

**Benthic modification and biotic associations at natural and artificial habitats excavated by *Epinephelus morio* and *Lutjanus campechanus***

**Ryan T. Munnelly\*, Brett R. Pittinger, Sean F. Keenan, Theodore S. Switzer**

\*Corresponding author: [rmunnelly@cfarm.org](mailto:rmunnelly@cfarm.org)



Table S1. Parameter estimates for water-quality characteristics of West Florida Shelf (WFS) fish excavations. Salinity, temperature, visibility, and dissolved oxygen were compared between WFS regions (Panhandle and Peninsula), habitat (isolated excavations, excavated low relief, and excavated artificial reefs), and depth. All variables and their interactions were initially included in each model, and backward selection was used to remove effects that were not significant and did not significantly improve the model fit. Indicator variables were used for region (Panhandle = 1 and Peninsula = 0) and habitat (isolated excavations and excavated artificial reefs = 1 and excavated low relief = 0).

Excavation water quality	Effect	DF	Slope ( $\beta$ )	SE	t	p
Salinity	Intercept	1	36.62	0.03	1056.59	<0.001
	Depth	1	1.00	0.35	2.84	0.005
Temperature (°C)	Intercept	1	3.40	0.19	158.50	<0.001
	Region	1	-1.04	0.34	-3.03	0.003
	Depth	1	-1.01	0.06	-15.74	<0.001
Visibility (m)	Intercept	1	4.09	0.30	13.68	<0.001
	Region	1	1.69	0.44	3.87	<0.001
	Depth	1	1.01	0.17	5.99	<0.001
	Region × Depth	1	-1.01	0.26	-3.91	<0.001
Dissolved oxygen (mg l <sup>-1</sup> )	Intercept	1	8.37	0.17	49.59	<0.001
	Region	1	-1.16	0.21	-5.63	<0.001
	Depth	1	-1.01	0.10	-10.51	<0.001

Table S2. Same as Table S1 but for excavation physical characteristics. IE and AR abbreviate isolated excavations and excavated artificial reefs, respectively.

Excavation characteristic	Effect	DF	Slope (β)	SE	t	p
Diameter (m)	Intercept	1	5.35	0.32	16.63	<0.001
	Region	1	1.31	0.70	1.86	0.064
	Habitat (AR)	1	1.29	0.35	3.73	<0.001
	Habitat (IE)	1	1.23	0.32	3.80	<0.001
	Depth	1	1.01	0.20	5.09	<0.001
	Region × Depth	1	-1.01	0.27	-3.77	<0.001
Height (m)	Intercept	1	-1.92	0.18	-10.73	<0.001
	Habitat (AR)	1	1.61	0.31	5.16	<0.001
	Habitat (IE)	1	1.49	0.32	4.62	<0.001
Slope (°)	Intercept	1	2.31	0.06	37.21	<0.001
	Region	1	-0.12	0.13	-0.88	0.380
	Habitat (AR)	1	-0.11	0.25	-0.45	0.654
	Habitat (IE)	1	-0.11	0.09	-1.16	0.247
	Region × Habitat (AR)	1	0.61	0.28	2.17	0.032
	Region × Habitat (IE)	1	0.83	0.17	4.75	<0.001
Excavated sediment (m <sup>3</sup> )	Intercept	1	6.12	0.41	14.88	<0.001
	Region	1	-2.55	0.48	-5.33	<0.001
	Habitat (AR)	1	2.86	0.58	4.90	<0.001
	Habitat (IE)	1	2.20	0.46	4.84	<0.001
Excavated rock (m <sup>2</sup> )	Intercept	1	1.84	0.27	6.87	<0.001
	Region	1	-2.11	0.61	-3.43	0.001
	Habitat (AR)	1	-3.46	1.07	-3.22	0.002
	Habitat (IE)	1	-0.03	0.19	-0.16	0.871
	Depth	1	0.01	0.01	1.12	0.264
	Region × Habitat (AR)	1	-1.90	1.58	-1.20	0.230
	Region × Habitat (IE)	1	-0.96	0.39	-2.50	0.013
Proportional epibenthic coverage	Intercept	1	1.94	0.18	10.56	<0.001
	Region	1	-0.14	0.17	-0.82	0.412
	Habitat (AR)	1	-0.15	0.31	-0.49	0.626
	Habitat (IE)	1	-0.46	0.14	-3.32	0.001
	Depth	1	-0.01	0.00	-2.61	0.010
	Region × Habitat (AR)	1	-0.96	0.37	-2.62	0.010
Region × Habitat (IE)	1	-0.60	0.29	-2.09	0.038	

Table S3. Same as Table S1 but for abundance and diversity indices of excavation-associated fish assemblages. IE and AR abbreviate isolated excavations and excavated artificial reefs, respectively, and ENT is the effective number of taxa.

Excavation characteristic	Effect	DF	Slope (β)	SE	t	p
Abundance (ΣMAXNO among taxa)	Intercept	1	4.94	0.30	16.38	<0.001
	Habitat (AR)	1	0.09	0.22	0.39	0.696
	Habitat (IE)	1	0.72	0.19	3.74	<0.001
	Depth	1	-0.01	0.01	-2.24	0.026
Hill's evenness	Intercept	1	-1.47	0.11	-13.12	<0.001
	Habitat (AR)	1	1.06	0.39	2.72	0.001
	Habitat (IE)	1	1.06	0.41	2.58	0.011
	Depth	1	1.00	0.32	3.11	0.002
Number of taxa ( $H_0$ )	Intercept	1	12.15	0.71	17.16	<0.001
	Habitat (AR)	1	-1.71	0.55	-3.10	0.002
	Habitat (IE)	1	-1.20	0.50	-2.37	0.019
	Depth	1	-0.05	0.01	-4.49	<0.001
$H_1$ ENT	Intercept	1	4.43	0.18	24.19	<0.001
	Region	1	1.24	0.51	2.42	0.016
	Habitat (AR)	1	-1.33	0.50	-2.64	0.009
$H_2$ ENT	Habitat (IE)	1	-1.53	0.30	-5.18	<0.001
	Intercept	1	3.26	0.18	18.26	<0.001
	Region	1	1.24	0.54	2.32	0.021
	Habitat (AR)	1	-1.28	0.60	-2.14	0.034
Habitat (IE)	1	-1.43	0.35	-4.15	<0.001	

Table S4. Main test results from the permutational multivariate analysis of variance (PERMANOVA) comparing West Florida Shelf (WFS) excavation-associated epibenthos coverage by region (Panhandle and Peninsula) and habitat (isolated excavations, excavated low-relief, and excavated artificial reefs). Asterisks indicate significant effects.

Environmental variable	DF	SS	MS	Pseudo-F	P (perm)	Unique
Region	1	53250	53250	85.183	0.001	999
Habitat	2	40785	20393	32.622	0.001	998
Region × Habitat	2	2764.6	1382.3	2.2113	0.037*	999
Depth	1	31550	31550	50.471	0.001*	998
Residual	195	121900	625.12			
Total	201	250250				

Table S5. Pairwise test results from the permutational multivariate analysis of variance (PERMANOVA) comparing West Florida Shelf (WFS) epibenthos coverage by region (Panhandle and Peninsula) and habitat (isolated excavations [IE], excavated low-relief [LR], and excavated artificial reefs [AR]). Asterisks indicate significant effects using a Bonferroni-adjusted significance level of  $\alpha = 0.0083$ .

Pairwise test	Level 1	Level 2	DF	t	P (perm)	Unique
Region × Habitat	Habitat: IE	Region	70	2.96	0.001*	999
	Habitat: LR	Region	71	3.05	0.001*	998
	Habitat: AR	Region	52	1.20	0.076	999
WFS Panhandle		Habitat: IE, LR	35	2.42	0.003*	999
		Habitat: IE, AR	69	5.37	0.001*	999
		Habitat: LR, AR	65	8.23	0.001*	999
Peninsular WFS		Habitat: IE, LR	106	2.44	0.002*	999
		Habitat: IE, AR	53	2.56	0.002*	999
		Habitat: LR, AR	58	3.65	0.001*	998

Table S6. Main test results from the permutational multivariate analysis of variance (PERMANOVA) comparing West Florida Shelf (WFS) excavation-associated fish taxonomic composition by region (Panhandle and Peninsula) and habitat (isolated excavations, excavated low-relief, and excavated artificial reefs). Asterisks indicate significant effects.

Environmental variable	DF	SS	MS	Pseudo-F	P (perm)	Unique
Region	1	38448	38448.0	16.32	0.001	999
Habitat	2	28012	14006.0	5.94	0.001	998
Region × Habitat	2	11614	5806.8	2.46	0.002*	997
Depth	1	27650	27650.0	11.73	0.001*	999
Residual	195	459520	2356.5			
Total	201	565250				

Table S7. Pairwise test results from the permutational multivariate analysis of variance (PERMANOVA) comparing West Florida Shelf (WFS) excavation-associated fish taxonomic composition by region (Panhandle and Peninsula) and habitat (isolated excavations [IE], excavated low-relief [LR], and excavated artificial reefs [AR]). Asterisks indicate significant effects using a Bonferroni-adjusted significance level of  $\alpha = 0.0083$ .

Pairwise test	Level 1	Level 2	DF	t	P (perm)	Unique
Region × Habitat	Habitat: IE	Region	70	1.88	0.001*	998
	Habitat: LR	Region	71	2.21	0.001*	999
	Habitat: AR	Region	52	2.09	0.001*	999
WFS Panhandle		Habitat: IE, LR	35	2.16	0.001*	999
		Habitat: IE, AR	69	1.71	0.010	998
		Habitat: LR, AR	65	2.37	0.001*	999
Peninsular WFS		Habitat: IE, LR	106	1.60	0.010	999
		Habitat: IE, AR	53	1.73	0.003*	997
		Habitat: LR, AR	58	1.98	0.001*	999

Table S8. Mean ± standard error (maximum) for MAXNO relative abundances of fishes identified on video by West Florida Shelf (WFS) region (Panhandle and Peninsula) and habitat (isolated excavations [IE], excavated low relief [LR], and excavated artificial reefs [AR]) pairwise groupings identified by PERMANOVA. Fishes were identified to the lowest taxonomic level possible and are presented in alphabetical order. The minimum was always 0. Subtaxa indicated were grouped for fish assemblage composition analyses but separated for determining diversity indices at each site. Regression equations for significant depth relationships indicated by PERMANOVA and the total number of each taxa are also reported.

Taxonomic & Common Names	WFS Panhandle		Peninsular WFS		Depth regression	Total
	IE & AR	LR	IE & LR	AR		
<i>Acanthurus</i> spp. (surgeonfishes)	0	0	0.04 ± 0.02 (2)	0	–	4
<i>Anisotremus virginicus</i> (porkfish)	0	0	0	0.25 ± 0.25 (1)	–	1
<i>Apogonidae</i> (cardinal fishes)	0	0.06 ± 0.06 (1)	0.10 ± 0.09 (10)	0	–	12
<i>Archosargus probatocephalus</i> (sheepshead)	0.01 ± 0.01 (1)	0	0.01 ± 0.01 (1)	3.25 ± 2.93 (12)	–	15
<i>Balistes capriscus</i> (grey triggerfish)	1.51 ± 0.28 (12)	0.47 ± 0.15 (2)	0.34 ± 0.07 (4)	0	$y = -0.0189x + 1.7465$	154
<i>Bodianus pulchellus</i> (spotfin hogfish)	0	0	0.06 ± 0.03 (2)	0	$y = 0.0020x$	7
<i>Bodianus rufus</i> (Spanish hogfish)	0.01 ± 0.01 (1)	0	0	0	–	1
<i>Brotula barbata</i> (bearded brotula)	0	0.06 ± 0.06 (1)	0	0	–	1
<i>Calamus</i> spp. (porgies)	0.22 ± 0.08 (3)	0.35 ± 0.17 (2)	0.24 ± 0.07 (5)	0	$y = -0.0129x + 1.4459$	48
<i>C. bajonado</i> (jolthead porgy)	0	0	0.38 ± 0.12 (11)	0.75 ± 0.48 (2)	–	44
<i>C. nodosus</i> (Knobbed porgy)	0	0	0.03 ± 0.02 (1)	0	–	3
<i>C. proridens</i> (littlehead porgy)	0.06 ± 0.03 (1)	0.35 ± 0.17 (2)	0.47 ± 0.16 (15)	0	$y = -0.0091x + 0.7762$	61
<i>Canthigaster</i> spp. (tobys & sharpnose puffers)	0.01 ± 0.01 (1)	0.24 ± 0.16 (2)	0.01 ± 0.01 (1)	0	–	6
<i>C. jamestyleri</i> (goldface toby)	0	0	0.02 ± 0.01 (1)	0	–	2
<i>C. rostrata</i> (sharpnose puffer)	0.03 ± 0.02 (1)	0	0.02 ± 0.02 (2)	0	–	4
Carangidae (scads)	53.03 ± 12.62 (300)	35.29 ± 24.16 (300)	59.85 ± 11.06 (300)	75.00 ± 75.00 (300)	–	11242
<i>Caranx bartholomaei</i> (yellow jack)	0	0	0.15 ± 0.15 (16)	0	–	16
<i>Caranx crysos</i> (blue runner)	0.25 ± 0.12 (7)	0.12 ± 0.12 (2)	0.16 ± 0.09 (8)	2.25 ± 1.31 (6)	$y = -0.0098x + 0.7393$	46
Carcharhiniformes (ground sharks)	0.01 ± 0.01 (1)	0	0	0	–	1
<i>Carcharhinus leucas</i> (bull shark)	0.03 ± 0.02 (1)	0	0	0	–	2
<i>Negaprion brevirostris</i> (lemon shark)	0	0	0.01 ± 0.01 (1)	0	–	1
<i>Centropristis</i> spp. (sea basses)	0.08 ± 0.08 (6)	0.18 ± 0.18 (3)	0	0	–	9
<i>C. ocyurus</i> (bank sea bass)	0.93 ± 0.29 (11)	0.24 ± 0.18 (3)	0.09 ± 0.07 (8)	0	–	81
<i>Cephalopholis cruentata</i> (graysby)	0.04 ± 0.02 (1)	0.12 ± 0.12 (2)	0.06 ± 0.03 (2)	0.75 ± 0.75 (3)	$y = -0.0025x + 0.2047$	15
<i>Chaenopsis ocellata</i> (bluethroat pikeblenny)	0.01 ± 0.01 (1)	0	0	0	–	1
<i>Chaetodipterus faber</i> (spadefish)	0.01 ± 0.01 (1)	0	0	0	–	1
<i>Chaetodon</i> spp. (butterflyfish)	0.03 ± 0.03 (2)	0.12 ± 0.08 (1)	0.04 ± 0.03 (3)	0	–	8
<i>C. ocellatus</i> (spotfin butterflyfish)	0.17 ± 0.07 (2)	0.35 ± 0.19 (2)	0.51 ± 0.08 (2)	0	–	74
<i>C. sedentarius</i> (reef butterflyfish)	0.03 ± 0.03 (2)	0.59 ± 0.24 (3)	0.26 ± 0.07 (4)	0	–	40
Clupeidae (herrings)	0	0	0.92 ± 0.92 (100)	0	–	100
<i>Dasyatis</i> spp. (stingrays)	0.01 ± 0.01 (1)	0	0	0	–	1

Table S8. (Continued)

Taxonomic & Common Names	WFS Panhandle		Peninsular WFS		Depth regression	Total
	IE & AR	LR	IE & LR	AR		
<i>Decodon puellaris</i> (red hogfish)	0	0.06 ± 0.06 (1)	0	0	–	1
Diodontidae (porcupinefish)	0	0.06 ± 0.06 (1)	0	0	–	1
<i>Diplectrum</i> spp. (sand perches)	0.90 ± 0.15 (5)	0	0.34 ± 0.13 (11)	0	$y = -0.0103x + 1.0414$	102
<i>Echeneis</i> spp. (sharksuckers)	0.07 ± 0.04 (2)	0	0.02 ± 0.02 (2)	0	–	7
<i>Epinephelus drummondhayi</i> (speckled hind)	0.01 ± 0.01 (1)	0	0	0	–	1
<i>Epinephelus morio</i> (red grouper)	0.14 ± 0.04 (1)	0.71 ± 0.17 (2)	1.19 ± 0.15 (11)	0	–	152
<i>Equetus lanceolatus</i> (jack-knifefish)	0.79 ± 0.33 (15)	0.41 ± 0.21 (3)	0.61 ± 0.20 (14)	0	$y = -0.0244x + 1.9163$	131
<i>Eucinostomus</i> spp. (mojaras)	0	0	0.01 ± 0.01 (1)	0	–	1
<i>Haemulon</i> spp. (grunts)	0	0	2.31 ± 1.11 (82)	0	–	252
<i>H. aurolineatum</i> (tomtate)	8.71 ± 4.39 (300)	0.06 ± 0.06 (1)	4.04 ± 1.33 (90)	0	–	1068
<i>H. flavolineatum</i> (French grunt)	0	0	0.01 ± 0.01 (1)	0	–	1
<i>H. striatum</i> (striped grunt)	0	0	0.81 ± 0.55 (43)	0	–	88
<i>Heteroconger</i> spp. (garden eels)	1.69 ± 1.10 (76)	0	0	0	–	122
<i>Holocanthus</i> spp. (angelfishes)	0.04 ± 0.03 (2)	0.06 ± 0.06 (1)	0.06 ± 0.03 (2)	0	–	10
<i>H. bermudensis</i> (blue angelfish)	0.38 ± 0.09 (4)	0.94 ± 30 (4)	0.38 ± 0.09 (6)	0	–	84
Holocentridae (squirrelfishes)	0	0.06 ± 0.06 (1)	0.02 ± 0.01 (1)	0	–	3
<i>Hyporthodus nigrurus</i> (Warsaw grouper)	0	0	0.01 ± 0.01 (1)	0	–	1
<i>Hyporthodus niveatus</i> (snowy grouper)	0.01 ± 0.01 (1)	0	0	0	–	1
Labridae (wrasses)	0.10 ± 0.10 (7)	0	0.12 ± 0.09 (10)	0	–	20
<i>Halichoeres</i> spp. (wrasses)	1.74 ± 0.43 (24)	4.65 ± 1.43 (18)	1.24 ± 0.27 (17)	0	–	339
<i>H. bathyphilus</i> (greenband wrasse)	0.19 ± 0.08 (4)	0.41 ± 0.29 (4)	0.63 ± 0.28 (23)	0	–	90
<i>H. pictus</i> (rainbow wrasse)	0.01 ± 0.01 (1)	0	0	0	–	1
<i>Thalassoma bifasciatum</i> (bluehead wrasse)	0	0	0.01 ± 0.01 (1)	0	–	1
<i>Lachnolaimus maximus</i> (hogfish)	0	0.06 ± 0.06 (1)	0.02 ± 0.01 (1)	0	–	3
<i>Lagodon rhomboides</i> (pinfish)	0.01 ± 0.01 (1)	0	0.01 ± 0.01 (1)	0	–	2
<i>Liopropoma eukrines</i> (wrasse bass)	0	0.06 ± 0.06 (1)	0.04 ± 0.02 (2)	0	$y = 0.0014x$	5
<i>Lutjanus analis</i> (mutton snapper)	0	0	0.01 ± 0.01 (1)	0	–	1
<i>Lutjanus campechanus</i> (red snapper)	4.88 ± 1.07 (56)	3.47 ± 1.39 (20)	1.95 ± 0.50 (28)	1.75 ± 1.75 (7)	–	630
<i>Lutjanus griseus</i> (grey snapper)	1.06 ± 0.35 (14)	1.12 ± 0.71 (11)	3.70 ± 0.81 (48)	13.50 ± 11.21 (47)	$y = -0.0492x + 5.2910$	552
<i>Lutjanus jocu</i> (dog snapper)	0.01 ± 0.01 (1)	0	0	0	–	1
<i>Lutjanus synagris</i> (lane snapper)	1.15 ± 1.04 (75)	1.35 ± 0.94 (16)	0.86 ± 0.22 (15)	2.50 ± 2.50 (10)	$y = -0.0418x + 3.1750$	210
Monacanthidae (filefishes & leatherjackets)	0.01 ± 0.01 (1)	0	0	0	$y = -0.0133x + 0.9459$	1
<i>Aluterus</i> spp. (leatherjackets)	0.32 ± 0.22 (15)	0.06 ± 0.06 (1)	0	0	–	24
<i>A. monoceros</i> (unicorn leatherjacket)	0.26 ± 0.11 (6)	0.18 ± 0.13 (2)	0.05 ± 0.03 (3)	0	$y = -0.0062x + 0.4545$	27
<i>Stephanolepis</i> spp. (filefish)	0.01 ± 0.01 (1)	0	0	0	–	1
Mullidae (Goatfishes)	0	0	0.17 ± 0.11 (10)	0	–	18

Table S8. (Continued)

Taxonomic & Common Names	WFS Panhandle		Peninsular WFS		Depth regression	Total
	IE & AR	LR	IE & LR	AR		
<i>Pseudupeneus maculatus</i> (spotted goatfish)	0	0	0.03 ± 0.03 (3)	0	–	3
<i>Muraena retifera</i> (reticulate moray)	0.03 ± 0.03 (2)	0	0	0	–	2
<i>Mycteroperca bonaci</i> (black grouper)	0	0	0.02 ± 0.01 (1)	0	–	2
<i>Mycteroperca microlepis</i> (gag)	0.29 ± 0.09 (4)	0.18 ± 0.18 (3)	0.14 ± 0.04 (3)	0	–	39
<i>Mycteroperca phenax</i> (scamp)	0.40 ± 0.19 (12)	1.12 ± 0.42 (6)	0.94 ± 0.22 (14)	0.25 ± 0.25 (1)	$y = 0.0307x - 0.8477$	151
<i>Ocyurus chrysurus</i> (yellowtail snapper)	0	0	0.28 ± 0.14 (13)	0	–	30
Ogcocephalidae (batfishes)	0.01 ± 0.01 (1)	0	0	0	–	1
Opistognathidae (jawfishes)	0.04 ± 0.03 (2)	0.12 ± 0.08 (1)	0.50 ± 0.14 (8)	0	–	60
Ostraciidae (boxfishes & cowfishes)	0.01 ± 0.01 (1)	0	0	0	–	1
<i>Pagrus pagrus</i> (red porgy)	1.90 ± 0.38 (15)	2.94 ± 0.67 (9)	1.22 ± 0.31 (21)	0	–	320
<i>Paradiplogrammus bairdi</i> (lancer dragonet)	0.01 ± 0.01 (1)	0.06 ± 0.06 (1)	0	0	–	2
<i>Pareques</i> spp. (cubbyu & highhats)	0	0.88 ± 0.88 (15)	0.43 ± 0.24 (20)	0	–	62
<i>P. umbrosus</i> (cubbyu)	0.04 ± 0.04 (3)	0	0.07 ± 0.07 (3)	0	–	11
Pleuronectiformes (flatfishes)	0.11 ± 0.06 (3)	0	0.05 ± 0.03 (3)	0	–	13
<i>Pomacanthus arcuatus</i> (gray angelfish)	0	0	0.17 ± 0.06 (3)	0	–	19
<i>Pomacanthus paru</i> (French angelfish)	0	0	0.01 ± 0.01 (1)	0	–	1
Pomacentridae (damsel-fishes)	0.22 ± 0.17 (12)	0.06 ± 0.06 (1)	1.37 ± 0.43 (32)	0	$y = 0.0349x$	166
<i>Chromis</i> spp. (damsel-fishes)	0	0.53 ± 0.31 (5)	0	0	–	9
<i>C. enchrysurus</i> (yellowtail reeffish)	0.15 ± 0.12 (8)	3.12 ± 2.63 (45)	0.37 ± 0.14 (10)	0	–	120
<i>C. scotti</i> (purple reeffish)	0	0	0.01 ± 0.01 (1)	0	–	1
<i>Stegastes</i> spp. (damsel-fishes)	0.03 ± 0.02 (1)	0	0.09 ± 0.04 (3)	0	–	7
<i>S. partitus</i> (bicolor damselfish)	0	0.01 ± 0.01 (1)	0	0.04 ± 0.03 (3)	–	5
<i>Pristigenys alta</i> (short bigeye)	0.06 ± 0.06 (4)	1.47 ± 0.65 (11)	0.12 ± 0.06 (5)	0	–	42
<i>Pristis pectinata</i> (smalltooth sawfish)	0	0	0.01 ± 0.01 (1)	0	–	1
<i>Prognathodes aya</i> (bank butterflyfish)	0	0.59 ± 0.32 (5)	0.05 ± 0.03 (2)	0	$y = 0.0017x$	15
<i>Ptereleotris</i> spp. (dartfishes)	0.10 ± 0.07 (5)	0.24 ± 0.24 (4)	0.15 ± 0.07 (6)	0	–	27
<i>Pterois</i> spp. (lionfishes)	3.83 ± 1.13 (78)	2.41 ± 0.38 (5)	3.06 ± 0.53 (43)	1.50 ± 1.50 (6)	–	657
<i>Rachycentron canadum</i> (cobia)	0.03 ± 0.02 (1)	0	0.01 ± 0.01 (1)	0	–	3
<i>Rhomboplites aurorubens</i> (vermillion snapper)	24.44 ± 6.97 (300)	5.76 ± 2.83 (36)	18.25 ± 4.42 (300)	3.50 ± 2.06 (8)	–	3861
<i>Rypticus maculatus</i> (whitespotted soapfish)	0.06 ± 0.04 (3)	0.18 ± 0.18 (3)	0.02 ± 0.02 (2)	0	$y = -0.0023x + 0.1656$	9
Scaridae (parrotfishes)	0	0	0.01 ± 0.01 (1)	0	–	1
<i>Sparisoma atomarium</i> (greenblotch parrotfish)	0	0	0.01 ± 0.01 (1)	0	–	1
Scombridae (mackerels)	0.18 ± 0.06 (2)	0.12 ± 0.12 (2)	0	0.75 ± 0.75 (3)	$y = -0.0055x + 0.3762$	18
Scombridae (tunas)	0.01 ± 0.01 (1)	0.24 ± 0.18 (3)	0.06 ± 0.03 (3)	2.25 ± 1.03 (5)	–	20
<i>Seriola dumerili</i> (greater amberjack)	2.76 ± 1.53 (109)	0	0.30 ± 0.09 (6)	0.75 ± 0.75 (3)	$y = -0.0654x + 4.5651$	235
<i>Seriola fasciata</i> (lesser amberjack)	0.01 ± 0.01 (1)	0.47 ± 0.26 (4)	0	0	–	9

Table S8. (Continued)

Taxonomic & Common Names	WFS Panhandle		Peninsular WFS		Depth regression	Total
	IE & AR	LR	IE & LR	AR		
<i>Seriola rivoliana</i> (almaco jack)	0.31 ± 0.09 (5)	0.06 ± 0.06 (1)	0.12 ± 0.05 (4)	0.25 ± 0.25 (1)	$y = -0.0054x + 0.4634$	37
<i>Serranus</i> spp. (Atlantic dwarf sea basses)	0.03 ± 0.03 (2)	0	0	0	$y = 0.0095x$	2
<i>S. annularis</i> (orangeback bass)	0	0	0.03 ± 0.02 (2)	0	–	3
<i>S. notospilus</i> (saddle bass)	0.03 ± 0.02 (1)	0	0.03 ± 0.02 (2)	0	–	5
<i>S. phoebe</i> (tattler)	0.15 ± 0.06 (3)	0.53 ± 0.26 (4)	0.27 ± 0.05 (3)	0.25 ± 0.25 (1)	$y = 0.0062x$	50
<i>S. subligarius</i> (belted sandfish)	0	0	0	0.25 ± 0.25 (1)	–	1
<i>S. tortugarum</i> (chalk bass)	0	0	0.09 ± 0.06 (5)	0	–	10
<i>Sphoeroides spengleri</i> (bandtail puffer)	0.14 ± 0.05 (3)	0	0.01 ± 0.01 (1)	0	–	11
<i>Sphyrna barracuda</i> (great barracuda)	0.01 ± 0.01 (1)	0	0.02 ± 0.01 (1)	0.75 ± 0.75 (3)	$y = -0.0016x + 0.1137$	6
<i>Sphyrna mokarran</i> (great hammerhead)	0	0.06 ± 0.06 (1)	0.01 ± 0.01 (1)	0	–	2
Synodontidae spp. (lizardfishes)	0.03 ± 0.02 (1)	0	0.08 ± 0.03 (1)	0	–	11
<i>Trachinotus falcatus</i> (permit)	0	0	0	0.25 ± 0.25 (1)	–	1
Triglidae (sea robins)	0.01 ± 0.01 (1)	0	0.01 ± 0.01 (1)	0	–	2
<i>Xyrichtys</i> spp. (razorfishes)	0.18 ± 0.08 (4)	0	0.06 ± 0.05 (5)	0	–	19
<i>X. novacula</i> (clever wrasse)	0.08 ± 0.05 (3)	0	0	0	–	6
<b>Total: 99 genera</b>						<b>22043</b>



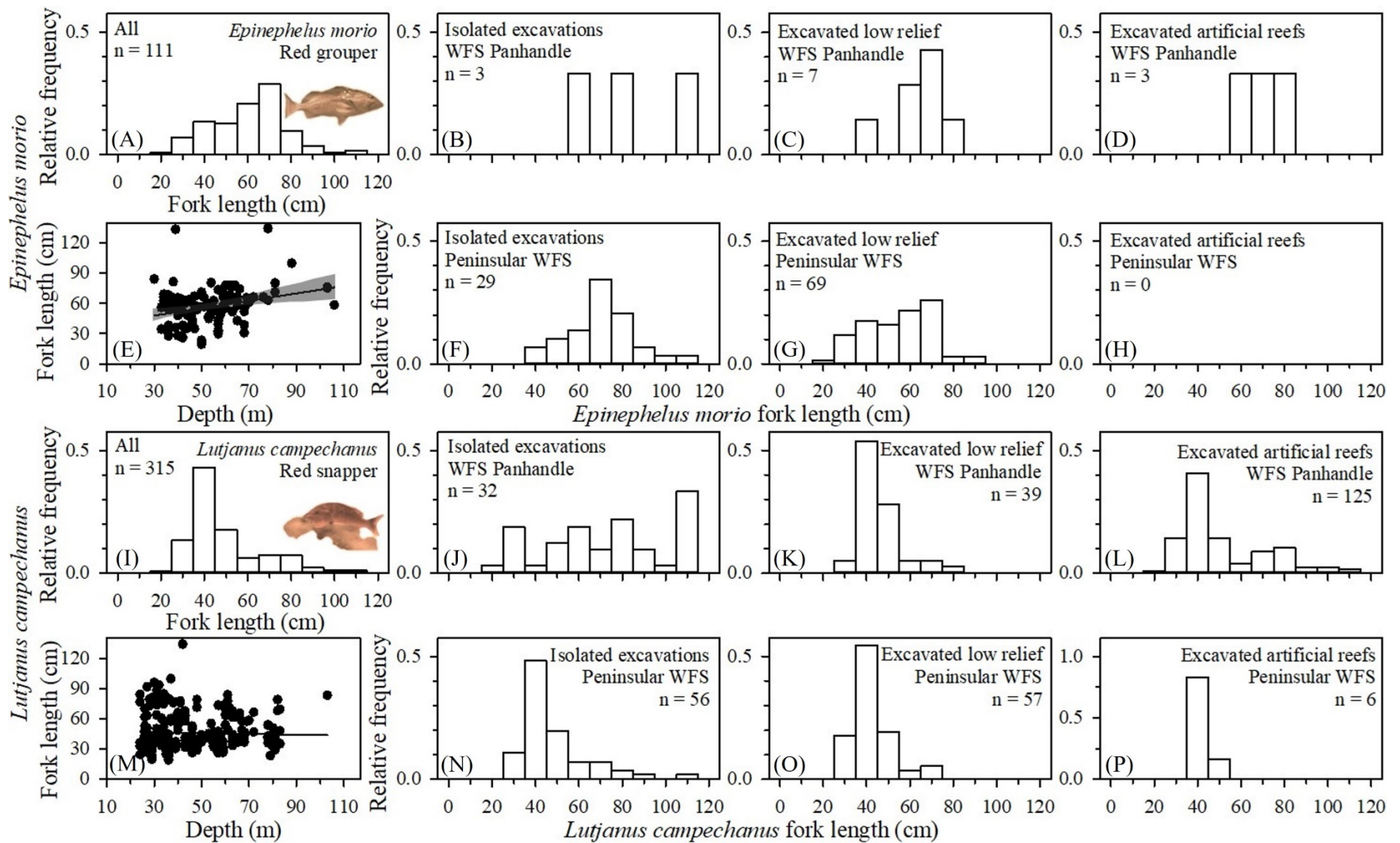


Fig. S1. Relative length frequencies of *Epinephelus morio* and *Lutjanus campechanus* from stereo video by West Florida Shelf (WFS) region (Panhandle and Peninsula), habitat (isolated excavations, excavated low relief, and excavated artificial reefs), and depth.