**Table S1 –** List of all species and their designated category (lionfish, fishery, or non-fishery) captured in experimental traps or observed on video during trap deployments on mesophotic natural reefs in the northeastern Gulf of Mexico.

|  |  |  |
| --- | --- | --- |
| **Category** | **Species** | **Common name** |
| Lionfish | *Pterois volitans* | Red lionfish |
| Fishery | *Balistes capriscus* | Gray triggerfish |
| Fishery | *Calamus proridens* | Littlehead porgy |
| Fishery | *Calamus nodosus* | Knobbed porgy |
| Fishery | *Cephalopholis cruentata* | Graysby grouper |
| Fishery | *Cephalopholis cruentatus* | Graysby |
| Fishery | *Epinephelus guttatus* | Red hind |
| Fishery | *Epinephelus morio* | Red grouper |
| Fishery | *Hyporthodus niveatus* | Snowy grouper |
| Fishery | *Lutjanus campechanus* | Red snapper |
| Fishery | *Lutjanus griseus* | Gray snapper |
| Fishery | *Lutjanus griseus* | Mangrove snapper |
| Fishery | *Lutjanus synagris* | Lane snapper |
| Fishery | *Mycteroperca microlepis* | Gag grouper |
| Fishery | *Mycteroperca phenax* | Scamp |
| Fishery | *Pagrus pagrus* | Red porgy |
| Fishery | *Rhomboplites aurorubens* | Vermilion snapper |
| Fishery | *Seriola dumerili* | Greater amberjack |
| Fishery | *Seriola rivoliana* | Almaco jack |
| Non-fishery | *Acanthostracion quadricornis* | Scrawled cowfish |
| Non-fishery | *Aluterus monoceros* | Unicorn filefish |
| Non-fishery | *Aluterus scriptus* | Scrawled filefish |
| Non-fishery | *Bathytoshia centroura* | Roughtail stingray |
| Non-fishery | *Bodianus pulchellus* | Spotfin hogfish |
| Non-fishery | *Bodianus rufus* | Spanish hogfish |
| Non-fishery | *Brotula barbata* | Atlantic bearded brotula |
| Non-fishery | *Calamus bajonado* | Jolthead porgy |
| Non-fishery | *Calamus leucosteus* | Whitebone porgy |
| Non-fishery | *Canthigaster rostrata* | Sharpnose puffer |
| Non-fishery | *Centropristis ocyurus* | Bank sea bass |
| Non-fishery | *Centropyge argi* | Cherubfish |
| Non-fishery | *Chaetodon aya* | Bank butterflyfish |
| Non-fishery | *Chaetodon ocellatus* | Spotfin butterflyfish |
| Non-fishery | *Chaetodon sedentarius* | Reef butterflyfish |
| Non-fishery | *Chelonia mydas* | Green turtle |
| Non-fishery | *Chilomycterus schoepfi* | Striped burrfish |
| Non-fishery | *Chromis enchrysura* | Yellowtail reeffish |
| Non-fishery | *Chromis cyanea* | Blue chromis |
| Non-fishery | *Diplectrum formosum* | Sand perch |
| Non-fishery | *Echeneis naucrates* | Sharksucker |
| Non-fishery | *Equetus lanceolatus* | Jacknife fish |
| Non-fishery | *Fistularia tabacaria* | Bluespotted cornetfish |
| Non-fishery | *Fowlerichthys ocellatus* | Ocellated frogfish |
| Non-fishery | *Gymnothorax moringa* | Spotted moray |
| Non-fishery | *Haemulon aurolineatum* | Tomtate |
| Non-fishery | *Halichoeres bathyphilus* | Greenband wrasse |
| Non-fishery | *Halichoeres bivittatus* | Slippery dick |
| Non-fishery | *Holacanthus bermudensis* | Blue angelfish |
| Non-fishery | *Holacanthus ciliaris* | Queen angelfish |
| Non-fishery | *Holocentrus adscensionis* | Squirrelfish |
| Non-fishery | *Hypanus americanus* | Southern stingray |
| Non-fishery | *Liopropoma eukrines* | Wrasse bass |
| Non-fishery | *Lutjanus vivanus* | Silk snapper |
| Non-fishery | *Malacanthus plumieri* | Sand tilefish |
| Non-fishery | *Microspathodon chrysurus* | Yellowtail damselfish |
| Non-fishery | *Muraena retifera* | Reticulate moray |
| Non-fishery | *Mustelus* sp. | Smooth hound |
| Non-fishery | *Ophidiidae* sp. | Cusk eel |
| Non-fishery | *Opsanus pardus* | Leopard toadfish |
| Non-fishery | *Paranthias furcifer* | Creolefish |
| Non-fishery | *Pareques acuminatus* | Highhat |
| Non-fishery | *Pareques iwamotoi* | Blackbar drum |
| Non-fishery | *Pareques umbrosus* | Cubbyu |
| Non-fishery | *Pomacentridae* | Damselfishes |
| Non-fishery | *Priacanthus arenatus* | Atlantic bigeye |
| Non-fishery | *Pristigenys alta* | Short Bigeye |
| Non-fishery | *Prognathodes aculeatus* | Longsnout butterflyfish |
| Non-fishery | *Rypticus maculatus* | Whitespotted soapfish |
| Non-fishery | *Sphoeroides spengleri* | Bandtail puffer |
| Non-fishery | *Stegastes leucostictus* | Beaugregory |
| Non-fishery | *Tattler bass* | Tattler bass |
| Non-fishery | *Triglidae* | Sea robins |

**Table S2 –** Totalcatches by trap type (lobster, seabass, or Gittings) and category (lionfish, fishery, or non-fishery) by species as number of individuals (n) and total biomass (kg). The ratio of lionfish biomass (LF) to the biomass of native fishes (NF) is indicated.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Trap type** | **Category** | **Species** | **n** | **Biomass (kg)** | **LF:NF** |
| Lobster |  |  |  |  |  |
| Lionfish | Lionfish | 8 | 3.02 | 1.00 |
| Fishery | Gray triggerfish | 44 | 68.55 | 22.70 |
| Red snapper | 18 | 21.94 | 7.27 |
| Red grouper | 2 | 4.54 | 1.50 |
| Scamp | 1 | 1.79 | 0.59 |
| ag | 1 | 1.56 | 0.52 |
| Lane snapper | 1 | 0.13 | 0.04 |
| Non-fishery | Blue angelfish | 1 | 0.38 | 0.13 |
| Atlantic bigeye | 1 | 0.36 | 0.12 |
| Cubbyu | 1 | 0.15 | 0.05 |
| Seabass |  |  |  |  |  |
| Lionfish | Lionfish | 7 | 2.40 | 1.00 |
| Fishery | Red snapper | 220 | 148.24 | 61.69 |
| Gray triggerfish | 127 | 111.40 | 46.36 |
| Lane snapper | 39 | 18.52 | 7.71 |
| Scamp | 21 | 14.24 | 5.93 |
| Red porgy | 18 | 8.70 | 3.62 |
| Graysby | 13 | 5.84 | 2.4 |
| *Calamus* sp. | 10 | 4.50 | 1.87 |
| Red grouper | 7 | 8.75 | 3.64 |
| Vermilion snapper | 7 | 3.10 | 1.29 |
| Gray snapper | 6 | 2.41 | 1.00 |
| Littlehead porgy | 2 | 1.28 | 0.53 |
| Knobbed porgy | 1 | 0.46 | 0.19 |
| Non-fishery | Blue angelfish | 26 | 11.33 | 4.71 |
| Leopard toadfish | 12 | 7.01 | 2.92 |
| Ocellated frogfish | 5 | 2.79 | 1.16 |
| Spotfin hogfish | 4 | 1.56 | 0.65 |
| Squirrelfish | 4 | 1.46 | 0.61 |
| Cubbyu | 4 | 0.71 | 0.29 |
| Spotted moray | 3 | 6.31 | 2.63 |
| Tomtate | 3 | 0.46 | 0.19 |
| Spotfin butterflyfish | 3 | 0.28 | 0.12 |
| Reef butterflyfish | 3 | 0.21 | 0.09 |
| Queen angelfish | 2 | 0.77 | 0.32 |
| Cusk eel | 1 | 1.91 | 0.79 |
| Atlantic bearded brotula | 1 | 0.97 | 0.40 |
| Silk snapper | 1 | 0.83 | 0.34 |
| White porgy | 1 | 0.67 | 0.28 |
| Creolefish | 1 | 0.45 | 0.19 |
| Bank butterflyfish | 1 | 0.05 | 0.02 |
|  |  |  |  |
| Gittings |  |  |  |  |  |
| Lionfish | Lionfish | 24 | 4.39 | 1.00 |
| Non-fishery | Jacknife fish | 2 | 0.16 | 0.04 |
| Stripped burrfish | 1 | 0.52 | 0.12 |
| Tattler | 1 | 0.08 | 0.02 |

 **Table S3 –** Analysis of deviance table for the zero-inflated negative binomial (ZINB) models used to assess the effects of trap deployment and reef site factors on catches of lionfish, fisheries species, and non-fisheries species. The chi-square test compared the deviance of the full model with all factors to the deviance of reduced models. The ZINB positive component assessed the effects of trap type (lobster, Gittings, sea bass), trap configuration (1, 2, 3, or 4 traps), soak time of traps at the given site (numeric days), lionfish density at the site, site depth (m), site relief (maximum reef height in m estimated from ROV surveys), and region (east or west). The ZINB binomial component assessed whether the deployment factors of trap type and trap configuration affected the probability of zero catches.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Response** | **Model** | **Factor** | **Df** | **Chisq** | **p value** |
| Lionfish CPUE | Positive (negative binomial) | Type | 2 | 1.75 | 0.417 |
| Configuration | 1 | 4.31 | **0.038** |
| Soak time | 1 | 1.06 | 0.304 |
| LF density | 1 | 0.77 | 0.379 |
| Depth | 1 | 1.18 | 0.278 |
| Relief | 1 | 0.05 | 0.820 |
| Region | 1 | 1.44 | 0.230 |
|  |  |  |  |  |
| Binomial (logistic) | Type | 2 | 11.13 | **0.004** |
| Configuration | 1 | 9.48 | **0.002** |
|  |  |  |  |  |  |
| Fishery CPUE | Positive (negative binomial) | Type | 2 | 12.81 | **<0.001** |
| Configuration | 1 | 0.97 | 0.324 |
| Soak time | 1 | 0.12 | 0.726 |
| LF density | 1 | 1.08 | 0.298 |
| Depth | 1 | 6.59 | **0.010** |
| Relief | 1 | 1.62 | 0.203 |
| Region | 1 | 1.26 | 0.262 |
|  |  |  |  |  |
| Binomial (logistic) | Type | 2 | 82.42 | **<0.001** |
| Configuration | 1 | 3.28 | 0.070 |
|  |  |  |  |  |  |
| Non-fishery species CPUE | Positive (negative binomial) | Type | 2 | 24.01 | **<0.001** |
| Configuration | 1 | 4.20 | **0.040** |
| Soak time | 1 | 2.28 | 0.131 |
| LF density | 1 | 2.05 | 0.152 |
| Depth | 1 | 1.50 | 0.221 |
| Relief | 1 | 0.95 | 0.330 |
| Region | 1 | 2.12 | 0.145 |
|  |  |  |  |  |
| Binomial (logistic) | Type | 2 | 62.26 | **<0.001** |
| Configuration | 1 | 9.95 | 0.002 |

**Table S4 –** Analysis of deviance table for the zero-inflated negative binomial (ZINB) model. The ZINB positive component assessed whether trap type, lionfish density, and diel period (dawn, midday, or dusk) had significant effects on **l**ionfish recruitment (i.e., in situ observation of fish within the trap structure during deployment) The ZINB binomial component assessed whether trap type or lionfish density affected the probability of zero lionfish counts. To account for repeated measures from videos taken during a given deployment at a reef site, reef site was included as a random effect

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Response** | **Model** | **Factor** | **Df** | **Chisq** | **p value** |
| Lionfish trap recruitment | Positive (negative binomial) | Trap type | 2 | 0.03 | 0.986 |
| Time of day | 2 | 11.34 | **0.003** |
| Lionfish density | 1 | 1.57 | 0.210 |
| Type : TOD | 4 | 5.82 | 0.213 |
| Type : LF density | 2 | 11.83 | **0.003** |
|  |  |  |  |  |
| Binomial (logistic) | Type | 2 | 13.06 | **0.001** |
| Lionfish density | 1 | 0.23 | 0.629 |