This analysis uses nationally collected landings data for the for theMid-Atlanticregion, downloaded from the
NOAA FOSS site https://foss.nmfs.noaa.gov/apexfoss/f?p=215:200::::::.

```
## [[1]]
## [1] "When back calculated, Q_{i,t} did not equal V_{i,t}/PI_{i,t}"
##
## [[2]]
## [1] "When back calculated, Q_{i,t} did not equal V_{i,t}/PI_{i,t}"
##
## [[3]]
## [1] "When back calculated, Q_{i,t} did not equal V_{i,t}/PI_{i,t}"
##
## [[4]]
## [1] "When back calculated, Q_t did not equal V_t/PI_t"
##
## [[5]]
## [1] "When back calculated, ln(Q_t/Q_{t-1}) = did not equal sum( ( frac{R_{i, t} - R_{i, t-1}}{2})  *
##
## [[6]]
## [1] "Out of 79 columns, 80 of species V columns are completely empty, 100 of species Q columns are c
```

Species in Each category by Common Name

```
## $Other
##  [1] "WITHHELD FOR CONFIDENTIALITY " "SEAWEEDS, OTHER **"          "LAMINARIA DIGITATA "
##  [6] "FINFISH **"                    "DORY, AMERICAN JOHN "        "PIKE, BLUE **"
## [11] "SPADEFISHES **"                "MARLIN, WHITE "              "HARVESTFISH "
## [16] "TURTLE, SNAPPING "             "TURTLE, TERRAPIN "           "TURTLES, BABY (YOUNG FW) **"
## [21] "TURTLE, GREEN SEA "            "TURTLE, SOFT-SHELL **"       " "
##
## $Finfish
##  [1] "HAGFISH FAMILY **"             "SHARKS, UNCLASSIFIED **"     "SHARKS, UNIDENT
##  [5] "SHARK, SAND TIGER "            "SHARK, WHITE "               "SHARK, PORBEAGL
##  [9] "SHARK, BIGEYE THRESHER "       "SHARK, MAKOS **"             "SHARK, SHORTFIN
## [13] "SHARK, NURSE "                 "CHAIN DOGFISH "              "SHARK, TIGER "
## [17] "SHARK, SMOOTH DOGFISH "        "SHARK, DUSKY "               "SHARK, BULL "
## [21] "SHARK, BLACKNOSE "             "SHARK, BIGNOSE "             "SHARK, SILKY "
## [25] "SHARK, OCEANIC WHITETIP "      "SHARK, SPINNER "             "SHARK, FINETOOT
## [29] "SHARK, BLUE "                  "SHARK, LEMON "               "SHARK, HAMMERHE
## [33] "SHARK, SMOOTH HAMMERHEAD "     "SHARK, SCALLOPED HAMMERHEAD " "SHARK, GREAT HA
## [37] "SHARK, DOGFISH **"            "SHARK, SPINY DOGFISH "       "BLACK DOGFISH "
## [41] "RAYS **"                       "BANDED GUITARFISH "          "SKATES **"
## [45] "SKATE, CLEARNOSE "             "RAY,STINGRAYS **"            "STINGRAY, ATLANT
## [49] "STURGEONS **"                  "PADDLEFISH "                 "GARS **"
## [53] "BOWFIN "                       "LADYFISH "                   "TARPON "
## [57] "EEL, AMERICAN "                "EEL, CONGER "                "HERRINGS **"
## [61] "SHAD, AMERICAN "               "HERRING, BLUEBACK "          "SHAD, HICKORY "
## [65] "HERRING, SEA, ATLANTIC "       "MENHADEN **"                 "MENHADEN, ATLANT
## [69] "HERRING, ATLANTIC THREAD "     "ANCHOVY, BAY "               "MOONEYES **"
## [73] "WHITEFISH, LAKE "              "SALMON, PACIFIC **"          "SALMON, COHO "
## [77] "TROUT, RAINBOW "               "SALMON, ATLANTIC "           "TROUT, BROWN "
## [81] "TROUT, BROOK "                 "WHITEFISH, ROUND "           "SMELTS **"
## [85] "ARGENTINES **"                 "PIKES **"                    "CARPS AND MINNO
## [89] "GOLDFISH "                     "SUCKERS **"                  "UNIDENTIFIED CA
```

```
##  [93] "CATFISHES-BULLHEADS **"        "CATFISH, BLUE "            "CATFISH, CHANNEL
##  [97] "WHITE CATFISH "                "BULLHEAD, BROWN "          "CATFISHES-BULLH
## [101] "OYSTER TOADFISH "              "GOOSEFISH "                "GOOSEFISH, BLACK
## [105] "TOMCOD, ATLANTIC "             "BURBOT "                   "POLLOCK "
## [109] "HAKE, RED "                    "HAKE, SPOTTED "            "HAKE, WHITE "
## [113] "CUSK "                         "HADDOCK "                  "HAKES, SILVER AN
## [117] "HAKE, OFFSHORE SILVER "        "BROTULA, BEARDED "         "GRENADIERS **"
## [121] "HOUNDFISH "                    "KILLIFISH FAMILY **"       "MUMMICHOG "
## [125] "SILVERSIDE, ATLANTIC "         "SQUIRRELFISHES **"         "DORIES **"
## [129] "OPAH "                         "RIBBONFISH FAMILY **"      "DEALFISH "
## [133] "REDFISH, ACADIAN "             "ROSEFISH, BLACKBELLY "     "SEAROBINS **"
## [137] "SEAROBIN, NORTHERN "           "SEAROBIN, STRIPED "        "SEAROBIN, ARMORE
## [141] "SCULPINS **"                   "RAVEN, SEA "               "LUMPFISH "
## [145] "GROUPERS **"                   "PERCH, WHITE "             "BASS, STRIPED "
## [149] "BASSES, MIXED SEA **"          "BASS, BLACK SEA "          "GROUPER, YELLOWF
## [153] "GROUPER, SNOWY "               "SAND PERCH "               "BARBIER, RED "
## [157] "WRECKFISH "                    "SUNFISHES **"              "BASS, ROCK "
## [161] "LARGEMOUTH BASS "              "CRAPPIE **"                "PERCHES **"
## [165] "TILEFISHES **"                 "TILEFISH, BLUELINE "       "TILEFISH, GOLDFA
## [169] "TILEFISH, SAND "               "BLUEFISH "                 "COBIA "
## [173] "JACK, CREVALLE "               "RUNNER, BLUE "             "BAR JACK "
## [177] "AMBERJACK **"                  "JACK, ALMACO "             "RUDDERFISH, BANK
## [181] "POMPANO, FLORIDA "             "PERMIT "                   "SCAD, ROUND "
## [185] "DOLPHIN GENUS **"              "DOLPHINFISH "              "SNAPPERS **"
## [189] "SNAPPER, DOG "                 "SNAPPER, VERMILION "       "TRIPLETAIL "
## [193] "PIGFISH "                      "SCUPS OR PORGIES **"       "SCUP "
## [197] "SHEEPSHEAD "                   "PORGY, RED "               "DRUMS **"
## [201] "SEATROUT, SPOTTED "            "SEATROUT, WEAKFISH "       "SEATROUT, SAND "
## [205] "BANDED DRUM "                  "KINGFISHES **"             "KINGFISH, NORTHE
## [209] "DRUM, BLACK "                  "DRUM, RED "                "DRUM, FRESHWATER
## [213] "SPADEFISH, ATLANTIC "          "POMFRETS, UNCLASSIFIED **" "MULLETS **"
## [217] "MULLET, WHITE "                "BARRACUDAS **"             "TAUTOG "
## [221] "HOGFISH "                      "STARGAZER FAMILY **"       "STARGAZER, NOTHE
## [225] "LAUNCES **"                    "AMERICAN SAND LANCE "      "BONEFISH "
## [229] "TUNA, SKIPJACK "               "TUNA, LITTLE TUNNY "       "BONITO, ATLANTIC
## [233] "MACKEREL, ATLANTIC CHUB "      "MACKEREL, ATLANTIC "       "TUNAS **"
## [237] "TUNA, BLUEFIN "                "TUNA, YELLOWFIN "          "TUNA, BLACKFIN "
## [241] "MACKEREL, KING AND CERO **"    "MACKEREL, KING "          "MACKEREL, SPANIS
## [245] "MACKEREL, FRIGATE "            "SWORDFISH "                "BILLFISHES **"
## [249] "BARRELFISH "                   "BUTTERFISH, UNCLASSIFIED **" "HARVESTFISH "
## [253] "GULF BUTTERFISH "              "FLATFISH **"               "FLOUNDER, SUMMER
## [257] "FLOUNDER, FOURSPOT "           "FLOUNDER, WINDOWPANE "     "FLOUNDER, WITCH
## [261] "FLOUNDER, WINTER "             "FLOUNDER, YELLOWTAIL "     "HALIBUT, ATLANTI
## [265] "LEATHERJACKETS **"             "TRIGGERFISH, GRAY "        "PUFFERS **"
## [269] "PUFFER GENUS **"               "PUFFER, NOTHERN "          "ANCHOVIES **"
## [273] "WHITE SUCKER "                 "SKATE, LITTLE "            "SKATE, ROSETTE "
## [277] "SKATE, WINTER "                "SKATE, THORNEY "           "SKATE, SMOOTH "
## [281] "OCEAN POUT "
##
## $Shellfish
##  [1] "MOLLUSKS **"          "PERIWINKLES **"          "STROMBIDAE **"
##  [6] "SNAIL, MOON **"       "WAVED WHELK "            "MELONGENIDAE **"
## [11] "WHELK, CHANNELED "    "CLAMS OR BIVALVES **"    "CLAM, ARC, BLOOD "
## [16] "SCALLOP, SEA "        "SCALLOP, CALICO "        "SCALLOP, BAY "
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## [21] "CLAM, ATLANTIC SURF "         "CLAM, ARCTIC SURF (STIMPSON) " "CLAM, ATLANTIC JACKKNIFE "
## [26] "CLAM, NORTHERN QUAHOG "        "PITAR **"                      "CLAM, SOFTSHELL "
## [31] "SQUID, LONGFIN LOLIGO "        "SQUID, SHORTFIN ILLEX "        "OCTOPUS **"
## [36] "CRABS **"                      "SHRIMP, DENDROBRANCHIATA **"   "SHRIMP, MARINE, OTHER **"
## [41] "CARIDEA **"                    "SHRIMP, NORTHERN "             "SHRIMP, BAY **"
## [46] "CRABS, HERMIT **"              "CRAB, NORTHERN STONE "         "CRAB, ATLANTIC SAND "
## [51] "CRAB, CANCER **"               "CRAB, JONAH "                  "CRAB, ATLANTIC ROCK "
## [56] "CRAB, GREEN "                  "CRAB, FLORIDA STONE CLAWS "    "UCA **"
## [61] "URCHINS, SEA **"               "SEA CUCUMBER, UNCLASSIFIED **" "SHRIMP, BROWN "
```

Where are there negative values?

X	Tsn	Year	State	AFS.Name	Pounds	Dollars	Collection	Confidentiality	category.tax
51314	165647	2014	New Jersey	MUMMICHOG	-321	-4494	Commercial	Public	Actinopteryg
72470	168791	2014	Connecticut	DOLPHINFISH	-1	-2	Commercial	Public	Actinopteryg

Where are there negative values?

X	Tsn	Year	State	AFS.Name	Pounds	Dollars	Collection	Confidentiality
429	11272	2017	Rhode Island	SEAWEED, KELP **	-1	7390	Commercial	Public
6543	79916	2015	New York	MUSSEL, SLIPPERSHELL	-1	NA	Commercial	Public
8386	81495	2010	Maryland	CLAM, QUAHOG **	-29	1506	Commercial	Public
25465	160502	2009	Virginia	SHARK, BONNETHEAD	-5	1011	Commercial	Public
28827	161030	2007	New Jersey	FINFISH **	-8	NA	Commercial	Public
51314	165647	2014	New Jersey	MUMMICHOG	-321	-4494	Commercial	Public
72470	168791	2014	Connecticut	DOLPHINFISH	-1	-2	Commercial	Public
92811	172412	2014	Connecticut	MACKEREL, CHUB	-1	NA	Commercial	Public
111150	551570	2017	Connecticut	SHRIMP, BROWN	-1	229	Commercial	Public