marinescotland science

Conservation Regulations – developments during 2016 and future refinements

Outline

- **Brief reminder of the concept.**
- **Consultation and engagement.**
- **Changes to the assessment process.**
- **Current and future developments.**
- **The need for good local data.**
- **Future and conclusion.**

The concept (1)

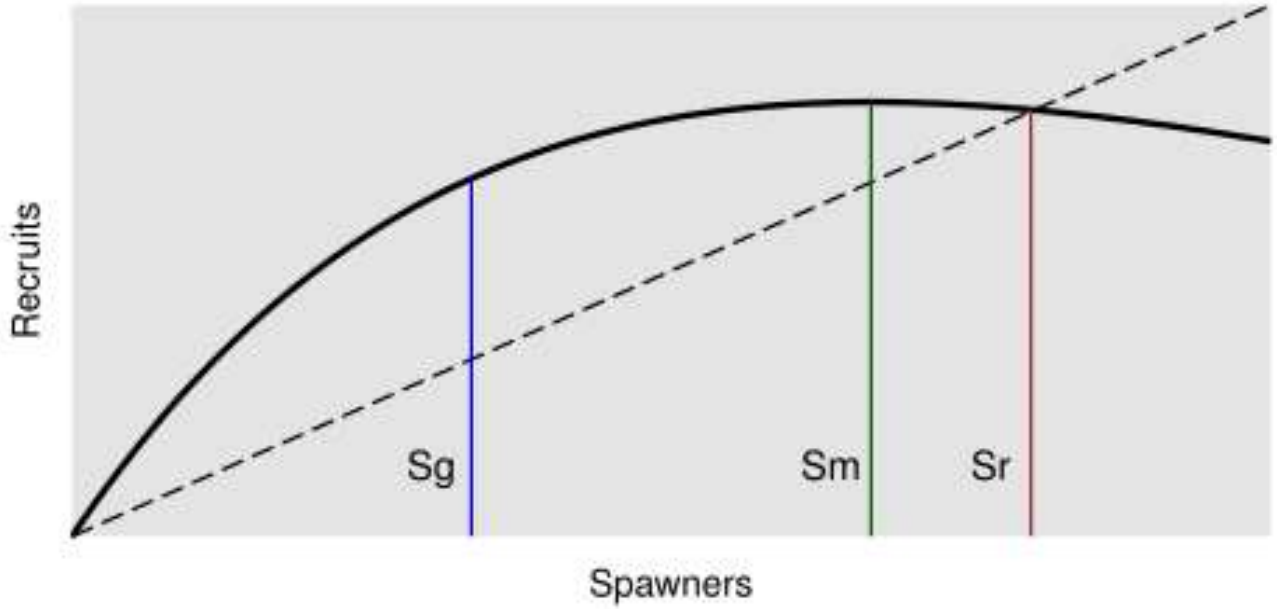
- **Use stock-recruitment relationships to derive egg targets for salmon.**

- **Calculate best estimates of eggs required and supplied to a river over the most recent five years.**

- **Likelihood of achieving target: >80% = Grade 1, 60-80% = Grade 2, <60% = Grade 3.**

- **No killing of salmon in Grade 3, reduced exploitation required for Grade 2.**

Stock-recruitment



The concept (2)

- **Predictions from biological management models invariably have a degree of uncertainty (termed “error”)- this is normal and to be expected.**

- **Simple models are easy to understand and visualise.**

- **As complexity is increased, the degree of error, both in terms of uncertainty and bias may be reduced… but complexity can reduce clarity.**

- **Development of the conservation regulation model will reduce error, increase complexity and make the workings more difficult to understand for non-specialists.**

The concept (3)

- **The modeling approach is based on methods developed by fisheries management scientists through ICES and NASCO.**

- **The approach uses the principle of applying best available scientific evidence to conservation management.**

- **Accuracy of the modeling process will increase as more scientifically-sound evidence is collected.**

Consultation

- **Salmon Liaison Group (FMS, Fisheries Trust biologists, Marine Scotland, SNH, SEPA).**

- **Sub-groups:**
  - **Counters**
  - **Exploitation rates**
  - **Grilse error**
  - **Juvenile sampling**

- **Public statutory 28 day consultation on preliminary gradings.**

Changes in 2016 in response to feedback from first year

- From district- to river-level assessment where possible.
- Web-based update of salmon distribution map (with SFCC).
- Monthly estimates (variation in size, sex, fecundity, catch/count data).
- Angling conditions (effects of flow).
- Sex ratios using genetics methods.

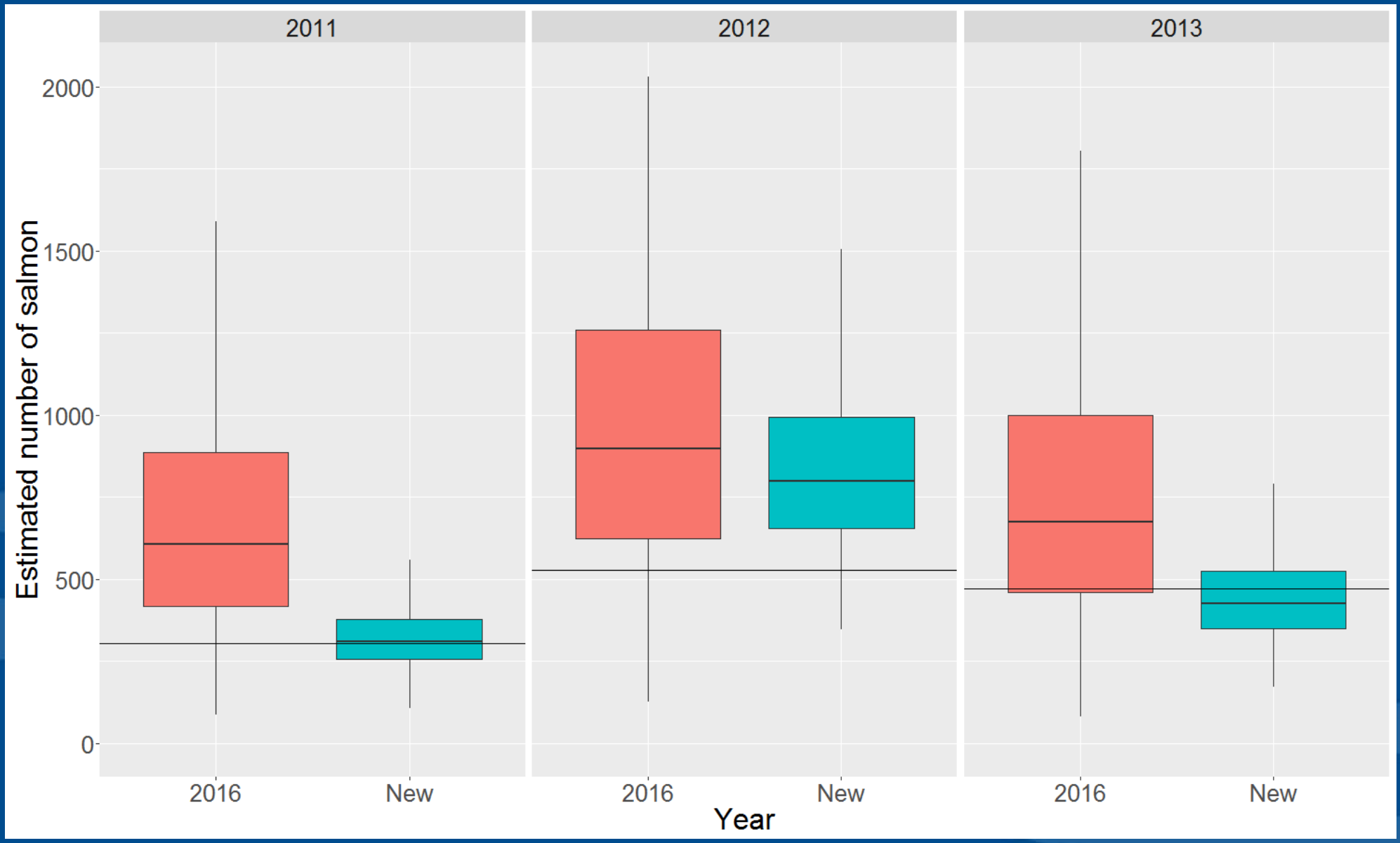
Consultation

- General model presented to, and accepted by, exploitation working group.
- *Balance between making progress on model and pre-consulting widely.*
- Consultation process highlighted a number of issues, particularly with the variation caused by among-site differences, including West Coast.
- Changes made after comments received during the consultation.

Further changes

- Counter and rod catch data from the River Helmsdale are now available in suitable form.
- The model can now incorporate a geographic (latitudinal) variable.
- This development has been communicated to the Salmon Liaison Group exploitation rate sub-group.

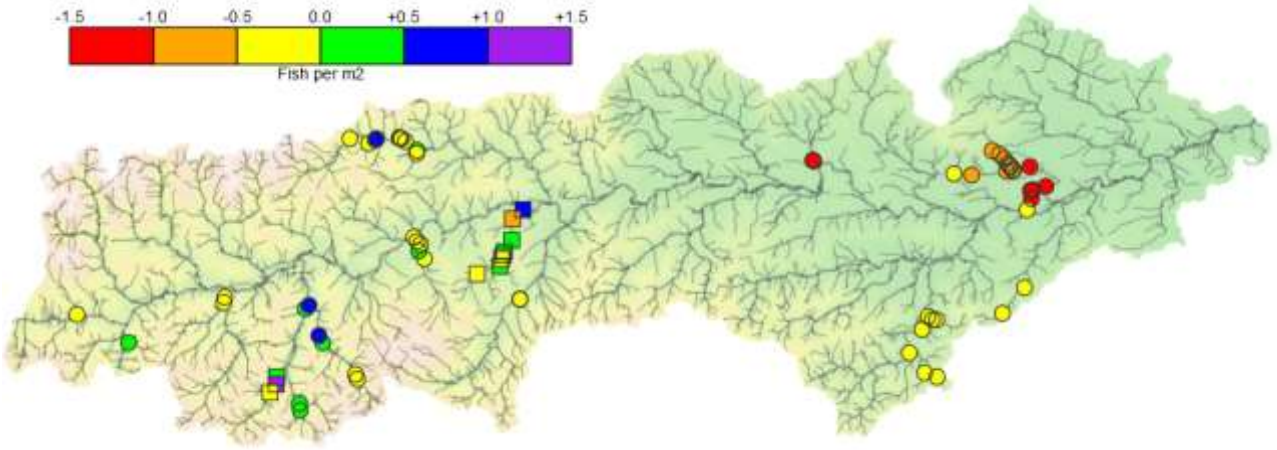
Example of new fits to the Morar counter data



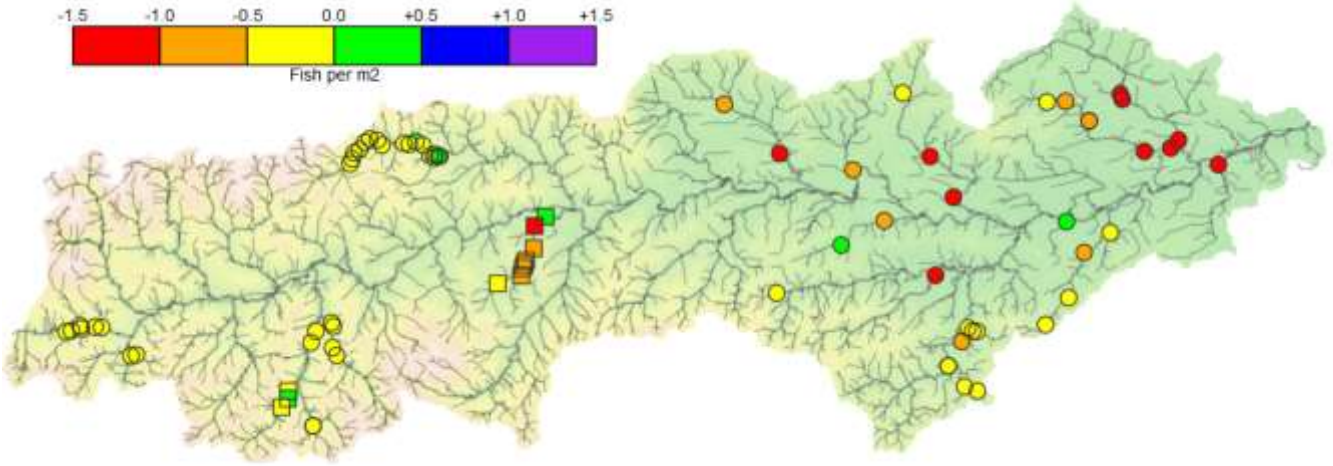
Developments

- Refine catch/count relationships further (in progress).
- Refine egg targets through new Scottish S/R curves.
- Quantify among-river variation in habitat (new group).
- Develop juvenile-based models (eg Dee application).
- Develop potential for expanding counter and tagging network (eg Awe, Helmsdale).
- Include additional geographic variation in model parameters (in progress).
- Sub-catchment level (Salmon Liaison Group report).
- Test genetics options (MSS, UHI).
- Understand variation in fecundity, sex ratio etc (in progress).

Juvenile assessment: Aberdeenshire River Dee fry



2012



2015

Local data

- Where good local data can be made available, models can be elaborated to refine estimates.
- A data call went to local biologists for information on ages and sizes of fish.
- Salmon distribution is being updated through SFCC.
- This year there will be a pre-consultation with local biologists (and hence less time for further development).

The future and conclusion

- Development of conservation regulation assessments is likely to be a focus for local-national collaboration and salmon management science over at least the next decade.

- This work provides a foundation for sustainable fisheries and conservation of Atlantic salmon.