

# Length and catch composition differences between the DOG (fall) and HBLL inside north and south surveys

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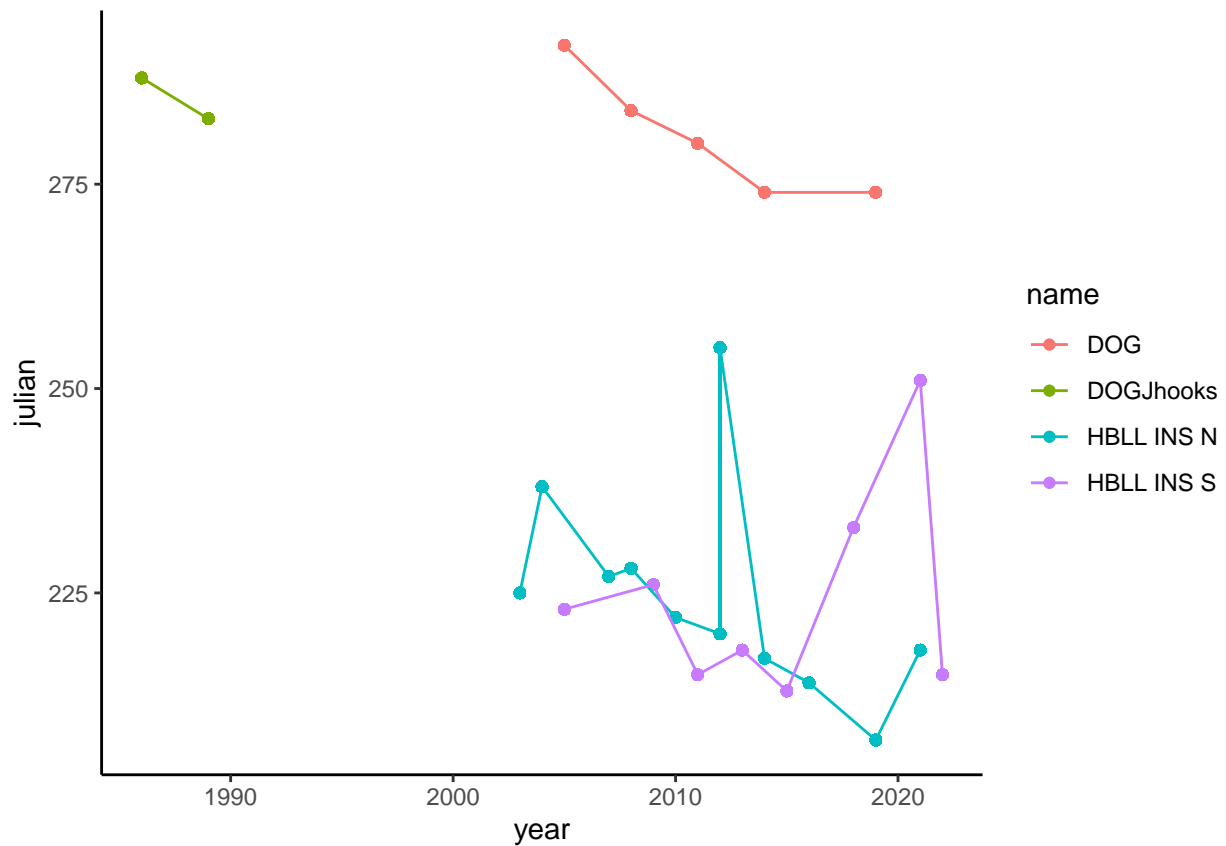
7/18/2023

```
## [1] "Strait of Georgia Dogfish Longline"
```

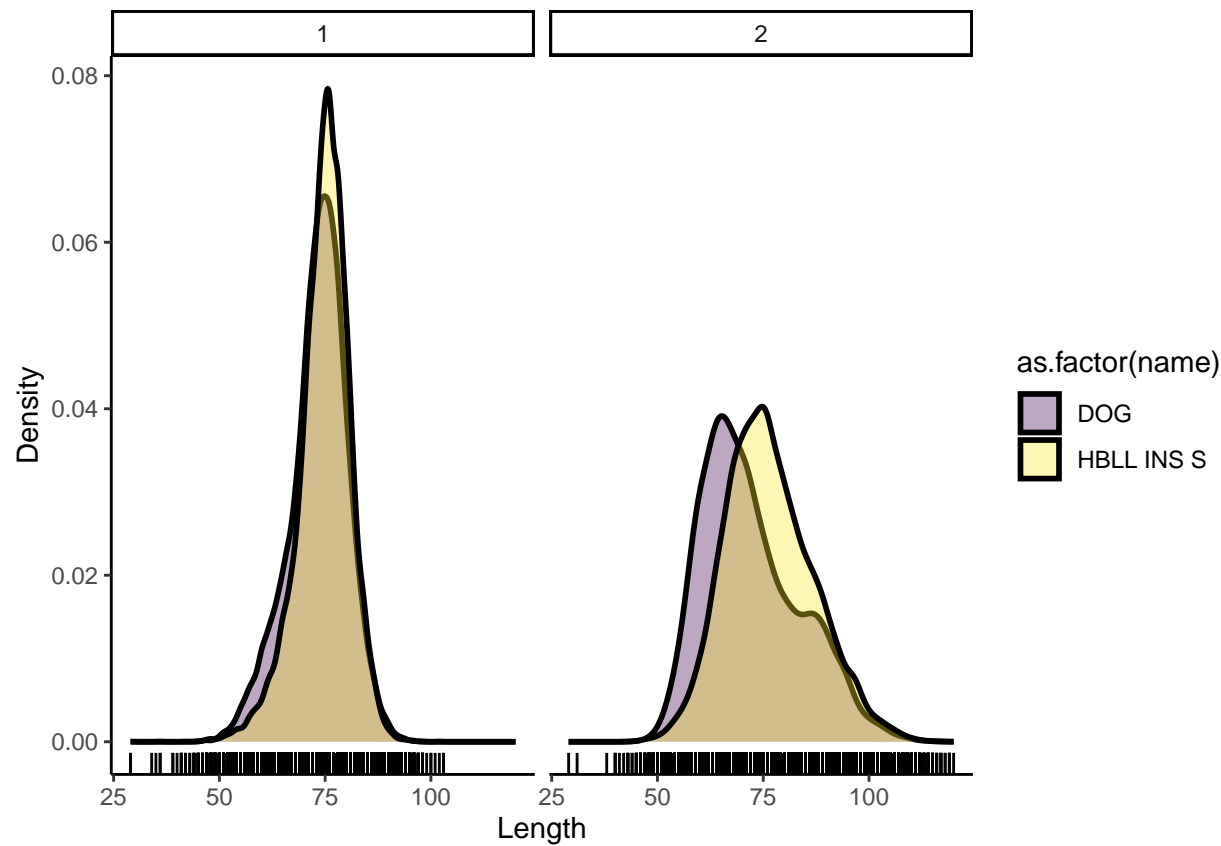
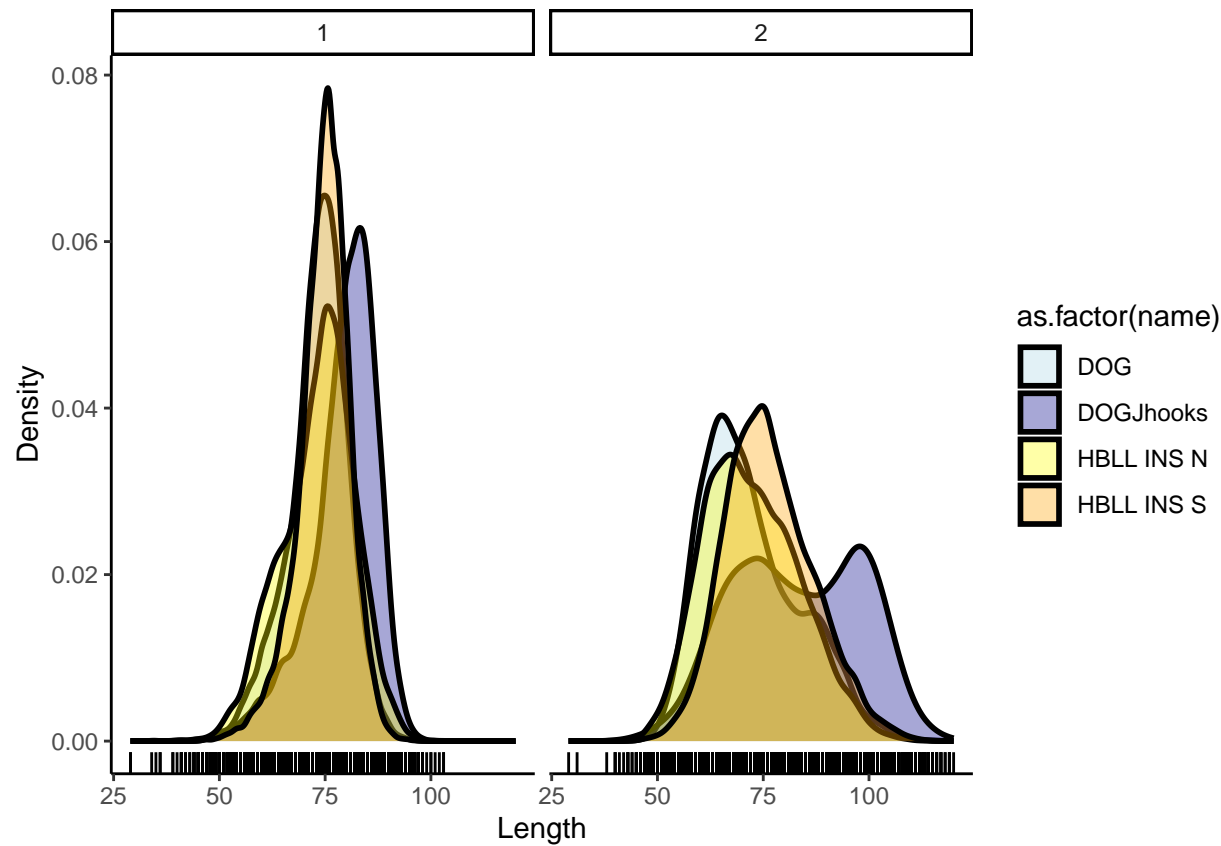
Load sample data using `get_survey_samples`. Strait of Georgia Dogfish Longline, Hard Bottom Longline Inside North , Hard Bottom Longline Inside South were included in the analysis.

Lengths in the database data ranged from 29, 120. Only lengths > 25 cm were included (`integer(0)`, `integer(0)`) were excluded. HBLL INS N in 2012 was completed about 30 days later than (`julian = 255`) and HBLL INS S in 2021 was completed about 30 days later (`julian = ~250`).

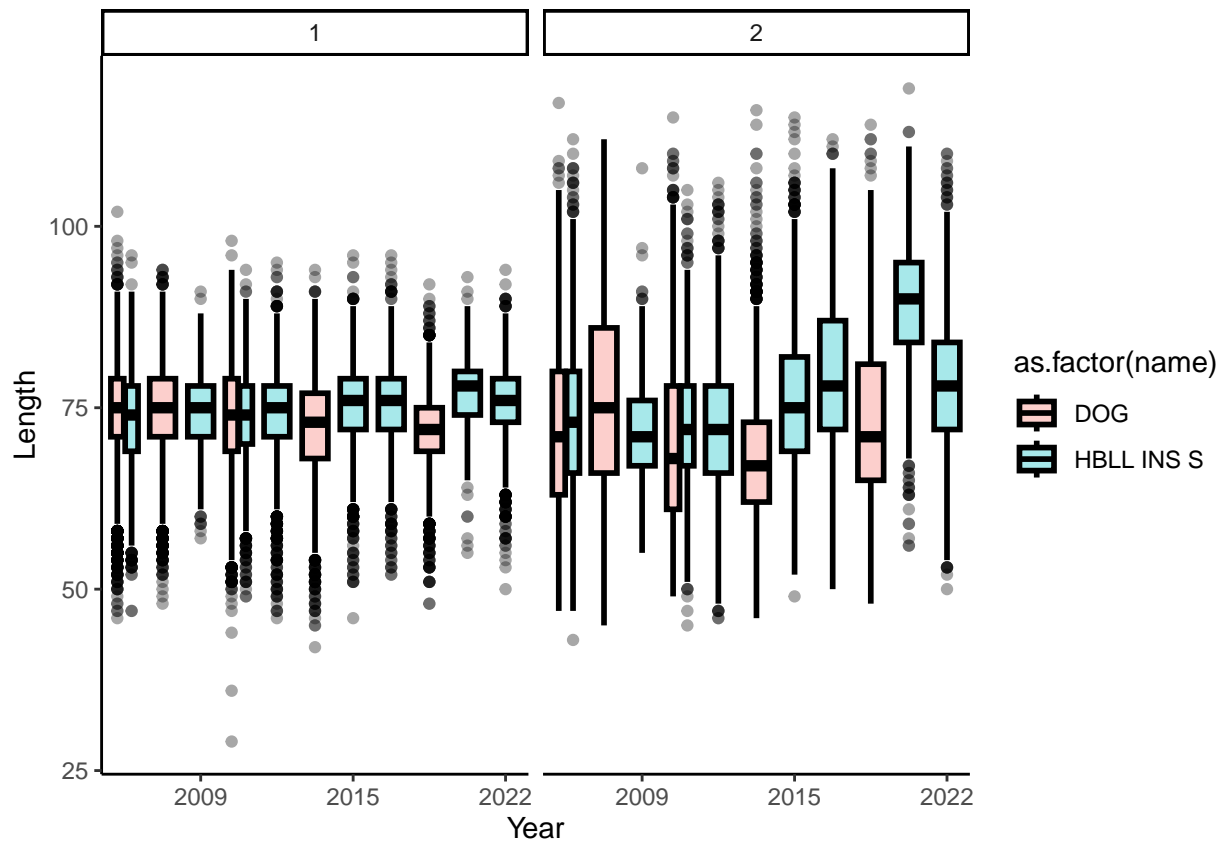
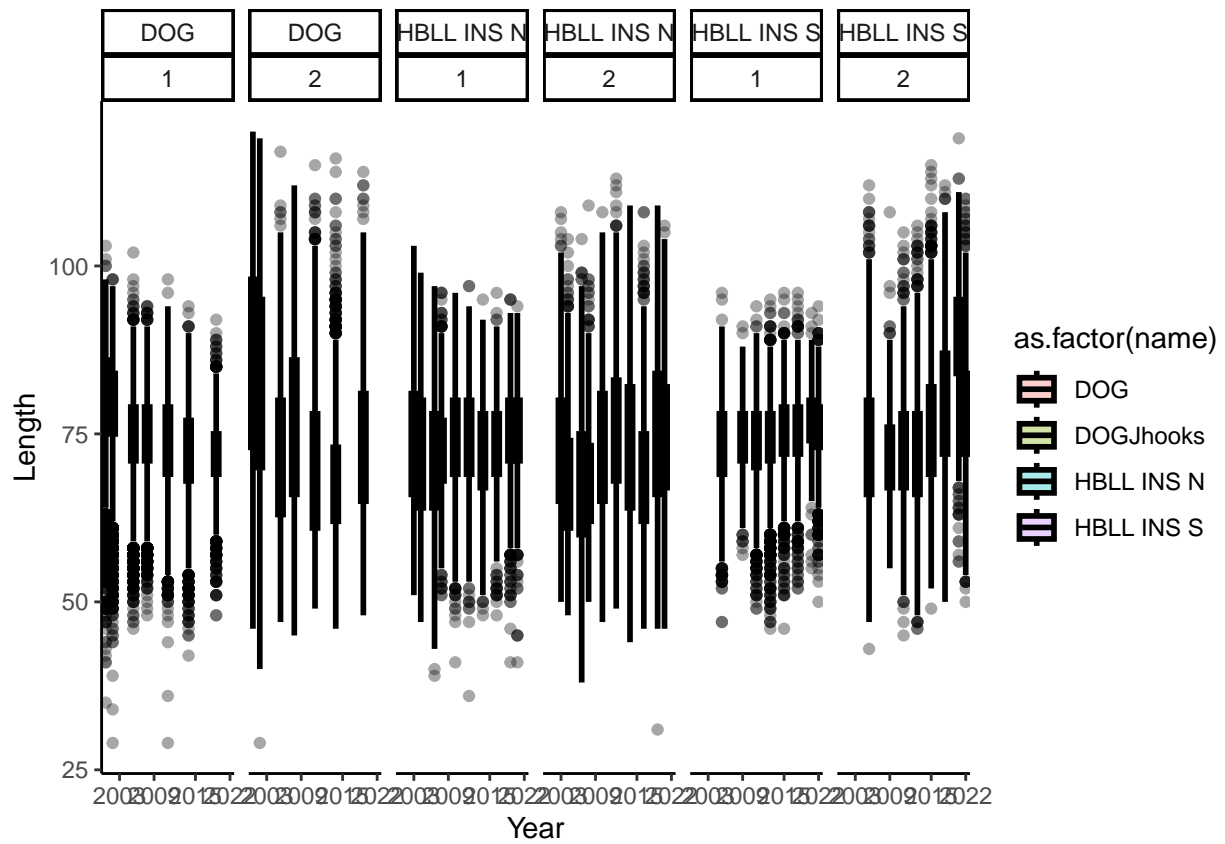
## Variability of julian date across surveys.



Density plots of sampled lengths across the four surveys.



Variability of lengths across year by survey types and sex (1 = male, 2 = female).



## Tested for differences between group means using an anova.

```
## Tukey multiple comparisons of means
## 95% family-wise confidence level
##
## Fit: aov(formula = length ~ name, data = filter(samps, sex == 2))
##
## $name
##              diff          lwr          upr      p adj
## DOGJhooks-DOG    11.1521692   10.6460048   11.6583336 0.0000000
## HBLL INS N-DOG     0.2612971   -0.1150789    0.6376731 0.2812212
## HBLL INS S-DOG     4.3979984    4.0381800    4.7578168 0.0000000
## HBLL INS N-DOGJhooks -10.8908721 -11.3897838 -10.3919603 0.0000000
## HBLL INS S-DOGJhooks  -6.7541708  -7.2407129  -6.2676286 0.0000000
## HBLL INS S-HBLL INS N  4.1367013   3.7871591   4.4862435 0.0000000

## Tukey multiple comparisons of means
## 95% family-wise confidence level
##
## Fit: aov(formula = length ~ name, data = filter(samps, sex == 1))
##
## $name
##              diff          lwr          upr      p adj
## DOGJhooks-DOG     5.966132307   5.7652105   6.1670541 0.0000000
## HBLL INS N-DOG     0.004125899  -0.1978614   0.2061132 0.9999482
## HBLL INS S-DOG     1.335582004   1.1542890   1.5168750 0.0000000
## HBLL INS N-DOGJhooks -5.962006407  -6.1910420  -5.7329708 0.0000000
## HBLL INS S-DOGJhooks  -4.630550302  -4.8415611  -4.4195395 0.0000000
## HBLL INS S-HBLL INS N  1.331456105   1.1194305   1.5434817 0.0000000
```

## Catch composition ratio.

```
## # A tibble: 115,952 x 43
##   trip_start_date   fishing_event_id year month gear survey_series_id
##   <dtm>              <dbl> <int> <int> <dbl>      <dbl>
## 1 1986-10-15 00:00:00    3369465 1986   10    5          76
## 2 1986-10-15 00:00:00    3369465 1986   10    5          76
## 3 1986-10-15 00:00:00    3369465 1986   10    5          76
## 4 1986-10-15 00:00:00    3369465 1986   10    5          76
## 5 1986-10-15 00:00:00    3369465 1986   10    5          76
## 6 1986-10-15 00:00:00    3369465 1986   10    5          76
## 7 1986-10-15 00:00:00    3369465 1986   10    5          76
## 8 1986-10-15 00:00:00    3369465 1986   10    5          76
## 9 1986-10-15 00:00:00    3369465 1986   10    5          76
## 10 1986-10-15 00:00:00    3369465 1986   10    5          76
## # i 115,942 more rows
## # i 37 more variables: survey_abbrev <chr>, survey_series_desc <chr>,
## #   survey_id <int>, major_stat_area_code <chr>, major_stat_area_name <chr>,
## #   minor_stat_area_code <chr>, species_code <chr>, species_common_name <chr>,
## #   species_science_name <chr>, specimen_id <dbl>, sample_id <dbl>, sex <dbl>,
## #   age_specimen_collected <int>, age <dbl>, sampling_desc <chr>,
## #   ageing_method_code <dbl>, length <dbl>, weight <int>, ...
```

```

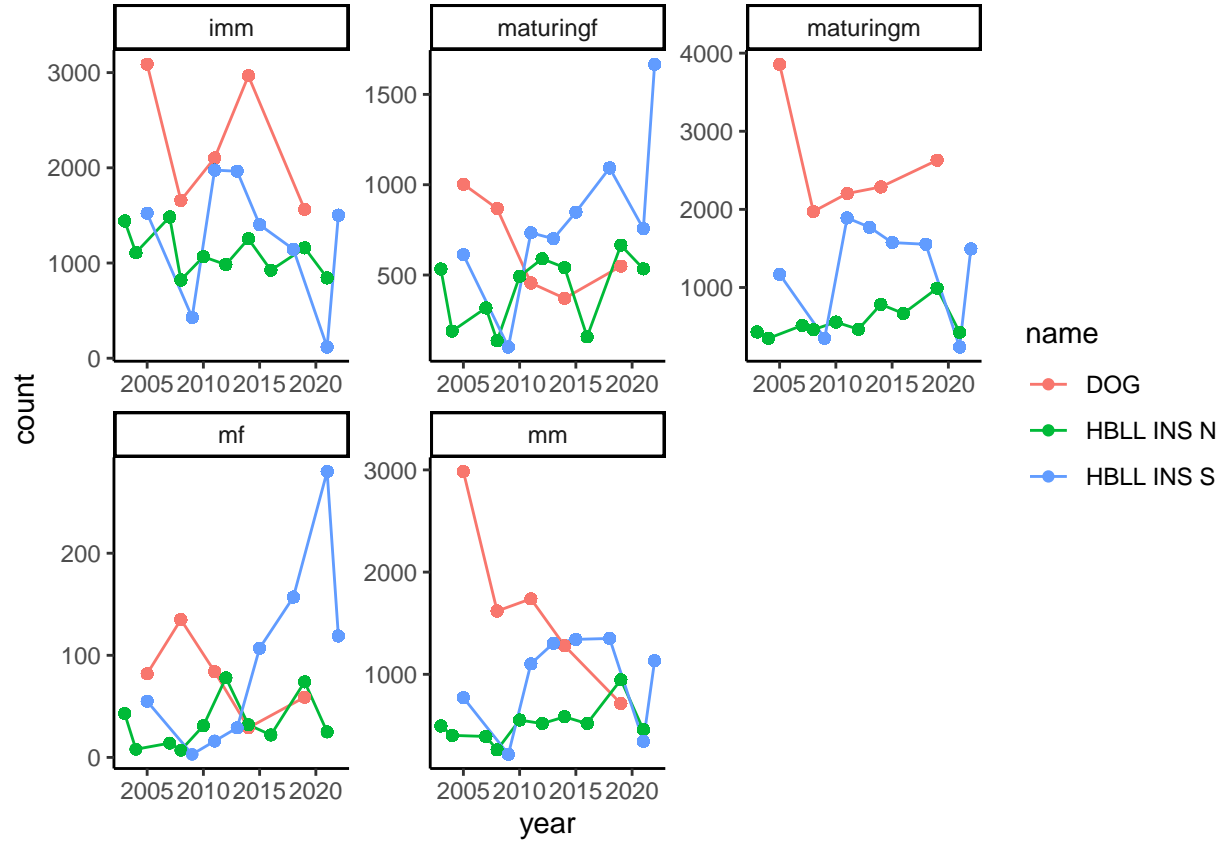
## Rows: 115,952
## Columns: 43
## $ trip_start_date      <dtm> 1986-10-15, 1986-10-15, 1986-10-15, 1986-
## $ fishing_event_id     <dbl> 3369465, 3369465, 3369465, 3369465, 33694-
## $ year                 <int> 1986, 1986, 1986, 1986, 1986, 1986, 1986, ~
## $ month                <int> 10, 10, 10, 10, 10, 10, 10, 10, 10, 10, 1-
## $ gear                 <dbl> 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, ~
## $ survey_series_id     <dbl> 76, 76, 76, 76, 76, 76, 76, 76, 76, 76, 76, 7-
## $ survey_abbrev        <chr> "DOG", "DOG", "DOG", "DOG", "DOG", "DOG", "DOG", ~
## $ survey_series_desc   <chr> "Strait of Georgia Dogfish Longline", "St-
## $ survey_id            <int> 498, 498, 498, 498, 498, 498, 498, 498, 4-
## $ major_stat_area_code <chr> "01", "01", "01", "01", "01", "01", "01", ~
## $ major_stat_area_name <chr> "4B: STRAIT OF GEORGIA", "4B: STRAIT OF G-
## $ minor_stat_area_code <chr> "17", "17", "17", "17", "17", "17", "17", ~
## $ species_code         <chr> "044", "044", "044", "044", "044", "044", ~
## $ species_common_name  <chr> "north pacific spiny dogfish", "north pac-
## $ species_science_name <chr> "squalus suckleyi", "squalus suckleyi", "~
## $ specimen_id         <dbl> 12888650, 12888651, 12888654, 12888656, 1-
## $ sample_id           <dbl> 419342, 419342, 419342, 419342, 419342, 4-
## $ sex                 <dbl> 1, 2, 1, 2, 2, 2, 1, 2, 1, 2, 1, 1, 1, 1, ~
## $ age_specimen_collected <int> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, ~
## $ age                 <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N-
## $ sampling_desc       <chr> "UNSORTED", "UNSORTED", "UNSORTED", "UNSO-
## $ ageing_method_code  <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N-
## $ length              <dbl> 83, 101, 90, 102, 119, 98, 88, 99, 89, 10-
## $ weight              <int> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N-
## $ maturity_code       <dbl> 90, 97, 90, 77, 77, 97, 90, 97, 90, 97, 9-
## $ maturity_name       <chr> "R", "R3D6", "R", "R2D6", "R2D6", "R3D6", ~
## $ maturity_desc       <chr> "CLASPERS EXTEND PAST TIPS OF ANAL FINS; ~
## $ maturity_convention_code <dbl> 10, 10, 10, 10, 10, 10, 10, 10, 10, 10, 1-
## $ maturity_convention_desc <chr> "DOGFISH", "DOGFISH", "DOGFISH", "DOGFISH~
## $ maturity_convention_maxvalue <dbl> 99, 99, 99, 99, 99, 99, 99, 99, 99, 99, 9-
## $ trip_sub_type_code   <dbl> 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, ~
## $ sample_type_code    <dbl> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, ~
## $ species_category_code <dbl> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, ~
## $ sample_source_code  <dbl> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, ~
## $ dna_sample_type     <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N-
## $ dna_container_id    <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N-
## $ usability_code      <dbl> 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, ~
## $ grouping_code       <dbl> 328, 328, 328, 328, 328, 328, 328, 328, 328, 3-
## $ length_type         <chr> "Total_Length", "Total_Length", "Total_Le-
## $ species_ageing_group <chr> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N-
## $ name                <chr> "DOGJhooks", "DOGJhooks", "DOGJhooks", "D-
## $ dmy                 <date> 1986-10-15, 1986-10-15, 1986-10-15, 1986-
## $ julian              <dbl> 288, 288, 288, 288, 288, 288, 288, 288, 2-

## # A tibble: 1 x 1
##       n
##   <int>
## 1   6984

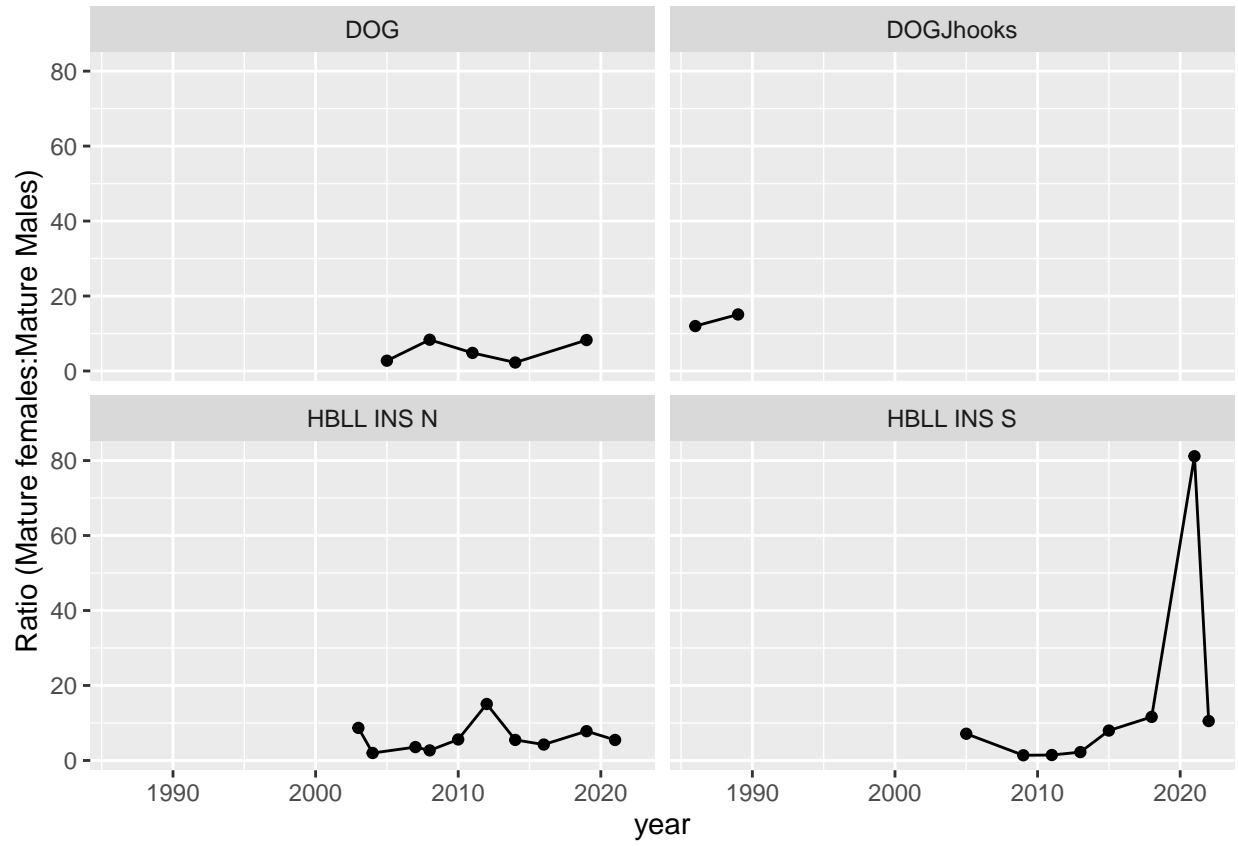
```

## Catch for each survey seperated by length and sex classes.

Each survey's catches were divided based on length into maturity classes. Females are 95% mature at 95.5 cm, and males at 76.7 cm. Immatures were defined at those less than 77 and 65.1 cm for females and males respectively (i.e. 5% probability of being mature).



Mature female to mature male ratio.



““