Popular science summary of the PhD thesis

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Title of the PhD thesis	The importance of oil and gas platform foundations for fish communities in the North Sea
PhD school/Department	DTU Aqua

Science summary

Offshore oil and gas (O&G) platforms may hold unexpected ecological value for marine ecosystems in the North Sea. While regulations call for th+e complete removal of O&G platforms at the end of their productive life, research increasingly suggests that these platforms may function as artificial reefs, offering habitats for fish and other marine life. Additionally, the 500-meter fishing exclusion zones around these platforms protect fish from extraction and promote seafloor stability. Yet, the ecological implications of platform removal remain poorly understood, making it difficult to predict the potential environmental outcome.

My thesis explores the spatial associations between O&G platforms and fish communities in the North Sea. Using multiple scientific methods—including angling surveys and underwater video footage from remotely operated vehicles (ROVs)—I studied how fish biodiversity, abundance, and size vary with distance to platforms. I also investigated how these spatial patterns change with depth and time of the day.

The findings reveal that platforms enhance fish biodiversity and abundance locally, with the highest number of fish species and individuals observed mostly within 50 meters of the structures. For example, Atlantic cod (*Gadus morhua*) were more abundant and larger near platforms, suggesting platform habitats may be crucial for their growth and survival. Similarly, ROV data showed that fish biodiversity and abundance were greatest at deeper depths and near platforms, with depth distribution shifting between day and night.

These results underscore the ecological relevance of offshore O&G platforms as potential hotspots for fish in the North Sea, raising important questions about their future. Importantly, we are unsure if fully removing the platforms results in the best ecological outcome. As the North Sea experiences an increase in the number of offshore wind farms, the lessons from this research can inform strategies to balance marine conservation with infrastructure development.