Review of CAMS 2019 Landings, Value, and Effort Data

Summary

A high level review of the Catch Accounting and Monitoring System (CAMS) 2019 data for landing, value, and effort was conducted. This relied on a comparison with the 2019 Area Allocated (AA) tables that have been used at the Northeast Fisheries Science Center. Changes to the data since the AA tables were created, along with differences in the matching, allocation, and imputation processes between CAMS and AA, were expected to create differences between the two data sets. Acknowledging these differences, the review team concluded that at a high level the CAMS data is consistent with the AA data and that the CAMS process can be used to create 2020 and 2021 landings, value, and effort data for use at the Northeast Fisheries Science Center and the Greater Atlantic Regional Fisheries Office as a common data source. The review team provides a summary of the main findings and appendices of the detailed comparisons along with caveats and limitations of these findings. Recommendations for near-term work are provided based on the high level review conducted.

Due to time limitations, this review was not able to examine in detail the methods used to match, allocate, and impute the landings, value, and effort data. Discussions with the programmers allowed insight into the methods, but detailed code review or process review could not be conducted in the time available. This means that the comparisons may appear good, but in fact the processes used may not be performing as expected and the comparisons made were just insufficient to realize this or the data did not contain sufficient variation to allow incorrect processes to be exhibited at the scale of the data examinations. Given the range of conditions examined, and the descriptions provided by the programmers, it is not expected that there are major problems in the methodologies used. However, an in-depth analysis of these processes should be conducted in the near-term to ensure that processes not examined in this review do not create problems for users.

Introduction

The Northeast Fisheries Science Center (NEFSC) had representatives from all four branches of the Resource Evaluation and Assessment Division (READ) contribute to a review of the 2019 landings, value, and effort data produced by the Catch Accounting and Monitoring System (CAMS). These data were provided in four tables that mimicked the original Area Allocation (AA) tables for 2019 but used data produced through the CAMS process instead of the AA process. The four tables provide information about the trip (CFDETT), species (CFDETS), length samples (CFLEN), and age samples (CFAGE). The purpose of creating the CAMS AA tables is to serve as a temporary set of tables to make CAMS data readily available to users of the current AA tables. This is because the CAMS data structures were not defined in time to allow all users to modify their code to point directly to the CAMS data. Using the AA data structures allows current code to be easily used for 2020 and 2021 data. As the CAMS base tables are developed and standardized, users will need to adjust their code to point to these tables directly. The CAMS tables will allow upgrades in the data available and use current state of the art approaches. The time table for this transition is to be determined.

The review conducted was limited to basic evaluation of the table structures and comparisons of output. Insufficient time and documentation were available for a full methodological review and this will need to occur at a later date. Since the underlying data processing in CAMS is different from AA, and there are changes in the data since the 2019 AA tables were created, differences between the tables are expected. The goal of this review is to document the magnitude of these differences and provide explanations for them, when possible.

First review

The first review began on January 11, 2022. Almost immediately, a number of issues were identified. These include doubling of some species' landings, leakage (fewer total pounds coming out of CAMS than went in), unusual combinations of species and gears, missing elements from tables, different indicators of missing information, and handling of special data (e.g., clam logbooks). It was decided to stop this review and address as many of these issues as possible before continuing. The Greater Atlantic Regional Fisheries Office (GARFO) programming team addressed these issues as they were identified in Jira (a project management software tool used to track progress in large programming projects). A major change in the imputation process was made to address the unusual combination of species and gears. Specifically, the first level of imputation was changed from using the trip that most closely (in time) matched the trip needing imputation to a process that is more similar to the other levels of imputation (grouping data according to available information and assigning area and gear based on these properties). Some other issues were also addressed in the matching and imputation process along with some changes in data handling decisions for special data.

Second review

The second review began on January 27, 2022. The results presented below are based on this review. Review team members looked at the 2019 data from their own perspectives and tried to ensure that users from their Branch would be able to use the data correctly and understand the changes. Minor changes to the CAMS AA continued to be made as Jira issues were addressed during the second review. A more major release (0.2.0) occurred the evening of February 14, 2022. Some of the results presented below may not reflect the most recent iteration of CAMS AA.

Landings

A high level comparison was made between AA and CAMS using the State of the Ecosystem Report ecological production units and groups of species in guilds. These comparisons show general agreement in magnitude across these large areas and groups of species. The largest apparent differences are in the Other region, but this is due to a much smaller magnitude of landings compared to the other regions. See Appendix 1 for full details.

The AA data had more landings with unknown area than did CAMS. This was explored in detail for a number of species by first comparing the AA and CAMS proportions by stock area or statistical area. For species with multiple stocks, there is a process in StockEff (a system of databases that generate input for stock assessment models and track decisions by stock assessment leads regarding how data are compiled for stock assessments) of assigning landings in unknown areas to one of the stock areas. The results of these allocations of unknown areas in AA through the StockEff process were also compared to CAMS. General agreement was found in how the landings were allocated among stock areas between AA (especially with the StockEff process included) and CAMS. Stock assessments use market category information for landings to determine length and age compositions of the landings. This is because market categories generally contain fish of similar size and age and samples of fish length measurements and hard parts (e.g., otoliths) for age determination are collected according to market categories. This allows for more precise estimation of length and age characteristics of the landings than pure random sampling of the total landings without market information. These comparisons were also generally good. CAMS includes records of fish caught and eaten at sea or taken home but not sold to dealers (so called home consumption) as well as Vessel Trip Reports (VTR) that were unable to be assigned to dealer reports (so called VTR orphans). These are additional sources of fish mortality that have not traditionally been included in stock assessment, but have been included in quota monitoring. Their availability in CAMS means there is the potential to see large changes in the landings records relative to AA, if these sources indicate large amounts relative to the dealer records alone. To examine this, the CAMS data were separated by landing source. For the species assessed through stock assessments, these additional sources of landings were negligible. See Appendix 2 for full details.

Since landings are such an integral component of the StockEff system and timing between CAMS' expected release date and 2022 stock assessments would be tight, the StockEff team further tested integrating CAMS data into StockEff. Due to time constraints, this testing is not complete as of this writing, but no insurmountable hurdles have been encountered to date. See last section of Appendix 2 for full details.

Value

The value of the landings (dollars) is a function of both the amount of landings and the price paid for the fish. It is an important metric for tracking the economic performance of different fisheries. Similar to the landings described above, value was compared between AA and CAMS. An initial total value across all species found AA to be about 12% less than CAMS. Comparison with the current commercial database indicated that this difference was driven by changes to the data since the AA tables were created because CAMS and the current commercial database differed by less than 0.01 per cent. Differences between CAMS and both AA and the current commercial database were found by gear, with unknown gear having differences of more than $600 million. Examining groups of similar gears, there were some consistent directional differences, although the overall patterns were the same. The matching and imputation differences between AA and CAMS were found to be the source of the differences between the values by gear groups. This suggests that the imputation methodological review will be necessary to assess the validity of the deviances between CAMS, AA, and the current commercial databases. The differences in value between AA and CAMS by species were attributed to the different data available since there were minimal differences between CAMS and the current commercial database. This suggests the differences by gear are due to how the species are assigned gears in AA and CAMS, and not a difference in the total value by species. A similar result was found when value was summed by port. In summary, the only major deviance left unexplained is the gear imputation method, which needs methodological review in order to assess appropriateness. See Appendix 3 for full details.

Effort

Fishing effort metrics of days away and days fished are used when computing catch (or bycatch) per unit effort. The days fished calculations in CAMS are changed from those used in AA based on a recommendation from an effort sub-group of the CAMS team. Specifically, days fished for fixed gear (e.g., lobster traps, gillnets) now includes the number of hauls as a multiplier to the average soak duration of the number of sets or strings fished. For example, a gillnet trip that reported tow duration of 96 hours and number of tows (meaning number of times the gear was hauled) of 5 would have days fished of 4 (=96/24 hours) in AA but 20 (=96*5/24 hours) in CAMS. This approach of multiplying average tow duration by the number of tows hauled per trip was used previously for mobile gear (e.g., bottom trawls) and continues in CAMS. Thus, the effort values for days fished are expected to change in CAMS relative to AA for fixed gear. Given this caveat, effort metrics were compared between AA and CAMS. The first major finding was that both AA and CAMS had less than one third of trips with non-null values, although CAMS had more trips with non-null values than AA. This is due to both the aggregated state data not being able to provide effort values on a trip basis and some of the imputation levels of both AA and CAMS not being able to estimate effort values. This limitation should be kept in mind when considering the following results. CAMS had higher total effort values than AA, even when the comparison was limited to federally required data (source = 7). Comparisons for mobile gear were much closer than those for fixed gear, as expected. State comparisons generally showed higher total effort in CAMS than in AA. See Appendix 4 for full details.

During the review, a comparison of distributions of effort per trip found 13 trips in CAMS with negative values for DA or DF. These were created by situations with low effort and multiple sub-trips combined with a rounding to two digits after the decimal. These problematic values were addressed by extending the number of digits after the decimal place from 2 to 4 and modifying how the sum of the sub-trip effort was handled. After these modifications, there were no longer any negative effort values in CAMS. See Appendix 5 for full details.

Imputation

The need for imputation is limited to cases where there is not a direct match between dealer and vessel trip reports. A universal trip ID that created this direct link would eliminate the need for imputation. Since a universal trip ID is not currently available, a comparison was made between the number of trips and landings that required imputation at different levels between AA and CAMS. Since imputation will have the largest impact on species with multiple stocks (because allocation among stocks could change), eight multi-stock species were first examined for the pounds imputed at different levels in AA and CAMS. Seven of the eight species had higher direct matches in CAMS than AA (the exception was windowpane flounder, a no-possession species) with similar patterns across species. Some of these differences are due to the goals of each method, with AA not attempting to impute area for state landings while CAMS does. Due to different imputation methods used within CAMS, not all of the uncertainty is captured for landings with imputed area. See Appendix 6 for full details.

Since both AA and CAMS provide uncertainty estimates associated with imputation, a statistical comparison was attempted between the AA and CAMS landings to determine if the difference between them at the stock level was statistically different from zero. This comparison was not possible due to the amount of landings not assigned an area in AA as well as the inability to assign variance estimates to some of the CAMS imputed values. See Appendix 7 for full details.

A qualitative comparison of the AA and CAMS data sets focused on the Level A "matched" landings, those landings that had a direct match to a VTR (area imputation was not needed). For landings that matched a VTR, there were a few "noticeable" percentage differences in both stock and statistical areas between AA and CAMS; overall, there were not large percent differences between AA and CAMS stock landings. The CAMS stock landings were always greater than the AA stock landings, but differed differentially. It appears the differences between AA and CAMS matched stock landings is not attributed to the time the data sets were created, so must be due to more trips being matched in CAMS than AA. A more detailed look at matched data is recommended. See Appendix 8 for full details.

Caveats and limitations of review

This review did not have clear guidelines for acceptance/rejection of the CAMS AA tables. This is because differences between the two data sets were expected a priori due to the differences in data available and underlying processing of the data. As noted above, the CAMS AA data changed as issues were identified and addressed. This made for a rolling review where the results of an analysis conducted yesterday may not match the results from the same analysis conducted today if a data issue had been addressed. These two properties made the review itself challenging. Most of the results presented indicate the date when they were conducted for this reason. Use of code that could easily be rerun helped with the rolling review issue, but could lead to failure to note changes in conclusion if the results were not examined in detail.

By necessity, this review was limited to one year of data, the calendar year 2019. It is not clear how representative 2019 was of all potential data issues. For landings, all the sources of data were fully available to CAMS for this time period. In contrast, the AA tables were created in the spring of 2020, before all the 2019 data were available. Any changes to the 2019 data since the AA tables were created are not reflected in the AA tables. This means direct comparisons between AA and CAMS will reflect changes in data availability. This also indicates that when CAMS is used in production, there will be times when only some data are available and users will need to be clear about whether data are sufficient for a particular use. This applies particularly to state data that often arrive in bulk from a given state in the spring or summer following the calendar year in which it was collected. This may apply to discard data as well. This review cannot provide insight into how the real-time application of CAMS will perform, but note that formal protocols should be developed to ensure all users are aware of data availability issues and use data appropriately. It is clear that the CAMS team has a robust quality assurance process in place for escalating and resolving data abnormalities on an ongoing basis once issues are manually identified within the CAMS system. It is hoped that lessons learned during this review will be used to create automated checks on data coming into CAMS and being produced by CAMS in the future to ensure the issues found during this review do not occur again. These comparisons of 2019 data can be used in the future as CAMS matures to ensure that future changes do not cause problems at the level examined in this review.

Due to competing time demands, documentation of CAMS was put on hold during the review process. This meant that the documentation that was available during the review could not reflect the actual processes used. This created challenges for the review team. Being able to ask questions of the programmers reduced this issue to some extent, but the incomplete documentation limited the scope of the review possible.

In August 2013, the Northeast Fisheries Science Center participated in a national review of fishery dependent and fishery independent data used in stock assessment. The major recommendation for the region from this review was the creation of a Universal Trip Identifier (UTID) that would allow easy matching of data across data sources. This need remains. Use of a UTID would improve the data going into CAMS and facilitate improved quality assurance/quality control cleaning of the data by using multiple pieces of information about a given trip to identify incorrect data entries. CAMS is currently configured to easily use such a UTID and it is expected that the uncertainty in landings due to imputation and orphan records will decrease substantially once UTID is fully in place.

Thanks to excellent IT support from both GARFO and NEFSC, materialized views were created at NEFSC that mirrored the CAMS data being produced at GARFO. These views kept the data in sync between both groups. Changes in the table structure, for example adding or removing a data column or changing the type of data contained in a column, meant the materialized views had to be recreated. This occasionally led to short delays in data availability between the groups. Additionally, the GARFO programming team conducted many of their processes in the programming language R and then pushed the results to Oracle for transfer to NEFSC. At times, the programming team could be working on an issue in R without pushing the results to Oracle, meaning the data looked at by the two groups differed. This led to a few minor confusions, but were worked out eventually.

Conclusions and Recommendations

Based on the available time and information, the NEFSC review team concludes the CAMS processes used to generate the 2019 AA landings, value, and effort data are sufficient to be used for 2020 and 2021 data for current stock delineations and ecological production units. However, a more thorough analysis of performance at the level of statistical area is warranted to ensure consistency between CAMS and AA at more granular geographies which might be of scientific interest. A more complete review of the methodologies used in CAMS is needed to ensure that this conclusion is fully robust to potential problems in future data. In addition, there are clear differences between the AA and CAMS data when assessed at the gear level, which is likely to translate into increased uncertainty in stock assessments and other analyses that track effort, landings, and other metrics at the gear level. There is no universal manner to address the discontinuity in time series between AA and CAM, but users should carefully consider how changes in imputation methods are likely to impact their products and analyses.

The review team recommends implementing a universal trip identifier for all fishery dependent data collection systems as soon as possible. This will improve the accuracy of the landings data and increase opportunities for quality assurance/quality control checks across multiple data sources for a given trip.

The review team recommends working with the Atlantic Coastal Cooperative Statistics Program (ACCSP) to collect state data by trip (with statistical area) for use in CAMS instead of the current aggregations across the year. This would provide users landings, value, and effort by trip and statistical area, a substantial improvement over the current aggregated state data. This would also support improved discard and protected species bycatch estimation.

The review team recommends the following as potential Terms of Reference for a future (near-term) external review of CAMS that includes both the landings and discard components:

1. Evaluate sufficiency of documentation for an external reviewer to sufficiently understand the complexities and processes of CAMS.
2. Evaluate the matching, apportionment, and imputation functions used to derive landings, value and effort in CAMS and comment on the potential benefits of a universal trip ID.
3. Evaluate the fleet identification and stratification levels, the business rules for assigning trips and species, and any new discard estimators used in the discard estimation.

CAMS Team

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List of Appendices

Appendix 1. Ecosystem level comparison of landings

Initial Comparisons

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2/18/2022

These are some initial comparisons between the 2019 AA and CAMS tables. Data were pulled using the `get_comland_raw_data` function from the R package `comlandr` created and maintained by the Ecosystem Dynamics and Assessment Branch (EDAB) of the Northeast Fisheries Science Center (NEFSC).

```
load(file = here('data-raw', 'CAMS_2019.RData'))
load(file = here('data-raw', 'AA_2019.RData'))
#move data out to main object
aa <- aa$comland
```

First some simple metrics

```
nrow(cams)
```

```
## [1] 52749
```

```
nrow(aa)
```

```
## [1] 57664
```

Total landings

```
cams[, sum(SPPLIVMT)]
```

```
## [1] 571766.4
```

```
aa[, sum(SPPLIVMT)]
```

```
## [1] 575854.3
```

Landings that are missing area

```
cams[AREA == 0, sum(SPPLIVMT)]
```

```
## [1] 11021.04
```

```
aa[AREA == 0, sum(SPPLIVMT)]
```

```
## [1] 110857.1
```

As percentage

```
cams[AREA == 0, sum(SPPLIVMT)] / cams[, sum(SPPLIVMT)]
```

```
## [1] 0.01927542
```

```
aa[AREA == 0, sum(SPPLIVMT)] / aa[, sum(SPPLIVMT)]
```

```
## [1] 0.192509
```

Now to run the scripts for the SOE. First assign landings to an EPU then aggregate landings by SOE groups.

```r
load(here('data-raw', 'SOE_species_list.RData'))

#AA
#Assign areas based on mskeyAreas
aa <- aggregate_area(aa, userAreas = comlandr::mskeyAreas, areaDescription = 'EPU',
                     propDescription = 'MeanProp')

#Aggregate by EBFM codes
aa.agg <- merge(aa, unique(species[!is.na(NESPP3), list(NESPP3, SOE.20, Fed.Managed)]),
                by = 'NESPP3', all.x = T)

#Fix NA codes
aa.agg[is.na(SOE.20), SOE.20 := 'Other']

#Sum Landings
aa.land <- aa.agg[, sum(SPPLIVMT), by = c('YEAR', 'EPU', 'SOE.20', 'Fed.Managed')]
aa.land[, Total := sum(V1), by = c('YEAR', 'EPU', 'SOE.20')]
aa.land[, Prop.managed := V1 / Total]
setnames(aa.land, 'V1', 'SPPLIVMT')

aa.land
```

```
##     YEAR   EPU       SOE.20 Fed.Managed     SPPLIVMT       Total Prop.managed
##  1: 2019    GB        Other        <NA> 4.594658e+02   459.51255 9.998983e-01
##  2: 2019   MAB        Other        <NA> 2.110531e+02   211.40512 9.983348e-01
##  3: 2019    GB    Piscivore       JOINT 3.133564e+03 11788.82543 2.658080e-01
##  4: 2019   GOM    Piscivore       JOINT 1.595248e+03  4039.95722 3.948676e-01
##  5: 2019 Other    Piscivore       JOINT 5.824381e+00  1009.79159 5.767904e-03
##  6: 2019   MAB    Piscivore       JOINT 1.863366e+03 17113.33113 1.088839e-01
##  7: 2019    GB    Piscivore       MAFMC 3.452690e+03 11788.82543 2.928782e-01
##  8: 2019   GOM    Piscivore       MAFMC 1.451662e+01  4039.95722 3.593260e-03
##  9: 2019 Other    Piscivore       MAFMC 7.121192e+02  1009.79159 7.052140e-01
## 10: 2019   MAB    Piscivore       MAFMC 1.213230e+04 17113.33113 7.089385e-01
## 11: 2019   GOM        Other        <NA> 2.474785e+02   247.47849 1.000000e+00
## 12: 2019 Other        Other        <NA> 2.916294e+01    29.16316 9.999926e-01
## 13: 2019    GB  Planktivore       MAFMC 4.030146e+02  2160.92753 1.865008e-01
## 14: 2019   GOM  Planktivore       MAFMC 8.709155e+01  1779.26011 4.894818e-02
## 15: 2019 Other  Planktivore       MAFMC 5.625248e+01    56.25305 9.999899e-01
## 16: 2019   MAB  Planktivore       MAFMC 1.708557e+03  1741.02037 9.813538e-01
## 17: 2019    GB    Piscivore       NEFMC 5.182375e+03 11788.82543 4.396007e-01
## 18: 2019   GOM    Piscivore       NEFMC 2.428802e+03  4039.95722 6.011949e-01
## 19: 2019 Other    Piscivore       NEFMC 2.869126e+02  1009.79159 2.841305e-01
## 20: 2019   MAB    Piscivore       NEFMC 3.100954e+03 17113.33113 1.812011e-01
## 21: 2019    GB   Benthivore        <NA> 3.117710e+03  6052.44710 5.151156e-01
## 22: 2019   MAB   Benthivore        <NA> 4.826861e+03  6799.90061 7.098429e-01
## 23: 2019   GOM   Benthivore        <NA> 4.557323e+02  3914.21721 1.164300e-01
## 24: 2019    GB  Planktivore        <NA> 3.593163e+01  2160.92753 1.662787e-02
## 25: 2019   GOM  Planktivore        <NA> 8.256335e+00  1779.26011 4.640319e-03
## 26: 2019 Other  Planktivore        <NA> 5.679221e-04    56.25305 1.009585e-05
## 27: 2019   MAB  Planktivore        <NA> 2.778046e+01  1741.02037 1.595642e-02
## 28: 2019    GB   Benthivore       NEFMC 2.641797e+03  6052.44710 4.364842e-01
## 29: 2019   GOM   Benthivore       NEFMC 3.454845e+03  3914.21721 8.826400e-01
## 30: 2019 Other   Benthivore       NEFMC 2.174834e+01   557.19775 3.903164e-02
## 31: 2019   MAB   Benthivore       NEFMC 4.311019e+02  6799.90061 6.339827e-02
```

```
## 32: 2019    GB      Piscivore        <NA> 2.019545e+01 11788.82543 1.713101e-03
## 33: 2019   GOM      Piscivore        <NA> 1.390686e+00  4039.95722 3.442328e-04
## 34: 2019   MAB      Piscivore        <NA> 1.671189e+01 17113.33113 9.765419e-04
## 35: 2019    GB    Planktivore       NEFMC 1.721981e+03  2160.92753 7.968714e-01
## 36: 2019   GOM    Planktivore       NEFMC 1.683912e+03  1779.26011 9.464115e-01
## 37: 2019   MAB    Planktivore       NEFMC 4.682970e+00  1741.02037 2.689785e-03
## 38: 2019 Other      Piscivore        <NA> 4.935461e+00  1009.79159 4.887603e-03
## 39: 2019    GB     Benthivore       MAFMC 2.929397e+02  6052.44710 4.840021e-02
## 40: 2019   GOM     Benthivore       MAFMC 3.640290e+00  3914.21721 9.300173e-04
## 41: 2019 Other     Benthivore       MAFMC 7.259585e-01   557.19775 1.302874e-03
## 42: 2019   MAB     Benthivore       MAFMC 1.541937e+03  6799.90061 2.267588e-01
## 43: 2019 Other     Benthivore        <NA> 5.347234e+02   557.19775 9.596655e-01
## 44: 2019    GB Apex Predator        <NA> 7.927803e+01    79.27803 1.000000e+00
## 45: 2019   GOM Apex Predator        <NA> 1.353009e+01    13.53009 1.000000e+00
## 46: 2019 Other Apex Predator        <NA> 2.131694e+01    21.31694 1.000000e+00
## 47: 2019   MAB Apex Predator        <NA> 1.535655e+02   153.56546 1.000000e+00
## 48: 2019    GB          Other       MAFMC 4.674010e-02   459.51255 1.017167e-04
## 49: 2019 Other          Other       MAFMC 2.165992e-04    29.16316 7.427151e-06
## 50: 2019   MAB          Other       MAFMC 3.520370e-01   211.40512 1.665224e-03
## 51: 2019    GB        Benthos       MAFMC 7.466716e+03 17299.98992 4.316024e-01
## 52: 2019 Other        Benthos       MAFMC 1.546243e+02   257.64772 6.001385e-01
## 53: 2019   MAB        Benthos       MAFMC 2.477529e+03  8603.23696 2.879764e-01
## 54: 2019   GOM        Benthos       MAFMC 2.161195e+01   583.45267 3.704148e-02
## 55: 2019    GB        Benthos        <NA> 1.612854e+02 17299.98992 9.322859e-03
## 56: 2019   GOM        Benthos        <NA> 1.188335e+01   583.45267 2.036730e-02
## 57: 2019 Other        Benthos        <NA> 5.153974e-03   257.64772 2.000396e-05
## 58: 2019   MAB        Benthos        <NA> 1.945974e+01  8603.23696 2.261909e-03
## 59: 2019    GB        Benthos       NEFMC 9.671988e+03 17299.98992 5.590748e-01
## 60: 2019   GOM        Benthos       NEFMC 5.499574e+02   583.45267 9.425912e-01
## 61: 2019 Other        Benthos       NEFMC 1.030183e+02   257.64772 3.998415e-01
## 62: 2019   MAB        Benthos       NEFMC 6.106248e+03  8603.23696 7.097617e-01
##     YEAR   EPU         SOE.20 Fed.Managed     SPPLIVMT       Total Prop.managed
```

```
#CAMS
#Assign areas based on mskeyAreas
cams <- aggregate_area(cams, userAreas = comlandr::mskeyAreas, areaDescription = 'EPU',
                       propDescription = 'MeanProp')

#Aggregate by EBFM codes
cams.agg <- merge(cams, unique(species[!is.na(NESPP3),
                                      list(NESPP3, SOE.20, Fed.Managed)]),
                  by = 'NESPP3', all.x = T)

#Fix NA codes
cams.agg[is.na(SOE.20), SOE.20 := 'Other']

#Sum Landings
cams.land <- cams.agg[, sum(SPPLIVMT), by = c('YEAR', 'EPU', 'SOE.20', 'Fed.Managed')]
cams.land[, Total := sum(V1), by = c('YEAR', 'EPU', 'SOE.20')]
cams.land[, Prop.managed := V1 / Total]
setnames(cams.land, 'V1', 'SPPLIVMT')

cams.land
```

```
##     YEAR   EPU         SOE.20 Fed.Managed     SPPLIVMT       Total Prop.managed
```

```
## 1: 2019    GB        Other  <NA> 7.243378e+02   724.41154 9.998982e-01
## 2: 2019   MAB        Other  <NA> 2.023330e+02   202.88838 9.972626e-01
## 3: 2019    GB    Piscivore JOINT 3.221680e+03 12366.13594 2.605244e-01
## 4: 2019   GOM    Piscivore JOINT 1.610808e+03  4053.26504 3.974101e-01
## 5: 2019 Other    Piscivore JOINT 6.061984e+00  1111.10549 5.455813e-03
## 6: 2019   MAB    Piscivore JOINT 2.042012e+03 17286.64737 1.181266e-01
## 7: 2019    GB    Piscivore MAFMC 3.792230e+03 12366.13594 3.066625e-01
## 8: 2019   GOM    Piscivore MAFMC 8.509866e+00  4053.26504 2.099509e-03
## 9: 2019 Other    Piscivore MAFMC 7.984018e+02  1111.10549 7.185653e-01
## 10: 2019   MAB    Piscivore MAFMC 1.201324e+04 17286.64737 6.949434e-01
## 11: 2019   GOM        Other  <NA> 2.961142e+02   296.11420 1.000000e+00
## 12: 2019 Other        Other  <NA> 2.605779e+01    26.05801 9.999917e-01
## 13: 2019    GB  Planktivore MAFMC 4.295732e+02  2226.13915 1.929678e-01
## 14: 2019   GOM  Planktivore MAFMC 1.004791e+02  1807.28327 5.559676e-02
## 15: 2019 Other  Planktivore MAFMC 5.593402e+01    55.93458 9.999898e-01
## 16: 2019   MAB  Planktivore MAFMC 1.725382e+03  1804.73949 9.560283e-01
## 17: 2019    GB    Piscivore NEFMC 5.256616e+03 12366.13594 4.250815e-01
## 18: 2019   GOM    Piscivore NEFMC 2.430365e+03  4053.26504 5.996068e-01
## 19: 2019 Other    Piscivore NEFMC 3.020390e+02  1111.10549 2.718365e-01
## 20: 2019   MAB    Piscivore NEFMC 3.206877e+03 17286.64737 1.855118e-01
## 21: 2019    GB   Benthivore  <NA> 3.463895e+03  6738.68983 5.140310e-01
## 22: 2019   GOM   Benthivore  <NA> 4.206760e+02  3888.16463 1.081940e-01
## 23: 2019   MAB   Benthivore  <NA> 5.160597e+03  7251.73398 7.116363e-01
## 24: 2019    GB  Planktivore  <NA> 7.176892e+01  2226.13915 3.223919e-02
## 25: 2019   GOM  Planktivore  <NA> 2.019527e+01  1807.28327 1.117438e-02
## 26: 2019 Other  Planktivore  <NA> 5.679221e-04    55.93458 1.015333e-05
## 27: 2019    GB   Benthivore NEFMC 2.783769e+03  6738.68983 4.131023e-01
## 28: 2019   GOM   Benthivore NEFMC 3.462301e+03  3888.16463 8.904717e-01
## 29: 2019 Other   Benthivore NEFMC 7.975059e+01   647.48797 1.231692e-01
## 30: 2019   MAB   Benthivore NEFMC 4.423055e+02  7251.73398 6.099306e-02
## 31: 2019    GB    Piscivore  <NA> 9.560988e+01 12366.13594 7.731589e-03
## 32: 2019   GOM    Piscivore  <NA> 3.581287e+00  4053.26504 8.835560e-04
## 33: 2019   MAB    Piscivore  <NA> 2.451709e+01 17286.64737 1.418267e-03
## 34: 2019    GB  Planktivore NEFMC 1.724797e+03  2226.13915 7.747930e-01
## 35: 2019   GOM  Planktivore NEFMC 1.686609e+03  1807.28327 9.332289e-01
## 36: 2019   MAB  Planktivore NEFMC 4.924792e+00  1804.73949 2.728810e-03
## 37: 2019 Other    Piscivore  <NA> 4.602726e+00  1111.10549 4.142474e-03
## 38: 2019   MAB  Planktivore  <NA> 7.443264e+01  1804.73949 4.124287e-02
## 39: 2019    GB   Benthivore MAFMC 4.910261e+02  6738.68983 7.286670e-02
## 40: 2019   GOM   Benthivore MAFMC 5.187885e+00  3888.16463 1.334276e-03
## 41: 2019 Other   Benthivore MAFMC 2.101177e-01   647.48797 3.245122e-04
## 42: 2019   MAB   Benthivore MAFMC 1.648831e+03  7251.73398 2.273706e-01
## 43: 2019 Other   Benthivore  <NA> 5.675273e+02   647.48797 8.765063e-01
## 44: 2019    GB Apex Predator  <NA> 3.530446e+02   353.04460 1.000000e+00
## 45: 2019   GOM Apex Predator  <NA> 3.885738e+01    38.85738 1.000000e+00
## 46: 2019 Other Apex Predator  <NA> 1.989314e+01    19.89314 1.000000e+00
## 47: 2019   MAB Apex Predator  <NA> 1.034471e+02   103.44708 1.000000e+00
## 48: 2019    GB        Other MAFMC 7.375803e-02   724.41154 1.018179e-04
## 49: 2019 Other        Other MAFMC 2.165992e-04    26.05801 8.312192e-06
## 50: 2019   MAB        Other MAFMC 5.553946e-01   202.88838 2.737439e-03
## 51: 2019    GB      Benthos MAFMC 7.460759e+03 17332.89385 4.304393e-01
## 52: 2019 Other      Benthos MAFMC 1.544451e+02   257.83216 5.990142e-01
## 53: 2019   MAB      Benthos MAFMC 2.495791e+03  8715.29346 2.863691e-01
## 54: 2019   GOM      Benthos MAFMC 2.162074e+01   630.94878 3.426702e-02
```

```
## 55: 2019    GB       Benthos        <NA> 1.936721e+02 17332.89385 1.117367e-02
## 56: 2019   MAB       Benthos        <NA> 1.606134e+01  8715.29346 1.842892e-03
## 57: 2019   GOM       Benthos        <NA> 5.228082e+01   630.94878 8.286064e-02
## 58: 2019    GB       Benthos       NEFMC 9.678462e+03 17332.89385 5.583870e-01
## 59: 2019   GOM       Benthos       NEFMC 5.570472e+02   630.94878 8.828723e-01
## 60: 2019 Other       Benthos       NEFMC 1.033870e+02   257.83216 4.009858e-01
## 61: 2019   MAB       Benthos       NEFMC 6.203441e+03  8715.29346 7.117880e-01
##     YEAR   EPU        SOE.20 Fed.Managed     SPPLIVMT       Total Prop.managed
```

Graphical differences

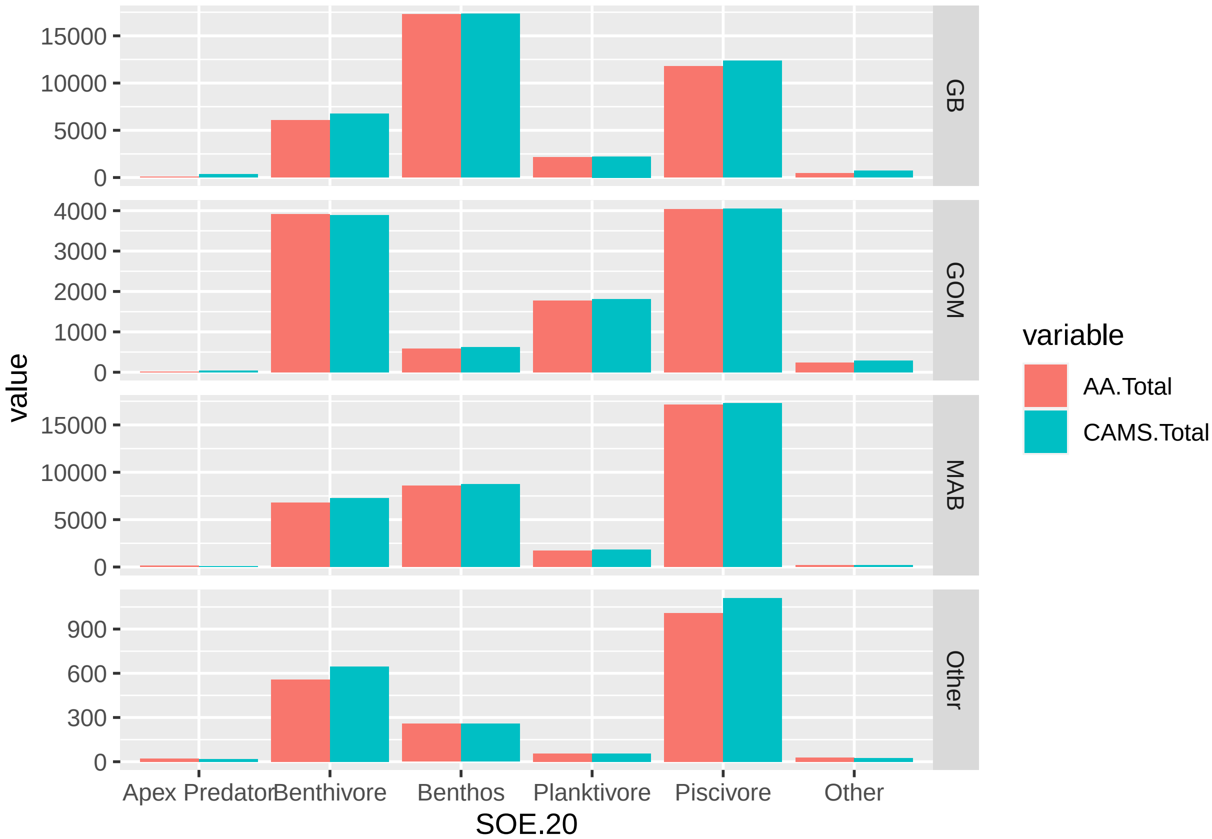
```
#Merge landings
all <- merge(aa.land, cams.land, by = c('YEAR', 'EPU', 'SOE.20', 'Fed.Managed'))
setnames(all, c('SPPLIVMT.x', 'Total.x', 'Prop.managed.x',
                'SPPLIVMT.y', 'Total.y', 'Prop.managed.y'),
         c('AA.SPPLIVMT',   'AA.Total',   'AA.Prop.managed',
           'CAMS.SPPLIVMT', 'CAMS.Total', 'CAMS.Prop.managed'))

tot.land <- unique(all[, list(YEAR, EPU, SOE.20, AA.Total, CAMS.Total)],
                   by = c('YEAR', 'EPU', 'SOE.20'))

#Put in long form
tot.land.long <- data.table::melt(tot.land, id.vars = c('YEAR', 'EPU', 'SOE.20'))

#Plot as a barplot
land.bar <- ggplot(data = tot.land.long,
                   aes(SOE.20, value, fill = variable)) +
    geom_bar(stat = "identity", position = 'dodge') +
    facet_grid(rows = 'EPU', scales = "free")

plot(land.bar)
```


15000
10000
5000
0
GB
4000
3000
2000
1000
0
GOM
value
15000
10000
5000
0
MAB
900
600
300
0
Other
Apex Predator
Benthivore
Benthos
Planktivore
Piscivore
Other
SOE.20
variable
AA.Total
CAMS.Total

Appendix 2. Stock level comparison of landings

Updated 2/15/2022 (Leona Burgess)

Species Review by Total Landings

The following comparisons consist of a review of species by NESPP3 code where they existed in both CAMS and CFDBS (264 species). Comparisons were made between CFDETS (static "AA" tables), CFDERS (dynamic – updated through time as more data becomes available or is updated) and CAMS.

After accounting for the difference between static and dynamic data sets, many of the differences between landings by species could be explained. CFDERS2019 (a dynamic data set like CAMS) was in much greater alignment than CFDETS2019AA was.

Only one species had a greater than 10% difference between CAMS and CFDERS, that was the species known as "Other Fish" with 18% more in both Live and Landed pounds in CFDERS. It's not surprising, and certainly more favorable, that CAMS would identify more species as their actual species than CFDERS did.

One species (White Hake) had 7% more in CFDERS in both Live and Landed pounds than CAMS.

All other species had 2% or less difference between CFDERS and CAMS.

CAMS to CFDETS had much wider variation in both Live and Landed pounds (0% - 1,000% difference).

SPPLIVLB and SPPLNDLB by Species Comparison – All Species

ITIS_TSN	DLR_NESPP3	DLR_SPPNAME	CAMS_LIVLB	CFDERS_LIVLB	CFDETS_LIVLB	CAMS_LNDLB	CFDERS_LNDLB	CFDETS_LNDLB	CAMS_TO_DERS_LIV	CAMS_TO_DERS_LIV_PER_DIF	CAMS_TO_DETS_LIV	CAMS_TO_DETS_LIV_PER_DIF	CAMS_TO_DERS_LND	CAMS_TO_DERS_LND_PER_DIFF	CAMS_TO_DETS_LND	CAMS_TO_DETS_LND_PER_DIFF
161706	001	ALEWIFE	2,155,347	2,155,347	1,847,494	1,847,547	1,847,547	1,847,494	0	0%	307,853	14%	0	0%	53	0%
168691	007	AMALCO JACK	35,562	35,562	35,560	34,240	34,240	34,240	0	0%	2	0%	0	0%	0	0%
168688	003	AMBER JACK	624	624	636	624	624	636	0	0%	-12	-2%	0	0%	-12	-2%
168689	181	AMBERJACK,GREATER	37,759	37,759	38,801	34,951	34,951	34,951	0	0%	-1,042	-3%	0	0%	0	0%
168690	182	AMBERJACK,LESSER	639	639	701	630	630	631	0	0%	-62	-10%	0	0%	-1	0%
164499	012	ANGLER	23,053,779	23,053,769	23,054,366	11,864,838	10,585,278	10,585,601	10	0%	-587	0%	1,279,560	11%	1,279,237	11%
168615	214	BAR JACK	444	444	444	444	444	444	0	0%	0	0%	0	0%	0	0%
170425	018	BARRACUDA	2,126	2,126	2,126	2,052	2,052	2,052	0	0%	0	0%	0	0%	0	0%
172512	027	BARRELFISH	2,850	2,850	2,850	2,764	2,764	2,764	0	0%	0	0%	0	0%	0	0%
167680	418	BASS,STRIPED	4,899,226	4,899,226	4,164,893	4,899,226	4,899,226	4,164,893	0	0%	734,333	15%	0	0%	734,333	15%
161839	006	BAY ANCHOVY	[redacted]													
615855	025	BIG ROUGHY														
011335	819	BLADDER WRACK														
168612	213	BLUE RUNNER	1,198	1,198	1,198	1,198	1,198	1,198	0	0%	0	0%	0	0%	0	0%
168559	023	BLUEFISH	2,811,475	2,811,477	2,790,088	2,799,878	2,799,876	2,765,666	-2	0%	21,387	1%	2	0%	34,212	1%
172409	033	BONITO	63,548	63,548	63,554	63,548	63,548	63,554	0	0%	-6	0%	0	0%	-6	0%
163996	045	BULLHEADS	46,156	46,156	46,156	46,156	46,156	46,156	0	0%	0	0%	0	0%	0	0%
172567	051	BUTTERFISH	7,567,083	7,567,080	7,563,747	7,567,083	7,567,080	7,563,747	3	0%	3,336	0%	3	0%	3,336	0%
163344	063	CARP	[redacted]													
163995	066	CATFISH (FRESHWATER)														
163992	069	CATFISH(SEA)														
163997	067	CATFISH,BLUE														
163998	068	CATFISH,CHANNEL														
164029	064	CATFISH,FLATHEAD														
164037	065	CATFISH,WHITE														
079118	764	CLAM NK														
080983	765	CLAM,ARTIC SURF	8,965	8,965	8,964	1,669	1,669	1,669	0	0%	1	0%	0	0%	0	0%
079342	743	CLAM,BLOOD ARC	128,042	128,042	18,673	16,950	16,950	18,673	0	0%	109,369	85%	0	0%	-1,723	-10%
081022	760	CLAM,RAZOR	555,476	555,476	620,192	220,593	220,593	220,694	0	0%	-64,716	-12%	0	0%	-101	0%

ITIS_TSN	DLR_NESPP3	DLR_SPPNAME	CAMS_LIVLB	CFDERS_LIVLB	CFDETS_LIVLB	CAMS_LNDLB	CFDERS_LNDLB	CFDETS_LNDLB	CAMS_TO_DERS_LIV	CAMS_TO_DERS_LIV_PER_DIF	CAMS_TO_DETS_LIV	CAMS_TO_DETS_LIV_PER_DIF	CAMS_TO_DERS_LND	CAMS_TO_DERS_LND_PER_DIFF	CAMS_TO_DETS_LND	CAMS_TO_DETS_LND_PER_DIFF
081692	763	CLAM,SOFT	11,834,614	11,834,614	13,794,557	2,806,888	2,806,888	2,814,278	0	0%	- 1,959,943	-17%	0	0%	-7,390	0%
080944	769	CLAM,SURF	195,476,991	195,476,99 1	214,968,90 6	41,024,587	41,024,587	41,024,592	0	0%	- 19,491,915	-10%	0	0%	-5	0%
168566	057	COBIA	60,324	60,324	56,908	56,319	56,319	52,904	0	0%	3,416	6%	0	0%	3,415	6%
164712	081	COD	2,242,582	2,223,921	2,224,438	1,917,208	1,900,194	1,900,673	18,661	1%	18,144	1%	17,014	1%	16,535	1%
072554	775	CONCHS	1,908,110	1,908,110	3,230,922	977,331	977,331	1,028,947	0	0%	- 1,322,812	-69%	0	0%	- 51,616	-5%
098696	700	CRAB,BLUE	70,464,885	70,464,885	68,394,423	70,439,272	70,439,272	68,394,423	0	0%	2,070,462	3%	0	0%	2,044,849	3%
098734	708	CRAB,GREEN	176,541	176,541	137,735	176,541	176,541	137,735	0	0%	38,806	22%	0	0%	38,806	22%
082703	724	CRAB,HORSESHOE	2,471,544	2,471,544	2,163,246	2,037,864	2,037,864	2,163,246	0	0%	308,298	12%	0	0%	- 125,382	-6%
098678	711	CRAB,JONAH	[redacted]													
098714	701	CRAB,LADY														
098276	713	CRAB,NK	45,116	45,116	45,116	45,116	45,116	45,116	0	0%	0	0%	0	0%	0	0%
620992	710	CRAB,RED	[redacted]													
098679	712	CRAB,ROCK	2,108,740	2,108,740	2,130,297	2,108,740	2,108,740	2,130,297	0	0%	-21,557	-1%	0	0%	21,557	-1%
098417	715	CRAB,SPIDER	1 613	1 613	1 613	1 613	1 613	1 613	0	0%	0	0%	0	0%	0	0%
168165	084	CRAPPIE	[redacted]													
168609	087	CREVALLE	8,355	8,355	8,348	8,355	8,355	8,348	0	0%	7	0%	0	0%	7	0%
169283	090	CROAKER,ATLANTIC	2,148,872	2,148,872	2,084,983	2,148,879	2,148,879	2,084,983	0	0%	63,889	3%	0	0%	63,896	3%
083677	834	CRUSTACEANS NK	6,109,326	6,109,326	4,872,168	4,872,168	4,872,168	4,872,168	0	0%	1,237,158	20%	0	0%	0	0%
170481	093	CUNNER	7,242	7,242	7,077	7,242	7,242	7,077	0	0%	165	2%	0	0%	165	2%
164740	096	CUSK	45,443	45,433	45,522	40,195	40,196	40,305	10	0%	-79	0%	-1	0%	-110	0%
172385	099	CUTLASSFISH, ATLANTIC	287,906	287,906	287,906	287,906	287,906	287,906	0	0%	0	0%	0	0%	0	0%
160604	350	DOGFISH (NK)	[redacted]													
160703	339	DOGFISH BLACK														
160230	351	DOGFISH SMOOTH	1,112,890	1,112,890	1,073,688	863,484	863,488	863,036	0	0%	39,202	4%	-4	0%	448	0%
160617	352	DOGFISH SPINY	17,437,201	17,437,201	17,438,628	17,467,025	17,467,025	17,294,469	0	0%	-1,427	0%	0	0%	172,556	1%
168790	105	DOLPHINFISH	355,915	355,915	335,057	315,981	315,981	322,329	0	0%	20,858	6%	0	0%	-6,348	-2%
169288	106	DRUM,BLACK	174,558	174,558	124,369	174,558	174,558	124,369	0	0%	50,189	29%	0	0%	50,189	29%
169269	109	DRUM,BRANDED	[redacted]													
169237	104	DRUM,NK	255	255	255	255	255	255	0	0%	0	0%	0	0%	0	0%
169290	107	DRUM,RED	22,288	22,288	21,587	22,288	22,288	21,587	0	0%	701	3%	0	0%	701	3%

ITIS_TSN	DLR_NESPP3	DLR_SPPNAME	CAMS_LIVLB	CFDERS_LIVLB	CFDETS_LIVLB	CAMS_LNDLB	CFDERS_LNDLB	CFDETS_LNDLB	CAMS_TO_DERS_LIV	CAMS_TO_DERS_LIV_PER_DIF	CAMS_TO_DETS_LIV	CAMS_TO_DETS_LIV_PER_DIF	CAMS_TO_DERS_LND	CAMS_TO_DERS_LND_PER_DIFF	CAMS_TO_DETS_LND	CAMS_TO_DETS_LND_PER_DIFF
161127	115	EEL,AMERICAN	541,137	541,135	502,128	540,511	540,509	502,128	2	0%	39,009	7%	2	0%	38,383	7%
161326	116	EEL,CONGER	49,813	49,819	49,109	49,803	49,809	49,099	-6	0%	704	1%	-6	0%	704	1%
161123	117	EEL,NK	[redacted]													
171671	206	EEL,SAND (LAUNCE)	478	478	478	478	478	478	0	0%	0	0%	0	0%	0	0%
172362	385	ESCOLAR	6,901	6,901	7,232	6,901	6,901	7,232	0	0%	-331	-5%	0	0%	-331	-5%
011228	820	FINGERED KELP	[redacted]													
172877	124	FLOUNDER,AM. PLAICE	2,173,573	2,173,606	2,173,760	2,173,573	2,173,606	2,173,760	-33	0%	-187	0%	-33	0%	-187	0%
172739	127	FLOUNDER,FOURSPOT	14,420	14,420	14,420	14,420	14,420	14,420	0	0%	0	0%	0	0%	0	0%
172719	129	FLOUNDER,GULFSTREAM	[redacted]													
172746	125	FLOUNDER,SAND-DAB	23,666	23,666	21,513	23,666	23,666	21,513	0	0%	2,153	9%	0	0%	2,153	9%
172738	130	FLOUNDER,SOUTHERN	312,211	312,211	312,107	312,211	312,211	312,107	0	0%	104	0%	0	0%	104	0%
172735	121	FLOUNDER,SUMMER	9,064,016	9,064,076	9,059,025	9,064,016	9,064,076	9,059,025	-60	0%	4,991	0%	-60	0%	4,991	0%
172905	120	FLOUNDER,WINTER	1,287,981	1,284,418	1,284,816	1,287,981	1,284,418	1,284,816	3,563	0%	3,165	0%	3,563	0%	3,165	0%
172873	122	FLOUNDER,WITCH	1,763,127	1,763,144	1,763,539	1,763,127	1,763,144	1,763,539	-17	0%	-412	0%	-17	0%	-412	0%
172909	123	FLOUNDER,YELLOWTAIL	906,678	906,679	906,691	906,678	906,679	906,691	-1	0%	-13	0%	-1	0%	-13	0%
161092	133	GARFISH	4,709	4,709	4,709	4,709	4,709	4,709	0	0%	0	0%	0	0%	0	0%
161737	134	GIZZARD SHAD	2,056,605	2,056,605	2,037,611	2,056,605	2,056,605	2,037,611	0	0%	18,994	1%	0	0%	18,994	1%
164500	013	GOOSEFISH,BLACKFIN	7,325	7,329	7,271	7,325	7,329	7,271	-4	0%	54	1%	-4	0%	54	1%
181220	590	GRAYSBY	[redacted]													
551018	141	GROUPER	11,496	11,496	11,495	9,283	9,283	9,283	0	0%	1	0%	0	0%	0	0%
167759	593	GROUPER,GAG	[redacted]													
167702	026	GROUPER,RED														
167763	145	GROUPER,SCAMP														
167705	146	GROUPER,SNOWY	61,319	61,319	61,042	49,812	49,812	49,612	0	0%	277	0%	0	0%	200	0%
167699	142	GROUPER,YELLOWEDGE	3,148	3,148	3,148	2,630	2,630	2,630	0	0%	0	0%	0	0%	0	0%
169055	144	GRUNTS	[redacted]													
164744	147	HADDOCK	19,214,463	19,160,983	19,162,246	16,856,292	16,808,223	16,809,451	53,480	0%	52,217	0%	48,069	0%	46,841	0%
159753	150	HAGFISH	[redacted]													
164729	155	HAKE MIX RED & WHITE	10,106	10,106	9,606	10,083	10,083	9,583	0	0%	500	5%	0	0%	500	5%
164793	508	HAKE,OFFSHORE	3,361	3,359	3,359	3,359	3,358	3,358	2	0%	2	0%	1	0%	1	0%

ITIS_TSN	DLR_NESPP3	DLR_SPPNAME	CAMS_LIVLB	CFDERS_LIVLB	CFDETS_LIVLB	CAMS_LNDLB	CFDERS_LNDLB	CFDETS_LNDLB	CAMS_TO_DERS_LIV	CAMS_TO_DERS_LIV_PER_DIF	CAMS_TO_DETS_LIV	CAMS_TO_DETS_LIV_PER_DIF	CAMS_TO_DERS_LND	CAMS_TO_DERS_LND_PER_DIFF	CAMS_TO_DETS_LND	CAMS_TO_DETS_LND_PER_DIFF
164730	152	HAKE,RED	1,019,877	1,019,876	987,838	988,983	988,982	987,838	1	0%	32,039	3%	1	0%	1,145	0%
164791	509	HAKE,SILVER	11,545,267	11,545,278	11,530,225	11,539,887	11,539,898	11,524,842	-11	0%	15,042	0%	-11	0%	15,045	0%
164731	662	HAKE,SPOTTED	[redacted]													
164732	153	HAKE,WHITE	4,355,248	4,029,884	4,031,100	3,253,383	3,009,877	3,011,165	325,364	7%	324,148	7%	243,506	7%	242,218	7%
172933	159	HALIBUT,ATLANTIC	111,110	111,113	109,294	97,675	97,671	96,011	-3	0%	1,816	2%	4	0%	1,664	2%
172564	165	HARVEST FISH	99,184	99,184	99,181	99,184	99,184	99,181	0	0%	3	0%	0	0%	3	0%
161700	167	HERRING (NK)	54,697	54,697	54,698	54,697	54,697	54,698	0	0%	-1	0%	0	0%	-1	0%
161748	174	HERRING,ATL THREAD	13,432	13,432	13,432	13,432	13,432	13,432	0	0%	0	0%	0	0%	0	0%
161722	168	HERRING,ATLANTIC	28,655,997	28,655,997	28,655,997	28,655,997	28,655,997	28,655,997	0	0%	0	0%	0	0%	0	0%
161703	112	HERRING,BLUE BACK	2,778	2,778	2,773	2,778	2,778	2,773	0	0%	5	0%	0	0%	5	0%
161701	170	HERRING,RIVER	[redacted]													
161743	166	HERRING,ROUND	70	70	70	70	70	70	0	0%	0	0%	0	0%	0	0%
167700	032	HIND,RED	[redacted]													
167696	028	HIND,ROCK	[redacted]													
170566	179	HOGFISH	[redacted]													
165577	020	HOUNDFISH	[redacted]													
166284	188	JOHN DORY	102,403	102,405	102,433	102,403	102,405	102,433	-2	0%	-30	0%	-2	0%	-30	0%
011222	833	KELP,SUGAR	256,646	256,646	256,646	256,646	256,646	256,646	0	0%	0	0%	0	0%	0	0%
169276	196	KINGFISH,NORTHERN	1,288	1,288	927	1,288	1,288	927	0	0%	361	28%	0	0%	361	28%
161111	268	LADYFISH	930	930	930	930	930	930	0	0%	0	0%	0	0%	0	0%
097314	727	LOBSTER	127,868,085	127,868,087	126,574,087	127,868,085	127,868,087	126,574,087	-2	0%	1,293,998	1%	-2	0%	1,293,998	1%
097648	728	LOBSTER,SPINY	[redacted]													
172414	212	MACKEREL,ATLANTIC	11,122,269	11,122,273	11,859,398	11,123,297	11,123,301	11,859,398	-4	0%	737,129	-7%	-4	0%	736,101	-7%
172455	131	MACKEREL,BULLET	269	269	269	269	269	269	0	0%	0	0%	0	0%	0	0%
172412	215	MACKEREL,CHUB	60,522	60,522	60,524	60,522	60,522	60,524	0	0%	-2	0%	0	0%	-2	0%
172456	132	MACKEREL,FRIGATE	316	316	316	316	316	316	0	0%	0	0%	0	0%	0	0%
172435	194	MACKEREL,KING	568,031	568,031	568,002	546,553	546,553	546,520	0	0%	29	0%	0	0%	33	0%
172436	384	MACKEREL,SPANISH	876,923	876,923	851,593	876,852	876,852	851,522	0	0%	25,330	3%	0	0%	25,330	3%
172491	217	MARLIN BLUE	[redacted]													

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161731	221	MENHADEN	[redacted]													
163342	223	MINNOW	[redacted]													
069458	804	MOLLUSKS NK	103,211	103,211	162,369	51,718	51,718	51,716	0	0%	-59,158	-57%	0	0%	2	0%
170333	234	MULLETS	12,451	12,450	12,403	12,450	12,449	12,403	1	0%	48	0%	1	0%	47	0%
165647	237	MUMMICHOG	[redacted]													
079454	781	MUSSELS	12,404,485	12,404,485	12,394,696	2,117,887	2,117,887	2,115,128	0	0%	9,789	0%	0	0%	2,759	0%
165551	019	NEEDLEFISH,ATLANTIC	9,927	9,927	9,927	9,927	9,927	9,927	0	0%	0	0%	0	0%	0	0%
011217	821	OARWEED KELP	[redacted]													
082590	786	OCTOPUS	[redacted]													
166326	249	OPAH	7,270	7,270	7,408	7,270	7,270	7,408	0	0%	-138	-2%	0	0%	-138	-2%
914179	526	OTHER FISH	790,569	647,524	790,027	790,490	647,445	790,027	143,045	18%	542	0%	143,045	18%	463	0%
079885	792	OYSTER,EUROPEAN FLT	[redacted]													
079872	789	OYSTERS	83,080,866	83,080,866	801,517,287	6,318,039	6,318,039	53,151,049	0	0%	718,436,421	-865%	0	0%	46,833,010	-741%
167793	311	PERCH,SAND	308	308	3,873	308	308	3,873	0	0%	-3,565	-1157%	0	0%	-3,565	-1157%
167678	506	PERCH,WHITE	1,267,189	1,267,189	1,202,776	1,267,189	1,267,189	1,202,776	0	0%	64,413	5%	0	0%	64,413	5%
168469	517	PERCH,YELLOW	[redacted]													
070419	798	PERIWINKLES	574,432	574,432	863,862	206,921	206,921	207,133	0	0%	289,430	-50%	0	0%	-212	0%
169077	258	PIGFISH	8,627	8,627	8,627	8,627	8,627	8,627	0	0%	0	0%	0	0%	0	0%
169187	267	PINFISH	[redacted]													
164727	269	POLLOCK	6,981,104	6,980,109	6,980,837	6,178,452	6,177,322	6,177,763	995	0%	267	0%	1,130	0%	689	0%
170287	271	POMFRETS	2,235	2,235	2,258	2,235	2,235	2,258	0	0%	-23	-1%	0	0%	-23	-1%
168708	272	POMPANO,COMMON	20,700	20,700	20,678	20,700	20,700	20,678	0	0%	22	0%	0	0%	22	0%
169197	325	PORGY,JOLTHEAD	[redacted]													
169180	332	PORGY,NK	[redacted]													
169207	330	PORGY,RED	[redacted]													
173289	430	PUFFER	2,171	2,171	1,934	1,934	1,934	1,934	0	0%	237	11%	0	0%	0	0%
173283	431	PUFFER	1,777	1,777	1,777	1,777	1,777	1,777	0	0%	0	0%	0	0%	0	0%
173290	429	PUFFER,NORTHERN	88,364	88,364	82,481	46,369	46,369	50,437	0	0%	5,883	7%	0	0%	-4,068	-9%
081495	748	QUAHOG	43,770,944	43,770,944	106,481,039	14,419,274	14,419,274	14,174,448	0	0%	-62,710,095	-143%	0	0%	244,826	2%

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081343	754	QUAHOG,OCEAN	203,693,884	203,693,884	203,693,884	24,690,155	24,690,155	24,690,155	0	0%	0	0%	0	0%	0	0%
160985	285	RAY,COWNOSE	16,924	16,924	12,201	12,201	12,201	12,201	0	0%	4,723	28%	0	0%	0	0%
166774	240	REDFISH	11,728,113	11,728,129	11,728,206	11,728,113	11,728,129	11,728,206	-16	0%	-93	0%	-16	0%	-93	0%
166339	098	RIBBONFISH	49,869	49,869	49,400	49,869	49,869	49,400	0	0%	469	1%	0	0%	469	1%
011329	832	ROCKWEED	14,793,321	14,793,321	14,793,321	14,793,321	14,793,321	14,793,321	0	0%	0	0%	0	0%	0	0%
166787	242	ROSEFISH,BLK BELLIED	2,355	2,355	2,355	2,355	2,355	2,355	0	0%	0	0%	0	0%	0	0%
168693	008	RUDDERFISH,BANDED	[redacted]													
161996	305	SALMON,ATLANTIC	[redacted]													
079737	799	SCALLOP,BAY	1,020,406	1,020,406	2,434,715	291,197	291,197	295,474	0	0%	1,414,309	-139%	0	0%	-4,277	-1%
079718	800	SCALLOP,SEA	505,867,534	505,867,539	507,769,570	60,729,223	60,729,221	60,956,687	-5	0%	-1,902,036	0%	2	0%	-227,464	0%
167196	326	SCULPINS	[redacted]													
169182	329	SCUP	13,784,076	13,784,080	13,783,703	13,784,076	13,784,080	13,783,703	-4	0%	373	0%	-4	0%	373	0%
167690	328	SEA BASS,BANK	390	390	390	390	390	390	0	0%	0	0%	0	0%	0	0%
167687	335	SEA BASS,BLACK	3,524,942	3,524,951	3,534,455	3,524,942	3,524,951	3,534,455	-9	0%	-9,513	0%	-9	0%	-9,513	0%
167686	333	SEA BASS,NK	[redacted]													
167289	327	SEA RAVEN	446	446	446	446	446	446	0	0%	0	0%	0	0%	0	0%
167010	343	SEA ROBIN,ARMORED	[redacted]													
166974	340	SEA ROBIN,NORTHERN	3,711	3,711	3,711	3,711	3,711	3,711	0	0%	0	0%	0	0%	0	0%
166975	342	SEA ROBIN,STRIPED	[redacted]													
166972	341	SEA ROBINS	70,840	70,839	69,195	70,840	70,839	69,195	1	0%	1,645	2%	1	0%	1,645	2%
157968	805	SEA URCHINS	1,732,825	1,732,825	1,732,825	1,732,825	1,732,825	1,732,825	0	0%	0	0%	0	0%	0	0%
010685	817	SEA WEEDS,NK	[redacted]													
169238	334	SEATROUT,NK	[redacted]													
161702	347	SHAD,AMERICAN	59,499	59,499	61,783	66,047	66,047	61,783	0	0%	-2,284	-4%	0	0%	4,264	6%
161704	173	SHAD,HICKORY	119,356	119,356	119,356	119,356	119,356	119,356	0	0%	0	0%	0	0%	0	0%
160200	494	SHARK,ATL SHARPNOSE	425,707	425,707	426,606	215,051	215,039	215,661	0	0%	-899	0%	12	0%	-610	0%
160318	487	SHARK,BLACK TIP	73,677	73,677	72,512	43,443	43,441	42,292	0	0%	1,165	2%	2	0%	1,151	3%
160502	476	SHARK,BONNETHEAD	[redacted]													

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160275	489	SHARK,BULL	[redacted]													
160409	499	SHARK,FINETOOTH	638	638	459	341	341	341	0	0%	179	28%	0	0%	0	0%
160515	386	SHARK,HAMERHD GREAT	35,972	35,972	35,972	25,890	25,890	25,890	0	0%	0	0%	0	0%	0	0%
160508	478	SHARK,HMHD,SCALLOPED	[redacted]													
160505	479	SHARK,HMHD,SMOOTH	[redacted]													
160433	492	SHARK,LEMON	[redacted]													
159923	357	SHARK,MAKO	[redacted]													
159924	355	SHARK,MAKO SHORTFIN	70,052	70,052	64,450	40,785	40,785	46,443	0	0%	5,602	8%	0	0%	-5,658	-14%
159785	359	SHARK,NK	[redacted]													
159911	481	SHARK,PORBEAGLE	[redacted]													
160289	482	SHARK,SANDBAR	48,366	48,366	69,413	35,086	35,086	35,365	0	0%	-21,047	-44%	0	0%	-279	-1%
160310	485	SHARK,SILKY	[redacted]													
160401	488	SHARK,SPINNER	66,380	66,380	67,834	48,065	48,044	49,090	0	0%	-1,454	-2%	21	0%	-1,025	-2%
159916	353	SHARK,THRESHER	73,547	73,546	94,204	52,423	52,424	52,074	1	0%	-20,657	-28%	-1	0%	349	1%
159915	360	SHARK,THRESHER UNC	[redacted]													
159921	354	SHARK,THRESHR BGEYE	[redacted]													
160189	491	SHARK,TIGER	3,760	3,760	3,760	1,895	1,895	1,895	0	0%	0	0%	0	0%	0	0%
159851	498	SHARKS,PELAGIC	4,296	4,296	4,258	4,299	4,296	4,258	0	0%	38	1%	3	0%	41	1%
169189	356	SHEEPSHEAD	51,031	51,031	50,948	51,031	51,031	50,948	0	0%	83	0%	0	0%	83	0%
099140	737	SHRIMP (MANTIS)	37,278	37,279	37,279	37,278	37,279	37,279	-1	0%	-1	0%	-1	0%	-1	0%
096106	735	SHRIMP (NK)	[redacted]													
096967	736	SHRIMP (PANDALID)	[redacted]													
095602	738	SHRIMP (PENAEID)	48,111	48,111	48,016	48,016	48,016	48,016	0	0%	95	0%	0	0%	0	0%
096027	730	SHRIMP (SICYONIA)	[redacted]													
551570	731	SHRIMP,BROWN	861,917	861,917	861,917	861,917	861,917	861,917	0	0%	0	0%	0	0%	0	0%
164790	507	SILVER&OFFSHAKE MIX	2,123	2,124	2,430	2,123	2,124	2,430	-1	0%	-307	-14%	-1	0%	-307	-14%
165994	362	SILVERSIDE,ATLANTIC	68,906	68,906	63,952	68,906	68,906	63,952	0	0%	4,954	7%	0	0%	4,954	7%
165984	363	SILVERSIDE,NK	[redacted]													
564139	368	SKATE,BARNDOOR	483,243	483,243	483,263	286,021	286,021	286,030	0	0%	-20	0%	0	0%	-9	0%
160855	372	SKATE,CLEARNOSE	28,927	28,927	28,929	15,066	15,066	15,067	0	0%	-2	0%	0	0%	-1	0%

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564130	366	SKATE,LITTLE	8,738,117	8,738,117	8,705,522	8,733,432	8,733,432	8,700,835	0	0%	32,595	0%	0	0%	32,597	0%
564136	364	SKATE,ROSETTE	[redacted]													
564151	369	SKATE,SMOOTH	481,876	481,874	481,697	237,615	237,611	237,474	2	0%	179	0%	4	0%	141	0%
564149	370	SKATE,THORNY	301	301	301	295	295	295	0	0%	0	0%	0	0%	0	0%
564145	367	SKATE,WINTER(BIG)	17,567,387	17,567,390	17,566,769	9,203,544	9,203,548	9,203,328	-3	0%	618	0%	-4	0%	216	0%
160845	365	SKATES(HEADS)	828,090	828,088	826,097	656,908	656,909	677,851	2	0%	1,993	0%	-1	0%	-20,943	-3%
162028	371	SMELT	[redacted]													
072878	780	SNAIL,MOON	9,769	9,769	9,769	9,769	9,769	9,769	0	0%	0	0%	0	0%	0	0%
166680	392	SNAKEHEAD,NORTHERN	[redacted]													
168845	336	SNAPPER	[redacted]													
168848	323	SNAPPER,GRAY	[redacted]													
168853	376	SNAPPER,RED	5,522	5,522	5,520	5,181	5,181	5,180	0	0%	2	0%	0	0%	1	0%
168909	374	SNAPPER,VERMILLION	[redacted]													
553178	381	SPADEFISH	30,485	30,485	30,454	30,485	30,485	30,454	0	0%	31	0%	0	0%	31	0%
169267	406	SPOT	1,488,452	1,488,452	1,225,808	1,488,526	1,488,526	1,225,808	0	0%	262,644	18%	0	0%	262,718	18%
082521	802	SQUID (ILLEX)	59,885,255	59,885,256	59,885,268	59,885,157	59,885,158	59,885,170	-1	0%	-13	0%	-1	0%	-13	0%
082372	801	SQUID (LOLIGO)	27,466,124	27,466,125	27,462,959	27,348,668	27,348,671	27,345,520	-1	0%	3,165	0%	-3	0%	3,148	0%
082367	807	SQUID,UNC	62	62	62	62	62	62	0	0%	0	0%	0	0%	0	0%
082369	803	SQUIDS,LOLIGINIDAE	1,418	1,418	1,393	1,418	1,418	1,393	0	0%	25	2%	0	0%	25	2%
166170	024	SQUIRRELFISH	568	568	568	556	556	556	0	0%	0	0%	0	0%	0	0%
156862	828	STARFISH	[redacted]													
171055	031	STARGAZER,NORTHERN	85	85	85	85	85	85	0	0%	0	0%	0	0%	0	0%
649685	286	STINGRAYS	[redacted]													
170335	235	STRIPED MULLET	896,851	896,851	896,851	896,851	896,851	896,851	0	0%	0	0%	0	0%	0	0%
168093	426	SUNFISHES	[redacted]													
172482	432	SWORDFISH	1,311,549	1,311,549	1,331,368	988,330	988,330	998,062	0	0%	-19,819	-2%	0	0%	-9,732	-1%
161116	435	TARPON	[redacted]													
170479	438	TAUTOG	408,333	408,333	405,593	408,333	408,333	405,593	0	0%	2,740	1%	0	0%	2,740	1%
168537	447	TILEFISH (NK)	[redacted]													
168543	444	TILEFISH,BLUELINE	87,363	87,364	87,376	81,021	81,021	81,034	-1	0%	-13	0%	0	0%	-13	0%
168546	446	TILEFISH,GOLDEN	1,555,823	1,555,822	1,557,493	1,429,147	1,429,151	1,428,924	1	0%	-1,670	0%	-4	0%	223	0%

ITIS_TSN	DLR_NESPP3	DLR_SPPNAME	CAMS_LIVLB	CFDERS_LIVLB	CFDETS_LIVLB	CAMS_LNDLB	CFDERS_LNDLB	CFDETS_LNDLB	CAMS_TO_DERS_LIV	CAMS_TO_DERS_LIV_PER_DIF	CAMS_TO_DETS_LIV	CAMS_TO_DETS_LIV_PER_DIF	CAMS_TO_DERS_LND	CAMS_TO_DERS_LND_PER_DIFF	CAMS_TO_DETS_LND	CAMS_TO_DETS_LND_PER_DIFF
168544	443	TILEFISH,GOLDFACE	[redacted]													
168548	445	TILEFISH,SAND	3,867	3,867	3,878	3,848	3,848	3,859	0	0%	-11	0%	0	0%	-11	0%
164412	451	TOADFISH,OYSTER	5,431	5,431	5,129	5,431	5,431	5,129	0	0%	302	6%	0	0%	302	6%
173128	456	TRIGGERFISH	87,231	87,185	87,118	87,231	87,185	87,118	46	0%	113	0%	46	0%	113	0%
173138	457	TRIGGERFISH, GRAY	38,755	38,755	38,739	38,756	38,755	38,739	0	0%	16	0%	1	0%	17	0%
169007	459	TRIPLETAIL	1,618	1,618	1,618	1,618	1,618	1,618	0	0%	0	0%	0	0%	0	0%
161989	415	TROUT,STEELHEAD	212	212	212	212	212	212	0	0%	0	0%	0	0%	0	0%
172419	470	TUNA,ALBACORE	249,766	249,766	263,509	174,655	174,655	182,402	0	0%	-13,743	-6%	0	0%	-7,747	-4%
172428	469	TUNA,BIG EYE	1,059,727	1,059,727	1,264,369	848,124	848,124	850,306	0	0%	-204,642	-19%	0	0%	-2,182	0%
172427	464	TUNA,BLACKFIN	19,985	19,985	21,030	14,494	14,494	14,494	0	0%	-1,045	-5%	0	0%	0	0%
172421	467	TUNA,BLUEFIN	2,329,529	2,329,529	2,330,521	1,850,730	1,850,730	1,851,540	0	0%	-992	0%	0	0%	-810	0%
172402	468	TUNA,LITTLE	246,952	246,951	239,045	245,799	245,798	237,928	1	0%	7,907	3%	1	0%	7,871	3%
172401	466	TUNA,SKIPJACK	1,712	1,712	1,625	1,497	1,497	1,501	0	0%	87	5%	0	0%	-4	0%
172423	471	TUNA,YELLOWFIN	1,112,374	1,112,374	1,327,003	895,126	895,126	899,492	0	0%	-214,629	-19%	0	0%	-4,366	0%
173752	815	TURTLE,SNAPPER	[redacted]													
172451	472	WAHOO	25,220	25,220	25,217	23,599	23,599	23,599	0	0%	3	0%	0	0%	0	0%
169239	345	WEAKFISH,SPOTTED	308,354	308,354	302,564	308,354	308,354	302,564	0	0%	5,790	2%	0	0%	5,790	2%
169241	344	WEAKFISH,SQUETEAGUE	160,125	160,127	151,446	160,125	160,127	151,446	-2	0%	8,679	5%	-2	0%	8,679	5%
074096	776	WHELK,CHANNELED	4,342,863	4,342,863	4,277,917	1,383,587	1,383,587	1,362,408	0	0%	64,946	1%	0	0%	21,179	2%
074071	777	WHELK,KNOBBED	1,885,666	1,885,666	1,915,600	609,154	609,154	610,074	0	0%	-29,934	-2%	0	0%	-920	0%
074075	778	WHELK,LIGHTNING	[redacted]													
073795	779	WHELK,WAVED	48,194	48,194	151,329	48,194	48,194	48,194	0	0%	103,135	-214%	0	0%	0	0%
169273	197	WHITING,KING	487,322	487,327	483,297	487,322	487,327	483,297	-5	0%	4,025	1%	-5	0%	4,025	1%
011300	822	WINGED KELP	[redacted]													
066107	823	WORMS	[redacted]													
065902	825	WORMS	[redacted]													
011332	824	WORMWEED	[redacted]													
167914	513	WRECKFISH	[redacted]													

SPPLIVLB and SPPLNDLB by Species Comparison – Population Dynamics Species

The species that the Population Dynamics Branch monitors and provides stock assessments for, all had a much smaller range of difference between CAMS and CFDETS than the overall general species, which was positive to see.

ITIS_TSN	DLR_NESPP3	DLR_SPPNAME	CAMS_LIVLB	CFDERS_LIVLB	CFDETS_LIVLB	CAMS_LNDLB	CFDERS_LNDLB	CFDETS_LNDLB	CAMS_to_DERS_LIV	CAMS_DERS_LIV_PER	CAMS_to_DETS_LIV	CAMS_DETS_LIV_PER	CAMS_to_DERS_LND	CAMS_DERS_LND_PER	CAMS_to_DETS_LND	CAMS_DETS_LND_PER
161706	001	ALEWIFE	2,155,347	2,155,347	1,847,494	1,847,547	1,847,547	1,847,494	-	0%	307,853	14%	-	0%	53	0%
164499	012	ANGLER	23,053,779	23,053,769	23,054,366	11,864,838	10,585,278	10,585,601	10	0%	(587)	0%	1,279,560	11%	1,279,237	11%
167680	418	BASS,STRIPED	4,899,226	4,899,226	4,164,893	4,899,226	4,899,226	4,164,893	-	0%	734,333	15%	-	0%	734,333	15%
168559	023	BLUEFISH	2,811,475	2,811,477	2,790,088	2,799,878	2,799,876	2,765,666	(2)	0%	21,387	1%	2	0%	34,212	1%
172567	051	BUTTERFISH	7,567,083	7,567,080	7,563,747	7,567,083	7,567,080	7,563,747	3	0%	3,336	0%	3	0%	3,336	0%
080944	769	CLAM,SURF	195,476,991	195,476,991	214,968,906	41,024,587	41,024,587	41,024,592	-	0%	(19,491,915)	-10%	-	0%	(5)	0%
164712	081	COD	2,242,582	2,223,921	2,224,438	1,917,208	1,900,194	1,900,673	18,661	1%	18,144	1%	17,014	1%	16,535	1%
098678	711	CRAB,JONAH	[redacted]													
620992	710	CRAB,RED														
160230	351	DOGFISH SMOOTH	1,112,890	1,112,890	1,073,688	863,484	863,488	863,036	-	0%	39,202	4%	(4)	0%	448	0%
160617	352	DOGFISH SPINY	17,437,201	17,437,201	17,438,628	17,467,025	17,467,025	17,294,469	-	0%	(1,427)	0%	-	0%	172,556	1%
172877	124	FLOUNDER,AM. PLAICE	2,173,573	2,173,606	2,173,760	2,173,573	2,173,606	2,173,760	(33)	0%	(187)	0%	(33)	0%	(187)	0%
172746	125	FLOUNDER,SAND-DAB	23,666	23,666	21,513	23,666	23,666	21,513	-	0%	2,153	9%	-	0%	2,153	9%
172735	121	FLOUNDER,SUMMER	9,064,069	9,064,076	9,059,025	9,064,069	9,064,076	9,059,025	(7)	0%	5,044	0%	(7)	0%	5,044	0%
172905	120	FLOUNDER,WINTER	1,287,981	1,284,418	1,284,816	1,287,981	1,284,418	1,284,816	3,563	0%	3,165	0%	3,563	0%	3,165	0%
172873	122	FLOUNDER,WITCH	1,763,127	1,763,144	1,763,539	1,763,127	1,763,144	1,763,539	(17)	0%	(412)	0%	(17)	0%	(412)	0%
172909	123	FLOUNDER,YELLOWTAIL	906,678	906,679	906,691	906,678	906,679	906,691	(1)	0%	(13)	0%	(1)	0%	(13)	0%
164744	147	HADDOCK	19,214,463	19,160,983	19,162,246	16,856,292	16,808,223	16,809,451	53,480	0%	52,217	0%	48,069	0%	46,841	0%
164793	508	HAKE,OFFSHORE	3,361	3,359	3,359	3,359	3,358	3,358	2	0%	2	0%	1	0%	1	0%
164730	152	HAKE,RED	1,019,877	1,019,876	987,838	988,983	988,982	987,838	1	0%	32,039	3%	1	0%	1,145	0%
164791	509	HAKE,SILVER	11,545,267	11,545,278	11,530,225	11,539,887	11,539,898	11,524,842	(11)	0%	15,042	0%	(11)	0%	15,045	0%
164732	153	HAKE,WHITE	4,355,248	4,029,884	4,031,100	3,253,383	3,009,877	3,011,165	325,364	7%	324,148	7%	243,506	7%	242,218	7%
172933	159	HALIBUT,ATLANTIC	111,110	111,113	109,294	97,675	97,671	96,011	(3)	0%	1,816	2%	4	0%	1,664	2%
161722	168	HERRING,ATLANTIC	28,655,997	28,655,997	28,655,997	28,655,997	28,655,997	28,655,997	-	0%	-	0%	-	0%	-	0%
161703	112	HERRING,BLUE BACK	2,778	2,778	2,773	2,778	2,778	2,773	-	0%	5	0%	-	0%	5	0%
161701	170	HERRING,RIVER	[redacted]													
097314	727	LOBSTER	127,868,085	127,868,087	126,574,087	127,868,085	127,868,087	126,574,087	(2)	0%	1,293,998	1%	(2)	0%	1,293,998	1%
172414	212	MACKEREL,ATLANTIC	11,122,269	11,122,273	11,859,398	11,123,297	11,123,301	11,859,398	(4)	0%	(737,129)	-7%	(4)	0%	(736,101)	-7%
164727	269	POLLOCK	6,981,104	6,980,109	6,980,837	6,178,452	6,177,322	6,177,763	995	0%	267	0%	1,130	0%	689	0%
081343	754	QUAHOG,OCEAN	203,693,884	203,693,884	203,693,884	24,690,155	24,690,155	24,690,155	-	0%	-	0%	-	0%	-	0%
166774	240	REDFISH	11,728,113	11,728,129	11,728,206	11,728,113	11,728,129	11,728,206	(16)	0%	(93)	0%	(16)	0%	(93)	0%
079718	800	SCALLOP,SEA	505,867,534	505,867,539	507,769,570	60,729,223	60,729,221	60,956,687	(5)	0%	(1,902,036)	0%	2	0%	(227,464)	0%
169182	329	SCUP	13,784,076	13,784,080	13,783,703	13,784,076	13,784,080	13,783,703	(4)	0%	373	0%	(4)	0%	373	0%
167687	335	SEA BASS,BLACK	3,524,942	3,524,951	3,534,455	3,524,942	3,524,951	3,534,455	(9)	0%	(9,513)	0%	(9)	0%	(9,513)	0%
161702	347	SHAD,AMERICAN	59,499	59,499	61,783	66,047	66,047	61,783	-	0%	(2,284)	-4%	-	0%	4,264	6%
551570	731	SHRIMP,BROWN	861,917	861,917	861,917	861,917	861,917	861,917	-	0%	-	0%	-	0%	-	0%
564139	368	SKATE,BARNDOOR	483,243	483,243	483,263	286,021	286,021	286,030	-	0%	(20)	0%	-	0%	(9)	0%
160855	372	SKATE,CLEARNOSE	28,927	28,927	28,929	15,066	15,066	15,067	-	0%	(2)	0%	-	0%	(1)	0%
564130	366	SKATE,LITTLE	8,738,117	8,738,117	8,705,522	8,733,432	8,733,432	8,700,835	-	0%	32,595	0%	-	0%	32,597	0%
564136	364	SKATE,ROSETTE	[redacted]													
564151	369	SKATE,SMOOTH	481,876	481,874	481,697	237,615	237,611	237,474	2	0%	179	0%	4	0%	141	0%
564149	370	SKATE,THORNY	301	301	301	295	295	295	-	0%	-	0%	-	0%	-	0%
564145	367	SKATE,WINTER(BIG)	17,567,387	17,567,390	17,566,769	9,203,544	9,203,548	9,203,328	(3)	0%	618	0%	(4)	0%	216	0%
082521	802	SQUID (ILLEX)	59,885,255	59,885,256	59,885,268	59,885,157	59,885,158	59,885,170	(1)	0%	(13)	0%	(1)	0%	(13)	0%
082372	801	SQUID (LOLIGO)	27,466,124	27,466,125	27,462,959	27,348,668	27,348,671	27,345,520	(1)	0%	3,165	0%	(3)	0%	3,148	0%
168543	444	TILEFISH,BLUELINE	87,363	87,364	87,376	81,021	81,021	81,034	(1)	0%	(13)	0%	-	0%	(13)	0%
168546	446	TILEFISH,GOLDEN	1,555,823	1,555,822	1,557,493	1,429,146	1,429,151	1,428,924	1	0%	(1,670)	0%	(5)	0%	222	0%

Area

Since area is critical to attributing landings to a specific stock area for multi-stock species, area was reviewed by species both in how many “unknown” areas remained and by specific area to determine if there were any wide shifts in landings moving from one stock area to another.

Missing Area

The states with the most landings (in lbs.) with missing areas are MD (5.4M lbs.), ME (6.8M lbs.) and VA (10.6M lbs.):

State	SUM(SPPLNDLB)
00	321
CT	26,053
DC	400
FL	37,554
MA	2,011
MD	5,434,439
ME	6,846,195
NA	3,625
NC	83,218
NH	34
NJ	57,486
NY	326,437
PR	13,178
RI	276,005
SC	152,186
TD	7,251
VA	10,611,475
Grand Total	**23,877,868**

The gear types of 100, 301, and 440 had the most landings (in lbs.) with missing areas:

NEGEAR	SUM(SPPLNDLB)
010	1,661,505
020	150,119
030	453
034	15,007
050	28,969
052	2,742
058	180
060	188
062	24,203
070	35,788
071	162,742
090	906

100	3,677,142
101	2,230,454
105	264
116	162,791
117	1,126
120	388,150
131	162
132	7,909
140	334,742
180	475,724
181	1,261,567
182	32,185
183	126,772
200	113
210	1,287,005
220	573,569
230	129,255
240	5,061
250	485,352
260	968
301	7,396,509
320	4,267
324	180,553
330	29,720
340	102,925
380	70,879
381	491,977
410	10,046
414	9,883
430	4,522
440	2,313,370
500	104
Grand Total	**23,877,868**

Of the 32 overall species with 10% or more in landings missing area in CAMS (area = 000), four are unit stocks monitored by the Population Dynamics Branch.

- Alewife 79% (1.5M) landed lbs. with area missing in CAMS, while 100% of Alewife in CFDBS.CFDETS2019AA were missing area so this is an improvement.
- Bass, Striped 17% (845k) landed lbs. with area missing in CAMS, while 89% of Striped Bass in CFDBS.CFDETS2019AA were missing area, so this is a significant improvement.
- Shad, American 31% (21k) landed lbs. with area missing in CAMS, while 60% of American Shad in CFDBS.CFDETS2019AA were missing area, so this is a significant improvement.

- Skate, Smooth 26% (61k) landed lbs. with area missing in CAMS, while 27% of Smooth Skate in CFDBS.CFDETS2019AA were missing area, so this is a very slight improvement.

Area Comparison by Select Species

The following figures include both Dealer and VTR source landings as future stock assessments will include both since we should understand how closely CAMS aligns overall including VTR records, and identify areas with significant differences.

Butterfish

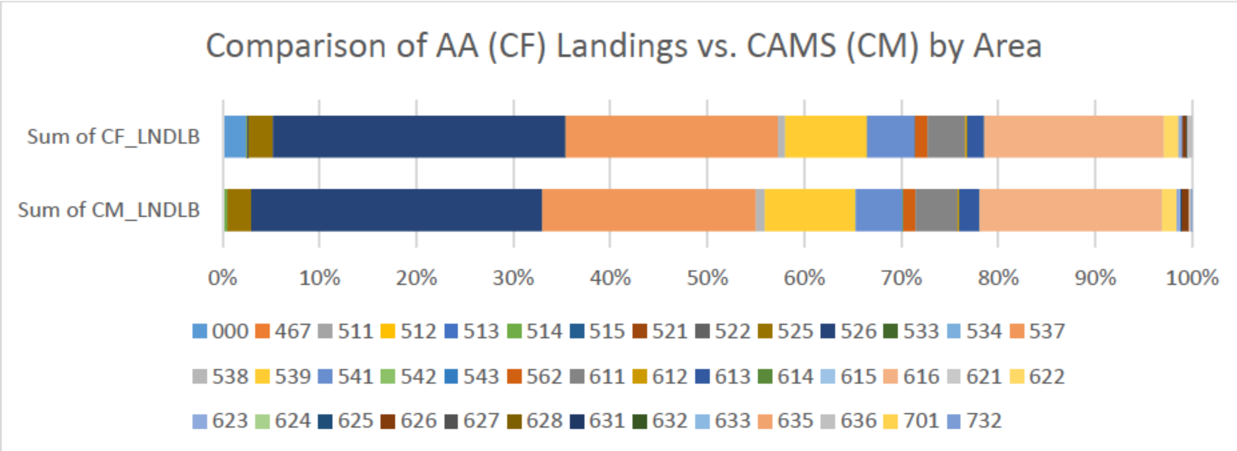
Butterfish is a Unit stock with only areas below 465 falling outside of the stock definition area.

CAMS did assign more landings to areas (only .2% unassigned versus 2.5% unassigned in CFDBS). No landings were assigned to areas outside of the stock definition area and no differences were significant.

Butterfish area comparison table:

Area	CM_LND_RAW	CM_PERCENT_TOTAL	CF_LND_RAW	CF_PERCENT_TOTAL
000	17,496	0.2%	187,001	2.5%
467	[redacted]			
511				
512				
513	723	0.0%	414	0.0%
514	18,297	0.2%	9,744	0.1%
515	[redacted]			
521	839	0.0%	1,426	0.0%
522	4,143	0.1%	3,656	0.0%
525	185,339	2.4%	187,453	2.5%
526	2,288,408	30.0%	2,282,565	30.2%
533	67	0.0%	69	0.0%
534	[redacted]			
537	1,680,073	22.0%	1,656,861	21.9%
538	70,105	0.9%	56,719	0.7%
539	711,843	9.3%	635,681	8.4%
541	[redacted]			
542	10	0.0%	-	0.0%
543	[redacted]			
562	97,498	1.3%	99,478	1.3%
611	330,415	4.3%	294,324	3.9%
612	11,863	0.2%	14,578	0.2%
613	159,336	2.1%	132,254	1.7%
614	[redacted]			
615	1,733	0.0%	1,706	0.0%
616	1,430,675	18.8%	1,399,197	18.5%
621	1,080	0.0%	307	0.0%
622	116,042	1.5%	115,645	1.5%
623	30,312	0.4%	28,190	0.4%
624	5	0.0%	-	0.0%
625	[redacted]			
626	50,044	0.7%	28,740	0.4%
627	5,578	0.1%	5,667	0.1%
628	51	0.0%	-	0.0%
631	[redacted]			
632				
633				
635	2,988		-	
636	[redacted]			
701	30		-	
732	84	0.0%	-	0.0%

Butterfish area comparison chart:



Cod

Cod is a multi-stock species with GBK and GOM stocks.

CAMS assigned an area to more landings than CFDBS. Only 26 lbs. remain with area = 000, while in CFDBS 5% of total landings have an area of 000.

While there were slight percentage differences between select areas (e.g. 512 & 513, or 521 & 522), overall, CAMS assigned the same percentages to GBK and GOM stock areas. Only a very small number of landings (3 lbs.) were assigned outside of the two defined stock areas.

Cod landings and percent of assigned landings (area <> 000) falling within select stock area:

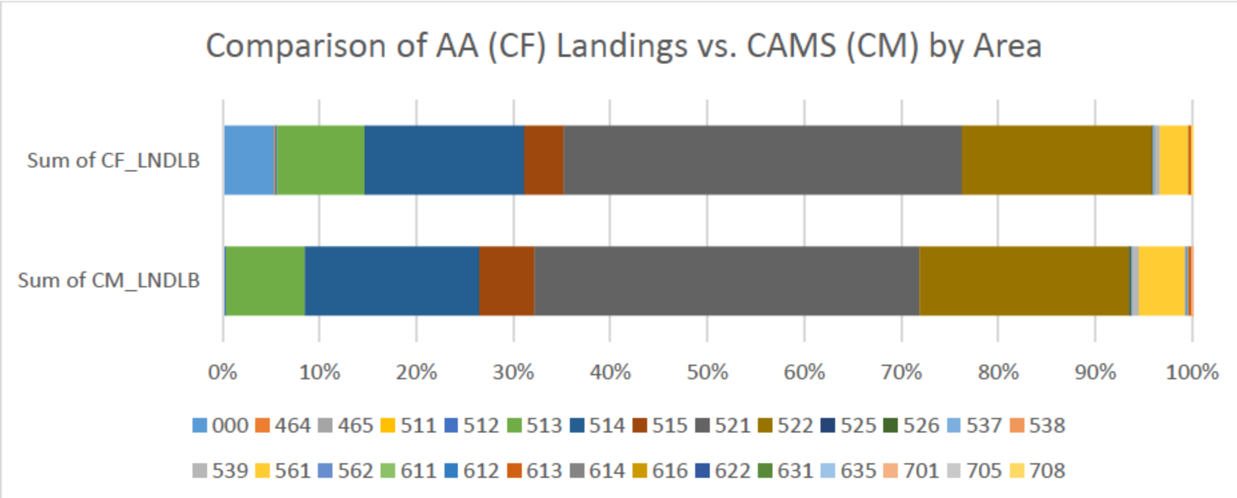
	CAMS	CFDBS
Total GOM:	623,927	572,773
Total GBK:	1,313,828	1,242,739
Percent GOM:	32%	32%
Percent GBK:	68%	68%

Cod area comparison table:

(blue)	GOM
(green)	GBK

Area	CM_LND_RAW	CM_PERCENT_TOTAL	CF_LND_RAW	CF_PERCENT_TOTAL
000	26	0.0%	102,166	5.3%
464	656	0.0%	1,418	0.1%
465	453	0.0%	255	0.0%
511	280	0.0%	355	0.0%
512	5,718	0.3%	3,401	0.2%
513	157,879	8.1%	173,816	9.1%
514	348,308	18.0%	315,419	16.4%
515	110,821	5.7%	78,109	4.1%
521	770,360	39.8%	787,368	41.1%
522	417,721	21.6%	376,219	19.6%
525	1,173	0.1%	1,033	0.1%
526	2,582	0.1%	157	0.0%
537	2,743	0.1%	4,778	0.2%
538	26	0.0%	1,134	0.1%
539	12,149	0.6%	7,761	0.4%
561	92,933	4.8%	56,116	2.9%
562	[redacted]			
611	1,540	0.1%	483	0.0%
612	162	0.0%	145	0.0%
613	7,128	0.4%	6,983	0.4%
614	[redacted]			
616				
622				
631				
635	3	0.0%	-	0.0%
701	3	0.0%	-	0.0%
705	[redacted]			
708				

Cod area comparison chart:



Flounder, Windowpane

Windowpane is a multi-stock species with GBGOM and SNEMA stocks.

CAMS assigned areas to a larger percentage of landings (only .8% remain unassigned, while 61% in CFDBS have an area = 000). Overall, there was a 1% shift from GBGOM to SNEMA between the two systems.

Windowpane landings and percent of assigned landings (area <> 000) falling within select stock area:

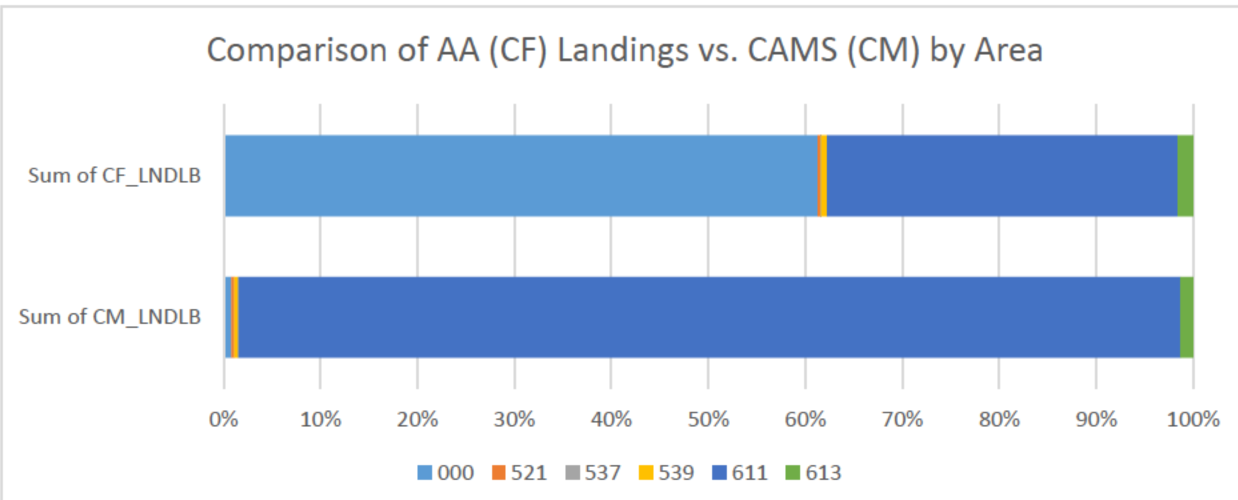
	CAMS	CFDBS
Total GBGOM:	168	204
Total SNEMA:	23,304	8,125
Percent	1%	2%
Percent	99%	98%

Windowpane area comparison table:

	GBGOM
	SNEMA

Area	CM_LND_RAW	CM_PERCENT_TOTAL	CF_LND_RAW	CF_PERCENT_TOTAL
000	194	0.8%	13,184	61.3%
521	[redacted]			
537				
539				
611	22,982	97.1%	7,773	36.1%
613	[redacted]			

Windowpane area comparison chart:



Flounder, Winter

Winter Flounder is a multi-stock species with GOM, GBK and SNEMA stocks.

CAMS assigned more landings to an area: only .1% remains unassigned while 12% is unassigned in CFDBS.

There were two notable shifts: SNEMA decreased by 6 percentage points as percent of assigned landings, GOM increased by 9 percentage points as percentage of assigned landings. GBK dropped by 2 percentage points.

Winter Flounder landings and percent of assigned landings (area <> 000) falling within select stock area:

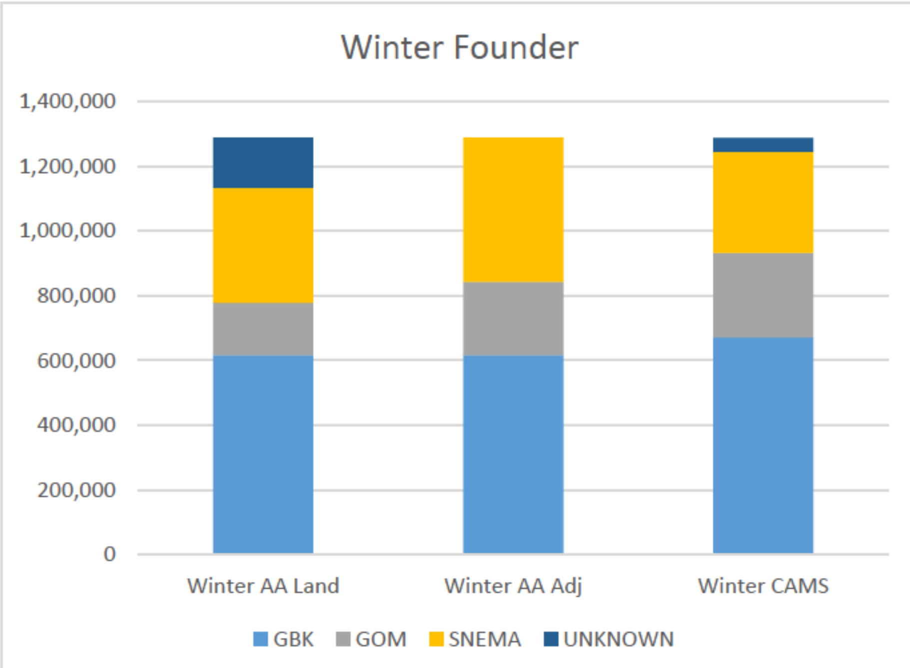
	CAMS	CFDBS
Total GBK:	669,697	617,247
Total GOM:	297,490	160,743
Total SNEMA:	326,427	355,184
Percent GBK:	52%	54%
Percent GOM:	23%	14%
Percent SNEMA:	25%	31%

When compared to StockEff's adjusted landings, more of the unknown landings were assigned to areas falling under the SNEMA area definition. This is not entirely surprising since StockEff's process would have leveraged areas CFDBS had assigned, along with gear and other attributes. GOM as a percentage of overall assigned landings is closer between CAMS and StockEff post-apportionment than CFDBS (pre-StockEff apportionment).

Winter Flounder area comparison between CAMS and StockEff post-apportionment:

	CAMS	StockEff Adjusted
Total GBK:	669,697	617,248
Total GOM:	297,594	225,783
Total SNEMA:	326,323	445,368
Percent GBK:	52%	48%
Percent GOM:	23%	18%
Percent SNEMA:	25%	35%

Prior to recent updates that assigned more landings (the chart below was created in mid-December, 2021 using data as it appeared at the time in CFDBS, StockEff and CAMS), Winter Flounder was closer to StockEff's assignments, though we did observe SNEMA was notably smaller overall:



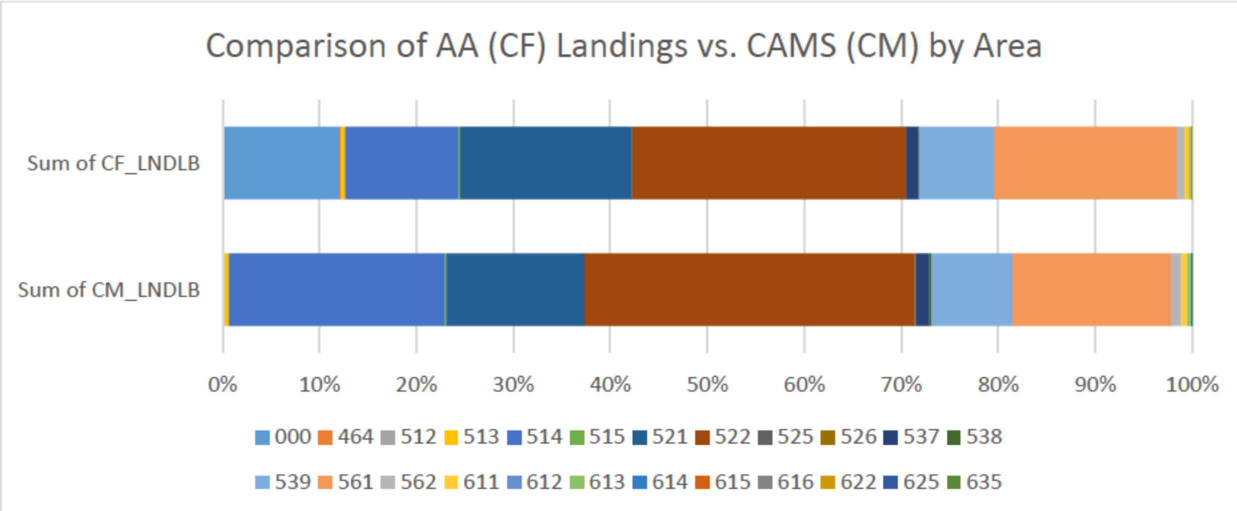
"Winter AA Land" is unadjusted landings, "Winter AA Adj" is post-StockEff apportionment, and "Winter CAMS" is how landings appeared in CAMS in December.

Winter Flounder area comparison table:

(blue)	GBK
(green)	GOM
(yellow)	SNEMA

Area	CM_LND_RAW	CM_PERCENT_TOTA	CF_LND_RAW	CF_PERCENT_TOTA
000	1,187	0.1%	155,227	12.0%
464	[redacted]			
512				
513	7,713	0.6%	6,264	0.5%
514	288,375	22.3%	150,750	11.7%
515	1,499	0.1%	2,160	0.2%
521	184,121	14.2%	227,898	17.7%
522	441,016	34.1%	363,646	28.2%
525	2,790	0.2%	1,036	0.1%
526	[redacted]			
537	17,189	1.3%	15,468	1.2%
538	2,323	0.2%	1,219	0.1%
539	107,833	8.3%	99,634	7.7%
561	211,857	16.4%	242,744	18.8%
562	[redacted]			
611	7,567	0.6%	6,899	0.5%
612	311	0.0%	268	0.0%
613	5,317	0.4%	3,213	0.2%
614	[redacted]			
615	211	0.0%	106	0.0%
616	21	0.0%	77	0.0%
622	[redacted]			
625	800	0.1%	-	0.0%
635	[redacted]			

Winter Flounder area comparison chart:



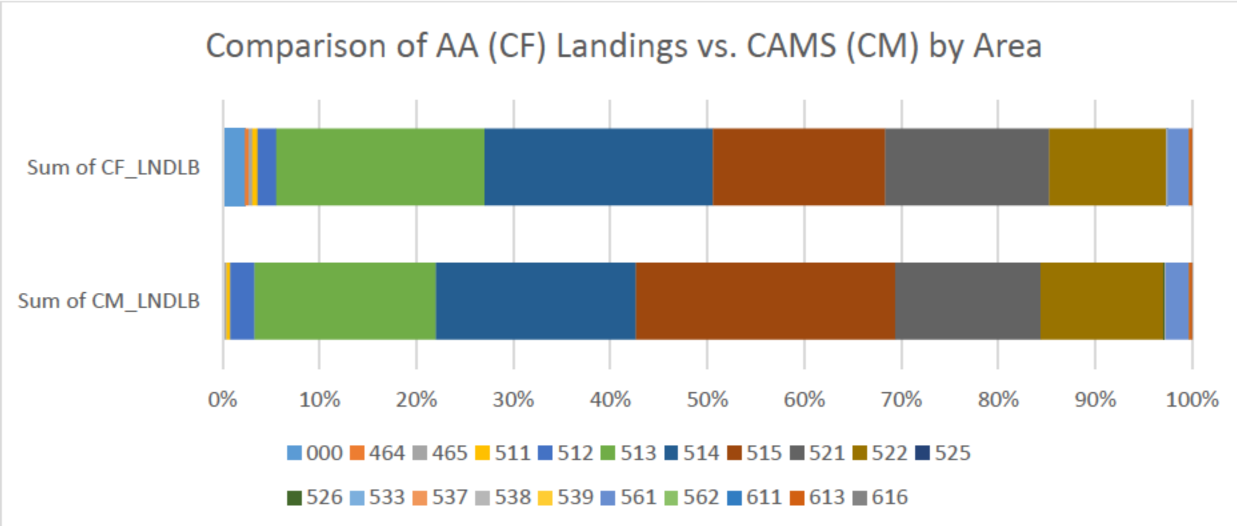
Flounder, Witch

Witch Flounder is a unit stock and CAMS assigned areas within the current definition to all landings, while CFDBS had 2.3% unassigned. Area 515 increased in percentage of overall landings with assigned landings by nearly 9 percentage points. Other areas were fairly similar or slightly decreased.

Witch Flounder area comparison table:

Area	CM_LND_RAW	CM_PERCENT_TOTAL	CF_LND_RAW	CF_PERCENT_TOTAL
000	-	0.0%	41,123	2.3%
464	2,657	0.1%	6,091	0.3%
465	4,856	0.3%	6,801	0.4%
511	6,675	0.4%	9,779	0.6%
512	44,517	2.5%	34,106	1.9%
513	331,289	18.7%	379,232	21.5%
514	368,779	20.8%	414,764	23.5%
515	470,727	26.6%	313,626	17.8%
521	266,147	15.0%	297,916	16.9%
522	223,383	12.6%	213,459	12.1%
525	[redacted]			
526	858	0.0%	-	0.0%
533	[redacted]			
537	702	0.0%	67	0.0%
538	[redacted]			
539				
561	42,759	2.4%	38,737	2.2%
562	[redacted]			
611	[redacted]			
613	6,274	0.4%	6,242	0.4%
616	[redacted]			
622	[redacted]			

Witch Flounder area comparison chart:



Flounder, Yellowtail

Yellowtail Flounder is a multi-stock species with GBK, CCGOM and SNEMA stocks. CAN has a defined stock area and is included in TRAC assessments. CAMS assigned all but 24 lbs. to areas, while CFDBS had 4% unassigned.

Canadian landings decreased by 5 percentage points as percent of assigned landings in CAMS compared to CFDBS, and GOM increased by 6 percentage points as percent of assigned landings. It appears that CAMS did not attribute any additional "unknown" landings to area 340, which would contribute to increases in other stock areas.

Yellowtail Flounder landings and percent of assigned landings (area <> 000) falling within select stock area:

	CAMS	CFDBS
Total CAN:	[redacted]	
Total GBK:	8,640	5,580
Total CCGOM:	404,892	325,345
Total SNEMA:	5,001	4,761
Percent CAN:	[redacted]	
Percent GBK:		
Percent CCGOM:		
Percent SNEMA:		

When compared to results within StockEff post running StockEff's apportionment process, the percentages overall are the same as CAMS, which is positive:

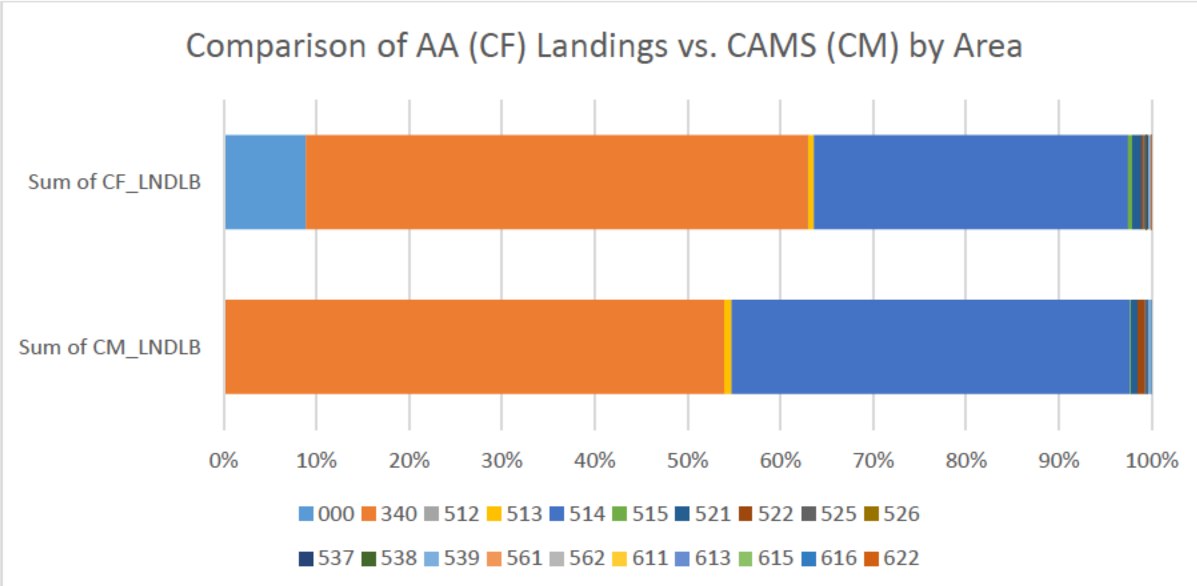
	Pre-Apportionment	Post-Apportionment	Post-App. Percent of Total
CAN	[redacted]	[redacted]	[redacted]
GBK	5,580	5,743	[redacted]
CCGOM	325,345	405,883	[redacted]
SNEMA	4,761	4,792	[redacted]
UNK	80,753		

Yellowtail Flounder area comparison table:

- GBK
- CCGOM
- SNEMA
- CAN

Area	CM_LND_RAW	CM_PERCENT_TOTAL	CF_LND_RAW	CF_PERCENT_TOTAL
000	24	0.0%	80,753	8.9%
340	[redacted]	[redacted]	[redacted]	[redacted]
512	[redacted]	[redacted]	[redacted]	[redacted]
513	7,296	0.8%	5,688	0.6%
514	390,057	42.9%	306,610	33.8%
515	921	0.1%	4,255	0.5%
521	6,574	0.7%	8,665	1.0%
522	6,861	0.8%	2,023	0.2%
525	[redacted]	[redacted]	[redacted]	[redacted]
526	[redacted]	[redacted]	[redacted]	[redacted]
537	1,616	0.2%	1,575	0.2%
538	[redacted]	[redacted]	[redacted]	[redacted]
539	2,851	0.3%	2,729	0.3%
561	[redacted]	[redacted]	[redacted]	[redacted]
562	43	0.0%	45	0.0%
611	32	0.0%	53	0.0%
613	317	0.0%	279	0.0%
615	[redacted]	[redacted]	[redacted]	[redacted]
616	38	0.0%	42	0.0%
622	[redacted]	[redacted]	[redacted]	[redacted]

Yellowtail Flounder area comparison chart:



Goosefish

Goosefish is a multi-stock species with NORTH and SOUTH stocks. CAMS assigned all but 0.1% of landings to an area, while CFDBS had 1.8% unassigned. Only a very small portion of landings fell outside of either stock area in both systems (28 lbs. in CAMS and 51 lbs. in CFDBS).

While there were minor differences between areas (most notably, 515 increased by 3 percentage points, there were no differences in stock areas between the CAMS and CFDBS.

Goosefish landings and percent of assigned landings (area <> 000) falling within select stock area:

	CAMS	CFDBS
Total North:	5,399,995	5,278,482
Total South:	6,567,386	6,372,368
Percent North:	45%	45%
Percent South:	55%	55%

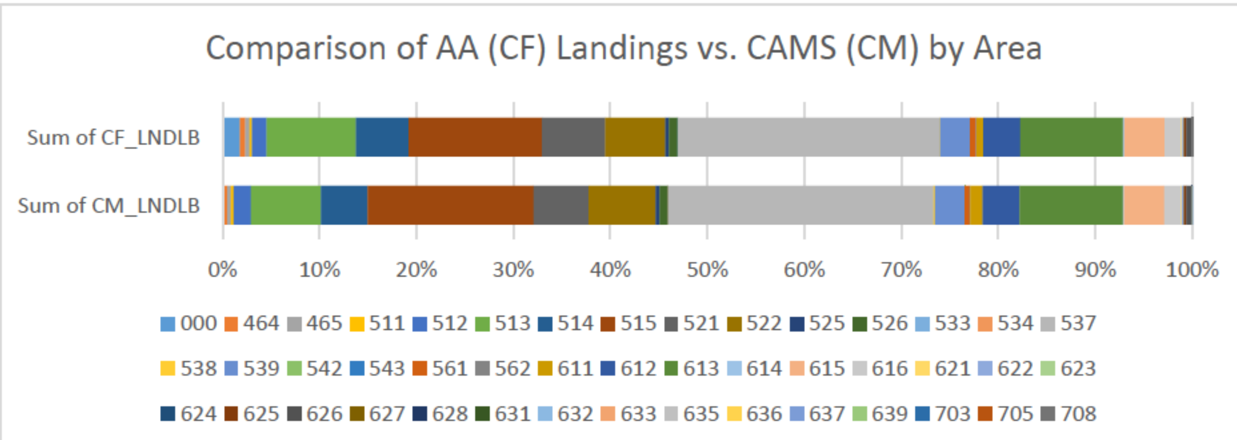
Goosefish area comparison table:

(blue)	North
(yellow)	South

Area	CM_LND_RAW	CM_PERCENT_TOTAL	CF_LND_RAW	CF_PERCENT_TOTAL
000	14,780	0.1%	214,282	1.8%
464	45,849	0.4%	64,778	0.5%
465	43,695	0.4%	53,047	0.4%
511	32,617	0.3%	29,041	0.2%
512	214,161	1.8%	179,071	1.5%
513	866,790	7.2%	1,093,103	9.2%
514	575,039	4.8%	646,413	5.4%
515	2,052,507	17.1%	1,628,657	13.7%
521	681,498	5.7%	776,628	6.5%
522	826,082	6.9%	732,176	6.2%
525	51,165	0.4%	46,757	0.4%
526	117,478	1.0%	104,620	0.9%
533	180	0.0%	5,656	0.0%
534	[redacted]			
537	3,279,850	27.4%	3,195,704	26.9%
538	7,850	0.1%	7,660	0.1%
539	368,430	3.1%	366,011	3.1%
542	5	0.0%	-	0.0%
543	[redacted]			
561	61,757	0.5%	75,568	0.6%
562	9,278	0.1%	8,008	0.1%
611	145,154	1.2%	79,981	0.7%
612	457,309	3.8%	452,390	3.8%
613	1,278,003	10.7%	1,258,475	10.6%
614	33,134	0.3%	12,284	0.1%
615	477,417	4.0%	494,792	4.2%
616	207,071	1.7%	206,489	1.7%
621	7,001	0.1%	9,815	0.1%
622	20,035	0.2%	18,665	0.2%
623	2,293	0.0%	2,061	0.0%
624	[redacted]			
625				
626	73,104	0.6%	70,393	0.6%
627	523	0.0%	454	0.0%
628	208	0.0%	-	0.0%
631	[redacted]			
632	289	0.0%	299	0.0%
633	[redacted]			
635	399	0.0%	675	0.0%

636	417	0.0%	595	0.0%
637	[redacted]			
639				
703				
705				
708				

Goosefish area comparison chart:



Haddock

Haddock is a multi-stock species with GBK and GOM stocks. CAMS assigned all but 11 lbs. to an area, while CFDBS had 2% unassigned (area = 000). While there were slight shifts in percentage points (3 or less) overall between areas, there were no changes between the defined stock areas.

Haddock landings and percent of assigned landings (area <> 000) falling within select stock area:

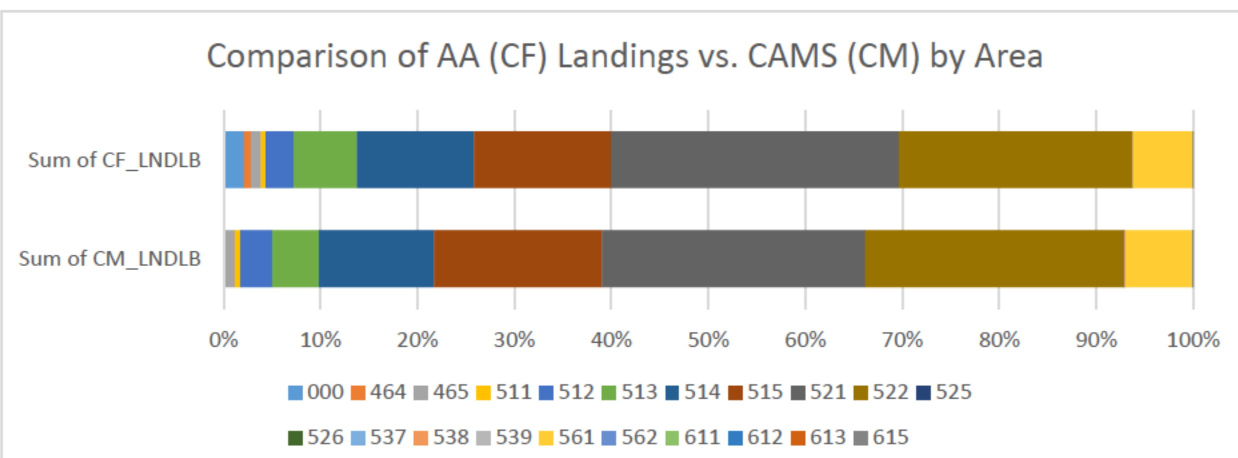
	CAMS	CFDBS
Total GBK:	10,300,474	10,120,392
Total GOM:	6,604,255	6,380,465
Percent GBK:	61%	61%
Percent GOM:	39%	39%

Haddock area comparison table:

(blue)	GBK
(green)	GOM

Area	CM_LND_RAW	CM_PERCENT_TOTAL	CF_LND_RAW	CF_PERCENT_TOTAL
000	11	0.0%	356,687	2.1%
464	23,858	0.1%	122,669	0.7%
465	177,046	1.0%	172,376	1.0%
511	89,365	0.5%	82,350	0.5%
512	561,865	3.3%	482,910	2.9%
513	813,082	4.8%	1,104,948	6.6%
514	2,012,676	11.9%	2,031,879	12.1%
515	2,929,363	17.3%	2,383,333	14.1%
521	4,589,089	27.1%	5,007,023	29.7%
522	4,508,531	26.7%	4,050,919	24.0%
525	2,975	0.0%	4,273	0.0%
526	[redacted]			
537	1,109	0.0%	2,662	0.0%
538	[redacted]			
539	482	0.0%	329	0.0%
561	1,165,840	6.9%	1,050,043	6.2%
562	15,377	0.1%	793	0.0%
611	[redacted]			
612				
613	976	0.0%	955	0.0%
615	[redacted]			

Haddock area comparison chart:



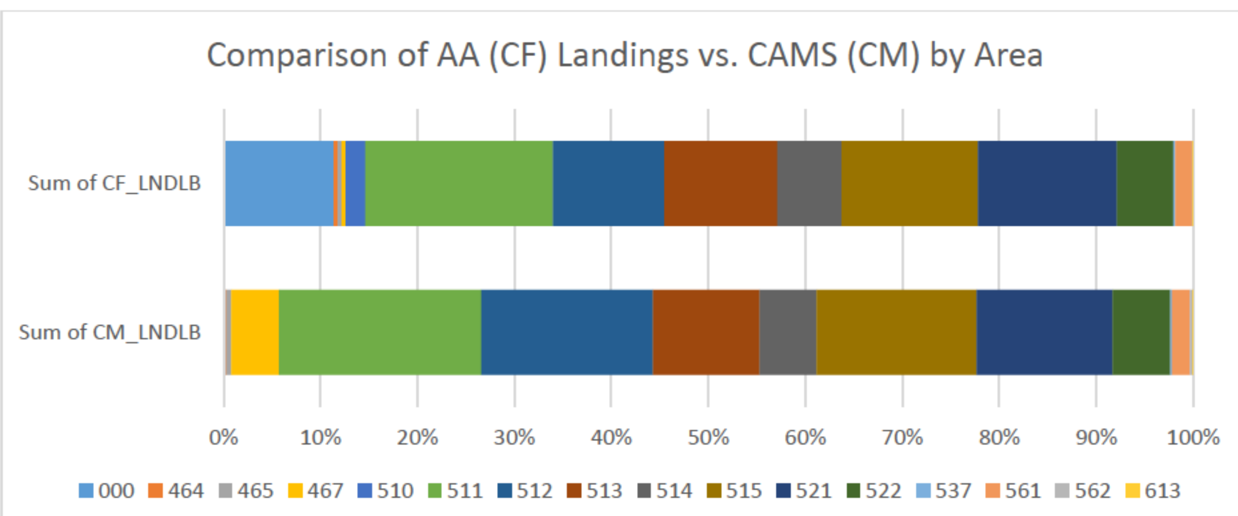
Halibut

Halibut is a unit stock. CAMS assigned all but .1% of landings while CFDBS left 11% unassigned. All areas CAMS assigned landings to are within the current stock definition. 510 is not within the definition, and CFDBS did assign 2% of landings there, but CAMS did not assign any.

Halibut area comparison table:

Area	CM_LND_RAW	CM_PERCENT_TOTAL	CF_LND_RAW	CF_PERCENT_TOTAL
000	71	0.1%	10,888	11.3%
464	238	0.2%	390	0.4%
465	493	0.5%	433	0.5%
467	4,948	4.9%	374	0.4%
[redacted]				
511	20,608	20.5%	18,565	19.3%
512	17,754	17.7%	11,012	11.5%
513	11,360	11.3%	11,159	11.6%
514	5,890	5.9%	6,393	6.7%
515	16,588	16.5%	13,484	14.1%
521	14,106	14.1%	13,728	14.3%
522	5,943	5.9%	5,605	5.8%
537	180	0.2%	180	0.2%
561	1,846	1.8%	1,646	1.7%
[redacted]				

Halibut area comparison chart:



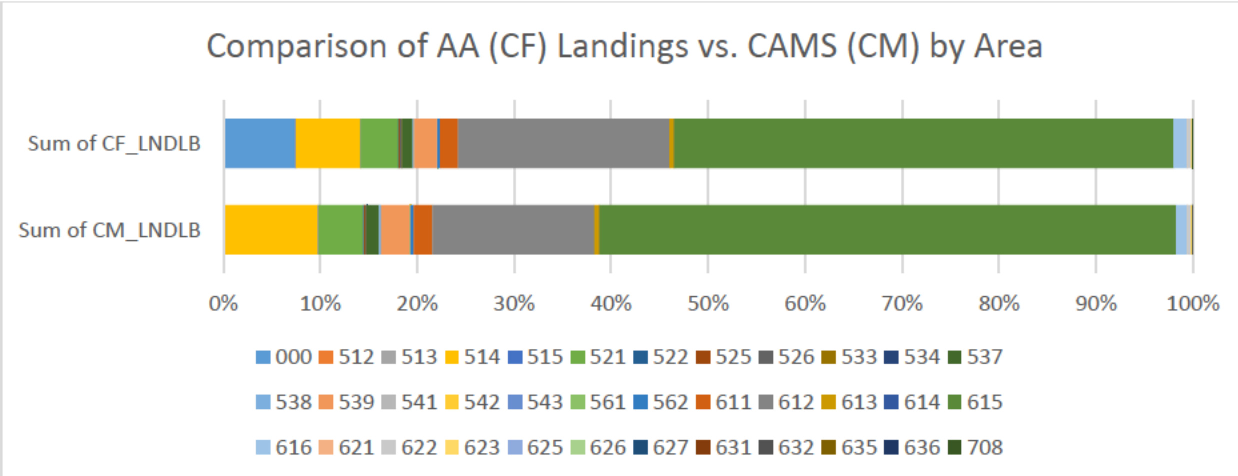
Mackerel

Mackerel is a unit stock. CAMS assigned all but 2k lbs. (0%) to an area while CFDBS left 7.5% unassigned. Individual areas remained the same or slightly increased (as would be expected with more landings being assigned to areas) with the exception of 612, which decreased by 5 percentage points as percent of overall, and 615 increased by 8 percentage points. All assigned areas fall within the stock definition.

Mackerel area comparison table:

Area	CM_LND_RAW	CM_PERCENT_TOTAL	CF_LND_RAW	CF_PERCENT_TOTAL
000	2,320	0.0%	887,280	7.5%
[redacted]				
513	9,824	0.1%	3,237	0.0%
514	1,111,328	9.7%	790,905	6.7%
515	8,347	0.1%	933	0.0%
521	531,466	4.6%	459,325	3.9%
[redacted]				
525	10,504	0.1%	11,464	0.1%
526	20,538	0.2%	29,695	0.3%
[redacted]				
534	460	0.0%	-	0.0%
537	142,645	1.2%	129,058	1.1%
538	22,475	0.2%	15,006	0.1%
539	347,472	3.0%	282,182	2.4%
[redacted]				
542	30	0.0%	-	0.0%
[redacted]				
562	36,500	0.3%	33,021	0.3%
611	222,059	1.9%	221,186	1.9%
612	1,919,424	16.7%	2,582,591	21.8%
613	62,047	0.5%	62,917	0.5%
[redacted]				
615	6,833,273	59.4%	6,102,526	51.5%
616	126,247	1.1%	164,679	1.4%
621	206	0.0%	70	0.0%
622	48,718	0.4%	48,796	0.4%
623	15,969	0.1%	15,406	0.1%
625	470	0.0%	301	0.0%
626	5,433	0.0%	5,222	0.0%
627	1,823	0.0%	1,803	0.0%
[redacted]				
635	388	0.0%	128	0.0%
636	229	0.0%	63	0.0%
[redacted]				

Mackerel area comparison chart:



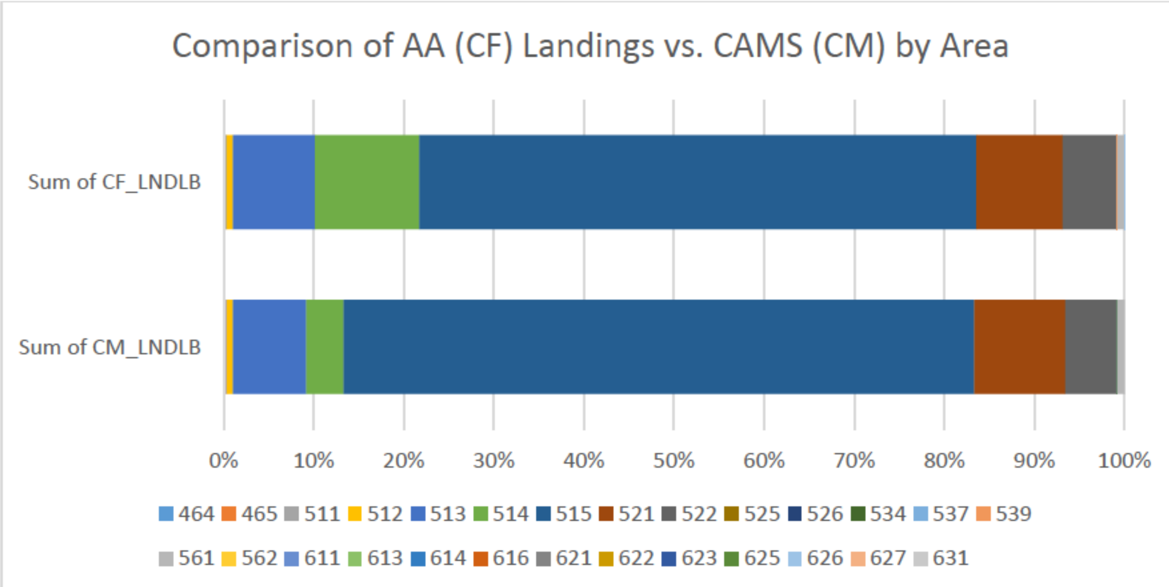
Perch (Redfish)

Perch is a unit stock. CAMS and CFDBS left the same percentage of landings unassigned (0.2%). All areas fall within the current stock definition. Area 515 increased by 8 percentage points (as percent of overall) in CAMS compared to CFDBS while area 514 decreased by 7.5 percentage points. There were no other significant differences noted.

Perch area comparison table:

Area	CM_LND_RAW	CM_PERCENT_TOTAL	CF_LND_RAW	CF_PERCENT_TOTAL
464	22,653	0.2%	22,384	0.2%
465	9,561	0.1%	7,737	0.1%
511	15,526	0.1%	9,884	0.1%
512	74,427	0.6%	82,683	0.7%
513	957,475	8.2%	1,060,321	9.1%
514	486,936	4.1%	1,352,424	11.6%
515	8,213,260	70.0%	7,210,866	61.8%
521	1,184,870	10.1%	1,116,770	9.6%
522	677,782	5.8%	704,402	6.0%
525	[redacted]			
526	30	0.0%	3	0.0%
534	3	0.0%	-	0.0%
537	113	0.0%	22	0.0%
539	[redacted]			
561	93,272	0.8%	94,027	0.8%
562	[redacted]			
611	5	0.0%	-	0.0%
613	610	0.0%	431	0.0%
614	6	0.0%	-	0.0%
616	367	0.0%	375	0.0%
621	16	0.0%	-	0.0%
622	[redacted]			
623	109	0.0%	110	0.0%
625	[redacted]			
626				
627				
631				

Perch area comparison chart:



Pollock

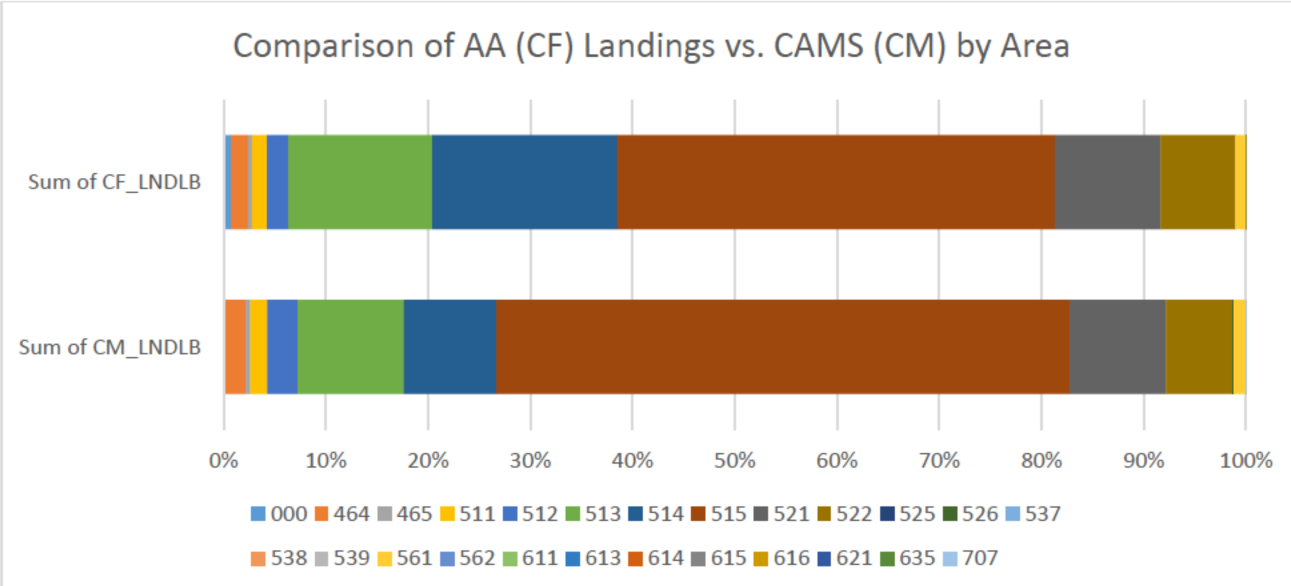
Pollock is a unit stock. CAMS assigned an area to all but 7 lbs., while CFDBS left 0.7% unassigned. CAMS assigned 58 lbs. to area 707 which is technically outside of the stock definition, however the apportionment logic for this species would assign it to "unknown" and then attempt to reassign the area. It's unclear how StockEff's apportionment would ultimately assign it, and if it would stay outside of the stock definition. However, given the value is so small, it is not of concern.

Area 515 increased by 13 percentage points as percent of overall landings by area within CAMS compared to CFDBS. Area 514 decreased by 9 percentage points and area 513 decreased by 4 percentage points. Other differences were not significant.

Pollock area comparison table:

Area	CM_LND_RAW	CM_PERCENT_TOTAL	CF_LND_RAW	CF_PERCENT_TOTAL
000	7	0.0%	46,047	0.7%
464	133,577	2.2%	101,905	1.6%
465	29,303	0.5%	23,220	0.4%
511	101,708	1.6%	91,794	1.5%
512	184,199	3.0%	127,713	2.1%
513	642,190	10.4%	870,043	14.1%
514	560,388	9.1%	1,119,112	18.1%
515	3,468,956	56.1%	2,644,065	42.8%
521	582,654	9.4%	638,128	10.3%
522	407,164	6.6%	450,545	7.3%
525	[redacted]			
526	935	0.0%	-	0.0%
537	4	0.0%	107	0.0%
538	4	0.0%	1,614	0.0%
539	229	0.0%	48	0.0%
561	73,349	1.2%	61,930	1.0%
562	[redacted]			
611	[redacted]			
613	[redacted]			
614	[redacted]			
615	[redacted]			
616	[redacted]			
621	[redacted]			
635	[redacted]			
707	[redacted]			

Pollock area comparison chart:



Pout & Wolffish are both zero possession species and no landings were recorded in 2019 in either system.

Market Category Review

Overall

StockEff Stocks

In general, market categories matched up very well within the species reviewed (the stocks currently within StockEff Commercial Landings). In most instances where the % difference was larger than 1%, I was able to confirm through StockEff's apportionment process that the particular market category is grouped with "unclassified" so the ultimate change would be immaterial as a result.

Since Windowpane Flounder is landed primarily on state permits (if not exclusively – we suspect dealers record federal permit numbers for vessels operating under a state permit, but a federal permit previously, since the dealers know them under that number) it is not surprising that we would see a 9% increase since CAMS includes data that would have been received after the AA cut-off.

Butterfish

	CAMS		CFDETS				
NESPP4	SUM(SPPLIVLB)	SUM(SPPLNDLB)	SUM(SPPLIVLB)	SUM(SPPLNDLB)	% Diff LIVLB	% Diff LNDLB	
0510	545,529	545,529	545,504	545,504	0%	0%	
0511	1,260,556	1,260,556	1,257,361	1,257,361	0%	0%	
0512	13,623	13,623	13,522	13,522	1%	1%	*Jumbo*
0513	168,894	168,894	168,894	168,894	0%	0%	
0515	3,100,053	3,100,053	3,100,056	3,100,056	0%	0%	
0516	2,213,672	2,213,672	2,213,654	2,213,654	0%	0%	
0517	258,292	258,292	258,292	258,292	0%	0%	
0518	6,464	6,464	6,464	6,464	0%	0%	
(blank)	57,905	57,905			100%	100%	
Total	**7,624,988**	**7,624,988**	**7,563,747**	**7,563,747**	1%	1%	

Cod

	CAMS		CFDETS			
NESPP4	SUM(SPPLIVLB)	SUM(SPPLNDLB)	SUM(SPPLIVLB)	SUM(SPPLNDLB)	% Diff LIVLB	% Diff LNDLB
0810	1,320	1,128	1,321	1,128	0%	0%
0811	821,002	701,682	821,069	701,708	0%	0%
0813	1,172,067	1,001,681	1,172,120	1,001,703	0%	0%
0814	148,153	126,512	148,196	126,566	0%	0%
0815	75,778	64,738	75,781	64,741	0%	0%
0816	2,978	1,861	2,978	1,861	0%	0%
0817	[redacted]					
0818	2,557	2,557	2,926	2,926	-14%	-14%*
0822	[redacted]					
0825						
0826						
0829						
(blank)	24,892	20,577			100%	100%
Total	**2,267,474**	**1,937,785**	**2,243,124**	**1,917,684**	**1%**	**1%**

**0818 is grouped with unclassified*

Flounder, Windowpane

	CAMS		CFDETS			
NESPP4	SUM(SPPLIVLB)	SUM(SPPLNDLB)	SUM(SPPLIVLB)	SUM(SPPLNDLB)	% Diff LIVLB	% Diff LNDLB
1250	23,321	23,321	21,168	21,168	9%	9%*
1251	[redacted]					
1252						
Total	**23,666**	**23,666**	**21,513**	**21,513**	9%	9%

1250 is unclassified.

Flounder, Winter

	CAMS		CFDETS			
NESPP4	SUM(SPPLIVLB)	SUM(SPPLNDLB)	SUM(SPPLIVLB)	SUM(SPPLNDLB)	% Diff LIVLB	% Diff LNDLB
1196	[redacted]					
1197						
1198						
1200	81,050	81,050	81,426	81,426	0%	0%
1201	178,016	178,016	178,017	178,017	0%	0%
1202	404,727	404,727	404,732	404,732	0%	0%
1203	209,899	209,899	209,906	209,906	0%	0%
1204	6,263	6,263	6,267	6,267	0%	0%
1205	106,841	106,841	106,844	106,844	0%	0%
1206	260,762	260,762	260,772	260,772	0%	0%
1207	36,854	36,854	36,852	36,852	0%	0%
(blank)	6,926	6,820			100%	100%
Total	**1,294,907**	**1,294,801**	**1,288,401**	**1,288,401**	1%	0%

Flounder, Witch

	CAMS		CFDETS			
NESPP4	SUM(SPPLIVLB)	SUM(SPPLNDLB)	SUM(SPPLIVLB)	SUM(SPPLNDLB)	% Diff LIVLB	% Diff LNDLB
1220	5,871	5,871	6,048	6,048	-3%	-3%
1221	13,652	13,652	13,758	13,758	-1%	-1%
1222	1,540,817	1,540,817	1,540,856	1,540,856	0%	0%
1224	100,414	100,414	100,501	100,501	0%	0%
1225	83,148	83,148	83,148	83,148	0%	0%
1226	[redacted]					
1227						
1228						
(blank)	9,020	8,838			100%	100%
Total	**1,772,147**	**1,771,965**	**1,763,539**	**1,763,539**	**0%**	**0%**

Flounder, Yellowtail

	CAMS		CFDETS			
NESPP4	**SUM(SPPLIVLB)**	**SUM(SPPLNDLB)**	**SUM(SPPLIVLB)**	**SUM(SPPLNDLB)**	**% Diff LIVLB**	**% Diff LNDLB**
1230	592,524	592,524	592,526	592,526	0%	0%
1231	32,325	32,325	32,332	32,332	0%	0%
1232	232,734	232,734	232,735	232,735	0%	0%
1233	19,044	19,044	19,046	19,046	0%	0%
1236	[redacted]					
1237	[redacted]					
(blank)	2,257	2,131			100%	100%
Total	**908,935**	**908,809**	**906,691**	**906,691**	**0%**	**0%**

Haddock

	CAMS		CFDETS			
NESPP4	**SUM(SPPLIVLB)**	**SUM(SPPLNDLB)**	**SUM(SPPLIVLB)**	**SUM(SPPLNDLB)**	**% Diff LIVLB**	**% Diff LNDLB**
1470	855,676	750,475	855,705	750,518	0%	0%
1471	[redacted]					
1472	1,626	1,427	1,625	1,426	0%	0%
1473	569	501	570	501	0%	0%
1475	9,677,670	8,489,120	9,677,721	8,489,161	0%	0%
1476	7,965,519	6,987,303	7,965,598	6,987,338	0%	0%
1477	4,365	4,365	5,481	5,481	-26%	-26%*
1479	654,811	574,384	654,828	574,396	0%	0%
1483	[redacted]					
1484	[redacted]					
1486	[redacted]					
1487	[redacted]					
1488	[redacted]					
(blank)						
Total	**19,270,455**	**16,904,740**	**19,162,246**	**16,809,451**	**1%**	**1%**

1477 is unclassified.

Halibut

	CAMS		CFDETS			
NESPP4	**SUM(SPPLIVLB)**	**SUM(SPPLNDLB)**	**SUM(SPPLIVLB)**	**SUM(SPPLNDLB)**	**% Diff LIVLB**	**% Diff LNDLB**
1590	66,740	58,111	64,923	56,445	3%	3%
1591	9,731	8,462	9,733	8,461	0%	0%
1592	26,072	22,664	26,070	22,666	0%	0%
1593	993	864	993	864	0%	0%
1594	6,725	6,725	6,726	6,726	0%	0%
1595	849	849	849	849	0%	0%
(blank)	7,094	2,700			100%	100%
Total	**118,204**	**100,375**	**109,294**	**96,011**	**8%**	**5%**

Mackerel

	CAMS		CFDETS			
NESPP4	**SUM(SPPLIVLB)**	**SUM(SPPLNDLB)**	**SUM(SPPLIVLB)**	**SUM(SPPLNDLB)**	**% Diff LIVLB**	**% Diff LNDLB**
2120	1,919,831	1,920,859	2,656,954	2,656,954	-38%	-38%*
2121	408,737	408,737	408,729	408,729	0%	0%
2122	1,131,577	1,131,577	1,131,582	1,131,582	0%	0%
2123	7,255,510	7,255,510	7,255,518	7,255,518	0%	0%
2124	[redacted]					
2125	405,502	405,502	405,502	405,502	0%	0%
2126	[redacted]					
(blank)	317,234	371,516			100%	100%
Total	**11,439,503**	**11,494,813**	**11,859,398**	**11,859,398**	**-4%**	**-3%**

2120 is unclassified.

Perch (Redfish)

	CAMS		CFDETS			
NESPP4	**SUM(SPPLIVLB)**	**SUM(SPPLNDLB)**	**SUM(SPPLIVLB)**	**SUM(SPPLNDLB)**	**% Diff LIVLB**	**% Diff LNDLB**
2400	10,082,824	10,082,824	10,082,900	10,082,900	0%	0%
2401	148,772	148,772	148,775	148,775	0%	0%
2402	1,494,375	1,494,375	1,494,386	1,494,386	0%	0%
2403	1,284	1,284	1,285	1,285	0%	0%
2406	[redacted]					
2407						
2408						
(blank)	9,208	8,972			100%	100%
Grand	**11,737,318**	**11,737,082**	**11,728,206**	**11,728,206**	**0%**	**0%**

Pollock

	CAMS		CFDETS			
NESPP4	SUM(SPPLIVLB)	SUM(SPPLNDLB)	SUM(SPPLIVLB)	SUM(SPPLNDLB)	% Diff LIVLB	% Diff LNDLB
2691	225,111	199,214	225,118	199,227	0%	0%
2692	[redacted]					
2693	3,034,172	2,685,540	3,034,789	2,685,604	0%	0%
2694	2,262	2,262	2,262	2,262	0%	0%
2695	201	201	438	438	-118%	-118%*
2696	939,094	831,068	939,108	831,107	0%	0%
2697	402	402	402	402	0%	0%
2698	2,776,461	2,457,061	2,776,531	2,457,125	0%	0%
2703	[redacted]					
2704						
2707						
(blank)	10,361	8,766			100%	100%
Grand	**6,991,465**	**6,187,218**	**6,982,048**	**6,178,869**	**0%**	**0%**

2695 is grouped with unclassified.

Impact of Inclusion of VTR/Non-Dealer Landing Source Records

VTR records turned out to be a very small percentage of overall records for most species that the Population Dynamics Branch is concerned with.

The following species had overall landings consisting of more than 10% VTR (not sold/orphan):

- Hake,Offshore – 32%
- Herring,Blue Back – 63%
- Skate,Thorny – 40%
- Sturgeon,Atlantic – 100% *(this is a no possession limit species – surprising to see any landings)*

The following page includes a chart of all stocks assessed by the Population Dynamics Branch with total live and landed lbs., dealer live and landed lbs., VTR live and landed lbs. by each category (take home/not sold, orphan species and orphan trip) and percentages of total live and landed lbs. that VTR records make up.

DLR_SPPNAME	ITIS_TSN	NESPP3	TOTAL_LIV_LB	TOTAL_LAND_LB	TOTAL_DLR_LIV_LB	TOTAL_DLR_LAND_LB	NOT_SOLD_LIV_LB	NOT_SOLD_LND_LB	ORPHAN_SPEC_LIV_LE	ORPHAN_SPEC_LND_LE	ORPHAN_TRIP_LIV_LB	ORPHAN_TRIP_LND_LB	VTR_PERCENT_OF_TOTAL_LIV_LB	VTR_PERCENT_OF_TOTAL_LND_LB
ALEWIFE	161706	001	2,157,987	1,851,047	2,155,347	1,847,547	-	-	1,500	1,500	1,140	2,000	0%	0%
ANGLER	164499	012	23,178,042	11,982,189	23,053,779	11,864,838	11,835	60,468	81,885	36,734	30,543	20,149	1%	1%
BASS,STRIPED	167680	418	4,929,766	4,929,766	4,899,226	4,899,226	-	-	7,889	7,889	22,651	22,651	1%	1%
BLUEFISH	168559	023	2,879,313	2,867,635	2,811,475	2,799,878	122	108	17,356	17,349	50,360	50,300	2%	2%
BUTTERFISH	172567	051	7,624,988	7,624,988	7,567,083	7,567,083	60	60	20,673	20,673	37,172	37,172	1%	1%
CLAM,SURF	080944	769	195,505,985	41,030,117	195,476,991	41,024,587	94	94	-	-	28,900	5,436	0%	0%
COD	164712	081	2,267,474	1,937,785	2,242,582	1,917,208	2,921	2,351	18,379	15,720	3,592	2,506	1%	1%
CRAB,JONAH	098678	711	[redacted]											
CRAB,RED	620992	710	[redacted]											
DOGFISH SMOOTH	160230	351	1,141,413	884,374	1,112,890	863,484	3,742	3,742	17,957	12,429	6,824	4,719	2%	2%
DOGFISH SPINY	160617	352	18,240,949	17,702,183	17,437,201	17,467,025	659,855	94,265	39,160	39,160	104,733	101,733	4%	1%
FLOUNDER,AM. PLAICE	172877	124	2,187,748	2,187,744	2,173,573	2,173,573	4,510	4,506	2,688	2,688	6,977	6,977	1%	1%
FLOUNDER,SAND-DAB	172746	125	23,666	23,666	23,666	23,666	-	-	-	-	-	-	0%	0%
FLOUNDER,SUMMER	172735	121	9,140,442	9,139,580	9,064,069	9,064,069	1,401	539	20,775	20,775	54,197	54,197	1%	1%
FLOUNDER,WINTER	172905	120	1,294,907	1,294,801	1,287,981	1,287,981	150	52	4,257	4,257	2,519	2,511	1%	1%
FLOUNDER,WITCH	172873	122	1,772,147	1,771,965	1,763,127	1,763,127	3,048	2,866	2,783	2,783	3,189	3,189	1%	0%
FLOUNDER,YELLOWTAIL	172909	123	908,935	908,809	906,678	906,678	177	59	1,402	1,402	678	670	0%	0%
HADDOCK	164744	147	19,270,455	16,904,740	19,214,463	16,856,292	1,019	572	41,260	36,229	13,713	11,647	0%	0%
HAKE,OFFSHORE	164793	508	4,939	4,905	3,361	3,359	3	3	1,551	1,519	24	24	32%	32%
HAKE,RED	164730	152	1,028,641	997,745	1,019,877	988,983	3,358	3,356	2,086	2,086	3,320	3,320	1%	1%
HAKE,SILVER	164791	509	11,610,132	11,604,337	11,545,267	11,539,887	7,850	7,847	7,511	7,468	49,504	49,135	1%	1%
HAKE,WHITE	164732	153	4,377,665	3,265,764	4,355,248	3,253,383	10,360	3,384	7,056	5,266	5,001	3,731	1%	0%
HALIBUT,ATLANTIC	172933	159	118,204	100,375	111,110	97,675	3,669	253	2,110	1,846	1,315	601	6%	3%
HERRING,ATLANTIC	161722	168	28,681,886	28,712,181	28,655,997	28,655,997	6,470	14,328	931	931	18,488	40,925	0%	0%
HERRING,BLUE BACK	161703	112	7,430	7,435	2,778	2,778	7	12	4,645	4,645	-	-	63%	63%
HERRING,RIVER	161701	170	[redacted]											
LOBSTER	097314	727	129,184,039	129,184,012	127,868,085	127,868,085	780	780	124,709	124,709	1,190,465	1,190,438	1%	1%
MACKEREL,ATLANTIC	172414	212	11,439,503	11,494,813	11,122,269	11,123,297	169,086	215,174	88,765	88,765	59,383	67,577	3%	3%
POLLOCK	164727	269	6,991,465	6,187,218	6,981,104	6,178,452	4,801	3,942	3,700	3,264	1,860	1,560	0%	0%
QUAHOG,OCEAN	081343	754	203,693,892	24,690,156	203,693,884	24,690,155	-	-	8	1	-	-	0%	0%
REDFISH	166774	240	11,737,321	11,737,085	11,728,113	11,728,113	378	182	7,629	7,629	1,201	1,161	0%	0%
SCALLOP,SEA	079718	800	506,509,939	60,811,489	505,867,534	60,729,223	5,937	658	8,490	1,074	627,978	80,534	0%	0%
SCUP	169182	329	13,854,750	13,854,750	13,784,076	13,784,076	5,817	5,817	30,447	30,447	34,410	34,410	1%	1%
SEA BASS,BLACK	167687	335	3,558,182	3,558,182	3,524,942	3,524,942	69	69	9,608	9,608	23,563	23,563	1%	1%
SHAD,AMERICAN	161702	347	59,786	66,334	59,499	66,047	-	-	261	261	26	26	0%	0%
SHRIMP,BROWN	551570	731	861,917	861,917	861,917	861,917	-	-	-	-	-	-	0%	0%
SKATE,BARNDOOR	564139	368	490,225	290,266	483,243	286,021	2,202	970	4,115	2,876	665	399	1%	1%
SKATE,CLEARNOSE	160855	372	29,606	15,450	28,927	15,066	375	250	304	134	-	-	2%	2%
SKATE,LITTLE	564130	366	8,802,826	8,798,090	8,738,117	8,733,432	20,208	20,208	24,901	24,850	19,600	19,600	1%	1%
SKATE,ROSETTE	564136	364	[redacted]											
SKATE,SMOOTH	564151	369	482,811	238,027	481,876	237,615	-	-	34	15	901	397	0%	0%
SKATE,THORNY	564149	370	501	495	301	295	-	-	-	-	200	200	40%	40%
SKATE,WINTER(BIG)	564145	367	17,620,677	9,233,153	17,567,387	9,203,544	1,614	915	9,132	4,257	42,544	24,437	0%	0%
SQUID (ILLEX)	082521	802	59,906,889	59,906,791	59,885,255	59,885,157	31	31	353	353	21,250	21,250	0%	0%
SQUID (LOLIGO)	082372	801	27,734,154	27,616,879	27,466,124	27,348,668	267	267	38,328	38,328	229,435	229,616	1%	1%
STURGEON,ATLANTIC	553269	420	60	60	-	-	-	-	60	60	-	-	100%	100%
TILEFISH,BLUELINE	168543	444	89,331	82,833	87,363	81,021	85	78	141	131	1,742	1,603	2%	2%
TILEFISH,GOLDEN	168546	446	1,556,650	1,429,908	1,555,823	1,429,146	182	168	645	594	-	-	0%	0%

Including the species assessed by the Population Dynamics Branch, there were 36 species with 10% or more of landings with VTR as the Landing Source.

DLR_SPPNAME	ITIS_TSN	NESPP3	TOTAL_LAND_LB	TOTAL_DLR_LAND_LB	NOT_SOLD_LND_LB	ORPHAN_SPEC_LND_LB	ORPHAN_TRIP_LND_LB	VTR_PERCENT_OF_TOTAL_LND_LB
ALEWIFE	161706	001	1,851,047	1,847,547	-	1,500	2,000	0%
AMALCO JACK	168691	007	34,339	34,240	-	-	99	0%
AMBER JACK	168688	003	685	624	-	59	2	9%
AMBERJACK,GREATER	168689	181	34,951	34,951	-	-	-	0%
AMBERJACK,LESSER	168690	182	630	630	-	-	-	0%
ANGLER	164499	012	11,982,189	11,864,838	60,468	36,734	20,149	1%
BAR JACK	168615	214	444	444	-	-	-	0%
BARRACUDA	170425	018	2,052	2,052	-	-	-	0%
BARRELFISH	172512	027	2,764	2,764	-	-	-	0%
BASS,STRIPED	167680	418	4,929,766	4,899,226	-	7,889	22,651	1%
BAY ANCHOVY	161839	006	[redacted]					
BIG ROUGHY	615855	025	[redacted]					
BLADDER WRACK	011335	819	[redacted]					
BLUE RUNNER	168612	213	1,198	1,198	-	-	-	0%
BLUEFISH	168559	023	2,867,635	2,799,878	108	17,349	50,300	2%
BONITO	172409	033	64,777	63,548	-	736	493	2%
BULLHEADS	163996	045	46,156	46,156	-	-	-	0%

DLR_SPPNAME	ITIS_TSN	NESPP3	TOTAL_LAND_LB	TOTAL_DLR_ LAND_LB	NOT_SOLD _LND_LB	ORPHAN_SPEC _LND_LB	ORPHAN_TRIP _LND_LB	VTR_PERCENT_OF _TOTAL_LND_LB
BUTTERFISH	172567	051	7,624,988	7,567,083	60	20,673	37,172	1%
CARP	163344	063	[redacted]					
CATFISH (FRESHWATER)	163995	066						
CATFISH(SEA)	163992	069						
CATFISH,BLUE	163997	067						
CATFISH,CHANNEL	163998	068						
CATFISH,FLATHEAD	164029	064						
CATFISH,WHITE	164037	065						
CLAM NK	079118	764						
CLAM,ARTIC SURF	080983	765	1,669	1,669	-	-	-	0%
CLAM,BLOODARC	079342	743	16,995	16,950	-	-	45	0%
CLAM,NORTHERN PROPEL	081763	766	27	27	-	-	-	0%
CLAM,RAZOR	081022	760	222,593	220,593	-	-	2,000	1%
CLAM,SOFT	081692	763	2,806,888	2,806,888	-	-	-	0%
CLAM,SURF	080944	769	41,030,117	41,024,587	94	-	5,436	0%
COBIA	168566	057	56,596	56,319	-	180	97	0%
COD	164712	081	1,937,785	1,917,208	2,351	15,720	2,506	1%
CONCHS	072554	775	977,331	977,331	-	-	-	0%
CRAB,BLUE	098696	700	70,575,845	70,439,272	-	318	136,255	0%
CRAB,CANCER	098671	714	621	-	19	567	35	100%

DLR_SPPNAME	ITIS_TSN	NESPP3	TOTAL_LAND_LB	TOTAL_DLR_ LAND_LB	NOT_SOLD _LND_LB	ORPHAN_SPEC _LND_LB	ORPHAN_TRIP _LND_LB	VTR_PERCENT_OF _TOTAL_LND_LB
CRAB,GREEN	098734	708	176,734	176,541	153	7	33	0%
CRAB,HERMIT	097775	702	177	-	142	-	35	100%
CRAB,HORSESHOE	082703	724	2,098,444	2,037,864	-	30,826	29,754	3%
CRAB,JONAH	098678	711	[redacted]					
CRAB,LADY	098714	701						
CRAB,NK	098276	713	171,638	45,116	-	14,405	112,117	74%
CRAB,RED	620992	710	[redacted]					
CRAB,ROCK	098679	712	2,117,335	2,108,740	54	3,853	4,688	0%
CRAB,SPIDER	098417	715	1,691	1,613	-	75	3	5%
CRAPPIE	168165	084	[redacted]					
CREVALLE	168609	087	8,381	8,355	-	26	-	0%
CROAKER,ATLANTIC	169283	090	2,227,410	2,148,879	-	965	77,566	4%
CRUSTACEANS NK	083677	834	4,872,168	4,872,168	-	-	-	0%
CUNNER	170481	093	10,418	7,242	2	103	3,071	30%
CUSK	164740	096	41,408	40,195	22	1,177	14	3%
CUSK-EELS	164807	253	16	-	-	16	-	100%
CUTLASSFISH,ATLANTIC	172385	099	287,906	287,906	-	-	-	0%
DOGFISH (NK)	160604	350	[redacted]					
DOGFISH BLACK	160703	339						
DOGFISH SMOOTH	160230	351	884,374	863,484	3,742	12,429	4,719	2%

DLR_SPPNAME	ITIS_TSN	NESPP3	TOTAL_LAND_LB	TOTAL_DLR_ LAND_LB	NOT_SOLD _LND_LB	ORPHAN_SPEC _LND_LB	ORPHAN_TRIP _LND_LB	VTR_PERCENT_OF _TOTAL_LND_LB
DOGFISH SPINY	160617	352	17,702,183	17,467,025	94,265	39,160	101,733	1%
DOLPHINFISH	168790	105	316,568	315,981	90	333	164	0%
DRUM,BLACK	169288	106	174,582	174,558	-	14	10	0%
DRUM,BRANDED	169269	109	[redacted]					
DRUM,NK	169237	104	405	255	-	150	-	37%
DRUM,RED	169290	107	22,288	22,288	-	-	-	0%
EEL,AMERICAN	161127	115	540,818	540,484	-	324	10	0%
EEL,CONGER	161326	116	55,769	49,803	2,439	3,444	83	11%
EEL,NK	161123	117	[redacted]					
EEL,SAND (LAUNCE)	171671	206	478	478	-	-	-	0%
ESCOLAR	172362	385	6,901	6,901	-	-	-	0%
FINGERED KELP	011228	820	[redacted]					
FLOUNDER,AM. PLAICE	172877	124	2,187,744	2,173,573	4,506	2,688	6,977	1%
FLOUNDER,FOURSPOT	172739	127	14,755	14,420	205	-	130	2%
FLOUNDER,GULFSTREAM	172719	129	[redacted]					
FLOUNDER,SAND-DAB	172746	125	23,666	23,666	-	-	-	0%
FLOUNDER,SOUTHERN	172738	130	312,213	312,211	-	2	-	0%
FLOUNDER,SUMMER	172735	121	9,139,580	9,064,069	539	20,775	54,197	1%
FLOUNDER,WINTER	172905	120	1,294,801	1,287,981	52	4,257	2,511	1%
FLOUNDER,WITCH	172873	122	1,771,965	1,763,127	2,866	2,783	3,189	0%

DLR_SPPNAME	ITIS_TSN	NESPP3	TOTAL_LAND_LB	TOTAL_DLR_ LAND_LB	NOT_SOLD _LND_LB	ORPHAN_SPEC _LND_LB	ORPHAN_TRIP _LND_LB	VTR_PERCENT_OF _TOTAL_LND_LB
FLOUNDER,YELLOWTAIL	172909	123	908,809	906,678	59	1,402	670	0%
GARFISH	161092	133	5,065	4,709	-	286	70	7%
GIZZARD SHAD	161737	134	2,056,605	2,056,605	-	-	-	0%
GOOSEFISH,BLACKFIN	164500	013	7,325	7,325	-	-	-	0%
GRAYSBY	181220	590	[redacted]					
GROUPER	551018	141	9,283	9,283	-	-	-	0%
GROUPER,GAG	167759	593	[redacted]					
GROUPER,RED	167702	026						
GROUPER,SCAMP	167763	145						
GROUPER,SNOWY	167705	146	50,181	49,812	-	197	172	1%
GROUPER,YELLOWEDGE	167699	142	2,630	2,630	-	-	-	0%
GRUNTS	169055	144	[redacted]					
HADDOCK	164744	147	16,904,740	16,856,292	572	36,229	11,647	0%
HAGFISH	159753	150	[redacted]					
HAKE MIX RED & WHITE	164729	155	10,083	10,083	-	-	-	0%
HAKE,OFFSHORE	164793	508	4,905	3,359	3	1,519	24	32%
HAKE,RED	164730	152	997,745	988,983	3,356	2,086	3,320	1%
HAKE,SILVER	164791	509	11,604,337	11,539,887	7,847	7,468	49,135	1%
HAKE,SPOTTED	164731	662	[redacted]					
HAKE,WHITE	164732	153	3,265,764	3,253,383	3,384	5,266	3,731	0%

DLR_SPPNAME	ITIS_TSN	NESPP3	TOTAL_LAND_LB	TOTAL_DLR_ LAND_LB	NOT_SOLD _LND_LB	ORPHAN_SPEC _LND_LB	ORPHAN_TRIP _LND_LB	VTR_PERCENT_OF _TOTAL_LND_LB
HALIBUT,ATLANTIC	172933	159	100,375	97,675	253	1,846	601	3%
HARVEST FISH	172564	165	99,189	99,184	-	5	-	0%
HERRING (NK)	161700	167	54,697	54,697	-	-	-	0%
HERRING,ATL THREAD	161748	174	13,432	13,432	-	-	-	0%
HERRING,ATLANTIC	161722	168	28,712,181	28,655,997	14,328	931	40,925	0%
HERRING,BLUE BACK	161703	112	7,435	2,778	12	4,645	-	63%
HERRING,RIVER	161701	170	[redacted]					
HERRING,ROUND	161743	166	70	70	-	-	-	0%
HIND,RED	167700	032	[redacted]					
HIND,ROCK	167696	028						
HOGFISH	170566	179						
HOUNDFISH	165577	020						
JOHN DORY	166284	188	103,929	102,403	60	1,466	-	1%
KELP,SUGAR	011222	833	[redacted]					
KINGFISH,NORTHERN	169276	196	1,288	1,288	-	-	-	0%
LADYFISH	161111	268	930	930	-	-	-	0%
LOBSTER	097314	727	129,184,012	127,868,085	780	124,709	1,190,438	1%
LOBSTER,SPINY	097648	728	[redacted]					
MACKEREL,ATLANTIC	172414	212	11,494,813	11,123,297	215,174	88,765	67,577	3%
MACKEREL,BULLET	172455	131	304	269	-	35	-	12%

DLR_SPPNAME	ITIS_TSN	NESPP3	TOTAL_LAND_LB	TOTAL_DLR_ LAND_LB	NOT_SOLD _LND_LB	ORPHAN_SPEC _LND_LB	ORPHAN_TRIP _LND_LB	VTR_PERCENT_OF _TOTAL_LND_LB
MACKEREL,CHUB	172412	215	83,839	60,522	9	22,594	714	28%
MACKEREL,FRIGATE	172456	132	590	316	-	174	100	46%
MACKEREL,KING	172435	194	553,287	546,553	-	28	6,706	1%
MACKEREL,SPANISH	172436	384	885,788	876,852	-	69	8,867	1%
MARLIN BLUE	172491	217	[redacted]					
MENHADEN	161731	221						
MINNOW	163342	223						
MOLLUSKS NK	069458	804	58,718	51,718	-	-	7,000	12%
MULLETS	170333	234	21,915	12,450	-	7,381	2,084	43%
MUMMICHOG	165647	237	[redacted]					
MUSSELS	079454	781	2,117,887	2,117,887	-	-	-	0%
NEEDLEFISH,ATLANTIC	165551	019	9,927	9,927	-	-	-	0%
OARWEED KELP	011217	821	[redacted]					
OCTOPUS	082590	786						
OPAH	166326	249	7,270	7,270	-	-	-	0%
OTHER FISH	914179	526	790,490	790,490	-	-	-	0%
OYSTER,EUROPEAN FLT	079885	792	[redacted]					
OYSTERS	079872	789	6,320,039	6,318,039	-	-	2,000	0%
PERCH,SAND	167793	311	323	308	-	15	-	5%
PERCH,WHITE	167678	506	1,267,267	1,267,189	-	-	78	0%

DLR_SPPNAME	ITIS_TSN	NESPP3	TOTAL_LAND_LB	TOTAL_DLR_LAND_LB	NOT_SOLD_LND_LB	ORPHAN_SPEC_LND_LB	ORPHAN_TRIP_LND_LB	VTR_PERCENT_OF_TOTAL_LND_LB
PERCH,YELLOW	168469	517	[redacted]					
PERIWINKLES	070419	798	206,921	206,921	-	-	-	0%
PIGFISH	169077	258	8,637	8,627	-	-	10	0%
PINFISH	169187	267	[redacted]					
POLLOCK	164727	269	6,187,218	6,178,452	3,942	3,264	1,560	0%
POMFRETS	170287	271	2,235	2,235	-	-	-	0%
POMPANO,COMMON	168708	272	20,818	20,700	-	27	91	1%
PORGY,JOLTHEAD	169197	325	[redacted]					
PORGY,NK	169180	332						
PORGY,RED	169207	330						
PUFFER	173283	431	1,777	1,777	-	-	-	0%
PUFFER	173289	430	1,934	1,934	-	-	-	0%
PUFFER,NORTHERN	173290	429	46,582	46,369	-	184	29	0%
QUAHOG	081495	748	14,491,024	14,419,274	-	-	71,750	0%
QUAHOG,OCEAN	081343	754	24,690,156	24,690,155	-	1	-	0%
RAY,COWNOSE	160985	285	12,466	12,201	-	265	-	2%
RAY,MANTA ATLANTIC	160992	672	45	-	-	45	-	100%
REDFISH	166774	240	11,737,085	11,728,113	182	7,629	1,161	0%
REDFISH,GOLDEN	166781	243	150	-	-	150	-	100%
RIBBONFISH	166339	098	219,773	49,869	-	159,192	10,712	77%

DLR_SPPNAME	ITIS_TSN	NESPP3	TOTAL_LAND_LB	TOTAL_DLR_ LAND_LB	NOT_SOLD _LND_LB	ORPHAN_SPEC _LND_LB	ORPHAN_TRIP _LND_LB	VTR_PERCENT_OF _TOTAL_LND_LB
ROCKWEED	011329	832	[redacted]					
ROSEFISH,BLK BELLIED	166787	242	2,559	2,355	-	204	-	8%
RUDDERFISH,BANDED	168693	008	[redacted]					
RUNNER,RAINBOW	168738	005	51	51	-	-	-	0%
SALMON,ATLANTIC	161996	305	[redacted]					
SCALLOP,BAY	079737	799	291,514	291,197	-	142	175	0%
SCALLOP,SEA	079718	800	60,811,489	60,729,223	658	1,074	80,534	0%
SCULPINS	167196	326	[redacted]					
SCUP	169182	329	13,854,750	13,784,076	5,817	30,447	34,410	1%
SEA BASS,BANK	167690	328	390	390	-	-	-	0%
SEA BASS,BLACK	167687	335	3,558,182	3,524,942	69	9,608	23,563	1%
SEA BASS,NK	167686	333	[redacted]					
SEA CUCUMBERS	158140	806	276,220	276,220	-	-	-	0%
SEA RAVEN	167289	327	5,504	446	1,350	3,688	20	92%
SEA ROBIN,ARMORED	167010	343	[redacted]					
SEA ROBIN,NORTHERN	166974	340	3,711	3,711	-	-	-	0%
SEA ROBIN,STRIPED	166975	342	[redacted]					
SEA ROBINS	166972	341	77,196	70,840	377	5,485	494	8%
SEA URCHINS	157968	805	1,733,000	1,732,825	-	-	175	0%
SEA WEEDS,NK	010685	817	[redacted]					

DLR_SPPNAME	ITIS_TSN	NESPP3	TOTAL_LAND_LB	TOTAL_DLR_ LAND_LB	NOT_SOLD _LND_LB	ORPHAN_SPEC _LND_LB	ORPHAN_TRIP _LND_LB	VTR_PERCENT_OF _TOTAL_LND_LB
SEATROUT,NK	169238	334	[redacted]					
SHAD,AMERICAN	161702	347	66,334	66,047	-	261	26	0%
SHAD,HICKORY	161704	173	119,356	119,356	-	-	-	0%
SHARK,ATL SHARPNOSE	160200	494	215,348	215,051	-	26	271	0%
SHARK,BLACK TIP	160318	487	45,761	43,443	-	-	2,318	5%
SHARK,BONNETHEAD	160502	476	[redacted]					
SHARK,BULL	160275	489	[redacted]					
SHARK,FINETOOTH	160409	499	341	341	-	-	-	0%
SHARK,HAMERHD GREAT	160515	386	25,890	25,890	-	-	-	0%
SHARK,HAMMERHEAD	160497	495	490	58	-	-	432	88%
SHARK,HMHD,SCALLOPED	160508	478	[redacted]					
SHARK,HMHD,SMOOTH	160505	479	[redacted]					
SHARK,LEMON	160433	492	[redacted]					
SHARK,MAKO	159923	357	[redacted]					
SHARK,MAKO SHORTFIN	159924	355	40,966	40,785	101	80	-	0%
SHARK,NK	159785	359	[redacted]					
SHARK,PORBEAGLE	159911	481	[redacted]					
SHARK,SANDBAR	160289	482	35,086	35,086	-	-	-	0%
SHARK,SILKY	160310	485	[redacted]					
SHARK,SPINNER	160401	488	49,023	48,065	-	-	958	2%

DLR_SPPNAME	ITIS_TSN	NESPP3	TOTAL_LAND_LB	TOTAL_DLR_ LAND_LB	NOT_SOLD _LND_LB	ORPHAN_SPEC _LND_LB	ORPHAN_TRIP _LND_LB	VTR_PERCENT_OF _TOTAL_LND_LB
SHARK,THRESHER	159916	353	53,581	52,423	-	451	707	2%
SHARK,THRESHER UNC	159915	360	[redacted]					
SHARK,THRESHR BGEYE	159921	354						
SHARK,TIGER	160189	491	1,900	1,895	-	5	-	0%
SHARKS,PELAGIC	159851	498	4,299	4,299	-	-	-	0%
SHEEPSHEAD	169189	356	51,050	51,031	-	13	6	0%
SHRIMP (MANTIS)	099140	737	54,824	37,278	-	372	17,174	32%
SHRIMP (NK)	096106	735	[redacted]					
SHRIMP (PANDALID)	096967	736						
SHRIMP (PENAEID)	095602	738	292,834	48,016	-	-	244,818	84%
SHRIMP (SICYONIA)	096027	730	[redacted]					
SHRIMP,BROWN	551570	731	861,917	861,917	-	-	-	0%
SILVER&OFFSHHAKE MIX	164790	507	2,123	2,123	-	-	-	0%
SILVERSIDE,ATLANTIC	165994	362	68,906	68,906	-	-	-	0%
SILVERSIDE,NK	165984	363	[redacted]					
SKATE,BARNDOOR	564139	368	290,266	286,021	970	2,876	399	1%
SKATE,CLEARNOSE	160855	372	15,450	15,066	250	134	-	2%
SKATE,LITTLE	564130	366	8,798,090	8,733,432	20,208	24,850	19,600	1%
SKATE,LITTLE/WINTER	564037	373	288,836	-	285,356	3,300	180	100%
SKATE,ROSETTE	564136	364	[redacted]					

DLR_SPPNAME	ITIS_TSN	NESPP3	TOTAL_LAND_LB	TOTAL_DLR_ LAND_LB	NOT_SOLD _LND_LB	ORPHAN_SPEC _LND_LB	ORPHAN_TRIP _LND_LB	VTR_PERCENT_OF _TOTAL_LND_LB
SKATE,SMOOTH	564151	369	238,027	237,615	-	15	397	0%
SKATE,THORNY	564149	370	495	295	-	-	200	40%
SKATE,WINTER(BIG)	564145	367	9,233,153	9,203,544	915	4,257	24,437	0%
SKATES(HEADS)	160845	365	823,165	656,908	89,206	67,024	10,027	20%
SMELT	162028	371	15	15	-	-	-	0%
SNAIL,MOON	072878	780	9,791	9,769	-	22	-	0%
SNAKEHEAD,NORTHERN	166680	392	[redacted]					
SNAPPER	168845	336						
SNAPPER,GRAY	168848	323						
SNAPPER,RED	168853	376	5,211	5,181	-	30	-	1%
SNAPPER,VERMILLION	168909	374	[redacted]					
SPADEFISH	553178	381	30,521	30,485	-	7	29	0%
SPOT	169267	406	1,507,287	1,488,526	-	653	18,108	1%
SQUID (ILLEX)	082521	802	59,906,791	59,885,157	31	353	21,250	0%
SQUID (LOLIGO)	082372	801	27,616,879	27,348,668	267	38,328	229,616	1%
SQUID,UNC	082367	807	62	62	-	-	-	0%
SQUIDS,LOLIGINIDAE	082369	803	1,418	1,418	-	-	-	0%
SQUIRRELFISH	166170	024	561	556	-	5	-	1%
STARFISH	156862	828	[redacted]					
STARGAZER,NORTHERN	171055	031	90	85	-	5	-	6%

DLR_SPPNAME	ITIS_TSN	NESPP3	TOTAL_LAND_LB	TOTAL_DLR_ LAND_LB	NOT_SOLD _LND_LB	ORPHAN_SPEC _LND_LB	ORPHAN_TRIP _LND_LB	VTR_PERCENT_OF _TOTAL_LND_LB
STINGRAYS	649685	286	[redacted]					
STRIPED MULLET	170335	235	896,851	896,851	-	-	-	0%
STURGEON,ATLANTIC	553269	420	60	-	-	60	-	100%
SUNFISHES	168093	426	[redacted]					
SWORDFISH	172482	432	991,981	988,330	605	2,896	150	0%
TARPON	161116	435	[redacted]					
TAUTOG	170479	438	425,469	408,333	20	2,861	14,255	4%
TILEFISH (NK)	168537	447	[redacted]					
TILEFISH,BLUELINE	168543	444	82,833	81,021	78	131	1,603	2%
TILEFISH,GOLDEN	168546	446	1,429,908	1,429,146	168	594	-	0%
TILEFISH,GOLDFACE	168544	443	[redacted]					
TILEFISH,SAND	168548	445	3,862	3,848	-	4	10	0%
TOADFISH,OYSTER	164412	451	5,444	5,431	-	13	-	0%
TRIGGERFISH	173128	456	87,629	87,231	5	178	215	0%
TRIGGERFISH,GRAY	173138	457	38,756	38,756	-	-	-	0%
TRIPLETAIL	169007	459	1,618	1,618	-	-	-	0%
TROUT,STEELHEAD	161989	415	212	212	-	-	-	0%
TUNA,ALBACORE	172419	470	179,736	174,655	25	116	4,940	3%
TUNA,BIG EYE	172428	469	850,372	848,124	-	421	1,827	0%
TUNA,BLACKFIN	172427	464	14,494	14,494	-	-	-	0%

DLR_SPPNAME	ITIS_TSN	NESPP3	TOTAL_LAND_LB	TOTAL_DLR_LAND_LB	NOT_SOLD_LND_LB	ORPHAN_SPEC_LND_LB	ORPHAN_TRIP_LND_LB	VTR_PERCENT_OF_TOTAL_LND_LB
TUNA,BLUEFIN	172421	467	1,863,976	1,850,730	-	-	13,246	1%
TUNA,LITTLE	172402	468	253,652	245,799	-	5,541	2,312	3%
TUNA,SKIPJACK	172401	466	1,607	1,497	-	85	25	7%
TUNA,YELLOWFIN	172423	471	897,033	895,126	-	470	1,437	0%
TURTLE,SNAPPER	173752	815	[redacted]					
WAHOO	172451	472	23,852	23,599	-	95	158	1%
WEAKFISH,SPOTTED	169239	345	309,607	308,354	-	331	922	0%
WEAKFISH,SQUETEAGUE	169241	344	164,349	160,125	-	1,070	3,154	3%
WHELK,CHANNELED	074096	776	1,815,065	1,383,587	50	16,936	414,492	24%
WHELK,KNOBBED	074071	777	1,075,476	609,154	475	39,130	426,717	43%
WHELK,LIGHTNING	074075	778	[redacted]					
WHELK,WAVED	073795	779	48,227	48,194	-	33	-	0%
WHITING,KING	169273	197	536,142	487,322	13	23,131	25,676	9%
WINGED KELP	011300	822	[redacted]					
WORMS	065902	825						
WORMS	066107	823						
WORMWEED	011332	824						
WRECKFISH	167914	513						
			1,857	-	-	665	1,192	100%

Below is a table of record counts of VTR records with status indicating what type of VTR records they are. "Not sold" make up a relatively small percentage compared to "orphan species" and "orphan trip" records.

LANDING_SOURCE	STATUS	COUNT(1)	% of VTR
VTR	VTR_NOT_SOLD	1766	9%
VTR	VTR_ORPHAN_SPECIES	7981	42%
VTR	VTR_ORPHAN_TRIP	9412	49%

StockEff Integration

In addition to validating the data within CAMS, the StockEff development team tested bringing CAMS data into StockEff and running StockEff's analytic processes using CAMS data. This was especially important since the expected release date of production CAMS would not allow the StockEff team much time to troubleshoot and resolve issues that could arise before analysts would need data for upcoming 2022 assessments.

The StockEff system currently normalizes landings data from three different time series so that accurate comparison may be made over time. The most recent of the three times series is housed in the CFDBS "AA" tables. StockEff pulls data from the "AA" tables CFAGEYYYYAA, CFDETSYYYYAA, CFDETTYYYYAA and CFLENYYYYAA (where YYYY = a specific year) into the following materialized views:

- MV_CF_AGE
- MV_CF_LANDINGS
- MV_CF_LEN

In late 2021 when very preliminary test CAMS data was available to the Center, the StockEff team began reviewing all available fields within CAMS compared to the corresponding AA tables. They then focused on fields that are needed by StockEff ensuring that data types and lengths were consistent.

The StockEff team originally discovered all fields had extensive lengths and did not match the AA tables. This was remedied by the CAMS development team prior to the official review process. The team also observed some fields were missing, but could be derived from other fields (e.g. PORT2 could be derived from PORT). Many fields were more frequently or always null.

The team documented and shared their findings with the CAMS team. The additional fields were added and nulls populated where possible during the review process. In some instances, it was determined that particular fields should not exist or be populated in the same manner because data elements as they were used in the past were in fact not the same in the new system and would be misleading (e.g. NESPP4 should not be populated with "unclassified" for VTR landing because NESPP4 is being phased out in general, and VTR records by function of what they are, don't have market categories).

To test how effectively the CAMS data could be brought into StockEff, the StockEff development team created "mirror" materialized views of MV_CF_AGE, MV_CF_LANDINGS and MV_CF_LEN in a non-production schema. The team successfully populated the mirror views with CAMS data.

The team continued creating “mirror” tables and views that are derived from the aforementioned materialized views and ran updated versions of analytic scripts (pulling from and writing to “mirror” objects and not current working, or live, StockEff objects) to ensure that they could continue processing using the new CAMS data. The team continues to work through each step within StockEff’s process using “mirror” data with the goal of continuing all the way through a selection of final product outputs to compare against current products generated from live data within current StockEff for 2019. Time has not allowed for the team to get all the way through this process as of the current date, but the team continues to make steady progress. No show stoppers have been encountered so far.

Some updates were required, for example, to pull data from the “AA” tables, StockEff used NESPP4 to obtain species ITIS values for each species in addition to market code. The selection and join had to be re-worked to obtain ITIS and market category directly from CAMS in order to accurately pull in the new VTR landings, which were absent from the AA tables.

The StockEff development team refreshes the mirror “cams” versions of materialized views in StockEff weekly to ensure any new updates within the CAMS system are being carried through for ongoing review by the StockEff team.

Appendix 3. Comparison of the value of landings

AA-CAMS-Data-Check_PII_Removed

Geret DePiper

2022-02-18

1 Confidentiality

Due to confidentiality concerns, the analyses presented publically differs from the full analysis undertaken. As such, there are rows of data in the full analyses that are missing from this public documentation.

2 Total Sum

```
Tempdata <- dplyr::tbl(DB_SOLE_Connection,
               in_schema("CFDBS","CFDETT2019AA"))
AA_Trip_SumTotal <- Tempdata %>% select(DLRTRPID,TRPVALUE)  %>%
  summarise(sum.TRPVALUE = sum(TRPVALUE, na.rm=TRUE)) %>%
   collect()

Tempdata <- dplyr::tbl(DB_SOLE_Connection,
               in_schema("CFDBS","CFDETS2019AA"))
 AA_Species_SumTotal <- Tempdata %>%
     select(NESPP4,SPPVALUE)  %>%
     summarise(sum.SPPVALUE =
       sum(SPPVALUE, na.rm=TRUE)) %>%
     collect()

Tempdata <- dplyr::tbl(DB_NOVA_Connection,
               in_schema("CAMS_GARFO","CAMS_CFDETT2019AA"))
CAMS_Trip_SumTotal <- Tempdata %>% select(DLRTRPID,TRPVALUE)  %>%
  summarise(sum.TRPVALUE = sum(TRPVALUE, na.rm=TRUE)) %>%
   collect()

Tempdata <- dplyr::tbl(DB_NOVA_Connection,
               in_schema("CAMS_GARFO","CAMS_CFDETS2019AA"))
 CAMS_Species_SumTotal <- Tempdata %>%
     select(NESPP4,SPPVALUE)  %>%
     summarise(sum.SPPVALUE =
       sum(SPPVALUE, na.rm=TRUE)) %>%
     collect()

AA_TEMP =  cbind.data.frame(AA_Trip_SumTotal,AA_Species_SumTotal)
CAMS_TEMP =  cbind.data.frame(CAMS_Trip_SumTotal,CAMS_Species_SumTotal)

SumTotal_table <-  rbind.data.frame(AA_TEMP,CAMS_TEMP)

SumTotal_table$TRP_SPP_Pct <- round(SumTotal_table$sum.TRPVALUE/SumTotal_table$sum.SPPVALUE*100,5)
```

```
SumTemp <- cbind(round(SumTotal_table[2,1]/SumTotal_table[1,1]*100,5),
                 round(SumTotal_table[2,2]/SumTotal_table[1,2]*100,5),"")
colnames(SumTemp) <- names(SumTotal_table)

SumTotal_table <- rbind.data.frame(SumTotal_table,SumTemp)
SumTotal_table <- cbind.data.frame(
  c("AA 2019","CAMS 2019","CAMS as Percent of AA"), SumTotal_table)

SumTotal_table$sum.TRPVALUE <- as.numeric(SumTotal_table$sum.TRPVALUE)
SumTotal_table$sum.SPPVALUE <- as.numeric(SumTotal_table$sum.SPPVALUE)

knitr::kable(SumTotal_table, format = "latex", linesep = "",
             format.args=list(big.mark=",",
                              scientific = FALSE),
             escape=FALSE,
      col.names = c("Source","TRPVALUE Sum","SPPVALUE Sum","TRPVALUE as Percent of SPPVALUE"),
      caption = "Comparison of sums for CFDETT TRPVALUE and CFDETS SPPVALUE from the AA and CAMS tables
      booktabs = T) %>%
  kable_styling(font_size = 11, latex_options = "hold_position") %>%
  column_spec(1, width = c("10em")) %>%
  column_spec(2, width = c("10em")) %>%
  column_spec(3, width = c("10em")) %>%
  column_spec(4, width = c("8em"), border_left=T) %>%
  row_spec(0, bold = TRUE) %>%
  row_spec(2,hline_after =TRUE) %>%
  column_spec(1,bold=TRUE)
```

Table 1: Comparison of sums for CFDETT TRPVALUE and CFDETS SPPVALUE from the AA and CAMS tables.

Source	**TRPVALUE Sum**	**SPPVALUE Sum**	**TRPVALUE as Percent of SPPVALUE**
AA 2019	2,580,429,781.00000	2,580,428,837.00000	100.00004
CAMS 2019	2,273,354,675.00000	2,273,354,675.00000	100
CAMS as Percent of AA	88.09985	88.09988	

CAMS totals for TRPVALUE and SPPVALUE are rouhgly 12 percent lower that AA, which warrants an investigation at port and or gear granularity to identify what is driving the difference at a more granular level.

3 State

```
Tempdata <- dplyr::tbl(DB_SOLE_Connection,
               in_schema("CFDBS","CFDETT2019AA"))
AA_Trip_SumTotal <- Tempdata %>%
  select(STATE,TRPVALUE,PERMIT, DEALNUM)  %>%
    group_by(STATE) %>%
   mutate(npermits = n_distinct(PERMIT),
          ndealers = n_distinct(DEALNUM)) %>%
   ungroup() %>%
```

```r
    filter(npermits>2 & ndealers>2) %>%
     mutate(Permit = ifelse(PERMIT ==  "000000","State","Federal")) %>%
    group_by(STATE, Permit) %>%
   summarise(AA.TRPVALUE = sum(TRPVALUE,na.rm=TRUE)) %>%
    collect()

 Tempdata <- dplyr::tbl(DB_SOLE_Connection,
                in_schema("CFDBS","CFDETS2019AA"))
  AA_Species_SumTotal <- Tempdata %>%
      select(STATE,SPPVALUE,PERMIT, DEALNUM)  %>%
     group_by(STATE) %>%
    mutate(npermits = n_distinct(PERMIT),
           ndealers = n_distinct(DEALNUM)) %>%
    ungroup() %>%
    filter(npermits>2 & ndealers>2) %>%
   mutate(Permit = ifelse(PERMIT ==  "000000","State","Federal")) %>%
    group_by(STATE, Permit) %>%
      summarise(AA.SPPVALUE =
        sum(SPPVALUE, na.rm=TRUE)) %>%
      collect()

Tempdata <- dplyr::tbl(DB_SOLE_Connection,
                in_schema("CFDBS","CFDERS2019"))
  CFDERS_Species_SumTotal <- Tempdata %>%
      select(STATE,SPPVALUE,PERMIT, DEALNUM)  %>%
     group_by(STATE) %>%
    mutate(npermits = n_distinct(PERMIT),
           ndealers = n_distinct(DEALNUM)) %>%
    ungroup() %>%
    filter(npermits>2 & ndealers>2) %>%
   mutate(Permit = ifelse(PERMIT ==  "000000","State","Federal")) %>%
    group_by(STATE, Permit) %>%
      summarise(CFDERS.SPPVALUE =
        sum(SPPVALUE, na.rm=TRUE)) %>%
      collect()

 Tempdata <- dplyr::tbl(DB_NOVA_Connection,
                in_schema("CAMS_GARFO","CAMS_CFDETT2019AA"))
 CAMS_Trip_SumTotal <- Tempdata %>%
   select(STATE,TRPVALUE,PERMIT, DEALNUM)  %>%
     group_by(STATE) %>%
    mutate(npermits = n_distinct(PERMIT),
           ndealers = n_distinct(DEALNUM)) %>%
    ungroup() %>%
    filter(npermits>2 & ndealers>2) %>%
   mutate(Permit = ifelse(PERMIT ==  "000000","State","Federal")) %>%
    group_by(STATE, Permit) %>%
   summarise(CAMS.TRPVALUE = sum(TRPVALUE, na.rm=TRUE)) %>%
    collect()

CFDETT_TEMP =  full_join(AA_Trip_SumTotal,CAMS_Trip_SumTotal,
                         by=c("STATE","Permit"))
```

```
CFDETT_TEMP =  full_join(CFDETT_TEMP,CFDERS_Species_SumTotal,
                         by=c("STATE","Permit"))

CFDETT_TEMP$Pct_TRP_Difference <- round(CFDETT_TEMP$CAMS.TRPVALUE/CFDETT_TEMP$AA.TRPVALUE*100,5)

CFDETT_TEMP$Pct_CFDERS_Difference <- round(CFDETT_TEMP$CAMS.TRPVALUE/CFDETT_TEMP$CFDERS.SPPVALUE*100,5)

Tempdata <- dplyr::tbl(DB_SOLE_Connection,
                in_schema("CFDBS","PORT"))
  STATES <- Tempdata %>%
      select(STATECD,STATEABB) %>%
    distinct %>%
      collect()

  colnames(STATES) <- c("STATE","STATEABB")

CFDETT_TEMP <- CFDETT_TEMP %>%
  left_join(.,STATES,by="STATE") %>%
  arrange(desc(Pct_TRP_Difference)) %>%
  relocate(STATEABB)

CFDETT_TEMPSUM <- CFDETT_TEMP %>% ungroup %>%
  summarise(AA.TRPVALUE = sum(AA.TRPVALUE, na.rm=TRUE),
            CAMS.TRPVALUE = sum(CAMS.TRPVALUE, na.rm=TRUE),
            CFDERS.SPPVALUE= sum( CFDERS.SPPVALUE, na.rm=TRUE)) %>%
  mutate (STATE = "Total",Permit="", STATEABB ="",
          Pct_TRP_Difference =CAMS.TRPVALUE/AA.TRPVALUE*100, Pct_CFDERS_Difference=CAMS.TRPVALUE/CFDERS

CFDETT_TEMP <- rbind.data.frame(CFDETT_TEMP,CFDETT_TEMPSUM)

knitr::kable(CFDETT_TEMP, format = "latex", linesep = "",
             format.args=list(big.mark=",",
                              scientific = FALSE),
             escape=FALSE,
      col.names = c("STATE ABB","STATE", "Permit Type",
      "AA TRPVALUE","CAMS TRPVALUE","CFDERS SPPVALUE",
      "CAMS as a Percent of AA","CAMS as a Percent of CFDERS" ),
      caption = "Comparison of State sums for CFDETT TRPVALUE from the AA and CAMS tables and SPPVALUE 
      booktabs = T) %>%
  kable_styling(font_size = 11) %>%
  column_spec(1, width = c("2em")) %>%
  column_spec(2, width = c("3em")) %>%
  column_spec(3, width = c("3em")) %>%
  column_spec(4, width = c("6em")) %>%
  column_spec(5, width = c("6em")) %>%
  column_spec(6, width = c("6em")) %>%
  column_spec(7, width = c("6em")) %>%
  column_spec(8, width = c("4em")) %>%
  row_spec(0, bold = TRUE) %>%
  column_spec(1,bold=TRUE) %>%
  row_spec(row=nrow(CFDETT_TEMP)-1,hline_after =TRUE)
```

The comparison of CAMS to AA and CFDERS indicates that the difference at both the State level and in total are driven by differences in static versus dynamic datasets, as CFDERS and CAMS differ by a total of

Table 2: Comparison of State sums for CFDETT TRPVALUE from the AA and CAMS tables and SPPVALUE from CFDERS.

STATE ABB	STATE	Permit Type	AA TRP-VALUE	CAMS TR-PVALUE	CFDERS SPP-VALUE	CAMS as a Percent of AA	CAMS as a Percent of CFDERS
DE	08	State	9,079,479	20,465,302	20,469,970	225.40172	99.97720
NY	35	State	98,944,271	209,656,351	209,656,304	211.89337	100.00002
FL	10	Federal	64,089	97,270	97,270	151.77332	100.00000
SC	43	Federal	777,198	1,053,289	1,053,289	135.52389	100.00000
MD	23	Federal	7,854,975	8,734,006	8,734,004	111.19075	100.00002
ME	22	Federal	371,136,291	408,526,226	408,526,225	110.07445	100.00000
NY	35	Federal	24,740,964	25,911,202	25,878,650	104.72996	100.12579
MD	23	State	68,633,630	71,611,871	71,611,871	104.33933	100.00000
VA	49	Federal	75,193,912	77,219,807	77,219,805	102.69423	100.00000
NC	36	Federal	21,919,014	22,325,603	22,325,603	101.85496	100.00000
CT	07	Federal	13,774,877	13,979,238	13,979,245	101.48358	99.99995
MA	24	Federal	603,980,531	610,867,616	610,867,598	101.14028	100.00000
RI	42	Federal	92,653,976	93,325,012	93,325,074	100.72424	99.99993
NJ	33	Federal	165,772,043	166,556,849	166,556,859	100.47342	99.99999
NH	32	Federal	37,978,080	38,096,044	38,096,048	100.31061	99.99999
NC	36	State	22,808,491	22,535,182	22,535,182	98.80172	100.00000
RI	42	State	15,802,412	15,242,321	15,242,321	96.45566	100.00000
MA	24	State	77,090,360	70,156,331	70,156,331	91.00532	100.00000
NJ	33	State	12,997,768	11,805,704	11,805,704	90.82870	100.00000
ME	22	State	302,047,118	269,917,019	269,917,019	89.36255	100.00000
FL	10	State	366,003	325,999	325,999	89.07003	100.00000
NK	99	Federal	242,308	209,771	NA	86.57205	NA
NH	32	State	2,274,391	1,905,284	1,905,284	83.77117	100.00000
CT	07	State	4,353,611	2,420,320	2,420,333	55.59339	99.99946
DE	08	Federal	2,018,904	793,066	793,066	39.28201	100.00000
VA	49	State	547,257,630	109,339,198	109,339,198	19.97947	100.00000
NK	99	State	7,726	NA	NA	NA	NA
SC	43	State	389,128	NA	NA	NA	NA
NA	00	State	NA	NA	7,726	NA	NA
NA	00	Federal	NA	NA	242,308	NA	NA
	Total		2,580,159,180	2,273,075,881	2,273,088,286	88.09828	99.99945

less than 0.01 percent.

4 Gear

4.1 Assessing NEGEAR Differences

```
# Tempdata <- dplyr::tbl(DB_SOLE_Connection,
#                 in_schema("CFDBS","CFDETT2019AA"))
# AA_Trip_SumTotal <- Tempdata %>% select(NEGEAR,TRPVALUE)  %>%
#   group_by(NEGEAR) %>%
#   summarise(AA.TRPVALUE = sum(TRPVALUE,
#        na.rm=TRUE)) %>%
#    collect()

Tempdata <- dplyr::tbl(DB_SOLE_Connection,
               in_schema("CFDBS","CFDETS2019AA"))
 AA_Species_SumTotal <- Tempdata %>%
     select(NEGEAR,SPPVALUE,PERMIT,DEALNUM) %>%
    group_by(NEGEAR) %>%
   mutate(npermits = n_distinct(PERMIT),
          ndealers = n_distinct(DEALNUM)) %>%
       filter(npermits>2 & ndealers>2) %>%
          summarise(AA.SPPVALUE =
       sum(SPPVALUE, na.rm=TRUE)) %>%
     collect()

  Tempdata <- dplyr::tbl(DB_SOLE_Connection,
               in_schema("CFDBS","CFDERS2019"))
 CFDBS_Species_SumTotal <- Tempdata %>%
     select(NEGEAR,SPPVALUE,PERMIT,DEALNUM) %>%
    group_by(NEGEAR) %>%
   mutate(npermits = n_distinct(PERMIT),
          ndealers = n_distinct(DEALNUM)) %>%
      filter(npermits>2 & ndealers>2) %>%
          summarise(CFDERS.SPPVALUE =
       sum(SPPVALUE, na.rm=TRUE)) %>%
     collect()

# Tempdata <- dplyr::tbl(DB_NOVA_Connection,
#                 in_schema("CAMS_GARFO","CAMS_CFDETT2019AA"))
# CAMS_Trip_SumTotal <- Tempdata %>%
#   select(NEGEAR,TRPVALUE)  %>%
#    group_by(NEGEAR) %>%
#   summarise(CAMS.TRPVALUE = sum(TRPVALUE, na.rm=TRUE)) %>%
#    collect()

Tempdata <- dplyr::tbl(DB_NOVA_Connection,                in_schema("CAMS_GARFO","CAMS_CFDETS2019AA"))
 CAMS_Species_SumTotal <- Tempdata %>%
      select(NEGEAR,SPPVALUE,PERMIT,DEALNUM) %>%
    group_by(NEGEAR) %>%
   mutate(npermits = n_distinct(PERMIT),
          ndealers = n_distinct(DEALNUM)) %>%
       filter(npermits>2 & ndealers>2) %>%
```

```
          summarise(CAMS.SPPVALUE =
        sum(SPPVALUE, na.rm=TRUE)) %>%
      collect()

#CFDETT_TEMP =  full_join(AA_Trip_SumTotal,CAMS_Trip_SumTotal, by="NEGEAR")

CFDETS_TEMP  =  full_join(AA_Species_SumTotal,
                CAMS_Species_SumTotal, by="NEGEAR")

CFDETS_TEMP  =  full_join(CFDETS_TEMP,
                CFDBS_Species_SumTotal, by="NEGEAR")

#CFDETT_TEMP$Pct_CFDETT_Difference <-
#round(CFDETT_TEMP$CAMS.TRPVALUE/CFDETT_TEMP$AA.TRPVALUE*100,5)

CFDETS_TEMP$Pct_CFDETS_Difference <-
  round(CFDETS_TEMP$CAMS.SPPVALUE/CFDETS_TEMP$AA.SPPVALUE*100,5)

CFDETS_TEMP$Pct_CFDERS_Difference <-
  round(CFDETS_TEMP$CAMS.SPPVALUE/CFDETS_TEMP$CFDERS.SPPVALUE*100,5)


FULL_TABLE = CFDETS_TEMP

Tempdata <- dplyr::tbl(DB_SOLE_Connection,
                in_schema("CFDBS","GEAR"))
  GEAR <- Tempdata %>%
      select(NEGEAR,GEARNM) %>%
    distinct %>%
      collect()

FULL_TABLE <- FULL_TABLE %>%
  arrange(desc(Pct_CFDETS_Difference))

FULL_TEMPSUM <- FULL_TABLE %>%
  summarise(AA.SPPVALUE = sum(AA.SPPVALUE, na.rm=TRUE),
            CAMS.SPPVALUE = sum(CAMS.SPPVALUE, na.rm=TRUE),
            CFDERS.SPPVALUE = sum(CFDERS.SPPVALUE,na.rm=TRUE)) %>%
  mutate (NEGEAR = "Total",
          Pct_CFDERS_Difference =CAMS.SPPVALUE/CFDERS.SPPVALUE*100,
          Pct_CFDETS_Difference =CAMS.SPPVALUE/AA.SPPVALUE*100)

FULL_TABLE <- rbind.data.frame(FULL_TABLE,FULL_TEMPSUM)

knitr::kable(FULL_TABLE, format = "latex", linesep = "",
             format.args=list(big.mark=",",
                              scientific = FALSE),
             escape=FALSE,
      col.names = c("NEGEAR",
      "AA SPPVALUE","CAMS SPPVALUE",
      "CFDERS SPPVALUE",
      "CAMS SPP (Percent of AA)",
      "CAMS SPP (Percent of CFDERS)"),
```

```
    caption = "Comparison of NEGEAR sums for CFDETT TRPVALUE and CFDETS SPPVALUE from the AA and CAMS
    booktabs = T,longtable = T) %>%
  kable_styling(font_size = 11,
    latex_options = c("hold_position", "repeat_header")) %>%
  column_spec(1, width = c("3em")) %>%
  column_spec(2, width = c("5em")) %>%
  column_spec(3, width = c("6em")) %>%
  column_spec(4, width = c("6em"), border_left=T, border_right=T) %>%
  column_spec(5, width = c("5em")) %>%
  column_spec(6, width = c("6em"), border_left=T, border_right=T) %>%
  row_spec(0, bold = TRUE) %>%
  column_spec(1,bold=TRUE) %>%
  row_spec(row=nrow(FULL_TABLE)-1,hline_after =TRUE)
```

Table 3: Comparison of NEGEAR sums for CFDETT TRPVALUE and CFDETS SPPVALUE from the AA and CAMS tables.

NEGEAR	AA SPPVALUE	CAMS SPPVALUE	CFDERS SPPVALUE	CAMS SPP (Percent of AA)	CAMS SPP (Percent of CFDERS)
182	768,431	15,002,887	15,001,496	1,952.40523	100.00927
230	13,412,981	92,322,486	14,058,945	688.30699	656.68147
250	20,692,157	139,844,783	21,131,290	675.83473	661.79009
105	151,942	986,420	763,994	649.20825	129.11358
520	354,898	1,794,823	52,670	505.72925	3,407.67610
030	1,133,064	4,509,149	1,136,750	397.96066	396.67024
381	23,337,164	89,379,641	297,295,835	382.99273	30.06421
071	638,384	1,970,934	2,076,362	308.73800	94.92247
116	1,693,689	4,227,123	5,099,808	249.58083	82.88789
140	3,800,544	8,900,756	7,748,080	234.19689	114.87692
410	3,927,886	7,601,568	6,593,280	193.52822	115.29266
115	14,931	25,619	NA	171.58261	NA
100	21,780,948	34,485,610	26,062,581	158.32924	132.31848
260	249,765	361,192	138,374	144.61274	261.02592
101	3,672,066	5,264,653	4,480,632	143.37033	117.49800
110	8,939	12,506	NA	139.90379	NA
450	4,948,510	6,521,008	NA	131.77720	NA
181	2,626,185	3,420,338	1,631,212	130.23980	209.68078
080	136,491	176,569	98,789	129.36311	178.73346
020	18,763,761	23,622,056	19,099,038	125.89190	123.68192
183	6,160,651	7,696,715	4,307,238	124.93347	178.69259
200	112,202,948	128,863,354	11,758,445	114.84846	1,095.92173
330	6,025,035	6,696,555	6,107,571	111.14550	109.64351
057	3,811,556	4,160,045	NA	109.14296	NA
220	29,118,877	31,624,937	29,140,545	108.60631	108.52555
301	68,684,064	71,184,014	71,176,644	103.63978	100.01035
400	51,762,886	53,129,852	49,359,746	102.64082	107.63802
180	100,961,000	102,401,373	183,570,867	101.42666	55.78302

Table 3: Comparison of NEGEAR sums for CFDETT TRPVALUE and CFDETS SPPVALUE from the AA and CAMS tables. *(continued)*

NEGEAR	AA SPPVALUE	CAMS SPPVALUE	CFDERS SPPVALUE	CAMS SPP (Percent of AA)	CAMS SPP (Percent of CFDERS)
050	179,251,184	181,582,915	181,385,672	101.30082	100.10874
132	560,466,016	565,402,679	168,309,753	100.88081	335.92984
350	206,416	208,067	106,479	100.79984	195.40661
300	4,023,222	4,038,502	7,049	100.37980	57,291.84281
054	1,162,619	1,164,273	NA	100.14227	NA
170	3,413,964	3,413,963	4,205,666	99.99997	81.17532
500	866,810	865,243	783,499	99.81922	110.43320
370	3,890,286	3,881,806	2,461,201	99.78202	157.71999
210	424,539,602	422,827,241	454,711,844	99.59665	92.98795
053	2,979,756	2,965,978	NA	99.53761	NA
059	4,440,082	4,410,850	3,444,025	99.34163	128.07253
052	2,460,738	2,317,067	1,869,615	94.16147	123.93284
010	15,625,831	14,613,193	17,215,115	93.51946	84.88583
058	8,848,981	7,839,183	12,875,476	88.58854	60.88461
120	19,261,126	16,685,339	18,152,669	86.62702	91.91673
060	832,964	677,784	863,944	81.37014	78.45231
021	261,030	199,997	519,515	76.61840	38.49687
040	5,137,070	3,588,152	3,492,046	69.84822	102.75214
065	286,295	195,494	317,665	68.28411	61.54093
382	2,605,063	803,016	4,162,800	30.82520	19.29029
034	312,971	NA	325,015	NA	NA
999	767,648,686	NA	540,384,037	NA	NA
062	NA	23,330,973	NA	NA	NA
070	NA	145,336	NA	NA	NA
340	NA	72,666	NA	NA	NA
414	NA	3,286,286	3,152,958	NA	104.22866
051	NA	NA	55,669	NA	NA
055	NA	NA	341,781	NA	NA
056	NA	NA	83,517	NA	NA
117	NA	NA	475,948	NA	NA
Total	2,509,360,465	2,110,702,969	2,197,593,150	84.11318	96.04612

The largest magnitude difference at the gear level is found in unknown gear (NEGEAR 999) at $700 million. There are 16 gears whose difference between AA and CAMS is greater than 200 percent. Lesser percentage differences still of concern (> 5 percent difference) are observed for an additional 31 gears.

4.2 Assessing NEGEAR2 Differences

```
Tempdata <- dplyr::tbl(DB_SOLE_Connection,
               in_schema("CFDBS","CFDETT2019AA"))
AA_Trip_SumTotal <- Tempdata %>%
```

```
  select(NEGEAR2,TRPVALUE,PERMIT,DEALNUM) %>%
     group_by(NEGEAR2) %>%
    mutate(npermits = n_distinct(PERMIT),
           ndealers = n_distinct(DEALNUM)) %>%
        filter(npermits>2 & ndealers>2) %>%
      summarise(AA.TRPVALUE = sum(TRPVALUE,
        na.rm=TRUE)) %>%
    collect()

 Tempdata <- dplyr::tbl(DB_NOVA_Connection,
                in_schema("CAMS_GARFO","CAMS_CFDETT2019AA"))
 CAMS_Trip_SumTotal <- Tempdata %>%
   select(NEGEAR2,TRPVALUE,PERMIT,DEALNUM) %>%
     group_by(NEGEAR2) %>%
    mutate(npermits = n_distinct(PERMIT),
           ndealers = n_distinct(DEALNUM)) %>%
       filter(npermits>2 & ndealers>2) %>%
       summarise(CAMS.TRPVALUE = sum(TRPVALUE, na.rm=TRUE)) %>%
    collect()

 Tempdata <- dplyr::tbl(DB_SOLE_Connection,
                in_schema("CFDBS","CFDERS2019"))
 Dealer_SumTotal <- Tempdata %>%
   select(NEGEAR2,SPPVALUE,PERMIT,DEALNUM) %>%
     group_by(NEGEAR2) %>%
    mutate(npermits = n_distinct(PERMIT),
           ndealers = n_distinct(DEALNUM)) %>%
       filter(npermits>2 & ndealers>2) %>%
      summarise(DEALER.SPPVALUE = sum(SPPVALUE, na.rm=TRUE)) %>%
    collect()


FULL_TABLE =  full_join(AA_Trip_SumTotal,
                CAMS_Trip_SumTotal, by="NEGEAR2")

FULL_TABLE  =  full_join(FULL_TABLE,Dealer_SumTotal,
                         by="NEGEAR2")

FULL_TABLE$Pct_CFDETT_Difference <- round(FULL_TABLE$CAMS.TRPVALUE/FULL_TABLE$AA.TRPVALUE*100,5)

FULL_TABLE$Pct_Dealer_Difference <- round(FULL_TABLE$CAMS.TRPVALUE/FULL_TABLE$DEALER.SPPVALUE*100,5)

Tempdata <- dplyr::tbl(DB_SOLE_Connection,
                in_schema("CFDBS","GEAR"))
  GEAR <- Tempdata %>%
      select(NEGEAR2,GEARNM) %>%
    distinct %>%
      collect()

FULL_TABLE <- FULL_TABLE %>%
  arrange(desc(Pct_CFDETT_Difference), desc(Pct_Dealer_Difference))

FULL_TEMPSUM <- FULL_TABLE %>%
```

```r
  summarise(AA.TRPVALUE = sum(AA.TRPVALUE, na.rm=TRUE),
            CAMS.TRPVALUE = sum(CAMS.TRPVALUE, na.rm=TRUE),
            DEALER.SPPVALUE = sum(DEALER.SPPVALUE, na.rm=TRUE)) %>%
  mutate (NEGEAR2 = "Total",
          Pct_CFDETT_Difference =CAMS.TRPVALUE/AA.TRPVALUE*100,
          Pct_Dealer_Difference =CAMS.TRPVALUE/DEALER.SPPVALUE*100)

FULL_TABLE <- rbind.data.frame(FULL_TABLE,FULL_TEMPSUM)

knitr::kable(FULL_TABLE, format = "latex", linesep = "",
             format.args=list(big.mark=",",
                              scientific = FALSE),
             escape=FALSE,
      col.names = c("NEGEAR2",
      "AA TRPVALUE","CAMS TRPVALUE",
      "CFDERS SPPVALUE",
      "CAMS TRP (Percent of AA)",
      "CAMS TRP (Percent of CFDERS)"),
      caption = "Comparison of NEGEAR2 sums for CFDETT TRPVALUE from the AA and CAMS tables and SPPVALUI
      booktabs = T,longtable = T) %>%
  kable_styling(font_size = 11,
      latex_options = c("hold_position", "repeat_header")) %>%
  column_spec(1, width = c("3em")) %>%
  column_spec(2, width = c("5em")) %>%
  column_spec(3, width = c("6em")) %>%
  column_spec(4, width = c("6em")) %>%
  column_spec(5, width = c("5em"), border_left=T, border_right=T) %>%
  column_spec(6, width = c("6em"), border_left=T, border_right=T) %>%
  row_spec(0, bold = TRUE) %>%
  column_spec(1,bold=TRUE) %>%
  row_spec(row=nrow(FULL_TABLE)-1,hline_after =TRUE)
```

Table 4: Comparison of NEGEAR2 sums for CFDETT TRPVALUE from the AA and CAMS tables and SPPVALUE from CFDERS.

NEGEAR2	AA TRPVALUE	CAMS TRPVALUE	CFDERS SPPVALUE	CAMS TRP (Percent of AA)	CAMS TRP (Percent of CFDERS)
23	13,413,281	92,322,486	14,058,945	688.29160	656.68147
25	21,500,532	141,189,081	21,939,664	656.67715	643.53347
52	354,898	1,794,823	52,670	505.72925	3,407.67610
38	27,450,760	99,610,071	309,311,656	362.86817	32.20379
03	1,446,679	4,824,053	1,461,765	333.45704	330.01563
07	757,219	2,116,270	2,176,253	279.47925	97.24375
11	1,778,866	4,391,812	5,575,756	246.88830	78.76622
14	3,800,544	8,900,756	7,748,080	234.19689	114.87692
41	5,833,551	10,887,854	9,746,238	186.64196	111.71340
10	25,604,956	40,736,683	31,307,207	159.09687	130.11919
26	249,765	361,192	138,374	144.61274	261.02592
06	17,532,836	24,204,256	17,881,583	138.05100	135.35858

Table 4: Comparison of NEGEAR2 sums for CFDETT TRPVALUE from the AA and CAMS tables and SPPVALUE from CFDERS. *(continued)*

NEGEAR2	AA TRPVALUE	CAMS TRPVALUE	CFDERS SPPVALUE	CAMS TRP (Percent of AA)	CAMS TRP (Percent of CFDERS)
22	29,406,349	40,121,386	29,466,445	136.43784	136.15957
45	4,948,510	6,521,008	NA	131.77720	NA
08	136,491	176,569	98,789	129.36311	178.73346
02	19,024,791	23,822,053	19,618,553	125.21585	121.42615
18	112,793,318	130,798,364	206,787,864	115.96287	63.25244
20	112,202,948	128,863,354	11,758,445	114.84846	1,095.92173
33	6,025,035	6,696,555	6,107,571	111.14550	109.64351
30	72,707,286	75,222,516	71,183,693	103.45939	105.67380
40	51,762,886	53,129,852	49,359,746	102.64082	107.63802
13	560,496,701	565,402,679	168,309,753	100.87529	335.92984
05	203,015,847	204,499,973	200,055,755	100.73104	102.22149
17	3,413,964	3,413,963	4,205,666	99.99997	81.17532
50	866,810	865,243	783,499	99.81922	110.43320
37	3,890,286	3,881,806	2,461,201	99.78202	157.71999
21	424,539,602	422,827,241	454,711,844	99.59665	92.98795
35	223,964	220,018	173,634	98.23811	126.71366
12	45,702,010	43,126,223	44,593,553	94.36395	96.70955
01	15,625,831	14,613,193	17,215,115	93.51946	84.88583
04	5,137,070	3,588,152	3,492,046	69.84822	102.75214
99	767,648,686	NA	540,384,037	NA	NA
34	NA	72,666	NA	NA	NA
Total	2,559,292,272	2,159,202,151	2,252,165,400	84.36716	95.87227

Looking at the NESPP2 sums, it is clear that the results are not just a function of CAMS better apportioning the unknown gear 99. Rather, CAMS sums are smaller than AA sums for numerous NEGEAR2 categories, meaning that the algorithm itself is identifying different gears to apportion or impute. Additionally, the results are not just a function of the underlying differences in data (static versus live), since the CFDERS to CAMS comparison still indicates sizeable differences in numerous gear categories such that the CFDERS and AA tables are more similar than the CAMS and AA tables (e.g. NEGEAR2 02 Auto jig, 03 harpoon, etc.).

##Assessing Gear Imputation Results

```
Tempdata <- dplyr::tbl(DB_NOVA_Connection,
               in_schema("CAMS_GARFO","CAMS_CFDETT2019AA"))
CAMS_Trip_SumTotal <- Tempdata %>%
  select(NEGEAR2,TRPVALUE,GEAR_IMP_METHOD, PERMIT, DEALNUM)  %>%
    group_by(NEGEAR2,GEAR_IMP_METHOD) %>%
  mutate(npermits = n_distinct(PERMIT),
          ndealers = n_distinct(DEALNUM)) %>%
   group_by(NEGEAR2) %>%
   mutate(npermits=min(npermits, na.rm=TRUE),
          ndealers=min(ndealers, na.rm+TRUE)) %>%
   filter(npermits>2 & ndealers>2) %>%
```

```
  ungroup() %>%
  group_by(NEGEAR2,GEAR_IMP_METHOD) %>%
  summarise(CAMS.TRPVALUE = sum(TRPVALUE, na.rm=TRUE)) %>%
   collect()
```

```
## Warning: Missing values are always removed in SQL.
## Use `MIN(x, na.rm = TRUE)` to silence this warning
## This warning is displayed only once per session.
```

```
 Tempdata <- dplyr::tbl(DB_NOVA_Connection,                in_schema("CAMS_GARFO","CAMS_CFDETS2019AA"))
  CAMS_Species_SumTotal <- Tempdata %>%
      select(NEGEAR2,SPPVALUE,GEAR_IMP_METHOD, PERMIT, DEALNUM)  %>%
    group_by(NEGEAR2,GEAR_IMP_METHOD) %>%
   mutate(npermits = n_distinct(PERMIT),
           ndealers = n_distinct(DEALNUM)) %>%
    group_by(NEGEAR2) %>%
    mutate(npermits=min(npermits, na.rm=TRUE),
           ndealers=min(ndealers, na.rm=TRUE)) %>%
    filter(npermits>2 & ndealers>2) %>%
    ungroup() %>%
    group_by(NEGEAR2,GEAR_IMP_METHOD) %>%
      summarise(CAMS.SPPVALUE =
        sum(SPPVALUE, na.rm=TRUE)) %>%
      collect()

CAMS_TEMP =  full_join(CAMS_Species_SumTotal,CAMS_Trip_SumTotal,
                by=c("NEGEAR2","GEAR_IMP_METHOD"))



CAMS_TEMP <- CAMS_TEMP %>%
              left_join(.,
              FULL_TABLE[,c("NEGEAR2",
                            "Pct_CFDETT_Difference",
                            "AA.TRPVALUE")],
              by="NEGEAR2") %>%
  arrange(NEGEAR2,desc(Pct_CFDETT_Difference))

knitr::kable(CAMS_TEMP, format = "latex", linesep = "",
             format.args=list(big.mark=",",
                              scientific = FALSE),
             escape=FALSE,
      col.names = c("NEGEAR2",
      "GEAR IMP METHOD",
      "CAMS SPPVALUE",
      "CAMS TRPVALUE",
      "CAMS TRP (Percent of AA) from Table 4",
      "AA TRPVALUE from Table 4"),
      caption = "Comparison of NEGEAR2 sums for CFDETT TRPVALUE and CFDETS SPPVALUE from the AA and CAMS
      booktabs = T,longtable = T) %>%
  kable_styling(font_size = 11,
      latex_options = c("hold_position", "repeat_header")) %>%
  column_spec(1, width = c("3em")) %>%
  column_spec(2, width = c("4em")) %>%
```

```
column_spec(3, width = c("6em")) %>%
column_spec(4, width = c("6em")) %>%
column_spec(5, width = c("6em"), border_left=T, border_right=T) %>%
column_spec(6, width = c("6em")) %>%
row_spec(0, bold = TRUE) %>%
column_spec(1,bold=TRUE) %>%
row_spec(row=nrow(CAMS_TEMP)-1,hline_after =TRUE)
```

Table 5: Comparison of NEGEAR2 sums for CFDETT TRPVALUE and CFDETS SPPVALUE from the AA and CAMS tables, identifying amount imputed and imputation method.

NEGEAR2	GEAR IMP METHOD	CAMS SPPVALUE	CAMS TRPVALUE	CAMS TRP (Percent of AA) from Table 4	AA TRPVALUE from Table 4
05	B	17,265	17,265	100.73104	203,015,847
05	C	810,665	810,665	100.73104	203,015,847
05	D	1,352,444	1,352,444	100.73104	203,015,847
05	E	563,430	563,430	100.73104	203,015,847
05	NA	201,756,169	201,756,169	100.73104	203,015,847
08	NA	176,569	176,569	129.36311	136,491
13	B	7,569	7,569	100.87529	560,496,701
13	C	384,052	384,052	100.87529	560,496,701
13	D	455,735	455,735	100.87529	560,496,701
13	NA	564,555,323	564,555,323	100.87529	560,496,701
17	NA	3,413,963	3,413,963	99.99997	3,413,964
20	B	93,096	93,096	114.84846	112,202,948
20	C	4,924,033	4,924,033	114.84846	112,202,948
20	D	1,661,346	1,661,346	114.84846	112,202,948
20	NA	122,184,879	122,184,879	114.84846	112,202,948
34	NA	72,666	72,666	NA	NA
35	NA	220,018	220,018	98.23811	223,964
37	NA	3,881,806	3,881,806	99.78202	3,890,286
50	NA	865,243	865,243	99.81922	866,810

It is clear that the bulk of the deviance is a result of the matching & imputation process. For example, the non-imputed results for NEGEAR2 14 (pound net) from Table 5 are very similar to the AA table results from Table 4 . Unfortunately the referenced values were suppressed due to confidentiality concerns for this publically facing document.

5 Species

5.1 Comparison of CAMS to AA

```
Tempdata <- dplyr::tbl(DB_SOLE_Connection,
               in_schema("CFDBS","CFDETS2019AA"))
 AA_Species_SumTotal <- Tempdata %>%
```

```
      select(NESPP4,NESPP3,SPPVALUE,PERMIT,DEALNUM)  %>%
    filter(!NESPP3%in%c(710,221)) %>%
     group_by(NESPP4) %>%
      mutate(npermits = n_distinct(PERMIT),
             ndealers = n_distinct(DEALNUM)) %>%
    filter(npermits>2 & ndealers>2) %>%
      summarise(AA.SPPVALUE =
        sum(SPPVALUE, na.rm=TRUE)) %>%
      collect()

 Tempdata <- dplyr::tbl(DB_NOVA_Connection,                 in_schema("CAMS_GARFO","CAMS_CFDETS2019AA"))
  CAMS_Species_SumTotal <- Tempdata %>%
      select(NESPP4,NESPP3,SPPVALUE,PERMIT,DEALNUM)  %>%
    filter(!NESPP3%in%c(710,221)) %>%
     group_by(NESPP4) %>%
      mutate(npermits = n_distinct(PERMIT),
             ndealers = n_distinct(DEALNUM)) %>%
    filter(npermits>2 & ndealers>2) %>%
      summarise(CAMS.SPPVALUE =
        sum(SPPVALUE, na.rm=TRUE)) %>%
      collect()

CFDETS_TEMP  =  full_join(AA_Species_SumTotal,CAMS_Species_SumTotal, by="NESPP4")

CFDETS_TEMP$Difference <- CFDETS_TEMP$CAMS.SPPVALUE-CFDETS_TEMP$AA.SPPVALUE

CFDETS_TEMP$Pct_CFDETS_Difference <- round(CFDETS_TEMP$CAMS.SPPVALUE/CFDETS_TEMP$AA.SPPVALUE*100,5)

Tempdata <- dplyr::tbl(DB_SOLE_Connection,
                in_schema("CFDBS","CFSPP"))
  SPP <- Tempdata %>%
      select(NESPP4,SPPNM,MKTNM) %>%
    distinct %>%
    mutate(SPPNM=replace(SPPNM,"/"," ")) %>%
     mutate(SPPNM=replace(SPPNM,"-"," ")) %>%
    mutate(SPPNM=replace(SPPNM,"&"," ")) %>%
    mutate(MKTNM=replace(MKTNM,"&"," ")) %>%
     mutate(SPPNM=replace(SPPNM,","," , ")) %>%
    mutate(MKTNM=replace(MKTNM,"+"," ")) %>%
      collect()

CFDETS_TEMP <- CFDETS_TEMP %>%
  arrange(desc(Difference),desc(Pct_CFDETS_Difference)) %>%
  filter(Pct_CFDETS_Difference!= 100) %>%
  filter(abs(Difference)>10) %>%
          left_join(.,SPP, by="NESPP4") %>%
          relocate(NESPP4,SPPNM,MKTNM)

# CFDETS_TEMPSUM <- CFDETS_TEMP %>%
#   summarise(AA.SPPVALUE = sum(AA.SPPVALUE, na.rm=TRUE),
#             CAMS.SPPVALUE = sum(CAMS.SPPVALUE, na.rm=TRUE)) %>%
#   mutate (NESPP4 = "Total", COMMON_NAME="",
#           Difference = CAMS.SPPVALUE-AA.SPPVALUE,
```

```
#           Pct_CFDETS_Difference =CAMS.SPPVALUE/AA.SPPVALUE*100)
#
#
# CFDETS_TEMP <- rbind.data.frame(CFDETS_TEMP,CFDETS_TEMPSUM)
knitr::kable(CFDETS_TEMP, format = "latex", linesep = "",
             format.args=list(big.mark=",",
                              scientific = FALSE),
             escape=FALSE,
      col.names = c("NESPP4","SPPNM","MKTNM",
      "AA SPPVALUE","CAMS SPPVALUE",
      "CAMS AA Difference",
      "CAMS SPP (Percent of AA)"),
      caption = "Comparison of NESPP4 sums for CFDETS SPPVALUE from the AA and CAMS tables, filtering o
      booktabs = T,longtable = T) %>%
  kable_styling(font_size = 11,
      latex_options = c("hold_position", "repeat_header")) %>%
  column_spec(1, width = c("3em")) %>%
  column_spec(2, width = c("5em")) %>%
  column_spec(3, width = c("7em")) %>%
  column_spec(4, width = c("5em")) %>%
  column_spec(5, width = c("5em"), border_left=T) %>%
  column_spec(6, width = c("5em"), border_right=T) %>%
  column_spec(7, width = c("5em"), border_right=T) %>%
  row_spec(0, bold = TRUE) %>%
  column_spec(1,bold=TRUE)
```

Table 6: Comparison of NESPP4 sums for CFDETS SPPVALUE from the AA and CAMS tables, filtering out equal values.

NESPP4	SPPNM	MKTNM	AA SPPVALUE	CAMS SPPVALUE	CAMS AA Difference	CAMS SPP (Percent of AA)
7486	QUAHOG	CHERRY TOPS	9,303,326	63,251,560	53,948,234	679.88115
1150	EEL , AMERICAN	UNCLASSIFIED	23,241,250	35,532,907	12,291,657	152.88725
7270	LOBSTER	UNCLASSIFIED	584,062,366	590,701,944	6,639,578	101.13679
7000	CRAB , BLUE	HARD	87,921,273	90,413,225	2,491,952	102.83430
4180	BASS , STRIPED	UNCLASSIFIED	14,415,942	16,907,490	2,491,548	117.28328
4060	SPOT	UNCLASSIFIED	1,353,648	2,697,710	1,344,062	199.29184
7487	QUAHOG	PUB,CHOW,STUFF,LOGS	636,200	1,321,803	685,603	207.76533
7273	LOBSTER	SELECT	42,472,350	42,804,400	332,050	100.78180
7760	WHELK , CHANNELED	UNCLASSIFIED	6,759,174	7,068,035	308,861	104.56951

Table 6: Comparison of NESPP4 sums for CFDETS SPP-VALUE from the AA and CAMS tables, filtering out equal values. *(continued)*

NESPP4	SPPNM	MKTNM	AA SPP-VALUE	CAMS SPP-VALUE	CAMS AA Difference	CAMS SPP (Percent of AA)
0903	CROAKER , ATLANTIC	SMALL	153,717	360,772	207,055	234.69883
7240	CRAB , HORSESHOE	UNCLASSIFIED	1,858,780	2,021,074	162,294	108.73121
7750	CONCHS	UNCLASSIFIED	2,475,335	2,629,112	153,777	106.21237
8340	CRUSTACEANS NK	UNCLASSIFIED	12,426,771	12,539,251	112,480	100.90514
0902	CROAKER , ATLANTIC	MEDIUM	442,332	527,348	85,016	119.21995
0234	BLUEFISH	MEDIUM ROUND	548,327	631,622	83,295	115.19075
3840	MACKEREL , SPANISH	UNCLASSIFIED	304,642	383,094	78,452	125.75219
3521	DOGFISH SPINY	ROUND	3,453,733	3,515,554	61,821	101.78998
0230	BLUEFISH	UNCLASSIFIED ROUND	823,328	884,932	61,604	107.48232
1970	WHITING , KING	UNCLASSIFIED	575,880	620,461	44,581	107.74137
1060	DRUM , BLACK	UNCLASSIFIED	70,315	112,283	41,968	159.68570
5060	PERCH , WHITE	UNCLASSIFIED	990,143	1,031,316	41,173	104.15829
1210	FLOUNDER , SUMMER	LARGE	11,148,813	11,173,853	25,040	100.22460
3450	WEAKFISH , SPOTTED	UNCLASSIFIED	445,974	469,405	23,431	105.25389
1212	FLOUNDER , SUMMER	MEDIUM	9,121,057	9,143,838	22,781	100.24976
3650	SKATES	UNCLASSIFIED	312,181	332,985	20,804	106.66408
7810	MUSSELS	UNCLASSIFIED	3,583,564	3,602,574	19,010	100.53048
0570	COBIA	UNCLASSIFIED	108,869	121,812	12,943	111.88860
7632	CLAM , SOFT	UNCLASSIFIED	30,318,666	30,331,433	12,767	100.04211

Table 6: Comparison of NESPP4 sums for CFDETS SPP-VALUE from the AA and CAMS tables, filtering out equal values. *(continued)*

NESPP4	SPPNM	MKTNM	AA SPP-VALUE	CAMS SPP-VALUE	CAMS AA Difference	CAMS SPP (Percent of AA)
3842	MACKEREL , SPANISH	MEDIUM	524,435	536,890	12,455	102.37494
1590	HALIBUT , ATLANTIC	UNCLASSIFIED	363,320	375,695	12,375	103.40609
3445	WEAKFISH , SQUETEAGUE	GREY-SEA TROUT SML	29,473	41,547	12,074	140.96631
3474	SHAD , AMERICAN	UNCLASSIFIED	39,518	50,665	11,147	128.20740
0901	CROAKER , ATLANTIC	LARGE	56,253	67,043	10,790	119.18120
3841	MACKEREL , SPANISH	SMALL	13,427	23,913	10,486	178.09637
3510	DOGFISH SMOOTH	DRESSED	513,800	523,560	9,760	101.89957
4380	TAUTOG	UNCLASSIFIED	1,613,404	1,622,608	9,204	100.57047
7080	CRAB , GREEN	UNCLASSIFIED	73,235	82,041	8,806	112.02431
4681	TUNA , LITTLE	UNCLASSIFIED ROUND	88,252	96,263	8,011	109.07741
1070	DRUM , RED	UNCLASSIFIED	59,203	66,734	7,531	112.72064
4183	BASS , STRIPED	12-13 INCHES	150,142	157,160	7,018	104.67424
3443	WEAKFISH , SQUETEAGUE	GREY-SEA TROUT MED	124,091	130,550	6,459	105.20505
3441	WEAKFISH , SQUETEAGUE	GREY-SEA TROUT LRG	10,981	17,134	6,153	156.03315
0233	BLUEFISH	LARGE ROUND	704,155	710,264	6,109	100.86756
3620	SILVERSIDE , ATLANTIC	UNCLASSIFIED	81,930	87,783	5,853	107.14390
2341	MULLETS	UNCLASSIFIED	9,324	14,884	5,560	159.63106
8011	SQUID (LOLIGO)	LARGE	6,444,977	6,449,835	4,858	100.07538

Table 6: Comparison of NESPP4 sums for CFDETS SPP-VALUE from the AA and CAMS tables, filtering out equal values. *(continued)*

NESPP4	SPPNM	MKTNM	AA SPP-VALUE	CAMS SPP-VALUE	CAMS AA Difference	CAMS SPP (Percent of AA)
5095	HAKE , SILVER	LARGE (ROUND)	2,522,014	2,526,782	4,768	100.18906
1218	FLOUNDER , SUMMER	JUMBO	6,888,810	6,893,464	4,654	100.06756
4510	TOADFISH , OYSTER	UNCLASSIFIED	10,315	14,341	4,026	139.03054
3660	SKATE , LITTLE	UNCLASSIFIED	1,008,752	1,012,008	3,256	100.32278
0235	BLUEFISH	SMALL ROUND	54,116	57,179	3,063	105.66006
5096	HAKE , SILVER	MEDIUM(ROUND)	2,294,530	2,297,436	2,906	100.12665
3810	SPADEFISH	UNCLASSIFIED	16,626	19,157	2,531	115.22314
5091	HAKE , SILVER	KING (ROUND)	367,942	370,408	2,466	100.67021
4182	BASS , STRIPED	14-16 INCHES	106,053	108,452	2,399	102.26208
1340	GIZZARD SHAD	UNCLASSIFIED	335,595	337,749	2,154	100.64185
3843	MACKEREL , SPANISH	LARGE	338,952	341,000	2,048	100.60422
4872	SHARK , BLACK TIP	GUTTED-CORES MIXED	23,289	25,095	1,806	107.75473
3520	DOGFISH SPINY	DRESSED	42,422	44,222	1,800	104.24308
5090	HAKE , SILVER	ROUND	3,062,341	3,063,967	1,626	100.05310
1214	FLOUNDER , SUMMER	SMALL	79,073	80,553	1,480	101.87169
3353	SEA BASS , BLACK	MEDIUM	1,953,984	1,955,351	1,367	100.06996
4940	SHARK , ATL SHARP-NOSE	UNCLASSIFIED DRESSED	592	1,911	1,319	322.80405
1461	GROUPER , SNOWY	GUTTED	266,311	267,588	1,277	100.47951

Table 6: Comparison of NESPP4 sums for CFDETS SPP-VALUE from the AA and CAMS tables, filtering out equal values. *(continued)*

NESPP4	SPPNM	MKTNM	AA SPP-VALUE	CAMS SPP-VALUE	CAMS AA Difference	CAMS SPP (Percent of AA)
4325	SWORDFISH	DBL MARK(200-299LBS)	316,435	317,568	1,133	100.35805
1250	FLOUNDER , SAND DAB	UNCLASSIFIED	11,278	12,398	1,120	109.93084
3295	SCUP	UNCLASSIFIED	839,153	840,168	1,015	100.12096
4460	TILEFISH , GOLDEN	UNCLASSIFIED	57,181	58,031	850	101.48651
3560	SHEEPSHEAD	SALTWATER	76,091	76,918	827	101.08686
1160	EEL , CONGER	UNCLASSIFIED	39,656	40,413	757	101.90892
4290	PUFFER , NORTHERN	UNCLASSIFIED	42,802	43,508	706	101.64946
0870	CREVALLE	UNCLASSIFIED	6,673	7,358	685	110.26525
1960	KINGFISH , NORTHERN	UNCLASSIFIED	1,018	1,536	518	150.88409
8010	SQUID (LOLIGO)	UNCLASSIFIED	25,912,163	25,912,647	484	100.00187
1520	HAKE , RED	UNCLASSIFIED	418,089	418,517	428	100.10237
3530	SHARK , THRESHER	UNCLASSIFIED DRESSED	10,759	11,085	326	103.03002
3352	SEA BASS , BLACK	JUMBO	5,971,850	5,972,164	314	100.00526
1551	HAKE MIX RED WHITE	UNCLASSIFIED ROUND	3,975	4,286	311	107.82390
3451	WEAKFISH , SPOTTED	SMALL	4,814	5,117	303	106.29414
7120	CRAB , ROCK	UNCLASSIFIED	1,040,845	1,041,112	267	100.02565
1300	FLOUNDER , SOUTHERN	UNCLASSIFIED	962,694	962,953	259	100.02690
3671	SKATE , WINTER(BIG)	WINGS	4,125,755	4,126,013	258	100.00625

Table 6: Comparison of NESPP4 sums for CFDETS SPP-VALUE from the AA and CAMS tables, filtering out equal values. *(continued)*

NESPP4	SPPNM	MKTNM	AA SPP-VALUE	CAMS SPP-VALUE	CAMS AA Difference	CAMS SPP (Percent of AA)
4446	TILEFISH , BLUE-LINE	ROUND UNC	27,689	27,927	238	100.85955
1940	MACKEREL , KING	UNCLASSIFIED	20,401	20,588	187	100.91662
1330	GARFISH	UNCLASSIFIED	578	761	183	131.66090
0130	GOOSEFISH , BLACK-FIN	UNCLASSIFIED	11,593	11,771	178	101.53541
3290	SCUP	LARGE	4,103,200	4,103,374	174	100.00424
3410	SEA ROBINS	UNCLASSIFIED	9,198	9,360	162	101.76125
0930	CUNNER	UNCLASSIFIED	13,758	13,902	144	101.04666
8005	SCALLOP , SEA	31-40 COUNT	7,545,048	7,545,184	136	100.00180
1656	HARVEST FISH	UNCLASSIFIED	116,428	116,537	109	100.09362
4941	SHARK , ATL SHARP-NOSE	UNCLASSIFIED ROUND	2,060	2,167	107	105.19417
3690	SKATE , SMOOTH	UNCLASSIFIED	33,938	34,033	95	100.27992
1592	HALIBUT , AT-LANTIC	MEDIUM	148,259	148,292	33	100.02226
0120	ANGLER	TAILS ONLY	497,533	497,564	31	100.00623
8030	SQUIDS , LOLIG-INIDAE	UNCLASSIFIED	1,158	1,186	28	102.41796
4881	SHARK , SPINNER	UNCLASSIFIED ROUND	722	740	18	102.49307
0510	BUTTERFISH	LARGE	552,043	552,060	17	100.00308
1595	HALIBUT , AT-LANTIC	SMALL ROUND	5,920	5,935	15	100.25338
0516	BUTTERFISH	SMALL	1,391,889	1,391,901	12	100.00086
2122	MACKEREL , AT-LANTIC	SMALL	304,063	304,052	-11	99.99638

Table 6: Comparison of NESPP4 sums for CFDETS SPP-VALUE from the AA and CAMS tables, filtering out equal values. *(continued)*

NESPP4	SPPNM	MKTNM	AA SPP-VALUE	CAMS SPP-VALUE	CAMS AA Difference	CAMS SPP (Percent of AA)
1530	HAKE , WHITE	UNCLASSIFIED DRESSED	190,302	190,291	-11	99.99422
0963	CUSK	LARGE	1,121	1,110	-11	99.01873
1242	FLOUNDER , AM. PLAICE	SMALL	1,949,458	1,949,446	-12	99.99938
3651	SKATES	UNCLASSIFIED WINGS	71,950	71,938	-12	99.98332
3675	SKATE , WIN-TER(BIG)	LARGE WINGS	148,331	148,318	-13	99.99124
7274	LOBSTER	LARGE	1,071,113	1,071,099	-14	99.99869
0811	COD	LARGE	1,841,916	1,841,901	-15	99.99919
1470	HADDOCK	LARGE	1,624,229	1,624,214	-15	99.99908
1880	JOHN DORY	UNCLASSIFIED	42,605	42,590	-15	99.96479
4456	TILEFISH , SAND	ROUND UNC	9,900	9,885	-15	99.84848
1241	FLOUNDER , AM. PLAICE	LARGE	499,104	499,086	-18	99.99639
1244	FLOUNDER , AM. PLAICE	MEDIUM	938,756	938,737	-19	99.99798
0814	COD	SCROD	293,797	293,777	-20	99.99319
1460	GROUPER , SNOWY	UNCLASSIFIED	23,211	23,191	-20	99.91383
0030	AMBER JACK	UNCLASSIFIED	880	860	-20	97.72727
1475	HADDOCK	SCROD	11,007,931	11,007,910	-21	99.99981
0813	COD	MARKET	2,724,080	2,724,059	-21	99.99923
1881	JOHN DORY	LARGE	57,419	57,398	-21	99.96343
3296	SCUP	JUMBO	1,868,968	1,868,946	-22	99.99882
2402	REDFISH	SMALL	416,568	416,546	-22	99.99472
5092	HAKE , SILVER	SMALL (ROUND)	408,399	408,377	-22	99.99461
7690	CLAM , SURF	UNCLASSIFIED	31,126,944	31,126,921	-23	99.99993
0330	BONITO	UNCLASSIFIED	127,586	127,563	-23	99.98197

Table 6: Comparison of NESPP4 sums for CFDETS SPP-VALUE from the AA and CAMS tables, filtering out equal values. *(continued)*

NESPP4	SPPNM	MKTNM	AA SPP-VALUE	CAMS SPP-VALUE	CAMS AA Difference	CAMS SPP (Percent of AA)
1222	FLOUNDER , WITCH	SMALL	2,377,669	2,377,642	-27	99.99886
2696	POLLOCK	DRAWN, LARGE	1,214,475	1,214,448	-27	99.99778
2123	MACKEREL , ATLANTIC	MEDIUM	1,443,826	1,443,798	-28	99.99806
1537	HAKE , WHITE	MEDIUM DRESSED	948,945	948,913	-32	99.99663
1536	HAKE , WHITE	LARGE DRESSED	2,865,576	2,865,539	-37	99.99871
0128	ANGLER	HEAD ON,GUTTED	4,854,653	4,854,612	-41	99.99916
4328	SWORDFISH	UNCLASSIFIED ROUND	22,280	22,239	-41	99.81598
3670	SKATE , WINTER(BIG)	UNCLASSIFIED	368,233	368,190	-43	99.98832
2710	POMFRETS	UNCLASSIFIED	3,879	3,834	-45	98.83991
1476	HADDOCK	SNAPPER	5,688,572	5,688,524	-48	99.99916
0512	BUTTERFISH	JUMBO	20,959	20,908	-51	99.75667
1221	FLOUNDER , WITCH	LARGE	75,417	75,364	-53	99.92972
3518	DOGFISH SMOOTH	FINS	48,388	48,334	-54	99.88840
0450	BULLHEADS	UNCLASSIFIED	12,653	12,594	-59	99.53371
4461	TILEFISH , GOLDEN	LARGE	1,466,045	1,465,985	-60	99.99591
2698	POLLOCK	DRAWN, SMALL	1,719,131	1,719,070	-61	99.99645
2693	POLLOCK	POLLOCK MEDIUM DRAWN	2,613,224	2,613,160	-64	99.99755
8015	SQUID (LOLIGO)	EXTRA LARGE	358,580	358,515	-65	99.98187
0960	CUSK	UNCLASSIFIED	27,873	27,807	-66	99.76321
4464	TILEFISH , GOLDEN	KITTEN	641,580	641,505	-75	99.98831
0964	CUSK	ROUND UNKNOWN	172	95	-77	55.23256

Table 6: Comparison of NESPP4 sums for CFDETS SPP-VALUE from the AA and CAMS tables, filtering out equal values. *(continued)*

NESPP4	SPPNM	MKTNM	AA SPP-VALUE	CAMS SPP-VALUE	CAMS AA Difference	CAMS SPP (Percent of AA)
4329	SWORDFISH	GUTTED-CORES-MIXED	139,689	139,603	-86	99.93843
1538	HAKE , WHITE	SMALL DRESSED	139,171	139,075	-96	99.93102
2150	MACKEREL , CHUB	UNCLASSIFIED	39,874	39,778	-96	99.75924
2400	REDFISH	UNCLASSIFIED	5,686,673	5,686,572	-101	99.99822
0122	ANGLER	TAILS, SMALL	2,083,824	2,083,712	-112	99.99463
4469	TILEFISH , GOLDEN	LARGE/MEDIUM	1,043,317	1,043,190	-127	99.98783
1240	FLOUNDER , AM. PLAICE	UNCLASSIFIED	801,946	801,812	-134	99.98329
4710	TUNA , YEL-LOWFIN	UNCLASSIFIED DRESSED	36,032	35,890	-142	99.60591
8014	SQUID (LOLIGO)	SUPER SMALL	639,339	639,196	-143	99.97763
4462	TILEFISH , GOLDEN	MEDIUM	2,047,343	2,047,197	-146	99.99287
0124	ANGLER	UNCLASSIFIED ROUND	2,742	2,541	-201	92.66958
1812	AMBERJACK , GREATER	UNCLASSIFIED GUTTED	39,180	38,971	-209	99.46656
1972	WHITING , KING	LARGE	4,250	3,967	-283	93.34118
1539	HAKE , WHITE	UNCLASSIFIED ROUND	684	339	-345	49.56140
3292	SCUP	MEDIUM	1,747,345	1,746,987	-358	99.97951
3351	SEA BASS , BLACK	LARGE	3,107,457	3,107,088	-369	99.98813
5070	SILVER OFFSH-HAKE MIX	UNCLASSIFIED	3,006	2,627	-379	87.39188
2490	OPAH	UNCLASSIFIED	15,669	15,255	-414	97.35784
2695	POLLOCK	UNCLASSIFIED	752	325	-427	43.21809
7310	SHRIMP , BROWN	UNCLASSIFIED	1,606,665	1,606,213	-452	99.97187

Table 6: Comparison of NESPP4 sums for CFDETS SPP-VALUE from the AA and CAMS tables, filtering out equal values. *(continued)*

NESPP4	SPPNM	MKTNM	AA SPP-VALUE	CAMS SPP-VALUE	CAMS AA Difference	CAMS SPP (Percent of AA)
1973	WHITING , KING	MEDIUM	59,313	58,825	-488	99.17725
4560	TRIGGERFISH	UNCLASSIFIED	250,090	249,570	-520	99.79207
7980	PERIWINKLES	UNCLASSIFIED	197,363	196,765	-598	99.69701
1220	FLOUNDER , WITCH	UNCLASSIFIED	20,947	20,326	-621	97.03537
4988	SHARKS , PELAGIC	FINS	18,786	18,163	-623	96.68370
3850	ESCOLAR	UNCLASSIFIED	10,882	10,219	-663	93.90737
3550	SHARK , MAKO SHORT-FIN	UNCLASSIFIED DRESSED	84,499	83,791	-708	99.16212
4181	BASS , STRIPED	17 INCHES	1,843,112	1,842,359	-753	99.95915
1050	DOLPHINFISH	UNCLASSIFIED	53,274	52,469	-805	98.48894
0121	ANGLER	TAILS, LARGE	6,127,781	6,126,972	-809	99.98680
1200	FLOUNDER , WINTER	UNCLASSIFIED	183,560	182,610	-950	99.48246
0818	COD	UNCLASSIFIED ROUND	8,032	7,032	-1,000	87.54980
0511	BUTTERFISH	UNCLASSIFIED	1,079,078	1,077,913	-1,165	99.89204
3291	SCUP	LARGE/MIX	624,118	622,630	-1,488	99.76158
4320	SWORDFISH	UNCLASSIFIED	736,059	734,527	-1,532	99.79186
3110	PERCH , SAND	UNCLASSIFIED	1,692	119	-1,573	7.03310
1477	HADDOCK	UNCLASSIFIED ROUND	7,567	5,993	-1,574	79.19915
4677	TUNA , BLUEFIN	GUTTED-CORES MIXED	469,399	467,289	-2,110	99.55049
7770	WHELK , KNOBBED	UNCLASSIFIED	1,413,840	1,411,500	-2,340	99.83449
7241	CRAB , HORSE-SHOE	UNCLASSIFIED/MALE	196,799	194,400	-2,399	98.78099
4871	SHARK , BLACK TIP	UNCLASSIFIED ROUND	11,241	8,824	-2,417	78.49835

Table 6: Comparison of NESPP4 sums for CFDETS SPP-VALUE from the AA and CAMS tables, filtering out equal values. *(continued)*

NESPP4	SPPNM	MKTNM	AA SPP-VALUE	CAMS SPP-VALUE	CAMS AA Difference	CAMS SPP (Percent of AA)
2120	MACKEREL , ATLANTIC	UNCLASSIFIED	639,210	636,665	-2,545	99.60185
7600	CLAM , RAZOR	UNCLASSIFIED	3,071,310	3,068,536	-2,774	99.90968
7242	CRAB , HORSESHOE	UNCLASSIFIED/FEMALE	85,313	81,433	-3,880	95.45204
0980	RIBBONFISH	UNCLASSIFIED	26,151	22,200	-3,951	84.89159
7380	SHRIMP (PENAEID)	UNCLASSIFIED	126,746	121,498	-5,248	95.85944
8002	SCALLOP , SEA	UNDER 10 COUNT	136,837,363	136,831,513	-5,850	99.99572
8004	SCALLOP , SEA	21-30 COUNT	73,640,269	73,633,822	-6,447	99.99125
2850	RAY , COWNOSE	UNCLASSIFIED	19,092	12,428	-6,664	65.09533
4323	SWORDFISH	SMALL (26-49 LBS)	474,589	467,400	-7,189	98.48522
4701	TUNA , ALBACORE	UNCLASSIFIED ROUND	16,063	8,289	-7,774	51.60306
3446	WEAKFISH , SQUETEAGUE	GREY-SEA TROUT UNC	127,738	119,837	-7,901	93.81468
2720	POMPANO , COMMON	UNCLASSIFIED	71,047	61,674	-9,373	86.80732
4670	TUNA , BLUEFIN	UNCLASSIFIED ROUND	14,852	4,491	-10,361	30.23835
4570	TRIGGERFISH , GRAY	UNCLASSIFIED	114,596	101,259	-13,337	88.36172
4703	TUNA , ALBACORE	GUTTED -CORES MIXED	207,200	191,849	-15,351	92.59122
4713	TUNA , YELLOWFIN	GUTTED-CORES MIXED	3,033,348	3,015,419	-17,929	99.40894
1053	DOLPHINFISH	GUTTED	950,293	928,790	-21,503	97.73722

Table 6: Comparison of NESPP4 sums for CFDETS SPP-VALUE from the AA and CAMS tables, filtering out equal values. *(continued)*

NESPP4	SPPNM	MKTNM	AA SPP-VALUE	CAMS SPP-VALUE	CAMS AA Difference	CAMS SPP (Percent of AA)
4322	SWORDFISH	MEDIUM (50-99 LBS)	1,047,158	1,024,980	-22,178	97.88208
0232	BLUEFISH	UNCLASSIFIED GUTTED	235,597	211,536	-24,061	89.78722
4693	TUNA , BIG EYE	GUTTED-CORES MIXED	4,910,799	4,885,821	-24,978	99.49137
1219	FLOUNDER , SUMMER	UNCLASSIFIED	1,304,198	1,278,705	-25,493	98.04531
7430	CLAM , BLOOD-ARC	UNCLASSIFIED	286,240	256,125	-30,115	89.47911
3511	DOGFISH SMOOTH	ROUND	65,797	32,918	-32,879	50.02964
4321	SWORDFISH	LARGE (100-199 LBS)	1,203,203	1,168,563	-34,640	97.12102
3350	SEA BASS , BLACK	UNCLASSIFIED	831,492	795,512	-35,980	95.67284
4675	TUNA , BLUEFIN	UNCLASSIFIED DRESSED	10,023,994	9,981,424	-42,570	99.57532
8003	SCALLOP , SEA	11-20 COUNT	339,950,806	339,890,496	-60,310	99.98226
7110	CRAB , JONAH	UNCLASSIFIED	13,067,607	12,976,012	-91,595	99.29907
0900	CROAKER , ATLANTIC	UNCLASSIFIED	1,346,646	1,032,066	-314,580	76.63974
8009	SCALLOP , SEA	UNCLASSIFIED	12,097,804	11,434,785	-663,019	94.51951
5260	OTHER FISH	FOOD	1,528,376	115,983	-1,412,393	7.58864
7990	SCALLOP , BAY	UNCLASSIFIED	7,071,752	5,373,256	-1,698,496	75.98196
7488	QUAHOG	UNCLASSIFIED	82,264,484	65,365,393	-16,899,091	79.45761
7890	OYSTERS	PUBLIC UNCLASSIFIED	557,681,214	190,551,421	-367,129,793	34.16852

The two largest differences in value between AA and CAMS stems from Ocean Quahog (NESPP3 748) and Eastern Oyster (789).

5.2 Comparison of static AA to live CFDERS

```
Tempdata <- dplyr::tbl(DB_SOLE_Connection,
               in_schema("CFDBS","CFDERS2019"))
 Dealer_Species_SumTotal <- Tempdata %>%
     select(NESPP4,SPPVALUE,PERMIT,DEALNUM)  %>%
    group_by(NESPP4) %>%
    mutate(npermits = n_distinct(PERMIT),
          ndealers = n_distinct(DEALNUM)) %>%
   filter(npermits>2 & ndealers>2) %>%
     summarise(Dealer.SPPVALUE =
       sum(SPPVALUE, na.rm=TRUE)) %>%
     collect()


CFDETS_TEMP1  =  left_join(CFDETS_TEMP,Dealer_Species_SumTotal, by="NESPP4")

CFDETS_TEMP1$Dealer_Difference <- CFDETS_TEMP1$CAMS.SPPVALUE-CFDETS_TEMP1$Dealer.SPPVALUE

CFDETS_TEMP1$Pct_Dealer_Difference <- round(CFDETS_TEMP1$CAMS.SPPVALUE/CFDETS_TEMP1$Dealer.SPPVALUE*100

CFDETS_TEMP1 <- CFDETS_TEMP1 %>%
  arrange(desc(Difference),desc(Pct_CFDETS_Difference)) %>%
  select(NESPP4, SPPNM,MKTNM, Difference, Pct_CFDETS_Difference,
         Dealer_Difference, Pct_Dealer_Difference)

cat("\n\n\\pagebreak\n")
```

```
##
##
## \pagebreak
```

```
knitr::kable(CFDETS_TEMP1, format = "latex", linesep = "",
             format.args=list(big.mark=",",
                              scientific = FALSE),
             escape=FALSE,
      col.names = c("NESPP4","SPPNM","MKTNM",
      "CAMS AA Difference",
      "CAMS SPP (Percent of AA)",
      "CAMS CFDERS Difference",
      "CAMS SPP (Percent of CFDERS"),
      caption = "Comparison of NESPP4 sums for CFDETS SPPVALUE from the AA, CAMS, and CFDERS tables, fi
      booktabs = T,longtable = T) %>%
  kable_styling(font_size = 11,
      latex_options = c("hold_position", "repeat_header")) %>%
  column_spec(1, width = c("3em")) %>%
  column_spec(2, width = c("8em")) %>%
  column_spec(3, width = c("6em")) %>%
  column_spec(4, width = c("6em")) %>%
  column_spec(5, width = c("6em")) %>%
  column_spec(6, width = c("4em"), border_left=T) %>%
  column_spec(7, width = c("6em"), border_right=T) %>%
  row_spec(0, bold = TRUE) %>%
  column_spec(1,bold=TRUE)
```

Table 7: Comparison of NESPP4 sums for CFDETS SPPVALUE from the AA, CAMS, and CFDERS tables, filtering out equal values.

NESPP4	SPPNM	MKTNM	CAMS AA Difference	CAMS SPP (Percent of AA)	CAMS CFDERS Difference	CAMS SPP (Percent of CFDERS
7486	QUAHOG	CHERRY TOPS	53,948,234	679.88115	0	100.00000
1150	EEL , AMERICAN	UNCLASSIFIED	12,291,657	152.88725	1	100.00000
7270	LOBSTER	UNCLASSIFIED	6,639,578	101.13679	-7	100.00000
7000	CRAB , BLUE	HARD	2,491,952	102.83430	0	100.00000
4180	BASS , STRIPED	UNCLASSIFIED	2,491,548	117.28328	-3	99.99998
4060	SPOT	UNCLASSIFIED	1,344,062	199.29184	0	100.00000
7487	QUAHOG	PUB,CHOW,STUFF,HOGS	685,603	207.76533	0	100.00000
7273	LOBSTER	SELECT	332,050	100.78180	0	100.00000
7760	WHELK , CHANNELED	UNCLASSIFIED	308,861	104.56951	0	100.00000
0903	CROAKER , ATLANTIC	SMALL	207,055	234.69883	0	100.00000
7240	CRAB , HORSESHOE	UNCLASSIFIED	162,294	108.73121	-4,933	99.75652
7750	CONCHS	UNCLASSIFIED	153,777	106.21237	0	100.00000
8340	CRUSTACEANS NK	UNCLASSIFIED	112,480	100.90514	-1	99.99999
0902	CROAKER , ATLANTIC	MEDIUM	85,016	119.21995	0	100.00000
0234	BLUEFISH	MEDIUM ROUND	83,295	115.19075	2	100.00032
3840	MACKEREL , SPANISH	UNCLASSIFIED	78,452	125.75219	0	100.00000
3521	DOGFISH SPINY	ROUND	61,821	101.78998	2	100.00006
0230	BLUEFISH	UNCLASSIFIED ROUND	61,604	107.48232	-1	99.99989
1970	WHITING , KING	UNCLASSIFIED	44,581	107.74137	-1	99.99984
1060	DRUM , BLACK	UNCLASSIFIED	41,968	159.68570	0	100.00000
5060	PERCH , WHITE	UNCLASSIFIED	41,173	104.15829	0	100.00000
1210	FLOUNDER , SUMMER	LARGE	25,040	100.22460	5	100.00004
3450	WEAKFISH , SPOTTED	UNCLASSIFIED	23,431	105.25389	0	100.00000
1212	FLOUNDER , SUMMER	MEDIUM	22,781	100.24976	6	100.00007
3650	SKATES	UNCLASSIFIED	20,804	106.66408	-3	99.99910
7810	MUSSELS	UNCLASSIFIED	19,010	100.53048	0	100.00000

Table 7: Comparison of NESPP4 sums for CFDETS SPP-VALUE from the AA, CAMS, and CFDERS tables, filtering out equal values. *(continued)*

NESPP4	SPPNM	MKTNM	CAMS AA Difference	CAMS SPP (Percent of AA)	CAMS CFDERS Difference	CAMS SPP (Percent of CFDERS
0570	COBIA	UNCLASSIFIED	12,943	111.88860	0	100.00000
7632	CLAM , SOFT	UNCLASSIFIED	12,767	100.04211	0	100.00000
3842	MACKEREL , SPANISH	MEDIUM	12,455	102.37494	0	100.00000
1590	HALIBUT , ATLANTIC	UNCLASSIFIED	12,375	103.40609	-1	99.99973
3445	WEAKFISH , SQUETEAGUE	GREY-SEA TROUT SML	12,074	140.96631	1	100.00241
3474	SHAD , AMERICAN	UNCLASSIFIED	11,147	128.20740	0	100.00000
0901	CROAKER , ATLANTIC	LARGE	10,790	119.18120	0	100.00000
3841	MACKEREL , SPANISH	SMALL	10,486	178.09637	0	100.00000
3510	DOGFISH SMOOTH	DRESSED	9,760	101.89957	7	100.00134
4380	TAUTOG	UNCLASSIFIED	9,204	100.57047	-1	99.99994
7080	CRAB , GREEN	UNCLASSIFIED	8,806	112.02431	0	100.00000
4681	TUNA , LITTLE	UNCLASSIFIED ROUND	8,011	109.07741	0	100.00000
1070	DRUM , RED	UNCLASSIFIED	7,531	112.72064	0	100.00000
4183	BASS , STRIPED	12-13 INCHES	7,018	104.67424	0	100.00000
3443	WEAKFISH , SQUETEAGUE	GREY-SEA TROUT MED	6,459	105.20505	0	100.00000
3441	WEAKFISH , SQUETEAGUE	GREY-SEA TROUT LRG	6,153	156.03315	0	100.00000
0233	BLUEFISH	LARGE ROUND	6,109	100.86756	1	100.00014
3620	SILVERSIDE , ATLANTIC	UNCLASSIFIED	5,853	107.14390	0	100.00000
2341	MULLETS	UNCLASSIFIED	5,560	159.63106	0	100.00000
8011	SQUID (LOLIGO)	LARGE	4,858	100.07538	4	100.00006
5095	HAKE , SILVER	LARGE (ROUND)	4,768	100.18906	-4	99.99984
1218	FLOUNDER , SUMMER	JUMBO	4,654	100.06756	-2	99.99997

Table 7: Comparison of NESPP4 sums for CFDETS SPP-VALUE from the AA, CAMS, and CFDERS tables, filtering out equal values. *(continued)*

NESPP4	SPPNM	MKTNM	CAMS AA Difference	CAMS SPP (Percent of AA)	CAMS CFDERS Difference	CAMS SPP (Percent of CFDERS
4510	TOADFISH , OYSTER	UNCLASSIFIED	4,026	139.03054	252	101.78863
3660	SKATE , LITTLE	UNCLASSIFIED	3,256	100.32278	1	100.00010
0235	BLUEFISH	SMALL ROUND	3,063	105.66006	0	100.00000
5096	HAKE , SILVER	MEDIUM(ROUND)	2,906	100.12665	-3	99.99987
3810	SPADEFISH	UNCLASSIFIED	2,531	115.22314	0	100.00000
5091	HAKE , SILVER	KING (ROUND)	2,466	100.67021	-6	99.99838
4182	BASS , STRIPED	14-16 INCHES	2,399	102.26208	0	100.00000
1340	GIZZARD SHAD	UNCLASSIFIED	2,154	100.64185	0	100.00000
3843	MACKEREL , SPANISH	LARGE	2,048	100.60422	0	100.00000
4872	SHARK , BLACK TIP	GUTTED-CORES MIXED	1,806	107.75473	0	100.00000
3520	DOGFISH SPINY	DRESSED	1,800	104.24308	0	100.00000
5090	HAKE , SILVER	ROUND	1,626	100.05310	-13	99.99958
1214	FLOUNDER , SUMMER	SMALL	1,480	101.87169	-1	99.99876
3353	SEA BASS , BLACK	MEDIUM	1,367	100.06996	3	100.00015
4940	SHARK , ATL SHARPNOSE	UNCLASSIFIED DRESSED	1,319	322.80405	0	100.00000
1461	GROUPER , SNOWY	GUTTED	1,277	100.47951	0	100.00000
4325	SWORDFISH	DBL MARK(200-299LBS)	1,133	100.35805	0	100.00000
1250	FLOUNDER , SAND DAB	UNCLASSIFIED	1,120	109.93084	0	100.00000
3295	SCUP	UNCLASSIFIED	1,015	100.12096	0	100.00000
4460	TILEFISH , GOLDEN	UNCLASSIFIED	850	101.48651	-1	99.99828
3560	SHEEPSHEAD	SALTWATER	827	101.08686	0	100.00000
1160	EEL , CONGER	UNCLASSIFIED	757	101.90892	-5	99.98763
4290	PUFFER , NORTHERN	UNCLASSIFIED	706	101.64946	16	100.03679

Table 7: Comparison of NESPP4 sums for CFDETS SPP-VALUE from the AA, CAMS, and CFDERS tables, filtering out equal values. *(continued)*

NESPP4	SPPNM	MKTNM	CAMS AA Difference	CAMS SPP (Percent of AA)	CAMS CFDERS Difference	CAMS SPP (Percent of CFDERS
0870	CREVALLE	UNCLASSIFIED	685	110.26525	0	100.00000
1960	KINGFISH , NORTHERN	UNCLASSIFIED	518	150.88409	1	100.06515
8010	SQUID (LOLIGO)	UNCLASSIFIED	484	100.00187	-7	99.99997
1520	HAKE , RED	UNCLASSIFIED	428	100.10237	-4	99.99904
3530	SHARK , THRESHER	UNCLASSIFIED DRESSED	326	103.03002	0	100.00000
3352	SEA BASS , BLACK	JUMBO	314	100.00526	-5	99.99992
1551	HAKE MIX RED WHITE	UNCLASSIFIED ROUND	311	107.82390	0	100.00000
3451	WEAKFISH , SPOTTED	SMALL	303	106.29414	0	100.00000
7120	CRAB , ROCK	UNCLASSIFIED	267	100.02565	0	100.00000
1300	FLOUNDER , SOUTHERN	UNCLASSIFIED	259	100.02690	0	100.00000
3671	SKATE , WINTER(BIG)	WINGS	258	100.00625	-5	99.99988
4446	TILEFISH , BLUELINE	ROUND UNC	238	100.85955	-1	99.99642
1940	MACKEREL , KING	UNCLASSIFIED	187	100.91662	0	100.00000
1330	GARFISH	UNCLASSIFIED	183	131.66090	0	100.00000
0130	GOOSEFISH , BLACKFIN	UNCLASSIFIED	178	101.53541	0	100.00000
3290	SCUP	LARGE	174	100.00424	2	100.00005
3410	SEA ROBINS	UNCLASSIFIED	162	101.76125	28	100.30004
0930	CUNNER	UNCLASSIFIED	144	101.04666	0	100.00000
8005	SCALLOP , SEA	31-40 COUNT	136	100.00180	0	100.00000
1656	HARVEST FISH	UNCLASSIFIED	109	100.09362	0	100.00000
4941	SHARK , ATL SHARPNOSE	UNCLASSIFIED ROUND	107	105.19417	0	100.00000
3690	SKATE , SMOOTH	UNCLASSIFIED	95	100.27992	-1	99.99706
1592	HALIBUT , ATLANTIC	MEDIUM	33	100.02226	0	100.00000
0120	ANGLER	TAILS ONLY	31	100.00623	1	100.00020

Table 7: Comparison of NESPP4 sums for CFDETS SPP-VALUE from the AA, CAMS, and CFDERS tables, filtering out equal values. *(continued)*

NESPP4	SPPNM	MKTNM	CAMS AA Difference	CAMS SPP (Percent of AA)	CAMS CFDERS Difference	CAMS SPP (Percent of CFDERS
8030	SQUIDS , LOLIGINIDAE	UNCLASSIFIED	28	102.41796	0	100.00000
4881	SHARK , SPINNER	UNCLASSIFIED ROUND	18	102.49307	0	100.00000
0510	BUTTERFISH	LARGE	17	100.00308	-4	99.99928
1595	HALIBUT , ATLANTIC	SMALL ROUND	15	100.25338	0	100.00000
0516	BUTTERFISH	SMALL	12	100.00086	-1	99.99993
2122	MACKEREL , ATLANTIC	SMALL	-11	99.99638	-2	99.99934
1530	HAKE , WHITE	UNCLASSIFIED DRESSED	-11	99.99422	0	100.00000
0963	CUSK	LARGE	-11	99.01873	0	100.00000
1242	FLOUNDER , AM. PLAICE	SMALL	-12	99.99938	11	100.00056
3651	SKATES	UNCLASSIFIED WINGS	-12	99.98332	0	100.00000
3675	SKATE , WINTER(BIG)	LARGE WINGS	-13	99.99124	0	100.00000
7274	LOBSTER	LARGE	-14	99.99869	5	100.00047
0811	COD	LARGE	-15	99.99919	6	100.00033
1470	HADDOCK	LARGE	-15	99.99908	-6	99.99963
1880	JOHN DORY	UNCLASSIFIED	-15	99.96479	0	100.00000
4456	TILEFISH , SAND	ROUND UNC	-15	99.84848	0	100.00000
1241	FLOUNDER , AM. PLAICE	LARGE	-18	99.99639	3	100.00060
1244	FLOUNDER , AM. PLAICE	MEDIUM	-19	99.99798	-3	99.99968
0814	COD	SCROD	-20	99.99319	7	100.00238
1460	GROUPER , SNOWY	UNCLASSIFIED	-20	99.91383	0	100.00000
0030	AMBER JACK	UNCLASSIFIED	-20	97.72727	0	100.00000
1475	HADDOCK	SCROD	-21	99.99981	49	100.00045
0813	COD	MARKET	-21	99.99923	-8	99.99971
1881	JOHN DORY	LARGE	-21	99.96343	-2	99.99652
3296	SCUP	JUMBO	-22	99.99882	2	100.00011
2402	REDFISH	SMALL	-22	99.99472	0	100.00000
5092	HAKE , SILVER	SMALL (ROUND)	-22	99.99461	-4	99.99902
7690	CLAM , SURF	UNCLASSIFIED	-23	99.99993	0	100.00000

Table 7: Comparison of NESPP4 sums for CFDETS SPP-VALUE from the AA, CAMS, and CFDERS tables, filtering out equal values. *(continued)*

NESPP4	SPPNM	MKTNM	CAMS AA Difference	CAMS SPP (Percent of AA)	CAMS CFDERS Difference	CAMS SPP (Percent of CFDERS
0330	BONITO	UNCLASSIFIED	-23	99.98197	0	100.00000
1222	FLOUNDER , WITCH	SMALL	-27	99.99886	-3	99.99987
2696	POLLOCK	DRAWN, LARGE	-27	99.99778	-3	99.99975
2123	MACKEREL , ATLANTIC	MEDIUM	-28	99.99806	-2	99.99986
1537	HAKE , WHITE	MEDIUM DRESSED	-32	99.99663	-8	99.99916
1536	HAKE , WHITE	LARGE DRESSED	-37	99.99871	6	100.00021
0128	ANGLER	HEAD ON,GUTTED	-41	99.99916	0	100.00000
4328	SWORDFISH	UNCLASSIFIED ROUND	-41	99.81598	0	100.00000
3670	SKATE , WINTER(BIG)	UNCLASSIFIED	-43	99.98832	0	100.00000
2710	POMFRETS	UNCLASSIFIED	-45	98.83991	0	100.00000
1476	HADDOCK	SNAPPER	-48	99.99916	42	100.00074
0512	BUTTERFISH	JUMBO	-51	99.75667	0	100.00000
1221	FLOUNDER , WITCH	LARGE	-53	99.92972	-23	99.96949
3518	DOGFISH SMOOTH	FINS	-54	99.88840	1	100.00207
0450	BULLHEADS	UNCLASSIFIED	-59	99.53371	0	100.00000
4461	TILEFISH , GOLDEN	LARGE	-60	99.99591	0	100.00000
2698	POLLOCK	DRAWN, SMALL	-61	99.99645	11	100.00064
2693	POLLOCK	POLLOCK MEDIUM DRAWN	-64	99.99755	7	100.00027
8015	SQUID (LOLIGO)	EXTRA LARGE	-65	99.98187	-1	99.99972
0960	CUSK	UNCLASSIFIED	-66	99.76321	-1	99.99640
4464	TILEFISH , GOLDEN	KITTEN	-75	99.98831	0	100.00000
0964	CUSK	ROUND UNKNOWN	-77	55.23256	NA	NA

Table 7: Comparison of NESPP4 sums for CFDETS SPP-VALUE from the AA, CAMS, and CFDERS tables, filtering out equal values. *(continued)*

NESPP4	SPPNM	MKTNM	CAMS AA Difference	CAMS SPP (Percent of AA)	CAMS CFDERS Difference	CAMS SPP (Percent of CFDERS
4329	SWORDFISH	GUTTED-CORES-MIXED	-86	99.93843	0	100.00000
1538	HAKE , WHITE	SMALL DRESSED	-96	99.93102	-10	99.99281
2150	MACKEREL , CHUB	UNCLASSIFIED	-96	99.75924	0	100.00000
2400	REDFISH	UNCLASSIFIED	-101	99.99822	-23	99.99960
0122	ANGLER	TAILS, SMALL	-112	99.99463	-11	99.99947
4469	TILEFISH , GOLDEN	LARGE/MEDIUM	-127	99.98783	-1	99.99990
1240	FLOUNDER , AM. PLAICE	UNCLASSIFIED	-134	99.98329	-4	99.99950
4710	TUNA , YELLOWFIN	UNCLASSIFIED DRESSED	-142	99.60591	0	100.00000
8014	SQUID (LOLIGO)	SUPER SMALL	-143	99.97763	1	100.00016
4462	TILEFISH , GOLDEN	MEDIUM	-146	99.99287	-3	99.99985
0124	ANGLER	UNCLASSIFIED ROUND	-201	92.66958	0	100.00000
1812	AMBERJACK , GREATER	UNCLASSIFIED GUTTED	-209	99.46656	0	100.00000
1972	WHITING , KING	LARGE	-283	93.34118	-3	99.92443
1539	HAKE , WHITE	UNCLASSIFIED ROUND	-345	49.56140	0	100.00000
3292	SCUP	MEDIUM	-358	99.97951	-9	99.99948
3351	SEA BASS , BLACK	LARGE	-369	99.98813	-6	99.99981
5070	SILVER OFFSHHAKE MIX	UNCLASSIFIED	-379	87.39188	-1	99.96195
2490	OPAH	UNCLASSIFIED	-414	97.35784	0	100.00000
2695	POLLOCK	UNCLASSIFIED	-427	43.21809	0	100.00000
7310	SHRIMP , BROWN	UNCLASSIFIED	-452	99.97187	0	100.00000
1973	WHITING , KING	MEDIUM	-488	99.17725	-2	99.99660
4560	TRIGGERFISH	UNCLASSIFIED	-520	99.79207	0	100.00000

Table 7: Comparison of NESPP4 sums for CFDETS SPPVALUE from the AA, CAMS, and CFDERS tables, filtering out equal values. *(continued)*

NESPP4	SPPNM	MKTNM	CAMS AA Difference	CAMS SPP (Percent of AA)	CAMS CFDERS Difference	CAMS SPP (Percent of CFDERS
7980	PERIWINKLES	UNCLASSIFIED	-598	99.69701	0	100.00000
1220	FLOUNDER , WITCH	UNCLASSIFIED	-621	97.03537	0	100.00000
4988	SHARKS , PELAGIC	FINS	-623	96.68370	0	100.00000
3850	ESCOLAR	UNCLASSIFIED	-663	93.90737	0	100.00000
3550	SHARK , MAKO SHORTFIN	UNCLASSIFIED DRESSED	-708	99.16212	0	100.00000
4181	BASS , STRIPED	17 INCHES	-753	99.95915	1	100.00005
1050	DOLPHINFISH	UNCLASSIFIED	-805	98.48894	0	100.00000
0121	ANGLER	TAILS, LARGE	-809	99.98680	3	100.00005
1200	FLOUNDER , WINTER	UNCLASSIFIED	-950	99.48246	-3	99.99836
0818	COD	UNCLASSIFIED ROUND	-1,000	87.54980	1	100.01422
0511	BUTTERFISH	UNCLASSIFIED	-1,165	99.89204	6	100.00056
3291	SCUP	LARGE/MIX	-1,488	99.76158	-1	99.99984
4320	SWORDFISH	UNCLASSIFIED	-1,532	99.79186	0	100.00000
3110	PERCH , SAND	UNCLASSIFIED	-1,573	7.03310	0	100.00000
1477	HADDOCK	UNCLASSIFIED ROUND	-1,574	79.19915	0	100.00000
4677	TUNA , BLUEFIN	GUTTED-CORES MIXED	-2,110	99.55049	0	100.00000
7770	WHELK , KNOBBED	UNCLASSIFIED	-2,340	99.83449	0	100.00000
7241	CRAB , HORSESHOE	UNCLASSIFIED/MALE	-2,399	98.78099	0	100.00000
4871	SHARK , BLACK TIP	UNCLASSIFIED ROUND	-2,417	78.49835	0	100.00000
2120	MACKEREL , ATLANTIC	UNCLASSIFIED	-2,545	99.60185	-2	99.99969
7600	CLAM , RAZOR	UNCLASSIFIED	-2,774	99.90968	0	100.00000
7242	CRAB , HORSESHOE	UNCLASSIFIED/FEMALE	-3,880	95.45204	0	100.00000
0980	RIBBONFISH	UNCLASSIFIED	-3,951	84.89159	0	100.00000
7380	SHRIMP (PENAEID)	UNCLASSIFIED	-5,248	95.85944	0	100.00000
8002	SCALLOP , SEA	UNDER 10 COUNT	-5,850	99.99572	-1	100.00000

Table 7: Comparison of NESPP4 sums for CFDETS SPPVALUE from the AA, CAMS, and CFDERS tables, filtering out equal values. *(continued)*

NESPP4	SPPNM	MKTNM	CAMS AA Difference	CAMS SPP (Percent of AA)	CAMS CFDERS Difference	CAMS SPP (Percent of CFDERS
8004	SCALLOP , SEA	21-30 COUNT	-6,447	99.99125	2	100.00000
2850	RAY , COWNOSE	UNCLASSIFIED	-6,664	65.09533	NA	NA
4323	SWORDFISH	SMALL (26-49 LBS)	-7,189	98.48522	0	100.00000
4701	TUNA , ALBACORE	UNCLASSIFIED ROUND	-7,774	51.60306	0	100.00000
3446	WEAKFISH , SQUETEAGUE	GREY-SEA TROUT UNC	-7,901	93.81468	1	100.00083
2720	POMPANO , COMMON	UNCLASSIFIED	-9,373	86.80732	0	100.00000
4670	TUNA , BLUEFIN	UNCLASSIFIED ROUND	-10,361	30.23835	0	100.00000
4570	TRIGGERFISH , GRAY	UNCLASSIFIED	-13,337	88.36172	0	100.00000
4703	TUNA , ALBACORE	GUTTED -CORES MIXED	-15,351	92.59122	0	100.00000
4713	TUNA , YELLOWFIN	GUTTED-CORES MIXED	-17,929	99.40894	0	100.00000
1053	DOLPHINFISH	GUTTED	-21,503	97.73722	0	100.00000
4322	SWORDFISH	MEDIUM (50-99 LBS)	-22,178	97.88208	0	100.00000
0232	BLUEFISH	UNCLASSIFIED GUTTED	-24,061	89.78722	3	100.00142
4693	TUNA , BIG EYE	GUTTED-CORES MIXED	-24,978	99.49137	0	100.00000
1219	FLOUNDER , SUMMER	UNCLASSIFIED	-25,493	98.04531	0	100.00000
7430	CLAM , BLOODARC	UNCLASSIFIED	-30,115	89.47911	0	100.00000
3511	DOGFISH SMOOTH	ROUND	-32,879	50.02964	0	100.00000
4321	SWORDFISH	LARGE (100-199 LBS)	-34,640	97.12102	0	100.00000

Table 7: Comparison of NESPP4 sums for CFDETS SPPVALUE from the AA, CAMS, and CFDERS tables, filtering out equal values. *(continued)*

NESPP4	SPPNM	MKTNM	CAMS AA Difference	CAMS SPP (Percent of AA)	CAMS CFDERS Difference	CAMS SPP (Percent of CFDERS
3350	SEA BASS , BLACK	UNCLASSIFIED	-35,980	95.67284	-3	99.99962
4675	TUNA , BLUEFIN	UNCLASSIFIED DRESSED	-42,570	99.57532	0	100.00000
8003	SCALLOP , SEA	11-20 COUNT	-60,310	99.98226	0	100.00000
7110	CRAB , JONAH	UNCLASSIFIED	-91,595	99.29907	1	100.00001
0900	CROAKER , ATLANTIC	UNCLASSIFIED	-314,580	76.63974	0	100.00000
8009	SCALLOP , SEA	UNCLASSIFIED	-663,019	94.51951	0	100.00000
5260	OTHER FISH	FOOD	-1,412,393	7.58864	0	100.00000
7990	SCALLOP , BAY	UNCLASSIFIED	-1,698,496	75.98196	0	100.00000
7488	QUAHOG	UNCLASSIFIED	-16,899,091	79.45761	0	100.00000
7890	OYSTERS	PUBLIC UNCLASSIFIED	-367,129,793	34.16852	0	100.00000

A quick comparison of differences between CAMS and AA versus CFDERS reveals that the differences are a result of AA being a static table and CAMS a live table, since the difference between CFDERS and CAMS are minimal. There are a few exceptions, however. In the next section I look at those species for which the difference betwee CAMS and CFDERS is greater than 1% in either direction.

5.3 CAMS CFDERS Species Differences Greater than 1%

```
CFDETS_TEMP1 <- CFDETS_TEMP1 %>%
  filter(as.numeric(abs(100-as.numeric(Pct_Dealer_Difference))) > 1)

knitr::kable(CFDETS_TEMP1, format = "latex", linesep = "",
             format.args=list(big.mark=",",
                              scientific = FALSE),
             escape=FALSE,
      col.names = c("NESPP4","SPPNM","MKTNM",
      "CAMS AA Difference",
      "CAMS SPP (Percent of AA)",
      "CAMS CFDERS Difference",
      "CAMS SPP (Percent of CFDERS"),
      caption = "Comparison of NESPP4 sums for CFDETS SPPVALUE from the AA, CAMS, and CFDERS tables, fo
      booktabs = T,longtable = T) %>%
  kable_styling(font_size = 11,
      latex_options = c("hold_position", "repeat_header")) %>%
  column_spec(1, width = c("3em")) %>%
  column_spec(2, width = c("6em")) %>%
```

```
  column_spec(3, width = c("6em")) %>%
  column_spec(4, width = c("6em")) %>%
  column_spec(5, width = c("6em")) %>%
  column_spec(6, width = c("6em"), border_left=T) %>%
  column_spec(7, width = c("6em"), border_right=T) %>%
  row_spec(0, bold = TRUE) %>%
  column_spec(1,bold=TRUE)
```

Table 8: Comparison of NESPP4 sums for CFDETS SPPVALUE from the AA, CAMS, and CFDERS tables, focusing on differences greater than 1 percent between CAMS and CFDERS.

NESPP4	SPPNM	MKTNM	CAMS AA Difference	CAMS SPP (Percent of AA)	CAMS CFDERS Difference	CAMS SPP (Percent of CFDERS
4510	TOADFISH , OYSTER	UNCLASSIFIED	4,026	139.0305	252	101.7886

Only two species have sum differences greater than 1%. These are both southern species, will very small total magnitudes. Unfortunately only one can be presented due to confidentiality concerns. Overall, this suggests that the differences in NEGEAR codes is driven solely by how the species are being assinged across gear, as opposed to a different mix of species due to doubling/dropping, etc. observations.

```
Tempdata <- dplyr::tbl(DB_SOLE_Connection,
               in_schema("CFDBS","CFDETT2019AA"))
AA_Trip_SumTotal <- Tempdata %>%
  select(PORT,STATE,TRPVALUE,PERMIT,DEALNUM)  %>%
  group_by(PORT,STATE) %>%
   mutate(npermits = n_distinct(PERMIT),
          ndealers = n_distinct(DEALNUM),
          conf =  ifelse(npermits <3 | ndealers <3,1,0)) %>%
  group_by(STATE) %>%
  mutate(conf =  sum(conf)) %>%
 filter(conf>2) %>%
ungroup() %>%
group_by(PORT,STATE) %>%
   filter(npermits>2 & ndealers>2) %>%
  summarise(AA.TRPVALUE = sum(TRPVALUE,na.rm=TRUE)) %>%
   collect()
```

```
## Warning: Missing values are always removed in SQL.
## Use `SUM(x, na.rm = TRUE)` to silence this warning
## This warning is displayed only once per session.
```

```
Tempdata <- dplyr::tbl(DB_NOVA_Connection,
               in_schema("CAMS_GARFO","CAMS_CFDETT2019AA"))
CAMS_Trip_SumTotal <- Tempdata %>%
  select(PORT,STATE,TRPVALUE,PERMIT,DEALNUM)  %>%
  group_by(PORT,STATE) %>%
   mutate(npermits = n_distinct(PERMIT),
          ndealers = n_distinct(DEALNUM),
          conf =  ifelse(npermits <3 | ndealers <3,1,0)) %>%
```

```
   group_by(STATE) %>%
   mutate(conf =  sum(conf)) %>%
  filter(conf>2) %>%
 ungroup() %>%
 group_by(PORT,STATE) %>%
    filter(npermits>2 & ndealers>2) %>%
   summarise(CAMS.TRPVALUE = sum(TRPVALUE, na.rm=TRUE)) %>%
    collect()

 Tempdata <- dplyr::tbl(DB_SOLE_Connection,
                in_schema("CFDBS","PORT"))
 Ports <- Tempdata %>%
   select(PORT,STATECD,PORTNM,STATEABB)  %>%
   distinct %>%
   rename(STATE=STATECD) %>%
    mutate(PORTNM=replace(PORTNM,"/"," ")) %>%
     mutate(PORTNM=replace(PORTNM,"-"," ")) %>%
    mutate(PORTNM=replace(PORTNM,"&"," ")) %>%
     mutate(PORTNM=replace(PORTNM,","," , ")) %>%
    collect()


FULL_TABLE =  full_join(AA_Trip_SumTotal,
                CAMS_Trip_SumTotal, by=c("PORT","STATE"))

FULL_TABLE  =  left_join(FULL_TABLE,Ports,
                          by=c("PORT","STATE"))

FULL_TABLE$Pct_CFDETT_Difference <- round(FULL_TABLE$CAMS.TRPVALUE/FULL_TABLE$AA.TRPVALUE*100,5)

FULL_TABLE <- FULL_TABLE %>%
  arrange(desc(Pct_CFDETT_Difference)) %>%
  filter(Pct_CFDETT_Difference !=100) %>%
          relocate(PORT,STATE,PORTNM,STATEABB)

knitr::kable(FULL_TABLE, format = "latex", linesep = "",
             format.args=list(big.mark=",",
                              scientific = FALSE),
             escape=FALSE,
      col.names = c("PORT",
      "STATE","PORTNM",
      "STATE ABB",
      "AA TRPVALUE",
      "CAMS TRPVALUE",
      "CAMS TRP (Percent of AA)"),
      caption = "Comparison of Port sums for CFDETT TRPVALUE from the AA and CAMS tables, filtering out
      booktabs = T,longtable = T) %>%
  kable_styling(font_size = 11,
      latex_options = c("hold_position", "repeat_header")) %>%
  column_spec(1, width = c("3em")) %>%
  column_spec(2, width = c("3em")) %>%
  column_spec(3, width = c("8em")) %>%
  column_spec(4, width = c("4em")) %>%
```

```
column_spec(5, width = c("6em")) %>%
column_spec(6, width = c("6em")) %>%
column_spec(7, width = c("6em"), border_left=T, border_right=T) %>%
row_spec(0, bold = TRUE) %>%
column_spec(1,bold=TRUE)
```

Table 9: Comparison of Port sums for CFDETT TRPVALUE from the AA and CAMS tables, filtering out equal values.

PORT	STATE	PORTNM	STATE ABB	AA TRPVALUE	CAMS TRPVALUE	CAMS TRP (Percent of AA)
080305	08	INDIAN RIVER	DE	574,046	1,486,296	258.91584
490401	49	WACHAPREAGUE	VA	19,251	33,982	176.52070
071211	07	GROTON	CT	69,560	116,289	167.17798
490951	49	VIRGINIA BEACH LYNNHAVEN	VA	2,180,461	3,525,339	161.67861
490910	49	NEWPORT NEWS	VA	18,159,649	26,053,457	143.46895
243001	24	HYANNISPORT	MA	2,816,056	3,752,920	133.26866
490701	49	CHINCOTEAGUE	VA	2,619,527	3,209,085	122.50628
351135	35	SHINNECOCK	NY	1,076,854	1,299,399	120.66622
490645	49	OYSTER	VA	67,561	80,005	118.41891
242801	24	HYANNIS	MA	1,944,158	2,264,911	116.49830
490213	49	NORFOLK	VA	769,795	878,642	114.13974
221407	22	FRIENDSHIP	ME	24,598,179	27,426,130	111.49659
224709	22	ROUND POND	ME	1,261,981	1,386,430	109.86140
226819	22	EASTPORT	ME	4,085,191	4,403,837	107.80003
227419	22	PEMBROKE	ME	718,927	769,399	107.02046
350515	35	ISLAND PARK	NY	40,244	43,034	106.93271
490118	49	HAMPTON	VA	13,468,280	14,348,352	106.53441
222801	22	SOUTH PORTLAND	ME	74,598	79,337	106.35272
224809	22	SOUTH BRISTOL	ME	6,170,581	6,470,865	104.86638
320601	32	NEW CASTLE	NH	138,544	145,004	104.66278
221907	22	PORT CLYDE	ME	7,370,245	7,697,235	104.43662
350735	35	HAMPTON BAYS	NY	6,073,435	6,318,691	104.03818
222701	22	HARPSWELL	ME	13,532,341	14,072,896	103.99454
071011	07	STONINGTON	CT	4,127,385	4,274,203	103.55717
420209	42	POINT JUDITH	RI	65,831,130	68,111,003	103.46321
320801	32	HAMPTON	NH	381,660	394,713	103.42006
071811	07	NEW LONDON	CT	3,627,337	3,713,988	102.38883
350315	35	FREEPORT	NY	292,958	299,696	102.29999
225103	22	BLUE HILL	ME	4,826,973	4,934,451	102.22661
350635	35	MONTAUK	NY	18,186,980	18,539,960	101.94084

Table 9: Comparison of Port sums for CFDETT TRPVALUE from the AA and CAMS tables, filtering out equal values. *(continued)*

PORT	STATE	PORTNM	STATE ABB	AA TRP-VALUE	CAMS TR-PVALUE	CAMS TRP (Percent of AA)
430107	43	WADMALAW ISLAND	SC	438,097	446,039	101.81284
242511	24	COHASSET	MA	1,982,382	2,008,568	101.32094
225819	22	CUTLER	ME	5,836,788	5,887,134	100.86256
076309	07	EAST HAVEN	CT	911,423	918,789	100.80819
241701	24	EASTHAM	MA	1,212,248	1,221,168	100.73582
241201	24	BARNSTABLE	MA	8,290,543	8,351,231	100.73201
220301	22	BAILEY ISLAND	ME	5,653,396	5,688,224	100.61605
240213	24	MARSHFIELD	MA	6,578,593	6,614,229	100.54170
240813	24	SCITUATE	MA	5,240,141	5,265,746	100.48863
240701	24	SANDWICH	MA	5,928,353	5,955,626	100.46004
240205	24	EDGARTOWN	MA	2,506,296	2,514,058	100.30970
221307	22	CUSHING	ME	11,146,720	11,170,067	100.20945
351235	35	CENTER MORICHES	NY	66,700	66,827	100.19040
240301	24	CHATHAM	MA	15,996,317	16,024,749	100.17774
225309	22	WISCASSET	ME	1,592,055	1,594,729	100.16796
220407	22	SOUTH THOMASTON	ME	393,355	393,960	100.15381
421605	42	JAMESTOWN	RI	23,064	23,094	100.13007
227319	22	STUEBEN	ME	7,876,499	7,885,287	100.11157
222007	22	SPRUCEHEAD	ME	18,780,303	18,799,406	100.10172
360219	36	WANCHESE	NC	13,034,533	13,047,709	100.10109
220403	22	DEER ISLE	ME	5,982,882	5,988,256	100.08982
330127	33	POINT PLEASANT	NJ	29,943,714	29,968,449	100.08260
350835	35	AMAGANSETT	NY	340,027	340,284	100.07558
243601	24	TRURO	MA	255,125	255,306	100.07095
226919	22	HARRINGTON	ME	10,379,176	10,384,973	100.05585
420505	42	PORTSMOUTH	RI	442,264	442,476	100.04794
241903	24	WESTPORT	MA	2,519,755	2,520,939	100.04699
243401	24	BREWSTER	MA	1,084,148	1,084,648	100.04612
221807	22	OWLS HEAD	ME	13,029,034	13,034,276	100.04023
223403	22	SOUTHWEST HARBOR	ME	11,308,466	11,312,925	100.03943
420105	42	NEWPORT	RI	7,789,091	7,791,887	100.03590
220803	22	HANCOCK	ME	2,283,414	2,284,193	100.03412
224209	22	BREMEN	ME	3,212,904	3,213,918	100.03156
241707	24	ROCKPORT	MA	6,762,810	6,764,278	100.02171
360127	36	ENGELHARD	NC	4,727,115	4,728,046	100.01969

Table 9: Comparison of Port sums for CFDETT TRPVALUE from the AA and CAMS tables, filtering out equal values. *(continued)*

PORT	STATE	PORTNM	STATE ABB	AA TRP-VALUE	CAMS TR-PVALUE	CAMS TRP (Percent of AA)
330909	33	OTHER CAPE MAY	NJ	2,100,706	2,101,105	100.01899
224509	22	NEW HARBOR	ME	5,938,556	5,939,554	100.01681
242713	24	DUXBURY	MA	6,294,807	6,295,326	100.00824
350435	35	ISLIP	NY	697,643	697,691	100.00688
240601	24	PROVINCETOWN	MA	7,659,625	7,659,917	100.00381
351315	35	OCEANSIDE	NY	824,531	824,555	100.00291
420601	42	BRISTOL	RI	1,137,770	1,137,792	100.00193
360209	36	BEAUFORT	NC	9,190,895	9,190,967	100.00078
421509	42	NORTH KINGSTOWN	RI	14,079,741	14,079,847	100.00075
240613	24	WAREHAM	MA	887,072	887,074	100.00023
220501	22	CUNDYS HARBOR	ME	11,625,453	11,625,465	100.00010
222403	22	BAR HARBOR	ME	7,263,194	7,263,195	100.00001
226820	22	CAPE PORPOISE	ME	4,460,973	4,460,972	99.99998
242203	24	FAIRHAVEN	MA	10,927,424	10,927,419	99.99995
330509	33	SEA ISLE CITY	NJ	1,987,852	1,987,851	99.99995
421805	42	LITTLE COMPTON	RI	3,359,140	3,359,136	99.99988
224519	22	TRESCOTT	ME	818,258	818,257	99.99988
240105	24	CHILMARK	MA	747,277	747,275	99.99973
320701	32	NEWINGTON	NH	26,823,895	26,823,769	99.99953
227020	22	KITTERY	ME	6,181,690	6,181,652	99.99939
240913	24	OTHER PLYMOUTH	MA	1,795,600	1,795,585	99.99916
241107	24	SAUGUS	MA	946,514	946,503	99.99884
351215	35	POINT LOOKOUT	NY	75,726	75,725	99.99868
070911	07	OTHER NEW LONDON	CT	245,988	245,984	99.99837
241901	24	WOODS HOLE	MA	782,466	782,451	99.99808
240403	24	NEW BEDFORD	MA	450,968,264	450,956,021	99.99729
240115	24	BOSTON	MA	19,307,335	19,306,779	99.99712
222107	22	ST. GEORGE	ME	1,139,297	1,139,262	99.99693
224109	22	BOOTHBAY HARBOR	ME	6,405,584	6,405,279	99.99524
220401	22	CHEBEAGUE ISLAND	ME	2,956,551	2,956,400	99.99489

Table 9: Comparison of Port sums for CFDETT TRPVALUE from the AA and CAMS tables, filtering out equal values. *(continued)*

PORT	STATE	PORTNM	STATE ABB	AA TRP-VALUE	CAMS TR-PVALUE	CAMS TRP (Percent of AA)
350935	35	OTHER SUFFOLK	NY	448,096	448,071	99.99442
225619	22	BEALS ISLAND	ME	22,731,283	22,729,945	99.99411
221217	22	BELFAST	ME	1,719,092	1,718,990	99.99407
222207	22	TENANTS HARBOR	ME	8,743,763	8,743,061	99.99197
244505	24	MENEMSHA	MA	1,199,763	1,199,661	99.99150
221203	22	LAMOINE	ME	2,933,224	2,932,971	99.99137
242901	24	HARWICHPORT	MA	4,316,287	4,315,889	99.99078
330309	33	CAPE MAY	NJ	82,257,470	82,249,529	99.99035
240901	24	OTHER BARNSTABLE	MA	4,103,366	4,102,925	99.98925
220103	22	BASS HARBOR	ME	13,449,008	13,447,448	99.98840
226119	22	MILBRIDGE	ME	13,020,923	13,019,386	99.98820
226019	22	JONESPORT	ME	13,571,453	13,568,878	99.98103
241507	24	IPSWICH	MA	2,986,029	2,985,446	99.98048
224909	22	SOUTHPORT	ME	2,414,913	2,414,424	99.97975
221603	22	MOUNT DESERT	ME	2,445,844	2,445,306	99.97800
220207	22	ROCKLAND	ME	11,505,523	11,502,873	99.97697
241101	24	WELLFLEET	MA	8,309,543	8,307,460	99.97493
243301	24	BOURNE	MA	210,471	210,411	99.97149
225203	22	BROOKSVILLE	ME	360,190	360,086	99.97113
222203	22	SEDGWICK	ME	442,685	442,557	99.97109
225719	22	BUCKS HARBOR	ME	362,071	361,955	99.96796
221707	22	NORTH HAVEN	ME	2,172,460	2,171,743	99.96700
243107	24	MARBLEHEAD	MA	3,486,756	3,485,363	99.96005
230131	23	OCEAN CITY	MD	7,702,956	7,699,644	99.95700
227719	22	MACHIASPORT	ME	7,509,792	7,506,381	99.95458
240101	24	DENNIS	MA	2,735,348	2,734,031	99.95185
240513	24	PLYMOUTH	MA	5,428,839	5,426,089	99.94934
222307	22	VINALHAVEN	ME	42,358,552	42,335,560	99.94572
320901	32	SEABROOK	NH	2,802,263	2,800,709	99.94454
222103	22	SEAL COVE	ME	818,541	818,070	99.94246
221607	22	MATINICUS	ME	4,228,432	4,225,086	99.92087
227320	22	ELIOT	ME	531,185	530,695	99.90775
350535	35	GREENPORT	NY	356,692	356,333	99.89935
227420	22	OGUNQUIT	ME	2,740,372	2,737,518	99.89585
241907	24	NEWBURYPORT	MA	1,282,130	1,280,584	99.87942
331125	33	BELFORD	NJ	1,951,875	1,949,447	99.87561

Table 9: Comparison of Port sums for CFDETT TRPVALUE from the AA and CAMS tables, filtering out equal values. *(continued)*

PORT	STATE	PORTNM	STATE ABB	AA TRP-VALUE	CAMS TR-PVALUE	CAMS TRP (Percent of AA)
227019	22	LUBEC	ME	5,137,329	5,130,912	99.87509
243201	24	OSTERVILLE	MA	291,551	291,074	99.83639
223503	22	STONINGTON	ME	51,038,585	50,947,982	99.82248
244605	24	VINEYARD HAVEN	MA	501,155	500,162	99.80186
360319	36	HATTERAS	NC	2,976,966	2,971,012	99.80000
221901	22	FALMOUTH	ME	1,812,654	1,808,350	99.76256
351035	35	MATTITUCK	NY	557,056	555,158	99.65928
220101	22	PORTLAND	ME	25,925,017	25,833,993	99.64890
331627	33	LONG BEACH (TOWN OF)	NJ	25,417,684	25,327,999	99.64716
241607	24	LYNN	MA	125,000	124,549	99.63920
241601	24	ORLEANS	MA	2,004,844	1,997,459	99.63164
080205	08	LEWES	DE	578,470	575,661	99.51441
240909	24	NANTUCKET	MA	1,287,831	1,280,827	99.45614
224503	22	NORTHEAST HARBOR	ME	788,399	784,109	99.45586
360999	36	OTHER NORTH CAROLINA	NC	2,110,681	2,099,071	99.44994
320401	32	RYE	NH	1,483,074	1,474,856	99.44588
240415	24	REVERE	MA	85,268	84,627	99.24825
240207	24	GLOUCESTER	MA	56,733,697	56,295,961	99.22844
221403	22	LITTLE DEER ISLE	ME	327,105	324,392	99.17060
241301	24	YARMOUTH	MA	1,127,025	1,115,911	99.01386
351435	35	ORIENT	NY	20,878	20,661	98.96063
225215	22	PHIPPSBURG	ME	417,872	413,324	98.91163
223519	22	EDMUNDS	ME	158,403	155,767	98.33589
224203	22	BROOKLIN	ME	1,980,093	1,939,404	97.94510
241001	24	FALMOUTH	MA	2,109,914	2,056,865	97.48573
320201	32	PORTSMOUTH	NH	8,303,884	8,035,966	96.77358
244013	24	HULL	MA	1,779,801	1,686,703	94.76919
221101	22	YARMOUTH	ME	551,094	514,317	93.32655
226619	22	ADDISON	ME	5,411,498	4,908,551	90.70596
430903	43	OTHER BEAUFORT	SC	479,627	411,193	85.73183
240607	24	MANCHESTER	MA	657,591	352,257	53.56780
330911	33	OTHER CUMBERLAND	NJ	94,655	47,260	49.92869
240999	24	OTHER MASSACHUSETTS	MA	1,089,533	503,925	46.25147

5.4 Port Analysis

```
 Tempdata <- dplyr::tbl(DB_SOLE_Connection,
               in_schema("CFDBS","CFDERS2019"))
 CFDERS_Trip_SumTotal <- Tempdata %>% select(PORT,STATE,SPPVALUE)  %>%
   group_by(PORT,STATE) %>%
   summarise(CFDERS.TRPVALUE = sum(SPPVALUE,
        na.rm=TRUE)) %>%
    collect()

 Tempdata <- dplyr::tbl(DB_NOVA_Connection,
               in_schema("CAMS_GARFO","CAMS_CFDETT2019AA"))
 CAMS_Trip_SumTotal <- Tempdata %>%
   select(PORT,STATE,TRPVALUE)  %>%
    group_by(PORT,STATE) %>%
   summarise(CAMS.TRPVALUE = sum(TRPVALUE, na.rm=TRUE)) %>%
    collect()

 Tempdata <- dplyr::tbl(DB_SOLE_Connection,
               in_schema("CFDBS","PORT"))
 Ports <- Tempdata %>%
   select(PORT,STATECD,PORTNM,STATEABB)  %>%
   distinct %>%
   rename(STATE=STATECD) %>%
    mutate(PORTNM=replace(PORTNM,"/"," ")) %>%
     mutate(PORTNM=replace(PORTNM,"-"," ")) %>%
    mutate(PORTNM=replace(PORTNM,"&"," ")) %>%
     mutate(PORTNM=replace(PORTNM,","," , ")) %>%
    collect()


FULL_TABLE =  full_join(CFDERS_Trip_SumTotal,
               CAMS_Trip_SumTotal, by=c("PORT","STATE"))

FULL_TABLE  =  left_join(FULL_TABLE,Ports,
                         by=c("PORT","STATE"))

FULL_TABLE$Pct_CFDETT_Difference <- round(FULL_TABLE$CAMS.TRPVALUE/FULL_TABLE$CFDERS.TRPVALUE*100,5)

FULL_TABLE <- FULL_TABLE %>%
  arrange(desc(Pct_CFDETT_Difference)) %>%
  filter(Pct_CFDETT_Difference !=100) %>%
          relocate(PORT,STATE,PORTNM,STATEABB)

knitr::kable(FULL_TABLE, format = "latex", linesep = "",
             format.args=list(big.mark=",",
                              scientific = FALSE),
             escape=FALSE,
      col.names = c("PORT",
      "STATE","PORTNM",
      "STATE ABB",
      "CFDERS SPPVALUE",
      "CAMS TRPVALUE",
      "CAMS TRP (Percent of CFDERS)"),
```

```
    caption = "Comparison of Port sums for CFDETT TRPVALUE from the CFDERS and CAMS tables, filtering
    booktabs = T,longtable = T) %>%
  kable_styling(font_size = 11,
    latex_options = c("hold_position", "repeat_header")) %>%
  column_spec(1, width = c("3em")) %>%
  column_spec(2, width = c("3em")) %>%
  column_spec(3, width = c("8em")) %>%
  column_spec(4, width = c("4em")) %>%
  column_spec(5, width = c("6em")) %>%
  column_spec(6, width = c("6em")) %>%
  column_spec(7, width = c("6em"), border_left=T, border_right=T) %>%
  row_spec(0, bold = TRUE) %>%
  column_spec(1,bold=TRUE)
```

Table 10: Comparison of Port sums for CFDETT TRPVALUE from the CFDERS and CAMS tables, filtering out equal values.

PORT	STATE	PORTNM	STATE ABB	CFDERS SPPVALUE	CAMS TRPVALUE	CAMS TRP (Percent of CFDERS)
350635	35	MONTAUK	NY	18,507,409	18,539,960	100.17588
352435	35	SHELTER ISLAND	NY	269,652	269,667	100.00556
351635	35	SOUTHOLD	NY	36,209	36,210	100.00276
080505	08	MISPILLION	DE	2,124,950	2,124,988	100.00179
351135	35	SHINNECOCK	NY	1,299,397	1,299,399	100.00015
331125	33	BELFORD	NJ	1,949,446	1,949,447	100.00005
221603	22	MOUNT DESERT	ME	2,445,305	2,445,306	100.00004
360209	36	BEAUFORT	NC	9,190,964	9,190,967	100.00003
230131	23	OCEAN CITY	MD	7,699,642	7,699,644	100.00003
490701	49	CHINCOTEAGUE	VA	3,209,084	3,209,085	100.00003
226820	22	CAPE PORPOISE	ME	4,460,971	4,460,972	100.00002
350999	35	OTHER NEW YORK	NY	204,410,550	204,410,582	100.00002
240403	24	NEW BEDFORD	MA	450,955,963	450,956,021	100.00001
320701	32	NEWINGTON	NH	26,823,766	26,823,769	100.00001
490118	49	HAMPTON	VA	14,348,350	14,348,352	100.00001
222403	22	BAR HARBOR	ME	7,263,194	7,263,195	100.00001
421509	42	NORTH KINGSTOWN	RI	14,079,846	14,079,847	100.00001
221907	22	PORT CLYDE	ME	7,697,236	7,697,235	99.99999
330309	33	CAPE MAY	NJ	82,249,538	82,249,529	99.99999
360219	36	WANCHESE	NC	13,047,712	13,047,709	99.99998
240207	24	GLOUCESTER	MA	56,295,970	56,295,961	99.99998
330127	33	POINT PLEASANT	NJ	29,968,454	29,968,449	99.99998

Table 10: Comparison of Port sums for CFDETT TRPVALUE from the CFDERS and CAMS tables, filtering out equal values. *(continued)*

PORT	STATE	PORTNM	STATE ABB	CFDERS SPPVALUE	CAMS TRPVALUE	CAMS TRP (Percent of CFDERS)
240301	24	CHATHAM	MA	16,024,753	16,024,749	99.99998
240813	24	SCITUATE	MA	5,265,748	5,265,746	99.99996
320901	32	SEABROOK	NH	2,800,710	2,800,709	99.99996
320201	32	PORTSMOUTH	NH	8,035,972	8,035,966	99.99993
420209	42	POINT JUDITH	RI	68,111,066	68,111,003	99.99991
076309	07	EAST HAVEN	CT	918,790	918,789	99.99989
071011	07	STONINGTON	CT	4,274,208	4,274,203	99.99988
224519	22	TRESCOTT	ME	818,258	818,257	99.99988
240115	24	BOSTON	MA	19,306,804	19,306,779	99.99987
070999	07	OTHER CONNECTICUT	CT	5,859,351	5,859,337	99.99976
350535	35	GREENPORT	NY	356,334	356,333	99.99972
351235	35	CENTER MORICHES	NY	66,828	66,827	99.99850
080305	08	INDIAN RIVER	DE	1,486,491	1,486,296	99.98688
080101	08	PORT MAHON	DE	5,724,400	5,723,478	99.98389
080999	08	OTHER DELAWARE	DE	1,331,725	1,331,123	99.95480
080901	08	OTHER KENT	DE	1,547,691	1,546,866	99.94669
080401	08	BOWERS BEACH	DE	2,748,439	2,746,277	99.92134
000000	00	NA	NA	250,034	7,726	3.08998

The major differences in port are generated from the fact that the AA tables have not been updated, as a comparison of CAMS and CFDERS highlights.

Appendix 4. Comparison of effort

Overview of AA-CAMS Comparison of 2019 Effort

Marjorie Lyssikatos and Kristin Precoda

2022-02-15

This report provides an overview comparing 2019 source data records entering the CAMS and AA allocation systems and associated effort variables and quantities. This overview does not provide any assessment of the quality or representativeness of effort variable quantities. Such assessment will require a deep dive into allocation and imputation methodologies.

2019 CAMS contains 1,097,653 records compared to 1,005,693 records in 2019 AA (a difference of 91,960 records). CAMS contains 2.7% more source 5 (state data) and 4% fewer source 7 (mandatory reporting) records compared to AA. CAMS also contains 14,645 orphans (no source assigned) whereas these same records are assigned to either source 5 or source 7 in AA (Table 1; Table 4).

Overviews of source types by imputation are shown in Table 2 and 3 for CAMS and AA, respectively. CAMS source 5 and 8 records include both imputed and not imputed effort and source 11 records all have imputed effort, whereas no AA source 5, 8 and 11 records had effort assigned or imputed (Table 3). We assume the difference can be attributed to different criteria used for records entering effort allocation and imputation methods in CAMS compared to AA.

Overall, 70%-76% of effort variables and 90%-95% of variables entering effort estimation equations have null values in both AA and CAMS. However, CAMS has 3.4%-6% fewer null values across all effort variables compared to AA. The smaller number of null values in CAMS also appears to be reflected in 5% fewer null values in effort_imp than there are AA records with a null value for imputation (Table 4).

Cautionary NOTE: Less than a third of records in both AA and CAMS have effort assigned. The vast majority of records entering both systems have null values for effort. Keep this in mind when interpreting the summary of comparisons described below.

Effort by source:

For source 7 records, days fished (DF) is substantially greater in CAMS than AA. This is to be expected given that the formula for DF in CAMS includes NTOWS as a multiplier for fixed gears whereas the AA formula did not. Days absent (DA) is 27% greater in the CAMS than AA (Table 5). CAMS consistently has higher values across all effort variables for source 7 records. Only source 7 records can be compared, because in contrast to CAMS, the AA estimates effort for source 7 records only (Tables 5-8).

Effort by negear:

Discrepancies in effort quantities by gear type are highly variable both within and across gear types. Negear = 050 (mobile; bottom trawl) DF is similar between AA and CAMS. DF for Midwater trawl, another mobile gear type (negear=370), is similar between CAMS and AA. In comparison, some gillnet gears (negears 100, 105, 110) and lobster pots (negear 200, 210) DF are substantially greater in CAMS than AA (Table 9). Differences between CAMS and AA for ntrips, ntows, gearqty, gearsize, and towdur are also variable among gear types (Tables 10-12).

Effort by state:

Overall, differences in DA are smaller than differences in DF across the states when comparing AA to CAMS (Table 13). When CAMS and AA both have non-zero values for effort variables, CAMS has larger quantities than AA, with the exception of two cases with state = 99 (Tables 13-16).

Effort by area:

CAMS has larger quantities than AA for nearly all effort variables in most areas; DA, NTRIPS, NTOWS, and TOWDUR have some exceptions. Days fished in CAMS is substantially larger than AA in most areas (Tables 17-20).

AA-CAMS Comparison of 2019 Effort

Marjorie Lyssikatos and Kristin Precoda

2022-02-18

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Comparing effort-related variables for 2019 data in CAMS tables with CFDBS AA tables

Data was pulled on 2/15/22.

Frequency of each SOURCE value

Table 1: Frequency of each SOURCE value (5=NEMFIS State Data (IWP); 7=Mandatory Reporting; 8=Clam Logbook; 11=Estimated Mandatory Landings (as reported in CFDERS); NULL (NA) for VTR orphans without matching DLR record).

SOURCE	Count (AAold)	Count (CAMS)	% (AAold)	% (CAMS)
11	26	26	0.0	0.0
5	470,511	543,005	46.8	49.5
7	531,905	536,725	52.9	48.9
8	3,251	3,252	0.3	0.3
NA	0	14,645	0.0	1.3

Variable sums for each combination of SOURCE and EFFORT_IMP in CAMS

Table 2: Combinations of SOURCE and EFFORT_IMP (0=not imputed, 1=imputed, NULL for permit 000000) in the CAMS table, count of each combination, and sums of variables for each combination

SOURCE	EFFORT_IMP	COUNT	DA	DF	NTRIPS	NTOWS	GEARQTY	GEARSIZE
5	0	3,614	1,711.7	82,389.5	1,410.2	43,310	34,117	1,723,158
5	1	22,565	26,220.6	121,682.6	19,037.4	583	2,536	102,069
5	NA	516,826	0.0	0.0	0.0	0	0	0
7	0	82,098	124,402.5	4,250,761.3	60,083.6	1,397,812	2,600,874	31,425,299
7	1	201,558	242,107.8	1,423,581.7	185,911.9	6,901	42,260	742,559
7	NA	253,069	0.0	0.0	0.0	0	0	0
8	0	361	558.7	243.1	170.9	17,674	361	52,774
8	1	2,891	6,378.7	1,451.4	2,575.2	0	1	120
11	1	26	14.4	2.9	8.0	0	0	0
NA	0	12,439	11,859.0	649,681.4	8,635.3	175,202	339,036	4,852,952
NA	1	2,206	1,854.8	2,496.4	1,762.5	1,787	12,776	247,304

Variable sums for each combination of SOURCE, EFFIND, and ELEVEL in old AA

Table 3: Combinations of SOURCE, EFFIND (0=Uninterviewed with minimal effort data: DA, DF, NTRIPS, FZONE; 2=Mandatory/Dealer report only, i.e., no effort data; 3=Mandatory/Vessel log only, i.e., effort data; 4=Mandatory/Dealer and vessel log, i.e., detailed effort data), and ELEVEL in the old AA table, count of each combination, and sums of variables for each combination. ELEVEL was used as a proxy for EFFORT_IMP. ELEVEL values are A=dealer trip matches VTR trip; B=level A trips pooled by vessel permit, gear group, main species group, and month; C=level A trips pooled by ton class, port group, gear group, main species group, and calendar quarter; D=level A trips grouped by port group; X=dealer trip entered the allocation but did not find a match at any of the four levels. ELEVEL=NULL implies these records did not enter the AA allocation procedure.

SOURCE	ELEVEL	EFFIND	COUNT	DA	DF	NTRIPS	NTOWS	GEARQTY	GEARSIZE
5		0	326,563	0.0	0.0	0.0	0	0	0
5		2	143,948	0.0	0.0	0.0	0	0	0
7		2	289,866	0.0	0.0	0.0	0	0	0
7	A	4	62,321	107,498.9	92,185.9	45,931.4	771,803	1,991,727	10,379,790
7	B	3	4,217	4,516.9	22,263.6	3,776.0	0	0	0
7	C	3	106,231	100,593.3	510,136.1	100,163.0	0	0	0
7	D	3	65,403	76,286.2	111,119.2	60,223.0	0	0	0
7	X	2	3,867	0.0	0.0	3,568.0	0	0	0
8		0	3,251	0.0	0.0	0.0	0	0	0
11		0	26	0.0	0.0	0.0	0	0	0

Tables below summarize data with any value for SOURCE, including NA.

Count of NA values

Table 4: First row: Number of rows in each table (n); Other rows: Number and percent of NAs. Includes all records (i.e. sources 5, 7, 8, 11, NA). ELEVEL in the AA table was used as a proxy for EFFORT_IMP below from CAMS.

Variable	AAold	AACAMS	AAold % NA	AACAMS % NA
n	1,005,693	1,097,653		
PORT	0	0	0.0	0.0
STATE	0	0	0.0	0.0
YEAR	0	0	0.0	0.0

Variable	AAold	AACAMS	AAold % NA	AACAMS % NA
MONTH	0	0	0.0	0.0
SOURCE	0	14,645	0.0	1.3
PERMIT	0	0	0.0	0.0
DLRTRPID	0	1,097,653	0.0	100.0
NEGEAR	0	0	0.0	0.0
AREA	0	0	0.0	0.0
DA	767,556	769,895	76.3	70.1
DF	767,547	769,895	76.3	70.1
NTRIPS	763,654	769,897	75.9	70.1
GEARQTY	949,951	989,030	94.5	90.1
GEARSIZE	954,503	990,714	94.9	90.3
NTOWS	947,666	996,880	94.2	90.8
TOWDUR	943,372	991,344	93.8	90.3
EFFORT_IMP	763,654	769,895	75.9	70.1

In the tables below, grey cells are redacted because they include fewer than 3 records or, in the case of ratios, are derived from redacted data.

Effort variables tabulated by SOURCE

DA and DF

*Table 5: Sum of DA and DF by SOURCE. Ratio is 100 * CAMS / old*

SOURCE	DA.old	DF.old	DA.CAMS	DF.CAMS	DA.ratio %	DF.ratio %
11	0.0	0.0	14.45	2.92	Inf	Inf
5	0.0	0.0	27,932.38	204,072.09	Inf	Inf
7	288,895.3	735,704.8	366,510.32	5,674,342.98	126.87	771.28
8	0.0	0.0	6,937.41	1,694.53	Inf	Inf
NA			13,713.79	652,177.78		

NTRIPS and NTOWS

*Table 6: Sum of NTRIPS and NTOWS by SOURCE. Ratio is 100 * CAMS / old*

SOURCE	NTRIPS.old	NTOWS.old	NTRIPS.CAMS	NTOWS.CAMS	NTRIPS.ratio %	NTOWS.ratio %
11	0.0	0	8.00	0	Inf	
5	0.0	0	20,447.66	43,893	Inf	Inf
7	213,661.4	771,803	245,995.51	1,404,713	115.13	182
8	0.0	0	2,746.11	17,674	Inf	Inf
NA			10,397.72	176,989		

GEARQTY and GEARSIZE

*Table 7: Sum of GEARQTY and GEARSIZE by SOURCE. Ratio is 100 * CAMS / old*

SOURCE	GEARQTY.old	GEARSIZE.old	GEARQTY.CAMS	GEARSIZE.CAMS	GEARQTY.ratio %	GEARSIZE.ratio %
11	0	0	0	0		
5	0	0	36,653	1,825,227	Inf	Inf
7	1,991,727	10,379,790	2,643,134	32,167,858	132.71	309.91
8	0	0	362	52,894	Inf	Inf
NA			351,812	5,100,256		

TOWDUR

*Table 8: Sum of TOWDUR by SOURCE. Ratio is 100 * CAMS / old*

SOURCE	TOWDUR.old	TOWDUR.CAMS	TOWDUR.ratio %
11	0	0.0	
5	0	267,263.9	Inf
7	2,178,358	5,151,891.3	236.5
8	0	243.5	Inf
NA		798,379.0	

Effort variables tabulated by NEGEAR

DA and DF

*Table 9: Sum of DA and DF by NEGEAR. Ratio is 100 * CAMS / old*

NEGEAR	DA.old	DF.old	DA.CAMS	DF.CAMS	DA.ratio %	DF.ratio %
10	2,108.13	886.00	2,515.12	6,012.71	119.31	678.64
20	9,677.87	5,282.07	10,456.59	4,311.15	108.05	81.62
21	37.33	5.89	7.56	1.48	20.25	25.13
30	0.00	0.00	680.35	134.75	Inf	Inf
34	0.00	0.00	0.00	0.00		
40	0.00	0.00	372.79	533.39	Inf	Inf
50	**37,439.96**	**11,815.21**	**45,585.02**	**12,484.45**	**121.75**	**105.66**
51			0.00	0.00		
52	919.50	1,794.28	2,269.31	424.41	246.80	23.65
53	180.34	36.08	299.40	88.15	166.02	244.31
54	173.85	33.02	149.25	31.52	85.85	95.47
55	145.51	58.75	74.10	17.07	50.92	29.06
57	342.13	147.16	388.60	192.21	113.58	130.62
58	861.75	204.35	785.08	206.55	91.10	101.08
59	725.24	195.89	956.17	247.10	131.84	126.14
60	102.00	7.54	76.93	17.67	75.42	234.35
62	0.00	0.00	522.08	3,412.92	Inf	Inf
65	70.83	5.31	57.83	13.13	81.65	247.27
66	0.00	0.00	0.00	0.00		
67						
70	4.40	0.98	19.07	2.87	433.33	292.95
71	23.00	6.43	59.85	384.82	260.22	5,984.76
80	**23.99**	**122.02**	**233.92**	**2,236.26**	**975.06**	**1,832.70**
90			0.00	0.00		
100	**10,669.40**	**16,510.54**	**12,602.02**	**62,656.66**	**118.11**	**379.49**

NEGEAR	DA.old	DF.old	DA.CAMS	DF.CAMS	DA.ratio %	DF.ratio %
101	513.99	34.53	575.11	3,662.67	111.89	10,607.21
105	**8.01**	**0.45**	**68.85**	**462.56**	**859.55**	**102,791.11**
110	**12.76**	**0.40**	**141.38**	**659.92**	**1,107.96**	**164,979.48**
115	0.00	0.00	26.39	83.20	Inf	Inf
116	50.33	3.34	125.03	31.49	248.42	942.91
117			219.77	1,261.46		
120	712.49	155.53	1,564.94	2,269.68	219.64	1,459.32
123	0.00	0.00	7.78	1.57	Inf	Inf
131	0.00	0.00	93.44	20.58	Inf	Inf
132	39,715.80	11,475.97	44,083.20	12,502.86	111.00	108.95
140	92.65	56.82	134.67	909.85	145.35	1,601.28
170	0.00	0.00	225.52	16.55	Inf	Inf
180	29,741.44	40,464.58	39,977.11	266,008.73	134.42	657.39
181	1,291.56	9,031.78	1,575.11	74,736.48	121.95	827.48
182	0.00	0.00	23.83	159.32	Inf	Inf
183	1,735.54	3,713.86	3,463.56	185,236.75	199.57	4,987.71
185	0.00	0.00	0.00	0.00		
186	122.50	13.12	12.77	84.09	10.42	640.93
200	**31,268.24**	**110,686.12**	**42,483.00**	**4,682,523.73**	**135.87**	**4,230.45**
210	**115,399.32**	**518,477.61**	**177,381.36**	**1,185,685.95**	**153.71**	**228.69**
220	44.50	133.29	66.40	13.18	149.21	9.89
223	0.00	0.00	0.00	0.00		
230	420.43	478.17	466.52	101.28	110.96	21.18
240			0.00	0.00		
250	652.00	332.46	2,088.62	414.98	320.34	124.82
251	0.00	0.00	0.00	0.00		
260	10.00	7.62	49.23	9.43	492.30	123.75
270	0.00	0.00	0.00	0.00		

NEGEAR	DA.old	DF.old	DA.CAMS	DF.CAMS	DA.ratio %	DF.ratio %
300	**641.99**	**188.26**	**722.51**	**4,002.33**	**112.54**	**2,125.96**
301	308.50	20.29	1,634.31	10,541.33	529.76	51,953.33
320	0.00	0.00				
324	0.00	0.00	0.00	0.00		
330	88.00	71.85	601.71	120.56	683.76	167.79
340	0.00	0.00	9.91	4.83	Inf	Inf
350	88.47	24.14	131.81	25.86	148.99	107.13
351	0.00	0.00	8.62	0.67	Inf	Inf
353	0.00	0.00	0.00	0.00		
360	0.00	0.00	0.00	0.00		
370	**202.69**	**20.66**	**224.63**	**20.63**	**110.83**	**99.84**
380	0.00	0.00	57.79	11.70	Inf	Inf
381	1,347.95	2,794.21	6,338.73	1,400.22	470.25	50.11
382	155.01	74.28	351.62	78.37	226.84	105.51
387			8.00	1.19		
400	0.00	0.00	8,337.11	2,134.82	Inf	Inf
410	148.92	53.51	134.87	27.24	90.57	50.91
414			3.85	0.78		
430	0.00	0.00	0.00	0.00		
440	0.00	0.00	0.00	0.00		
450	269.00	23.26	2,947.00	862.55	1,095.54	3,708.29
500	104.64	8.07	114.90	108.73	109.81	1,347.32
520	124.83	75.41	270.40	1,056.14	216.61	1,400.53
530	111.50	166.45	241.30	1,617.82	216.41	971.96
999	0.00	0.00				

NTRIPS and NTOWS

*Table 10: Sum of NTRIPS and NTOWS by NEGEAR. Ratio is 100 * CAMS / old*

NEGEAR	NTRIPS.old	NTOWS.old	NTRIPS.CAMS	NTOWS.CAMS	NTRIPS.ratio %	NTOWS.ratio %
10	1,165.22	4,263	1,392.69	5,699	119.52	133.69
20	7,680.39	218	10,439.56	1,035	135.92	474.77
21	38.83	0	7.02	0	18.08	
30	0.00	0	700.08	128	Inf	Inf
34	0.00	0	0.00	0		
40	0.00	0	79.00	194	Inf	Inf
50	16,647.37	142,362	19,247.77	166,499	115.62	116.95
51		0	0.00	0		
52	678.50	938	927.67	856	136.72	91.26
53	108.45		107.44	1,168	99.07	
54	34.09	154	34.14	763	100.13	495.45
55	30.00	0	31.00	0	103.33	
57	51.98	442	53.37	3,743	102.67	846.83
58	418.93	1,162	236.31	2,067	56.41	177.88
59	264.65	1,630	277.61	1,727	104.90	105.95
60	109.00	0	26.50	0	24.31	
62	0.00	0	409.00	0	Inf	
65	73.83	0	23.05	0	31.22	
66	0.00	0	0.00	0		
67				0		
70	2.04		7.11	56	348.43	
71	13.50	0	46.46	0	344.18	
80	24.00	655	202.98	812	845.73	123.97
90			0.00	0		
100	8,605.26	30,573	10,174.07	43,892	118.23	143.56
101	532.50	0	438.49	0	82.34	
105	6.00	0	51.75	0	862.55	

NEGEAR	NTRIPS.old	NTOWS.old	NTRIPS.CAMS	NTOWS.CAMS	NTRIPS.ratio %	NTOWS.ratio %
110	11.76	40	125.25	489	1,064.86	1,222.50
115	0.00	0	26.00	98	Inf	Inf
116	52.83	0	122.00	96	230.91	Inf
117		0	159.92	48		Inf
120	549.00	822	1,334.67	2,476	243.11	301.22
123	0.00	0	4.54	0	Inf	
131	0.00	0	33.30	0	Inf	
132	10,888.80	328,627	12,297.16	342,376	112.93	104.18
140	86.67	0	101.13	0	116.69	
170	0.00	0	58.00	178	Inf	Inf
180	23,553.16	174	30,638.00	1,138	130.08	654.02
181	1,277.31	9,797	1,536.82	16,643	120.32	169.88
182	0.00	0	12.16	0	Inf	
183	1,661.02	66,085	3,067.39	87,619	184.67	132.59
185	0.00	0	0.00	0		
186	10.00	553	10.00	0	100.00	0.00
200	22,491.16	179,448	32,959.55	898,956	146.54	500.96
210	112,997.26	0	139,837.71	5,845	123.75	Inf
220	40.50	0	54.36	0	134.22	
223	0.00	0	0.00	0		
230	365.50	0	476.63	12	130.40	Inf
240		0	0.00	0		
250	578.00	90	2,137.87	137	369.87	152.22
251	0.00	0	0.00	0		
260	8.50	0	40.11	0	471.92	
270	0.00	0	0.00	0		
300	81.00	1,938	122.76	3,113	151.56	160.63
301	496.00	0	1,263.92	15	254.82	Inf
320	0.00	0		0		

NEGEAR	NTRIPS.old	NTOWS.old	NTRIPS.CAMS	NTOWS.CAMS	NTRIPS.ratio %	NTOWS.ratio %
324	0.00	0	0.00	0		
330	85.00	0	619.62	0	728.97	
340	0.00	0	10.00	202	Inf	Inf
350	22.01	411	75.00	703	340.78	171.05
351	0.00	0	5.00	0	Inf	
353	0.00	0	0.00	0		
360	0.00	0	0.00	0		
370	56.43	290	63.15	324	111.90	111.72
380	0.00	0	42.00	0	Inf	
381	1,067.25	644	2,711.16	4,029	254.03	625.62
382	114.50	0	144.97	0	126.61	
387			8.00	125		
400	0.00	0	3,309.22	42,773	Inf	Inf
410	141.00	0	140.00	0	99.29	
414		0	2.05	0		
430	0.00	0	0.00	0		
440	0.00	0	0.00	0		
450	271.00	0	717.74	6,392	264.85	Inf
500	82.67	260	89.00	331	107.66	127.31
520	97.00	214	221.50	510	228.35	238.32
530	85.50	0	101.29	0	118.47	
999	0.00	0				

GEARQTY and GEARSIZE

*Table 11: Sum of GEARQTY and GEARSIZE by NEGEAR. Ratio is 100 * CAMS / old*

NEGEAR	GEARQTY.old	GEARSIZE.old	GEARQTY.CAMS	GEARSIZE.CAMS	GEARQTY.ratio %	GEARSIZE.ratio %
10	1,695,855	6,269	2,032,999	8,243.8	119.88	131.50
20	24,689	0	33,880	62.0	137.23	Inf
21	0	0	0	0.0		
30	0	0	33	0.0	Inf	
34	0	0	0	0.0		
40	0	0	28,340	822.0	Inf	Inf
50	24,050	2,588,675	32,012	3,225,451.0	133.11	124.60
51	0	0	0	0.0		
52	234	14,366	380	15,035.0	162.39	104.66
53			256	19,181.0		
54	15	2,381	80	11,729.0	533.33	492.61
55	0	0	0	0.0		
57	36	7,317	311	61,383.0	863.89	838.91
58	94	6,764	411	17,828.0	437.23	263.57
59	236	33,621	267	38,241.4	113.14	113.74
60	0	0	0	0.0		
62	0	0	0	0.0		
65	0	0	0	0.0		
66	0	0	0	0.0		
67				0.0		
70			14	1,705.0		
71	0	0	0	0.0		
80	608	13,336	11,877	75,451.0	1,953.45	565.77
90			0	0.0		
100	188,511	4,945,683	227,699	7,325,006.0	120.79	148.11
101	0	0	0	0.0		
105	0	0	0	0.0		
110	65	6,578	408	71,940.0	627.69	1,093.65

NEGEAR	GEARQTY.old	GEARSIZE.old	GEARQTY.CAMS	GEARSIZE.CAMS	GEARQTY.ratio %	GEARSIZE.ratio %
115	0	0	362	11,700.0	Inf	Inf
116	0	0	105	18,000.0	Inf	Inf
117	0	0	402	10,290.0	Inf	Inf
120	407	394,888	1,630	729,654.0	400.49	184.77
123	0	0	0	0.0		
131	0	0	0	0.0		
132	15,320	1,405,664	16,368	1,497,389.0	106.84	106.53
140	0	0	0	0.0		
170	0	0	95	27,550.0	Inf	Inf
180	933	1,381	7,694	12,537.0	824.65	907.82
181	16,261	467,859	22,993	608,675.0	141.40	130.10
182	0	0	0	0.0		
183	22,714	393,368	46,229	779,091.0	203.53	198.06
185	0	0	0	0.0		
186	407	3,150	457	3,500.0	112.29	111.11
200	0	0	552,489	24,099,197.0	Inf	Inf
210	0	0	1,077	55,684.0	Inf	Inf
220	0	0	0	0.0		
223	0	0	0	0.0		
230	0	0	20	1,200.0	Inf	Inf
240	0	0	0	0.0		
250	8	122	10	142.0	125.00	116.39
251	0	0	0	0.0		
260	0	0	0	0.0		
270	0	0	0	0.0		
300	0	0	8,304	77,865.0	Inf	Inf
301	0	0	9	3,600.0	Inf	Inf
320	0	0	0	0.0		
324	0	0	0	0.0		
330	0	0	0	0.0		

NEGEAR	GEARQTY.old	GEARSIZE.old	GEARQTY.CAMS	GEARSIZE.CAMS	GEARQTY.ratio %	GEARSIZE.ratio %
340	0	0		108.0		Inf
350	51	3,155	101	1,935.0	198.04	61.33
351	0	0	0	0.0		
353	0	0	0	0.0		
360	0	0	0	0.0		
370	107	30,584	127	36,128.0	118.69	118.13
380	0	0	0	0.0		
381	51	2,839	595	27,243.0	1,166.67	959.60
382	0	0	0	0.0		
387			8	528.0		
400	0	0	1,115	135,815.0	Inf	Inf
410	0	0	0	0.0		
414	0	0	0	0.0		
430	0	0	0	0.0		
440	0	0	0	0.0		
450	0	0	816	41,376.0	Inf	Inf
500	505	27,300	618	35,100.0	122.38	128.57
520	564	24,000	1,356	59,850.0	240.43	249.38
530	0	0	0	0.0		
999	0	0		0.0		

TOWDUR

*Table 12: Sum of TOWDUR by NEGEAR. Ratio is 100 * CAMS / old*

NEGEAR	TOWDUR.old	TOWDUR.CAMS	TOWDUR.ratio %
10	4,444.0	6,093.4	137.12
20	25,679.3	43,134.7	167.97
21	0.0	0.0	
30	0.0	64.5	Inf
34	0.0	0.0	
40	0.0	501.0	Inf
50	59,926.9	73,125.7	122.02
51	0.0	0.0	
52	143.4	158.1	110.25
53		397.7	
54	41.6	175.6	422.12
55	0.0	0.0	
57	106.6	916.4	859.66
58	232.9	345.0	148.13
59	618.1	672.5	108.80
60	0.0	0.0	
62	0.0	0.0	
65	0.0	0.0	
66	0.0	0.0	
67		0.0	
70		23.6	
71	0.0	0.0	
80	4,463.5	9,882.1	221.40
90		0.0	
100	531,414.8	609,138.3	114.63

NEGEAR	TOWDUR.old	TOWDUR.CAMS	TOWDUR.ratio %
101	0.0	0.0	
105	0.0	0.0	
110	11.1	145.1	1,307.21
115	0.0	618.5	Inf
116	0.0	140.0	Inf
117	0.0	1,684.5	Inf
120	483.1	3,218.4	666.20
123	0.0	0.0	
131	0.0	0.0	
132	8,287.3	9,224.0	111.30
140	0.0	0.0	
170	0.0	136.4	Inf
180	1,156.3	7,140.9	617.56
181	259,517.9	333,548.4	128.53
182	0.0	0.0	
183	77,581.2	141,414.4	182.28
185	0.0	0.0	
186	197.5	219.5	111.14
200	1,195,570.6	4,947,325.9	413.80
210	0.0	13,522.4	Inf
220	0.0	0.0	
223	0.0	0.0	
230	0.0	192.0	Inf
240	0.0	0.0	
250	5.9	626.4	10,616.95
251	0.0	0.0	

NEGEAR	TOWDUR.old	TOWDUR.CAMS	TOWDUR.ratio %
260	0.0	0.0	
270	0.0	0.0	
300	6,513.0	6,059.5	93.04
301	0.0	72.0	Inf
320	0.0	0.0	
324	0.0	0.0	
330	224.0	245.0	109.38
340	0.0	7.0	Inf
350	70.3	69.7	99.15
351	0.0	0.0	
353	0.0	0.0	
360	0.0	0.0	
370	331.2	332.3	100.33
380	0.0	0.0	
381	37.6	148.7	395.48
382	0.0	0.0	
387		1.4	
400	0.0	626.3	Inf
410	0.0	0.0	
414	0.0	0.0	
430	0.0	0.0	
440	0.0	0.0	
450	0.0	1,168.1	Inf
500	175.4	211.3	120.47
520	1,113.5	5,043.0	452.90
530	0.0	0.0	

NEGEAR	TOWDUR.old	TOWDUR.CAMS	TOWDUR.ratio %
999	0.0		

Effort variables tabulated by STATE

DA and DF

*Table 13: Sum of DA and DF by STATE. Ratio is 100 * CAMS / old*

STATE	DA.old	DF.old	DA.CAMS	DF.CAMS	DA.ratio %	DF.ratio %
0			0.00	0.00		
7	2,497.96	981.20	4,586.89	19,304.48	183.63	1,967.44
8	93.65	955.97	159.25	20,514.81	170.05	2,145.97
9			0.00	0.00		
10	0.00	0.00	213.70	183.61	Inf	Inf
11			80.00	28.62		
13			241.60	95.59		
21	0.00	0.00	8.89	56.89	Inf	Inf
22	136,875.06	575,004.68	221,544.18	3,589,577.25	161.86	624.27
23	1,273.52	911.76	3,202.63	43,077.86	251.48	4,724.69
24	83,156.06	89,647.38	97,961.40	1,851,298.19	117.80	2,065.09
32	9,349.42	25,159.28	9,753.39	430,936.61	104.32	1,712.83
33	16,788.78	13,411.80	22,677.47	161,547.26	135.08	1,204.52
35	9,555.26	7,260.54	12,729.16	59,470.79	133.22	819.10
36	5,037.44	798.49	7,810.26	11,106.24	155.04	1,390.91
39						
42	19,090.29	18,394.05	26,440.00	320,922.70	138.50	1,744.71
43	0.00	0.00	85.32	490.83	Inf	Inf
49	5,174.85	3,179.00	7,584.65	23,546.54	146.57	740.69
55	0.00	0.00	7.63	49.45	Inf	Inf
94	0.00	0.00	3.93	24.86	Inf	Inf
96	0.00	0.00				
99			14.92	41.27		

NTRIPS and NTOWS

*Table 14: Sum of NTRIPS and NTOWS by STATE. Ratio is 100 * CAMS / old*

STATE	NTRIPS.old	NTOWS.old	NTRIPS.CAMS	NTOWS.CAMS	NTRIPS.ratio %	NTOWS.ratio %
0			0.00	0		
7	1,157.56	16,350	2,272.59	23,397	196.33	143.10
8	78.67	2,872	111.75	3,464	142.06	120.61
9			0.00	0		
10	0.00	0	161.00	511	Inf	Inf
11			4.00	130		
13			35.50	710		
21	0.00	0	7.00	0	Inf	
22	133,346.22	76,516	170,900.42	467,547	128.16	611.04
23	844.20	3,721	2,300.00	16,589	272.45	445.82
24	42,805.07	400,265	55,797.84	670,039	130.35	167.40
32	5,124.36	25,295	6,107.62	80,230	119.19	317.18
33	7,488.53	86,396	10,506.70	139,824	140.30	161.84
35	7,112.99	37,632	9,317.43	49,506	130.99	131.55
36	3,327.39	7,389	3,633.37	15,114	109.20	204.55
39				0		
42	10,383.36	91,550	14,824.68	138,256	142.77	151.02
43	0.00	0	58.00		Inf	
49	1,992.51	23,751	3,537.00	37,902	177.51	159.58
55	0.00	0	6.00	0	Inf	
94	0.00	0	3.00	0	Inf	
96	0.00	0		0		
99			9.61	16		

GEARQTY and GEARSIZE

*Table 15: Sum of GEARQTY and GEARSIZE by STATE. Ratio is 100 * CAMS / old*

STATE	GEARQTY.old	GEARSIZE.old	GEARQTY.CAMS	GEARSIZE.CAMS	GEARQTY.ratio %	GEARSIZE.ratio %
0			0	0.0		
7	4,406	173,202	6,508	277,137.5	147.71	160.01
8	25	1,512	3,552	174,622.0	14,208.00	11,549.07
9			0	0.0		
10	0	0	166	242,008.0	Inf	Inf
11			10	385.0		
13			72	3,300.0		
21	0	0	0	0.0		
22	24,831	554,370	162,492	7,427,541.6	654.39	1,339.82
23	7,536	214,317	29,612	467,573.3	392.94	218.17
24	1,078,806	2,926,532	1,556,555	14,094,222.5	144.28	481.60
32	20,438	255,798	93,263	3,365,508.0	456.32	1,315.69
33	118,393	1,821,456	186,032	3,257,771.4	157.13	178.86
35	686,324	1,035,100	846,371	1,754,798.8	123.32	169.53
36	4,783	859,958	10,829	1,469,110.3	226.41	170.84
39				0.0		
42	37,419	1,265,386	119,914	4,375,759.7	320.46	345.80
43	0	0				
49	8,764	1,271,719	16,551	2,236,011.1	188.85	175.83
55	0	0	0	0.0		
94	0	0	0	0.0		
96	0	0	0	0.0		
99			31	376.0		

TOWDUR

*Table 16: Sum of TOWDUR by STATE. Ratio is 100 * CAMS / old*

STATE	TOWDUR.old	TOWDUR.CAMS	TOWDUR.ratio %
0		0.0	
7	12,305.8	37,202.5	302.32
8	46,854.3	55,309.1	118.04
9		0.0	
10	0.0	146.5	Inf
11		21.0	
13		113.4	
21	0.0	0.0	
22	330,383.1	1,514,549.7	458.42
23	25,685.3	56,450.2	219.78
24	685,200.5	2,369,209.2	345.77
32	192,301.4	599,668.9	311.84
33	301,903.1	442,951.0	146.72
35	199,763.7	286,893.0	143.62
36	3,370.2	6,239.9	185.15
39			
42	327,362.7	772,049.3	235.84
43	0.0		
49	53,226.3	76,950.7	144.57
55	0.0	0.0	
94	0.0	0.0	
96	0.0	0.0	
99		13.8	

Effort variables tabulated by AREA

DA and DF

*Table 17: Sum of DA and DF by AREA. Ratio is 100 * CAMS / old*

AREA	DA.old	DF.old	DA.CAMS	DF.CAMS	DA.ratio %	DF.ratio %
0	0.00	0.00	61.27	390.29	Inf	Inf
320						
340	0.00	0.00				
458						
459						
463			6.00	852.17		
464	965.87	1,402.44	686.83	26,670.76	71.11	1,901.74
465	600.60	563.27	442.37	11,350.69	73.66	2,015.14
467	291.66	32.75	4,075.82	9,596.62	1,397.46	29,302.66
469						
510	0.00	0.00				
511	24,913.05	148,922.69	39,370.52	559,678.09	158.03	375.82
512	67,700.54	260,780.23	106,990.71	1,538,467.78	158.04	589.95
513	44,721.76	167,578.51	77,588.28	1,767,649.46	173.49	1,054.82
514	27,927.54	47,032.96	41,050.52	1,204,330.00	146.99	2,560.61
515	12,687.98	24,319.75	4,062.56	75,651.86	32.02	311.07
521	12,908.06	8,912.22	14,757.12	146,722.91	114.32	1,646.31
522	3,419.29	1,645.73	3,120.71	13,768.29	91.27	836.61
525	4,883.97	3,770.82	4,318.48	48,304.12	88.42	1,281.00
526	14,429.60	4,750.69	14,090.52	75,974.53	97.65	1,599.23
533	37.99	7.89	34.43	85.17	90.63	1,079.45
534			29.36	12.89		
537	12,360.22	22,857.78	12,233.85	259,280.48	98.98	1,134.32
538	4,737.85	6,111.99	8,712.08	206,111.26	183.88	3,372.24
539	6,128.85	4,015.52	14,368.85	146,472.92	234.45	3,647.67

AREA	DA.old	DF.old	DA.CAMS	DF.CAMS	DA.ratio %	DF.ratio %
541	26.00	5.06	99.68	144.93	383.38	2,864.20
542			20.93	5.89		
543			29.00	9.58		
551						
552						
561	1,493.52	1,620.00	1,064.32	18,591.16	71.26	1,147.60
562	2,528.50	1,967.02	2,809.77	81,482.62	111.12	4,142.44
611	4,762.80	2,313.10	9,530.73	39,721.05	200.11	1,717.22
612	3,908.45	3,448.45	4,447.58	52,234.42	113.79	1,514.72
613	5,975.49	4,611.14	7,144.19	20,759.93	119.56	450.21
614	994.22	901.13	1,618.27	14,235.75	162.77	1,579.77
615	3,014.27	3,737.91	4,439.25	37,989.05	147.27	1,016.32
616	7,737.90	2,604.28	7,753.80	14,833.95	100.21	569.60
621	5,573.52	6,403.83	8,322.83	98,173.61	149.33	1,533.05
622	7,686.83	2,108.96	8,115.21	15,791.17	105.57	748.77
623	425.32	127.56	554.90	282.60	130.47	221.55
624	55.00	5.05	15.00	3.22	27.27	63.81
625	517.56	616.26	3,400.38	17,032.90	657.00	2,763.92
626	865.60	552.44	969.07	7,093.02	111.95	1,283.94
627	87.64	27.10	84.91	28.35	96.89	104.60
628			20.55	25.02		
629			4.00	6.25		
631	923.52	1,479.40	1,566.39	10,173.63	169.61	687.69
632	323.07	73.35	297.39	601.07	92.05	819.46
633	40.00	4.65	28.00	16.32	70.00	351.03
634						
635	2,050.94	262.57	5,236.27	9,605.74	255.31	3,658.36
636	889.81	60.97	433.08	1,129.10	48.67	1,851.90

AREA	DA.old	DF.old	DA.CAMS	DF.CAMS	DA.ratio %	DF.ratio %
637	23.00	5.06	10.05	16.83	43.70	332.54
638						
639	5.00	1.53				
640			16.00	65.24		
700						
701	69.50	22.34	188.93	212.55	271.84	951.41
702	8.00	1.64	7.38	2.17	92.25	132.52
703			6.99	5.69		
704						
705	0.00	0.00				
707			44.00	9.96		
708	0.00	0.00				
709			15.29	3.02		
712	0.00	0.00	79.50	240.57	Inf	Inf
713	0.00	0.00				
714	0.00	0.00				
717			228.10	85.42		
718	0.00	0.00	52.00	18.54	Inf	Inf
720			34.00	8.25		
721						
722	0.00	0.00				
727			0.00	0.00		
728			0.00	0.00		
730	159.00	31.91				
732	0.00	0.00	165.30	36.22	Inf	Inf
736	0.00	0.00	48.40	147.39	Inf	Inf
740			0.00	0.00		

AREA	DA.old	DF.old	DA.CAMS	DF.CAMS	DA.ratio %	DF.ratio %
744			80.00	28.62		
799	0.00	0.00				

NTRIPS and NTOWS

*Table 18: Sum of NTRIPS and NTOWS by AREA. Ratio is 100 * CAMS / old*

AREA	NTRIPS.old	NTOWS.old	NTRIPS.CAMS	NTOWS.CAMS	NTRIPS.ratio %	NTOWS.ratio %
0	0.00	0	46.97	0	Inf	
320			[redacted]	0		
340	[redacted]	0	[redacted]	[redacted]	[redacted]	[redacted]
458			[redacted]	[redacted]		
459			[redacted]	[redacted]		
463			6.00	210		
464	102.38	3,806	66.48	3,635	64.93	95.51
465	64.29	1,403	45.25	1,697	70.39	120.96
467	276.67	550	2,169.39	453	784.12	82.36
469			[redacted]	[redacted]		
510	0.00	0				
511	24,908.71	10,507	29,172.67	61,891	117.12	589.05
512	64,170.07	43,306	81,024.35	203,152	126.27	469.11
513	42,046.52	36,042	63,733.44	252,581	151.58	700.80
514	26,200.42	42,623	35,228.72	242,740	134.46	569.50
515	6,374.96	22,099	787.09	38,250	12.35	173.08
521	6,567.19	62,331	7,940.55	85,843	120.91	137.72
522	524.94	19,462	500.15	23,099	95.28	118.69
525	578.23	49,352	499.24	52,408	86.34	106.19
526	2,130.65	92,984	2,207.09	102,385	103.59	110.11
533	12.00	71	11.14	79	92.86	111.27
534	[redacted]	[redacted]	13.43	172	[redacted]	[redacted]
537	5,522.62	73,455	4,918.54	90,848	89.06	123.68
538	4,350.78	50,877	6,064.86	76,285	139.40	149.94
539	5,750.97	23,206	11,264.39	55,371	195.87	238.61
541	6.00	[redacted]	78.00	130	1,300.00	[redacted]
542			8.00	47		

AREA	NTRIPS.old	NTOWS.old	NTRIPS.CAMS	NTOWS.CAMS	NTRIPS.ratio %	NTOWS.ratio %
543			4.00	330		
551						
552						
561	160.70	7,607	127.77	7,641	79.51	100.45
562	280.44	19,697	362.48	24,384	129.26	123.80
611	4,654.27	9,081	7,382.06	17,302	158.61	190.53
612	2,716.03	12,793	3,292.23	23,312	121.21	182.22
613	3,528.46	35,801	3,887.27	54,374	110.17	151.88
614	742.86	3,929	1,269.49	6,570	170.89	167.22
615	1,482.16	22,833	1,951.31	33,866	131.65	148.32
616	1,669.18	38,190	1,618.11	46,338	96.94	121.34
621	2,634.34	30,584	4,357.63	50,735	165.42	165.89
622	1,385.06	44,164	1,526.06	48,884	110.18	110.69
623	73.42	1,781	183.97	2,029	250.55	113.92
624	45.00	177	5.00	76	11.11	42.94
625	485.09	1,299	2,566.60	9,049	529.09	696.61
626	262.04	4,271	326.60	7,831	124.64	183.35
627	16.73	308	15.74	297	94.11	96.43
628			4.23	41		
629			3.00	16		
631	872.07	3,246	1,194.75	6,121	137.00	188.57
632	181.98	489	120.96	687	66.47	140.49
633	4.00	161	4.00	151	100.00	93.79
634						
635	1,666.00	1,589	2,872.33	7,007	172.41	440.97
636	889.15	1,398	386.19	2,123	43.43	151.86
637	6.00	85	4.00	39	66.67	45.88
638						
639	6.00	61				

AREA	NTRIPS.old	NTOWS.old	NTRIPS.CAMS	NTOWS.CAMS	NTRIPS.ratio %	NTOWS.ratio %
640			4.00	147		
700	30.00	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
701	86.00	101	48.44	433	56.32	428.71
702	22.00	[redacted]	6.00	[redacted]	27.27	[redacted]
703	4.00	[redacted]	7.00	5	175.00	[redacted]
704			[redacted]	[redacted]		
705	0.00	0				
707	[redacted]	[redacted]	5.00	91	[redacted]	[redacted]
708	0.00	0				
709			16.00	0		
712	3.00	0	32.03	96	1,067.65	Inf
713	0.00	0				
714	0.00	0	[redacted]	[redacted]	[redacted]	[redacted]
717			33.00	627		
718	[redacted]	0	7.00	159	[redacted]	Inf
720			2.00	28		
721			[redacted]	[redacted]		
722	0.00	0	[redacted]	[redacted]	[redacted]	[redacted]
727			0.00	0		
728			0.00	0		
730	162.00	0				
732	0.00	0	119.00	483	Inf	Inf
736	0.00	0	42.00	28	Inf	Inf
740			0.00	0		
744			4.00	130		
799	0.00	0				

GEARQTY and GEARSIZE

*Table 19: Sum of GEARQTY and GEARSIZE by AREA. Ratio is 100 * CAMS / old*

AREA	GEARQTY.old	GEARSIZE.old	GEARQTY.CAMS	GEARSIZE.CAMS	GEARQTY.ratio %	GEARSIZE.ratio %
0	0	0	0	0.0		
320			0	0.0		
340	0	0				
458						
459						
463			119	4,600.0		
464	75	13,925	4,457	152,993.0	5,942.67	1,098.69
465	64	11,755	2,393	79,700.0	3,739.06	678.01
467	44	3,160	54	3,835.0	122.73	121.36
469						
510	0	0				
511	144	14,603	27,601	985,111.0	19,167.36	6,745.95
512	5,454	181,675	58,295	2,761,229.4	1,068.85	1,519.87
513	58,793	519,372	237,669	6,321,610.6	404.25	1,217.16
514	138,892	824,204	380,960	9,189,231.7	274.29	1,114.92
515	8,716	214,424	26,473	570,124.3	303.73	265.89
521	880,274	945,955	968,095	1,730,109.4	109.98	182.90
522	1,142	120,829	4,005	266,407.7	350.70	220.48
525	627	54,587	16,192	521,594.5	2,582.46	955.53
526	68,381	280,025	97,461	788,920.7	142.53	281.73
533	10	605	225	2,825.0	2,250.00	466.94
534			838	2,354.0		
537	403,866	608,862	532,299	2,439,926.2	131.80	400.74
538	12,273	275,989	15,692	417,541.8	127.86	151.29
539	19,884	633,546	48,592	1,862,440.5	244.38	293.97
541	26		1,713	4,792.0	6,588.46	
542			812	326.0		
543			9	845.0		
551						

AREA	GEARQTY.old	GEARSIZE.old	GEARQTY.CAMS	GEARSIZE.CAMS	GEARQTY.ratio %	GEARSIZE.ratio %
552						
561	1,550	33,433	12,731	182,077.0	821.35	544.60
562	765	18,560	15,400	544,767.0	2,013.07	2,935.17
611	8,796	361,355	20,881	672,079.2	237.39	185.99
612	8,200	494,695	20,403	918,075.0	248.82	185.58
613	50,421	805,822	62,816	1,257,098.0	124.58	156.00
614	6,379	253,398	13,719	489,031.0	215.07	192.99
615	14,441	306,751	18,330	549,255.5	126.93	179.06
616	249,514	315,440	317,113	522,822.3	127.09	165.74
621	21,447	762,016	50,256	1,474,251.2	234.33	193.47
622	2,231	228,099	11,278	447,120.7	505.51	196.02
623	15,173	20,854	20,699	26,848.0	136.42	128.74
624	44	6,336	7	634.0	15.91	10.01
625	3,613	283,546	8,627	910,416.0	238.78	321.08
626	2,350	126,015	13,280	207,714.5	565.11	164.83
627	39	5,198	60	7,228.0	153.85	139.05
628			107	1,430.0		
629			27	792.0		
631	3,334	801,780	5,741	1,116,741.0	172.20	139.28
632	559	52,684	3,167	63,965.0	566.55	121.41
633	6	993	13	4,086.0	216.67	411.48
634						
635	2,338	521,109	5,008	946,858.0	214.20	181.70
636	1,600	272,270	2,783	436,488.0	173.94	160.31
637	7	1,430	17	866.0	242.86	60.56
638						
639	6	720				
640			25	1,208.0		
700						
701	54	445	87	4,257.0	161.11	956.63
702	18		30		166.67	
703			95	2,400.0		

AREA	GEARQTY.old	GEARSIZE.old	GEARQTY.CAMS	GEARSIZE.CAMS	GEARQTY.ratio %	GEARSIZE.ratio %
704						
705	0	0				
707			12	537.0		
708	0	0				
709			68	0.0		
712	0	0	12	660.0	Inf	Inf
713	0	0				
714	0	0				
717			70	2,805.0		
718	0	0	16	880.0	Inf	Inf
720			2,875	87.0		
721						
722	0	0				
727			0	0.0		
728			0	0.0		
730	168	0				
732	0	0	141	197,008.0	Inf	Inf
736	0	0	25	45,000.0	Inf	Inf
740			0	0.0		
744			10	385.0		
799	0	0				

TOWDUR

*Table 20: Sum of TOWDUR by AREA. Ratio is 100 * CAMS / old*

AREA	TOWDUR.old	TOWDUR.CAMS	TOWDUR.ratio %
0	0.0	0.0	
320		0.0	
340	0.0		
458			
459			
463		554.0	
464	23,266.7	23,709.6	101.90
465	9,493.2	11,411.1	120.20
467	20.2	80.6	399.01
469			
510	0.0		
511	114,480.7	247,492.1	216.19
512	97,062.2	460,422.1	474.36
513	218,824.2	1,305,275.9	596.50
514	255,516.9	1,634,517.6	639.69
515	42,802.6	64,785.8	151.36
521	75,183.4	213,312.2	283.72
522	12,398.3	15,386.8	124.10
525	51,100.3	57,478.4	112.48
526	54,374.4	73,726.1	135.59
533	170.1	641.2	376.95
534		86.6	
537	382,188.8	515,919.8	134.99
538	72,796.4	114,417.7	157.17
539	55,855.7	431,659.3	772.81

AREA	TOWDUR.old	TOWDUR.CAMS	TOWDUR.ratio %
541	125.3	3,405.2	2,717.64
542		16.7	
543		5.7	
551			
552			
561	25,536.6	26,874.4	105.24
562	38,218.7	50,449.3	132.00
611	50,416.3	113,510.0	225.15
612	68,751.9	143,564.0	208.81
613	130,650.6	159,453.7	122.05
614	30,804.2	55,609.6	180.53
615	74,907.0	81,880.1	109.31
616	24,251.8	26,665.5	109.95
621	181,851.5	255,330.5	140.41
622	25,450.8	28,580.7	112.30
623	579.5	772.0	133.22
624	27.8	6.2	22.30
625	13,261.6	26,645.9	200.93
626	9,255.4	23,150.3	250.13
627	106.1	159.8	150.61
628		34.2	
629		98.0	
631	34,253.2	42,977.5	125.47
632	1,497.0	1,678.2	112.10
633	13.5	223.7	1,657.04
634			
635	1,709.2	3,677.3	215.15

AREA	TOWDUR.old	TOWDUR.CAMS	TOWDUR.ratio %
636	658.7	1,241.1	188.42
637	27.7	5.2	18.77
638			
639	4.5		
640		74.6	
700			
701	134.0	110.3	82.31
702	34.0	36.0	105.88
703		38.0	
704			
705	0.0		
707		12.5	
708	0.0		
709		191.5	
712	0.0	21.0	Inf
713	0.0		
714	0.0		
717		103.4	
718	0.0	26.5	Inf
720		33.0	
721			
722	0.0		
727		0.0	
728		0.0	
730	271.0		
732	0.0	121.5	Inf

AREA	TOWDUR.old	TOWDUR.CAMS	TOWDUR.ratio %
736	0.0	25.0	Inf
740		0.0	
744		21.0	
799	0.0		

Appendix 5. Comparison of effort per trip distributions

Effort Distribution Comparisons by Gear

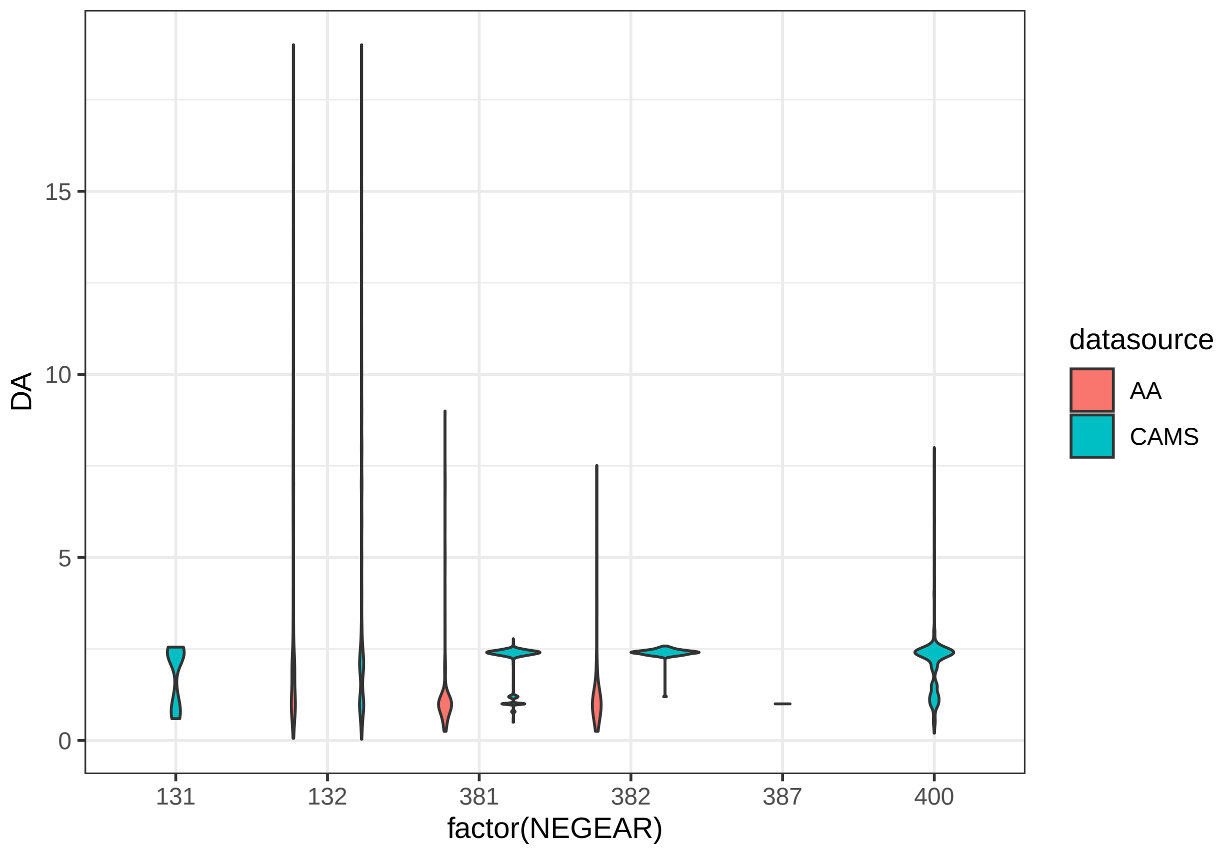
Chris Legault

2022-02-15

Grab the effort data by trip for a group of gears and use violin plots to compare distributions between AA and CAMS.

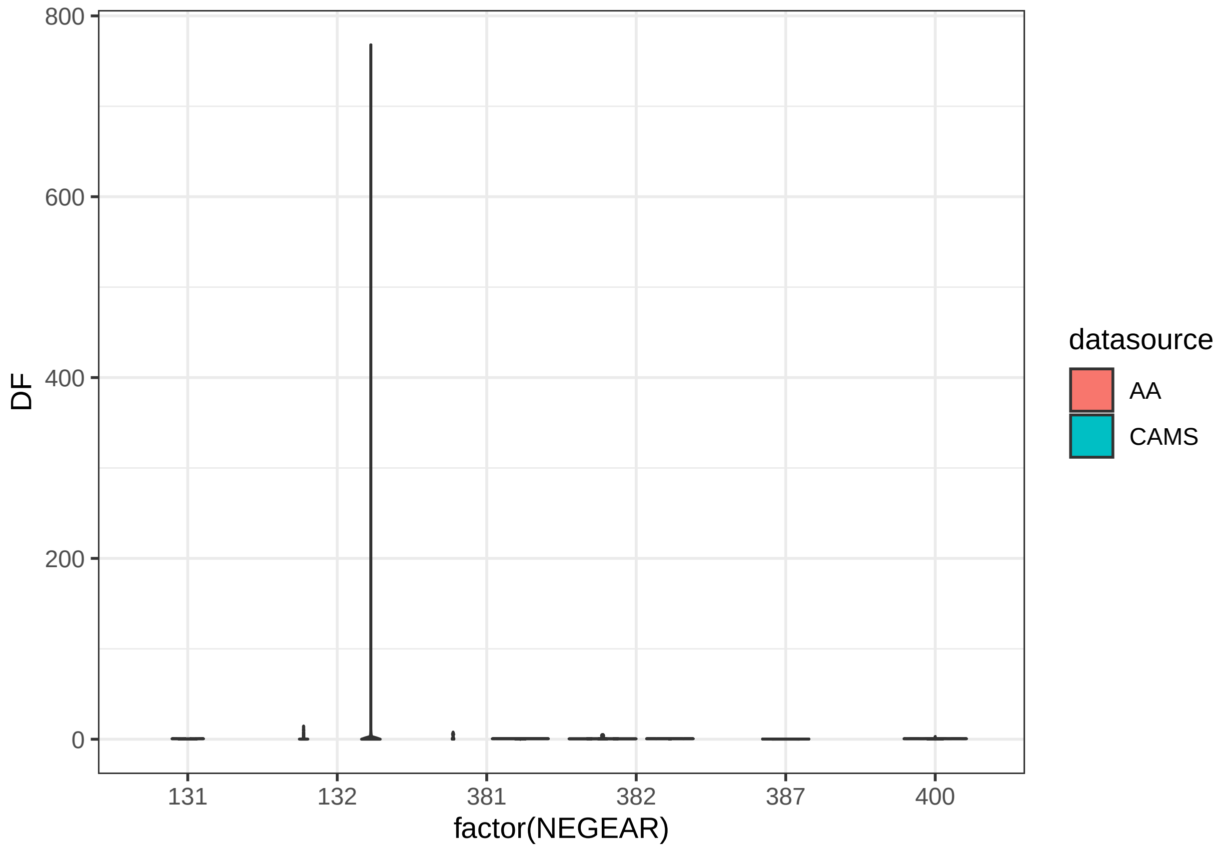
```
myq3 <- "select negear, DA, DF, ntrips
from CFDBS.CFDETT2019AA
where negear in ('131', '132', '381', '382', '387', '400')"
aadredge <- sqlQuery(DB_SOLE_Connection, myq3)

myq4 <- "select negear, DA, DF, ntrips
from CAMS_GARFO.CAMS_CFDETT2019AA
where negear in ('131', '132', '381', '382', '387', '400')"
camsdredge <- sqlQuery(DB_NOVA_Connection, myq4)

aadredge <- aadredge %>%
  mutate(datasource = "AA")
camsdredge <- camsdredge %>%
  mutate(datasource = "CAMS")

mydredge <- rbind(aadredge, camsdredge)

ggplot(mydredge, aes(x=factor(NEGEAR), y=DA, fill=datasource)) +
  geom_violin() +
  theme_bw()
```

```
## Warning: Removed 43706 rows containing non-finite values (stat_ydensity).
```




```
ggplot(mydredge, aes(x=factor(NEGEAR), y=DF, fill=datasource)) +
  geom_violin() +
  theme_bw()
```

```
## Warning: Removed 43706 rows containing non-finite values (stat_ydensity).
```

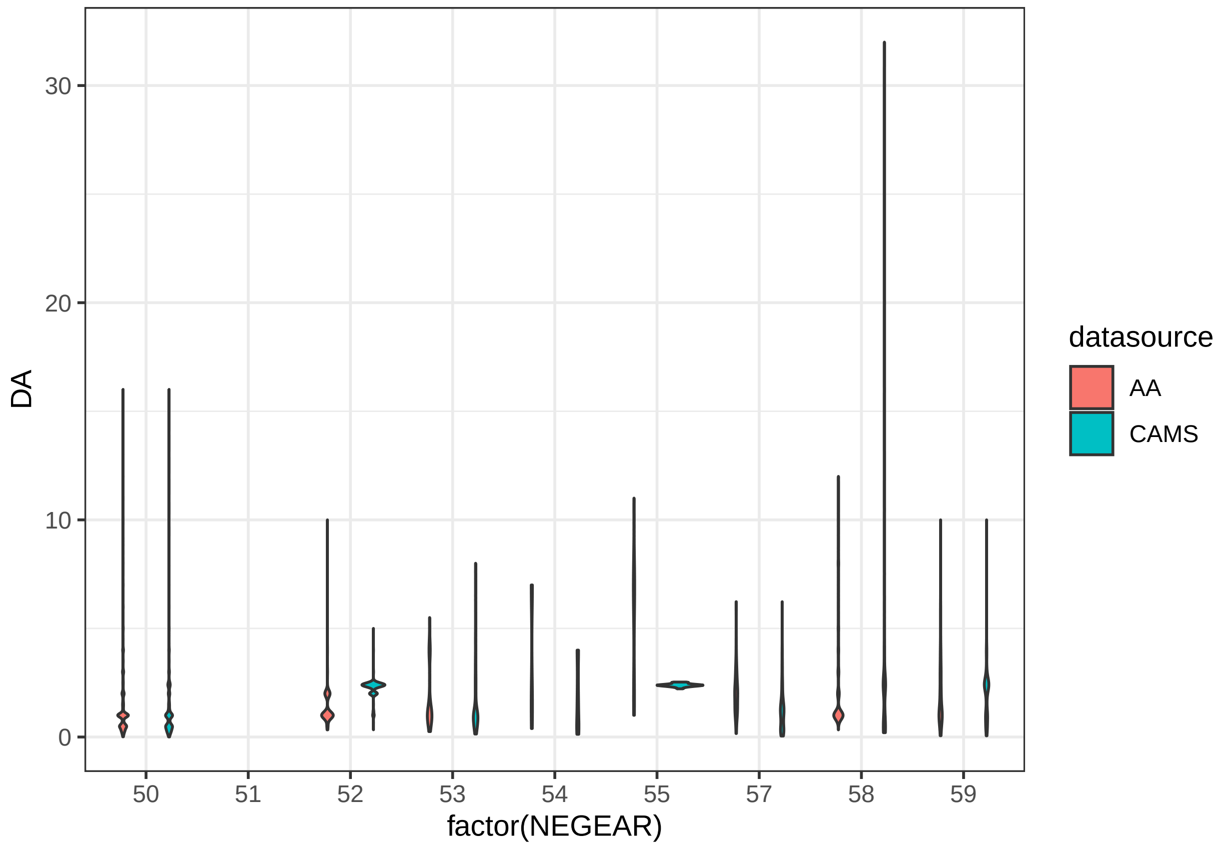


Dredge gears originally had some negative values for DF in CAMS data, but since fixed. The DA distributions look good for scallop dredge (NEGEAR=132), but appear a little odd for other dredge and clam dredge (NEGEARS=381 and 382, respectively) with CAMS having most trips around 2.5 days while AA has most trips around 1 day. The surfclam/ocean quohog dredge (NEGEAR=400) appears only in CAMS data because it comes from the clam logbooks, which do not enter the AA process. The DF distribution for scallop dredge in CAMS has a much larger range than AA. This may warrant future attention. The large values for scallop dredge make comparisons of DF for the other dredge gears difficult.

```
myq5 <- "select negear, DA, DF, ntrips
from CFDBS.CFDETT2019AA
where negear in ('050', '051','052','053','054','055','057','058','059')"
aatrawl <- sqlQuery(DB_SOLE_Connection, myq5)

myq6 <- "select negear, DA, DF, ntrips
from CAMS_GARFO.CAMS_CFDETT2019AA
where negear in ('050', '051','052','053','054','055','057','058','059')"
camstrawl <- sqlQuery(DB_NOVA_Connection, myq6)

aatrawl <- aatrawl %>%
  mutate(datasource = "AA")
camstrawl <- camstrawl %>%
  mutate(datasource = "CAMS")

mytrawl <- rbind(aatrawl, camstrawl)

ggplot(mytrawl, aes(x=factor(NEGEAR), y=DA, fill=datasource)) +
  geom_violin() +
```

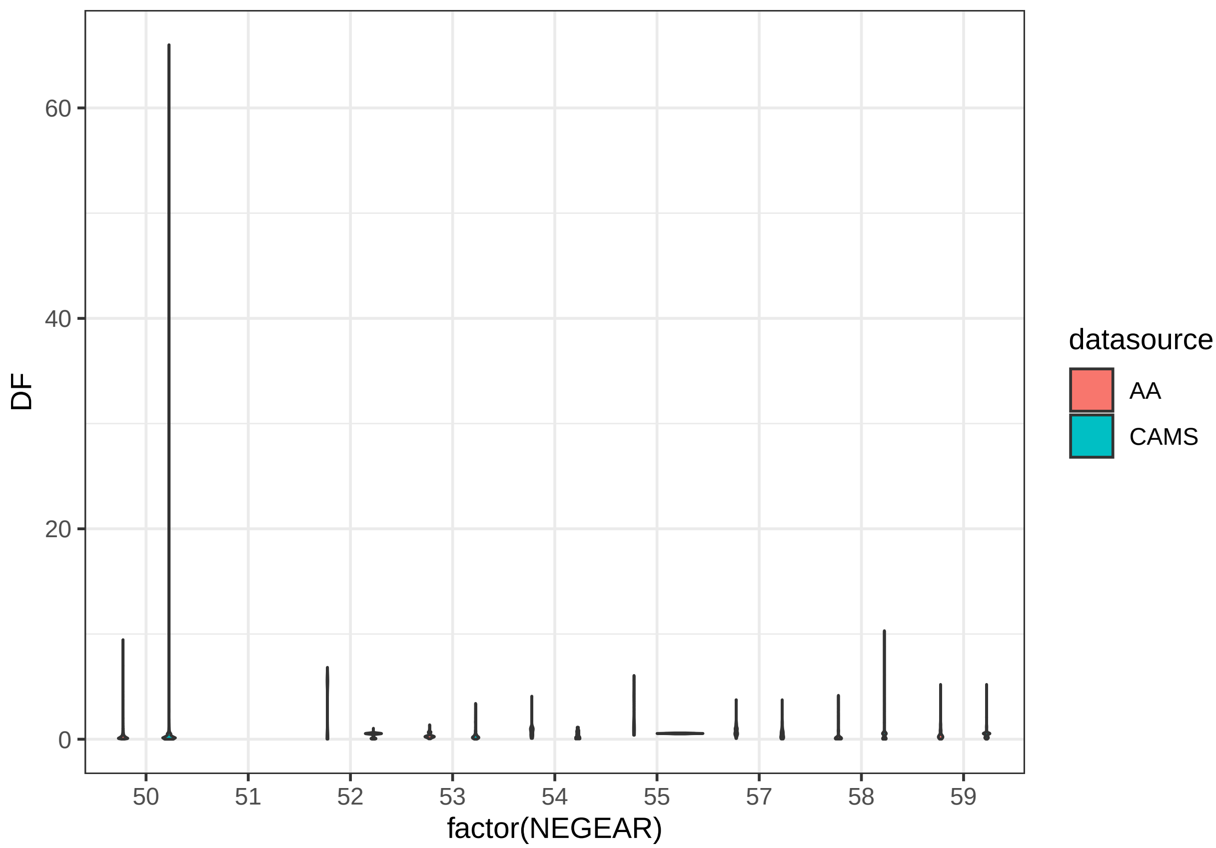
```
  theme_bw()
```

```
## Warning: Removed 13297 rows containing non-finite values (stat_ydensity).
```




```
ggplot(mytrawl, aes(x=factor(NEGEAR), y=DF, fill=datasource)) +
  geom_violin() +
  theme_bw()
```

```
## Warning: Removed 13310 rows containing non-finite values (stat_ydensity).
```



Trawl gears originally had some negative DF in CAMS, but now fixed. The most common trawl gear (50) has quite similar distributions of DA between CAMS and AA. The other trawl gear DA distributions also look pretty good, with some possible minor differences in modes for scallop trawl (52) and lobster trawl (55) and an extended range for shrimp trawl (58) in CAMS compared to AA. The DF distibutions are hard to compare due to a much larger range of values for CAMS in the common trawl gear (50). This may deserve some future examination.

Finally, check CAMS for any negative DA, DF, or NTRIPS.

```
myq8 <- "select CAMSID, negear, DA, DF, ntrips
from CAMS_GARFO.CAMS_CFDETT2019AA
where DA < 0 or DF < 0 or NTRIPS < 0"
camsnegs <- sqlQuery(DB_NOVA_Connection, myq8)

kable(camsnegs)
```

CAMSID	NEGEAR	DA	DF	NTRIPS

No negative effort values in CAMS.

Appendix 6. Comparison of imputation

Comparison of AA and CAMS imputed landings for 8 species with multi-stock components. (S.E. Wigley)
Jan 21, 2022
Feb 2-3, 2022 re-run to pick up CAMS methods changes for Level B, and other changes.
Feb 16, 2022 re-run to pick up CAMS methods changes made on Feb 6th and Feb 14th.

I. Background on AREA imputation in CFDBS.CFDETS2019AA@SOLE (AA)

Clipped from Center's Data Dictionary

Column Name	Description
ALEVEL	The level at which the area was allocated to this unit of dealer landings. A = a Dealer trip matched a VTR trip; B = a Dealer trip matched a group of VTR trips stratified by permit, month, gear group, and species group; C = Dealer trip matched a group of VTR trips stratified by ton class, port group, gear group, species group, calendar quarter and year; D = Dealer trip matched a group of VTR trips stratified by port group; X = Dealer trip enter allocation but did not find a match; and NULL = Dealer trip did not enter allocation.
PROB	The probability of the trip occurring in the area associated with the allocated landings determined at ALEVEL in (B,C,D). Landings with ALEVEL=A or landings that have not been allocated (ALEVEL is null) have PROB=0.000.

Table 1. Summary of CFDETS2019AA (AA) as of 2/3/2022; AREA_000 is number of records with area = 000.

DSET	ALEVEL	AREA_000	REC_CNT	TRIP_CNT	SPPLNDMT	SPPLIVMT	SPPVALUE
AA	A	0	276,030	46,441	159,272	367,449	860,739,947
AA	B	0	8,364	3,696	2,860	3,169	14,118,720
AA	C	0	184,137	120,222	33,933	35,199	295,160,438
AA	D	0	68,931	43,406	12,837	18,046	100,794,604
AA	NULL	450,535	1,050,669	27,278	354,607	910,413	1,309,615,128

NOTE: Some STATE data has AREA > 000, but not all.

II. Background on Area Imputation in CAMS_GARFO.CAMS_CFDETS2019AA@NOVA (CAMS)

Clipped from CAMS Documentation Section 9 (dated 2021-12-17), subsection 9.6 Data Dictionary
Updated Feb 1, 2022

Data Element	Description
AREA_SOURCE	Groundfish trips use the VTR-reported **AREA** and other trips with VTRs use the calculated area **CAREA**. SOURCE = '11' have areas reported in CFDERS from the ACCSP warehouse noted by AREA_SOURCE **WHSE**. Trips with no valid permits that day or only lobster permits and no matched VTR are assigned the area adjacent to the PORT and is denoted as AREA_SOURCE **PORT**. Other missing or invalid areas are **IMPUTED**. *[SEW added **bold** for clarity; this nor the CAMS documentation describes '**DLR**'…believed to be permit = 000000 and others?* *WHSE ACCSP Warehouse for source = 11 menhaden data assigned stat area 625 (no VTR reporting requirements); area and gear taken from CFDERS* *PORT – this is blend of trips (some with and without VTR reporting requirements)* *DLR -- Source = '08'; area and gear taken from CFDERS]*
AREA_IMP_METHOD	Method or level of area imputation: **YEAR-QUARTER-PERMIT (?) = B**; (not described in MAPS News or CAMS documentation) YEAR-QUARTER-PORT_GRP-MAIN_SPP_GRP = C; YEAR-PORT_GRP = **D**; YEAR-STATE-QUARTER = **E**. *[SEW added **bold** for clarity;* ***NULL** isn't described here, but CAMS documentation says NULL is used for no imputation. This implies a mix of trips that have NULL: subtrips with area > 000 need no imputation AND subtrips with area = 000 and have area imputed/determined.* *See Table below PORT is an example of blend of AREA = 000 and AREA != 000* *IMPUTE NULL represents Federal data that didn't find a match?(?); all recs have area = 000]*
AREA_PROP	If area imputed by stratification group (B, C, D, E), the proportion of subtrips fished in the imputed area across subtrips at that stratification level from VTR reporting area.

Table 2. Summary of CAMS_CFDETS2019AA (CAMS) as of 2/16/2022; AREA_000 is number of records with area = 000.

DSET	AREA_ SOURCE	AREA_IMP_ METHOD	AREA_ 000	REC_CNT	TRIP_ CNT	SPPLND MT	SPPLIV MT	SPP VALUE
CAMS	AREA	NULL	0	127,976	6,495	27,664	34,713	65,923,022
CAMS	CAREA	NULL	0	255,672	62,627	149,107	357,326	869,231,578
CAMS	DLR	NULL	0	3,252	2,965	26,170	170,828	49,322,528
CAMS	IMPUTE	B	0	645	273	124	145	510,295
CAMS	IMPUTE	C	0	13,144	6,849	1,818	1,993	16,542,384
CAMS	IMPUTE	D	0	14,643	5,846	7,715	10,629	17,603,466
CAMS	IMPUTE	E	0	853	426	178	288	1,200,744
CAMS	PORT	NULL	113,162	1,731,214	955,170	171,535	234,870	1,224,384,918
CAMS	WHSE	NULL	0	26	8	163,269	163,269	28,635,740

III. Crosswalk 1 (revised 2/16/22) of meta data variables

Table 3. Summary of imputation meta data for AA (ALEVEL), CAMS (AREA_SOURCE and AREA_IMP_METHOD), and 3 newly created meta data variables for bridging data sets (LEVEL, BIN, and AREA_BIN).

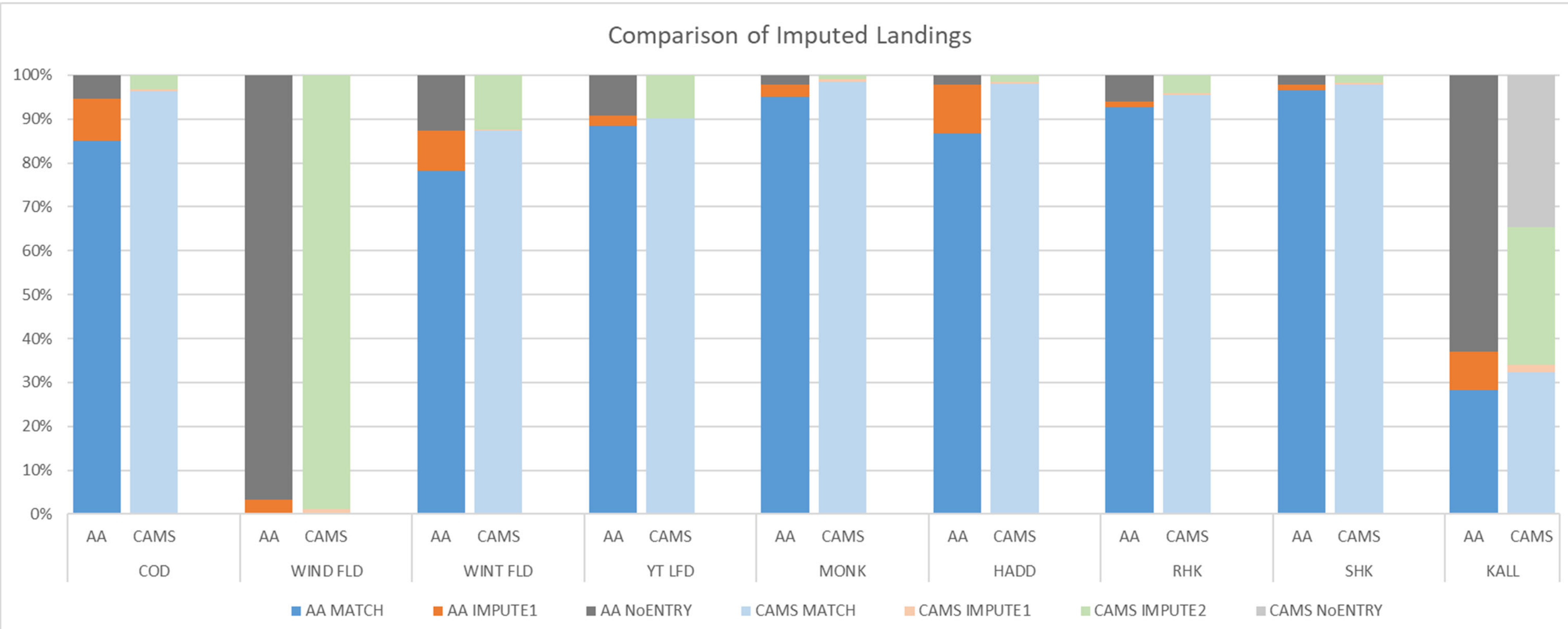
AA ALEVEL	CAMS AREA_SOURCE	CAMS AREA_IMP_METHOD	LEVEL	BIN	AREA_BIN
A	AREA, CAREA	NULL	A 1:1 match	MATCHED	AREA !=000
B, C, D	IMPUTE	B, C, D, E	B, C, D, E,	IMPUTE1	AREA!=000
	PORT	NULL	P no associated uncertainty with DLR PORT method	IMPUTE2	AREA!=000
	WHSE	NULL	"NON"	NoEntry	AREA!=000
Null	DLR	NULL	"NON"	NoEntry	AREA=000 AREA!=000

IV. AA and CAMS Comparisons (high level; revised 2/16/2022)

Table 4. Percentage of landings (landed mt) for 8 multi-stock species and KALL (species weight of all species) by BIN from CFDETS2019AA (AA) and CAMS_CFDETS2019AA (CAMS). BINs are: MATCHED (LEVEL A), IMPUTE1 (LEVELS B, C, D, E; with uncertainty), IMPUTE2 (LEVEL P; without uncertainty), and NoENTRY (data does not enter imputation; mix of area = 000 and area !=000).

	MATCHED		IMPUTE1		IMPUTE2		NoEntry			
SPECIES	AA	CAMS	AA	CAMS	AA	CAMS	AA	CAMS	TOTAL AA	TOTAL CAMS
COD	84.98	96.35	9.6	0.47		3.18	5.42		100.0	100.0
WIND FLD	0.37	0.33	2.85	0.86		98.8	96.77		100.0	100.0
WINT FLD	78.12	87.33	9.26	0.2		12.46	12.63		100.0	100.0
YT FLD	88.54	90.12	2.32	0.09		9.79	9.15		100.0	100.0
MONK	95.01	98.46	2.86	0.77		0.78	2.13		100.0	100.0
HADD	86.83	98.01	11.01	0.46		1.53	2.16		100.0	100.0
RED HAKE	92.8	95.4	1.25	0.61		3.99	5.95		100.0	100.0
SILVER HAKE	96.65	97.94	1.25	0.36		1.7	2.11		100.0	100.0
KALL	**28.26**	**32.28**	**8.81**	**1.79**		**31.33**	**62.93**	**34.6**	**100.0**	**100.0**
Colors used in Figure 1										

Figure 1. Percentage of landings (landed mt) for 8 multi-stock species and KALL (species weight of all species) by BIN from CFDETS2019AA (AA) and CAMS_CFDETS2019AA (CAMS). Revised 2/16/2022.



V. Summary Points (revised 2/16/2022)

- For both KALL and the multi-stock species, CAMS had higher percentages of MATCHED (the blues) landings than AA, with the exception of windowpane flounder which had similar, negligible percentage of MATCHED landings in both data sets.
- For KALL, AA and CAMS percentages of MATCHED (the blues) and IMPUTE1 (the oranges) landings were generally similar. Both AA and CAMS have landings that do not enter the imputation processes (NoEntry; the grays; may include a mix of area = 000 and area != 000 landings); however, on the positive side, CAMS had imputed (IMPUTE2, green; without uncertainty) nearly half of the AA landings that do not enter the imputation process. The uncertainty associated with stock area landings will be underestimated because the "PORT/adjacent area" method does not capture uncertainty.
- For 7 of 8 multi-stock species, AA and CAMS had relatively high percentages of MATCHED landings and relatively small percentages of IMPUTE1 landings. For these species, CAMS had imputed (green; without uncertainty) landings and no NoEntry landings (all landings have area !=000). AA had generally small percentages of NoEntry landings.
- Windowpane flounder is an exception with only a very minor percentage of MATCHED or IMPUTE1 landings. This species had a high percentage of AA landings that did not enter the imputation process while CAMS had a high percentage of IMPUTE2 landings.
- CAMS still has a very minor amount of landings with area = 000 (see detail summary below). Detailed summary of landings and value, by LEVEL, BIN, and AREA_BIN are available below.
- Caveats:
  - Windowpane fld is a federal no-possession species [see tables below]
  - Variables used in 1:1 matching differ between AA and CAMS processes.
  - The design and goals of AA and CAMS differ: AA imputation process was designed to impute landings from vessels with VTR reporting requirements, thus do not include State data in the imputation. Additionally, some gear types associated with data collection system with separate logbooks (i.e. clam logbook, HMS logbook) or unknown gear, etc) were not included in the imputation process. CAMS imputation process is designed to support a "single set of books". Area, gear, and mesh are needed for a "single set of books" for individual stock landings as well as for KALL used in discard estimation.

VI. Detailed Comparison of Landings and Value for 8 species with multi-stock components

Obs	YEAR	SPECIES_ ITIS	level	area_bin	comname	spplndmt	SPPVALUE	spplndmt_ perc	sppvalue_ perc
1	2019	164499	A	>000	GOOSEFISH	5113.37	13913419	95.01	94.78
2	2019	164499	B	>000	GOOSEFISH	65.07	195989	1.21	1.34
3	2019	164499	C	>000	GOOSEFISH	77.75	229180	1.44	1.56
4	2019	164499	D	>000	GOOSEFISH	11.50	35437	0.21	0.24
5	2019	164499	NON	=000	GOOSEFISH	97.20	251355	1.81	1.71
6	2019	164499	NON	>000	GOOSEFISH	17.07	54998	0.32	0.37
7	2019	164712	A	>000	COD,ATLANTIC	739.20	4280063	84.98	83.75
8	2019	164712	B	>000	COD,ATLANTIC	33.90	202824	3.90	3.97
9	2019	164712	C	>000	COD,ATLANTIC	42.73	288833	4.91	5.65
10	2019	164712	D	>000	COD,ATLANTIC	6.88	47565	0.79	0.93
11	2019	164712	NON	=000	COD,ATLANTIC	46.34	286191	5.33	5.60
12	2019	164712	NON	>000	COD,ATLANTIC	0.79	4771	0.09	0.09
13	2019	164730	A	>000	HAKE,ATLANTIC,RED	415.79	392934	92.80	93.98
14	2019	164730	B	>000	HAKE,ATLANTIC,RED	1.67	2526	0.37	0.60
15	2019	164730	C	>000	HAKE,ATLANTIC,RED	3.29	2651	0.73	0.63
16	2019	164730	D	>000	HAKE,ATLANTIC,RED	0.67	731	0.15	0.17
17	2019	164730	NON	=000	HAKE,ATLANTIC,RED	18.46	12414	4.12	2.97
18	2019	164730	NON	>000	HAKE,ATLANTIC,RED	8.19	6833	1.83	1.63
19	2019	164744	A	>000	HADDOCK	6639.71	16391160	86.83	86.53
20	2019	164744	B	>000	HADDOCK	387.89	1018318	5.07	5.38
21	2019	164744	C	>000	HADDOCK	438.95	1077164	5.74	5.69
22	2019	164744	D	>000	HADDOCK	15.16	44891	0.20	0.24
23	2019	164744	NON	=000	HADDOCK	161.79	404387	2.12	2.13
24	2019	164744	NON	>000	HADDOCK	2.95	7157	0.04	0.04
25	2019	164791	A	>000	HAKE,SILVER (WHITING)	5052.33	8414617	96.65	97.11
26	2019	164791	B	>000	HAKE,SILVER (WHITING)	30.53	35128	0.58	0.41
27	2019	164791	C	>000	HAKE,SILVER (WHITING)	24.42	30365	0.47	0.35
28	2019	164791	D	>000	HAKE,SILVER (WHITING)	10.36	11681	0.20	0.13
29	2019	164791	NON	=000	HAKE,SILVER (WHITING)	64.65	86256	1.24	1.00
30	2019	164791	NON	>000	HAKE,SILVER (WHITING)	45.30	87329	0.87	1.01
31	2019	172746	A	>000	FLOUNDER,SAND DAB (WINDOWPANE)	0.04	161	0.37	1.39
32	2019	172746	C	>000	FLOUNDER,SAND DAB (WINDOWPANE)	0.28	226	2.85	1.95
33	2019	172746	NON	=000	FLOUNDER,SAND DAB (WINDOWPANE)	5.98	7453	61.28	64.22
34	2019	172746	NON	>000	FLOUNDER,SAND DAB (WINDOWPANE)	3.46	3765	35.49	32.44
35	2019	172905	A	>000	FLOUNDER,WINTER	456.55	2855334	78.12	79.06
36	2019	172905	B	>000	FLOUNDER,WINTER	12.14	93035	2.08	2.58
37	2019	172905	C	>000	FLOUNDER,WINTER	39.60	208365	6.78	5.77
38	2019	172905	D	>000	FLOUNDER,WINTER	2.32	13597	0.40	0.38
39	2019	172905	NON	=000	FLOUNDER,WINTER	70.41	416431	12.05	11.53
40	2019	172905	NON	>000	FLOUNDER,WINTER	3.38	24820	0.58	0.69
41	2019	172909	A	>000	FLOUNDER,YELLOWTAIL	364.13	815745	88.54	87.11
42	2019	172909	B	>000	FLOUNDER,YELLOWTAIL	2.59	5788	0.63	0.62
43	2019	172909	C	>000	FLOUNDER,YELLOWTAIL	6.01	24296	1.46	2.59
44	2019	172909	D	>000	FLOUNDER,YELLOWTAIL	0.93	2380	0.23	0.25
45	2019	172909	NON	=000	FLOUNDER,YELLOWTAIL	36.63	84332	8.91	9.01
46	2019	172909	NON	>000	FLOUNDER,YELLOWTAIL	0.98	3917	0.24	0.42

Obs	YEAR	SPECIES_ ITIS	level	area_bin	spplndmt	SPPVALUE	spplndmt_ perc	sppvalue_ perc
1	2019	164499	A	>000	5298.84	14444662	98.46	98.40
2	2019	164499	B	>000	6.73	16704	0.13	0.11
3	2019	164499	C	>000	11.03	38417	0.21	0.26
4	2019	164499	D	>000	23.23	70243	0.43	0.48
5	2019	164499	P	=000	6.70	18549	0.12	0.13
6	2019	164499	P	>000	35.26	90668	0.66	0.62
7	2019	164712	A	>000	837.91	4916305	96.35	96.22
8	2019	164712	B	>000	0.41	2377	0.05	0.05
9	2019	164712	C	>000	1.94	12165	0.22	0.24
10	2019	164712	D	>000	1.75	12412	0.20	0.24
11	2019	164712	P	=000	0.01	71	0.00	0.00
12	2019	164712	P	>000	27.62	165858	3.18	3.25
13	2019	164730	A	>000	427.96	404295	95.40	96.60
14	2019	164730	C	>000	1.31	1489	0.29	0.36
15	2019	164730	D	>000	1.46	1435	0.32	0.34
16	2019	164730	P	=000	0.30	439	0.07	0.10
17	2019	164730	P	>000	17.57	10859	3.92	2.59
18	2019	164744	A	>000	7493.91	18562658	98.01	98.00
19	2019	164744	B	>000	6.35	12756	0.08	0.07
20	2019	164744	C	>000	18.86	48298	0.25	0.25
21	2019	164744	D	>000	9.84	24991	0.13	0.13
22	2019	164744	P	=000	0.00	19	0.00	0.00
23	2019	164744	P	>000	116.92	292691	1.53	1.55
24	2019	164791	A	>000	5126.52	8532038	97.94	98.35
25	2019	164791	B	>000	0.06	83	0.00	0.00
26	2019	164791	C	>000	8.63	13664	0.16	0.16
27	2019	164791	D	>000	10.37	19641	0.20	0.23
28	2019	164791	P	=000	3.14	4882	0.06	0.06
29	2019	164791	P	>000	85.68	104697	1.64	1.21
30	2019	172746	A	>000	0.04	161	0.33	1.27
31	2019	172746	C	>000	0.06	101	0.60	0.79
32	2019	172746	D	>000	0.03	48	0.26	0.38
33	2019	172746	P	=000	0.09	87	0.82	0.68
34	2019	172746	P	>000	10.52	12328	97.98	96.88
35	2019	172905	A	>000	510.20	3175397	87.33	87.95
36	2019	172905	B	>000	0.20	876	0.03	0.02
37	2019	172905	C	>000	0.53	3417	0.09	0.09
38	2019	172905	D	>000	0.49	2828	0.08	0.08
39	2019	172905	P	=000	0.54	3047	0.09	0.08
40	2019	172905	P	>000	72.26	425060	12.37	11.77
41	2019	172909	A	>000	370.62	835332	90.12	89.20
42	2019	172909	B	>000	0.33	640	0.08	0.07
43	2019	172909	C	>000	0.02	41	0.00	0.00
44	2019	172909	D	>000	0.03	107	0.01	0.01
45	2019	172909	P	=000	0.01	69	0.00	0.01
46	2019	172909	P	>000	40.25	100251	9.79	10.71

2019 AA and CAMS LANDINGS (spplndlb, mt) and percentage BY LEVEL and AREA_BIN

Obs	SPECIES_ ITIS	comname	level	area_bin	AA_spplndmt	CAMS_ spplndmt	AA_spplndmt_ perc	CAMS_ spplndmt_ perc
1	164499	GOOSEFISH	A	>000	5113.37	5298.84	95.01	98.46
2	164499	GOOSEFISH	B	>000	65.07	6.73	1.21	0.13
3	164499	GOOSEFISH	C	>000	77.75	11.03	1.44	0.21
4	164499	GOOSEFISH	D	>000	11.50	23.23	0.21	0.43
5	164499	GOOSEFISH	NON	=000	97.20	.	1.81	.
6	164499	GOOSEFISH	NON	>000	17.07	.	0.32	.
7	164499	GOOSEFISH	P	=000	.	6.70	.	0.12
8	164499	GOOSEFISH	P	>000	.	35.26	.	0.66
9	164712	COD,ATLANTIC	A	>000	739.20	837.91	84.98	96.35
10	164712	COD,ATLANTIC	B	>000	33.90	0.41	3.90	0.05
11	164712	COD,ATLANTIC	C	>000	42.73	1.94	4.91	0.22
12	164712	COD,ATLANTIC	D	>000	6.88	1.75	0.79	0.20
13	164712	COD,ATLANTIC	NON	=000	46.34	.	5.33	.
14	164712	COD,ATLANTIC	NON	>000	0.79	.	0.09	.
15	164712	COD,ATLANTIC	P	=000	.	0.01	.	0.00
16	164712	COD,ATLANTIC	P	>000	.	27.62	.	3.18
17	164730	HAKE,ATLANTIC,RED	A	>000	415.79	427.96	92.80	95.40
18	164730	HAKE,ATLANTIC,RED	B	>000	1.67	.	0.37	.
19	164730	HAKE,ATLANTIC,RED	C	>000	3.29	1.31	0.73	0.29
20	164730	HAKE,ATLANTIC,RED	D	>000	0.67	1.46	0.15	0.32
21	164730	HAKE,ATLANTIC,RED	NON	=000	18.46	.	4.12	.
22	164730	HAKE,ATLANTIC,RED	NON	>000	8.19	.	1.83	.
23	164730	HAKE,ATLANTIC,RED	P	=000	.	0.30	.	0.07
24	164730	HAKE,ATLANTIC,RED	P	>000	.	17.57	.	3.92
25	164744	HADDOCK	A	>000	6639.71	7493.91	86.83	98.01
26	164744	HADDOCK	B	>000	387.89	6.35	5.07	0.08
27	164744	HADDOCK	C	>000	438.95	18.86	5.74	0.25
28	164744	HADDOCK	D	>000	15.16	9.84	0.20	0.13
29	164744	HADDOCK	NON	=000	161.79	.	2.12	.
30	164744	HADDOCK	NON	>000	2.95	.	0.04	.
31	164744	HADDOCK	P	=000	.	0.00	.	0.00
32	164744	HADDOCK	P	>000	.	116.92	.	1.53
33	164791	HAKE,SILVER (WHITING)	A	>000	5052.33	5126.52	96.65	97.94
34	164791	HAKE,SILVER (WHITING)	B	>000	30.53	0.06	0.58	0.00
35	164791	HAKE,SILVER (WHITING)	C	>000	24.42	8.63	0.47	0.16
36	164791	HAKE,SILVER (WHITING)	D	>000	10.36	10.37	0.20	0.20
37	164791	HAKE,SILVER (WHITING)	NON	=000	64.65	.	1.24	.
38	164791	HAKE,SILVER (WHITING)	NON	>000	45.30	.	0.87	.
39	164791	HAKE,SILVER (WHITING)	P	=000	.	3.14	.	0.06
40	164791	HAKE,SILVER (WHITING)	P	>000	.	85.68	.	1.64
41	172746	FLOUNDER,SAND DAB (WINDOWPANE)	A	>000	0.04	0.04	0.37	0.33
42	172746	FLOUNDER,SAND DAB (WINDOWPANE)	C	>000	0.28	0.06	2.85	0.60
43	172746	FLOUNDER,SAND DAB (WINDOWPANE)	D	>000	.	0.03	.	0.26
44	172746	FLOUNDER,SAND DAB (WINDOWPANE)	NON	=000	5.98	.	61.28	.
45	172746	FLOUNDER,SAND DAB (WINDOWPANE)	NON	>000	3.46	.	35.49	.
46	172746	FLOUNDER,SAND DAB (WINDOWPANE)	P	=000	.	0.09	.	0.82
47	172746	FLOUNDER,SAND DAB (WINDOWPANE)	P	>000	.	10.52	.	97.98
48	172905	FLOUNDER,WINTER	A	>000	456.55	510.20	78.12	87.33
49	172905	FLOUNDER,WINTER	B	>000	12.14	0.20	2.08	0.03

50	172905	FLOUNDER,WINTER	C	>000	39.60	0.53	6.78	0.09
51	172905	FLOUNDER,WINTER	D	>000	2.32	0.49	0.40	0.08
52	172905	FLOUNDER,WINTER	NON	=000	70.41	.	12.05	.
53	172905	FLOUNDER,WINTER	NON	>000	3.38	.	0.58	.
54	172905	FLOUNDER,WINTER	P	=000	.	0.54	.	0.09
55	172905	FLOUNDER,WINTER	P	>000	.	72.26	.	12.37
56	172909	FLOUNDER,YELLOWTAIL	A	>000	364.13	370.62	88.54	90.12
57	172909	FLOUNDER,YELLOWTAIL	B	>000	2.59	0.33	0.63	0.08
58	172909	FLOUNDER,YELLOWTAIL	C	>000	6.01	0.02	1.46	0.00
59	172909	FLOUNDER,YELLOWTAIL	D	>000	0.93	0.03	0.23	0.01
60	172909	FLOUNDER,YELLOWTAIL	NON	=000	36.63	.	8.91	.
61	172909	FLOUNDER,YELLOWTAIL	NON	>000	0.98	.	0.24	.
62	172909	FLOUNDER,YELLOWTAIL	P	=000	.	0.01	.	0.00
63	172909	FLOUNDER,YELLOWTAIL	P	>000	.	40.25	.	9.79

2019 AA and CAMS VALUE (**sppvalue, dollars**) and percentage BY LEVEL and AREA_BIN

Obs	SPECIES_ITIS	comname	level	area_bin	AA_sppvalue	CAMS_sppvalue	AA_sppvalue_perc	CAMS_sppvalue_perc
1	164499	GOOSEFISH	A	>000	13913419	14444662	94.78	98.40
2	164499	GOOSEFISH	B	>000	195989	16704	1.34	0.11
3	164499	GOOSEFISH	C	>000	229180	38417	1.56	0.26
4	164499	GOOSEFISH	D	>000	35437	70243	0.24	0.48
5	164499	GOOSEFISH	NON	=000	251355	.	1.71	.
6	164499	GOOSEFISH	NON	>000	54998	.	0.37	.
7	164499	GOOSEFISH	P	=000	.	18549	.	0.13
8	164499	GOOSEFISH	P	>000	.	90668	.	0.62
9	164712	COD,ATLANTIC	A	>000	4280063	4916305	83.75	96.22
10	164712	COD,ATLANTIC	B	>000	202824	2377	3.97	0.05
11	164712	COD,ATLANTIC	C	>000	288833	12165	5.65	0.24
12	164712	COD,ATLANTIC	D	>000	47565	12412	0.93	0.24
13	164712	COD,ATLANTIC	NON	=000	286191	.	5.60	.
14	164712	COD,ATLANTIC	NON	>000	4771	.	0.09	.
15	164712	COD,ATLANTIC	P	=000	.	71	.	0.00
16	164712	COD,ATLANTIC	P	>000	.	165858	.	3.25
17	164730	HAKE,ATLANTIC,RED	A	>000	392934	404295	93.98	96.60
18	164730	HAKE,ATLANTIC,RED	B	>000	2526	.	0.60	.
19	164730	HAKE,ATLANTIC,RED	C	>000	2651	1489	0.63	0.36
20	164730	HAKE,ATLANTIC,RED	D	>000	731	1435	0.17	0.34
21	164730	HAKE,ATLANTIC,RED	NON	=000	12414	.	2.97	.
22	164730	HAKE,ATLANTIC,RED	NON	>000	6833	.	1.63	.
23	164730	HAKE,ATLANTIC,RED	P	=000	.	439	.	0.10
24	164730	HAKE,ATLANTIC,RED	P	>000	.	10859	.	2.59
25	164744	HADDOCK	A	>000	16391160	18562658	86.53	98.00
26	164744	HADDOCK	B	>000	1018318	12756	5.38	0.07
27	164744	HADDOCK	C	>000	1077164	48298	5.69	0.25
28	164744	HADDOCK	D	>000	44891	24991	0.24	0.13
29	164744	HADDOCK	NON	=000	404387	.	2.13	.
30	164744	HADDOCK	NON	>000	7157	.	0.04	.
31	164744	HADDOCK	P	=000	.	19	.	0.00
32	164744	HADDOCK	P	>000	.	292691	.	1.55
33	164791	HAKE,SILVER (WHITING)	A	>000	8414617	8532038	97.11	98.35
34	164791	HAKE,SILVER (WHITING)	B	>000	35128	83	0.41	0.00
35	164791	HAKE,SILVER (WHITING)	C	>000	30365	13664	0.35	0.16
36	164791	HAKE,SILVER (WHITING)	D	>000	11681	19641	0.13	0.23
37	164791	HAKE,SILVER (WHITING)	NON	=000	86256	.	1.00	.
38	164791	HAKE,SILVER (WHITING)	NON	>000	87329	.	1.01	.
39	164791	HAKE,SILVER (WHITING)	P	=000	.	4882	.	0.06
40	164791	HAKE,SILVER (WHITING)	P	>000	.	104697	.	1.21
41	172746	FLOUNDER,SAND DAB (WINDOWPANE)	A	>000	161	161	1.39	1.27
42	172746	FLOUNDER,SAND DAB (WINDOWPANE)	C	>000	226	101	1.95	0.79
43	172746	FLOUNDER,SAND DAB (WINDOWPANE)	D	>000	.	48	.	0.38
44	172746	FLOUNDER,SAND DAB (WINDOWPANE)	NON	=000	7453	.	64.22	.
45	172746	FLOUNDER,SAND DAB (WINDOWPANE)	NON	>000	3765	.	32.44	.
46	172746	FLOUNDER,SAND DAB (WINDOWPANE)	P	=000	.	87	.	0.68
47	172746	FLOUNDER,SAND DAB (WINDOWPANE)	P	>000	.	12328	.	96.88
48	172905	FLOUNDER,WINTER	A	>000	2855334	3175397	79.06	87.95
49	172905	FLOUNDER,WINTER	B	>000	93035	876	2.58	0.02

50	172905	FLOUNDER,WINTER	C	>000	208365	3417	5.77	0.09
51	172905	FLOUNDER,WINTER	D	>000	13597	2828	0.38	0.08
52	172905	FLOUNDER,WINTER	NON	=000	416431	.	11.53	.
53	172905	FLOUNDER,WINTER	NON	>000	24820	.	0.69	.
54	172905	FLOUNDER,WINTER	P	=000	.	3047	.	0.08
55	172905	FLOUNDER,WINTER	P	>000	.	425060	.	11.77
56	172909	FLOUNDER,YELLOWTAIL	A	>000	815745	835332	87.11	89.20
57	172909	FLOUNDER,YELLOWTAIL	B	>000	5788	640	0.62	0.07
58	172909	FLOUNDER,YELLOWTAIL	C	>000	24296	41	2.59	0.00
59	172909	FLOUNDER,YELLOWTAIL	D	>000	2380	107	0.25	0.01
60	172909	FLOUNDER,YELLOWTAIL	NON	=000	84332	.	9.01	.
61	172909	FLOUNDER,YELLOWTAIL	NON	>000	3917	.	0.42	.
62	172909	FLOUNDER,YELLOWTAIL	P	=000	.	69	.	0.01
63	172909	FLOUNDER,YELLOWTAIL	P	>000	.	100251	.	10.71

2019 AA and CAMS LANDINGS (spplndlb, mt) and percentage BY BIN and AREA_BIN

Obs	species_ itis	comname	bin	area_bin	AA_spplndmt	CAMS_ spplndmt	AA_spplndmt_ perc	CAMS_ spplndmt_ perc
1	164499	GOOSEFISH	IMPUTE1	>000	154.32	41.00	2.86	0.77
2	164499	GOOSEFISH	IMPUTE2	=000	.	6.70	.	0.12
3	164499	GOOSEFISH	IMPUTE2	>000	.	35.26	.	0.66
4	164499	GOOSEFISH	MATCHED	>000	5113.37	5298.84	95.01	98.46
5	164499	GOOSEFISH	NoEntry	=000	97.20	.	1.81	.
6	164499	GOOSEFISH	NoEntry	>000	17.07	.	0.32	.
7	164712	COD,ATLANTIC	IMPUTE1	>000	83.51	4.10	9.60	0.47
8	164712	COD,ATLANTIC	IMPUTE2	=000	.	0.01	.	0.00
9	164712	COD,ATLANTIC	IMPUTE2	>000	.	27.62	.	3.18
10	164712	COD,ATLANTIC	MATCHED	>000	739.20	837.91	84.98	96.35
11	164712	COD,ATLANTIC	NoEntry	=000	46.34	.	5.33	.
12	164712	COD,ATLANTIC	NoEntry	>000	0.79	.	0.09	.
13	164730	HAKE,ATLANTIC,RED	IMPUTE1	>000	5.63	2.76	1.25	0.61
14	164730	HAKE,ATLANTIC,RED	IMPUTE2	=000	.	0.30	.	0.07
15	164730	HAKE,ATLANTIC,RED	IMPUTE2	>000	.	17.57	.	3.92
16	164730	HAKE,ATLANTIC,RED	MATCHED	>000	415.79	427.96	92.80	95.40
17	164730	HAKE,ATLANTIC,RED	NoEntry	=000	18.46	.	4.12	.
18	164730	HAKE,ATLANTIC,RED	NoEntry	>000	8.19	.	1.83	.
19	164744	HADDOCK	IMPUTE1	>000	842.00	35.05	11.01	0.46
20	164744	HADDOCK	IMPUTE2	=000	.	0.00	.	0.00
21	164744	HADDOCK	IMPUTE2	>000	.	116.92	.	1.53
22	164744	HADDOCK	MATCHED	>000	6639.71	7493.91	86.83	98.01
23	164744	HADDOCK	NoEntry	=000	161.79	.	2.12	.
24	164744	HADDOCK	NoEntry	>000	2.95	.	0.04	.
25	164791	HAKE,SILVER (WHITING)	IMPUTE1	>000	65.31	19.06	1.25	0.36
26	164791	HAKE,SILVER (WHITING)	IMPUTE2	=000	.	3.14	.	0.06
27	164791	HAKE,SILVER (WHITING)	IMPUTE2	>000	.	85.68	.	1.64
28	164791	HAKE,SILVER (WHITING)	MATCHED	>000	5052.33	5126.52	96.65	97.94
29	164791	HAKE,SILVER (WHITING)	NoEntry	=000	64.65	.	1.24	.
30	164791	HAKE,SILVER (WHITING)	NoEntry	>000	45.30	.	0.87	.
31	172746	FLOUNDER,SAND DAB (WINDOWPANE)	IMPUTE1	>000	0.28	0.09	2.85	0.86
32	172746	FLOUNDER,SAND DAB (WINDOWPANE)	IMPUTE2	=000	.	0.09	.	0.82
33	172746	FLOUNDER,SAND DAB (WINDOWPANE)	IMPUTE2	>000	.	10.52	.	97.98
34	172746	FLOUNDER,SAND DAB (WINDOWPANE)	MATCHED	>000	0.04	0.04	0.37	0.33
35	172746	FLOUNDER,SAND DAB (WINDOWPANE)	NoEntry	=000	5.98	.	61.28	.
36	172746	FLOUNDER,SAND DAB (WINDOWPANE)	NoEntry	>000	3.46	.	35.49	.
37	172905	FLOUNDER,WINTER	IMPUTE1	>000	54.07	1.23	9.26	0.20
38	172905	FLOUNDER,WINTER	IMPUTE2	=000	.	0.54	.	0.09
39	172905	FLOUNDER,WINTER	IMPUTE2	>000	.	72.26	.	12.37
40	172905	FLOUNDER,WINTER	MATCHED	>000	456.55	510.20	78.12	87.33
41	172905	FLOUNDER,WINTER	NoEntry	=000	70.41	.	12.05	.
42	172905	FLOUNDER,WINTER	NoEntry	>000	3.38	.	0.58	.
43	172909	FLOUNDER,YELLOWTAIL	IMPUTE1	>000	9.53	0.38	2.32	0.09
44	172909	FLOUNDER,YELLOWTAIL	IMPUTE2	=000	.	0.01	.	0.00
45	172909	FLOUNDER,YELLOWTAIL	IMPUTE2	>000	.	40.25	.	9.79
46	172909	FLOUNDER,YELLOWTAIL	MATCHED	>000	364.13	370.62	88.54	90.12
47	172909	FLOUNDER,YELLOWTAIL	NoEntry	=000	36.63	.	8.91	.
48	172909	FLOUNDER,YELLOWTAIL	NoEntry	>000	0.98	.	0.24	.

2019 AA and CAMS VALUE (sppvalue, dollars) and percentage BY BIN and AREA_BIN

Obs	species_itis	comname	bin	area_bin	AA_sppvalue	CAMS_sppvalue	AA_sppvalue_perc	CAMS_sppvalue_perc
1	164499	GOOSEFISH	IMPUTE1	>000	460606	125364	3.14	0.85
2	164499	GOOSEFISH	IMPUTE2	=000	.	18549	.	0.13
3	164499	GOOSEFISH	IMPUTE2	>000	.	90668	.	0.62
4	164499	GOOSEFISH	MATCHED	>000	13913419	14444662	94.78	98.40
5	164499	GOOSEFISH	NoEntry	=000	251355	.	1.71	.
6	164499	GOOSEFISH	NoEntry	>000	54998	.	0.37	.
7	164712	COD,ATLANTIC	IMPUTE1	>000	539222	26954	10.55	0.53
8	164712	COD,ATLANTIC	IMPUTE2	=000	.	71	.	0.00
9	164712	COD,ATLANTIC	IMPUTE2	>000	.	165858	.	3.25
10	164712	COD,ATLANTIC	MATCHED	>000	4280063	4916305	83.75	96.22
11	164712	COD,ATLANTIC	NoEntry	=000	286191	.	5.60	.
12	164712	COD,ATLANTIC	NoEntry	>000	4771	.	0.09	.
13	164730	HAKE,ATLANTIC,RED	IMPUTE1	>000	5908	2924	1.40	0.70
14	164730	HAKE,ATLANTIC,RED	IMPUTE2	=000	.	439	.	0.10
15	164730	HAKE,ATLANTIC,RED	IMPUTE2	>000	.	10859	.	2.59
16	164730	HAKE,ATLANTIC,RED	MATCHED	>000	392934	404295	93.98	96.60
17	164730	HAKE,ATLANTIC,RED	NoEntry	=000	12414	.	2.97	.
18	164730	HAKE,ATLANTIC,RED	NoEntry	>000	6833	.	1.63	.
19	164744	HADDOCK	IMPUTE1	>000	2140373	86045	11.31	0.45
20	164744	HADDOCK	IMPUTE2	=000	.	19	.	0.00
21	164744	HADDOCK	IMPUTE2	>000	.	292691	.	1.55
22	164744	HADDOCK	MATCHED	>000	16391160	18562658	86.53	98.00
23	164744	HADDOCK	NoEntry	=000	404387	.	2.13	.
24	164744	HADDOCK	NoEntry	>000	7157	.	0.04	.
25	164791	HAKE,SILVER (WHITING)	IMPUTE1	>000	77174	33388	0.89	0.39
26	164791	HAKE,SILVER (WHITING)	IMPUTE2	=000	.	4882	.	0.06
27	164791	HAKE,SILVER (WHITING)	IMPUTE2	>000	.	104697	.	1.21
28	164791	HAKE,SILVER (WHITING)	MATCHED	>000	8414617	8532038	97.11	98.35
29	164791	HAKE,SILVER (WHITING)	NoEntry	=000	86256	.	1.00	.
30	164791	HAKE,SILVER (WHITING)	NoEntry	>000	87329	.	1.01	.
31	172746	FLOUNDER,SAND DAB (WINDOWPANE)	IMPUTE1	>000	226	149	1.95	1.17
32	172746	FLOUNDER,SAND DAB (WINDOWPANE)	IMPUTE2	=000	.	87	.	0.68
33	172746	FLOUNDER,SAND DAB (WINDOWPANE)	IMPUTE2	>000	.	12328	.	96.88
34	172746	FLOUNDER,SAND DAB (WINDOWPANE)	MATCHED	>000	161	161	1.39	1.27
35	172746	FLOUNDER,SAND DAB (WINDOWPANE)	NoEntry	=000	7453	.	64.22	.
36	172746	FLOUNDER,SAND DAB (WINDOWPANE)	NoEntry	>000	3765	.	32.44	.
37	172905	FLOUNDER,WINTER	IMPUTE1	>000	314997	7121	8.73	0.19
38	172905	FLOUNDER,WINTER	IMPUTE2	=000	.	3047	.	0.08
39	172905	FLOUNDER,WINTER	IMPUTE2	>000	.	425060	.	11.77
40	172905	FLOUNDER,WINTER	MATCHED	>000	2855334	3175397	79.06	87.95
41	172905	FLOUNDER,WINTER	NoEntry	=000	416431	.	11.53	.
42	172905	FLOUNDER,WINTER	NoEntry	>000	24820	.	0.69	.
43	172909	FLOUNDER,YELLOWTAIL	IMPUTE1	>000	32464	788	3.46	0.08
44	172909	FLOUNDER,YELLOWTAIL	IMPUTE2	=000	.	69	.	0.01
45	172909	FLOUNDER,YELLOWTAIL	IMPUTE2	>000	.	100251	.	10.71
46	172909	FLOUNDER,YELLOWTAIL	MATCHED	>000	815745	835332	87.11	89.20
47	172909	FLOUNDER,YELLOWTAIL	NoEntry	=000	84332	.	9.01	.
48	172909	FLOUNDER,YELLOWTAIL	NoEntry	>000	3917	.	0.42	.

2019 AA and CAMS LANDINGS (spplndlb, mt) and percentage

Obs	AA_spplndmt	CAMS_ spplndmt	AA_spplndmt_ perc	CAMS_ spplndmt_ perc
1	5381.96	5381.80	100.00	100.01
2	869.85	869.63	100.00	100.00
3	448.08	448.60	100.00	100.00
4	7646.45	7645.89	100.00	100.00
5	5227.58	5234.40	100.01	100.00
6	9.76	10.73	99.99	99.99
7	584.41	584.22	100.01	99.99
8	411.27	411.26	100.01	100.00

2019 AA and CAMS LANDINGS (spplndlb, mt) and percentage

Obs	AA_sppvalue	CAMS_ sppvalue	AA_sppvalue_ perc	CAMS_ sppvalue_ perc
1	14680378	14679243	100.00	100.00
2	5110247	5109188	99.99	100.00
3	418089	418517	99.98	99.99
4	18943077	18941413	100.01	100.00
5	8665376	8675005	100.01	100.01
6	11605	12725	100.00	100.00
7	3611582	3610625	100.01	99.99
8	936458	936440	100.00	100.00

VII. Detailed Comparison of Landings and Value for KALL (kept weight of all species combined)

AA AA_CAMS_impute_KALL_v3.sas 13:05 Wednesday, February 16, 2022 1

Obs	YEAR	level	area_bin	splndmt	SPPVALUE	spplndmt_ perc	sppvalue_ perc
1	2019	A	>000	159271.59	860739947	28.26	33.36
2	2019	B	>000	2860.08	14118720	0.51	0.55
3	2019	C	>000	33933.41	295160438	6.02	11.44
4	2019	D	>000	12836.99	100794604	2.28	3.91
5	2019	NON	=000	110264.86	990873171	19.57	38.40
6	2019	NON	>000	244342.00	318741957	43.36	12.35

CAMS AA_CAMS_impute_KALL_v3.sas 13:05 Wednesday, February 16, 2022 2

Obs	YEAR	level	area_bin	spplndmt	SPPVALUE	spplndmt_ perc	sppvalue_ perc
1	2019	A	>000	176771.71	935154600	32.28	41.14
2	2019	B	>000	124.09	510295	0.02	0.02
3	2019	C	>000	1818.24	16542384	0.33	0.73
4	2019	D	>000	7715.28	17603466	1.41	0.77
5	2019	E	>000	177.82	1200744	0.03	0.05
6	2019	NON	>000	189439.03	77958268	34.60	3.43
7	2019	P	=000	10830.82	59048258	1.98	2.60
8	2019	P	>000	160703.85	1165336660	29.35	51.26

The SAS System 13:11 Wednesday, February 16, 2022 1

2019 AA and CAMS LANDINGS (spplndlb, mt) and percentage BY LEVEL and AREA_BIN

Obs	level	area_bin	AA_spplndmt	CAMS_ spplndmt	AA_spplndmt_ perc	CAMS_ spplndmt_ perc
1	A	>000	159271.59	176771.71	28.26	32.28
2	B	>000	2860.08	124.09	0.51	0.02
3	C	>000	33933.41	1818.24	6.02	0.33
4	D	>000	12836.99	7715.28	2.28	1.41
5	E	>000	.	177.82	.	0.03
6	NON	=000	110264.86	.	19.57	.
7	NON	>000	244342.00	189439.03	43.36	34.60
8	P	=000	.	10830.82	.	1.98
9	P	>000	.	160703.85	.	29.35

The SAS System 13:11 Wednesday, February 16, 2022 2

2019 AA and CAMS VALUE (sppvalue, dollars) and percentage BY LEVEL and AREA_BIN

Obs	level	area_bin	AA_sppvalue	CAMS_ sppvalue	AA_sppvalue_ perc	CAMS_ sppvalue_ perc
1	A	>000	860739947	935154600	33.36	41.14
2	B	>000	14118720	510295	0.55	0.02
3	C	>000	295160438	16542384	11.44	0.73
4	D	>000	100794604	17603466	3.91	0.77
5	E	>000	.	1200744	.	0.05
6	NON	=000	990873171	.	38.40	.
7	NON	>000	318741957	77958268	12.35	3.43
8	P	=000	.	59048258	.	2.60
9	P	>000	.	1165336660	.	51.26

2019 AA and CAMS LANDINGS (spplndlb, mt) and percentage BY BIN and AREA_BIN

Obs	bin	area_bin	AA_spplndmt	CAMS_ spplndmt	AA_spplndmt_ perc	CAMS_ spplndmt_ perc
1	IMPUTE1	>000	49630.48	9835.43	8.81	1.79
2	IMPUTE2	=000	.	10830.82	.	1.98
3	IMPUTE2	>000	.	160703.85	.	29.35
4	MATCHED	>000	159271.59	176771.71	28.26	32.28
5	NoEntry	=000	110264.86	.	19.57	.
6	NoEntry	>000	244342.00	189439.03	43.36	34.60

2019 AA and CAMS VALUE (sppvalue, dollars) and percentage BY BIN and AREA_BIN

Obs	bin	area_bin	AA_sppvalue	CAMS_ sppvalue	AA_sppvalue_ perc	CAMS_ sppvalue_ perc
1	IMPUTE1	>000	410073762	35856889	15.90	1.57
2	IMPUTE2	=000	.	59048258	.	2.60
3	IMPUTE2	>000	.	1165336660	.	51.26
4	MATCHED	>000	860739947	935154600	33.36	41.14
5	NoEntry	=000	990873171	.	38.40	.
6	NoEntry	>000	318741957	77958268	12.35	3.43

2019 AA and CAMS LANDINGS (spplndlb, mt) and percentage

Obs	AA_spplndmt	CAMS_ spplndmt	AA_spplndmt_ perc	CAMS_ spplndmt_ perc
1	563508.93	547580.84	100	100

2019 AA and CAMS LANDINGS (spplndlb, mt) and percentage

Obs	AA_sppvalue	CAMS_ sppvalue	AA_sppvalue_ perc	CAMS_ sppvalue_ perc
1	2580428837	2273354675	100.01	100

VIII. SAS CODE USED (…CAMS_review/AA_CAMS_impute)

Table 1

```
--1_CFDETS2019AA.sql AA and CAMS Imputed Landings
--Table 1 AA landings
select distinct 'AA' as dset, year, alevel,
sum(case when area is null or area = '000' then 1 else 0 end) area_000,  /* 0 = has area;  >0  = # of recs with area no area */
count(*) as rec_cnt, count(distinct dlrtrpid) trip_cnt,
round(sum(spplndlb)*0.000453592370, 2) as spplndmt,
round(sum(spplivlb)*0.000453592370,2) as spplivmt,
sum(sppvalue) as sppvalue
from cfdbs.CFDETS2019AA@sole
group by year, alevel order by alevel;
--export to 1_CFDETS2019AA.xlsx
```

Table 2

```
--2_CAMS_CFDETS2019AA.sql AA and CAMS Imputed Landings
--Table 2 CAMS landings
select distinct 'CAMS' as dset, year, area_source, area_imp_method,
sum(case when area is null or area = '000' then 1 else 0 end) area_000,  /* 0 = has area;  >0  = # of recs with area no area */
count(*) as rec_cnt, count(distinct camsid) trip_cnt,
round(sum(spplndlb)*0.000453592370, 2) as spplndmt,
round(sum(spplivlb)*0.000453592370,2) as spplivmt,
sum(sppvalue) as sppvalue
from CAMS_GARFO.CAMS_CFDETS2019AA@NOVA
where landing_source = 'DLR'
group by year, area_source, area_imp_method order by area_source;
--export to 2_CAMS_CFDETS2019AA.xlsx
```

2_CAMS_CFDETS2019AA_20220216.xlsx

Table 3 CROSSWALK (revised 2/16/2022)

Used distinct meta data values that appear in Tables 1 and 2.

Table 4 and Figure 1 (revised 2/16/2022)

1) **3a_AA_CAMS_impute_KALL_v3.sas** creates sas set used in
2) **3b_part2_KALL_v3.sas** creates csv file
3) **AA_CAMS_impute_mt_bin_KALL_v3.csv** used in xlsx file given last.

4) **3c_AA_CAMS_impute_spp8_v3.sas** creates sas set used in
5) **3d_part2_v3.sas** creates csv file
6) **AA_CAMS_impute_mt_bin_spp8_v3.csv** used in xlsx file

7) **AA_CAMS_impute_mt_bin_spp8_KALL_v3.xlsx (date: 2/16/2022)**

- -

V3 code is same as v2 code except for "v2" is changed to "v3" for sas sets and csv files

```
%include '!HOME/sas_data.sas';

*** modified to coordinate with CAMS refresh at end of January


*** a modifcation of species-5parts.sas ;
***  landlb by species_itis and allocated and not allocated;
/*
TO RUN on network:  sas AA_CAMS_impute_KALL_v2 -noterminal &
*/
```

```
***libname cf  oracle path = 'SOLE';
libname sole oracle user=&orausername1 password=&orapassword1 path = 'SOLE';  /* for AA tables */
libname mydir '/home5/swigley/CAMS/CAMS_review/AA_CAMS_impute/';

options ps= 100;
options ls= 132;

title1 ' AA_CAMS_impute_KALL_v2.sas';

**************************;
/*   GET AA data */
**************************;

proc sql;
connect to oracle ( user=&orausername1 password=&orapassword1 );

create view sp3 as
 select year, alevel, area, spplndlb, sppvalue

from connection to oracle

(select year, alevel, area, spplndlb, sppvalue
from cfdbs.cfdets2019aa@SOLE );

disconnect from oracle;
quit;
run;

*** code for stock area from single species allocation;

data sp3dat; set sp3;
spplndmt = spplndlb * 0.000453592370;
if alevel < 'A' then level = 'NON';
if alevel = '' then level =  'NON';
if alevel = 'A'  then level = 'A  ';
if alevel = 'B'  then level = 'B  ';
if alevel = 'C' then level = 'C  ';
if alevel = 'D' then level = 'D  ';

if area > '000' then area_bin = '>000';
if area = '000' then area_bin = '=000';

***if species_itis in ('012','081','120','123','125','147','152','509');
***if species_itis in ('164499', '164712', '172905', '172909', '172746', '164744', '164730', '164791');
run;

*proc contents;
*run;

proc sort;
 by year level area_bin;

proc means sum noprint;
 by year level area_bin;
 var spplndmt sppvalue;
 output out = results sum = ;
***proc print;
run;

/*
proc export data = results
 outfile =
"species-5parts.csv"
 dbms=csv replace;
run;
*/ ;

proc sort;
```

```
 by year;

proc means sum noprint;
 by year;
 var spplndmt sppvalue;
 output out = kall_total sum = spplndmt_total sppvalue_total;
***proc print;
run;

data all (drop = _TYPE_ _FREQ_ );
merge results kall_total;
by year;
run;

***proc print;
run;

data all (drop = spplndmt_total sppvalue_total); set all;
spplndmt_perc = round(spplndmt / spplndmt_total*100, 0.01);
sppvalue_perc = round(sppvalue / sppvalue_total*100, 0.01);
run;

proc print;
run;

/* make sas set */
data mydir.AA_impute_KALL_v2; set all;
run;


/* make oracle table in schema swigley */
/*
proc sql;
create table sew.AA_impute_KALL as
select * from mydir.AA_impute_KALL;
select * from AA_impute_KALL
quit;
*/;
***ENDSAS;

****************************;
/* Get CAMS data */


proc sql;
connect to oracle ( user=&orausername1 password=&orapassword1 );

create view CAMSsp3 as
 select year, area, area_source, area_imp_method, spplndlb, sppvalue
from connection to oracle

(select year, area, area_source, area_imp_method, spplndlb, sppvalue
from cams_garfo.cams_cfdets2019aa@nova
where landing_source = 'DLR');

disconnect from oracle;
quit;
run;

*** code for stock area from single species allocation;

data CAMSsp3dat; set CAMSsp3;
spplndmt = spplndlb * 0.000453592370;
if area_source in ('AREA', 'CAREA') and area_imp_method in ('') then level = 'A  ';
if area_source in ('IMPUTE') and area_imp_method in ('') then level = 'NA ';
if area_source in ('PORT') then level = 'P  ';
if area_imp_method in ('CLOSEST') then level = 'B  ';
if area_imp_method in ('B') then level =  'B  ';
if area_imp_method in ('C')  then level = 'C  ';
```

```
if area_imp_method in ('D')  then level = 'D  ';
if area_imp_method in('E') then level = 'E  ';
if area_source in ('DLR', 'WHSE') then level = 'NON';

if area > '000' then area_bin = '>000';
if area = '000' then area_bin = '=000';


***if species_itis in ('012','081','120','123','125','147','152','509');
***if species_itis in ('164499', '164712', '172905', '172909', '172746', '164744', '164730', '164791');
run;

proc sort;
 by year level area_bin;

proc means sum noprint;
 by year level area_bin;
 var spplndmt sppvalue;
 output out = CAMSresults sum = ;
***proc print;
run;

/*
proc export data = CAMSresults
 outfile =
"CAMSspecies_KALL.csv"
 dbms=csv replace;
run;
*/ ;

proc sort;
 by year;

proc means sum noprint;
 by year ;
 var spplndmt sppvalue;
 output out = CAMSKALL_total sum = spplndmt_total sppvalue_total;
***proc print;
run;

data CAMSall (drop = _TYPE_ _FREQ_ );
merge CAMSresults CAMSKALL_total;
by year;
run;

***proc print;
run;

data CAMSall (drop = spplndmt_total sppvalue_total); set CAMSall;
spplndmt_perc = round(spplndmt / spplndmt_total*100, 0.01);
sppvalue_perc = round(sppvalue / sppvalue_total*100, 0.01);
run;

proc print;
run;

/* make sas set */
data mydir.CAMS_impute_KALL_v2; set CAMSall;
run;


/* make oracle table in schema swigley */
/*
proc sql;
create table sew.CAMS_impute_KALL as
select * from mydir.CAMS_impute_KALL;
select * from CAMS_impute_KALL;
quit;
*/;
```

```
endsas;   /* see part2_KALL_v2.sas */


**************************************************************************************


%include '!HOME/sas_data.sas';

*** v2 includes area_bin

***TO RUN: sas part2_KALL_v2 -noterminal &

*** a modifcation of species-5parts.sas ;
***  landlb by species_itis and allocated and not allocated;

***libname cf  oracle path = 'SOLE';
libname sole oracle user=&orausername1 password=&orapassword1 path = 'SOLE';  /* for AA tables */
libname mydir '/home5/swigley/CAMS/CAMS_review/AA_CAMS_impute/';

options ps= 100;
options ls= 120;

/*  join AA and CAMS */
data AA; set mydir.AA_impute_KALL_v2
(rename = (
spplndmt = AA_spplndmt
sppvalue = AA_sppvalue
spplndmt_perc = AA_spplndmt_perc
sppvalue_perc = AA_sppvalue_perc));
run;

proc sort;
by year level area_bin;
run;

*proc print;
*run;

data CAMS; set mydir.CAMS_impute_KALL_v2
(rename = (
spplndmt = CAMS_spplndmt
sppvalue = CAMS_sppvalue
spplndmt_perc = CAMS_spplndmt_perc
sppvalue_perc = CAMS_sppvalue_perc));
run;

proc sort;
by year level area_bin;
run;

*proc print;
*run;

data AA_CAMS;
merge AA CAMS;
by year level area_bin;
run;

*proc print;
*run;

data AA_CAMS_mt (keep = year level area_bin
AA_spplndmt CAMS_spplndmt AA_spplndmt_perc CAMS_spplndmt_perc
AA_sppvalue CAMS_sppvalue AA_sppvalue_perc CAMS_sppvalue_perc);
set AA_CAMS;

title2 "2019 AA and CAMS LANDINGS (spplndlb, mt) and percentage BY LEVEL and AREA_BIN";
proc print;
```

```
var  level area_bin AA_spplndmt CAMS_spplndmt AA_spplndmt_perc CAMS_spplndmt_perc;
run;

title2 "2019 AA and CAMS VALUE (sppvalue, dollars) and percentage BY LEVEL and AREA_BIN";
proc print;
var level area_bin AA_sppvalue CAMS_sppvalue AA_sppvalue_perc CAMS_sppvalue_perc;
run;

data AA_CAMS_mt; set AA_CAMS_mt;
if LEVEL in ('B  ', 'C  ', 'D  ', 'E  ') then BIN = 'IMPUTE1';
else if LEVEL in ('P  ') then BIN = 'IMPUTE2';
else if LEVEL in ('A  ') then BIN = 'MATCHED';
else if LEVEL in ('NA ') then BIN = 'Entry  ';
else if LEVEL in ('NON') then BIN = 'NoEntry';
else if LEVEL in ('')    then BIN = 'NoEntry';
else BIN = 'JUNK';
run;

proc sort;
by  bin area_bin;

proc means sum noprint;
by year bin area_bin;
output out = AA_CAMS_mt_binx sum = ;
run;


data AA_CAMS_mt_binx; set AA_CAMS_mt_binx;
length species_itis $11 comname $30;
species_itis = '999999';
comname = 'KALL';
run;

data AA_CAMS_mt_bin (drop = _type_ _freq_);
retain year species_itis  comname bin area_bin
AA_spplndmt CAMS_spplndmt AA_spplndmt_perc CAMS_spplndmt_perc
AA_sppvalue CAMS_sppvalue AA_sppvalue_perc CAMS_sppvalue_perc;
set AA_CAMS_mt_binx;
run;

proc contents;
run;
proc export data = AA_CAMS_mt_bin
 outfile = "AA_CAMS_mt_bin_KALL_v2.csv"
 dbms=csv replace;
run;

title2 "2019 AA and CAMS LANDINGS (spplndlb, mt) and percentage BY BIN and AREA_BIN";
proc print;
var  bin area_bin AA_spplndmt CAMS_spplndmt AA_spplndmt_perc CAMS_spplndmt_perc;
run;


title2 "2019 AA and CAMS VALUE (sppvalue, dollars) and percentage BY BIN and AREA_BIN";
proc print;
var  bin  area_bin AA_sppvalue CAMS_sppvalue AA_sppvalue_perc CAMS_sppvalue_perc;
run;


proc means sum noprint;
by year;
output out= AA_CAMS_mt sum= ;
run;

title2 "2019 AA and CAMS LANDINGS (spplndlb, mt) and percentage ";
proc print;
var  AA_spplndmt CAMS_spplndmt AA_spplndmt_perc CAMS_spplndmt_perc;
run;
```

```
title2 "2019 AA and CAMS LANDINGS (spplndlb, mt) and percentage";
proc print;
var  AA_sppvalue CAMS_sppvalue AA_sppvalue_perc CAMS_sppvalue_perc;
run;

endsas;
```

```
%include '!HOME/sas_data.sas';

*** v2  includes area_bin

***TO RUN: sas part2_v2 -noterminal &

*** a modifcation of species-5parts.sas ;
***  landlb by species_itis and allocated and not allocated;

***libname cf  oracle path = 'SOLE';
libname sole oracle user=&orausername1 password=&orapassword1 path = 'SOLE';  /* for AA tables */
libname mydir '/home5/swigley/CAMS/CAMS_review/AA_CAMS_impute/';

options ps= 100;
options ls= 120;

/*  join AA and CAMS */
data AA; set mydir.AA_impute_spp_v2
(rename = (
spplndmt = AA_spplndmt
sppvalue = AA_sppvalue
spplndmt_perc = AA_spplndmt_perc
sppvalue_perc = AA_sppvalue_perc));
run;

proc sort;
by year species_itis level area_bin;
run;

*proc print;
*run;

data CAMS; set mydir.CAMS_impute_spp_v2
(rename = (
spplndmt = CAMS_spplndmt
sppvalue = CAMS_sppvalue
spplndmt_perc = CAMS_spplndmt_perc
sppvalue_perc = CAMS_sppvalue_perc));
run;

proc sort;
by species_itis;
run;

/* add comname to CAMS using comname in AA sas set */
proc sql;
create view AAcomnamex as
select distinct species_itis, comname
from AA;

****select * from AAcomname;
quit;

data AAcomname; set AAcomnamex;
run;

proc sort;
by species_itis;
```

```
run;

data CAMS_2;
merge CAMS  AAcomname;
by species_itis;
run;


proc sort;
by year species_itis level area_bin;
run;

*proc print;
*run;

data AA_CAMS;
merge AA CAMS_2;
by year species_itis level area_bin;
run;

*proc print;
*run;

data AA_CAMS_mt (keep = year species_itis comname level area_bin
AA_spplndmt CAMS_spplndmt AA_spplndmt_perc CAMS_spplndmt_perc
AA_sppvalue CAMS_sppvalue AA_sppvalue_perc CAMS_sppvalue_perc);
set AA_CAMS;

title2 "2019 AA and CAMS LANDINGS (spplndlb, mt) and percentage BY LEVEL and AREA_BIN";
proc print;
var species_itis comname level area_bin AA_spplndmt CAMS_spplndmt AA_spplndmt_perc CAMS_spplndmt_perc;
run;

title2 "2019 AA and CAMS VALUE (sppvalue, dollars) and percentage BY LEVEL and AREA_BIN";
proc print;
var species_itis comname level area_bin AA_sppvalue CAMS_sppvalue AA_sppvalue_perc CAMS_sppvalue_perc;
run;

/* IMP_1 has uncertainty, IMP_2 no uncertainty (DLR PORT imputation) */
data AA_CAMS_mt; set AA_CAMS_mt;
if LEVEL in ('B  ', 'C  ', 'D  ', 'E  ') then BIN = 'IMPUTE1';
else if LEVEL in ('P  ') then BIN = 'IMPUTE2';
else if LEVEL in ('A  ') then BIN = 'MATCHED';
else if LEVEL in ('NA ') then BIN = 'Entry';
else if LEVEL in ('NON') then BIN = 'NoEntry';
else if LEVEL in ('')    then BIN = 'NoEntry';
else BIN = 'JUNK';
run;

proc sort;
by species_itis bin area_bin;

proc means sum noprint;
by year species_itis bin area_bin;
id comname;
output out = AA_CAMS_mt_binx sum = ;
run;

proc contents;
run;

data AA_CAMS_mt_bin (drop = _type_ _freq_);
retain year species_itis comname bin area_bin
AA_spplndmt CAMS_spplndmt AA_spplndmt_perc CAMS_spplndmt_perc
AA_sppvalue CAMS_sppvalue AA_sppvalue_perc CAMS_sppvalue_perc;
set AA_CAMS_mt_binx;
run;

proc contents;
```

```
run;

proc export data = AA_CAMS_mt_bin
 outfile = "AA_CAMS_mt_bin_spp8_v2.csv"
 dbms=csv replace;
run;


title2 "2019 AA and CAMS LANDINGS (spplndlb, mt) and percentage BY BIN and AREA_BIN";
proc print;
var species_itis comname bin area_bin AA_spplndmt CAMS_spplndmt AA_spplndmt_perc CAMS_spplndmt_perc;
run;

title2 "2019 AA and CAMS VALUE (sppvalue, dollars) and percentage BY BIN and AREA_BIN";
proc print;
var species_itis comname bin area_bin AA_sppvalue CAMS_sppvalue AA_sppvalue_perc CAMS_sppvalue_perc;
run;

/* checking */
proc sort;
 by year species_itis;

proc means sum noprint;
by year species_itis;
output out= AA_CAMS_mt sum= ;
run;

title2 "2019 AA and CAMS LANDINGS (spplndlb, mt) and percentage ";
proc print;
var  AA_spplndmt CAMS_spplndmt AA_spplndmt_perc CAMS_spplndmt_perc;
run;

title2 "2019 AA and CAMS LANDINGS (spplndlb, mt) and percentage";
proc print;
var  AA_sppvalue CAMS_sppvalue AA_sppvalue_perc CAMS_sppvalue_perc;
run;

endsas;
```

Appendix 7. Evaluation of statistical significance

Statistical comparison of AA and CAMS Stock Landings (S.E. Wigley)

Run on Feb 5, 2022;
Summarized on Feb 8, 2022

Data Sources: CFDBS.CFDETS2019AA and CAMS_GARFO.CAMS_CFDETS2019AA

Methods:

1) A statistical comparison of stock landings focused on 8 species with multiple stocks: cod, haddock, yellowtail flounder, winter flounder, windowpane flounder, goosefish, red hake, and silver hake
2) The same stock area definitions were applied to each data set; the stock area definitions were taken from STOCKEFF comland (shared by Leona and modified by SEW to run in SAS)
3) Within each data set, some of the subtrips had area = 000 indicating the statistical area where fishing occurred was unknown. For some of these subtrips, a statistical area was imputed on a probabilistic basis using VTR data. Meta data elements identify imputed subtrips.
    a. In the AA set, ALEVEL in (B, C, D) represents imputed subtrips while AREA_SOURCE and AREA_IMP_METHOD in (B, C, D, E) represent imputed subtrips in CAMS. CAMS also imputed subtrips using a different method that did not have an associated probability (AREA_SOURCE = PORT; stat area adjacent to port of landing was assigned to subtrip); thus these subtrips do not have an uncertainty associated with the imputed area.
    b. The AA and CAMS used different methods to impute statistical area. And, more importantly, the data which enter the imputation processes differ.
    c. The probability of the imputed statistical area is stored in the data elements, PROB and AREA_PROP, in the AA and CAMS data sets, respectively.
4) The probability associated with each subtrip can be used to approximate the uncertainty associated with the landings. The variance of a multi-nominal probability distribution was used.
5) The following equations were used to calculated the variance (V, var) and coefficient of variation (cv) of a trip with associated landings) using the multinomial distribution:

    Eq. 1 $V(T) = pq = p * (1-p)$
    Eq. 2 $CV(T) = sqrt(pq)$
    Eq. 3 $CV(L) \sim CV(T)$
    Eq. 4 $V(L) = (CV(T) * L)^2$
    Eq. 5 $Var\_MT = prob *(1-prob) * MT^2$

    Additionally, the cv, standard deviation and 95% confidence interval were derived for each species and stock using:

    Eq. 6 cv = sqrt(var_MT) / MT
    Eq. 7 std = sqrt(var_MT)
    Eq. 8 ci95 = 1.96 * std

To compare differences in species and stock landings between data sets, the following equations were used:

Eq. 9 $MT_{s,\,diff} = MT_{s,\,AA} - MT_{s,\,CAMS}$

Eq. 10 $V(MT_{s,\,diff}) = V(MT_{s,\,AA}) + V(MT_{s,\,CAMS})$

Eq. 11 diff_ci95 = 1.96 * sqrt(var_diff)

Eq. 12 lcl = MT_diff - diff_ci95

Eq. 13 ucl = MT_diff + diff_ci95

Eq. 14 product = lcl * ucl

Where:

p is the probability (*prob and area_prop, in AA and CAMS, respectively*) of the subtrip

T is the given subtrip with imputed area

L are the landings associated with an imputed subtrip.

MT = metric tons of landings

AA = Area Allocation data set

CAMS = Catch Accounting and Monitoring System data

product <= 0 then overlap_0 = -1; /* overlaps zero = no signif diff */
else overlap_0 = 0; /* no overlap = signif differences */

SAS code is provided.

6) There were 28 species-stock comparisons conducted
    a. There were 25 species-stock combinations with significant differences in stock landings between data sets and 3 were not significantly different
    b. There were unexpected results.
    c. Because of the differences in the landings data entering the imputation process, there were unknown stock landings that were not assigned to a stock, but instead to 'UNK' stock because of the remaining subtrips with area = 000. The unknown stock landings differed between AA and CAMS and this caused the known stock landings to statistically differ.

7) **Conclusion: It was determined that a statistical comparison of this type cannot be made between AA and CAMs stock landings due to differences in the data entering the imputation processes in the AA**.

Post script: It may be possible to compare the percentages of stock landings between the two data sets for the landings that matched VTRs. In each data set, there is a relatively high percentage of landings that do not need area imputation. For 7 of the 8 species with multiple stocks, there are more landings that matched than imputed landings. A comparison of percentages by stock using matched data may shed light on how similar the matched data are. This might be useful to know.

Below are the results of the statistical comparisons for cod. Yellow shading highlights the issue of area = 000 in the AA tables.

comname	stock	MT _AA	var_mt _AA	ci95 _AA	u95ci _AA	l95ci _AA	MT_ CAMS	var_mt_ CAMS	ci95_ CAMS	u95ci_ CAMS	l95ci_ CAMS	mt_diff	var_diff	diff_ci95	lcl	ucl	product	overlap_0
COD,ATLANTIC	EGB	30.05	2.27	2.95	33.00	27.10	52.03	0.00	0.00	52.03	52.03	-21.98	2.27	2.95	-24.93	-19.03	474.30	0
COD,ATLANTIC	GOM	303.93	0.51	1.39	305.32	302.53	329.33	0.11	0.66	329.99	328.67	-25.41	0.62	1.54	-26.95	-23.87	643.28	0
COD,ATLANTIC	OTHR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
COD,ATLANTIC	UNK	53.73	0.00	0.00	53.73	53.73	0.01	0.00	0.00	0.01	0.01	53.72	0.00	0.00	53.72	53.72	2885.77	0
COD,ATLANTIC	WGB	629.75	8.60	5.75	635.50	624.01	635.83	0.07	0.51	636.34	635.33	-6.08	8.66	5.77	-11.85	-0.31	3.69	0

```
%include '!HOME/sas_data.sas';

TO DO for v5:  fix silver hake, monkfish, etc, and add short name

*** assume cv of trip = cv of pounds;
*** collapse data to trip-area-species level, then sum mt and var_mt;
*** Using Leona's stock area sql code for STOCKEFF (comland area definitions for CF module)
*** Using mulitnominal probability approach suggeted by Chris L.

*** TO RUN:  sas AA_CAMS_landings_cv_v4 -noterminal &

options ls = 132;
options ps = 90;

title ' ~swigley/CAMS/CAMS_Review/landings/AA_CAMS_landings_cv_v4.sas;';

libname sole oracle user=&orausername1 password=&orapassword1 path = 'SOLE';
libname mydir '/home5/swigley/CAMS/CAMS_review/landings/';

**************************************************************************;
**************************************************************************;
*** get species data from cfdets2019AA@SOLE and cams_garfo.cams_cfdets2019aa ;
*** sum to trip-area-nespp4 level ;

proc sql;
connect to oracle ( user=&orausername1 password=&orapassword1 path = 'SOLE');

%put &sqlxmsg;
%put &sqlxrc;

create view cfallx  as
select dlrtrpid, area, alevel, prob, nespp4, species_itis, common_name, mt
from connection to oracle
(select dlrtrpid, area, alevel, prob, a.nespp4, species_itis, common_name,
  sum(spplivlb * 0.000453592370) as  mt
  from  cfdbs.cfdets2019aa@sole a, stockeff.mv_species_itis_ne@sole s
  where
   a.nespp4 = s.nespp4(+)
   and s.nespp4_flag = 1
   group by dlrtrpid, area, alevel, prob, a.nespp4, species_itis, common_name);

   %put &sqlxmsg;
   %put &sqlxrc;

create view cmallx  as
select dlrtrpid, area, area_source, area_imp_method, prob, nespp4, species_itis, common_name, mt
from connection to oracle
(select camsid as dlrtrpid, area,
area_source, area_imp_method,
area_prop as prob,
c.nespp4, species_itis, common_name,
  sum(spplivlb * 0.000453592370) as  mt
  from  cams_garfo.cams_cfdets2019aa@nova c, stockeff.mv_species_itis_ne@sole s
```

```
  where
   c.nespp4 = s.nespp4(+)
   and s.nespp4_flag = 1
   and landing_source = 'DLR'
   group by camsid, area, area_source, area_imp_method,
    area_prop, c.nespp4, species_itis, common_name);

 %put &sqlxmsg;
   %put &sqlxrc;
execute (commit) by oracle;
%put &sqlxmsg;
%put &sqlxrc;
disconnect from oracle;
quit;

/* ************************************** */
/* prep to align data sets */
data AA_all; set cfallx;
length dlrtrpid $225;
var_mt = prob * (1-prob) * mt**2;
dset = 'AA  ';
run;

*proc contents;
*run;

/* prep CAMS data */
data CAMS_all;  set cmallx ;
length dlrtrpid $225 nespp4 $4  area $3;

if prob = '' then prob = 0;

if area_source in ('AREA', 'CAREA') and area_imp_method in ('') then alevel = 'A';
if area_source in ('IMPUTE') and area_imp_method in ('') then alevel = 'O';
if area_source in ('PORT') then alevel = 'P';
if area_imp_method in ('CLOSEST') then alevel = 'B';
if area_imp_method in ('B') then alevel =  'B';
if area_imp_method in ('C')  then alevel = 'C';
if area_imp_method in ('D')  then alevel = 'D';
if area_imp_method in('E') then alevel = 'E';
if area_source in ('DLR', 'WHSE') then alevel = 'O';

var_mt = prob * (1-prob) * mt**2;
dset = 'CAMS';
run;

*proc contents;
*run;

/* join data sets */
data all; set AA_all CAMS_all;
run;
```

```
/* find stock area */
proc sql;
create view all_2x as
select  a.*,
case when species_itis = '164499' then
case when area in ('460','464','465','467', '510','511','512',
'513','514','515','521','522','523','561') then 'NORTH'
when (area in ('525','526','533','534','537','538','539',
'540','541','542','543','562') or (area > '600' and area < '700')) then 'SOUTH'
else 'OTHR' end
when species_itis = '164712' then
case when area in ('464','465','467','510','511','512','513','514','515') then 'GOM'
/* when (area >= '520' and area <= '700') then 'GBK' */
  when area in ( '523', '524', '551', '552', '560', '561', '562') then 'EGB'
  when area not in ( '523', '524', '551', '552', '560', '561', '562')
  and area >= '520' and area <= '700' then 'WGB'
when area in ('464','465') then 'SCO'
when area = '000' then 'UNK'
else 'OTHR' end
when species_itis = '164727' then
case when (area >= '500' and area <= '600') then 'UNIT'
when area in ('464', '465') then 'UNIT'
when (area >= '300' and area <= '463') then 'CAN'
when (area >= '466' and area <= '499') then 'CAN'
when (area = '000' or area <='299' or area >= '700') then 'UNK'
else 'OTHR' end
when species_itis = '164730' then
case when area in ('511', '512', '513', '514', '515','521', '522', '561') then 'NORTH'
when area in ('525','526','537','538','539','562','533','534','541','542','543',
'621','622','623','625','626','627','631','632','635','636') then 'SOUTH'
when area >= '700' then 'UNK'
else 'OTH' end
when species_itis = '164744' then
case when area in ('464','465','467','510','511','512','513','514','515') then 'GOM'
/* when (area >= '520' and area <= '700') then 'GBK' */
when area in ('520', '521', '522', '525', '526',
                                '530', '533', '534', '537', '538', '539',
                                '541', '542', '543')
          or (area >= '600' and area <= '700') then 'WGB'
            when area in ( '523', '524', '551', '552', '560', '561', '562') then 'EGB'
when (area = '000' or area = '500') then 'UNK'
else 'OTH' end
when species_itis = '171341' then
case when area in ('510','511','512','513','514','515','521','522','561','525','526',
'533','534','537','538','539','541','542','543','562') then 'UNIT'
when area in ('451','452','453','454','455','456','457','458','459',
'461','462','463','464','465','466','467','468','469','551','552') then 'CAN'
when area = '000' then 'UNK'
else 'OTH' end
when species_itis = '172414' then
case when (area >= '464' and area <= '799') then 'UNIT'
when area < '464' then 'OTH'
when area = '000' then 'UNIT'
```

```
else 'OTH' end
when species_itis = '172567' then
case when area >= '464' then 'UNIT'
when area = '000' then 'UNK'
else 'OTH' end
when species_itis = '172746' then
case when area in ('510','511','512','513','514','515','516','517','518','519','521',
'522','523','524','525','551','552','553','554','555',
'556','557','558','559','560','561','562','542','543','544','545','546',
'547','548','549','464','465') then 'GBGOM'
when (area in ('541','526','533','534','535','536','537','538','539')
or area >= '611') then 'SNEMA'
when area in ('000','500','520') then 'UNK'
else 'OTH' end
when species_itis = '172873' then
case when area in ( '464', '465', '467', '510', '511', '512', '513', '514', '515', '520',
'521', '522', '523', '524', '525', '526', '530', '533', '534', '537', '538', '539', '540', '541',
'542', '543', '560', '561', '562', '600', '610', '611', '612', '613', '614', '615', '616', '620',
'621', '622', '623', '624', '625', '626', '627', '628', '629', '630', '631', '632', '633', '634',
'635', '636', '637', '638', '639', '640') then 'UNIT'
when area >= '700' then 'UNK'
else 'OTH' end
when species_itis = '172877' then
case when area in ('510','511','512','513','514','515') then 'GOM'
when area in ('520','521','522','523','524','525','526','551','552','561','562') then 'GB'
when area in ('537','538','539','533','534','541','542','543') then 'SNE'
when (area >= '611' and area <= '700') then 'MAB'
when area = '000' then 'UNK'
else 'OTH' end
when species_itis = '172905' then
case when area in ('465','464','510','511','512','513','514','515','516','517','518','519') then 'GOM'
when area in ('522','523','524','525','551','552','553','554','555',
'556','557','558','559','560','561','562','542','543','544','545','546',
'547','548','549') then 'GBK'
when (area in ('541','521','526','533','534','535','536','537','538','539')
or area >= '611') then 'SNEMA'
when area in ('000','500','520') then 'UNK'
else 'OTH' end
when species_itis = '172909' then
case when area in ('320','330','340','350','441','456','443','451','453','458','462','463') then 'CAN'
when area in ('464','465','466','467','500','510','511','512','513','514','515','521') then 'CCGOM'
when area in ('520','522','523','524','525','541','542','543','550','551','552','560','561','562') then 'GBK'
when (area in ('526','530','531','533','534','536','537','538','539') or area >= '600') then 'SNEMA'
when area = '000' then 'UNK'
else 'OTH' end
when species_itis = '172933' then
case when area in ('464','465','467','511','512','513','514','515','521',
'522','525','526','533','534','537','538','539','541',
'542','543','561','562','523','524','611','612','613',
'614','615','616','621','622','623','624','625','626',
'627','628','629','631','632','633','634','635','636',
'637','638','639','640','510','520','530','540','560',
'600','610','620','630') then 'UNIT'
```

```
when (area in ('000','500') or (area >= '600' and area <= '700')) then 'UNK'
else 'OTH' end
when species_itis = '630979' then
case when area in ('464','465','467','510','511','512','513','514','515','520','521','522','523',
'524','525','526','530','533','534','537','538','539','540','541','542',
'543','561','562','560','610','611','612','613','614','615','616','620',
'621','622','623','624','625','626','627','628','629','630','631','632',
'633','634','635','636','637','638','639','640','600') then 'UNIT'
when area = '000' then 'UNK'
else 'OTH' end
else 'NO_AREA_DEF' end as stock_abbrev
from all a;
quit;
run;

data all; set all_2x;
length comname $30;
stock = stock_abbrev;
comname = common_name;
run;

*proc contents;
*run;

data all; set all;
***if species_itis = '164499';   /* for testing */

spp_select = 0;

if species_itis in /* 8 multistock species  */
(
'164744',       /*      HADDOCK         */
'164499',       /*      GOOSEFISH       */
'164712',       /*      COD,ATLANTIC    */
'172905',       /*      FLOUNDER,WINTER         */
'172909',       /*      FLOUNDER,YELLOWTAIL     */
'164730',       /*      HAKE,ATLANTIC,RED       */
'164791',       /*      HAKE,SILVER (WHITING)   */
'172746' /*     FLOUNDER,SAND DAB (WINDOWPANE)          */
 ) then spp_select = 1;

if species_itis in  /* other 'selected' species */
(
'082372',       /*      SQUID,LONG FINNED (LOLIGO)      */
'160230',       /*      DOGFISH,SMOOTH          */
'172873',       /*      FLOUNDER,WITCH (GRAY SOLE)      */
'172414',       /*      MACKEREL,ATLANTIC       */
'082521',       /*      SQUID,SHORT FINNED (ILLEX)      */
'620992',       /*      CRAB,RED DEEPSEA        */
'160855',       /*      SKATE,CLEARNOSE         */
'172735',       /*      FLOUNDER,SUMMER (FLUKE)         */
'160617',       /*      DOGFISH,SPINY   */
'169273',       /*      KING WHITING    */
```

```
'080944',	/*	CLAM,SURF	*/
'169182',	/*	SCUP	*/
'167680',	/*	STRIPED BASS	*/
'080983',	/*	CLAM,ARCTIC SURF (STIMPSON)	*/
'159753',	/*	HAGFISH	*/
'172567',	/*	BUTTERFISH	*/
'164740',	/*	CUSK	*/
'564149',	/*	SKATE,THORNY	*/
'167687',	/*	SEA BASS,BLACK	*/
'079718',	/*	SCALLOP,SEA	*/
'097314',	/*	LOBSTER,AMERICAN	*/
'172877',	/*	FLOUNDER,PLAICE,AMERICAN (DAB)	*/
'164732',	/*	HAKE,ATLANTIC,WHITE	*/
'098678',	/*	CRAB,JONAH	*/
'161722',	/*	HERRING,ATLANTIC,SEA	*/
'564136',	/*	SKATE,ROSETTE	*/
'564145',	/*	SKATE,WINTER	*/
'160845',	/*	SKATES	*/
'170479',	/*	TAUTOG	*/
'564151',	/*	SKATE,SMOOTH	*/
'564130',	/*	SKATE,LITTLE	*/
'168543',	/*	TILEFISH,BLUELINE	*/
'164790',	/*	BLACK WHITING/SILVER HAKE MIX	*/
'172413',	/*	MACKEREL,CHUB	*/
'161706',	/*	ALEWIFE*/
'168559',	/*	BLUEFISH	*/
'168546',	/*	TILEFISH (GOLDEN TILEFISH)	*/
'172933',	/*	HALIBUT,ATLANTIC	*/
'164727',	/*	POLLOCK,ATLANTIC	*/
'161701',	/*	HERRING,RIVER	*/
'096967',	/*	SHRIMP,PANDALID	*/
'161731',	/*	MENHADEN	*/
'564139',	/*	SKATE,BARNDOOR	*/
'161703',	/*	HERRING,BLUEBACK	*/
'166774',	/*	REDFISH,ACADIAN	*/
'164729',	/*	HAKE,ATLANTIC,RED & WHITE	*/
'164793',	/*	HAKE,OFFSHORE UNC (WHITING,BLACK)	*/
'168544',	/*	TILEFISH,GOLDFACE	*/
'081343',	/*	CLAM,OCEAN QUAHOG	*/
'081496' /*	CLAM,NORTHERN QUAHOG	*/
) then spp_select = 2;

run;
 /***  end of data prep ******************** */

proc sort data = all;
 by dset spp_select comname species_itis stock alevel;

proc means sum noprint data = all;
by dset spp_select comname species_itis;
var mt var_mt;
output out = results_total sum = mt_total  var_mt_total  ;
run;
```

```
*proc print;
*title2 "TOTAL Landings and associated statistics by species_itis and stock ";
*run;

proc means sum noprint data = all;
by dset spp_select comname species_itis stock;
var mt var_mt;
output out = results_stock sum =  mt_stock var_mt_stock;
run;

*proc print;
*title2 " STOCK Landings and associated statistics by species_itis and stock ";
*run;

proc means sum noprint data = all;
 by dset spp_select comname species_itis stock alevel;
 var mt var_mt;
output out = results1 sum = ;

data results1; set results1;
 cv = sqrt(var_mt) / mt;
 std = cv * mt;
 ci95 = 1.96 * std;
 u95ci = mt + 1.96 * std;
 l95ci = mt - 1.96 * std;
 ***u80ci = mt + 1.28 * std;
 ***l80ci = mt - 1.28 * std;

run;

*proc print;
*title2 "STOCK and ALEVEL Landings and associated statistics by species and stock ";
*run;

data area_imp; set all;
if alevel in ('B', 'C', 'D', 'E');
run;

proc means sum noprint data = area_imp;
 by dset spp_select comname species_itis;
 var mt var_mt;
output out = area_imp_total sum = mt_total_imp;
run;

*proc print;
*title2 "TOTAL Imputed Landings and associated statistics for species and stock ";
*run;

proc means sum noprint data = area_imp;
 by dset spp_select comname species_itis stock;
 var mt var_mt;
output out = area_imp_stock sum = mt_stock_imp;
```

```
run;

*proc print;
*title2 "STOCK Imputed Landings and associated statistics for species and stock  ";
*run;

/* TOTAL species landings: % of imputed landings */
/* find % of imputed area landings */
proc sql;
create view total_area_imp_perc as
select a.*, mt_total_imp,  mt_total_imp/ mt_total * 100 as mt_total_imp_perc
from results_total a, area_imp_total b
where a.dset = b.dset
and a.species_itis = b.species_itis;
quit;
run;


/*** SAVE species_itis SAS set */
data mydir.AACAMS_total (drop = _type_) ; set total_area_imp_perc;
run;

*proc print;
*title2 "Pecentage of total imputed landings for species and stock";
*run;



/* TOTAL STOCK landings: % of imputed landings */
/* find % of imputed area landings */
proc sql;
create view stock_area_imp_perc as
select a.*, mt_stock_imp,  mt_stock_imp/ mt_stock * 100 as mt_stock_imp_perc
from results_stock a, area_imp_stock b
where
a.dset = b.dset
and a.species_itis = b.species_itis
and a.stock = b.stock;
quit;

*proc print data = stock_area_imp_perc;
*title2 "Pecentage of total imputed landings for species and stock";
*run;

proc sort data = all;
 by dset spp_select comname species_itis stock;
run;

proc means sum noprint;
 by dset spp_select comname species_itis stock;
 var mt var_mt;
output out = results2 sum = ;
run;
```

```
data results2; set results2;
 cv = sqrt(var_mt) / mt;
 std = sqrt(var_mt);
 ci95 = 1.96 * std;
 u95ci = mt + (1.96 * std);  /* 1.96 for ci95, 1.645 for 90ci */
 l95ci = mt - (1.96 * std);
 ***u80ci = mt + (1.28 * std);
 ***l80ci = mt - (1.28 * std);
run;

*proc print;
*title2 "Landings and associated statistics for species and stock";
*run;

/* merge stock level PERC and CI info together */
proc sql;
create view stock_all as
select a.*, b.mt_stock_imp, b.mt_stock_imp_perc
from results2 a
full outer join stock_area_imp_perc b
on
a.dset = b.dset
and a.species_itis = b.species_itis
and a.stock = b.stock;
quit;


data AACAMS_stock_all; set stock_all ;
***(rename = ( mt = AA_mt var_mt = AA_var_mt cv = AA_cv std = AA_std u95ci = AA_u95ci l95ci = AA_l95ic ));

run;


 /*** SAVE species_itis SAS set */
data mydir.AACAMS_stock_all (drop= _type_) ; set AACAMS_stock_all;
run;

proc print;
title2 'stock stats - save this set';
run;

proc export data = AACAMS_stock_all
 outfile = "AACAMS_stock_all.csv"
 dbms=csv replace;
run;

/*  ******************************************** */
/*  FOCUS on 8 multistock species */

data AACAMS_8stocks; set AACAMS_stock_all;
if spp_select = 1;
```

```
run;


title2 "CHECK: TOTAL Landings for 8 species and stock";

proc sql;
select dset, comname, species_itis, sum(mt) as MT
from AACAMS_8stocks
group by dset, comname, species_itis;
quit;

/* ****************************************** */
/* transpose data set and rename variables */

proc sort data = AACAMS_8stocks;
  by comname species_itis stock dset;
  run;

proc transpose data = AACAMS_8stocks out = out1;
  by comname species_itis stock dset;
  var mt var_mt ci95 u95ci l95ci;  *cv std mt_stock_imp mt_stock_imp_perc;
  run;

  *proc print;
  *run;

proc transpose data =  out1 delimiter =_ out= new (drop = _name_);
by comname species_itis stock;
 var col1;
 id  _name_ dset;
 run;

*title2 'transposed sas set NEW ';
*proc print;
*run;


data AACAMS_8stocks_new; set new;

mt_diff = mt_AA - mt_CAMS;
var_diff = var_mt_AA  + var_mt_CAMS;

if var_diff = . then diff_ci95 = .;
 else
   diff_ci95 = 1.96 * sqrt(var_diff);

lcl = mt_diff - diff_ci95;
ucl = mt_diff + diff_ci95;
product = lcl * ucl;

if product <= 0 then overlap_0 = -1;  /* overlaps zero = no signif diff */
else overlap_0 = 0;   /* no overlap = signif differences */
run;
```

```
title2 'AACAMS_8stocks_new';
proc print;
run;

proc export data = AACAMS_8stocks_new
 outfile = "AACAMS_8stocks_new.csv"
 dbms=csv replace;
run;

proc print;
var comname stock mt_aa mt_CAMS mt_diff;
run;
endsas;
```

Appendix 8. Comparison of matched trips

Comparison of AA and CAMS landings that matched a VTR (S.E. Wigley)
Feb 10, 2022; rerun Feb 15, 2022

Data Sources: CFDBS.CFDETS2019AA (AA) and CAMS_GARFO.CAMS_CFDETS2019AA (CAMS)

Methods:

1) A comparison of species, stock, and statistical area landings between AA and CAMS focused on 8 species with multiple stocks; cod, haddock, yellowtail flounder, winter flounder, windowpane flounder, goosefish, red hake, and silver hake.
2) The same stock area definitions were applied to each data set; the stock area definitions were taken from STOCKEFF comland (shared by Leona Burgess and modified to run in SAS)
3) Total species landings were summarized in Table 1. In Tables 2 thru 5, landings are summarized by species, stock, and statistical area for those landings that had a direct match to the VTR (referred to a "LEVEL A" or "matched" landings). Only trips with an unique permit (permit != 000000, and permit != 190998, 290998, and 390998) enter the processes to match trips in AA and CAMS. The AA and CAMS processes used different data elements to match trips.
    a. AA used permit-month-day (details described in CRD 08-18)
    b. CAMS used permit, VTR serial number, and date (described in CAMS documentation [insert link when available to public].
    c. When a match occurs, the statistical area reported on the VTR is assigned to the Dealer landings. The AA process uses the data element CAREA for all trips while CAMS uses AREA for groundfish trips ("per agreement with sector managers") and CAREA is used for all other trips.
        i. AREA is defined as "NAFO Statistical Area from charts provided with VTR forms."
        ii. CAREA is defined as "Statistical area calculated from the actual latitudes and longitudes."
4) For each species, stock, and statistical area, the landings (MT, live wt) were summed by data set and their associated percentage of MT was derived by species, stock, and statistical area, respectively. The data set difference in percentage of MT by species, stock and statistical area were also derived.
5) Percentages equal to or greater than the absolute value of 2 were noted.

Summary Points:

Tables 1 and 2 SPECIES

- There were minor differences (less than 1 mt) in total landings between AA and CAMS with exception of red hake and silver hake where the difference in total mt differed by 14 and 8 MT, respectively, with CAMS having more landings for these 2 species.
- The AA data set for 2019 has been constant since May 8, 2020 while the landings in CAMS reflect current dealer landings for 2019 as of Feb 10, 2022. Dealer landings may change

throughout the following year (2020) as multiple sources of Dealer landings (including STATE data) are submitted and finalized.

- For 8 species examined, CAMS has more landings that matched a VTR than the AA data set.
- For 7 of the 8 species, there was generally high (> 78%) percentage of matched landings that the species level.
    - Windowpane flounder had a low percentage of matched landings; windowpane is a no possession species.

Tables 3 and 4 SPECIES, STOCK

- Differences between matched landings varied at the stock level; however, CAMS stock landings are higher than AA stock landings (except silver hake "OTHER" stock).
- Cod and haddock had stock level percent differences that were greater than abs(2%); all other stocks were less than abs(2%).
    - For cod, the differences were between EGB and WGB (within GB)
    - For haddock, the differences were between GOM and GB (EGB and WGB)
    - Winter flounder had a similar pattern to haddock, but percentages were lower.

Table 5 SPECIES, STOCK, STAT AREA

- Differences in statistical area within a stock varied
- Noticeable (=> -2%, +2%) differences in percentages between AA and CAMS occurred in the following species, stock, stat areas:

EGB COD: 561 and 562
GOM COD: 513 and 515
WGB COD: 521 and 522
WINDOWPANE had high percentages of small mt
GB WINTER FLD: 521 and 561
SNEMA WINTER FLD: 538
GB YT: 522, 525, 561 (small mt)
SNEMA YT: 537 and 539 (small mt)
NO MONK: 513, 514, 515
GOM HADD: 513, 514, 515
SO RHK: 539
NO SHK: 514

Conclusion:

This is a qualitative comparison. For landings that matched a VTR, there were a few "noticeable" percentage differences in both stock and statistical areas between AA and CAMS; overall, there were not large percent differences between AA and CAMS stock landings. The CAMS stock landings were always greater than the AA stock landings, but differed differentially. It appears the differences between AA and CAMS matched stock landings is not attributed to the time the data sets were created. A more detailed look at matched data is recommended, including any possible impacts due to differences between CAMS's use of AREA and CAREA.

Code used is provided at the end.

Table 1. Total landings (MT, live) for 8 multi-stock species, by species and data set (AA, CAMS).

SPECIES	AA	CAMS	DIFF MT (CAMS - AA)
COD,ATLANTIC	1017.46	1017.22	-0.25
FLOUNDER,WINDOWPANE	9.76	10.73	0.98
FLOUNDER,WINTER	584.41	584.22	-0.19
FLOUNDER,YELLOWTAIL	411.27	411.26	-0.01
GOOSEFISH	10457.28	10457.02	-0.27
HADDOCK	8716.12	8715.53	-0.59
HAKE,ATLANTIC,RED	448.08	462.61	14.53
HAKE,SILVER (WHITING)	5228.99	5236.84	7.85

Table 2. LEVEL A ("matched") landings (MT, live) and percent of total species landings for 8 multi-stock species by species and data set (AA, CAMS).

Species	AA	CAMS	DIFF MT (CAMS - AA)	% of AA Total	% of CAMS Total
COD,ATLANTIC	865.198	980.558	115.36	85.0%	96.4%
FLOUNDER,WINDOWPANE	0.036	0.036	0.00	0.4%	0.3%
FLOUNDER,WINTER	456.551	510.196	53.65	78.1%	87.3%
FLOUNDER,YELLOWTAIL	364.129	370.618	6.49	88.5%	90.1%
GOOSEFISH	9893.350	10287.736	394.39	94.6%	98.4%
HADDOCK	7568.662	8542.273	973.61	86.8%	98.0%
HAKE,ATLANTIC,RED	415.793	441.970	26.18	92.8%	95.5%
HAKE,SILVER (WHITING)	5054.210	5128.868	74.66	96.7%	97.9%

Table 3. LEVEL A ("matched") landings (MT, live) for 8 multi-stock species by species, stock, and data set (AA, CAMS)

SPECIES, STOCK	AA	CAMS	DIFF MT (CAMS - AA)
COD,ATLANTIC	**865.198**	**980.558**	**115.36**
164712EGB	23.767	52.027	28.26
164712GOM	257.460	295.412	37.95
164712WGB	583.970	633.119	49.15
FLOUNDER,WINDOWPANE	**0.036**	**0.036**	**0.00**
172746GBGOM	0.032	0.032	0.00
172746SNEMA	0.004	0.004	0.00
FLOUNDER,WINTER	**456.551**	**510.196**	**53.65**
172905GBK	267.803	302.899	35.10
172905GOM	67.434	69.333	1.90
172905SNEMA	121.314	137.964	16.65
FLOUNDER,YELLOWTAIL	**364.129**	**370.618**	**6.49**
172909CAN	222.375	222.375	0.00
172909CCGOM	137.776	142.145	4.37
172909GBK	2.232	3.906	1.67
172909SNEMA	1.746	2.193	0.45
GOOSEFISH	**9893.350**	**10287.736**	**394.39**
164499NORTH	5792.804	6019.855	227.05
164499OTHR	0.013	0.013	0.00
164499SOUTH	4100.534	4267.868	167.33
HADDOCK	**7568.662**	**8542.273**	**973.61**
164744EGB	462.087	610.776	148.69
164744GOM	3201.148	3253.426	52.28
164744WGB	3905.427	4678.072	772.64
HAKE,ATLANTIC,RED	**415.793**	**441.970**	**26.18**
164730NORTH	106.145	120.784	14.64
164730OTH	166.932	170.418	3.49
164730SOUTH	142.716	150.767	8.05
HAKE,SILVER (WHITING)	**5054.210**	**5128.868**	**74.66**
164791NORTH	1143.811	1192.757	48.95
164791OTH	1040.698	1011.479	-29.22
164791SOUTH	2869.701	2924.632	54.93

Table 4. LEVEL A ("matched") landings (MT, live) and associated percentage for 8 multi-stock species by species, stock, and data set (AA, CAMS).

SPECIES, STOCK	AA	CAMS	AA %	CAMS %	DIFF (CAM % - AA %)
COD,ATLANTIC					
164712EGB	23.7673	52.0270	2.75%	5.31%	2.56%
164712GOM	257.4604	295.4120	29.76%	30.13%	0.37%
164712WGB	583.9698	633.1192	67.50%	64.57%	-2.93%
FLOUNDER,WINDOWPANE					
172746GBGOM	0.0318	0.0318	88.61%	88.61%	0.00%
172746SNEMA	0.0041	0.0041	11.39%	11.39%	0.00%
FLOUNDER,WINTER					
172905GBK	267.8027	302.8986	58.66%	59.37%	0.71%
172905GOM	67.4342	69.3334	14.77%	13.59%	-1.18%
172905SNEMA	121.3142	137.9642	26.57%	27.04%	0.47%
FLOUNDER,YELLOWTAIL					
172909CAN	222.3746	222.3746	61.07%	60.00%	-1.07%
172909CCGOM	137.7760	142.1445	37.84%	38.35%	0.52%
172909GBK	2.2317	3.9059	0.61%	1.05%	0.44%
172909SNEMA	1.7463	2.1931	0.48%	0.59%	0.11%
GOOSEFISH					
164499NORTH	5792.8041	6019.8548	58.55%	58.51%	-0.04%
164499OTHR	0.0127	0.0127	0.00%	0.00%	0.00%
164499SOUTH	4100.5335	4267.8683	41.45%	41.49%	0.04%
HADDOCK					
164744EGB	462.0872	610.7757	6.11%	7.15%	1.04%
164744GOM	3201.1479	3253.4257	42.29%	38.09%	-4.21%
164744WGB	3905.4271	4678.0718	51.60%	54.76%	3.16%
HAKE,ATLANTIC,RED					
164730NORTH	106.1447	120.7844	25.53%	27.33%	1.80%
164730OTH	166.9324	170.4178	40.15%	38.56%	-1.59%
164730SOUTH	142.7160	150.7673	34.32%	34.11%	-0.21%
HAKE,SILVER (WHITING)					
164791NORTH	1143.8112	1192.7570	22.63%	23.26%	0.62%
164791OTH	1040.6983	1011.4792	20.59%	19.72%	-0.87%
164791SOUTH	2869.7007	2924.6316	56.78%	57.02%	0.24%

Table 5. LEVEL A ("matched") landings (MT, live) and associated percentage by statistical area within stock, for 8 multi-stock species, by species, stock, statistical area, and data set (AA, CAMS).

SPECIES, STOCK, STAT AREA	AA	CAMS	AA %	CAMS %	DIFF (CAMS % - AA %)
COD,ATLANTIC					
164712EGB					
561	23.500	49.314	98.88%	94.79%	-4.09%
562	0.267	2.713	1.12%	5.21%	4.09%
164712GOM					
464	0.740	0.349	0.29%	0.12%	-0.17%
465	0.134	0.242	0.05%	0.08%	0.03%
511	0.120	0.151	0.05%	0.05%	0.00%
512	1.660	3.009	0.64%	1.02%	0.37%
513	81.180	81.456	31.53%	27.57%	-3.96%
514	135.747	151.799	52.73%	51.39%	-1.34%
515	37.879	58.407	14.71%	19.77%	5.06%
164712WGB					
521	392.076	401.167	67.14%	63.36%	-3.78%
522	181.879	219.745	31.15%	34.71%	3.56%
525	0.524	0.613	0.09%	0.10%	0.01%
526	0.010	1.281	0.00%	0.20%	0.20%
537	2.178	1.422	0.37%	0.22%	-0.15%
538	0.029	0.006	0.00%	0.00%	0.00%
539	3.332	4.878	0.57%	0.77%	0.20%
611	0.176	0.213	0.03%	0.03%	0.00%
612	0.068	0.071	0.01%	0.01%	0.00%
613	3.689	3.722	0.63%	0.59%	-0.04%
614	0.002		0.00%	0.00%	0.00%
616	0.005		0.00%	0.00%	0.00%
631	0.002	0.002	0.00%	0.00%	0.00%
FLOUNDER,WINDOWPANE					
172746GBGOM					
521	0.032	0.032	100.00%	100.00%	0.00%
172746SNEMA					
539		0.001	0.00%	33.33%	33.33%
611	0.004	0.003	100.00%	66.67%	-33.33%
FLOUNDER,WINTER					
172905GBK					
522	159.639	199.171	59.61%	65.75%	6.14%
525	0.470	1.266	0.18%	0.42%	0.24%
561	103.239	96.097	38.55%	31.73%	-6.82%
562	4.455	6.366	1.66%	2.10%	0.44%
172905GOM					
464	0.684	0.001	1.01%	0.00%	-1.01%

SPECIES, STOCK, STAT AREA	AA	CAMS	AA %	CAMS %	DIFF (CAMS % - AA %)
512		0.002	0.00%	0.00%	0.00%
513	2.789	3.464	4.14%	5.00%	0.86%
514	63.947	65.186	94.83%	94.02%	-0.81%
515	0.015	0.680	0.02%	0.98%	0.96%
172905SNEMA					
521	70.896	82.014	58.44%	59.45%	1.01%
526	0.002	0.008	0.00%	0.01%	0.00%
537	5.342	7.554	4.40%	5.48%	1.07%
538	0.201	0.379	0.17%	0.27%	0.11%
539	40.914	43.663	33.73%	31.65%	-2.08%
611	2.455	2.202	2.02%	1.60%	-0.43%
612	0.119	0.121	0.10%	0.09%	-0.01%
613	1.253	1.893	1.03%	1.37%	0.34%
614	0.070	0.024	0.06%	0.02%	-0.04%
615	0.048	0.096	0.04%	0.07%	0.03%
616	0.013	0.010	0.01%	0.01%	0.00%
FLOUNDER,YELLOWTAIL					
172909CAN					
340	222.375	222.375	100.00%	100.00%	0.00%
172909CCGOM					
512	0.004	0.020	0.00%	0.01%	0.01%
513	2.131	3.262	1.55%	2.30%	0.75%
514	131.989	135.579	95.80%	95.38%	-0.42%
515	0.357	0.418	0.26%	0.29%	0.04%
521	3.295	2.866	2.39%	2.02%	-0.38%
172909GBK					
522	0.738	3.099	33.09%	79.34%	46.25%
525	1.446	0.661	64.78%	16.93%	-47.84%
561	0.027	0.126	1.22%	3.23%	2.01%
562	0.020	0.020	0.91%	0.50%	-0.42%
172909SNEMA					
526		0.000	0.00%	0.00%	0.00%
537	0.479	0.733	27.45%	33.42%	5.97%
538	0.017	0.031	0.96%	1.43%	0.47%
539	1.082	1.266	61.95%	57.75%	-4.20%
611	0.021	0.011	1.22%	0.50%	-0.72%
613	0.127	0.134	7.25%	6.12%	-1.12%
615	0.001		0.08%	0.00%	-0.08%
616	0.019	0.017	1.09%	0.79%	-0.30%
GOOSEFISH					
164499NORTH					
464	96.212	67.827	1.66%	1.13%	-0.53%
465	76.243	63.669	1.32%	1.06%	-0.26%
511	42.603	48.755	0.74%	0.81%	0.07%

SPECIES, STOCK, STAT AREA	AA	CAMS	AA %	CAMS %	DIFF (CAMS % - AA %)
512	248.293	303.634	4.29%	5.04%	0.76%
513	1102.193	879.632	19.03%	14.61%	-4.41%
514	796.069	647.043	13.74%	10.75%	-2.99%
515	1831.223	2288.931	31.61%	38.02%	6.41%
521	776.460	752.880	13.40%	12.51%	-0.90%
522	755.178	884.729	13.04%	14.70%	1.66%
561	68.331	82.755	1.18%	1.37%	0.20%
164499OTHR					
703	0.013	0.013	100.00%	100.00%	0.00%
164499SOUTH					
525	70.256	70.795	1.71%	1.66%	-0.05%
526	114.010	117.846	2.78%	2.76%	-0.02%
533	7.590	0.273	0.19%	0.01%	-0.18%
534	0.091	0.388	0.00%	0.01%	0.01%
537	1771.043	1855.161	43.19%	43.47%	0.28%
538	3.458	5.019	0.08%	0.12%	0.03%
539	214.400	215.369	5.23%	5.05%	-0.18%
543	0.188	0.188	0.00%	0.00%	0.00%
562	11.872	12.662	0.29%	0.30%	0.01%
611	54.121	87.791	1.32%	2.06%	0.74%
612	284.586	291.053	6.94%	6.82%	-0.12%
613	970.043	1005.196	23.66%	23.55%	-0.10%
614	9.637	7.149	0.24%	0.17%	-0.07%
615	311.085	310.958	7.59%	7.29%	-0.30%
616	183.281	184.079	4.47%	4.31%	-0.16%
621	7.482	8.523	0.18%	0.20%	0.02%
622	23.814	25.771	0.58%	0.60%	0.02%
623	3.103	3.258	0.08%	0.08%	0.00%
624	0.073	0.256	0.00%	0.01%	0.00%
625	17.295	17.297	0.42%	0.41%	-0.02%
626	41.306	47.394	1.01%	1.11%	0.10%
627	0.656	0.764	0.02%	0.02%	0.00%
628		0.164	0.00%	0.00%	0.00%
631	0.039	0.039	0.00%	0.00%	0.00%
632	0.151	0.171	0.00%	0.00%	0.00%
633	0.226	0.058	0.01%	0.00%	0.00%
635	0.287	0.049	0.01%	0.00%	-0.01%
636	0.402	0.196	0.01%	0.00%	-0.01%
637	0.037		0.00%	0.00%	0.00%
HADDOCK					
164744EGB					
561	461.679	602.826	99.91%	98.70%	-1.21%
562	0.408	7.950	0.09%	1.30%	1.21%
164744GOM					

SPECIES, STOCK, STAT AREA	AA	CAMS	AA %	CAMS %	DIFF (CAMS % - AA %)
464	59.799	12.340	1.87%	0.38%	-1.49%
465	89.134	91.556	2.78%	2.81%	0.03%
511	42.516	46.215	1.33%	1.42%	0.09%
512	249.009	290.475	7.78%	8.93%	1.15%
513	533.531	415.301	16.67%	12.77%	-3.90%
514	1004.112	885.360	31.37%	27.21%	-4.15%
515	1223.047	1512.179	38.21%	46.48%	8.27%
164744WGB					
521	2038.639	2353.855	52.20%	50.32%	-1.88%
522	1863.250	2321.276	47.71%	49.62%	1.91%
525	2.206	1.536	0.06%	0.03%	-0.02%
526		0.099	0.00%	0.00%	0.00%
537	0.609	0.569	0.02%	0.01%	0.00%
538	0.040	0.002	0.00%	0.00%	0.00%
539	0.159	0.210	0.00%	0.00%	0.00%
612	0.026	0.026	0.00%	0.00%	0.00%
613	0.490	0.490	0.01%	0.01%	0.00%
615	0.009	0.010	0.00%	0.00%	0.00%
HAKE,ATLANTIC,RED					
164730NORTH					
511	0.016		0.01%	0.00%	-0.01%
513	17.916	20.288	16.88%	16.80%	-0.08%
514	76.976	88.520	72.52%	73.29%	0.77%
515		0.078	0.00%	0.06%	0.06%
521	11.124	11.757	10.48%	9.73%	-0.75%
522	0.114	0.141	0.11%	0.12%	0.01%
164730OTH					
611	60.975	65.269	36.53%	38.30%	1.77%
612	29.829	29.873	17.87%	17.53%	-0.34%
613	42.693	41.033	25.58%	24.08%	-1.50%
614	0.059	0.059	0.04%	0.03%	0.00%
615	2.751	2.751	1.65%	1.61%	-0.03%
616	30.608	31.403	18.34%	18.43%	0.09%
624		0.029	0.00%	0.02%	0.02%
633	0.018		0.01%	0.00%	-0.01%
164730SOUTH					
525	0.513	0.430	0.36%	0.28%	-0.07%
526	0.016	0.073	0.01%	0.05%	0.04%
533	0.027	0.054	0.02%	0.04%	0.02%
534	0.021	0.032	0.01%	0.02%	0.01%
537	65.442	70.491	45.86%	46.75%	0.90%
538	0.730	1.730	0.51%	1.15%	0.64%
539	71.267	72.119	49.94%	47.83%	-2.10%
542		0.324	0.00%	0.22%	0.22%

SPECIES, STOCK, STAT AREA	AA	CAMS	AA %	CAMS %	DIFF (CAMS % - AA %)
543	0.082	0.082	0.06%	0.05%	0.00%
562	1.839	2.381	1.29%	1.58%	0.29%
621	0.843	0.953	0.59%	0.63%	0.04%
622	1.023	1.066	0.72%	0.71%	-0.01%
623	0.286	0.319	0.20%	0.21%	0.01%
626	0.517	0.711	0.36%	0.47%	0.11%
627		0.000	0.00%	0.00%	0.00%
631	0.002	0.002	0.00%	0.00%	0.00%
636	0.109		0.08%	0.00%	-0.08%
HAKE,SILVER (WHITING)					
164791NORTH					
511	0.040	0.043	0.00%	0.00%	0.00%
512	0.205	0.450	0.02%	0.04%	0.02%
513	55.045	42.894	4.81%	3.60%	-1.22%
514	402.081	478.522	35.15%	40.12%	4.97%
515	7.884	10.498	0.69%	0.88%	0.19%
521	522.466	524.379	45.68%	43.96%	-1.71%
522	155.783	135.663	13.62%	11.37%	-2.25%
561	0.307	0.308	0.03%	0.03%	0.00%
164791OTH					
464	0.090	0.089	0.01%	0.01%	0.00%
465	0.015	0.029	0.00%	0.00%	0.00%
611	280.130	290.753	26.92%	28.75%	1.83%
612	79.106	69.011	7.60%	6.82%	-0.78%
613	183.191	179.740	17.60%	17.77%	0.17%
614	0.004	0.035	0.00%	0.00%	0.00%
615	1.221	1.238	0.12%	0.12%	0.01%
616	496.827	470.095	47.74%	46.48%	-1.26%
624		0.437	0.00%	0.04%	0.04%
628		0.051	0.00%	0.01%	0.01%
633	0.052		0.00%	0.00%	0.00%
637	0.064		0.01%	0.00%	-0.01%
164791SOUTH					
525	180.405	178.890	6.29%	6.12%	-0.17%
526	4.017	4.802	0.14%	0.16%	0.02%
533	2.359	2.522	0.08%	0.09%	0.00%
534	0.039	0.095	0.00%	0.00%	0.00%
537	1130.195	1152.150	39.38%	39.39%	0.01%
538	20.560	47.933	0.72%	1.64%	0.92%
539	935.516	909.657	32.60%	31.10%	-1.50%
542		0.163	0.00%	0.01%	0.01%
543	18.502	18.502	0.64%	0.63%	-0.01%
562	512.552	542.771	17.86%	18.56%	0.70%
621	1.348	2.253	0.05%	0.08%	0.03%

SPECIES, STOCK, STAT AREA	AA	CAMS	AA %	CAMS %	DIFF (CAMS % - AA %)
622	29.909	30.174	1.04%	1.03%	-0.01%
623	6.590	9.546	0.23%	0.33%	0.10%
625	0.508	1.030	0.02%	0.04%	0.02%
626	18.757	24.037	0.65%	0.82%	0.17%
627	0.213	0.100	0.01%	0.00%	0.00%
632	0.033	0.006	0.00%	0.00%	0.00%
636	8.197		0.29%	0.00%	-0.29%

SQL and SAS code used

FOR TOTAL SPECIES LANDINGS

```
select species_itis, sum(spplivlb)*0.000453592370 as mt
from  cams_garfo.cams_cfdets2019aa@nova c, stockeff.mv_species_itis_ne@sole s
  where
   c.nespp4 = s.nespp4(+)
   and s.nespp4_flag = 1
 and landing_source = 'DLR'
and species_itis in
(
'164744',
'164499',
'164712',
'172905',
'172909',
'164730',
'164791',
'172746'
 )
 group by species_itis;

 select species_itis, sum(spplivlb)*0.000453592370 as mt
from  cfdbs.cfdets2019aa@sole c, stockeff.mv_species_itis_ne@sole s
  where
   c.nespp4 = s.nespp4(+)
   and s.nespp4_flag = 1
and species_itis in
(
'164744',
'164499',
'164712',
'172905',
'172909',
'164730',
'164791',
'172746'
 )
 group by species_itis;
```

SAScode

```
%include '!HOME/sas_data.sas';

*** Modified LB's stock area sql code for STOCKEFF (comland area definitions for CF module)
*** TO RUN:  sas AA_CAMS_landings_MATCHED_v1 -noterminal &

options ls = 132;
```

```
options ps = 90;

***************************************************************************;
***************************************************************************;

*** get species data from cfdets2019AA@SOLE and cams_garfo.cams_cfdets2019aa ;
*** sum to trip-area-nespp4 level ;

proc sql;
connect to oracle ( user=&orausername1 password=&orapassword1 path = 'SOLE');

%put &sqlxmsg;
%put &sqlxrc;

create view cfallx  as
select dlrtrpid, area, alevel, prob, nespp4, species_itis, common_name, mt
from connection to oracle
(select dlrtrpid, area, alevel, prob, a.nespp4, species_itis, common_name,
  sum(spplivlb * 0.000453592370) as  mt
  from  cfdbs.cfdets2019aa@sole a, stockeff.mv_species_itis_ne@sole s
  where
   a.nespp4 = s.nespp4(+)
   and s.nespp4_flag = 1
   and alevel = 'A'
   group by dlrtrpid, area, alevel, prob, a.nespp4, species_itis, common_name);

   %put &sqlxmsg;
   %put &sqlxrc;

create view cmallx  as
select dlrtrpid, area, area_source, area_imp_method, prob, nespp4, species_itis, common_name,
  mt
from connection to oracle
(select camsid as dlrtrpid, area,
area_source, area_imp_method,
area_prop as prob,
c.nespp4, species_itis, common_name,
  sum(spplivlb * 0.000453592370) as  mt
  from  cams_garfo.cams_cfdets2019aa@nova c, stockeff.mv_species_itis_ne@sole s
  where
   c.nespp4 = s.nespp4(+)
   and s.nespp4_flag = 1
   and landing_source = 'DLR'
   and area_source in ('AREA', 'CAREA')
   group by camsid, area, area_source, area_imp_method,
    area_prop, c.nespp4, species_itis, common_name);
```

```
 %put &sqlxmsg;
   %put &sqlxrc;
execute (commit) by oracle;
%put &sqlxmsg;
%put &sqlxrc;
disconnect from oracle;
quit;

/* ************************************ */
/* prep to align data sets */
data AA_all; set cfallx;
dset = 'AA  ';
run;

*proc contents;
*run;

/* prep CAMS data */
data CAMS_all;  set cmallx ;
if area_source in ('AREA', 'CAREA') and area_imp_method in ('') then alevel = 'A';
dset = 'CAMS';
run;

*proc contents;
*run;

/* join data sets */
data all; set AA_all CAMS_all;
run;

/* find stock area */
proc sql;
create view all_2x as
select  a.*,
case when species_itis = '164499' then
case when area in ('460','464','465','467', '510','511','512',
'513','514','515','521','522','523','561') then 'NORTH'
when (area in ('525','526','533','534','537','538','539',
'540','541','542','543','562') or (area > '600' and area < '700')) then 'SOUTH'
else 'OTHR' end
when species_itis = '164712' then
case when area in ('464','465','467','510','511','512','513','514','515') then 'GOM'
/* when (area >= '520' and area <= '700') then 'GBK' */
  when area in ( '523', '524', '551', '552', '560', '561', '562') then 'EGB'
  when area not in ( '523', '524', '551', '552', '560', '561', '562')
  and area >= '520' and area <= '700' then 'WGB'
when area in ('464','465') then 'SCO'
```

```
when area = '000' then 'UNK'
else 'OTHR' end
when species_itis = '164727' then
case when (area >= '500' and area <= '600') then 'UNIT'
when area in ('464', '465') then 'UNIT'
when (area >= '300' and area <= '463') then 'CAN'
when (area >= '466' and area <= '499') then 'CAN'
when (area = '000' or area <='299' or area >= '700') then 'UNK'
else 'OTHR' end
when species_itis in ( '164730', '164791') then    /* SILVER and RED - same definition */
case when area in ('511', '512', '513', '514', '515','521', '522', '561') then 'NORTH'
when area in ('525','526','537','538','539','562','533','534','541','542','543',
'621','622','623','625','626','627','631','632','635','636') then 'SOUTH'
when area >= '700' then 'UNK'
else 'OTH' end
when species_itis = '164744' then
case when area in ('464','465','467','510','511','512','513','514','515') then 'GOM'
/* when (area >= '520' and area <= '700') then 'GBK' */
when area in ('520', '521', '522', '525', '526',
                    '530', '533', '534', '537', '538', '539',
                    '541', '542', '543')
  or (area >= '600' and area <= '700') then 'WGB'
    when area in ( '523', '524', '551', '552', '560', '561', '562') then 'EGB'
when (area = '000' or area = '500') then 'UNK'
else 'OTH' end
when species_itis = '171341' then
case when area in ('510','511','512','513','514','515','521','522','561','525','526',
'533','534','537','538','539','541','542','543','562') then 'UNIT'
when area in ('451','452','453','454','455','456','457','458','459',
'461','462','463','464','465','466','467','468','469','551','552') then 'CAN'
when area = '000' then 'UNK'
else 'OTH' end
when species_itis = '172414' then
case when (area >= '464' and area <= '799') then 'UNIT'
when area < '464' then 'OTH'
when area = '000' then 'UNIT'
else 'OTH' end
when species_itis = '172567' then
case when area >= '464' then 'UNIT'
when area = '000' then 'UNK'
else 'OTH' end
when species_itis = '172746' then
case when area in ('510','511','512','513','514','515','516','517','518','519','521',
'522','523','524','525','551','552','553','554','555',
'556','557','558','559','560','561','562','542','543','544','545','546',
'547','548','549','464','465') then 'GBGOM'
when (area in ('541','526','533','534','535','536','537','538','539')
```

```
or area >= '611') then 'SNEMA'
when area in ('000','500','520') then 'UNK'
else 'OTH' end
when species_itis = '172873' then
case when area in ( '464', '465', '467', '510', '511', '512', '513', '514', '515', '520',
'521', '522', '523', '524', '525', '526', '530', '533', '534', '537', '538', '539', '540', '541',
'542', '543', '560', '561', '562', '600', '610', '611', '612', '613', '614', '615', '616', '620',
'621', '622', '623', '624', '625', '626', '627', '628', '629', '630', '631', '632', '633', '634',
'635', '636', '637', '638', '639', '640') then 'UNIT'
when area >= '700' then 'UNK'
else 'OTH' end
when species_itis = '172877' then
case when area in ('510','511','512','513','514','515') then 'GOM'
when area in ('520','521','522','523','524','525','526','551','552','561','562') then 'GB'
when area in ('537','538','539','533','534','541','542','543') then 'SNE'
when (area >= '611' and area <= '700') then 'MAB'
when area = '000' then 'UNK'
else 'OTH' end
when species_itis = '172905' then
case when area in ('465','464','510','511','512','513','514','515','516','517','518','519') then 'GOM'
when area in ('522','523','524','525','551','552','553','554','555',
'556','557','558','559','560','561','562','542','543','544','545','546',
'547','548','549') then 'GBK'
when (area in ('541','521','526','533','534','535','536','537','538','539')
or area >= '611') then 'SNEMA'
when area in ('000','500','520') then 'UNK'
else 'OTH' end
when species_itis = '172909' then
case when area in ('320','330','340','350','441','456','443','451','453','458','462','463') then 'CAN'
when area in ('464','465','466','467','500','510','511','512','513','514','515','521') then 'CCGOM'
when area in ('520','522','523','524','525','541','542','543','550','551','552','560','561','562') then
 'GBK'
when (area in ('526','530','531','533','534','536','537','538','539') or area >= '600') then 'SNEMA'
when area = '000' then 'UNK'
else 'OTH' end
when species_itis = '172933' then
case when area in ('464','465','467','511','512','513','514','515','521',
'522','525','526','533','534','537','538','539','541',
'542','543','561','562','523','524','611','612','613',
'614','615','616','621','622','623','624','625','626',
'627','628','629','631','632','633','634','635','636',
'637','638','639','640','510','520','530','540','560',
'600','610','620','630') then 'UNIT'
when (area in ('000','500') or (area >= '600' and area <= '700')) then 'UNK'
else 'OTH' end
when species_itis = '630979' then
case when area in ('464','465','467','510','511','512','513','514','515','520','521','522','523',
```

```
'524','525','526','530','533','534','537','538','539','540','541','542',
'543','561','562','560','610','611','612','613','614','615','616','620',
'621','622','623','624','625','626','627','628','629','630','631','632',
'633','634','635','636','637','638','639','640','600') then 'UNIT'
when area = '000' then 'UNK'
else 'OTH' end
else 'NO_AREA_DEF' end as stock_abbrev
from all a;
quit;
run;

data all; set all_2x;
length comname $30;
stock = stock_abbrev;
comname = common_name;
run;

*proc contents;
*run;

data all; set all;
***if species_itis = '164499';   /* for testing */

spp_select = 0;

if species_itis in /* 8 multistock species  */
(
'164744',       /*      HADDOCK         */
'164499',       /*      GOOSEFISH       */
'164712',       /*      COD,ATLANTIC  */
'172905',       /*      FLOUNDER,WINTER       */
'172909',       /*      FLOUNDER,YELLOWTAIL            */
'164730',       /*      HAKE,ATLANTIC,RED      */
'164791',       /*      HAKE,SILVER (WHITING)*/
'172746' /*     FLOUNDER,SAND DAB (WINDOWPANE)  */
 ) then spp_select = 1;

if species_itis in  /* other 'selected' species */
(
'082372',       /*      SQUID,LONG FINNED (LOLIGO)   */
'160230',       /*      DOGFISH,SMOOTH        */
'172873',       /*      FLOUNDER,WITCH (GRAY SOLE) */
'172414',       /*      MACKEREL,ATLANTIC     */
'082521',       /*      SQUID,SHORT FINNED (ILLEX)     */
'620992',       /*      CRAB,RED DEEPSEA       */
'160855',       /*      SKATE,CLEARNOSE        */
'172735',       /*      FLOUNDER,SUMMER (FLUKE)     */
```

```
'160617',     /*    DOGFISH,SPINY */
'169273',     /*    KING WHITING  */
'080944',     /*    CLAM,SURF     */
'169182',     /*    SCUP    */
'167680',     /*    STRIPED BASS    */
'080983',     /*    CLAM,ARCTIC SURF (STIMPSON)*/
'159753',     /*    HAGFISH       */
'172567',     /*    BUTTERFISH    */
'164740',     /*    CUSK    */
'564149',     /*    SKATE,THORNY */
'167687',     /*    SEA BASS,BLACK          */
'079718',     /*    SCALLOP,SEA     */
'097314',     /*    LOBSTER,AMERICAN      */
'172877',     /*    FLOUNDER,PLAICE,AMERICAN (DAB)      */
'164732',     /*    HAKE,ATLANTIC,WHITE  */
'098678',     /*    CRAB,JONAH    */
'161722',     /*    HERRING,ATLANTIC,SEA */
'564136',     /*    SKATE,ROSETTE */
'564145',     /*    SKATE,WINTER  */
'160845',     /*    SKATES */
'170479',     /*    TAUTOG        */
'564151',     /*    SKATE,SMOOTH*/
'564130',     /*    SKATE,LITTLE    */
'168543',     /*    TILEFISH,BLUELINE       */
'164790',     /*    BLACK WHITING/SILVER HAKE MIX        */
'172413',     /*    MACKEREL,CHUB           */
'161706',     /*    ALEWIFE       */
'168559',     /*    BLUEFISH      */
'168546',     /*    TILEFISH (GOLDEN TILEFISH)       */
'172933',     /*    HALIBUT,ATLANTIC        */
'164727',     /*    POLLOCK,ATLANTIC        */
'161701',     /*    HERRING,RIVER */
'096967',     /*    SHRIMP,PANDALID         */
'161731',     /*    MENHADEN      */
'564139',     /*    SKATE,BARNDOOR          */
'161703',     /*    HERRING,BLUEBACK        */
'166774',     /*    REDFISH,ACADIAN         */
'164729',     /*    HAKE,ATLANTIC,RED & WHITE    */
'164793',     /*    HAKE,OFFSHORE UNC (WHITING,BLACK)*/
'168544',     /*    TILEFISH,GOLDFACE       */
'081343',     /*    CLAM,OCEAN QUAHOG */
'081496' /*   CLAM,NORTHERN QUAHOG       */
) then spp_select = 2;

run;
 /***  end of data prep ******************** */
```

```
data all; set all;
if spp_select = 1;
run;

proc sort;
by species_itis comname stock area dset;
run;

/* stat area */
proc means sum noprint;
by  species_itis comname stock area dset;
var mt;
output out = area sum = ;
run;

proc transpose data = area out = out1;
  by species_itis comname stock area dset;
  var mt;
  run;

  *proc print;
  *run;

proc transpose data =  out1 delimiter =_ out= new (drop = _name_);
by species_itis comname stock area;
 var col1;
 id  _name_ dset;
 run;

data area_new; set new;
run;
title2 'transposed sas set AREA_NEW ';
proc print;
run;


proc export data = area_new
outfile = "AACAMS_MATCHED_area_new.csv"
 dbms=csv replace;
run;


ENDSAS;
/* the rest not needed or used*/
```