APPENDIX 2-A: TABLES

TABLE 1 – Reef Sampling Sites. Site names, abbreviations, locations (degrees and decimal minutes), the number of dredge hauls, area sampled, shell volume collected in the dredge hauls, and temperature (C°) and salinity (ppt) for the 51 sampled sites.

Site	Site Abbreviation	Date	Latitude	Longitude	No. of hauls	Sampled Area (m^2)	Shell Volume collected (l)	Temperature (°C)	Salinity (ppt)
April Fools Reef	APRIL	16/04/92	29° 28.87'	94° 55.00'	3	150.7	5.5	25.0	9
Buoy 53/55	B5355	28/04/92	29° 30.06'	94° 52.35'	2	118.4	12.0	22.0	5
Buoy 73/75	B7375	27/04/02	29° 35.89'	94° 56.65'	2	98.3	21.0	22.5	3
Bart's Pass Reef	BARTS	27/04/92	29° 32.25'	94° 48.00'	1	39.5	9.0	22.5	0
Big Beezley Reef	BBEEZ	26/04/92	29° 39.47'	94° 52.81'	2	111.2	7.0	24.0	3
Bull Hill	SBHILL	21/04/92	29° 28.38'	94° 44.81'	2	114.8	7.5	23.0	2
Bull Shoals	BSHOA	03/05/92	29° 29.42'	94° 47.28'	3	157.1	8.0	24.0	8
Buoy 59	BUO59	28/04/92	29° 31.55'	94° 53.54'	3	177.2	6.0	22.0	5
Buoy 63	BU063	28/04/92	29° 32.38'	94° 54.17'	3	183.7	14.5	22.0	5
Confederate Reef	CONFE	13/04/92	29° 15.83'	94° 54.59'	2	91.8	10.5	24.0	14
Dickinson Reef	DIKIN	16/04/92	29° 27.86'	94° 55.28'	2	91.8	5.5	25.0	10
Dollar Reef	DOLLA	15/04/92	29° 26.40'	94° 52.50'	4	196.6	2.5	23.8	8
Dow Reef	DOWRE	26/04/92	29° 39.08'	94° 54.37'	4	200.2	0.5	24.0	4
East Redfish Reef	EREDF	29/04/92	29° 30.23'	94° 49.25'	1	35.9	8.0	22.3	2
South Redfish Reef (east)	ESRED	29/04/92	29° 29.52'	94° 49.70'	1	58.8	11.0	22.3	2
Fisher Reef	FISHE	26/04/92	29° 40.31'	94° 51.35'	3	131.3	0.8	24.0	3
Four Bit Reef	FOBIT	03/05/92	29° 27.74'	94° 50.66'	2	101.9	13.0	24.0	13
Frenchy's Reef	FRENC	20/04/92	29° 31.32'	94° 35.87'	2	118.4	4.0	22.5	4
Gale's Reef	GALES	22/04/92	29° 30.73'	94° 40.51'	4	196.6	4.0	23.5	5
Gaspipe Reef	GPIPE	26/04/92	29° 30.80'	94° 47.50'	1	39.5	10.0	21.5	0
Half Moon Reef	HMOON	15/04/92	29° 23.99'	94° 50.99'	2	95.4	3.5	22.0	17
Lost Beezley Reef	LBEEZ	02/05/92	29° 28.63'	94° 48.99'	2	78.9	11.0	24.0	10
Levee Reef	LEVEE	15/04/92	29° 26.57'	94° 53.86'	3	160.7	2.5	24.5	7
Lone Tree Reef	LONTR	21/04/92	29° 32.47'	94° 38.38'	3	173.6	7.0	22.5	4
Mattie B. Reef	MATTI	03/05/92	29° 29.27'	94° 46.36'	2	124.8	11.0	23.8	7
Middle Reef	MIDDL	21/04/92	29° 30.18'	94° 39.38'	3	177.2	6.0	23.5	4
Morgans Point Reef	MORPT	20/04/92	20° 39.60'	94° 58.59'	4	229.6	1.3	23.5	4
Green's Cut Reef	MWBAY	14/04/92	29° 15.25'	94° 59.20'	2	95.4	5.0	25.5	13
Carancahua Reef (north)	NCARA	14/04/92	29° 13.45'	95° 00.81'	3	164.3	1.5	26.0	14
North Deer Island Reef	NDEER	13/04/92	29° 16.63'	94° 55.09'	2	101.9	5.5	24.5	14
Hanna Reef	NHANN	02/05/92	29° 28.83'	94° 43.49'	4	216.7	7.0	23.3	6
North Redfish Reef	NREDF	29/04/92	29° 30.25'	94° 51.49'	1	58.8	10.0	22.0	4
Pelican Island Reef	PELIS	12/04/92	29° 20.40'	94° 52.94'	2	114.1	1.3	24.5	14
Pepper Grove Reef	PEPGR	22/04/92	29° 29.05'	94° 39.29'	4	144.2	5.0	22.6	4
Possum Pass Reef	POSSU	28/04/92	29° 31.55'	94° 48.32'	3	160.7	6.0	22.3	0
Red Bluff Reef	RBLUF	25/04/92	29° 36.16'	94° 58.42'	2	88.3	8.5	23.8	3
Richard's Reef	RICHA	26/04/92	29° 31.42'	94° 44.36'	2	91.8	6.0	21.5	1
San Leon Reef	SANLE	20/04/92	29° 30.40'	94° 56.33'	4	247.5	4.5	23.8	7
Carancahua Reef (south)	SCARA	14/04/92	29° 12.91'	95° 00.02'	3	173.6	3.0	24.8	14
Scott Reef	SCOTT	20/04/92	29° 34.45'	94° 59.41'	2	104.8	2.9	23.8	6
South Deer Island Reef	SDEER	14/04/92	29° 15.79'	94° 55.85'	2	104.8	11.5	26.0	13
Hanna Reef (south)	SHANN	02/05/92	29° 27.29'	94° 42.38'	4	216.7	4.0	23.0	8
Shell Island Reef	SHEIS	14/04/92	29° 11.43'	95° 01.02'	3	177.2	4.0	26.0	14
Stephenson Reef	STEPH	22/04/92	29° 32.03'	94° 41.12'	4	196.6	2.5	23.5	3
Tern Reef	TERNR	27/04/92	29° 36.42'	94° 50.93'	1	56.0	6.0	22.5	2
Todd's Dump	TODDS	16/04/92	29° 29.99'	94° 53.59'	4	219.6	3.0	24.5	8
Trinity Reef	TRINI	25/04/92	29° 41.33'	94° 50.44'	4	180.1	3.0	23.3	3
Vingt-et-un Reef	VINGT	27/04/92	29° 33.91'	94° 46.94'	1	39.5	4.0	22.5	0
Whitehead Reef	WHEAD	22/04/92	29° 31.28'	94° 42.94'	4	210.2	2.7	23.5	3
South Redfish Reef (west)	WSRED	29/04/92	29° 29.58'	94° 51.25'	1	39.5	10.5	22.5	5
Yacht Club Reef	YACHT	25/04/92	29° 37.30'	94° 59.55'	1	35.9	8.0	23.5	2

TABLE 2 – The TAMU/ODU oyster population dynamics model. Further information can be found in Hofmann et al. (submitted), Powell et al. (1992b, in press, submitted c).

Size class structure

Crassostrea virginica	11 size classes, denoted by subscript j, defined in g AFDW (Table 1); j = 1 to 3, juveniles
Perkinsus marinus	28 infection levels, designated by the subscript k; k = 1, uninfected oysters; k = 2 to 27, degrees of infection defined as one population doubling per level; k = 2, initial infection of one cell
Mussel population	7 size classes in 1 cm intervals denoted by the subscript m

Governing equations

$$NP_{jk} = P_{gjk} + P_{rjk} = A_{jk} - R_{jk} - E_{jk}$$

NP_{jk}, net production; P_{gjk}, somatic production; P_{rjk}, reproductive production; R_{jk}, respiration; A_{jk}, assimilation; E_{jk}, *P. marinus* consumption

$$\frac{d0_j}{dtk} = P_{gjk} + P_{rjk} + (\text{gain from } j-1) - (\text{loss to } j+1) + (\text{gain from } j+1) - (\text{loss to } j-1) + (\text{gain from } k-1) - (\text{loss to } k+1) + (\text{gain from } k+1) - (\text{loss to } k-1)$$

0_{jk}, the change in oyster standing stock with time in each size class and infection level is the sum of local growth of somatic and reproductive tissue plus the addition of individuals from the previous size class or loss to the next largest size class by growth, plus the movement of individuals up or down in infection intensity as the *P. marinus* population increases or decreases in cell number; recognizing $P_{rjk} = 0$ for j = 1,3

Unusual Transfers

Settlement of spat occurs exclusively in size class 1, infection level 1 (O_{11}); movement of oysters between infection level 1 (uninfected) and infection level 2 (newly infected by 1 cell) occurs only in the positive direction, a gain of infection; the *P. marinus* calls and oyster biomass are permanently lost from the population for oysters transferring into the infection level defined as a lethal infection

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TABLE 2 – Continued

Crassostrea virginica Component

Feeding and assimilation:

Filtration rate and water flow

Primary Equations

$F_t + (uF)_x + (wF)_z - (AF_z)_z + aFO = 0$

$u_x + w_z = 0$

0, oyster biomass

F, food

A, vertical diffusion coefficient

filtration rate $a = \sum FRd_{jk(t-1)}$

subscripts, partial derivatives.

Characteristic velocity profile

$u[x,z] = u_o[x]\ln(z/z_o)$ μ, flow at the upper edge of the box

$u_o[x] = \mu[x]/\ln(h/z_o)$ h, thickness of the bottom flow

z_o, bottom roughness parameter = 10% of height of oyster clumps

Food assumed to be a linear function of distance across the box

$F = F_o[t] + (x/L)F_1[t]$ o,1, the upstream and downstream box faces

F is integrated over the box and the average amount of food in the box during one time step calculated by differencing over time

$F_o[t=1] = F_{oo}$

$F_1[t=1] = F_1^1 = [-2a\Delta tF_{oo} + (\Delta t/hL)(D^1 = D^o)] /$

$[1 + .5a\Delta tO^o + [(\mu[L] + \mu[0]\Delta t/2L][1 - 1/\ln(h/z_o)]]$

Food reduction factor

$F_{red} + (F_{oo} + .5F_1^1) / F_{oo})$

TABLE 2 – Continued

Food Content

$f^* = F_{red} F_{oo}$

Conditions for simulation

Box length = 1 m
Thickness of bottom flow (h) = 5.4 cm

Filtration rate and temperature

$$FR_j = \frac{L_j^{0.96} \quad T^{0.95}}{2.95}$$

$L_j = W_j^{0.317} \quad 10^{0.669}$ filtration rate (FR_j) in ml filtered ind^{-1} min^{-1}; length (L_j) obtained from W_j, the ash-free dry weight in g; T, temperature

Filtration rate and salinity

at $S \geq 7.5‰$	$FR_{sj} = FR_j$
at $3.5‰ < S < 7.5‰$	$FR_{sj} = FR_j\ (3.5 - S) / 4.0$
at $S \leq 3.5‰$	$FR_{sj} = 0$
	S, ambient salinity

Filtration rate and turbidity

$\tau^* = \tau_{red}\, \tau_{oo}$ calculated similarly to f^*

$\tau = (4.17 \times 10^{-4})\,(10^{0.418x})$ τ, total particulate content (inorganic + organic) in g l^{-1}; x, the percent reduction in filtration rate

$$FR_{\tau j} = FR_{sj}\left[1 - .01^{o}\left(\frac{\log_{10} \tau + 3.38}{0.418}\right)\right]$$

Ingestion

$I_{jk} = f^* FR_{Djk}$ f^*, the measured food value (mg l^{-1})

Assimilation

$A_{jk} = I_{jk} A_{eff}$ A_{eff}, the assimilation efficiency

TABLE 2 – Continued

Respiration:	
Respiration and temperature	
$R_j = (69.7 + 12.6T)W_j^{b-1}$	R_j, in μl O_2 consumed hr^{-1} g dry wt^{-1}; b = 0.75
Respiration and salinity	
at $T < 20°C$	$R_r = .007T + 2.099$
at $T \geq 20°C$	$R_r = .0915T + 1.324$
at $S \geq 15‰$	$R_{Tj} = R_j$
at $10‰ < S < 15‰$	$R_{Tj} = R_j(1. + [(R_r - 1.)5.*(15. - S)])$
at $S \leq 10‰$	$R_{Tj} = R_j R_r$
Reproduction:	
Juvenile/adult boundary	0.39 g ash-free dry weight, about 50 mm long
$P_{rjk} = R_{effj} NP_{jk}$	for adult size classes
$R_{effjk} = 0.054T(t) - 0.729$	for January to June
$R_{effjk} = 0.047T(t) - 0.809$	for July to December
when $NP_{jk} < 0$	preferential resorption of gonadal tissue
Spawning	when the reproductive biomass exceeds 20% of total biomass
Male/female ratio	
$f_{ratio} = 0.021\ L_b - .62$	f_{ratio}, the ratio of females to males; L_b , length in mm
Eggs spawned	
$T_{fjk} = 0.20\ 0_{jk}$	when the reproductive biomass exceeds 20% of total biomass
# eggs spawned = R_{fjk} 1/6133 $1/W_{egg}$	
$W_{egg} = 2.14 \times 10^{-14}\ V_{egg}$	V_{egg}, oyster egg volume

TABLE 2 – Continued

Larval recruitment:	
Larval life span	20 d
Mortality:	
Larvae	
# larvae recruited spawn^{-1} = s(# eggs spawned)	s, the mortality rate, in spawn^{-1}
Post-settlement population	
$M(p) = k_p$ (# living), for j = n, o	M(p), the number of dying per time; k_p, the daily mortality rate (day^{-1}); n and o, the inclusive size classes affected by mortality
Low salinity mortality	
$M(s) = k_s$ (# living)	
$k_s = (-.000348S + .01764)T - (-.00232S + .3089)$	M(s), the number of dying per time; k, in day^{-1}; S, salinity (‰); T, temperature (°C)
Caloric conversions:	
oysters	6100 cal g dry wt^{-1}
food	5168 cal g dry wt^{-1}
oyster eggs	6133 cal g dry wt^{-1}

Perkinsus marinus Component

Cell growth and mortality

Cell division rate: temperature effects

$r_d [T] = r_d [T_o] \; e^{0.06931 (T(t) - T_o)}$

$T_o = 20°C$; $r_d [T]$, the specific rate of cell division (day^{-1}); $r_d [T_o]$, the rate at 20°C

TABLE 2 – Continued

Cell division rate: Salinity effects

For salinities above 10‰

$r_d\,[T,S] = r_d\,[T_o]$

For salinities below 10‰

$r_d\,[T_o] = r_d\,[T_o, S_o]$

$r_d\,[T,S] = r_d\,[T_o, S_o]\,(S/10.)\;\; e^{0.06931(T(t)-T_o)}\;\; S_o = 20‰$

Cell division rate: cell density effects

$r_d[p]_{jk} = \min[r_d[T,S],\, 2.45 \times 10^8\, r_d[T,S](C_k/W_j)^{-1.5}$

C_k, cell number; W_j, oyster dry weight; $r_d[p]_{jk}$, the specific rate of cell division modified by temperature, salinity and density (day^{-1})

Cell mortality rate: temperature and salinity effects

$r_m[T,S] =$

$r_m[T_o,S_o]\; e^{[-0.08153[S[t]/S_o]\,[\max[10,T[t]-T_o]]}\; e^{[-0.08153[T_o-10.]/S_o][S[t]-S_o]]}$

$r_m[T,S]$, the specific loss rate (day^{-1}) determined by halving time; $r_m[T_o,S_o]$, specific loss rate at T_o = 20°C and S_o = 20‰

Cell mortality rate: cell density effects

$r_m[p]_{jk} = \min[r_m[T,S],\, 2.454 \times 10^8 r_m[T,S](C_k/W_j)^{-1.5}$

$r_m[p]_{jk}$, the specific rate of cell mortality taking cell density into account

***P. marinus* energy demand**

Growth and respiration

$E_c = E_r + E_g - E_L$

E_c, the energy requirement of the *P. marinus* population; E_r, the energy requirement for population respiration; E_g, the energy requirement for population growth; E_L, the energy equivalent of tissue loss in the population due to cell mortality

TABLE 2 – Continued

P. marinus growth

$dC_{jk}/dt = [rd[p]_{jk} - r_m[p]_{jk}]C_{jk}$

ΔC_{jk}, the number of cells added or lost, converted to calories exchanged between the parasite and its host

$E_{gjk} = (9.57 \times 10^{-10} V)\, \Delta C_{jk}$

$V = (4/3)\, \pi\, (D/2.)^3$

D, an average cell diameter of 8 μm; V, cell volume in $(\mu m)^3$; 9.57×10^{-10} converts 5 g wet wt to 1 g dry wt, 20 joules to 1 mg dry wt, joules to calories, μm^3 to cm^3, g to mg

P. marinus respiration

$E_{rjk} = 1.16 \times 10^{-4}\, e^{[0.0693[T[t]-T_o]]}\, 10^{-4.09}\, V^{0.75}\, C_{jk}$

$T_o = 20°C$, 1.16×10^{-4} converts ml O_2 to calories, days to hours, and nl to ml; 0.0693 assumes a Q_{10} of 2

***P. marinus* effects on oyster physiology**

Reduction in filtration rate

$F_{djk} = FR_{rj}\, (1 - D_{redjk})$

$D_{redjk} = .58 / [57.9\, e^{[-2.287 \times 10^{-4}\, c_k/w_k]} + 1]$

Cell density yielding mortality

$C_{Lj} = 10^{[2.057 Log[L_j] + 3.2]}$

C_{Lj}, the lethal cell density (cells oyster $^{-1}$); L_j, anterior-posterior length (mm) converted from biomass using the conversion of White *et al*. (1988)

Transmission

$r(\eta)_{[k=1]} = r(\eta)_b + r(\eta)_o\, (P_1 + P_2 + P_3)$

$r(\eta)_{[k=1]}$, the specific rate of infection among unifected individuals; $r(\eta)_b$, a background or population-to-population transmission rate; $r(\eta)_o$, the specific rate of transmission within a known population; P_1, P_2, P_3, factors varying $r(\eta)_o$

$r(\eta)_b = 0.2\ yr^{-1}$

$r(\eta)_o = 12.0 yr^{-1}$

TABLE 2 – Continued

Effect of prevalence on transmission

$$P_1 = \min\left(1., \sum_{j=1}^{n} \sum_{k=2}^{o} N_{jk} \Big/ \sum_{j=1}^{n} \sum_{k=1}^{o} N_{jk}\right)$$

n, the number of oyster size classes; o the highest infection class not resulting in mortality as defined by C_{Lj}

Effect of infection intensity on transmission

$$P_2 = \min\left(1., \sum_{j=1}^{n} \sum_{k=1}^{o} [C_k / (5.W_j)] \Big/ 2.5 \times 10^5\right)$$

2.5×10^5 cells g wet wt^{-1}, the number of cells equivalent to a population mean infection intensity of 3.5; 5., converts dry wt to wet wt

Effect of oyster density on transmission

$$P_3 = \min\left(1., \sum_{j=1}^{n} \sum_{k=1}^{o} (N_{jk} \Big/ 4000.)\right)$$

4000 oyster m^{-2}, a relatively high population density

Mussel component

Effect of oyster filtration rate

$$F_t + (uF)_x + (wF)_z - (AF_z)_z + \alpha F0 = 0$$

$$\alpha = F_{djk} + \Sigma F_{vm}$$

F_{vm}, the filtration rate of the mussel population

Mussel weight

$$W_m = (L_m^{.9576})^3 \cdot 10.^{-4.8879}$$

W_m, dry wt in g, L_m, length in mm

Mussel filtration rate, temperature effects

$$F_m = \frac{L_e^{0.096} \quad T^{0.095}}{2.95}$$

$$L_e = W_m^{0.317} \quad 10^{.669}$$

F_m, filtration rate (ml filtered ind^{-1} min^{-1})

TABLE – 2 Continued

Mussel filtration rate, salinity effects

at $S \geq 7.5$ ‰	$F_{sm} = F_m$
$3.5 < S < 7.5$ ‰	$F_{sm} = F_m (3.5 - S) / 4.0$
$S \leq 3.5$ ‰	$F_{sm} = 0$

Mussel filtration rate, turbidity effect

$$\tau_m = 4.17 \times 10^{-4} * 10^{0.418X}$$

$$F_\tau = F_{sm} [1 - .01 * (\frac{\log_{10}\tau_m + 3.38}{0.418})].$$

Salinity effect on mussel distribution

at $S > 14$ ‰	$F_{\upsilon m} = 0$
at $S \leq 14$ ‰	$F_{\upsilon m} = F_{\tau m}$

Model Solution:

An implicit (Crank-Nicolson) tridiagonal solution technique.

Time step for integration: one day.

TABLE 3 – The primary data. Units are as follows: condition index (g dry wt ml-1), *P. marinus* mean infection intensity (Mackin's number), *P. marinus* prevalence (%), eggs present (mg ind^{-1}), gonadal-somatic index (g dry wt egg g dry wt somatic tissue^{-1}), shell volume (l m^{-2}), crabs density (ind m^{-2}), mussel density (ind m^{-2}), maximum clump size (cm), oyster biomass (g m^{-2}), oyster density (ind m^{-2}), juvenile oyster density (ind m^{-2}), submarket-size oyster density (ind m^{-2}), market-size oyster density (ind m^{-2}), boxes (ind m^{-2}), sex ratio (number females/number males), barnacles (% coverage), bryozoans (% coverage), algae (% coverage), polychaetes (total weight oyster^{-1}).

	Condition Index	*P. marinus* Infection intensity	*P. marinus* Prevalence	Egg Quantity	Gonadal-Somatic Index	Shell Volume	Crab Density
EAST BAY							
Bull Hill	13.160	0.248	75.0	127.245	0.051	0.065	0.096
Frenchy's Reef	15.349	0.165	50.0	159.621	0.082	0.034	0.042
Gale's Reef	14.194	0.116	35.3	295.349	0.116	0.020	0.020
Lone Tree Reef	12.292	0.173	52.5	58.013	0.018	0.040	0.328
Mattie B. Reef	10.138	0.231	70.0	593.694	0.244	0.088	0.136
Middle Reef	12.779	0.275	75.0	105.495	0.034	0.034	0.017
Hanna Reef (north)	13.088	0.157	47.5	454.091	0.187	0.032	0.162
Pepper Grove Reef	12.115	0.210	56.7	43.073	0.012	0.350	0.007
Richard's Reef	9.789	0.140	42.5	67.903	0.036	0.065	0.338
Hanna Reef (south)	14.315	0.348	82.5	524.611	0.231	0.019	0.097
Stephenson Reef	11.882	0.159	48.1	175.946	0.110	0.013	0.046
Whitehead Reef	12.929	0.085	25.8	45.757	0.026	0.013	0.024
AVERAGE	12.669	0.192	55.1	220.900	0.096	0.038	0.109
HOUSTON SHIP CHANNEL							
Buoy 53/55	12.946	0.215	62.5	204.131	0.062	0.101	0.051
Buoy 59	12.857	0.140	42.5	437.684	0.128	0.034	0.062
Buoy 63	11.449	0.273	65.0	485.122	0.130	0.079	0.011
Buoy 73/75	9.246	0.650	77.5	328.018	0.134	0.214	0.102
Morgans Point Reef	12.094	0.188	46.7	30.522	0.013	0.006	0.000
AVERAGE	11.718	0.293	58.8	297.095	0.093	0.087	0.045
CLEAR LAKE TO MORGAN'S POINT							
Red Bluff Reef	11.839	0.323	85.0	76.765	0.029	0.096	0.272
San Leon Reef	18.977	0.141	37.5	66.637	0.021	0.018	0.008
Scott Reef	13.846	0.151	42.9	48.898	0.011	0.028	0.019
Yacht Club Reef	12.695	0.264	75.0	435.058	0.174	0.223	0.139
AVERAGE	14.339	0.220	60.1	156.590	0.059	0.091	0.110
TRINITY BAY							
Big Breezy Reef	10.867	0.296	89.7	31.011	0.040	0.063	0.099
Dow Reef	9.769	0.264	80.0	0.000	0.000	0.003	0.010
Fisher Reef	–	0.132	40.0	0.000	0.000	0.006	0.031
Tern Reef	10.483	0.305	92.5	45.325	0.031	0.107	0.054
Trinity Reef	7.863	0.066	20.0	0.000	0.000	0.017	0.050
Vingt-et-un Reef	–	0.000	0.0	0.000	0.000	0.101	0.354
AVERAGE	9.746	0.177	53.7	12.723	0.012	0.049	0.100
WEST BAY							
Confederate Reef	14.365	0.936	88.0	202.522	0.070	0.114	0.283
Green's Cut Shell	–	0.000	0.0	0.000	0.000	0.052	0.178
Carancahua Reef (north)	–	0.000	0.0	0.000	0.000	0.009	0.097
North Deer Island Reef	14.236	0.914	92.3	167.213	0.072	0.054	0.128
Carancahua Reef (south)	–	0.000	0.0	0.000	0.000	0.017	0.207
South Deer Island Reef	10.017	1.213	94.9	272.108	0.100	0.110	0.697
Pelican Island Reef	–	0.000	0.0	0.000	0.000	0.011	0.061
Shell Island Reef	–	0.000	0.0	0.000	0.000	0.023	0.198
AVERAGE	12.783	0.383	34.5	80.230	0.030	0.049	0.231
DICKINSON EMBAYMENT							
April Fool's Reef	9.011	0.475	70.0	192.483	0.079	0.037	0.053
Dickinson Reef	14.339	0.240	65.0	51.023	0.024	0.060	0.261
Dollar Reef	19.795	0.258	31.3	410.627	0.160	0.013	0.005
Half Moon Reef	12.454	0.330	100.0	614.328	0.273	0.037	0.105
Levee Reef	20.349	0.297	90.0	222.481	0.081	0.016	0.056
Todd's Dump	15.304	0.085	25.7	250.211	0.116	0.014	0.059
AVERAGE	15.209	0.281	63.7	290.192	0.122	0.029	0.090
REDFISH BAR TO SMITH POINT							
Bart's Pass Reef	10.596	0.330	100.0	21.363	0.011	0.228	0.228
Bull Shoals	8.320	0.173	52.5	190.709	0.086	0.051	0.407
East Redfish Reef	10.205	0.165	50.0	193.955	0.082	0.223	0.446
South Redfish Reef (east)	8.922	0.083	25.0	310.459	0.178	0.187	0.068
Four Bit Reef	9.693	0.099	30.0	744.324	0.327	0.128	0.137
Gaspipe Reef	10.611	0.231	70.0	76.393	0.031	0.253	0.279
Lost Beezley Reef	10.934	0.281	85.0	334.301	0.129	0.139	0.456
North Redfish Reef	10.811	0.198	57.5	68.057	0.021	0.170	0.255
Possum Pass Reef	10.631	0.083	25.0	0.000	0.000	0.037	0.044
South Redfish Reef (west)	10.113	0.204	48.7	233.82	0.113	0.266	0.557
AVERAGE	10.084	0.186	54.4	217.338	0.098	0.168	0.288

TABLE 3 – CONTINUED

	Mussel Density	Maximal Clump Size	Oyster Biomass	Total Oyster Density	Juvenile Oyster Density	Sub-market sized Oyster Density	Market-sized Oyster Density
EAST BAY							
Bull Hill	2.065	121	9.679	1.063	0.270	0.409	0.383
Frenchy's Reef	0.845	147	0.442	0.041	0.025	0.017	0.008
Gale's Reef	2.860	116	1.043	0.183	0.061	0.092	0.030
Lone Tree Reef	1.561	89	2.354	0.363	0.086	0.242	0.035
Mattie B. Reef	0.425	114	11.603	2.083	0.773	0.826	0.486
Middle Reef	0.277	142	1.516	0.226	0.085	0.102	0.039
Hanna Reef (north)	1.735	109	5.045	0.794	0.226	0.508	0.060
Pepper Grove Reef	0.388	116	4.089	0.257	0.000	0.090	0.166
Richard's Reef	13.475	124	7.414	1.754	0.534	1.068	0.153
Hanna Reef (south)	1.504	94	2.209	0.438	0.217	0.203	0.018
Stephenson Reef	0.254	101	0.876	0.137	0.020	0.107	0.010
Whitehead Reef	0.871	110	1.302	0.257	0.105	0.138	0.014
AVERAGE	2.189	115	3.964	0.634	0.200	0.317	0.117
HOUSTON SHIP CHANNEL							
Buoy 53/55	0.068	114	8.328	1.140	0.346	0.608	0.186
Buoy 59	0.051	116	5.043	1.163	0.728	0.299	0.135
Buoy 63	0.103	164	6.675	1.486	0.861	0.435	0.191
Buoy 73/75	1.078	133	15.824	4.435	2.617	1.287	0.528
Morgans Point Reef	0.070	111	0.822	0.157	0.061	0.083	0.013
AVERAGE	0.274	128	7.339	1.676	0.923	0.542	0.210
CLEAR LAKE TO MORGAN'S POINT							
Red Bluff Reef	8.426	142	14.916	2.763	0.985	1.484	0.294
San Leon Reef	0.424	112	3.095	0.412	0.133	0.226	0.053
Scott Reef	0.706	116	3.812	0.458	0.105	0.219	0.134
Yacht Club Reef	53.036	134	32.984	7.549	3.427	3.747	0.381
AVERAGE	15.648	126	13.702	2.796	1.163	1.419	0.215
TRINITY BAY							
Big Breezy Reef	1.277	112	0.890	0.477	0.297	0.180	0.000
Dow Reef	0.804	100	0.226	0.055	0.015	0.040	0.000
Fisher Reef	0.693	110	0.121	0.053	0.030	0.023	0.000
Tern Reef	3.143	155	11.888	3.071	0.851	1.765	0.455
Trinity Reef	1.272	99	0.642	0.339	0.161	0.178	0.000
Vingt-et-un Reef	4.734	125	0.043	0.025	0.025	0.000	0.000
AVERAGE	1.987	117	2.302	0.670	0.230	0.364	0.076
WEST BAY							
Confederate Reef	0.218	174	22.710	3.170	1.275	1.111	0.784
Green's Cut Shell	0.115	–	0.049	0.168	0.168	0.000	0.000
Carancahua Reef (north)	0.037	–	0.011	0.067	0.067	0.000	0.000
North Deer Island Reef	0.049	137	6.479	1.295	0.677	0.412	0.206
Carancahua Reef (south)	0.017	123	0.338	0.467	0.467	0.000	0.000
South Deer Island Reef	0.000	185	10.164	2.347	1.174	0.726	0.450
Pelican Island Reef	0.000	100	0.294	0.587	0.587	0.000	0.000
Shell Island Reef	0.051	–	0.062	0.181	0.181	0.000	0.000
AVERAGE	0.061	90	5.013	1.035	0.574	0.281	0.180
DICKINSON EMBAYMENT							
April Fool's Reef	0.597	166	4.982	0.723	0.239	0.279	0.206
Dickinson Reef	1.340	130	9.759	1.482	0.490	0.762	0.229
Dollar Reef	0.005	83	1.760	0.229	0.030	0.163	0.036
Half Moon Reef	0.021	128	2.290	0.503	0.273	0.199	0.031
Levee Reef	0.604	111	3.592	0.504	0.156	0.255	0.093
Todd's Dump	0.392	107	1.465	0.200	0.036	0.146	0.018
AVERAGE	0.493	121	3.975	0.607	0.204	0.301	0.102
REDFISH BAR TO SMITH POINT							
Bart's Pass Reef	2.937	149	17.484	3.165	0.810	1.468	0.886
Bull Shoals	0.808	160	7.649	1.540	0.559	0.538	0.442
East Redfish Reef	2.813	168	45.557	6.852	2.015	2.980	1.857
South Redfish Reef (east)	1.633	162	20.719	4.082	1.086	1.536	1.463
Four Bit Reef	0.059	138	15.835	3.572	1.336	1.354	0.892
Gaspipe Reef	4.152	144	39.205	8.633	2.944	4.920	0.771
Lost Beezley Reef	0.837	148	22.341	6.033	2.901	2.164	0.968
North Redfish Reef	0.884	134	22.764	2.738	0.612	1.326	0.799
Possum Pass Reef	6.578	115	1.505	0.405	0.143	0.212	0.050
South Redfish Reef (west)	2.354	138	38.137	7.949	2.504	3.957	1.483
AVERAGE	2.306	146	23.120	4.497	1.491	2.046	0.961

TABLE 3 – CONTINUED

	Boxes	Sex Ratio	Coverage of Barnacles	Coverage of Bryozoans	Coverage of Alga	Biomass of Polychaetes
EAST BAY						
Bull Hill	0.026	1.5	46	6	0	34.2
Frenchy's Reef	0.000	2.0	33	3	13	36.9
Gale's Reef	0.015	1.0	38	8	0	3.9
Lone Tree Reef	0.000	1.0	58	0	0	32.5
Mattie B. Reef	0.064	2.3	20	2	4	9.8
Middle Reef	0.006	1.0	42	8	2	7.6
Hanna Reef (north)	0.014	1.0	21	4	2	5.2
Pepper Grove Reef	0.035	1.0	28	18	8	26.9
Richard's Reef	0.109	1.5	40	0	0	5.3
Hanna Reef (south)	0.037	4.0	68	2	10	0.0
Stephenson Reef	0.000	2.3	32	0	0	3.5
Whitehead Reef	0.024	1.5	64	0	0	16.8
AVERAGE	0.027	1.7	41	4	3	15.2
HOUSTON SHIP CHANNEL						
Buoy 53/55	0.101	2.3	16	10	0	0.8
Buoy 59	0.068	2.3	14	8	0	9.5
Buoy 63	0.065	1.5	10	14	0	11.3
Buoy 73/75	0.417	1.5	18	6	0	25.4
Morgans Point Reef	0.030	0.4	34	2	0	5.2
AVERAGE	0.136	1.6	18	8	0	10.4
CLEAR LAKE TO MORGAN'S POINT						
Red Bluff Reef	0.057	4.0	44	8	12	21.1
San Leon Reef	0.000	4.0	10	8	0	40.3
Scott Reef	0.000	1.0	12	2	28	101.6
Yacht Club Reef	0.056	1.5	40	0	16	14.8
AVERAGE	0.028	2.6	27	5	14	44.4
TRINITY BAY						
Big Breezy Reef	0.063	0.4	8	0	0	0.0
Dow Reef	0.010	0.2	28	6	14	2.7
Fisher Reef	0.015	–	8	0	0	0.0
Tern Reef	0.732	1.5	14	0	0	6.9
Trinity Reef	0.017	0.0	20	0	0	0.0
Vingt-et-un Reef	2.785	–	18	0	0	0.0
AVERAGE	0.604	0.5	16	1	2	1.6
WEST BAY						
Confederate Reef	0.065	4.0	6	4	0	14.1
Green's Cut Shell	0.126	–	0	0	0	124.0
Carancahua Reef (north)	0.043	–	0	22	22	1204.5
North Deer Island Reef	0.088	1.5	0	0	0	1.4
Carancahua Reef (south)	0.058	–	6	24	22	249.3
South Deer Island Reef	0.076	2.3	2	6	0	6.9
Pelican Island Reef	0.114	–	0	66	0	47.3
Shell Island Reef	0.056	–	4	32	24	822.8
AVERAGE	0.078	2.6	2	19	9	308.8
DICKINSON EMBAYMENT						
April Fool's Reef	0.027	4.0	12	12	0	4.5
Dickinson Reef	0.033	0.4	14	12	0	2.4
Dollar Reef	0.005	4.0	24	32	0	7.6
Half Moon Reef	0.063	0.8	60	20	0	1.5
Levee Reef	0.000	4.0	14	12	0	14.5
Todd's Dump	0.032	4.0	24	10	6	3.3
AVERAGE	0.027	2.9	25	16	1	5.6
REDFISH BAR TO SMITH POINT						
Bart's Pass Reef	0.481	4.0	48	6	0	2.0
Bull Shoals	0.197	4.0	22	4	2	5.7
East Redfish Reef	0.279	1.5	26	6	0	13.0
South Redfish Reef (east)	0.578	1.5	28	2	2	3.9
Four Bit Reef	0.275	2.3	6	26	0	18.6
Gaspipe Reef	0.759	1.0	26	0	0	21.0
Lost Beezley Reef	0.038	9.0	18	12	0	11.8
North Redfish Reef	0.272	1.0	38	12	0	14.2
Possum Pass Reef	0.324	0.0	44	2	0	3.5
South Redfish Reef (west)	0.025	1.5	20	5	0	10.4
AVERAGE	0.323	2.6	28	8	0	10.4

TABLE 4 – P-values. P-values for partial regressions derived from the best 4-variable model obtained from regression analyses using all the variables listed in Table 1.

Dependent Variable	r-square	Box Density	Salinity	Shell Volume	Condition Index	Crab Density	Mussel Density
Box Density	0.54			0.0001	0.0772	0.0057	0.0581
Salinity	0.68			0.0011			
Shell Volume	0.90	0.0024			0.2142		
Condition Index	0.51		0.0013			0.0842	
Crab Density	0.55	0.0205			0.0192		
Mussel Density	0.48						
Gonadal-Somatic Index	0.46		0.0001				
Minimal Clump Size	0.34						0.0771
Maximal Clump Size	0.66				0.0116		
Mean Infection Intensity	0.63		0.0005				
Prevalence	0.51			0.0545			
Oyster Biomass	0.97	0.0149					
Juvenile Oyster Density	0.86			0.1890			
Submarket Oyster Density	0.93	0.1875					
Market Oyster Density	0.89				0.0192		0.0009
Polychaete Biomass	0.59						0.0075
Coverage of Bryozoans	0.36		0.0001	0.0685			
Coverage of Alga	0.64						0.0001
Coverage of Barnacles	0.25				0.2431		

TABLE 4 – CONTINUED

Dependent Variable	Gonadal-Somatic Index	Maximal Clump Size	Mean Infection Intensity	Prevalence	Oyster Biomass	Juvenile Oyster Density
Box Density						
Salinity	0.0008		0.0001			
Shell Volume					0.0001	0.0211
Condition Index	0.0200	0.0007				
Crab Density			0.0070		0.0001	
Mussel Density					0.0001	
Gonadal-Somatic Index			0.0036			0.0087
Minimal Clump Size			0.1482		0.0005	
Maximal Clump Size			0.0002			
Mean Infection Intensity		0.0308		0.0006		
Prevalence			0.0001			
Oyster Biomass			0.0726			
Juvenile Oyster Density	0.0167		0.0098			
Submarket Oyster Density					0.0001	0.0090
Market Oyster Density	0.0223				0.0001	
Polychaete Biomass						0.1083
Coverage of Bryozoans			0.0069			
Coverage of Alga	0.1084					0.0351
Coverage of Barnacles		0.0560	0.0719	0.0737		

TABLE 4 – CONTINUED

Dependent Variable	Submarket Oyster Density	Market Oyster Density	Polychaete Biomass	Coverage of Bryozoans	Coverage of Alga	Coverage of Barnacles
Box Density						
Salinity				0.0102		
Shell Volume						
Condition Index						
Crab Density						
Mussel Density		0.0001	0.1875		0.0556	
Gonadal-Somatic Index			0.0567			
Minimal Clump Size	0.0033					
Maximal Clump Size		0.0002				0.2119
Mean Infection Intensity				0.0668		
Prevalence		0.1548				0.1977
Oyster Biomass	0.0001	0.0001				
Juvenile Oyster Density	0.0001					
Submarket Oyster Density		0.0004				
Market Oyster Density	0.0021					
Polychaete Biomass					0.0001	
Coverage of Bryozoans	0.1043					
Coverage of Alga			0.0001			
Coverage of Barnacles						

TABLE 5 – Comparison between sites sampled by Soniat et al. (1989) and this study. Density (ind m^{-2}; Soniat et al. (1989) densities obtained by diver-sampled quadrants; our values converted to be equivalent assuming 12% dredging efficiency), percentage of boxes [number boxes/(number individuals + boxes)], condition index (g dry wt ml^{-1}), weighted incidence [Mackin's number using a 0-to-6-point scale for Soniat et al. (1989) and a 0-to-5-point scale for the present study].

Site	Oyster Density (1985)	Oyster Density (1992)	Percentage of Boxes (1985)	Percentage of Boxes (1992)	Condition Index (1985)	Condition Index (1992)	Weighted Incidence (1985)	Weighted Incidence (1992)
April Fools Reef	25.87	6.02	8.9	3.5	6.3	9.0	3.00	0.44
Big Beezley Reef	34.93	3.97	0.0	11.7	6.8	10.9	0.00	0.01
Confederate Reef	52.00	26.42	10.5	2.0	11.5	14.4	3.40	0.94
Dow Reef	25.20	0.46	0.5	15.4	6.6	9.8	0.00	0.07
Fisher Reef	2.27	0.44	5.9	22.2	–	–	0.08	0.00
Frenchy's Reef	11.07	0.42	1.2	0.0	6.0	15.4	0.17	0.06
Hanna Reef (north)	3.87	6.62	0.0	1.7	7.3	13.1	0.83	0.02
Red Bluff Reef	44.40	23.03	4.0	2.0	5.8	11.8	1.75	0.11
San Leon Reef	13.37	3.43	4.8	0.0	6.0	19.0	2.08	0.06
Todd's Dump Reef	4.67	1.67	2.8	13.7	6.2	15.3	2.80	0.02
Vingt-et-un Reef	23.33	0.21	0.5	99.1	7.5	–	0.08	–
Yacht Club Reef	45.47	62.96	2.9	0.7	6.5	12.7	2.17	0.05

TABLE 6 – Comparison of gonadal-somatic index. Comparison of gonadal-somatic index between oysters collected from Confederate Reef in April, 1989 (Choi et al., 1993) and the Deer Islands area in April, 1992.

	Mean Size Dry wt (mg) ± SD	Mean GSI GSI ± SD	GSI			
			Median	Highest	Lowest	N
Choi *et al.* 1993	1051.6 ± 689.5	0.157 ± 0.188	0	0.422	0	9
Current Study	3066.25 ± 744.5	0.06997 ± 0.052	0.052	0.144	0.013	8

TABLE 7 – Comparison of *P. marinus* prevalence. Comparison of *P. marinus* prevalence between this study and the first four years of NOAA's Status and Trends Program (Powell et al., 1992a) for four sites in Galveston Bay. The Status and Trends data were obtained during the months of December and January.

	1986	1987	1988	1989	This Study
Confederate Reef	98	95	100	97	89
Hanna Reef	98	82	100	63	82.5
Todd's Dump Reef	100	93	82	85	26
Yacht Club Reef	100	86	92	93	75
Average	99	89	94	85	68

TABLE 8 – Distribution of *P. marinus*. Distribution of *P. marinus* prevalence and infection intensity among three size classes of oysters at the 51 sites.

	Prevalence			Mean Infection			Median Infection		
Site	Juvenile	Submarket	Market	Juvenile	Submarket	Market	Juvenile	Submarket	Market
April Fools Reef	25	61.5	73.7	0.083	0.385	0.632	0	0.33	0.67
Buoy 53/55	10	6.7	0	0.067	0.022	0	0	0	0
Buoy 73/75	33.3	75	84.2	0.37	0.667	0.719	0	0.67	0.67
Bart's Pass Reef	0	0	0	0	0	0	0	0	0
Big Beezley Reef	0	5.9	–	0	0.019	–	0	0	–
Bull Hill	22.2	0	21.1	0.073	0	0.069	0	0	0
Bull Shoals	0	0	5.6	0	0	0.018	0	0	0
Buoy 59	0	0	5.3	0	0	0.017	0	0	0
Buoy 63	10	9.1	15.8	0.033	0.03	0.175	0	0	0
Confederate Reef	75	85.7	100	0.499	0.929	1.191	0.33	1.00	1.33
Dickinson Reef	0	15	7.1	0	0.1	0.024	0	0	0
Dollar Reef	0	4.76	0	0	0.016	0	0	0	0
Dow Reef	33.3	14.3	–	0.11	0.047	–	0	0	–
East Redfish Reef	10	0	0	0.033	0	0	0	0	0
South Redfish Reef (east)	12.5	0	5.3	0.041	0	0.017	0	0	0
Fisher Reef	0	0	–	0	0	–	0	0	–
Four Bit Reef	0	0	0	0	0	0	0	0	0
Frenchy's Reef	0	0	–	0	0	–	0	0	–
Gale's Reef	0	0	0	0	0	0	0	0	0
Gaspipe Reef	0	5.6	0	0	0.018	0	0	0	0
Half Moon Reef	0	0	0	0	0	0	0	0	0
Lost Beezley Reef	0	15.4	10.5	0	0.051	0.035	0	0	0
Levee Reef	14.3	0	0	0.047	0	0	0	0	0
Lone Tree Reef	0	8.3	0	0	0.028	0	0	0	0
Mattie B. Reef	0	0	0	0	0	0	0	0	0
Middle Reef	8.3	0	16.7	0.028	0	0.222	0	0	0
Morgans Point Reef	0	50	0	0	0.229	0	0	0.17	
Green's Cut Reef	0	–	–	0	–	–	0	–	–
Carancahua Reef (north)	0	–	–	0	–	–	0	–	–
North Deer Island Reef	55.6	81.3	100	0.741	0.896	0.951	0.67	0.67	0.84
Hanna Reef	0	4.8	11.1	0	0.016	0.037	0	0	0
North Redfish Reef	0	0	22.2	0	0	0.111	0	0	0
Pelican Island Reef	0	–	–	0	–	–	0	–	–
Pepper Grove Reef	–	0	21.1	–	0	0.105	–	0	0
Possum Pass Reef	0	4.5	12.5	0	0.015	0.041	0	0	0
Red Bluff Reef	0	13.63	45.5	0	0.045	0.303	0	0	0
Richard's Reef	0	3	0	0	0.013	0	0	0	0
San Leon Reef	14.3	10	15.4	0.047	0.033	0.102	0	0	0
Carancahua Reef (south)	0	–	–	0	–	–	0	–	–
Scott Reef	0	11.1	0	0	0.056	0	0	0	0
South Deer Island Reef	70	70	100	1.067	1.134	1.26	1.33	1.67	1.33
Hanna Reef (south)	10	15.4	0	0.167	0.115	0	0	0	0
Shell Island Reef	0	–	–	0	–	–	0	–	–
Stephenson Reef	0	0	0	0	0	0	0	0	0
Tern Reef	0	0	0	0	0	0	0	0	0
Todd's Dump	20	0	25	0.066	0	0.083	0	0	0
Trinity Reef	0	0	–	0	0	–	0	0	–
Vingt-et-un Reef	–	–	–	–	–	–	–	–	–
Whitehead Reef	0	9.5	0	0	0.031	0	0	0	0
South Redfish Reef (west)	10	0	29.4	0.033	0	0.196	0	0	0
Yacht Club Reef	20	9.5	22.2	0.066	0.031	0.073	0	0	0

TABLE 9 – Site comparisons based on the sum of the weights for five factors affecting condition. In each case the weight for each factor for each reef was a value from 1 (best) to 51 (worst) according to the site's position in the rankings for that parameter. The final sum was the sum of the five independently obtained weights.

Site	Total	Condition Index	Infection Intensity	Gonadal-Somatic	Oyster Biomass	Oyster Abundance
Yacht Club Reef	185	27	16	45	48	49
Four Bit Reef	183	6	40	51	42	44
South Redfish Reef (east)	182	3	44	46	44	45
East Redfish Reef	174.5	12	31	32.5	51	48
South Redfish Reef (west)	171	10	25	37	49	50
Hanna Reef (north)	169	32	33	47	29	28
Lost Beezley Reef	165	19	13	41	45	47
Buoy 59	164	29	36	40	28	31
Gaspipe Reef	158.5	15	21	21.5	50	51
Confederate Reef	158	39	2	28	46	43
Mattie B. Reef	157	11	22	49	38	37
Todd's Dump	147	40	41	39	16	11
North Redfish Reef	145.5	17	26	16.5	47	39
Dickinson Reef	145	38	20	18	36	33
Buoy 53/55	145	31	23	27	34	30
Buoy 63	142	20	15	42	31	34
Bull Hill	142	33	19	26	35	29
Buoy 73/75	139	5	4	43	41	46
Richard's Reef	137	8	37	24	32	36
Dollar Reef	137	43	18	44	19	13
Gale's Reef	136	35	39	38	14	10
San Leon Reef	135.5	42	35	16.5	23	19
Levee Reef	135	44	11	31	24	25
Bull Shoals	133	2	29	34	33	35
Hanna Reef (south)	131	37	6	48	20	20
Red Bluff Reef	130	21	9	20	40	40
North Deer Island Reef	130	36	3	29	30	32
Half Moon Reef	128	26	7	50	21	24
Scott Reef	125.5	34	34	11.5	25	21
Tern Reef	124.5	13	10	21.5	39	41
Whitehead Reef	121	30	42	19	15	15
South Deer Island Reef	120	9	1	35	37	38
Bart's Pass Reef	118.5	14	8	11.5	43	42
Frenchy's Reef	114.5	41	30	32.5	9	2
Stephenson Reef	108	22	32	36	12	6
Lone Tree Reef	107	25	28	15	22	17
Pepper Grove Reef	101	24	24	13	26	14
Possum Pass Reef	99.5	16	43	5.5	17	18
Middle Reef	95	28	14	23	18	12
April Fools Reef	93	4	5	30	27	27
Big Beezley Reef	91	18	12	25	13	23
Morgans Point Reef	82	23	27	14	11	7
Fisher Reef	51.5	0	38	5.5	5	3
Dow Reef	39.5	7	17	5.5	6	4
Pelican Island Reef	38.5	0	0	5.5	7	26
Carancahua Reef (south)	35.5	0	0	5.5	8	22
Trinity Reef	32.5	1	0	5.5	10	16
Shell Island Reef	18.5	0	0	5.5	4	9
Green's Cut Shell	16.5	0	0	5.5	3	8
Carancahua Reef (north)	11.5	0	0	5.5	1	5
Vingt-et-un Reef	8.5	0	0	5.5	2	1