

SEACAR Nekton catch per unit effort

In order to analyze the various nekton datasets we must standardize the data to account for varying sampling methods and equipment. Fundamental differences between equipment requires nekton data to be split into 3 classifications (Trawls, Seines, Visual). For each of the net based samples we need to be able to calculate the total surface area sampled.

Summary of Nekton Programs

Effort Correction Possible	Id	Name
NA - Data Not Available	32	<u>32 : Gulf of Mexico States Shark Popping and Nursery Area (GULFSPAN)</u>
No	60	<u>60 : Southeast Area Monitoring and Assessment Program (SEAMAP) - Gulf of Mexico Fall & Summer Shrimp/Groundfish Survey</u>
See Prog. 60	62	<u>62 : Southeast Area Monitoring and Assessment Program (SEAMAP) - Gulf of Mexico Reef Fish Survey</u>
Yes	69	<u>69 : Fisheries-Independent Monitoring (FIM) Program</u>
No	115	<u>115 : Environmental Monitoring Assessment Program</u>
Yes	129	<u>129 : Apalachicola National Estuarine Research Reserve Juvenile Fish and Benthic Macroinvertebrate Monitoring</u>
See Prog. 60	520	<u>520 : Florida Southeast Area Monitoring and Assessment Program (SEAMAP) - Groundfish Surveys</u>
NA - Data Not Available	523	<u>523 : Florida Hooked Gear Marine Fish Surveys</u>
No (Visual)	899	<u>899 : USGS Coral Reef Ecosystem Studies (CREST) Project</u>
No (Traps)	965	<u>965 : South Florida Seagrass Fish and Invertebrate Assessment Network</u>
No	3004	<u>3004 : Guana Tolomato Matanzas NERR Nekton monitoring</u>
NA - Data Not Available	3027	<u>3027 : Species Monitoring</u>
Yes	4043	<u>4043 : RBNERR Fish Assessment</u>
No (Visual)	4050	<u>4050 : Integrated Biscayne Bay Ecological Assessment and Monitoring</u>
NA - Data Not Available	5003	<u>5003 : Flagler College Fisheries Monitoring in GTM NERR</u>

Trawls

Trawls are net sampling that is actively being towed by a vessel. To calculate the total surface area sampled during the trawl we need to know:

1. Size of the net being used (preferably actual net width while deployed)
2. One of the following.
 - a. Distance towed
 - b. Speed of tow and length of time of tow

Program 60 – **NO ACTUAL NET WIDTH WHILE TRAWLING WAS GIVEN** Many different net configurations and deployments. Data contains gear codes (net widths, heights, mesh etc.), speed of vessel and time net was fished.

Program 69 - 6.1m otter 10 minute trawl has an approximate opening of 4.0m while trawling (5 minute in rivers, 3 minutes in Indian River bay sampling). 0.2 nautical miles is target in Bays, 0.1nm in rivers,

0.07nm in IRBS. 1nm is 1852 meters so in bays approximately 1,482.4 m² is sampled, 741.2 m² in rivers and 518.56 m² in IRBS. **Bays effort correction is 14.824, Rivers correction is 7.412, IRBS correction is 5.1856**

Program 115 - **NO ACTUAL NET WIDTH WHILE TRAWLING WAS GIVEN** 6.1m otter 2-3 knts for 10 minutes effort = 30.887 (2.5knts is 1.28611m/s *600 (10 minutes) = 771.666m*4.0m = 3086.664m²/100 is an effort correction of 30.887) (assuming a net trawling width of 4.0m measured by Program 69)

Program 115 – **NO ACTUAL NET WIDTH WHILE TRAWLING WAS GIVEN** 4.9m otter 2-3 knts for 10 minutes (2.5knts is 1.28611m/s *600 (10 minutes) = 771.666m*4.5m =3472.497m²/100 is an effort correction of 34.725 (communication with program 129 indicated they estimate net opening as 4.5 m)

Program 115 – **NO ACTUAL NET WIDTH WHILE TRAWLING WAS GIVEN** 21.3m Center Bag 2-3 knts for 10 minutes (2.5knts is 1.28611m/s *600 (10 minutes) = 771.666m*18.91 m =14595.6 m²/100 is an effort correction of 145.956 (communication with program 129 indicated they estimate net opening as 4.5 m)

Program 129 – 4.9m otter each site has 5 -2 minute tows at each station at 1 m/s (120m) (communication with program indicated they estimate net opening as 4.5 m) 540m² per trawl gives an effort correction of **5.4**

Program 3004 – **NO ACTUAL NET WIDTH WHILE TRAWLING WAS GIVEN** 4.9m otter (3 replicate samples each towed at 2-3 knts for 2- minutes) effort correction of 6.9

Program 4043 – 6.1m otter 0.1nm towed (1,129.72 m²) effort **7.412**

Trawl and Seine Calculations

A. Species level

a. Individual species Abundance – count of each unique species in the trawl (3004)

- i. Data_69d_Final – For each “reference” and “scientificname” “ToatlCount”/”effort” will give species specific # / 100m²
- ii. Data_115_b_Final– For each unique “STA_NAME”, “DATE”, “TR_REP” and “COD_EMAP”, “ABUNDANC” gives total count of that species/41.67(6.1m net) or 34.725 (4.9m net),
- iii. Data_115_f_Final and Data_115_g_Final– For each unique “StationName”, “SamplingCollectionDate”, “ReplicateNumber” and “LatinName”, “Abundance” gives total count of that species/41.67(6.1m net) or 34.725 (4.9m net) or 145.956 (21.3m net)
- iv. Data_4043_Final – For each unique “LocationID”, “Month”, “Day”, “Year” and “Species”, “N” gives number of that species / 7.412 give number of that species per 100m²
- v. Data_129b_Final – For Each unique “Station”, “Date”, “Tow” and “GENSPE”, “Total” gives the abundance of each species/5.4 gives number of that species per 100m²

b. Catch per unit effort – total abundance/ number of tows with standard deviation (3004)

B. Trawl/Seine level

a. Species Richness – Count of unique species in trawl (3004)

- i. Data_69d_Final – For each “reference” Sum of unique “scientificname”/” effort” will give species richness per 100m² (Trawls and Seines)
- ii. Data_4043_Final – For each unique “LocationID”, “Month”, “Day”, “Year” a count of unique “Species”, where “N” is not 0 gives number of species / 7.412 give number of species per 100m²
- iii. Data_129b_Final – For Each unique “Station”, “Date”, “Tow” the count of unique “GENSPE”/5.4 gives number of species per 100m²

b. Species Diversity – Shannon Diversity Index, Natural log transformed (3004)

c. Species Evenness – Pielou’s Evenness (3004)

Seines

Seines are net sampling that is conducted either by hand or by vessel. To calculate the total surface area sampled during a seine net sampling we need to know:

1. Size of the net being used
2. Arrangement of net deployment (rectangle, circle)

Program 69 – 183m seine deployed net in a 40mx103m rectangle using the shoreline as the other side approximately 4,120 m². Deployed as a circle, 2,664.97m²

Program 69 – 21.3m seine Bay – deploys as a circle with a circumference of 21.3m covers an area of 36.1m²

Program 115 – 21.3m seine

Visual

Visual survey are conducted by divers using either a stationary point count in a “column” or along a predetermined transect. To calculate the total surface area sampled in a visual survey we need to know:

1. Length of transect
2. Width of transect
3. Radius or other measure of column
4. Length of time of observation

Program 899 – belt transect – 2m wide, 10m transects = 20m²

Data_899g_final for each "Site_ID" and "Transect_ID" and "Parrotfish_taxon", "Density_per_100m²" gives the calculated number of that taxon per 100m²

Program 915 – belt transect – 2m wide, 10m transects = 20m² (dataset should have diadema counts on transect (I do not see it in data) and we have 915b that has fish species but no mention in any of the protocols of nekton)

Program 4050 –transect – 30 meters, 2m wide =60m²

Program 4050 – Throw trap 1m² 3 throws per site

Program 3022 – column – 7.5 m radius or 4.0 m radius depending on visibility from substrate to surface or the limits of vertical visibility 5- minutes for first list, another 5 minutes for second list, can add species up to 15 minutes

Program 3024 – stationary -column 15m diameter for 10 minutes from substrate to surface

Program 3024 – roving – 20-45 minutes "across entire reef"

Program 5034 – column 7.5 m radius or 4.0 m radius depending on visibility from substrate to surface or the limits of vertical visibility 5- minutes for first list, another 5 minutes for second list, can add species up to 15 minutes

Traps

Fish traps are a physical enclosure used to isolate organisms for sampling where the trap is deployed over substrate followed by divers removing the trapped organisms. The total surface area sampled in throw traps is the dimensions of the physical trap.

Program 965 – Throw trap 1m². In dataset, "sweep" should be summed per "grid-cell" and "site_num"