# NEFSC-Fishery

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```r
PKG <- c(# devtools::install_github("emilymarkowitz-NOAA/FishEconProdOutput", force = TRUE)
    "FishEconProdOutput",

    #Seperating species by taxonomic group
    "taxize",  # install.packages("remotes"); remotes::install_github("ropensci/taxize")

    # Data Managment
    "tidyverse",
    "filesstrings",
    "data.table",
    "plyr",
    "rlist",

    # #RMarkdown
    "rmarkdown",
    "ggpubr",
    "kableExtra",

    #Excel File Management
    "xlsx",
    "readxl"
)

for (p in PKG) {
  if(!require(p,character.only = TRUE)) {
    install.packages(p)
    require(p,character.only = TRUE)}
}
```

# Northeast Commerical Fisheries Productivity Output Tables

## 1. Set knowns

```
# Define what regions we are interested in
reg_order = c("Northeast")
reg_order_abbrv = c("NorE")

# Define Category
category0 = "category"

# Define Years
maxyr <- 2018
minyr <- 2007 #of data going into the analysis
baseyr <- minyr
```

# 2. Set your Directories where you will save everything

```
dir.in<-getwd()
#Local Directories
dir_outputtables<-paste0(dir.in, "/output/")
dir.create(dir_outputtables)

# Folder name for output
folder<-"Northeast"
titleadd = paste0(minyr, "To", maxyr, "_NorE")
counter<-0

# Define Directories
dir_analyses = paste0(dir_outputtables, folder)
dir.create(dir_analyses)
```

# 3. Load example data

## Commercial Data

```
counter<-0
landings_data<-FishEconProdOutput::land
landings_data<-landings_data[landings_data$Region %in% c("New England", "Mid-Atlantic"),]
landings_data$Region<-"Northeast"

knitr::kable(head(landings_data), booktabs = T) %>%
  kable_styling(latex_options = "striped")
```

|    | Year | Pounds | Dollars | category | Tsn | State | Region | abbvreg |
|----|------|--------|---------|----------|------|-----------|-----------|---------|
| 14 | 2005 | 15 | 30 | Shellfish | 83677 | Maryland | Northeast | MA |
| 15 | 2004 | 3 | 2 | Shellfish | 83677 | New Jersey | Northeast | MA |
| 16 | 2006 | 37 | 28 | Shellfish | 83677 | New Jersey | Northeast | MA |
| 17 | 2004 | 611 | 393 | Shellfish | 83677 | New York | Northeast | MA |
| 18 | 2005 | 1268 | 1154 | Shellfish | 83677 | New York | Northeast | MA |

| | Year | Pounds | Dollars | category | Tsn | State | Region | abbvreg |
|---|---|---|---|---|---|---|---|---|
| 19 | 2005 | 14183 | 6323 | Shellfish | 83677 | Maine | Northeast | NE |

# Northeast Data

| code | plan | name |
|---|---|---|
| 23 | BF | Bluefish |
| 352 | DF | Spiny Dogfish |
| 81 | GFISH | Atlantic Cod |
| 120 | GFISH | Winter Flounder |
| 122 | GFISH | Witch Flounder |
| 123 | GFISH | Yellowtail Flounder |
| 124 | GFISH | American Plaice Flounder |
| 125 | GFISH | Sand Dab Flounder |
| 147 | GFISH | Atlantic Haddock |
| 153 | GFISH | White Hake |
| 159 | GFISH | Atlantic Halibut |
| 240 | GFISH | Redfish |
| 250 | GFISH | Ocean Pout |
| 269 | GFISH | Pollock |
| 512 | GFISH | Wolffish |
| 168 | HER | Atlantic Herring |
| 12 | MONK | Monkfish |
| 710 | RCRAB | Red Crab |
| 800 | SCAL | Sea Scallop |
| 754 | SCOQ | Ocean Quahog |
| 769 | SCOQ | Surf clam |
| 121 | SF | Summer Flounder |
| 329 | SF | Scup |
| 335 | SF | Black Sea Bass |

| code | plan | name |
| --- | --- | --- |
| 364 | SKATE | Rosette Skate |
| 365 | SKATE | Skates |
| 366 | SKATE | Little Skate |
| 367 | SKATE | Winter Skate |
| 368 | SKATE | Barndoor Skate |
| 369 | SKATE | Smooth Skate |
| 370 | SKATE | Thorny Skate |
| 372 | SKATE | Clearnose Skate |
| 51 | SMB | Butterfish |
| 212 | SMB | Atlantic Mackerel |
| 801 | SMB | Loligo Squid |
| 802 | SMB | Illex Squid |
| 152 | SMESH | Red Hake |
| 508 | SMESH | Offshore Hake |
| 509 | SMESH | Silver Hake |
| 444 | TF | Blueline Tilefish |
| 446 | TF | Golden Tilefish |

## Find TSN numbers and categorize

```
spcat.list<-list('Bluefish' = 168559, # Species Pomatomus saltatrix (Linnaeus, 1766) – bluefish, anjova
            'Spiny dogfish' = 160617, #Species Squalus acanthias Linnaeus, 1758 – cazón espinoso comú
n, piked dogfish, spiny dogfish, galludo espinoso, aiguillat commun, dogfish, grayfish, spurdog
            'Atlantic Cod' = 164712, # Species Gadus morhua Linnaeus, 1758 – morue de l'Atlantique, ba
calao del Atlántico, cod, rock cod, morue franche, Atlantic cod
            'Summer flounder' = 172735, #Species   Paralichthys dentatus (Linnaeus, 1766) – summer flo
under, fluke, cardeau d'été, Summer Flounder
            'Winter Flounder' = 172905, # Species  Pseudopleuronectes americanus (Walbaum, 1792) – pli
e rouge, blackback, Georges Bank flounder, lemon sole, rough flounder, winter flounder, Winter Flounder
            'Witch Flounder' = 172873, #Species    Glyptocephalus cynoglossus (Linnaeus, 1758) – witch
flounder, gray sole, plie grise, Witch Flounder
            'Yellowtail Flounder' = 172909, #Species   Limanda ferruginea (Storer, 1839) – limande à q
ueue jaune, rusty flounder, yellowtail flounder, Yellowtail Flounder
            'American Plaice Flounder' = 172877, # Species Hippoglossoides platessoides (Fabricius, 17
80) – American plaice, plie canadienne, American dab, Canadian plaice, dab, American Plaice
            'Sand Dab Flounder' = 172746, #Species Scophthalmus aquosus (Mitchill, 1815) – windowpane,
brill, sand dab, spotted flounder, turbot de sable, Windowpane
            'Atlantic haddock' = 164744, # Species Melanogrammus aeglefinus (Linnaeus, 1758) – haddoc
k, aiglefin
            'White hake' = 164732, # Species   Urophycis tenuis (Mitchill, 1814) – white hake, mud hak
e, merluche blanche
            'Red hake' = c(164730 #  Species   Urophycis chuss (Walbaum, 1792) – red hake, squirrel ha
ke, merluche-écureuil
            ),#164729), # Genus    Urophycis Gill, 1863 – codlings # Toledo, includes other hake
            'Silver hake' = c(164791 #Species  Merluccius bilinearis (Mitchill, 1814) – silver hake, m
erlu argenté
            ), # 164790), # Genus  Merluccius Rafinesque, 1810 – hakes # Toledo, includes other hake
            'Skates' = 160845, # Family    Rajidae Blainville, 1816 – rayas, rays, skates, raies
            "Rosette skate" = 564136,# Species Leucoraja garmani (Whitley, 1939) – rosette skate
            'Little Skate' = 564130,#Species   Leucoraja erinacea (Mitchill, 1825) – raie-hérisson, co
mmon skate, little skate, summer skate
            'Winter Skate' = 564145,#Species   Leucoraja ocellata (Mitchill, 1815) – raie tachetée, bi
g skate, eyed skate, winter skate
            'Barndoor Skate' = 564139,#Species Dipturus laevis (Mitchill, 1818) – grande raie, barndoo
r skate
            'Smooth Skate' = 564151,# Species  Malacoraja senta (Garman, 1885) – raie à queue de velou
rs, smooth skate
            'Thorny Skate' = 564149,#Species   Amblyraja radiata (Donovan, 1808) – raie épineuse, star
ry skate, thorny skate
            'Clearnose Skate' = 160855,#Species    Raja eglanteria Bosc in Lacepède, 1800 – raya naric
ita, clearnose skate
            'Loligo squid' = 82370, # Genus    Loligo Lamarck, 1798
            'Illex Squid' = 82520, # Genus Illex Steenstrup, 1880
            'Ocean pout' = 630979, # Species   Zoarces americanus (Bloch and Schneider, 1801) – ocean
 pout, loquette d'Amérique
            'Atlantic mackerel' = 172414, #Species Scomber scombrus Linnaeus, 1758 – caballa del Atlán
tico, maquereau commun, maquereau bleu, Atlantic mackerel
            'Atlantic pollock' = 164727, #Species  Pollachius virens (Linnaeus, 1758) – pollock, coalf
ish, carbonero, lieu noir, saithe, goberge
            'Atlantic Wolffish' = 171336, # Genus  Anarhichas Linnaeus, 1758 – Atlantic wolffishes
            'Black sea bass' = 167687, # Species   Centropristis striata (Linnaeus, 1758) – black sea
 bass
            'Scups' = 169181, # Genus  Stenotomus Gill, 1865
            'Butterfish' = 172567, # Species   Peprilus triacanthus (Peck, 1804) – palometa estrecha,
 butterfish, stromatée à fossettes
            'Blueline Tilefish' = 168543, #  Species   Caulolatilus microps Goode and Bean, 1878 – blu
eline tilefish, blanquillo lucio
            'Golden Tilefish' = 168546, # Species  Lopholatilus chamaeleonticeps Goode and Bean, 1879
 – blue tilefish, tilefish, conejo amarillo
            'Monkfish' = 164499 , #Species Lophius americanus Valenciennes in Cuvier and Valenciennes,
1837 – goosefish, monkfish, baudroie d'Amérique
            'Acadian Redfish' = 166774, # Species  Sebastes fasciatus Storer, 1854 – Acadian redfish,
 Labrador redfish, Acadian rockfish, sébaste acadien
```

```r
                  'Atlantic Herring' = 161722, # Species Clupea harengus Linnaeus, 1758 – Baltic herring, he
    rring, hareng atlantique, Atlantic herring

                  'Atlantic surf clam' = 80944, #Species Spisula solidissima (Dillwyn, 1817) – Atlantic surf
    clam
                  'Offshore Hake' = 164793, # Species    Merluccius albidus (Mitchill, 1818) – offshore hak
    e, offshore whiting
                  'Ocean quahog clam' = 81343, # Species Arctica islandica (Linnaeus, 1767) – ocean quahog
                  'Red Crab' = 620992, # Species Chaceon quinquedens (S. I. Smith, 1879) – red deepsea crab
                  'Sea scallop' = 79718, #Species    Placopecten magellanicus (Gmelin, 1791) – sea scallop
                  'Atlantic halibut' = 172933 # Species  Hippoglossus hippoglossus (Linnaeus, 1758) – Atlant
    ic halibut, flétan atlantique, Atlantic Halibut
)

spcat<-c()

for (i in 1:nrow(ne_spp)) {
  spcat<-c(spcat,
          ifelse(sum(grepl(pattern = ne_spp$name[i], x = names(spcat.list) , ignore.case = T)) == 0,
                  NA, grep(pattern = ne_spp$name[i], x = names(spcat.list), ignore.case = T) ))
}

ne_spp$TSN<-as.numeric(unlist(spcat.list[spcat]))

categories<-list()
for (i in 1:length(unique(ne_spp$plan))) {
  categories[i]<-list(ne_spp$TSN[ne_spp$plan %in% unique(ne_spp$plan)[i]])
  names(categories)[i]<-unique(ne_spp$plan)[i]
}



temp<-itis_reclassify(tsn = unique(landings_data$Tsn),
                      categories = categories,
                      missing_name="Uncategorized")



tsn_id<-temp[1][[1]]

if (sum(tsn_id$category %in% c("Other", "Uncategorized"))>0) {
  tsn_id<-tsn_id[!(tsn_id$category %in% c("Other", "Uncategorized")),
                c("TSN", "category")]
}

landings_data<-dplyr::rename(landings_data,
              TSN = Tsn)

tsn_id$TSN<-as.numeric(tsn_id$TSN)

landings_data<-dplyr::left_join(x = landings_data,
                    y = tsn_id,
                    by = "TSN")

landings_data<-dplyr::rename(landings_data,
              Tsn = TSN,
              category = category.y)

landings_data<-landings_data[landings_data$Year>=minyr & landings_data$Year<=maxyr,
      c("Year","Pounds","Dollars","category","Tsn", "State", "Region", "abbvreg")]
```

```
landings_data<-landings_data[(landings_data$Pounds>=0), ]
landings_data<-landings_data[(landings_data$Dollars>=0), ]

knitr::kable(head(landings_data), booktabs = T) %>%
  kable_styling(latex_options = "striped")
```

| | Year | Pounds | Dollars | category | Tsn | State | Region | abbvreg |
|---|---|---|---|---|---|---|---|---|
| 7056 | 2018 | 18898 | 17008 | GFISH | 11272 | Rhode Island | Northeast | NE |
| 7057 | 2018 | 18898 | 17008 | SCOQ | 11272 | Rhode Island | Northeast | NE |
| 7058 | 2018 | 18898 | 17008 | SF | 11272 | Rhode Island | Northeast | NE |
| 7059 | 2018 | 18898 | 17008 | SKATE | 11272 | Rhode Island | Northeast | NE |
| 7060 | 2018 | 18898 | 17008 | SMB | 11272 | Rhode Island | Northeast | NE |
| 7061 | 2018 | 18898 | 17008 | SMESH | 11272 | Rhode Island | Northeast | NE |

# 4. Run Analysis

```
out <- OutputAnalysis(landings_data = landings_data,
                category0 = "category",
                baseyr = baseyr,
                titleadd = titleadd,
                dir_analyses = dir_analyses,
                skipplots = TRUE,
                reg_order = "Northeast",
                reg_order_abbrv = "NorE",
                save_outputs_to_file = FALSE)
#> [1] "Northeast"
#> [1] "Create spreadsheets"
#> [1] "Create plots"
names(out)
#> [1] "warnings_list"    "editeddata_list"  "index_list"      "spp_list"
#> [5] "figures_list"     "gridfigures_list"

for (jjj in 1:length(out)) {
  assign(names(out)[jjj], out[[jjj]])
}
```

# 5. Show Tables

```r
result <- lapply(index_list, "[", , c("Year", "cat", "PI_CB", "Q_CB", "v"))
a<-result$Northeast
a<-a[a$Year %in% minyr:maxyr, ]


a<-dplyr::rename(a,
                 PI = PI_CB,
                 Q = Q_CB,
                 V = v)


# temp_code
a.pi<-spread(a[!(names(a) %in% c("V", "Q"))], cat, PI)
names(a.pi)[-1]<-paste0(names(a.pi)[-1], "_PI")
a.q<-spread(a[!(names(a) %in% c("PI", "V"))], cat, Q)
names(a.q)[-1]<-paste0(names(a.q)[-1], "_Q")
a.v<-spread(a[!(names(a) %in% c("PI", "Q"))], cat, V)
names(a.v)[-1]<-paste0(names(a.v)[-1], "_V")


b<-left_join(a.pi, a.q, by = c("Year"))
b<-left_join(b, a.v, by = c("Year"))



b<-b[,match(x = c("Year",
                  names(b)[grep(pattern = "_V", x = names(b), ignore.case = T)],
                  names(b)[grep(pattern = "_PI", x = names(b), ignore.case = T)],
                  names(b)[grep(pattern = "_Q", x = names(b), ignore.case = T)]),
            names(b))]


b<-b[,match(x = c("Year",
                  names(b)[grep(pattern = "fin", x = names(b), ignore.case = T)],
                  names(b)[grep(pattern = "Shell", x = names(b), ignore.case = T)],
                  names(b)[grep(pattern = "Total", x = names(b))]),
            names(b))]

b<-b[b$Year %in% minyr:maxyr, ]
temp_code<-b
temp_code$Footnotes<-NA



# temp_print
b<-a
b$PI<-round(x = b$PI, digits = 2)
b$Q<-prettyNum(x = round(x = b$Q/1e6), digits = 2, big.mark = ",")
b$V<-prettyNum(x = round(x = b$V/1e6), digits = 2, big.mark = ",")

b.pi<-spread(b[!(names(b) %in% c("V", "Q"))], cat, PI)
names(b.pi)[-1]<-paste0(names(b.pi)[-1], "_PI")
b.q<-spread(b[!(names(b) %in% c("PI", "V"))], cat, Q)
names(b.q)[-1]<-paste0(names(b.q)[-1], "_Q")
b.v<-spread(b[!(names(b) %in% c("PI", "Q"))], cat, V)
names(b.v)[-1]<-paste0(names(b.v)[-1], "_V")

b<-left_join(b.pi, b.q, by = c("Year"))
b<-left_join(b, b.v, by = c("Year"))

b<-b[,match(x = c("Year",
                  names(b)[grep(pattern = "_V", x = names(b), ignore.case = T)],
                  names(b)[grep(pattern = "_PI", x = names(b), ignore.case = T)],
                  names(b)[grep(pattern = "_Q", x = names(b), ignore.case = T)]),
```

```
            names(b))]

b<-b[,match(x = c("Year",
              names(b)[grep(pattern = "fin", x = names(b), ignore.case = T)],
              names(b)[grep(pattern = "Shell", x = names(b), ignore.case = T)],
              names(b)[grep(pattern = "Total", x = names(b))]),
            names(b))]

b<-b[b$Year %in% minyr:maxyr, ]
temp_print<-b
temp_print$Footnotes<-NA

ProdOutputUS_Raw<-temp_code
write_csv(x = ProdOutputUS_Raw, file = paste0(dir_analyses, "/ProdOutputUS_Raw.csv"))

ProdOutputUS_Print<-temp_print
write_csv(x = ProdOutputUS_Print, file = paste0(dir_analyses, "/ProdOutputUS_Print.csv"))

ProdOutputUS_Print$Footnotes<-NULL
knitr::kable(ProdOutputUS_Print, booktabs = T) %>%
  kable_styling(latex_options = "striped")
```

| Year | Total_V | Total_PI | Total_Q |
|------|---------|----------|---------|
| 2007 | 11,372 | 1.00 | 11,372 |
| 2008 | 10,839 | 0.99 | 10,976 |
| 2009 | 10,678 | 0.91 | 11,710 |
| 2010 | 12,639 | 1.03 | 12,318 |
| 2011 | 14,398 | 1.12 | 12,903 |
| 2012 | 14,946 | 1.16 | 12,833 |
| 2013 | 13,720 | 1.31 | 10,508 |
| 2014 | 14,128 | 1.36 | 10,366 |
| 2015 | 14,524 | 1.42 | 10,257 |
| 2016 | 15,294 | 1.43 | 10,718 |
| 2017 | 14,700 | 1.36 | 10,833 |
| 2018 | 15,014 | 1.34 | 11,189 |

# 6. Figures

Here are a few figures that come out of this analysis!

```
figures_list$Northeast__PI_CB_PI
```
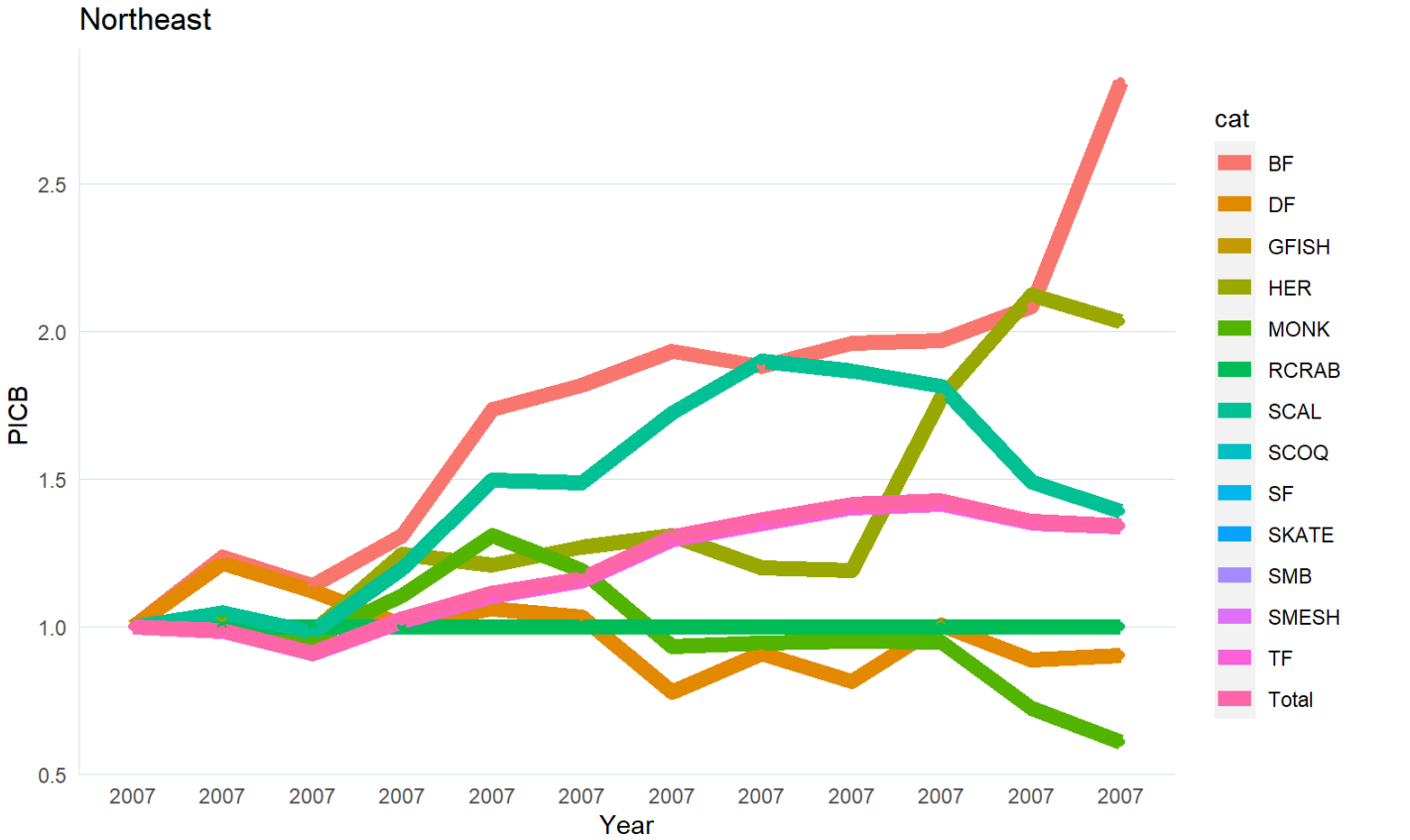
## Northeast



```
figures_list$Northeast__Q_CB_CatTot_QCatTot
```

## Northeast