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Representing key interactions driving the dynamics of marine mammal -fisheries conflicts: a qualitative modelling approach

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Global expansion of fisheries over the past decades has intensified the conflicts between human activities and marine biodiversity. More specifically, the increasing interactions between fisheries and marine mammals represent a major ecological and economic viability issue. Since the 1990s, France has regularly experienced in winter major dolphin (*Delphinus delphis*) mortality in the Bay of Biscay. On the Atlantic coast, strandings have reached unprecedented levels since 2016 and are mainly due to bycatch in fishing gear. There is a need to better understand the environmental and human factors driving this bycatch and its increase. As part of the Delmoges project, two participatory workshops were organized to develop an integrated representation of these interactions. The workshops were based on a qualitative modeling method considering Political, Ecological, Social, Technological, Economic and Legal (PESTEL) dimensions. We aimed to identify the elements perceived as important by different stakeholder groups to understand the determinants and possible evolutions of common dolphin bycatch in the Bay. Building on workshop outcomes, a synthetic representation of elements categorized as "causes", "consequences" and "solutions", and interactions between these was developed. A notable result of the analysis is that the ratios of "causes" to "solutions" differed greatly between stakeholder groups. We also identified potential levers of action, as well as indicators to include in multi-criteria evaluations such as co-viability approaches.