

MPA NEWS



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Diseased lobsters in UK's Lundy Marine Conservation Zone: A natural or "unnatural" result of protection?

Most ecological studies of the reserve effect of no-take zones focus on changes in abundance and diversity of marine life inside reserves: in other words, is a reserve leading to more individuals and more species inside its boundaries? However, a recent study of lobsters inside the UK's Lundy Marine Conservation Zone has sparked a novel discussion and some controversy. It asks, is there such a thing as too much abundance in a reserve - and if so, what should be done about it?

The study, led by Charlotte Eve Davies of Swansea University (UK), examined lobster populations inside Lundy's 3.3-km² no-take zone and in adjacent fished waters. Her team found that lobsters were twice as abundant inside the no-take zone as outside. In itself, this was not a surprise: no-take zones typically lead to increases in abundance inside their boundaries.

What was unusual was the team's other finding: lobsters inside the no-take zone were 71% more likely to exhibit shell injuries than lobsters outside - most likely due to competition among individual lobsters, according to the researchers. And injured lobsters are 76% more likely than uninjured lobsters to exhibit shell disease. The shell disease exposes lobsters' underlying soft tissues and is caused by bacteria that enter through injuries to a lobster's carapace. (The disease is typically non-lethal but can lead to secondary infections and molting difficulty, and can also cause lobsters to be thrown back by fishermen for aesthetic reasons.)

By the study's analysis, the abundance of lobsters inside the no-take zone is leading them to battle for territory. The researchers suggest the competition and incidence of disease amount to "negative effects" of the no-take zone. And in a follow-up opinion piece that Davies published online, she went further:

"Our study...introduces the idea that un-fished populations in marine parks may eventually reach a threshold at which conditions become unhealthy. This may even introduce the possibility of controlled fishing in long-standing no-take zones." (<http://theconversation.com/competitive-lobsters-are-fighting-it-out-in-uks-first-marine-park-35830>)

What is "natural"?

Davies' suggestion that one of the UK's very few no-take areas should perhaps be reopened to fishing is controversial, not least because England is just starting to plan its second allotment of marine conservation zones (see the box at the end of this article). And the idea that lobsters should be fished in order to protect them from disease is also somewhat contentious.

Peter Jones of University College London suggests the study is an unfair criticism of no-take zones. He says what is going on inside Lundy is simply population ecology in action - an inevitable outcome of protection that should be accepted and welcomed.

"Density dependence is a well-recognized central tenet of population ecology," Jones wrote on OpenChannels.org in response to the study (<https://www.openchannels.org/node/8522>). "As the density of a population is restored back to unexploited levels, a number of 'natural' trends will increase, such as increased prevalence of disease amongst more crowded populations and older 'senile' individuals (as natural age structure is restored), along with increased competition for space, sexual partners, food, etc., leading to increased fighting-related injuries. Per capita production will also decrease due to competition for food, cannibalism, etc. This is naturally what happens when you stop thinning a population through harvesting."

Davies suggests, though, that it is difficult to say what is really "natural" or "unnatural" in this case. For one thing, there was no baseline monitoring of Lundy prior to designation of its no-take zone in 2003. Furthermore, centuries of fishing have long since shifted any ecosystem balance in the region.

"Large cod, which are natural predators of juvenile lobsters, have long been fished out of the Lundy waters," says Davies. "Hence, in the Lundy reserve where fishing is now prohibited, there is nothing to prey on lobsters, so the lobster population will dramatically increase, potentially beyond 'natural' levels. I agree with Peter: basic population ecology will be in action. But if we follow this basic ecology, at present with increased population and injury/disease, the lobsters are in the process of declining health."

Davies points out it is a changing world: fishing pressure, disease, and other factors like climate change can all have profound effects on ecosystems. "Our study highlights that it is imperative to continuously monitor any management plan and each MPA should be treated like a live experiment, as essentially that is what they are," she says.

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The paper "Effects of population density and body size on disease ecology of the European lobster in a temperate marine conservation zone" was published in the ICES Journal of Marine Science; the abstract is here: <http://icesjms.oxfordjournals.org/content/early/2014/12/29/icesjms.fsu237.abstract>

BOX: Public consultation begins for second wave of Marine Conservation Zones in England

A public consultation is underway on 23 proposed Marine Conservation Zones (MCZs) in English waters, as well as new conservation features for 10 existing MCZs. The proposed MCZs would be a second tranche (or portion) of an eventual, ecologically coherent network of MCZs for England. The network is being implemented in a phased approach. The first tranche of 27 MCZs was designated in November 2013 ([MPA News 15:4](#)).

Together the sites proposed for designation in the second tranche cover a total area of 10,810 km². This would add to the 9664 km² protected by the first tranche of MCZs. To participate in the consultation, go to <https://consult.defra.gov.uk/marine/tranche2mczs>

Conservation NGOs have expressed disappointment that an additional 14 sites that had been slated for the second tranche of MCZs were dropped this year, largely on the grounds of potential costs to the fishing and ports industries, coupled with concerns about potential limitations on recreational boating (<http://bit.ly/secondtranche>).

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