**Model parametrization for the Pulse project**

**1. Cost of effort/area:**

Different home ports, I have just picked two approximate port locations for estimate the effort cost. These data comes from assuming vessels have steaming speed of 12Nm h-1.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Port/area | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **16** |
| **Harlingen (** lon 5.4; lat 53.05**)** | 15 | 14 | 14 | 16 | 14 | 13 | 15 | 16 | 17 | 14 | 15 | 17 | 15 | 15 | 18 |
| **Port A (south,** lon 4.2; lat 52.05**)** | 14 | 12 | 13 | 16 | 14 | 15 | 17 | 18 | 19 | 16 | 17 | 19 | 16 | 17 | 18 |
| **Port B (north,** lon 6.5; lat 53.4**)** | 17 | 15 | 15 | 17 | 14 | 12 | 14 | 15 | 17 | 13 | 15 | 17 | 16 | 16 | 18 |

See excel spreadsheet

|  |  |  |  |
| --- | --- | --- | --- |
|  | Fishing time (hours) | Travel time (hours) | |
|  |  | south | north |
| 1 | 88 | 13 | 27 |
| 2 | 88 | 5 | 26 |
| 3 | 88 | 6 | 20 |
| 4 | 88 | 21 | 26 |
| 5 | 88 | 13 | 6 |
| 6 | 88 | 11 | 5 |
| 7 | 88 | 31 | 11 |
| 8 | 88 | 39 | 19 |
| 9 | 88 | 49 | 29 |
| 10 | 88 | 25 | 5 |
| 11 | 88 | 35 | 16 |
| 12 | 88 | 45 | 27 |
| 13 | 88 | 25 | 20 |
| 14 | 88 | 33 | 18 |
| 16 | 88 | 39 | 28 |

Which are the exact port locations that we would like to model?

We can use an average position along the stretch of coast line

|  |  |  |
| --- | --- | --- |
|  | **Lon** | **Lat** |
| **Port A (south, name?)** | 4.2 | 52 |
| **Port B (north, name?)** | 6.0 | 53.4 |

Steaming speed:

|  |  |  |
| --- | --- | --- |
| Nm h-1 | **Beam trawlers** | **Pulse trawlers** |
| **Long distance** | 11.0 | 11.0 |
| **Euro cutters** | 8.9 | 8.9 |

**2. Catch efficiency parameters:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Long distance**  **Beam trawlers** | **Long distance**  **Pulse trawlers** | **Euro cutters**  **Beam trawlers** | **Euro cutters**  **Pulse trawlers** |
| **Sole** | 1 | 1.28 | 1\*0.282 | 1.28\*0.243 |
| **Marketable plaice** | 1 | 0.60 | 1\*0.282 | 0.60\*0.243 |
| **Undersized plaice** | 1 | 0.60 | 1\*0.282 | 0.60\*0.243 |
| **Cod** | 1 | 0.60 | 1\*0.282 | 0.60\*0.243 |
| **Shrimp** | 0.00 | 0.00 | 1 | 0.00 |

Efficiency parameters based on results analysis Jan Jaap for large vessels

For Euro cutters the catchability needs to be reduced by a factor q

q can be estimated from the difference in gear width (Euro=4m; large=12m) and fishing speed between large and small vessels relative to TBB\_large

q\_euro\_pulse= 4/12\*4.63/6.34 = 0.243428

q\_euro\_tbb = 4/12\*5.36/6.34 = 0.2818086

Euro Large

TBB 5.36 6.34

Pulse 4.63 4.90

**3. Quotas:**

The model could only be constrained by two quota species, in principle, we just assume that sole is the only limiting specie. Therefore we can decide if we want to also constraint the fishery with plaice at any moment. I think shrimp has no quota.

We can set the quota based on the proportion of the annual landings observed within the fleet (see figures below). If we break the large vessels in three groups of about 20 vessels, the median proportion of sole landings are 0.020, 0.015 and 0.010 respectively. For the 18 Euro-cutters the median = 0.009

Assuming an annual total sole landings of 8000 ton, the quota limits become

|  |  |  |  |
| --- | --- | --- | --- |
| tonnes | **Low quota scenario** | **Mid quota scenario** | **High quota scenario** |
| **Sole** | 80 | 120 | 160 |
| **Plaice** | unconstraint | unconstraint | unconstraint |
| **Shrimp** | unconstraint | unconstraint | unconstraint |

**4. Fuel costs:**

|  |  |  |
| --- | --- | --- |
| d-1 | **Beam trawlers** | **Pulse trawlers** |
| **Long distance** | 6400 | 2400 |
| **Euro cutters** |  |  |

I have asked Arie Mol (WEcR) for an update. Alternatively we can estimate the fuel consumption based on the relative towing speed while fishing (we can use the relationships from Poos et al 2013 IJMS)



Work document with the results of the ‘kengetallen’ of the flatfish metiers of the large and small (Euro cutter) vessels

See script M:\My Documents\Adriaan\Projecten\2018\_DSVM\_pulse\_tbb\trip\_kengetallen.R

Input data set: 2009-2017 data set of pulse license holders used for WGELECTRA and subsequent papers written in 2018

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| kwclass | Gear | Mean effort per trip (hours at sea) | n | sdev | Median effort per trip (hours at sea) | Fishing speed (nm)  [mu2] | Steaming speed (nm)  [mu3] |
| large | PUL\_SOL | 102.95356 | 11217 | 24.74673 | 99.48333 | 4.906268 | 10.357801 |
| large | TBB\_PLE | 125.29823 | 1387 | 36.21890 | 116.00000 | 6.316359 | 10.995083 |
| large | TBB\_SOL | 101.35008 | 11241 | 20.60681 | 99.00000 | 6.341776 | 11.060355 |
| large | OTHER | 104.83821 | 714 | 24.95763 | 101.43333 | 4.344401 | 10.068702 |
| small | PUL\_SOL | 91.84105 | 3366 | 22.24084 | 91.86667 | 4.630876 | 8.150665 |
| small | TBB\_SOL | 93.11148 | 2038 | 28.99943 | 93.66667 | 5.363948 | 8.879123 |
| small | TBB\_PLE | 98.00000 | 1 | NA | 98.00000 | 4.550746 | 8.200000 |
| small | TBB\_CRG | 85.51818 | 1968 | 26.30873 | 92.00000 | 3.799257 | 8.248503 |
| small | OTHER | 86.86471 | 503 | 26.58027 | 93.00000 | 3.949564 | 8.468321 |

Analysis of the annual total of sole landed by individual vessels expressed as a proportion of the total landings of all vessels

|  |  |  |
| --- | --- | --- |
| Annual Landings (1000 kg) of pulse license holders | | |
|  |  |  |
| **Row Labels** | **Sum of sol.x** | **Sum of ple.x** |
| 2009 | 6641 | 14958 |
| 2010 | 6187 | 17492 |
| 2011 | 5993 | 18220 |
| 2012 | 7435 | 20589 |
| 2013 | 8663 | 22814 |
| 2014 | 8169 | 19515 |
| 2015 | 8317 | 20025 |
| 2016 | 9686 | 21269 |
| 2017 | 8380 | 17294 |

Economic data can be obtained from

<https://www.agrimatie.nl/PublicatiePage.aspx?subpubID=2526&sectorID=2862&themaID=2263&indicatorID%20=%202035>

shrimp prices are strongly affected by the volume landed. Current high shrimp landings have reduced the price to below 2Euro/kg

We better parameterise the shrimps for the years 2010-2015 avoiding the situation of the very high prices in 2016 and 2017 which may be atypical.

