Combining litter observations with a regional ocean model to identify sources and sinks of floating debris in a semi-enclosed basin: The Adriatic Sea

Visual ship transect surveys provide crucial information about the density, and spatial distribution of floating anthropogenic litter in a basin. However, such observations provide a 'snapshot' of local conditions at a given time and cannot be used to deduce the provenance of the litter or to predict its fate, crucial information for management and mitigation policies. Particle tracking techniques have seen extensive use in these roles, however, most previous studies have used simplistic initial conditions based on bulk average inputs of debris to the system. Here, observations of floating anthropogenic macro debris in the Adriatic Sea are used to define initial conditions (number of particles, location, and time) in a Lagrangian particle tracking model. Particles are advected backward and forward in time for 60 days (120 days total) using surface velocities from an operational regional ocean model. Sources and sinks for debris observed in the central and southern Adriatic in May 2013 and March 2015 included the Italian coastline from Pescara to Brindisi, the Croatian island of Mljet, and the coastline from Dubrovnik through Montenegro to Albania. Debris observed in the northern Adriatic originated from the Istrian peninsula to the Italian city of Termoli, as well as the Croatian island of Cres and the Kornati archipelago. Particles spent a total of roughly 47 days afloat. Coastal currents, notably the eastern and western Adriatic currents, resulted in large alongshore displacements. Our results indicate that anthropogenic macro debris originates largely from coastal sources near population centers and is advected by the cyclonic surface circulation until it strands on the southwest (Italian) coast, exits the Adriatic, or recirculates in the southern gyre.
FLEXSELECT: a flexible counter-herding device to reduce bycatch in trawl fisheries

General information
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Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, SINTEF Fisheries and Aquaculture
Authors: Melli, V. (Intern), Karlsen, J. D. (Intern), Feekings, J. P. (Intern), Herrmann, B. (Ekstern), Krag, L. A. (Intern)
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FLEXSELECT: counter-herding device to reduce bycatch in crustacean trawl fisheries
FLEXSELECT is a simple counter-herding device which aims at reducing the bycatch of fish by scaring them away from the trawl path without affecting the catches of the target species. FLEXSELECT was tested in the Norway lobster (Nephrops norvegicus) directed trawl fishery, as this includes bycatch of both roundfish and flatfish. Length-based data were collected for Nephrops, four roundfish species (cod, haddock, whiting and hake) and two flatfish species (plaice and lemon sole) and length-based catch comparisons performed. No significant effect on the target species, Nephrops, was detected, whereas a reduction of 39% (CI: 29-46 %) was obtained for the overall number of fish. Catches of all the six fish species examined were significantly reduced by FLEXSELECT, with the efficiency varying considerably among species and over length classes. No significant diel differences were found for either roundfish or flatfish species. FLEXSELECT prevents bycatch species from interacting with the trawl, thus most likely enhancing their survival and fitness. Moreover, its fast attachment system makes FLEXSELECT a flexible tool, adaptable to different fisheries and catch goals.

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Authors: Melli, V. (Intern), Frandsen, R. (Intern), Krag, L. A. (Intern), Feekings, J. P. (Intern)
Projects:

From science to innovation in the Nephrops fishery to comply with the Common Fisheries Policy: development of an optimal and flexible selection system for trawl by use of new technology and underutilized fish behaviour (39375)

The aim of the VISION-project is to develop a new generation of trawl designs towards a targeted and controllable species and size selection in the mixed fisheries targeting Nephrops by improving vertical separation of the catch and gear selectivity. This will contribute to an economic viable fishery and sustainable use of resources under a landing obligation.

The mixed fisheries targeting Nephrops is one of the most economically important Danish fisheries. It is characterized by high proportions of discards and will have a low capitalization of the vessels' quotas under a landing obligation.

In the VISION-project, a horizontally divided codend developed in the FishValue-project (vaerdifisk.dk) will be refined to increase the vertical separation of cod, flatfish and small fish in general from Nephrops. The project will combine new technology and knowledge of fish behavior in an innovative way to develop new selection principles and thus gear designs with an increased species and size selectivity. Also, the project seeks to provide solutions for a highly flexible fishery so fishermen can change their gear to match the selective properties with the current fishing situation.

This project is coordinated by DTU Aqua.

National Institute of Aquatic Resources
Section for Ecosystem based Marine Management
Euronete Scandinavia A/S
Strandby Net A/S
Danish Fishermen's Association
Period: 01/08/2016 → 08/08/2018
Number of participants: 4
Project participant:
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Krag, Ludvig Ahm (Intern)
Melli, Valentina (Intern)
Project Coordinator:
Karlsen, Junita Diana (Intern)
Project

Identifying simple and cost effective gear solutions which can lead to an effective implementation of the new EU common Fisheries Policy (CFP)

National Institute of Aquatic Resources
Period: 15/12/2015 → 14/12/2018
Number of participants: 4
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