

10. European spiny lobster (*Palinurus elephas*)

Irish name: Piardóg



Figure A10.10.1. European spiny lobster (*Palinurus elephas*) © Georges Jansoone ([CC BY 3.0](https://creativecommons.org/licenses/by/3.0/deed.en))

Background

The European spiny lobster *Palinurus elephas* is found throughout the north-east Atlantic from Norway to Morocco, possibly extending as far south as Madeira (Goñi & Latrouite, 2005). It is found on rocky, exposed coasts, from the shallow subtidal to around 70 m depth, occasionally deeper, migrating offshore in the autumn, and inshore in the spring and summer to mate (Ansell & Robb, 1977). Tagging studies on the southwest coast of Ireland show high residency of commercial sized spiny lobster in coastal reef (Marine Institute and BIM, 2023). In Irish waters, functional maturity (egg-bearing) is reached at approximately 82 mm carapace length in females and 84.5 mm in males (Groeneveld et al., 2013). Between 20,000 – 200,000 eggs are produced by mature females annually, which have an incubation period of approximately 9 months in the Atlantic, followed by a pelagic larval duration (PLD) of approximately 1 year. (Hunter, 1999). Incubation period and PLD vary according to temperature and food availability (Groeneveld et al., 2013). The long PLD increases the dispersal potential and may explain the apparently panmictic population in the north-east Atlantic (Ellis et al., 2013). Adult spiny lobsters can also migrate large distances as lobsters tagged off

northern France have been found on the west coast of Ireland, and juvenile lobsters are common in offshore sedimentary habitats (Marine Institute IGFS data). *Palinurus elephas* is an important commercial fisheries species with 58 tonnes landed in 2022, the highest catch since 2004 (Marine Institute & Bord Iascaigh Mhara, 2023).

Rationale for spatial protection in the Celtic Sea

The European spiny lobster is currently listed as Vulnerable under criteria A2bd on the IUCN red list (Goñi, 2014), with the main threat being from commercial fisheries. In Irish waters the minimum landing size is 110 mm. Onshore reproductive migrations of distances between 5 and 20 km occur in sexually mature adults but outside these migrations adults have offshore resident home-ranges (Groeneveld et al., 2013). Spatial protection is warranted due to restricted adult movement of spiny lobsters, and their demonstrated residency on reef habitat in Irish waters, and has been shown to be effective for this species (Follesa et al., 2008).

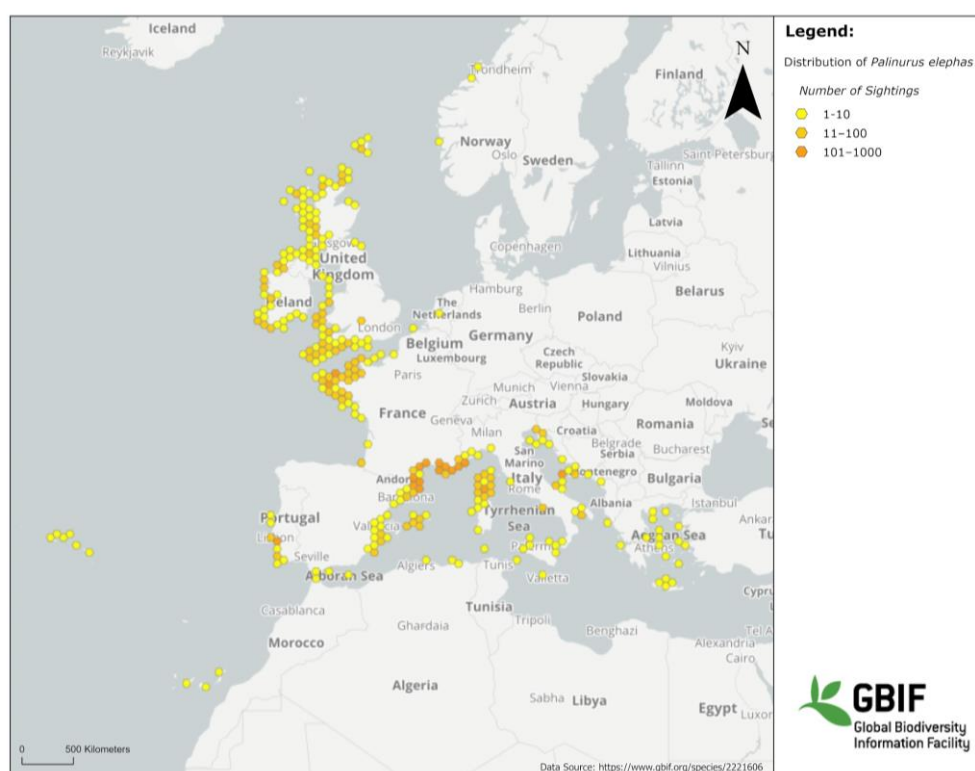


Figure A10.10.2. Distribution of European spiny lobster (*Palinurus elephas*). Source <https://www.gbif.org/species/2221606>

Sensitivity assessment

European spiny lobster is highly sensitive to four of the pressures associated with the construction and operation of offshore wind farms. The species is highly sensitive with high confidence to

physical loss (to land or freshwater habitat) and physical change (to another seabed type). All benthic marine species have a resistance of 'None' to physical loss to land or freshwater and would be unable to recover from a permanent loss of habitat (very low resilience). Spiny lobsters are highly sensitive to a change from hard to soft substrate due to the loss of structured refuges, as sheltering is their most effective defensive measure against predators (Buscaino et al., 2011). The addition of artificial hard substrate associated with offshore wind farms has the potential to create new refuges and habitat for European spiny lobster, however, associated pressures from offshore wind farm operations such as vibrations or presence of antifoulant may make such artificial substrate unsuitable. The species is highly sensitive with low confidence to smothering and siltation changes (heavy) which may be caused during the construction and ongoing operation of offshore wind farms. Ability to leave or enter shelters could be reduced by obstruction caused by heavy deposition of sediment, leading to individuals being vulnerable to predators. The species is also highly sensitive to deoxygenation (low confidence).

European spiny lobster is highly sensitive to the pressures associated with targeted and non-targeted removal by fishing (medium confidence) and moderately sensitive to abrasion/disturbance of the surface of the substratum or seabed (low confidence). This species is a commercially important species and pressure comes from both targeted fisheries and from by-catch from other fisheries. Intensive fishing has seen a dramatic decline in population size in Irish waters, with current landings at 20-30 tonnes per annum, down from an average of 150 tonnes per average between 1950s – 1970s (Tully & Palma-Pedraza, 2022). Mortality of undersized lobsters caught in nets or traps increases with length of time they are trapped, over seven days reduces survival rates to 64% (Catanese et al., 2018). The use of nets and pots by other fisheries means that there is also a high sensitivity to pressures associated with removal of non-target species, i.e., as by-catch. The species is moderately sensitive to the abrasion/disturbance of the substratum or seabed associated with trawl fishing. Adults shelter during the day in rocky substratum during the day so are only vulnerable to trawling activities at night. Damage to juvenile habitat may occur through abrasion.

European spiny lobster was not assessed for the chemical pressures associated with the fishing sector due to lack of evidence. The pressures not assessed were transition elements & organo-metal contamination, hydrocarbon & PAH contamination, synthetic compound contamination, and introduction of other substances.

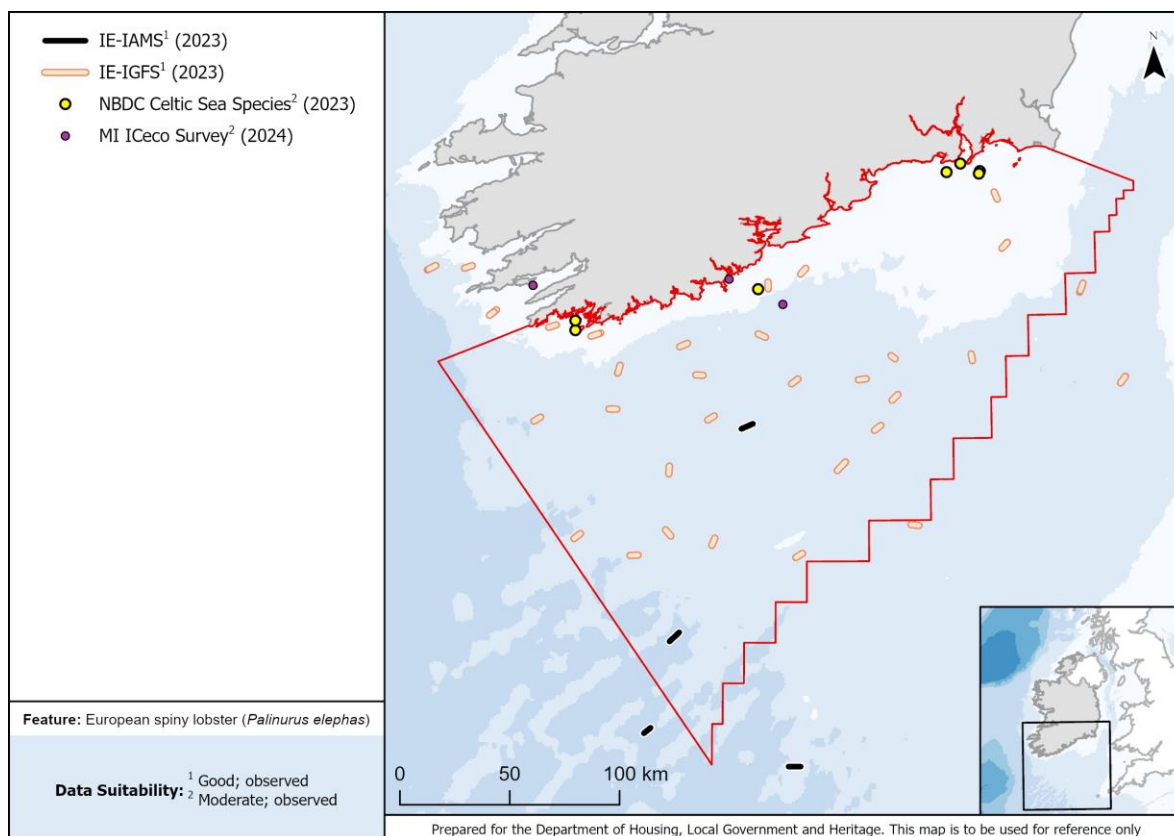


Figure A10.10.3. Data available for European spiny lobster (*Palinurus elephas*) in the Celtic Sea.

Data sources available

Data sources for European spiny lobster in the Celtic Sea AOI that were available to the MPA Advisory Group, and the quality / suitability of those data for conservation prioritization analyses (See Table 3.2.1 Main Report), are shown in Figure A10.10.3. Data were not considered suitable for inclusion in prioritization analyses: sampling gears on the surveys that yielded data are not surveying preferred habitat of the species.

Future research

Future research is required to establish the life history of *Palinurus elephas* in Irish waters, including size at maturity, incubation periods, and PLD. Knowledge is also needed as to when and where their annual migrations between shallow and deeper waters occur, information which is important in order to provide effective spatial protection. Further molecular genetics research would help determine the level of self-recruitment vs settlement from other regions. Not all pressures could be assessed due to lack of evidence; future research is needed to be able to fully and accurately assess

the sensitivity of the European spiny lobster to this suite of pressures. Accurate distributional data are urgently required in order to include this species in conservation prioritization analyses.

References

- Ansell, A.D., & Robb, L. (1977). The spiny lobster *Palinurus elephas* in Scottish waters. *Marine Biology*, 43, 63–70. <https://doi.org/10.1007/BF00392572>
- Catanese, G., Hinz, H., Gil, M.d.M., Palmer, M., Breen, M., Mira, A., Pastor, E., Grau, A., Campos-Candela, A., Koleva, E., Grau, A.M., & Morales-Nin, B. (2018). Comparing the catch composition, profitability and discard survival from different trammel net designs targeting common spiny lobster (*Palinurus elephas*) in a Mediterranean fishery. *PeerJ*, 6, e4707. <https://doi.org/10.7717/peerj.4707>
- Buscaino, G., Filiciotto, F., Gristina, M., Buffa, G., Bellante, A., Maccarrone, V., Patti, B., & Mazzola, S. (2011). Defensive strategies of European spiny lobster *Palinurus elephas* during predator attack. *Marine Ecology Progress Series*, 423, 143–154. <https://doi.org/10.3354/meps08957>
- Ellis, C.D., MacLeod, K.L., Jenkins, T.L., Rato, L.D., Jézéquel, Y., Pavičić, M., Díaz, D., & Stevens, J.R. (2023). Shared and distinct patterns of genetic structure in two sympatric large decapods. *Journal of Biogeography*, 50, 1271–1284. <https://doi.org/10.1111/jbi.14623>
- Follesa, M.C., Cuccu, D., Cannas, R., Cabiddu, S., Murenu, M., Sabatini, A., & Cau, A. (2008). Effects of marine reserve protection on spiny lobster (*Palinurus elephas* Fabr., 1787) in a central western Mediterranean area. *Hydrobiologia*, 606, 63–68. <https://doi.org/10.1007/s10750-008-9346-8>
- Gibson-Hall, E., Jackson, A., Wilding, C.M., & Marshall, C.E. (2020). *Palinurus elephas* European spiny lobster. In Tyler-Walters, H. (ed) *Marine Life Information Network: Biology and Sensitivity Key Information Reviews*, [on-line]. Marine Biological Association of the United Kingdom, Plymouth. [cited 24-01-2024]. Available from: <https://www.marlin.ac.uk/species/detail/1145>
- Goñi, R., 2014. *Palinurus elephas*. The IUCN Red List of Threatened Species 2014: e.T169975A1281221. <http://dx.doi.org/10.2305/IUCN.UK.2014-1.RLTS.T169975A1281221.en>
- Goñi, R., & Latrouite, D. (2005). The biology, ecology and fisheries of *Palinurus* spp. in European waters: *Palinurus elephas* (Fabricius, 1787) and *Palinurus mauritanicus* (Gruvel, 1911). *Cahiers de Biologie Marine*, 46, 127–142. <https://archimer.ifremer.fr/doc/00000/3625/>
- Gonulal, O. (2015). Spiny Lobster (*Palinurus elephas* Fabricius, 1787) and Common Lobster (*Homarus gammarus* Linnaeus, 1758) Fishing in the Aegean Sea. pp. 384 -393 in Katağan, T., Tokaç, A.,

- Beşiktepe, Ş., Öztürk, B. (eds), *The Aegean Sea Marine Biodiversity, Fisheries, Conservation and Governance*. Turkish Marine Research Foundation (TUDAV), Publication No: 41, Istanbul, Turkey.
- Groeneveld, J.C., Goñi, R., & Díaz, D. (2013). *Palinurus* Species. pp. 326–356 in Phillips, B. (ed), *Lobsters: Biology, Management, Aquaculture and Fisheries* (Vol. 11, 2nd ed.). Wiley-Blackwell.
- Hunter, E. (1999). Biology of the European spiny lobster, *Palinurus elephas* (Fabricius, 1787) (Decapoda, Palinuroidea). *Crustaceana*, 72, 545–565. <https://doi.org/10.1163/156854099503609>
- Hunter, E., Shackley, S.E., & Bennett, D.B. (1996). Recent studies on the crawfish *Palinurus elephas* in South Wales and Cornwall. *Journal of the Marine Biological Association of the United Kingdom*, 76, 963-983. <https://doi.org/10.1017/S0025315400040911>
- Jackson, A.C. (2021). Bayesian occupancy modelling of benthic Crustacea and the recovery of the European spiny lobster, *Palinurus elephas*. *Journal of the Marine Biological Association of the United Kingdom*, 101, 1033–1046. <https://doi.org/10.1017/S002531542200008x>
- Marine Institute & Bord Iascaigh Mhara, 2023. *Shellfish Stocks and Fisheries Review 2022: An assessment of selected stocks*. Marine Institute, Galway, Ireland. 120 pp.
- Tully, O. and Palma-Pedraza, S. (2022). *Catch and bycatch in the tangle net fishery for crayfish (Palinurus elephas) off the south west coast of Ireland*. EMFF 2014-2020 Marine Institute Report Series, Marine Institute, Galway, Ireland. 47 pp.