

Understanding how icebreaking vessels can impact on breeding seals and what to do about it

Susan Wilson¹ & Simon Goodman²

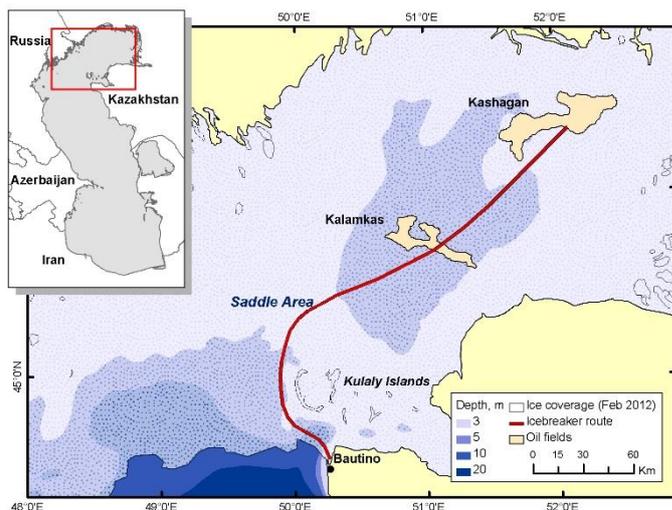
1. Tara Seal Research, Killyleagh, North Ireland, UK (suewilson@sealresearch.org)
2. School of Biology, University of Leeds, Leeds, UK (s.j.goodman@leeds.ac.uk)

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In our new [open access paper](#), just published in *Biological Conservation*, we examined the impact of icebreaking vessels passing through the breeding areas of endangered Caspian seals (*Pusa caspica*) situated on the winter ice-field of the north Caspian Sea. The area is seeing expansion of the oil and gas industry as new fields are developed and come into production. Icebreakers which service the Kashagan field in the Kazakh sector have to traverse the seal breeding areas each January to March, as they travel along the route from the supply port of Bautino to offshore installations.



1. Caspian seal mother and pup



2. Map of the icebreaker shipping route in the north Caspian Sea

The motivation for the work, which was facilitated by the oil company operating the Kashagan oilfield, was to understand what kind of effects icebreakers might have on breeding seals, and to advise the company on what measures they should take to avoid and reduce impacts. This is also important as the Caspian can act as a model for other areas where icebreaker routes might overlap with breeding seals, such as in the Arctic.

We collected data by having trained observers travel on 39 vessel transits between Bautino and Kashagan and record all vessel-seal encounters. We found that icebreakers can disrupt seal breeding habitat, cause displacement and separation of mother-pup pairs, force unweaned pups into the water and sometimes collide with seals. Collisions with seals can cause direct mortality, while



3. Caspian seal mother and pup in the icebreaker path

the other impacts can generate stress and cause animals to expend energy unnecessarily as they move away from the ship. If young pups become permanently separated from their mothers they will die.

Encounters between vessels and seals are quite unpredictable since they depend on ice conditions and seal distributions, which can vary a lot within and between years. This makes it difficult to estimate precisely how many seals are affected by icebreakers, but under current vessel traffic volumes, between a few hundred and few thousand seals might be disturbed by vessels each season. Caspian seals experience lots of other anthropogenic pressures, such as habitat loss due to human activities, and thousands of seals are caught and drowned in fishing nets each year. More research is needed understand the effect all these factors have on current seal population numbers.



4. Seal Observer on the bridge of an icebreaker scans for seals

Nonetheless, icebreaking vessel disturbance is an avoidable impact, and should be seen as an important welfare issue at the individual level, affecting mothers and pups, however large or small the consequences at the population level. Therefore we recommended mitigation measures to the company to avoid and reduce impacts, including decreasing the number of vessel transits during the critical breeding period, using aerial surveys to provide routing information to avoid seal groups, imposing speed limits near seals, using infrared vision systems at night, having Seal Observers on board vessels to record vessel-seal encounters and advise the crew, and to train vessel crews in seal avoidance measures. If vessel

traffic increases substantially due to further development of new oil fields, then the potential disturbance levels may be too high for reactive mitigation, so the only option might be to reduce or avoid vessel transits during the breeding period. The decisions on how to handle this will lie primarily with the industrial operators and Kazakh regulatory authorities, but companies have already trialled some mitigation measures such as Seal Observers. The same issues will arise if icebreakers have to travel through seal breeding areas in Russian waters, though in most years, the majority of breeding takes place in the Kazakh sector.

As industrial development grows rapidly in other areas with frozen seas, such as the Arctic, the lessons learnt in the Caspian Sea can be used there to assess risks to seals, develop mitigation measures and inform regulatory frameworks.

For more information see:

Wilson SC, Trukhanova I, Dmitrieva L, Dolgova E, Crawford I, Baimukanov M, Baimukanov T, Ismagambetov B, Pazylbekov M, Jüssi M, Goodman SJ (2017). Assessment of impacts and potential mitigation for icebreaking vessels transiting pupping areas of an ice-breeding seal. *Biological Conservation* **214** 213-222, [DOI:10.1016/j.biocon.2017.05.028](https://doi.org/10.1016/j.biocon.2017.05.028).

Links: www.goodmanlab.org, www.caspianseal.org