

## ASSESSMENT OF ELECTRIC PULSE FISHING AS AN ENVIRONMENT FRIENDLY FISHING METHOD IN THE NORTH SEA

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Brown shrimps (*Crangon crangon*) are of great commercial importance as the third greatest marine production in the North sea. They are caught with bottom trawls, operated by approximately 600 vessels. The application of the small meshed nets leads to high amounts of discards. Additionally the heavy bobbin rope, used to startle the shrimp, might cause damage to vulnerable habitats in coastal areas and estuaries.

The adoption of electric pulses is a promising alternative. The bobbin rope is replaced by electrodes to aim at a stricter selectivity and to reduce seabed contact. Extensive commercial testing of the prototype revealed an average by-catch reduction of 35% in volume and a reduction of bottom contact by 75% while catch efficiency is preserved. Therefore electric pulse fishing has high economic potential, while reducing environmental impact. At the moment electric fishing is banned in the EU because of its unknown effects. Additional information is crucial to lift the standing ban.

The effects of those low intensity pulses on marine organisms are poorly documented. Preliminary studies indicate no immediate effects, but they lack information on the various life stages of the exposed organisms. Impact on stress levels was not investigated and exposures were limited to one specific electric pulse. Whether electric pulse fishing is ecologically justifiable in the marine ecosystem will be examined by the following steps:

- 1) A multifunctional pulse generator will be constructed to determine the safety margins within which no health risks occur. Electrical field parameters such as pulse shape, amplitude, duration, frequency and polarity will be tested. A founded selection of marine organisms will be subjected to homogeneous pulse fields under controlled laboratory conditions, this allows altering one pulse variable while keeping all others constant.
- 2) Different life stages of three invertebrate species and three demersal fish species, that often occur in the catches of the crangon and that can easily survive in captivity will be selected for the experiments. After an adaptation period the organisms will be exposed to a specific pulse characteristic combination. Some of them will be followed up and others will be immediately euthanized for the examination.
- 3) The impact of the electric fields will be assessed using a multidisciplinary approach with the following parameters: mortality, behaviour, reproduction, tissue lesions (macroscopic and microscopic) and stress indicators. Information on the latter is scarce and in a first series of experiments, the response to acute stress will be characterized.

The present study constitutes the essential basis of all future work in this field and will avoid applying harmful pulse fields.