Council

CNL(16)19

Classification of Norwegian salmon populations according to the National Quality Norm for Wild Salmon

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A quality norm for wild stocks of Atlantic salmon in Norway was adopted by Royal Decree in 2013 under the authority of the Nature Diversity Act (Anon, 2013). This norm is a classification tool that is used to assess the status of individual salmon stocks and guide the management authorities in their decisions that may have implications for wild salmon.

The quality norm has five categories ranging from very good to very poor. The management target is, with some exceptions, for each individual salmon stock to be classified as 'good' or 'very good'. If a wild salmon stock is classified under the quality norm as 'moderate', 'poor' or 'very poor', impacts on the stock should be assessed, and a plan detailing relevant measures should be made with the goal of improving the status of the stock.

The status of salmon stocks is evaluated in two dimensions (Figure 1). One dimension is the level of attainment of the conservation limit and the harvest potential for each stock, and the other dimension is the genetic integrity of the stock. In the conservation limit and harvest potential dimension, both the attainment of the conservation limit (after harvest) and the potential for harvest in relation to a 'normal' harvest potential is evaluated. Conservation limit attainment was assessed using the methods described in Forseth *et al*. (2013). The genetic integrity is evaluated in relation to species hybridization, genetic introgression from escaped farmed salmon and selection as a result of selective harvest and/or human induced changes in the environment. In the first implementation of the genetic integrity dimension of the quality norm, only introgression from escaped farmed salmon was evaluated. On both dimensions, the lowest (worst) classification among the different categories decides the final classification. A brief English description of the quality norm is given on page 21 of the 2014 Report of the ICES Working Group on North Atlantic Salmon (ICES, 2014).

Results of the classification of 104 rivers in 2016.

The first classification for both dimensions of the quality norm was conducted in 2016 for 104 rivers (www.vitenskapsradet.no, Anon. 2016). The classification includes nearly all of the most important Norwegian salmon rivers representing 76 % of the total combined Norwegian spawning target.

		Conservation limit attainment and harvest potential					
		Very poor	Poor	Moderate	Good	Very good	Sum
Genetic integrity	Very poor	11	2	1	5	6	25
	Poor	1	1	2	1	3	8
	Moderate	4	5	5	7	14	35
	Very good /good	10	0	3	3	20	36
	Sum	26	8	11	16	43	104

Management targets, based on spawning target attainment alone, were achieved for 82 of the 104 classified stocks in the period 2010 - 2014 (Anon 2015, Anon 2016). However, only 23 of the 104 stocks reached the goal *good* or *very good* quality according to the norm, 29 stocks had moderate quality, and 52 stocks (50 % of those assessed) were classified as poor or very poor (Figure 2).
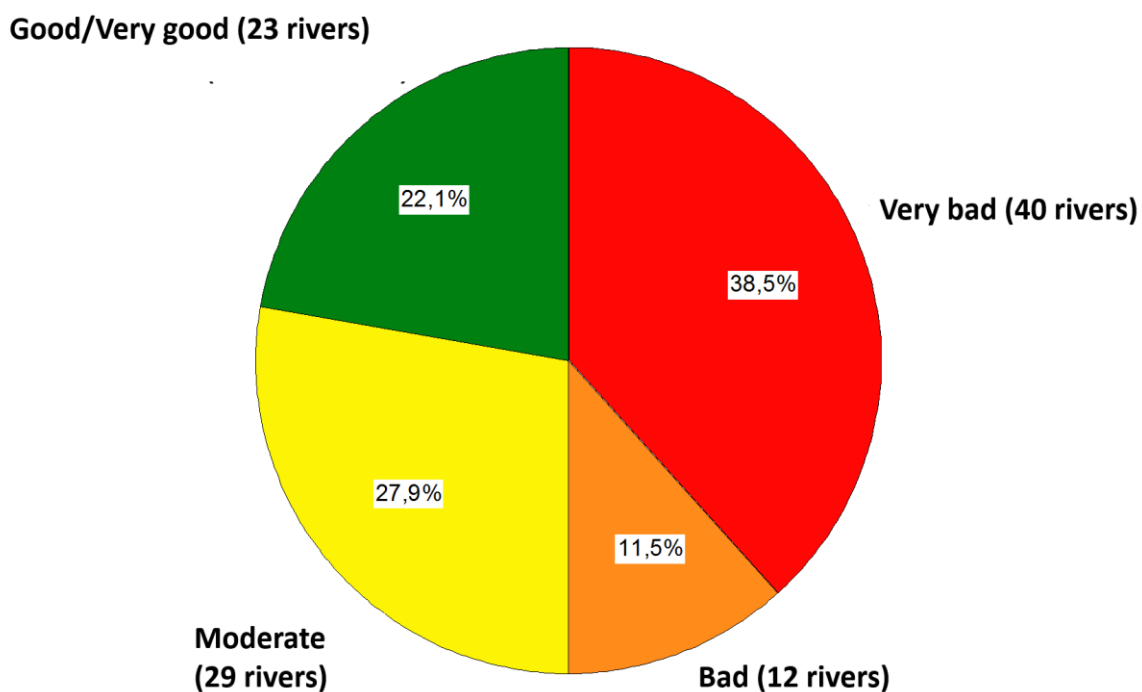
Good/Very good (23 rivers)

22,1%

Very bad (40 rivers)

38,5%

27,9%

11,5%

**Moderate
(29 rivers)**

Bad (12 rivers)

Figure 2. *Classification of 104 Norwegian salmon stocks using the Quality Norm system. Colours as in Figure 1. (Figure translated from Anon, 2016)*

45 stocks did not reach the goal for the *Conservation limit attainment and harvest potential dimension;* the overall quality status was determined by this dimension for 13 stocks. 68 stocks did not reach the goal according to the *Genetic integrity dimension;* the overall quality status for 36 stocks was determined by influences from farmed salmon . For 32 stocks the status was worse than good for both dimensions. (Figure 1).

The 81 stocks which did not reach the goal *good* or *very good* quality were located along the whole Norwegian coast (Figure 3). These results indicate that the stock situation in Norway is not as good as a categorization based on management target attainment alone would suggest, and demonstrate the importance and value of a more sophisticated classification system.

The experience of utilizing the quality norm in Norway suggests that an approach based only on conservation limit will not adequately classify the status and well-being of salmon stocks

and that the approach being suggested by NASCO's Stock Classification Working Group (see CNL(16)11) will be more appropriate for use with the NASCO Rivers Database'
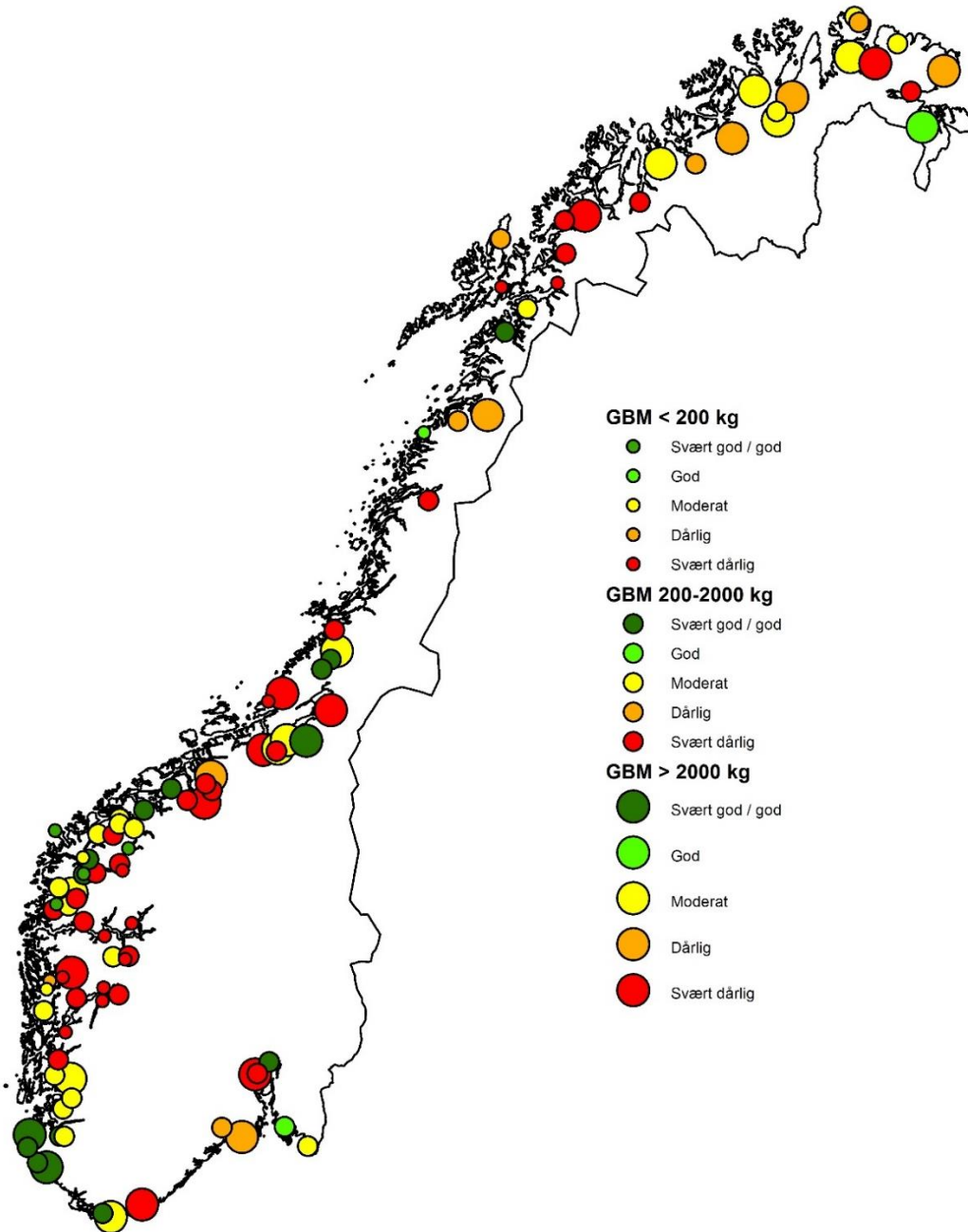

Figure 3. *Map showing the classification of 104 populations based on the Norwegian Quality Norm. Area of circles represent spawning target range in kg female fish. Colours as in figure 1. (Figure from Anon. 2016)*

References

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