

# How strong is fisheries-induced selection?

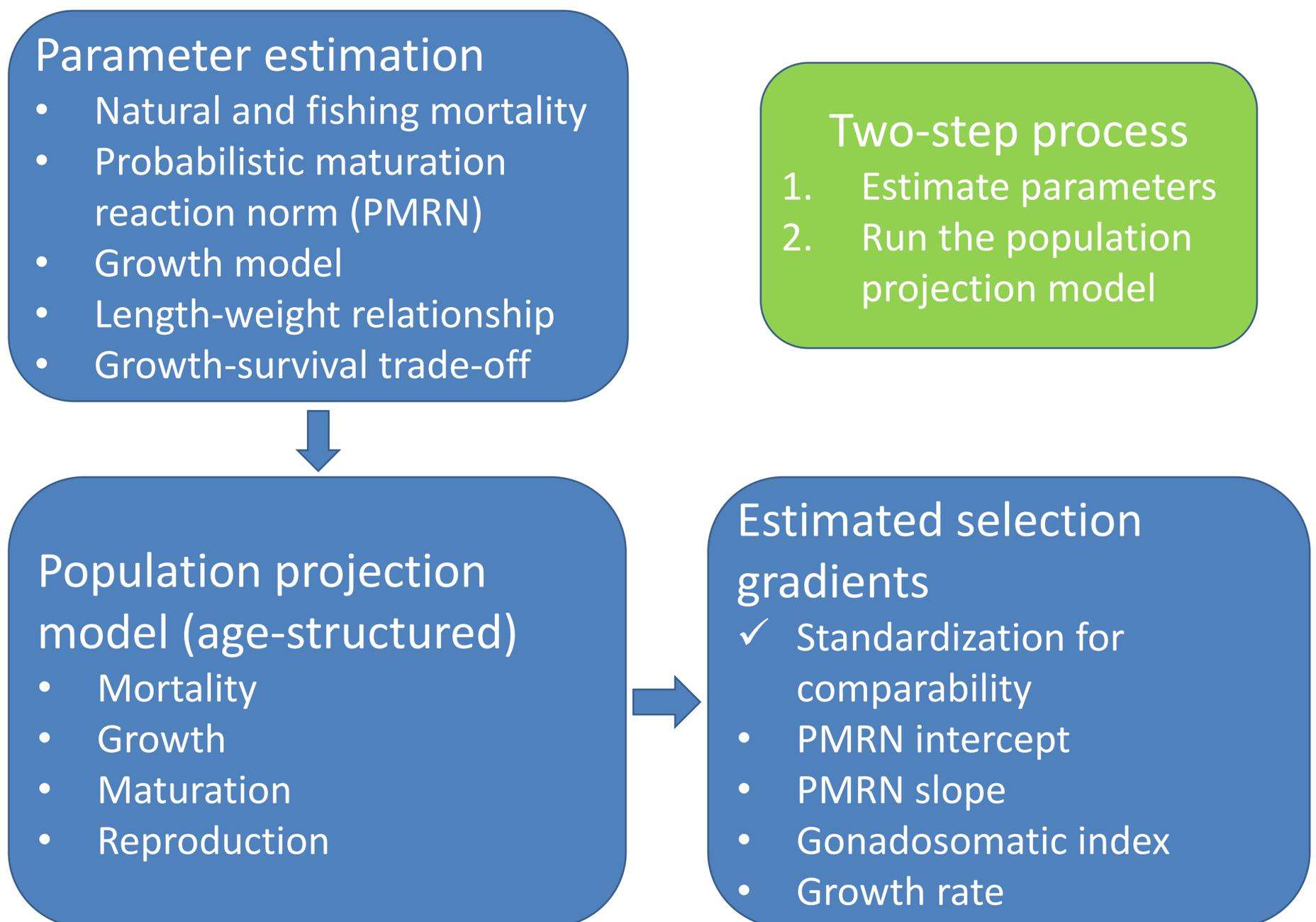
## A general framework for estimating fisheries-induced selection differentials



Mikko Heino<sup>1</sup>, Bruno Ernande<sup>2</sup>, Shuichi Matsumura<sup>3</sup>, Adriaan Rijnsdorp<sup>4</sup>, Ulf Dieckmann<sup>5</sup>, and the WGEVO\* participants

**Issue.** There is a need to better understand how strong selection pressures created by fishing are – first at the level of single stocks, but then also more generally – what are the patterns across stocks and different traits? Which kind of stocks are most at risk? To provide answers, we need tools that make such estimations easy and practical.

**Solution.** In WGEVO\* we have developed a framework that is complex enough to respect stock-specific differences, yet simple enough to be easy to apply to a wide range of stocks. Most parameters can be estimated with commonly available types of data. The whole framework is implemented in *R*, making it free and universally available.



**Challenges.** Data availability will vary from case to case. Good data on natural mortality and growth-survival trade-off are almost always lacking.

**Outlook.** It works! We have completed parameterization for 12 stocks, with a similar number in preparation. Check E:02 for some first results!



<sup>1</sup> University of Bergen and Institute of Marine Research, Norway; International Institute for Applied Systems Analysis (IIASA), Austria; <sup>2</sup> Ifremer, France; <sup>3</sup> Gifu University, Japan; <sup>4</sup> Wageningen IMARES, the Netherlands;

<sup>5</sup> International Institute for Applied Systems Analysis (IIASA), Austria

\* ICES Working Group on Fisheries-Induced Evolution