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ENVIRONMENTAL PROTECTION

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INTERNAL MEMORANDUM

TO: Sidney Bigham, Senior Assistant General Counsel

FROM: *KW*
Kenneth Weaver, Environmental Administrator

CC: Gary Maier

DATE: March 24, 2015

RE: Florida Keys Nutrient Criteria

“All Class V Group 3 wells designed to inject domestic wastewater in Monroe County shall be required as part of the operation permit application to provide reasonable assurance that operation of the well will not cause or contribute to a violation of surface water standards as defined in Chapter 62-302, F.A.C.” (Rule 62-528.630, F.A.C). The narrative nutrient criterion in paragraph 62-302.530(47)(b), F.A.C., states that “in no case shall nutrient concentrations of a body of water be altered so as to cause an imbalance in natural populations of aquatic flora or fauna.” The method for numerically interpreting this narrative criterion, on a site-specific basis, is provided in Rule 62-302.531, F.A.C, using a hierarchical process. This hierarchical scheme specifies a prioritization for determining the numeric nutrient criteria that apply to a given waterbody.

The Rule’s hierarchical approach gives preference to site-specific analyses that result in a numeric interpretation of the narrative nutrient criterion. Site specific interpretations are generally deemed superior to more broadly applicable interpretations of the narrative criterion because many natural factors affect the expression of nutrient loadings on a given waterbody. Estuary-specific numeric nutrient criteria (NNC) have been adopted for the Florida Keys. See Rule 62-302.532, F.A.C.

Table 1 lists the adopted NNC applicable to the Florida Keys Marine Nutrient Regions. The NNC for the Keys are expressed as annual geometric means not to be exceeded more than once in a three year period. Furthermore, as required in subsection 62-302.532(1), F.A.C., the concentration-based estuary-specific criteria are expressed as open water, area wide averages across all stations within the segment. The criteria are not intended to be interpreted against a single sample.

The spatial extent of the Marine Regions are defined in rule through a series of maps that were incorporated by reference in Rule 62-302.532, F.A.C. NNC applicable to the Florida Keys are provided in paragraph 62-302.532(1)(g), F.A.C., including those for the Lower Keys and Back Bay areas. Attachment 1 is the Florida Marine Nutrient Regions map for the Florida Keys. Note

that a narrow “Halo” Zone has been excluded from the Florida Keys Marine Nutrient Regions. Attachment 2 was created to show the Halo Zone in greater detail for the Lower Keys, particularly around Key West and Stock Island. The Halo Zone consists of a narrow strip of water that extends from the shoreline out to 500 meter (approx. 0.311 miles) offshore. The Halo Zone was excluded from the Keys Marine Nutrient Regions in anticipation of subsequent adoption of Halo Zone criteria consistent with the Florida Keys Reasonable Assurance Plan (Keys RAP). The Keys RAP has not yet been established as a site specific interpretation of the narrative nutrient criterion. As a result, only the narrative nutrient criterion in rule 62-302.530(47)(b), F.A.C., currently applies within the Halo Zone.

Table 1. Numeric Nutrient Criteria for the Florida Keys Marine Nutrient Regions. Criteria are listed in paragraph 62302.532(1)(g), F.A.C., and are expressed as area-wide annual geometric means.

Marine Nutrient Region	Total Phosphorus	Total Nitrogen	Chlorophyll a
1. Back Bay	0.009 mg/L	0.25 mg/L	0.3 µg/L
2. Backshelf	0.011 mg/L	0.23 mg/L	0.7 µg/L
3. Lower Keys	0.008 mg/L	0.21 mg/L	0.3 µg/L
4. Marquesas	0.008 mg/L	0.21 mg/L	0.6 µg/L
5. Middle Keys	0.007 mg/L	0.22 mg/L	0.3 µg/L
6. Oceanside	0.007 mg/L	0.17 mg/L	0.3 µg/L
7. Upper Keys	0.007 mg/L	0.18 mg/L	0.2 µg/L

I retrieved all monitoring data (<http://serc.fiu.edu/wqmnetwork/>) for the Florida Keys and assessed attainment of the applicable criteria for the Back Bay and Lower Keys. The assessment was conducted using both Marine Nutrient Regions (Back and Lower Keys) and the closest Waterbody ID¹s (8074 and 8079). The available data set runs from 1995 through 2013. Data for 2014 are not yet available. Attainment of the annual geometric mean (AGM) total phosphorus (TP), total nitrogen (TN), and chlorophyll a (Chl-a) concentrations were assessed against the criteria shown in Table 1. The Lower Keys and Back Bay Marine Nutrient Regions in question are attaining all applicable NNC. Likewise, WBIDs 8074 and 8079 are also attaining the applicable NNC.

Because the two adjacent Marine Nutrient Regions and nearest WBIDs currently attain all NNC, the existing loads from Key West Resort Utilities Waste Water Treatment Plant (WWTP) provide for the attainment of the downstream NNC; that is, the Department has reasonable assurance that the existing discharge level (*i.e.*, loads) do not cause or contribute to violations of the NNC. Likewise, reasonable assurance would be provided in the case of load reductions. The analyses presented within the January 9, 2015 memorandum from Ed Castle, PE with Weiler Engineering Corporation indicate that upgrading the facility to Advanced Wastewater Treatment (AWT) will result in significant load reductions for both TN and TP (Table 2). Reasonable assurance is thus provided; if the existing TN and TP loads of 58.0 and 14.4 lbs/day, respectively, are currently

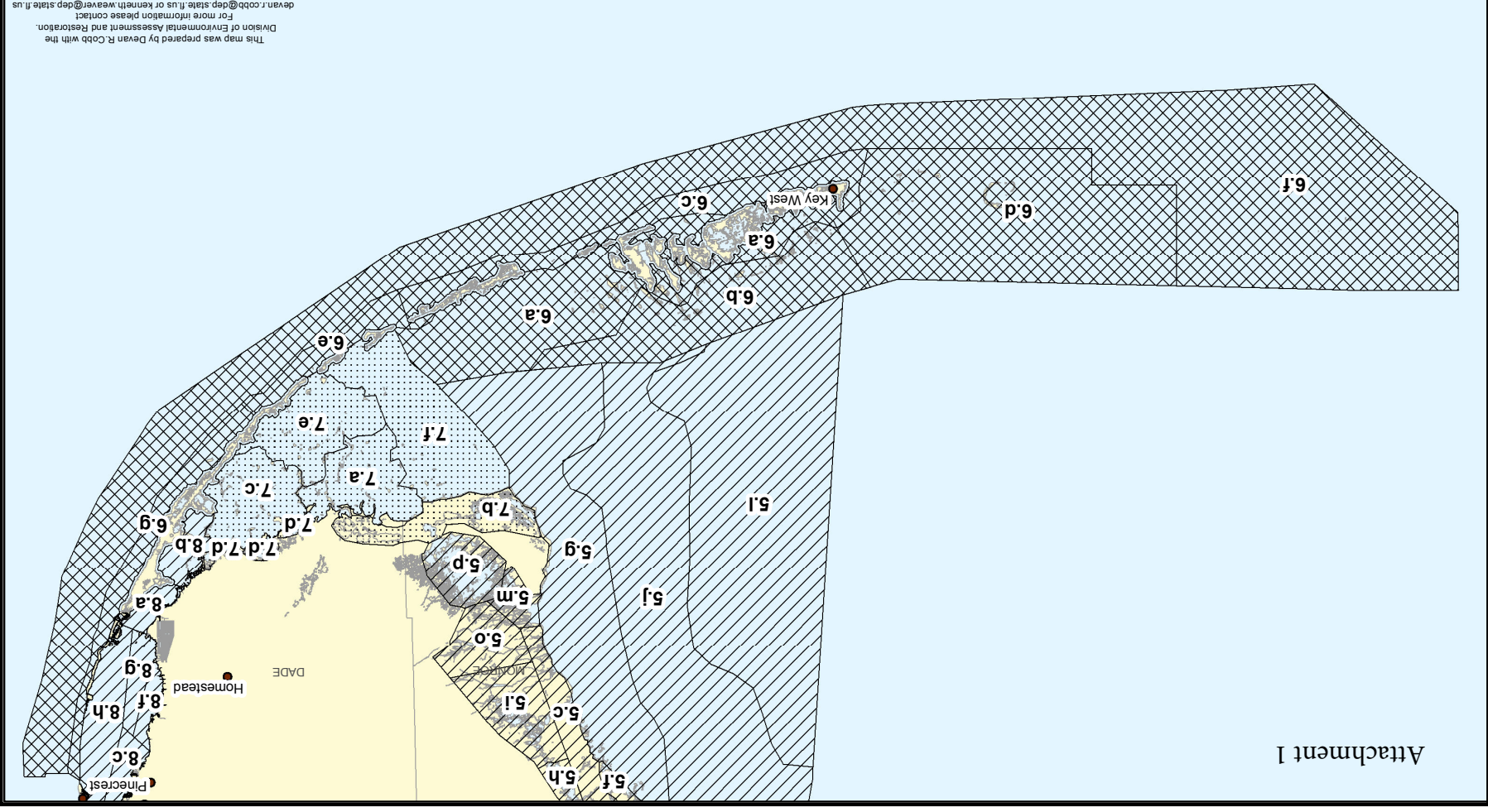
¹ Waterbody IDs (WBIDs) are the spatial assessment areas used by the Department for Impaired Waters Rule 303(d) listing purposes under Chapter 62-303, F.A.C. WBIDs are generally smaller in area than are the associated Marine Nutrient Regions.

providing for attainment of the NNC, then it logically follows that reducing TN and TP by 72.4% and 63.2%, respectively, will provide for continued attainment. This logic holds regardless of whether it is assumed that none of the discharge reaches nearshore waters or if 100% (or any percentage in between) of the discharge reaches nearshore waters.

Table 2. TN and TP mass loadings from Key West Resort Utilities on the current (5-year average) and predicted under AWT and increased permitted flow.

Parameter	Secondary Treatment Conc., 5 years historical data	Predicted AWT Conc.
Total Nitrogen, mg/l as N	13.92	2.25
Total Phosphorus, mg/l as P	3.47	0.75
Permitted Flow, MGD	0.499	0.849
Total Nitrogen Average Daily Discharge, lbs/day	58.0	15.9
Total Phosphorus Average Daily Discharge, lbs/day	14.4	5.3

This map was prepared by Devan R. Cobb with the
Division of Environmental Assessment and Restoration.
For more information please contact
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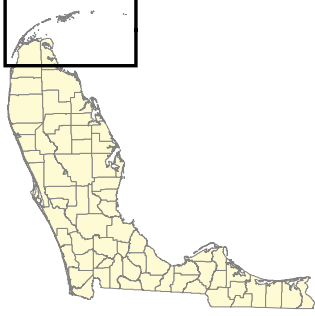
Marine Nutrient Regions

May 13, 2013

Keys



0 5 10 20 30 40
Miles



	5.a. Southwest Florida/10,000 Islands, Blackwater River
	5.b. Southwest Florida/10,000 Islands, Clam Bay
	5.c. Southwest Florida/10,000 Islands, Coastal Transition Zone
	5.d. Southwest Florida/10,000 Islands, Cocolatchee River
	5.e. Southwest Florida/10,000 Islands, Collier Inshore
	5.f. Southwest Florida/10,000 Islands, Gulf Islands
	5.g. Southwest Florida/10,000 Islands, Inner Gulf Shelf
	5.h. Southwest Florida/10,000 Islands, Mangrove Rivers
	5.i. Southwest Florida/10,000 Islands, Ponce De Leon
	5.j. Southwest Florida/10,000 Islands, Outer Gulf Shelf
	5.k. Southwest Florida/10,000 Islands, Shark River Mouth
	5.l. Southwest Florida/10,000 Islands, Whitewater Bay
	6.a. Keys, Back Bay
	6.b. Keys, Marquesas
	6.c. Keys, Middle Keys
	6.d. Keys, Oceanide
	6.e. Keys, Upper Keys
	7.a. Florida Bay, Central Florida Bay
	7.b. Florida Bay, Coastal Lakes
	7.c. Florida Bay, East Central Florida Bay
	7.d. Florida Bay, Northern Florida Bay
	7.e. Florida Bay, Southern Florida Bay
	7.f. Florida Bay, Western Florida Bay
	8.a. Biscayne Bay, Card Sound
	8.b. Biscayne Bay, Manatee Bay-Barnes Sound
	8.c. Biscayne Bay, North Central Inshore
	8.d. Biscayne Bay, North Central Outer-Bay
	8.e. Biscayne Bay, Northern North Bay
	8.f. Biscayne Bay, South Central Inshore
	8.g. Biscayne Bay, South Central Mid-Bay
	8.h. Biscayne Bay, South Central Outer-Bay
	8.i. Biscayne Bay, Southern North Bay

