

# Marine Fish Farming and Wild Fish Aggregations in Scotland



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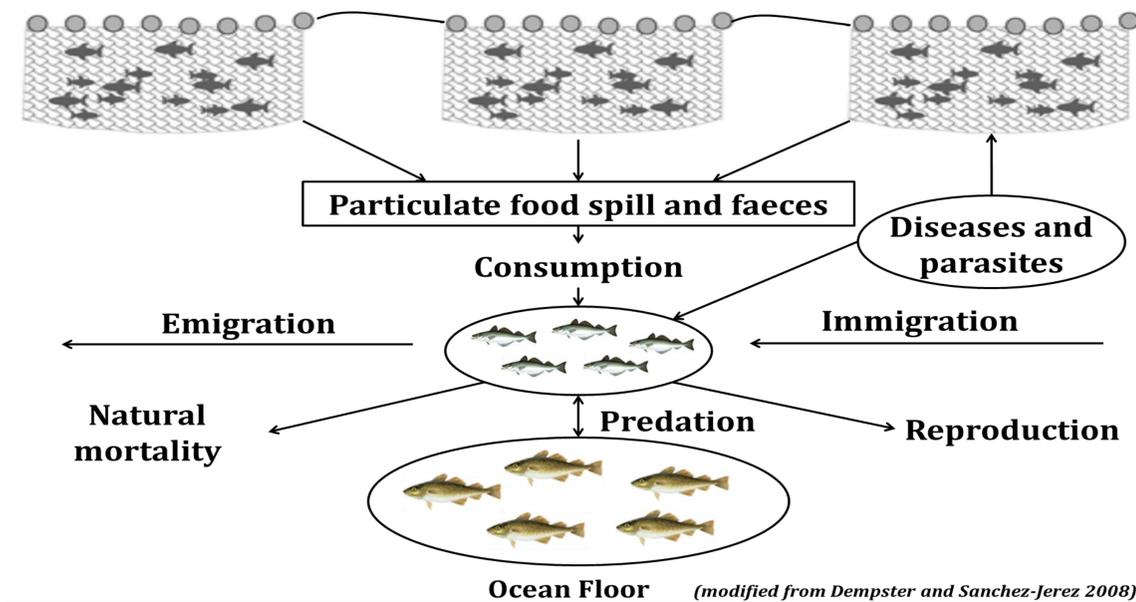
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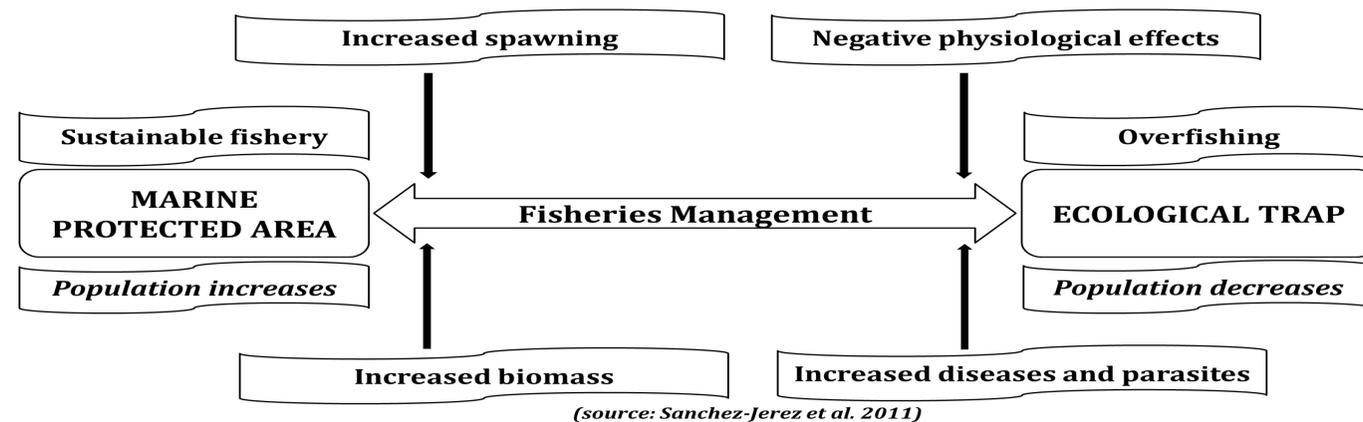
# Coastal Fish Farms Attract Wild Fish

Sea cages can attract wild fish e.g. reports in Mediterranean Sea, Norway, Australia, Indonesia, Canada, and Red Sea.

Sea cages can change the physiology (modified diet, body fat content, fatty acid composition and parasite loads) and behaviour of wild fish.



Sea cages could be good (like marine protected area) or bad (an ecological trap) for wild fish.



Aquaculture and fisheries are of significant importance to Scottish economy.

**Fisheries:** Dominating pelagic species include mackerel and herring, followed by demersal fish (monkfish, haddock and cod) and shellfish (nephrops and scallops) (Marine Scotland Science (MSS) 2012).

**Aquaculture:** Scotland is the third largest producer of Atlantic salmon (*Salmo salar*): 158,018 tonnes in 2011 (MSS 2012).

Distribution of Active Salmon Production Sites in 2011

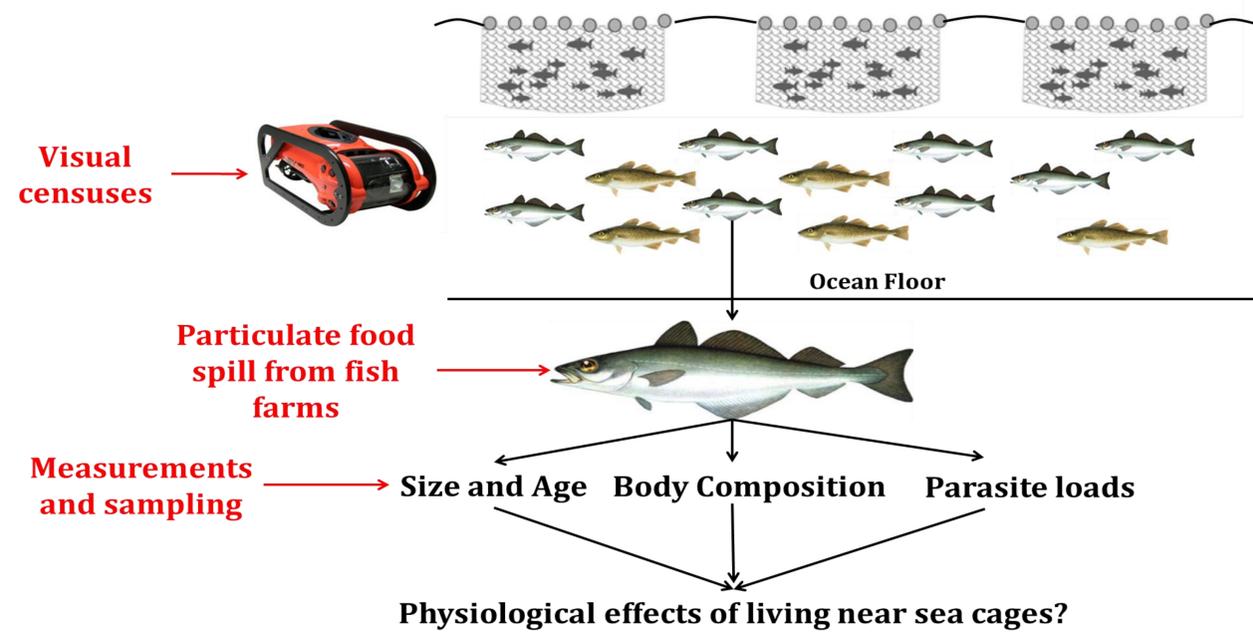


(source: Marine Scotland Science 2012)

Little has been done to quantify effects of fish farms on wild fish in Scotland.

# How to Determine Fish Farm Effects on Wild Fish?

Fieldwork will involve visual census techniques, collecting of fish for further analysis (proximate analysis, otoliths), sampling of benthos and plankton next to cages and away from cages (control cite).



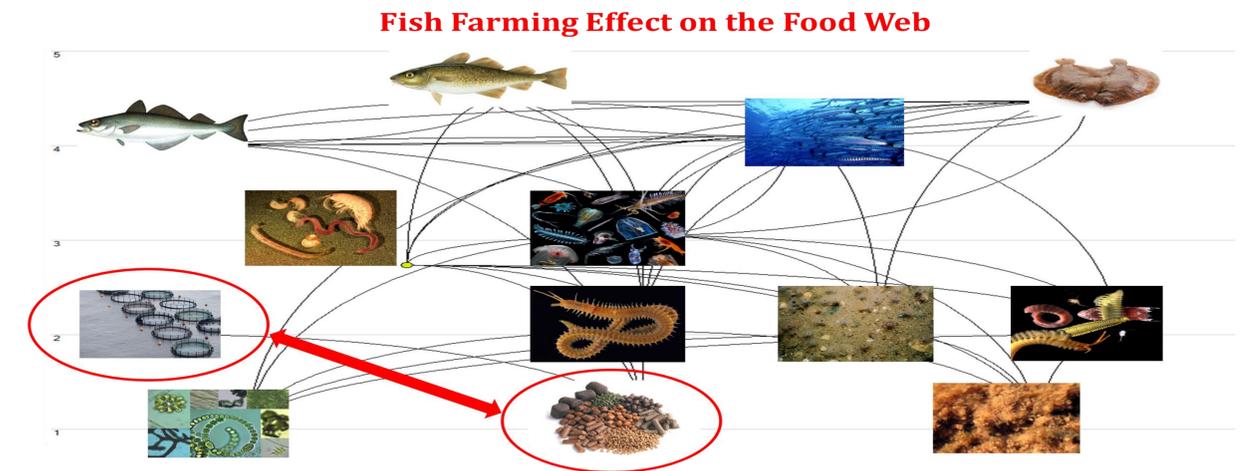
Preliminary fieldwork (July 2013) in Loch Melfort with my supervisor Dr. Bruce McAdam.



# Modelling Fish Farms and Wild Fish

## The Food Web Approach

Sea cages have a direct effect by producing detritus from excess feed, and possibly releasing parasites. These in turn have indirect effects on the rest of the food chain. Is there an impact on fisheries? Perhaps juveniles benefit from quality feed, or perhaps they suffer from parasites?



## The Bioenergetics Approach

Individual fish near farms will have different food and diseases from wild fish. The food web approach can tell us how their ecology changes; the energetic approach uses physiological laws to say how this ecology affects physiology.

