Productivity of Benthic Habitats in Tampa Bay

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Seagrass Health and Restoration

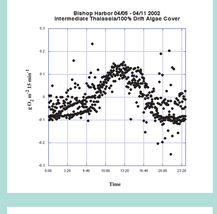
Monitoring and research on the distribution and health of seagrass in Tampa Bay has, historically, been of highest priority to the Tampa Bay scientific community because seagrass is one of the primary ecological indicators for estuarine health. Seagrass has been recovering in Tampa Bay since the early 1980's after severe losses due to poor water quality resulting from nitrogen loading. However, despite reduced nitrogen loads and improved water quality since the 1980's, seagrass recovery still appears to be limited in some areas. Geochemical monitoring of productivity associated with seagrass and other benthic habitats is being coordinated with investigations on groundwater, sediment contamination, sediment resuspension/light attenuation, seagrass restoration, and epiphytes to to help determine what factors are controlling the recovery of benthic habitats in the Bay.

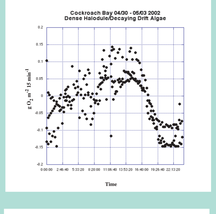
Geochemical Productivity Measurements

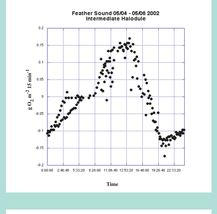
Monitoring sites for productivity of benthic habitats are located at sites of sediment and groundwater sampling stations, and suspended sediment and seagrass restoration studies. Productivity measurements are performed using the Submersible Habitat for Analyzing Reef Quality (SHARQ).

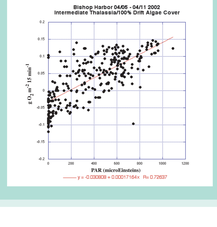
The Submersible Habitat for Analyzing Reef Quality (SHARQ) is a benthic incubation chamber used to isolate a mass of water overlying the substrate. Changes in chemical parameters resulting from benthic metabolism can then be measured during incubation periods. Rates of metabolism are calculated from changes in key chemical parameters.

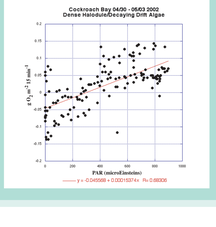
The following results show rates of gross daily production (P) and 24-hour respiration (R) for representative substrate types at six monitoring locations throughout the bay, and examples of the dependency of photosynthesis on photosynthetically active radiation (PAR). This type of information will be used to model the impact of light attenuation resulting from sediment resuspension on seagrass productivity. Similar relations will be developed for modeling the potential impact of groundwater nutrients, sediment contaminants, and seagrass epiphytes on benthic habitat health.

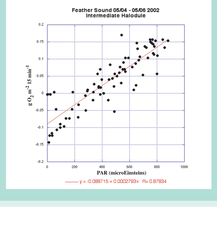




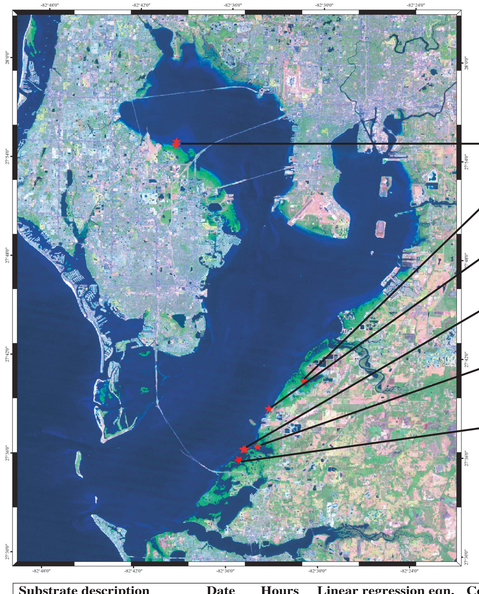


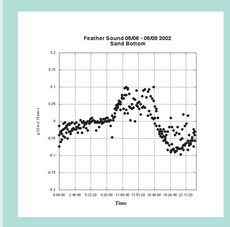
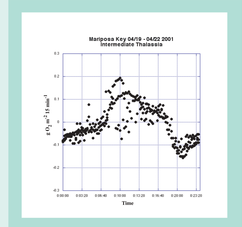
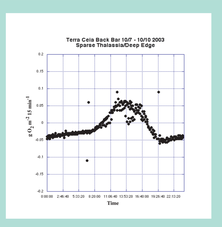
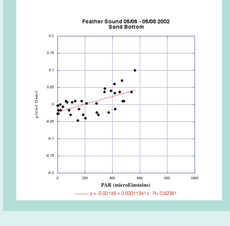
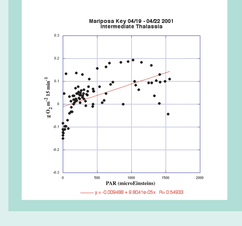
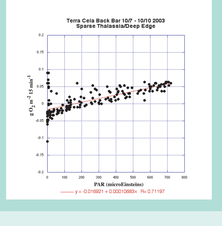
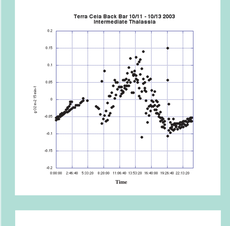
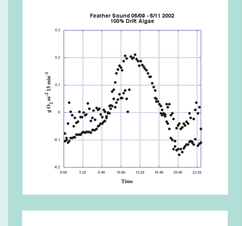
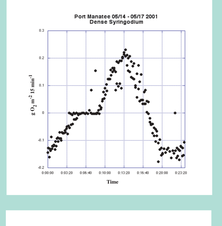
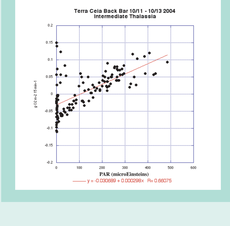
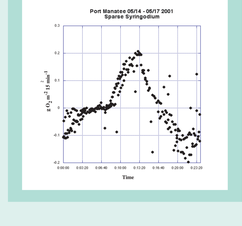
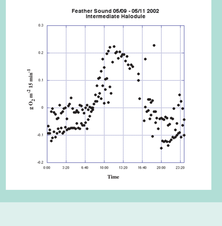






Metabolic Parameters for Representative Substrate Types



Substrate description	Date	Hours sunlight	Linear regression eqn. y = mx + b	Correlation Coef. (R)	P	R	P/R	n
Bishop Harbor								
Int. Thalassia/100% drift algae	04/05/02	12.7	y = 1.7164e-4x – 0.030808	0.73	5.33	5.71	0.93	533
Int. Thalassia/50% drift algae	04/05/02	12.7	y = 1.5943e-4x – 0.025627	0.68	4.92	5.03	0.98	496
Cockroach Bay								
Int. Thalassia/decaying algae	04/30/02	13.2	y = 1.494e-4x – 0.043975	0.68	4.60	5.97	0.77	233
Dense Halodule/decaying algae	04/30/02	13.2	y = 1.5374e-4x – 0.045568	0.68	4.99	6.90	0.72	246
Feather Sound								
Int. Halodule	05/04/02	13.3	y = 2.793e-4x – 0.088715	0.87	6.56	7.44	0.88	172
Int. Halodule	05/04/02	13.3	y = 2.8802e-4x – 0.10265	0.88	6.53	8.17	0.80	154
Sand bottom	05/06/02	13.4	y = 1.1341e-4 – 0.02149	0.62	3.08	3.67	0.84	232
Sand bottom	05/06/02	13.4	y = 1.0109e-4x – 0.022375	0.41	3.77	4.01	0.94	246
100% drift algae	05/09/02	13.4	no light data	nd	6.91	5.94	1.16	170
Int. Halodule	05/09/02	13.4	no light data	nd	7.25	5.75	1.26	161
Mariposa Key								
Sparse Thalassia	04/19/01	13.0	y = 1.406e-4x – 0.032323	0.61	6.70	7.12	0.94	221
Int. Thalassia	04/19/01	13.0	y = 9.8041e-5x – 0.009488	0.54	5.69	6.12	0.93	300
Port Manatee								
Sparse Syringodium	05/14/01	13.5	No light data		6.16	6.12	1.01	224
Dense Syringodium	05/14/01	13.5	No light data		7.92	8.27	0.96	174
Terra Ceia Back Bar								
Sparse Thalassia/deep edge	10/07/03	11.7	y = 1.0683e-4x – 0.016921	0.71	2.35	3.23	0.73	289
Int. Thalassia	10/11/03	11.6	y = 2.98e-4x – 0.030689	0.66	2.82	4.70	0.60	222
Int. Thalassia	10/11/03	11.6	y = 3.9056e-4x – 0.046291	0.73	3.24	5.39	0.60	200

Metabolic parameters for representative substrate types in Tampa Bay. *P* daily gross production (g O_2 m^{-2}), integration of metabolism curve with respect to y + r from sunrise to sunset; *R* 24-h respiration (g O_2 m^{-2}) calculated from the average night-time respiration rate; *P/R* ratio of daily gross production to 24-h respiration; n number of net photosynthesis and respiration data points collected and used to generate each metabolism curve; *nd* no data available; *Int.* intermediate seagrass coverage.