Appendix I6

Nekton Raw Data Source Description

Lower Hillsborough River Recovery Strategy Master Nekton Data README

Southwest Florida Water Management District

Last Compiled on: 2024-08-13

Summary

This document summarizes the nekton data used to construct the nekton master dataset for the Lower Hillsborough River (LHR) for the period of January 1, 1996 to December 31, 2023, as part of the Task 2 data deliverable, for Task Work Order 22TW0003992.

This document is produced using R software code that reads in datasets provided by the District as well as additional data found by Frydenborg Ecologic LLC, and combines the data into a master dataset.

README documentation is provided within each section, divided by data source, within this file.

Johnson, Mirmiran, & Thompson (JMT)

File Name: /JMT/Nekton/JMT_nekton_FrEco.xlsx

This is a spreadsheet of nekton species collected by net by JMT between 2020 and 2023.

The source for this data is Data/JMT/Nekton in SharePoint.

The seven individual excel spreadsheets were combined manually (copy paste to single document). These files were:

- Nekton_2020_Fall_Data_Revised
- Nekton_2020_Spring_Data_Revised
- Nekton_2021_Spring_Data
- Nekton_2022_Spring_Data
- Nekton_2023_Spring_Data
- Nekton_2023_Summer_Data
- Nekton_2023_Winter_Data

The JMT_nekton_FrEco.xlsx file has a tab for per_m2 and for individual counts.

These data were last modified 06/26/2024 downloaded 06/26/2024.

Data are provided as counts of species identified to lowest practical taxonomic unit, along with a sampling effort in square meters of net. Sampling effort was calculated following FIM handbook, and then used to convert to number per m2.

Summary Statistics:

source	n site-dates	n dates	n sites	n taxa
JMT	42	7	6	45

Tampa Bay Water

File Name: /TBW_HBMP/Data_Download_20230815/Fish/HBMP Fish Archive Database 20191204.accs

This is a Microsoft Access database of data collected by the Tampa Bay Water Hydro-Biological Monitoring Program. This data collection was conducted from June 2000 through June 2011 in the Hillsborough River and several other tributaries and embayments in eastern Tampa Bay, Florida.

The source for this data is Data/TBW_HBMP/Data_Download_20230815/Fish in SharePoint.

The following database sheets were exported from the database as xlsx files and then read into R:

- HBMP_Fish_Abundance
- HBMP_Fish_Deployment
- HBMP_Fish_Taxonomy

These data were last modified 9/25/2023 and downloaded from the project SharePoint data repository on 11/06/2023.

Data are provided as counts of species identified to lowest practical taxonomic unit.

Netting/trawling was used for collection. For shallow areas, a 21.3 m long net was deployed a variable amount (typically 0.7 meters). For deeper sites, a tow of approximately 0.1 nautical miles was performed using a 8 meter net.

Sampling effort was determined following the FIM sampling handbook. A sampling effort was determined for both sites collected via seine and trawl, and multiple events (same site, date, method) were summed, following FIM methods.

Sites (using associated latitude/longitude) were joined within QGIS to study area (GIS layer provided by the WMD). A csv file of sites (/FrEco/TBW_HBMP_nekton_stations_segment.csv) was brought into R and joined to taxa data. Data outside of the Hillsborough River were discarded.

Summary Statistics:

source	n site-dates	n dates	n sites	n taxa
TBW HBMP	2680	166	2430	157

Water and Air Research, Inc. (WAR)

File Name: /WAR/Second_FiveYear_Assess/Biology/Nekton 30 Day No Flow w WQ.xlsx

This is a spreadsheet of benthic species collected by TBW/HBMP from 2000-2011 and reduced to days of no flow over the dam, as well as the data collected by WAR in 2018. This data sheet contains duplicates, and the data are not included in the master data set.

The source for this data is Data/WAR/Second_FiveYear_Assess/Biology in SharePoint.

These data were last modified 9/05/2023 and downloaded from the project SharePoint data repository on 9/23/2023.

Data are provided as counts of species identified to lowest practical taxonomic unit as well as counts per 100 m^2.

File Name: Appendix E Nekton Count Data.xlsx

This is a spreadsheet of nekton collected by WAR in 2018.

The source for this data is Data/WAR/Bio_2018 in SharePoint.

These data were last modified 9/05/2023 and downloaded 9/06/2023.

Data were provided as counts, and FIM SOP was used to standardize to produce a density.

Summary Statistics:

source	n site-dates	n dates	n sites	n taxa
WAR	12	2	6	33

FIM

File Name: /FIM/LHR_lower_totaltaxa_phys.csv, /FIM/LHR_middle_totaltaxa_phys.csv, /FIM/LHR_upper_totaltaxa_phys.csv

These are three spreadsheets of nekton species collected between 2000 and 2012 by FWC, and are duplicate records of data in the TBW HBMP database.

The source for these data is Data/FIM in SharePoint.

These data were last modified 9/05/2023 and downloaded from the project SharePoint data repository on 11/15/2023.

Data are provided as counts of species identified to lowest practical taxonomic unit.

Additional Data

No additional data from the FDEP Statewide Biological Database could be used. EPC data was phytoplankton only and was not included. Flannery did not collect nekton.

Morris Bridge Sink Data

File Name: /FrEco/MBS_consolidated_bio.xlsx

Nekton data from yearly sampling PDF reports were extracted and placed into a consolidated excel file, and added to the master data set.

Combine and Export Master Dataset

Combining of Data Sets

Each data set was manipulated within R to have columns of:

- Date - the date of observation
- Year - the year of observation
- River Segment - Upper, Middle, Lower, Downstream
- MFL Period - the MFL implementation period
- Site - the distinct site identifier
- Final Taxa - the synonomyzed taxa name
- n - the number observed
- result_100m2 - the number standardized by effort
- Source - the source of the data
- Salinity Tolerance - literature associated values of salinity for taxa
- sampling effort - the sampling effort (m2)
- Location - LHR River or Morris Bridge Sink
- datatype - qualitative or quantitative
- Seine - whether or not a seine was used for collection

The data sets were then combined into one file using bind_rows().

Species synonomy

File Name: FrEco/Master_nekton_for_synon.xlsx

The preliminary Master data set was used to create a distinct table of taxa. These were manually examined for duplicates (misspellings, etc). A look up table was created based on that exercise and used to finalize species names.

This document uses the final species list for all summary/descriptive statistics of the combined data.

Distinct Nekton Species

Final Taxa
Achirus lineatus
Adinia xenica
Albula vulpes
Alpheidae
Ameiurus catus
Ameiurus natalis
Ameiurus nebulosus
Amia calva
Anchoa hepsetus
Anchoa mitchilli
Anchoa sp.
Apalone ferox
Archosargus probatocephalus
Arias felis
Ariopsis felis
Bagre marinus
Bairdiella chrysoura
Bathygobius soporator
Brevoortia sp.
Callinectes sapidus
Caranx hippos
Centropomus undecimalis
Chaetodipterus faber
Chasmodes saburrae

Final Taxa
Chelydra serpentina osceola
Chilomycterus schoepfii
Chloroscombrus chrysurus
Cichlasoma managuense
Cichlasoma salvini
Cichlasoma sp.
Cichlasoma urophthalmus
Clupeidae sp.
Ctenogobius smaragdus
Cynoscion arenarius
Cynoscion nebulosus
Cyprinidae sp. (likely Opsopoeodus)
Cyprinodon variegatus
Dasyatis sabina
Dasyatis say
Diplodus holbrookii
Dormitator maculatus
Dorosoma cepedianum
Dorosoma petenense
Dorosoma sp.
Echeneis naucrates
Elops saurus
Etheostoma fusiforme
Eucinostomus gula
Eucinostomus harengulus
Eucinostomus sp.
Eugerres plumieri
Farfantepenaeus duorarum
Floridichthys carpio
Fundulus chrysotus
Fundulus confluentus
Fundulus grandis
Fundulus seminolis
Fundulus similis
Fundulus sp.

Final Taxa
Gambusia holbrooki
Gobiesox strumosus
Gobiosoma bosc
Gobiosoma longipala
Gobiosoma robustum
Gobiosoma sp.
Gymnura micrura
Harengula jaguana
Hemicaranx amblyrhynchus
Heterandria formosa
Hypsoblennius hentz
Ictalurus punctatus
Labidesthes sicculus
Labidesthes vanhyningi
Lagodon rhomboides
Leiostomus xanthurus
Lepisosteus osseus
Lepisosteus platyrhincus
Lepisosteus sp.
Lepomis auritus
Lepomis gulosus
Lepomis macrochirus
Lepomis macrochirus x L. microlophus
Lepomis marginatus
Lepomis microlophus
Lepomis punctatus
Lepomis sp.
Limulus polyphemus
Lophogobius cyprinoides
Loricariidae sp.
Lucania goodei
Lucania parva
Lupinoblennius nicholsi
Lutjanus griseus
Lysmata amboinensis

Final Taxa
Mayaheros urophthalmus
Membras martinica
Menidia beryllina
Menidia sp.
Menippe mercenaria
Menippe sp.
Menticirrhus americanus
Menticirrhus saxatilis
Menticirrhus sp.
Microgobius gulosus
Microgobius thalassinus
Micropogonias undulatus
Micropterus salmoides
Mugil cephalus
Mugil curema
Mugil sp.
Mugil trichodon
No fish
Notemigonus crysoleucas
Notropis maculatus
Notropis petersoni
Notropis sp.
Oligoplites saurus
Opisthonema oglinum
Opsanus beta
Oreochromis aureus
Oreochromis sp.
Oreochromis/Sarotherodon spp.
Orthopristis chrysoptera
Palaemon floridanus
Palaemonetes intermedius
Palaemonetes paludosus
Palaemonetes pugio
Palaemonetes sp.
Paralichthys albigutta

Final Taxa
Penaeid sp.
Periclimenes longicaudatus
Poecilia latipinna
Pogonias cromis
Pomatomus saltatrix
Pomoxis nigromaculatus
Portunus sp.
Prionotus scitulus
Prionotus tribulus
Pseudemys nelsoni
Pseudemys peninsularis
Pseudemys sp.
Pterygoplichthys disjunctivus
Pterygoplichthys multiradiatus
Pterygoplichthys sp.
Rhinoptera bonasus
Sardinella aurita
Sarotherodon melanotheron
Sciaenops ocellatus
Sphoeroides nephelus
Stephanolepis hispidus
Sternotherus odoratus
Strongylura marina
Strongylura notata
Strongylura sp.
Strongylura timucu
Symphurus plagiusa
Syngnathus floridae
Syngnathus louisianae
Syngnathus scovelli
Synodus foetens
Tilapia sp.
Trachemys scripta
Trinectes maculatus
Unidentified species

Final Taxa
Urophycis floridana
Xiphophorus sp.

Master Nekton Data

File Name: Master_nekton_Data.csv

This master data set is to be used for all taxa analyses.

The Final Master Nekton data set was output as a csv file titled Master_nekton_Data.csv and also saved as an RSD file.

Summary Statistics:

source	n site-dates	n dates	n sites	n taxa
Master	2762	182	2440	166