## Sampling summary

Martin Pastoors

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This report excludes the survey work carried out by Grateful (July 2019) and the commercial catches taking in the North Sea (Dirk Dirk, Wiron5, Wiron6).

The five vessels covered four different areas between 2019-09-02 and the 2019-10-06 (Figure 3.1), making a total of 57 hauls, of which 24 were taken in survey mode and 33 during commercial fisheries.

Within area 6a, a total of 57 hauls were carried out (24 in survey mode and 33 in commercial mode). Herring were caught during 35 hauls, of which 26 were sampled for biological information resulting in a total of 1687 sampled herring (Table 3.1). 370 spawning herring were found in 8 out of 57 hauls.

vesselname2 area3 area4 area5 oth (all)   
------------------- ------- ------- ------- ----- -------  
Dirk Dirk (KW172) 279 0 12 666 956   
Pathway (PD165) 51 0 1 200 252   
Research (LK62) 30 0 4 0 34   
Wiron5+6 (PH2200) 440 0 472 90 1002   
(all) 799 0 489 956 2244

*Table 3.1: Total catch in 6a by area (all species) during survey activities and directed commercial fishing operations.*

vesselname2 BOC HAD HER HOM MAC WHG (all)   
------------------- ----- ----- ------ ----- ----- ----- -------  
Dirk Dirk (KW172) 1 0 591 330 33 1 956   
Pathway (PD165) 0 1 202 38 9 1 252   
Research (LK62) 0 0 33 1 0 0 34   
Wiron5+6 (PH2200) 0 0 680 251 71 0 1002   
(all) 1 1 1506 621 113 2 2243

*Table 3.2: Total catch in 6a by area (all species) during survey activities and directed commercial fishing operations.*

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**Overview of hauls by vessel**

typehaul vesselname2 area3 area4 area5 oth (all)   
---------- ------------------- ------- ------- ------- ----- -------  
   
C Dirk Dirk (KW172) 6 0 0 12 18   
C Pathway (PD165) 1 0 0 1 2   
C Wiron5+6 (PH2200) 5 0 6 2 13   
C (all) 12 0 6 15 33   
   
S Dirk Dirk (KW172) 3 0 5 0 8   
S Pathway (PD165) 4 2 3 0 9   
S Research (LK62) 1 1 4 0 6   
S Wiron5+6 (PH2200) 0 0 1 0 1   
S (all) 8 3 13 0 24   
   
(all) (all) 20 3 19 15 57

*Table 3.3: overview by survey area of the number of hauls during commercial fishing operation (C) or survey operations (S).*

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**Overview of length-frequency sampling**

typehaul vesselname2 area3 area4 area5 oth (all)   
---------- ------------------- ------- ------- ------- ------ -------  
   
C Dirk Dirk (KW172) 343 0 0 972 1315   
C Pathway (PD165) 170 0 0 196 366   
C Wiron5+6 (PH2200) 691 0 303 0 994   
C (all) 1204 0 303 1168 2675   
   
S Dirk Dirk (KW172) 0 0 367 0 367   
S Pathway (PD165) 186 44 574 0 804   
S Research (LK62) 154 0 1012 0 1166   
S Wiron5+6 (PH2200) 0 0 198 0 198   
S (all) 340 44 2151 0 2535   
   
(all) (all) 1544 44 2454 1168 5210

*Table 3.4: overview by survey area of the number of herring measured for length frequencies during commercial fishing operation (C) or survey operations (S).*

**Overview of biological sampling**

variable typehaul vesselname2 area3 area4 area5 oth (all)   
---------- ---------- ------------------- ------- ------- ------- ----- -------  
   
nage C Dirk Dirk (KW172) 90 0 0 150 240   
nage C Pathway (PD165) 51 0 0 67 118   
nage C Wiron5+6 (PH2200) 145 0 150 0 295   
nage C (all) 286 0 150 217 653   
nage S Dirk Dirk (KW172) 0 0 221 0 221   
nage S Pathway (PD165) 85 34 162 0 281   
nage S Research (LK62) 99 0 199 0 298   
nage S (all) 184 34 582 0 800   
nage (all) (all) 470 34 732 217 1453   
   
ngen C Dirk Dirk (KW172) 200 0 0 25 225   
ngen C Pathway (PD165) 0 0 0 0 0   
ngen C Wiron5+6 (PH2200) 0 0 100 0 100   
ngen C (all) 200 0 100 25 325   
ngen S Dirk Dirk (KW172) 0 0 0 0 0   
ngen S Pathway (PD165) 100 0 0 0 100   
ngen S Research (LK62) 100 0 200 0 300   
ngen S (all) 200 0 200 0 400   
ngen (all) (all) 400 0 300 25 725   
   
nlen C Dirk Dirk (KW172) 200 0 0 175 375   
nlen C Pathway (PD165) 51 0 0 68 119   
nlen C Wiron5+6 (PH2200) 145 0 187 0 332   
nlen C (all) 396 0 187 243 826   
nlen S Dirk Dirk (KW172) 0 0 221 0 221   
nlen S Pathway (PD165) 139 37 162 0 338   
nlen S Research (LK62) 100 0 202 0 302   
nlen S (all) 239 37 585 0 861   
nlen (all) (all) 635 37 772 243 1687   
   
nmat C Dirk Dirk (KW172) 200 0 0 175 375   
nmat C Pathway (PD165) 51 0 0 59 110   
nmat C Wiron5+6 (PH2200) 145 0 187 0 332   
nmat C (all) 396 0 187 234 817   
nmat S Dirk Dirk (KW172) 0 0 121 0 121   
nmat S Pathway (PD165) 120 14 104 0 238   
nmat S Research (LK62) 100 0 143 0 243   
nmat S (all) 220 14 368 0 602   
nmat (all) (all) 616 14 555 234 1419   
   
nmorph C Dirk Dirk (KW172) 0 0 0 0 0   
nmorph C Pathway (PD165) 0 0 0 0 0   
nmorph C Wiron5+6 (PH2200) 0 0 0 0 0   
nmorph C (all) 0 0 0 0 0   
nmorph S Dirk Dirk (KW172) 0 0 0 0 0   
nmorph S Pathway (PD165) 0 0 0 0 0   
nmorph S Research (LK62) 0 0 0 0 0   
nmorph S (all) 0 0 0 0 0   
nmorph (all) (all) 0 0 0 0 0   
   
nsex C Dirk Dirk (KW172) 200 0 0 175 375   
nsex C Pathway (PD165) 51 0 0 68 119   
nsex C Wiron5+6 (PH2200) 145 0 187 0 332   
nsex C (all) 396 0 187 243 826   
nsex S Dirk Dirk (KW172) 0 0 121 0 121   
nsex S Pathway (PD165) 139 37 162 0 338   
nsex S Research (LK62) 100 0 202 0 302   
nsex S (all) 239 37 485 0 761   
nsex (all) (all) 635 37 672 243 1587   
   
nwgt C Dirk Dirk (KW172) 200 0 0 175 375   
nwgt C Pathway (PD165) 51 0 0 68 119   
nwgt C Wiron5+6 (PH2200) 145 0 187 0 332   
nwgt C (all) 396 0 187 243 826   
nwgt S Dirk Dirk (KW172) 0 0 221 0 221   
nwgt S Pathway (PD165) 139 37 162 0 338   
nwgt S Research (LK62) 100 0 202 0 302   
nwgt S (all) 239 37 585 0 861   
nwgt (all) (all) 635 37 772 243 1687

*Table 3.5: overview of biological sampling by variable (number of observations for nage, ngen, nlen, nmat, nmorph, nsex, nwght). Typehaul refers to the type of activity (S=survey, C=commercial).*

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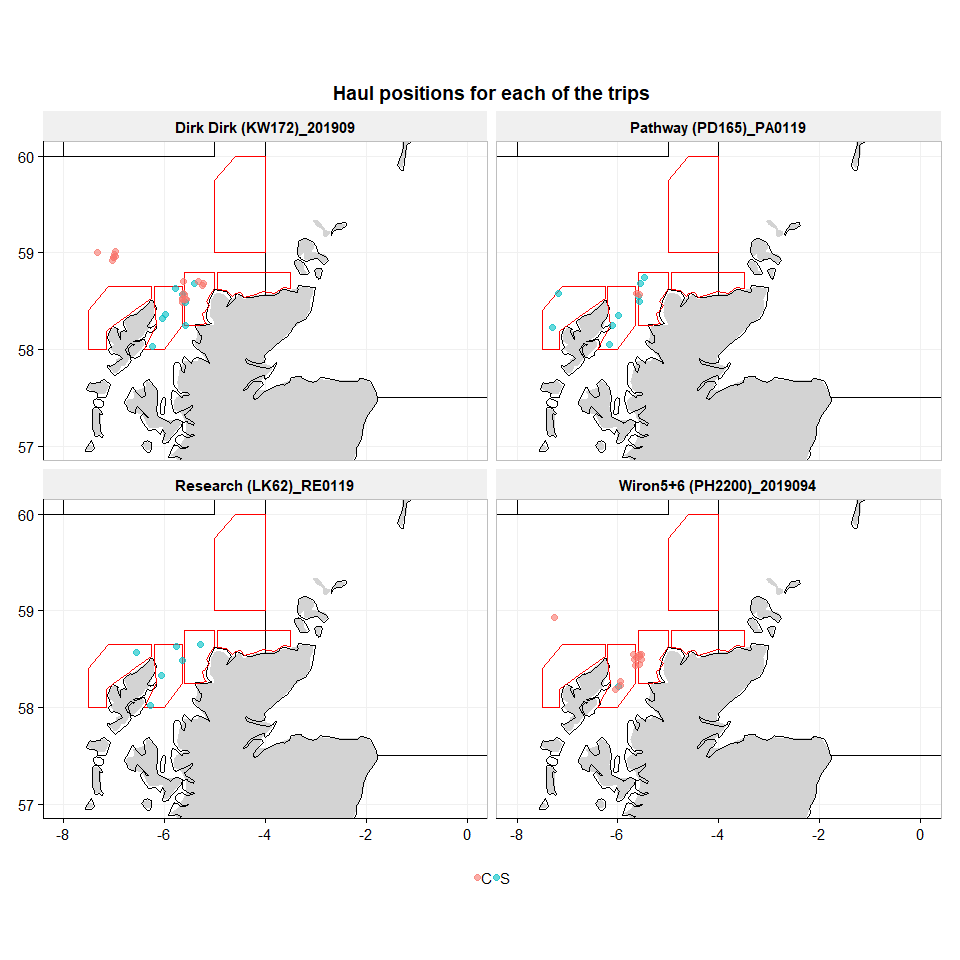
**Overview of biological sampling for spawning herring only**

variable typehaul vesselname2 area3 oth (all)   
---------- ---------- ------------------- ------- ----- -------  
   
nage C Dirk Dirk (KW172) 80 59 139   
nage C Wiron5+6 (PH2200) 9 0 9   
nage C (all) 89 59 148   
nage S Pathway (PD165) 19 0 19   
nage S Research (LK62) 54 0 54   
nage S (all) 73 0 73   
nage (all) (all) 162 59 221   
   
ngen C Dirk Dirk (KW172) 182 25 207   
ngen C Wiron5+6 (PH2200) 0 0 0   
ngen C (all) 182 25 207   
ngen S Pathway (PD165) 41 0 41   
ngen S Research (LK62) 54 0 54   
ngen S (all) 95 0 95   
ngen (all) (all) 277 25 302   
   
nlen C Dirk Dirk (KW172) 182 84 266   
nlen C Wiron5+6 (PH2200) 9 0 9   
nlen C (all) 191 84 275   
nlen S Pathway (PD165) 41 0 41   
nlen S Research (LK62) 54 0 54   
nlen S (all) 95 0 95   
nlen (all) (all) 286 84 370   
   
nmorph C Dirk Dirk (KW172) 0 0 0   
nmorph C Wiron5+6 (PH2200) 0 0 0   
nmorph C (all) 0 0 0   
nmorph S Pathway (PD165) 0 0 0   
nmorph S Research (LK62) 0 0 0   
nmorph S (all) 0 0 0   
nmorph (all) (all) 0 0 0   
   
nsex C Dirk Dirk (KW172) 182 84 266   
nsex C Wiron5+6 (PH2200) 9 0 9   
nsex C (all) 191 84 275   
nsex S Pathway (PD165) 41 0 41   
nsex S Research (LK62) 54 0 54   
nsex S (all) 95 0 95   
nsex (all) (all) 286 84 370   
   
nwgt C Dirk Dirk (KW172) 182 84 266   
nwgt C Wiron5+6 (PH2200) 9 0 9   
nwgt C (all) 191 84 275   
nwgt S Pathway (PD165) 41 0 41   
nwgt S Research (LK62) 54 0 54   
nwgt S (all) 95 0 95   
nwgt (all) (all) 286 84 370   
  
Table: Spawning herring only

*Table 3.6: Spawning herring only. Overview of biological sampling by variable (number of observations for nage, ngen, nlen, nmat, nmorph, nsex, nwght). Typehaul refers to the type of activity (S=survey, C=commercial).*

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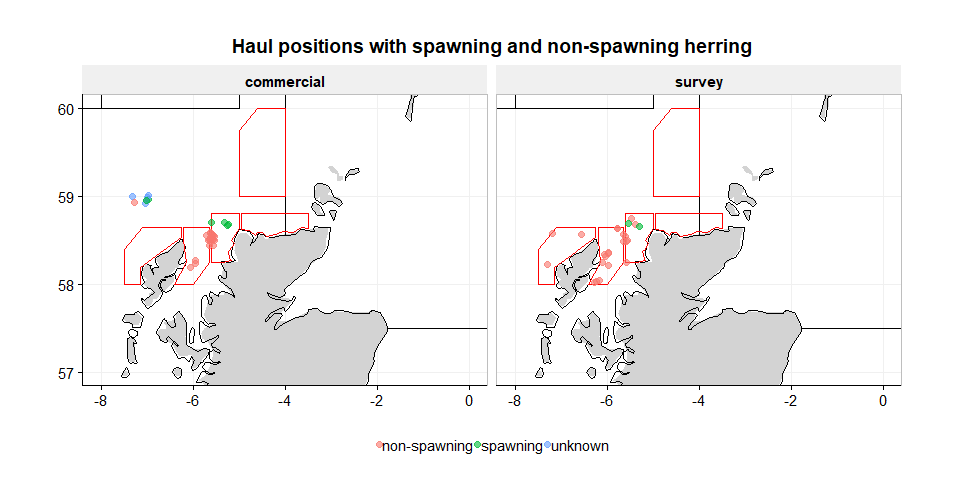
**Overview of hauls per vessel**



*Figure 3.1: Haul positions by vessel (trip) and haul type (C = commercial, S = survey)*

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**Overview of hauls with spawning, non-spawning or unknown herring**

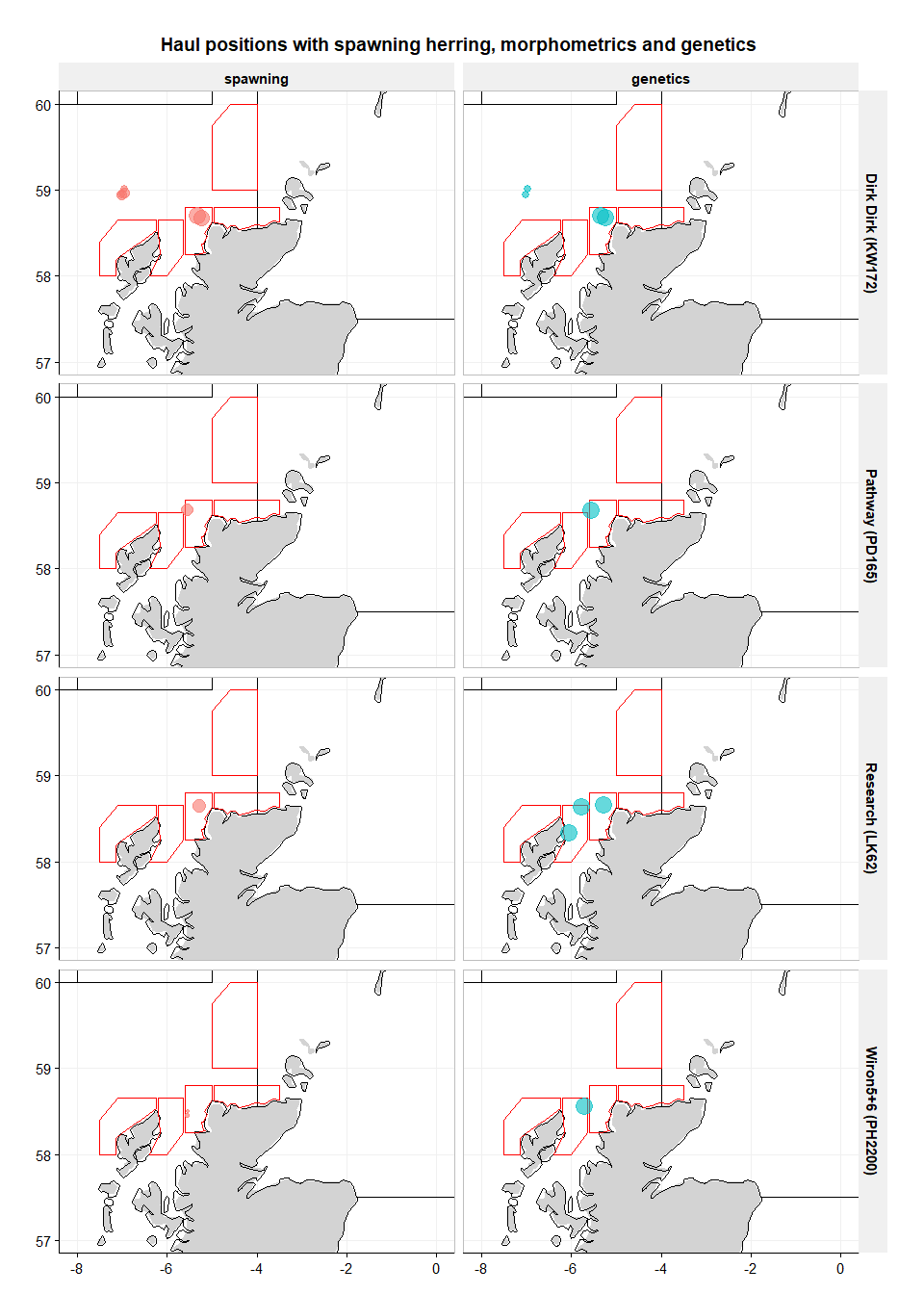


*Figure 3.2: spatial distribution of commercial hauls (C) and survey hauls (S) with spawning and non-spawning herring.*

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**Overview of hauls by vessel with spawning herring and with genetic samples**

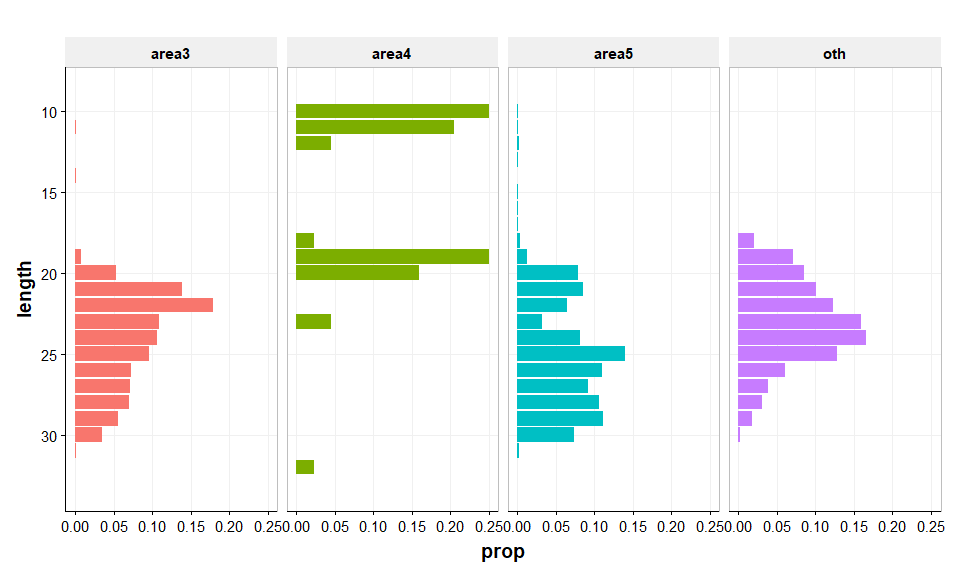
No morphometric samples have been collected during the survey.



*Figure 3.3: spatial distribution of hauls with spawning herring, morphometric samples and genetic samples in the herring survey*

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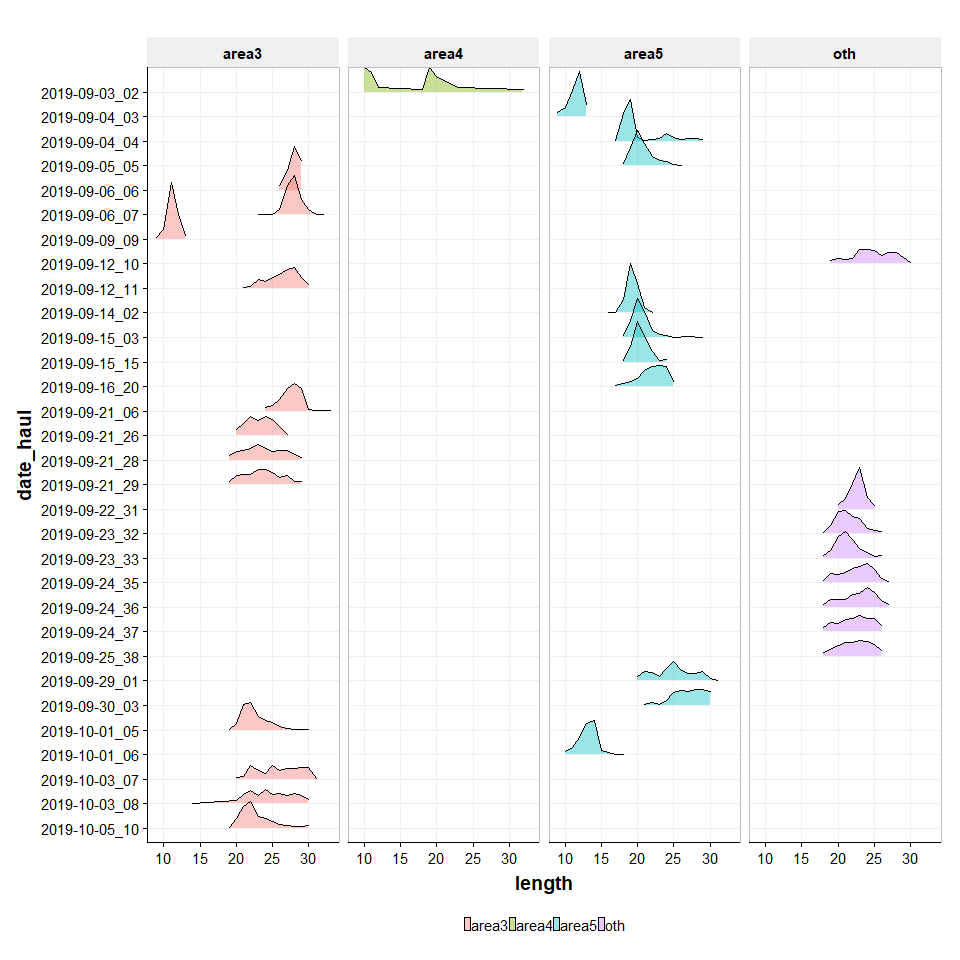
**Relative length distributions of herring**



*Figure 3.4: Length frequencies of herring catches by survey area*

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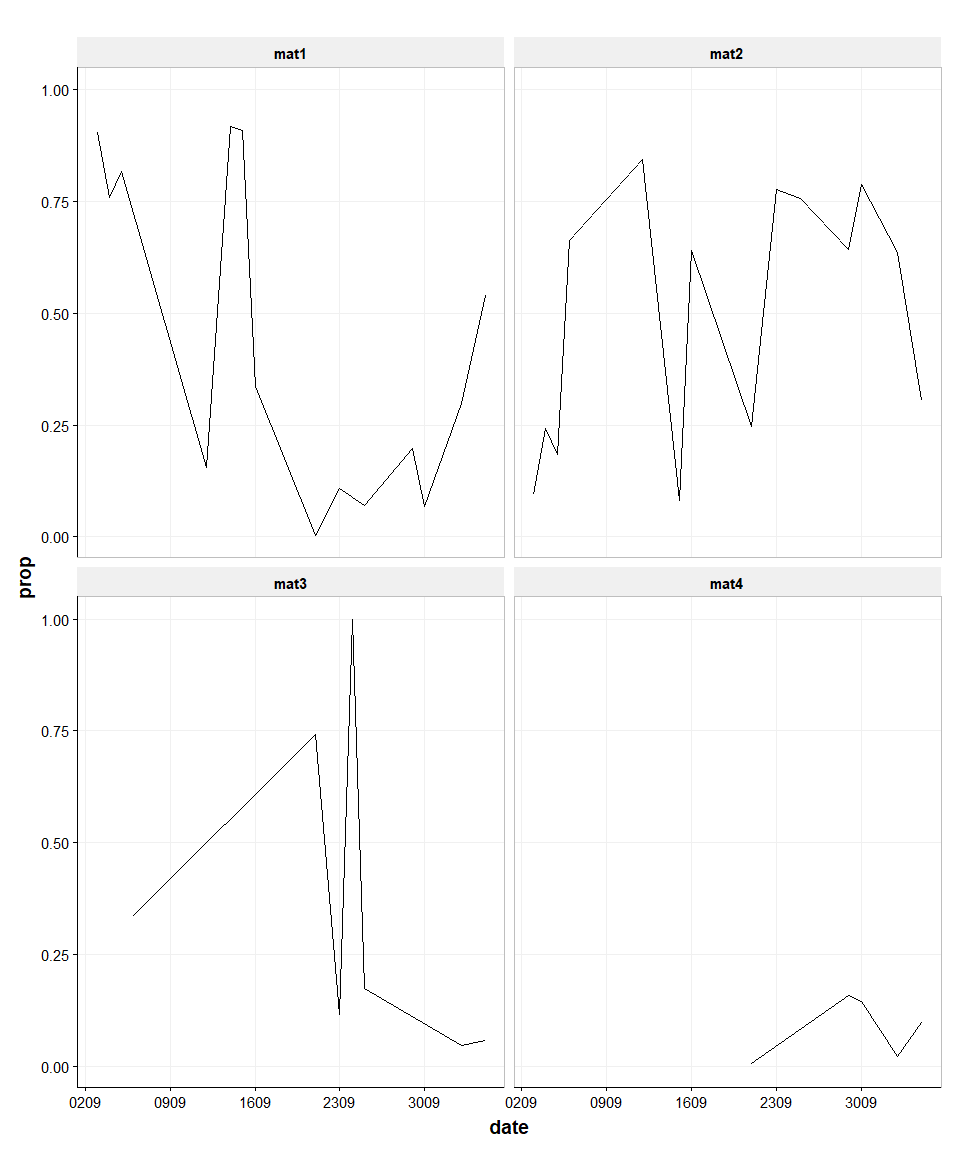
**Relative length by haul of herring by date and area**



*Figure 3.5: Haul by haul relative length frequencies of herring by survey area. Triphaul refers to the combination of vessel, trip and haul*

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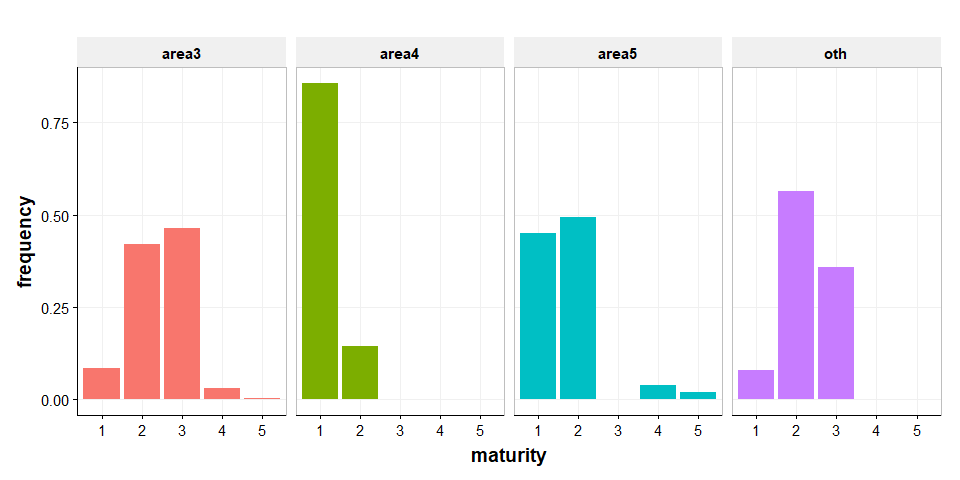
**Herring length-maturity key**



*Figure 3.6: Maturity stage by day*

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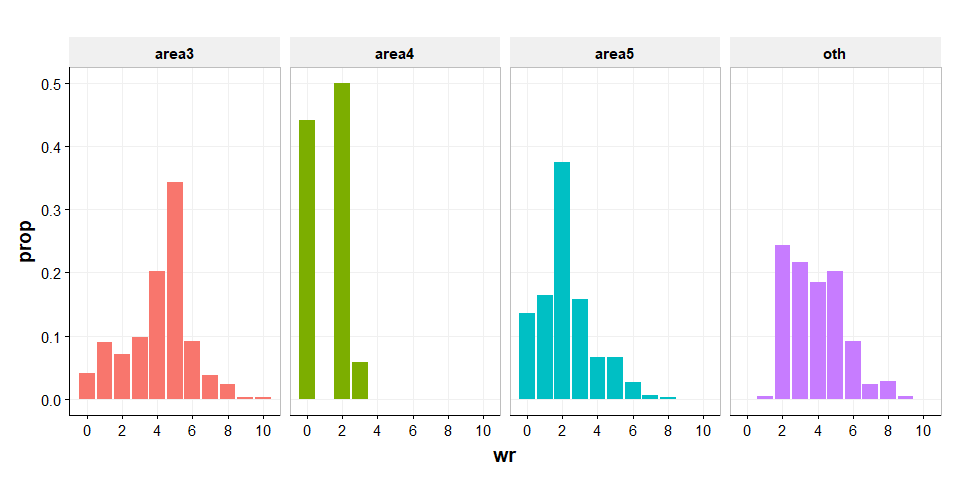
**Herring length-maturity key**



*Figure 3.7: Maturity (6 scale) by survey area*

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**Herring age (winterrings) distribution by survey area**



*Figure 3.8: Proportion of wr by survey area*

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**Haulnumber plots by vessel**

