Conservation Regulations 2019

Assessment for 2019 season

Assessments for the 2019 fishing season have been made following further developments of the underlying models and incorporation of the 2017 catch data. Out of the 173 areas assessed there were 48 at grade 1, 30 at grade 2 and 95 at grade 3. The occurrence of the different grades follows a similar pattern to previous years with grade 1 rivers being more prevalent on the East Coast and grade 3 in the west of Scotland (Fig. 1).

Figure 1. Map showing the results of the 2019 assessment.

Change from the 2018 assessment

Despite a general, but variable, recent decline in catches and counts (Fig. 2) and continuing concerns over low salmon catches, the number of areas in grade 1 and 2 is higher in the 2019 assessment compared to the 2018 regulations when there were 28 areas in grade 1, 21 in grade 2 and 122 in grade 3. This difference is due to the changes in the model as illustrated by also running the new assessment for the 2011-2015 and 2012-2016 periods. This shows that there is a progressive decline in the higher grades which would allow killing of salmon (1 & 2) consistent with decline in catches (Fig.3).
Figure 2. Trends in catches and counts for Scottish salmon. A. reported rod catch 1952-2017. B. counts from sites with long term data, note differences in recent trends between sites. River Awe and Beauly counts supplied by Scottish and Southern Electricity.

Figure 3. Number of assessment areas for the different grades when the conservation regulations assessment is run for three different time periods.
Changes to the model

The change between the 2018 and 2019 assessments are the result of changes in the methodology used to assess conservation status in two areas - estimating the egg requirements for each river and estimating numbers of returning adults. These areas were updated partially in response to comments received through the public consultation and more widely through from Fishery Boards and Trusts.

Egg requirements

In previous years the number of salmon eggs required was estimated to fall between 1.1 and 9.8 eggs for every square metre wetted area of salmon habitat. This was used in the absence of Scotland specific information and Marine Scotland has been working to produce Scotland specific egg requirements.

The new egg requirements, based on information from 11 sites in Scotland, allow targets to differ between areas. The new estimates are all lower than those used previously, mostly substantially so. However, as shown in Table 1, these new estimates are in line with egg requirements used in other countries in their assessments of salmon conservation status.

Table 1. Comparison of egg requirements used in different countries for assessing conservation status of salmon. Requirements are presented as eggs per square meter.

<table>
<thead>
<tr>
<th>Area</th>
<th>Median egg requirement</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scotland</td>
<td>2.1</td>
<td>0.7-8.3</td>
</tr>
<tr>
<td>Scotland (minus North Esk)</td>
<td>2.1</td>
<td>0.7-3.8</td>
</tr>
<tr>
<td>England &amp; Wales</td>
<td>2.2</td>
<td>0.7-4.0</td>
</tr>
<tr>
<td>Ireland</td>
<td>-</td>
<td>2.0-4.5</td>
</tr>
<tr>
<td>Norway</td>
<td>-</td>
<td>0.5-7.0</td>
</tr>
</tbody>
</table>

The new egg targets have a substantial impact on the assessments. Running the assessments using the old egg requirements for 2012-2016 produced 31 grade 1, 19 grade 2s and 123 grade 3 areas which are very similar to the 2018 regulations of 28/21/122. Using these requirements for the period 2013-2017 produces 29 grade 1 areas, 14 grade 2 and 130 grade 3.

Adult assessments

Following feedback the methods used to estimate the numbers of adults from rod catches have been re-examined. The updated methods remove any geographic component from the process with the relationship between catch and salmon numbers being determined by month and the flow conditions. The rod catches and the estimated adult abundance can then be compared to produce an annual exploitation rate for each assessment areas. This exploitation rate can then be compared to those used in other countries.
In all areas there is considerable variation in estimated annual exploitation rates of salmon. Exploitation rates derived for Scotland are slightly larger than those from Ireland, similar to those from England & Wales and generally lower than those used in Norway (Table 2).

Table 2. Comparison of annual exploitation rates from different countries.

<table>
<thead>
<tr>
<th>Area</th>
<th>Median exploitation</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scotland</td>
<td>15</td>
<td>7-38</td>
</tr>
<tr>
<td>England &amp; Wales</td>
<td>16.5</td>
<td>7-49</td>
</tr>
<tr>
<td>Ireland</td>
<td>11</td>
<td>4-30</td>
</tr>
<tr>
<td>Norway</td>
<td>-</td>
<td>10-80</td>
</tr>
</tbody>
</table>

Next Steps

No change to methodology

It is proposed that there are no changes to the methodology use to assess conservation status for the following two years.

• This will allow the various aspects of the process to undergo peer-review.
  – It should be noted that although the work has not been published in a peer-review journal it has been the subject of a number of public consultation exercises and has been scrutinised by the public, District Salmon Fishery Boards and Trusts, politicians and universities.

• This would also allow the potential for using sampling of juvenile salmon to feed into the assessment process to be determined and, if appropriate, used in the assessments.

Change the egg targets

It has been proposed that different egg targets could be used rather than MSY, which would change the resultant gradings. For example, it has been proposed to use SMax rather than MSY for the assessments. While further work will be undertaken into the potential for using different reference points for setting conservation limits the following points can be made:

• The use of MSY is recommended by ICES and is adopted in Ireland and England & Wales. Norway have used stock recruitment data from the freshwater phase to set their reference point as the biomass of females necessary to achieve the carrying capacity (SMax).

• SMax is the stock level which will produce the greatest number of recruits to the population, and may be appropriate if the aim is to maximise numbers of adult returning to the river.

• Analysis of egg requirements has assumed using MSY and it is not possible to use this work to produce SMax levels for new rivers in Scotland (relationship with catch per area etc used to transport requirements is with MSY).
– A quick examination of SMax for the areas with stock recruitment information suggest that the relationship between MSY and SMax is variable with SMax being on average approximately twice MSY.
– The examination also suggests some caution should be exercised when considering the use of SMax. The analysis highlights that the North Esk has never achieved SMax during the period it has been monitored (1981 onwards), suggesting it would have been in poor conservation status.
– An appraisal of the different options for setting egg requirements is planned after the initial work on setting egg requirements has been sent to peer review and this should help inform any changes made going forward.
– There are a number of different relationships which can be used to estimate SMax and which are likely to produce different results. Evaluation of the fits of different types of stock-recruitment curves to the Scottish data will be undertaken before the data is sent to peer-review.

- The current regulations are in place because Scottish Ministers consider that it is necessary or expedient to do so for the conservation of salmon. It is legitimate to be concerned about stocks at higher levels than this, for example it is likely that economic sustainability is different from ecological sustainability.

Does a grade 1 or 2 mean everything is okay?

Conservation regulations could be seen as a back-stop where levels have reached a point that Scottish Ministers have stepped in to regulate the fisheries. This does not however preclude management action being taken in areas designated grade 1 or 2 due to either local knowledge/circumstances or the setting of different management goals (e.g. to maximise the fishery).