学位論文内容の要旨

Dissertation Abstract

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学 位 論 文 題 目

Title of dissertation

Perceptions, attitudes and knowledge regarding the Steller sea lion-fisheries conflict in Hokkaido coastal waters（北海道沿岸におけるトドと漁業の対立に関する認識、態度と知識）

Conflicts between fisheries and pinnipeds occur worldwide and have a significant impact on both conservation and fishermen's livelihoods. While various mitigation measures have been implemented to curb these impacts, their effectiveness and acceptability varied widely. Indeed, pinniped-fisheries conflicts are not driven solely by direct damage but are deeply embedded within social, cultural, and political contexts. In Hokkaido, interactions between coastal fisheries and Steller sea lions (SSL; *Eumetopias jubatus*) have caused substantial economic damage to the regional fishing sector, particularly along the coast of the Sea of Japan. Despite long-standing efforts for mitigation, the severity of this conflict is widely perceived as unacceptable by fishing communities. Yet, the human dimension of this conflict has not been examined so far. The human dimension of pinniped-fisheries conflicts, encompassing perceptions, attitudes, values, and beliefs, varies extensively based on context but remains an understudied emerging field. In particular, fishermen's perceptions of both the conflict and the existing mitigation measures, as well as public knowledge and attitudes toward both the animal and the conflict, remain unknown, which may impede the resolution of this conflict. In this context, this doctoral thesis explored the SSL–coastal fisheries conflict in Hokkaido through the lens of the human dimension. Using a combination of qualitative and quantitative approaches, this work aimed to clarify the stakeholders' perceptions and attitudes, and to identify approaches towards more socially acceptable and effective conflict mitigation.

A global literature review on the context and operating mechanisms of pinniped–fisheries interactions (**Chapter 2**) clarified that pinniped–fisheries conflicts affect particularly artisanal and coastal fisheries that use static gears such as gillnets and trap nets. These interactions have had adverse effects on pinnipeds and fisheries through different mechanisms. Bycatch remains a major conservation concern for endemic or endangered pinniped populations, whereas depredation was the most frequently reported impact on fisheries, often resulting in substantial economic losses and threatening fishermen's livelihoods. A wide range of mitigation strategies has been developed to address these issues. Among non-lethal mitigation methods, technical innovations such as acoustic deterrent devices, reinforced fishing gear, and seal exclusion devices demonstrated variable effectiveness and were often successful when combined. The Baltic Sea case study in particular illustrated the necessity and complexity of combining multiple technological innovations to mitigate the seal–fisheries conflict within a complex socio-political context. Moreover, this review highlighted a growing recognition of the importance to consider the human dimension of these conflicts. However, limited attention has been paid to public perception of these conflicts outside a few regions.

Fishermen's perception of the SSL–fisheries conflict in Hokkaido was examined through semi-structured interviews conducted with 29 coastal fishermen from 12 fishing villages between April 2023 and August 2024 (**Chapter 3**). This study made comparisons between two groups of fishermen, those operating gillnets and set nets, on their attitudes toward current and potential mitigation measures, the perceptions of SSL's ecological role, and attitudes toward SSL. The Potential Conflict Index (PCI_2) was used to compare

perceptions and attitudes between and within groups. A text analysis enabled the examination of the factors shaping perceptions of the conflict. Results revealed that population control was widely viewed as the only currently viable solution in both fishermen groups, reflecting both the severity of perceived impacts and the limited availability of effective non-lethal alternatives. However, fishermen expressed a clear desire for additional mitigation options beyond lethal management, even though they remained sceptical of the existence of such alternatives. Damage compensation was not perceived as a satisfactory long-term solution, as fishermen emphasised the need to operate viable businesses rather than rely on subsidies, and expressed concern that compensation could undermine their professional identity. Fishermen held mixed perceptions of the ecological role of SSL, simultaneously recognising them as an indicator of a healthy ecosystem while also viewing them as a direct threat to fishing activities. Gillnet fishermen were less tolerant of SSL than were set net fishermen, highlighting the heavier socio-economic impact of the conflict with SSLs on gillnet fishermen's livelihood. The thematic analysis revealed an additional socioeconomic burden imposed by the conflict with SSL on an already challenged profession with few perspectives for future generations. In addition, fishermen expressed the need for improved communication with authorities involved in the solution-making process. This highlights the need to foster dialogue and include fishermen in the decision-making process, which could play a critical role in consensus-building and in shaping the feasibility and long-term effectiveness of mitigation measures.

Public knowledge on SSL, and attitudes toward the SSL-fisheries conflict in Hokkaido were examined by collecting 486 questionnaires during surveys conducted between October 2022 and January 2025 in the Sapporo urban area (**Chapter 4**). A stepwise ordinal regression model identified factors influencing attitudes toward lethal management. In addition, text analysis explored the narratives and reasoning underlying respondents' attitudes. Results revealed that the public had relatively high awareness of the presence of SSL in Hokkaido but limited ecological knowledge on SSL. Overall, the public attitudes toward population control were negative, and respondents expressed clear support for the development of non-lethal mitigation measures. Attitudes toward population control were influenced by gender, interest in the Sustainable Development Goals (SDGs), attitude toward wildlife, conflict awareness, and SSL knowledge level. Women and respondents with nature-oriented values were more likely to oppose lethal management, whereas higher knowledge scores were unexpectedly associated with greater acceptance of population control, suggesting that a multitude of social and psychological drivers shaped the public's attitudes. Text analysis revealed that support for population control was associated with Kellert's dominionistic and utilitarian perspectives, while opposition reflected Kellert's naturalistic, ecological, humanistic, and moralistic viewpoints. Recurring themes included the desire for coexistence between SSL and humans, and empathy for fishermen's livelihoods, indicating potential consensus on mitigation solutions between public and fishing communities despite divergent views on lethal management.

This thesis represents the initial step toward incorporating the human dimension into the fisheries–SSL conflict in Japan. By moving beyond purely ecological or economic approaches and incorporating fishermen's ecological knowledge and perceptions, this research provides insights into the broader context in which wildlife damage applies. This thesis highlights a divergence between fishermen's and the public's attitudes toward lethal management, pointing to a potential human-human conflict that may seem to further complicate management decisions. However, shared values regarding the regional importance of sustained fisheries and the claimed support for non-lethal solutions suggest possibilities for socially acceptable pathways toward coexistence. Revitalization programs in rural areas may help strengthen this shared value and empower fishing communities to engage more actively in conflict resolution. In the Japanese contexts characterised by an aging population and rural depopulation, the impact of conflicts with wildlife on local communities is likely to intensify. Addressing these challenges will require trust-building and collaborative approaches to identify mitigation strategies that reflect the needs and values of all stakeholders. Such efforts are essential to move from conflict to coexistence with wildlife.