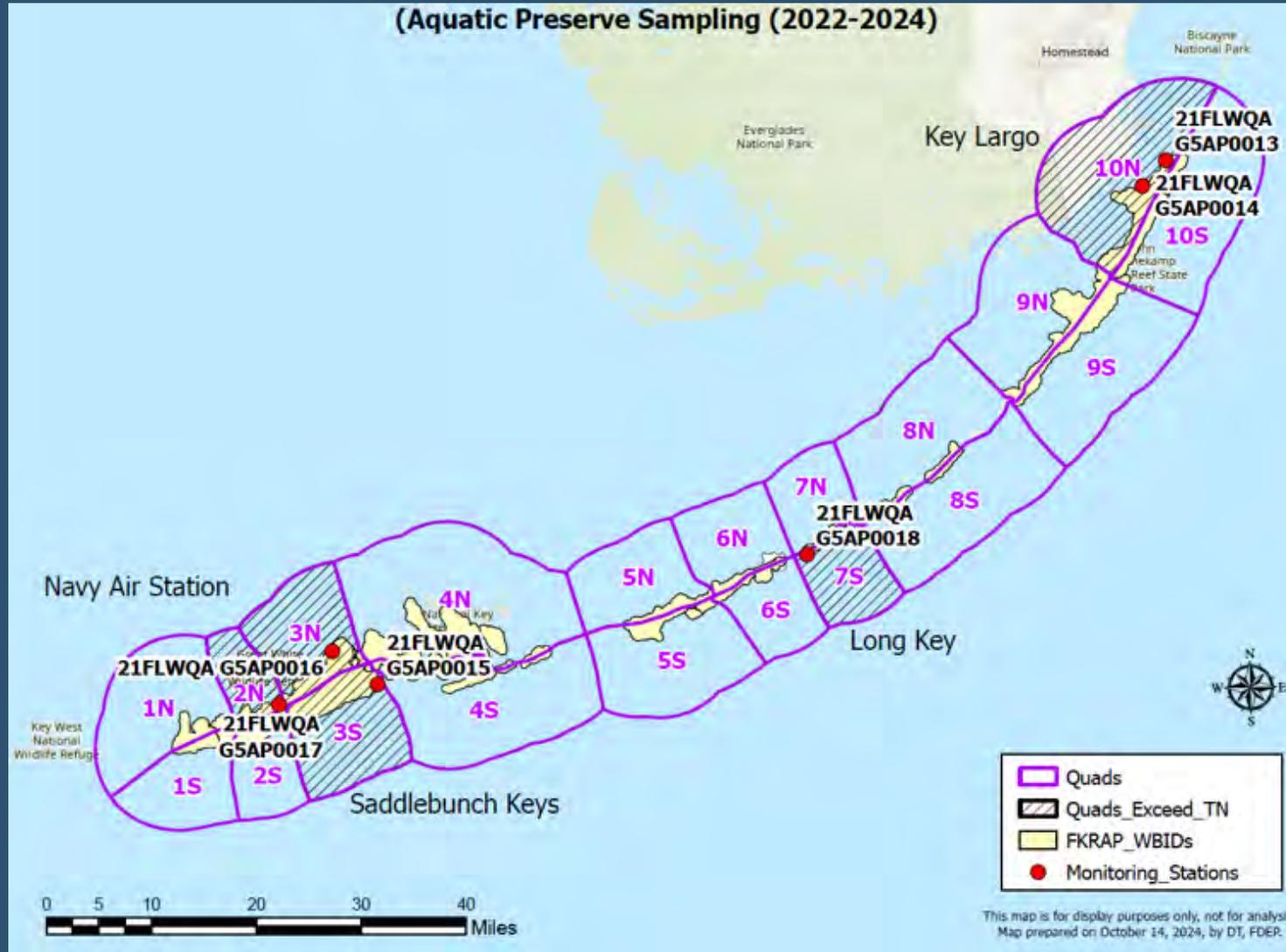
BIENNIAL ASSESSMENT 2020–22

			2019	2020	2019 and 2020
Reference Community	Quad	TN Target (µg/L)	TN Aver. (µg/L)	TN Aver. (µg/L)	TN Aver. (µg/L)
Key West	1N	178	78	123	100
	1S	140	53	77	65
Boca Chica	2N	205	247	244	246
	2S	135	54	62	58
Saddlebunch	3N	215	246	210	228
	3S	138	113	165	139
Big Pine	4N	221	166	164	165
	4S	141	77	120	98
Marathon	5N	225	69	118	94
	5S	135	63	75	69
Marathon	6N	248	133	91	112
	6S	135	68	84	76
Layton	7N	399	188	121	151
	7S	125	127	135	132
Islamorada	8N	764	208	207	207
	8S	124	61	73	68
Key Largo	9N	739	529	554	545
	9S	123	35	45	41
Ocean Reef	10N	334	299	343	325
	10S	128	42	65	55

Note:
Highlighted cells indicate the TN average exceeds the target.



QUADS NOT ATTAINING APPLICABLE TN TARGETS



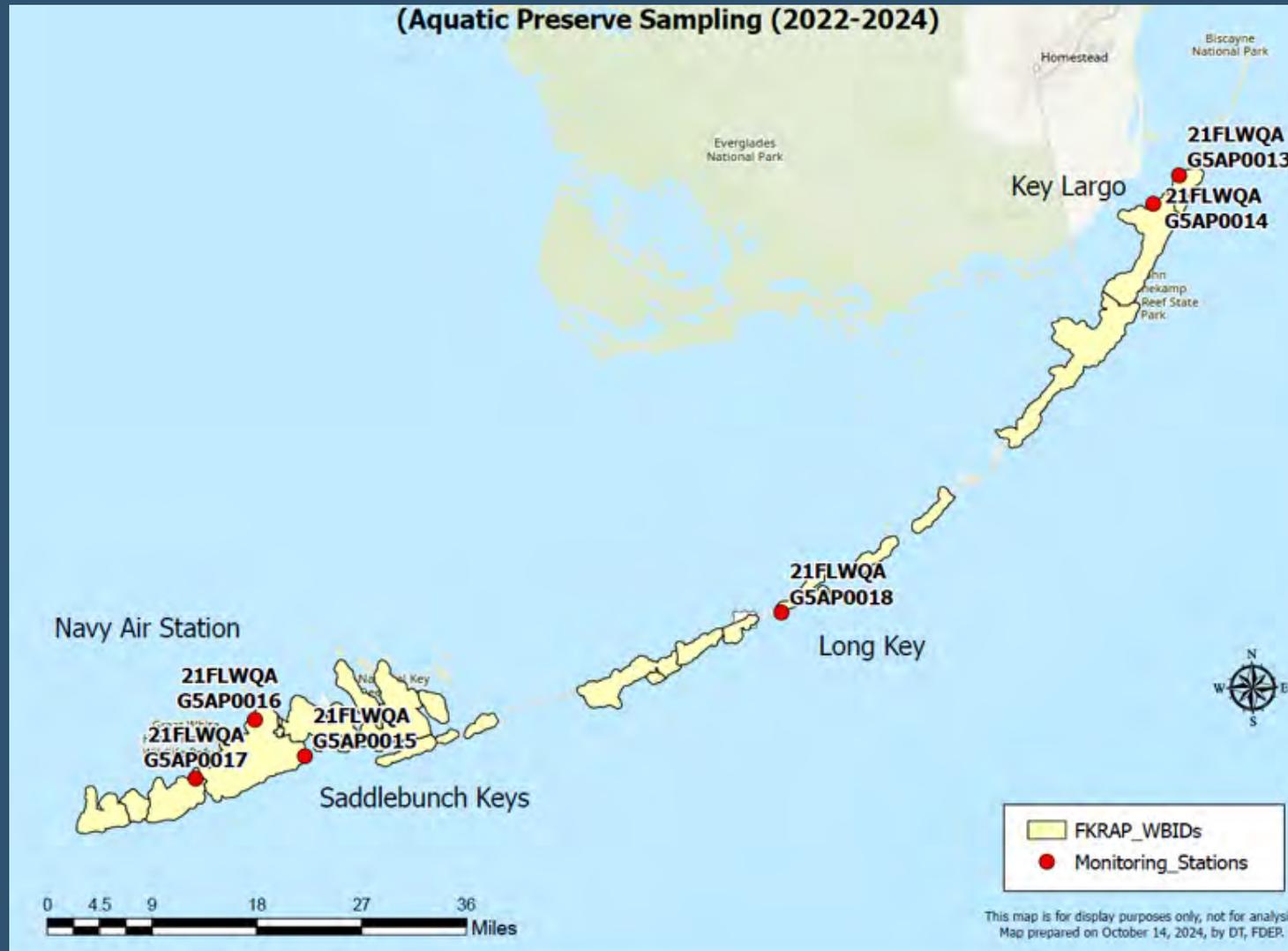


AQUATIC PRESERVE MONITORING

- Additional sampling was initiated in March 2022 and is ongoing.
- Monitoring plan was designed to collect water quality data in the quads that exceeded the TN target.
- Monitoring consists of quarterly sampling at six stations within quads 2N, 3S, 3N, 7S and 10N.
- Monitoring in Quad 10N was discontinued in 2024.
 - Travel logistics.
 - Quad 10N attained TN target in 2023.



AQUATIC PRESERVE MONITORING LOCATIONS





TARGET ASSESSMENT UPDATE

- All quads remain below the target for TP.
- Quads 2N, 3N, 3S and 7S continue to exceed applicable TN targets.
- The average for 2024 was calculated based on a partial year.

		2022	2023	2024	2022-2024	
Reference Community	Quad	TN Aver (ug/L)	TN Aver (ug/L)	TN Aver (ug/L)	TN Aver (ug/L)	TN Target (µg/L)
Ocean Reef	10N	292	312	NA	301	334
Saddlebunch	3S	166	165	162	164	138
	3N	326	227	512	355	215
Boca Chica	2N	317	383	442	380	205
Layton	7S	162	171	162	165	125

NA indicates sampling was discontinued.
Aver = average (arithmetic mean).



2024 RAP UPDATE

- Status of Restoration Projects.
 - DEP contacted stakeholders in May 2024 for project status updates.
 - Updated project information received from Monroe County, City of Key West, Florida Aqueduct Authority and the Village of Islamorada.
- Monroe County provided DEP with an inventory of residential canals and locations where restoration activities are occurring.
- DEP to complete the next RAP update in the fourth quarter of 2024.
- DEP requested additional onsite sewage treatment and disposal systems (OSTDS) information from Monroe County.



2024 RAP UPDATE

OSTDS COUNTS

- Counts were based on the 2023 Area of Critical State Concern Annual Report.
 - 969 known OSTDS have not yet been connected to central sewer.
 - OSTDS remain in both unincorporated Monroe County and within municipalities.
 - Some of the remaining OSTDS are in areas where the cost to extend centralized sewer is not economical.
 - Unknown if remaining OSTDS are enhanced nutrient reducing systems as required by law.
 - Parcels refusing to connect have been reported to code compliance.
 - Timeline to connect depends on code enforcement proceedings.
 - All new units are required to connect to centralized sewer.



MONITORING RECOMMENDATIONS

- Continued Halo Zone monitoring is needed before DEP can move Keys Waterbody IDs (WBIDs) out of assessment Category 4b.
- Coordination with stakeholders on continued monitoring.
 - Monroe County.
 - Florida Keys National Marine Sanctuary (FKNMS) monitoring program.
- Collect additional TN and TP data in at least the non-attaining quads (all attain for TP). Needs for water quality monitoring data is currently being evaluated.



CONCLUSIONS

- All quads (Halo Zone) attain TP targets.
- TN targets are not fully attained.
- Some canals remain impaired for DO.
 - Currently listed in assessment Category 4e (ongoing restoration activities).
- Continued monitoring is needed at the 500-meter quad boundary.
- Continue implementing water quality improvement projects and OSTDS remediation requirements.



THANK YOU

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