

Traditional stewardship practices promote the sustainability and resilience of a small-scale kelp fishery

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It is commonly thought that harvesting from wild populations is damaging for them. However, along the Northeast Pacific coast, and around the world, Indigenous peoples have been both exploiting *and* sustaining a diversity of plants and animals for thousands of years. Over time, these tightly connected systems of people and nature create opportunities for people to learn, adapt and develop stewardship practices that promote the longevity of populations from which they harvest. Today, with new markets and quickly changing environments, understanding these interactions can inform policies for the continued resilience of traditional harvest systems, such as those operating along the Northeastern Pacific coast.

This research emerged from dialogue among Indigenous fishermen, researchers and Indigenous resource managers who were collectively concerned about the culturally important feather boa kelp and the degree to which it could withstand increased harvest pressure under warming ocean conditions and an emerging commercial market. Together, we sought to inform a management plan for this kelp rooted in traditional practices and complemented by experimental ecological knowledge. We used multiple methods to illuminate the recovery rates of kelp following traditional harvest methods, environmental drivers of recovery, and the stewardship practices used today.

Our findings revealed that feather boa kelp recovered quickly from the traditional harvest practice of removing 25% of fronds (i.e. branches). The quick recovery resulted because the kelp sprouted new fronds after the traditional harvest. In fact, this 25% rate

of removal mimicked natural rates of frond loss. Additionally, plant size and water temperature drove the speed at which kelps recovered and knowledge of these environmental conditions were reflected in the current practices of selecting larger plants from healthy patches of kelp.



Kelp is harvested by fishermen, like co-author Keith Gladstone (left) and then suspended in the ocean where herring lay their eggs on it (middle). Then kelp and eggs are harvested together and processed by community members, like Connie Newman (right). This is an important traditional food and trade item for coastal First Nations on the Pacific coast of Canada. (photos taken by H Kobluk & A Salomon, shared with consent)

With global interest in kelp harvest intensifying as part of the emerging 'blue economy', social-ecological approaches to studying kelp fisheries, and small-scale fisheries more broadly, can provide insights into balancing livelihood opportunities with social-ecological resilience and sustainability, especially in light of changing oceans. By weaving Indigenous knowledge and western science, and co-producing this research, we enhanced our understanding of the factors driving the resilience of this kelp fishery and democratized the science and practice of natural resource management.

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