

# Invasive spread of Red king crab along the Norwegian coastline



Nirmala Dhakal, Linn Elise Doddema,  
Marina Metic, Sigurd Riise Nilsen,  
Pedro Rendon

\*All authors contributed equally



# Introduction

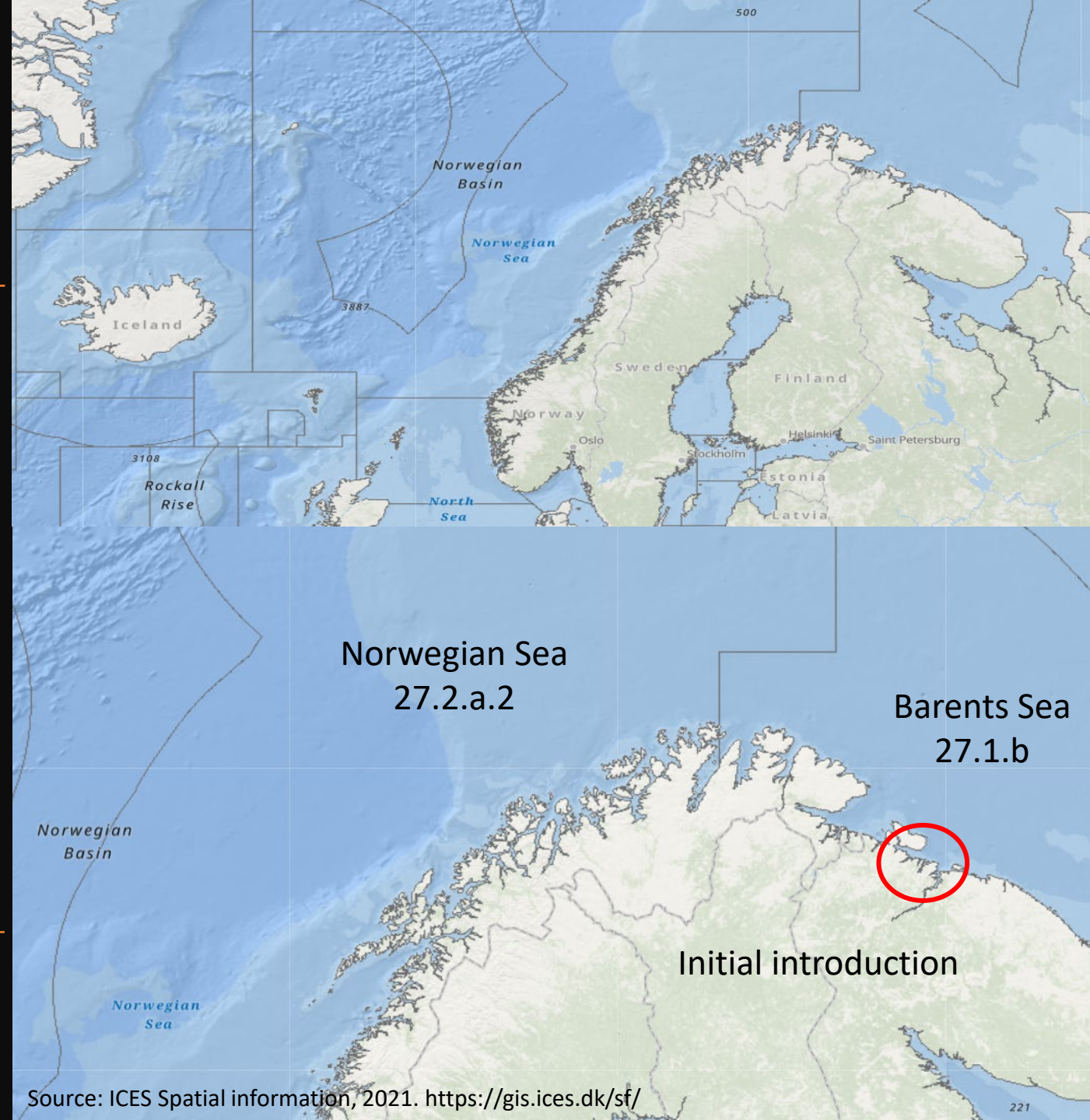
---

- Red king crabs (*Paralithodes camtschaticus*) → one of the largest member of Decapods in phylum Arthropoda.
  - Large, generalist opportunistic predators that feed on various benthic invertebrates (such as molluscs, polychaetes, echinoderms) and even eggs of some commercial fish and other crustaceans
  - 1961-1969 → 2609 adults have been released into the Barents Sea (Kola Peninsula, Russia, aprox. 120 km from Norwegian border)
  - 1961 → about 10000 crabs from 1 to 3 years old (M:F=1:1)
  - Barents and Norwegian Seas → favourable conditions that acclimate all developmental stages of these crabs
- 

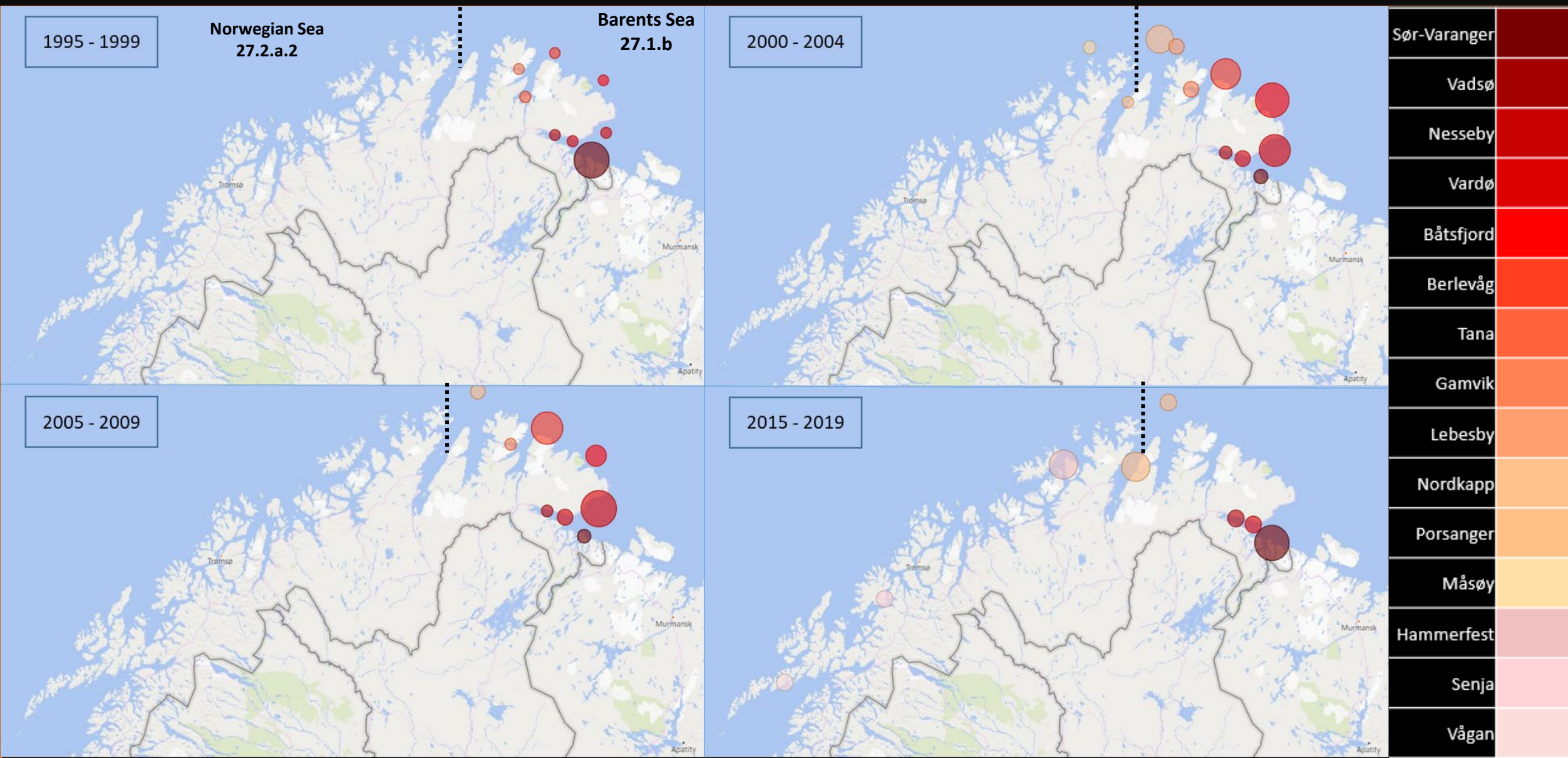


# Material and Methods & Results

- 2 datasets
- Observational data from the Norwegian Biodiversity Information Centre (artsdatabanken.no) → individual sightings of the red king crab between 1995 and 2019. sorted by date and municipality.
- International Council for the Exploration of the Sea (ICES) → official Nominal Catches 2000 – 2018 in FAO area 27 (Atlantic Northeast), subdivisions 27.1.b (Barents Sea) & 27.2.a.2 (Norwegian Sea). Extracted RKC data for these 2 areas.

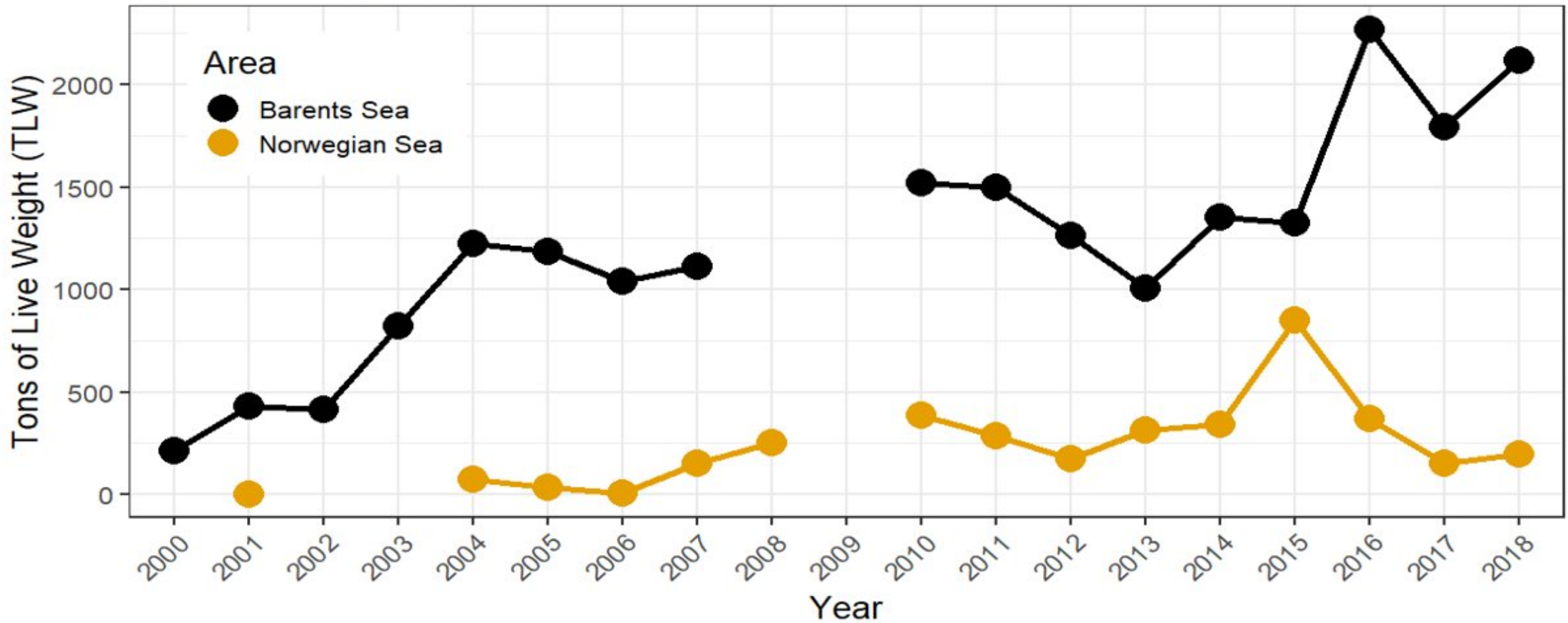






**Figure 1.** Spatial distribution maps for RKC on the Barents and Norwegian Seas. Individual bubbles represent the municipality where the observations occurred. The size of the bubble indicates the relative number of observations for that municipality, per time period. Dotted line represents the ICES area division. Data from Norwegian Biodiversity Information Centre (artsdatabanken.no). Created on Microsoft PowerBI.

## Catch Rates 2000-2018



**Figure 2.** Nominal catch rates of red king crab in Tonnes of Live Weight (TLW) between 2000-2018 on the Barents Sea (27.1b) and Norwegian Sea (27.2.a.2), according to the ICES areas system. Blank spaces indicate zero catch records for that year. Data from Eurostat/ICES data compilation of catch statistics - ICES 2021, Copenhagen. Version: 19-10-2021

---

# Discussion & Conclusion

---

- Most observational data is clustered around the Barents Sea Area. While we can see observations on the Norwegian sea, the catch data gives us insight into how dense the populations are (BS catch rates almost twice as large as NS)
- The small clusters of observations we see along the coasts of the Norwegian Sea area are likely to be either stragglers or very early signs of establishment.
- Once the populations in the Norwegian Sea start to grow and spread, we should see that reflected on the catch rates reports. Since the Norwegian Sea area is bigger, these numbers could potentially surpass the Barents Sea catch rates.
- Since the Norwegian Sea catch is relatively low, we can say that even though there's clear signs of spreading (observations), the population in the Norwegian Sea is not yet as established as is the population in the Barents Sea.



Thank you for  
your attention!



# References

- 'NOBANIS-Invasive Alien Species Fact Sheet Paralithodes camtschaticus Species description' (no date). Available at: [www.nobanis.org](http://www.nobanis.org), (Accessed: 14 October 2021).
- Artskart.artsdatabanken.no 21.02.2017. Funndata frå: Bergen museum, UiB, Naturhistorisk museum UiO, Tromsø museum UiT, NTNU Vitenskapsmuseet. Nedlasta frå Artskart.
- Capra, F. and Jakobsen, O. D. (2017) 'A conceptual framework for ecological economics based on systemic principles of life', *International Journal of Social Economics*, 44(6), pp. 831–844. doi: 10.1108/IJSE-05-2016-0136.
- *Catch statistics* (no date). Available at: <https://www.ices.dk/data/dataset-collections/Pages/Fish-catch-and-stock-assessment.aspx> (Accessed: 20 October 2021).
- Falk-Petersen, J., Renaud, P. & Anisimova, N. 2011. Establishment and ecosystem effects of the alien invasive red king crab (*Paralithodes camtschaticus*) in the Barents Sea—a review. *Ices Journal of Marine Science*, 68, 479–488.
- Jørgensen, L. L. and Primicerio, R. (2007) 'Impact scenario for the invasive red king crab *Paralithodes camtschaticus* (Tilesius, 1815) (Reptantia, Lithodidae) on Norwegian, native, epibenthic prey', *Hydrobiologia* 2007 590:1, 590(1), pp. 47–54. doi: 10.1007/S10750-007-0756-9.
- Kassen, R. (2002) 'The experimental evolution of specialists, generalists, and the maintenance of diversity', *Journal of Evolutionary Biology*, pp. 173–190. doi: 10.1046/j.1420-9101.2002.00377.x.
- Lorentzen, G. *et al.* (2017) 'Current Status of the Red King Crab (*Paralithodes camtschaticus*) and Snow Crab (*Chionoecetes opilio*) Industries in Norway', <https://doi.org/10.1080/23308249.2017.1335284>, 26(1), pp. 42–54. doi: 10.1080/23308249.2017.1335284.
- Mack, R. N. *et al.* (2000) 'Biotic Invasions: Causes, Epidemiology, Global Consequences, and Control', *Ecological Applications*, 10(3), p. 689. doi: 10.2307/2641039.
- Orlov, Y. I. & Ivanov, B. G. 1978. Introduction Of Kamchatka King Crab *Paralithodes-camtschatica* (Decapoda Anomura Lithodidae) Into Barents Sea. *Marine Biology*, 48, 373–375.