

Increasing Diversity in the US Ocean Studies Community

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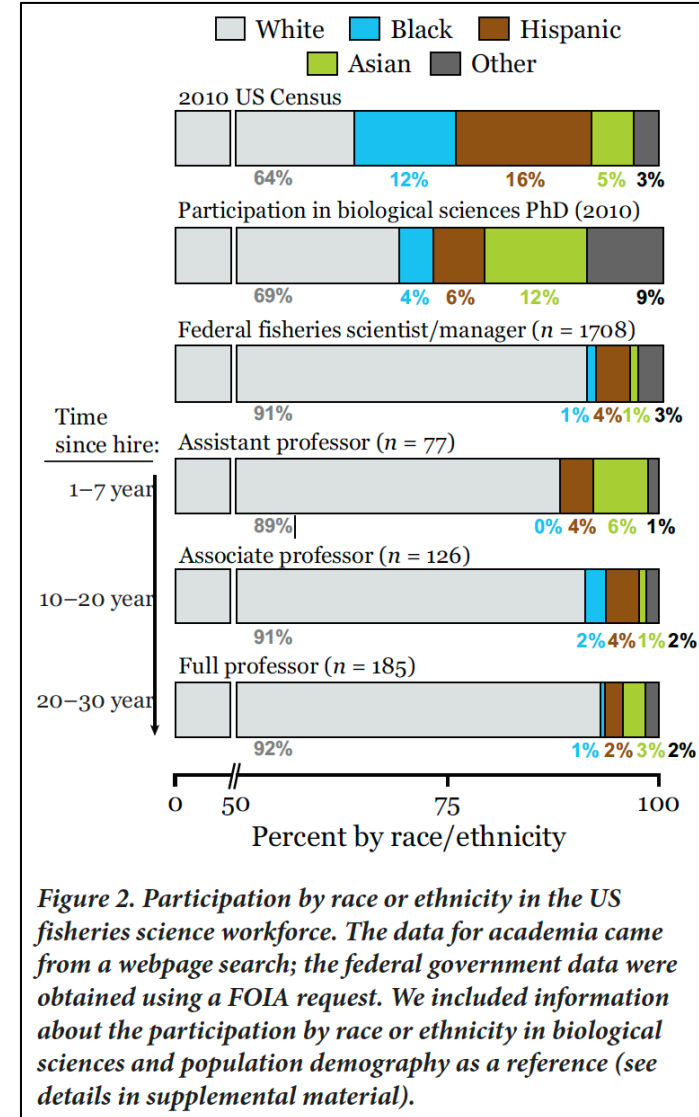
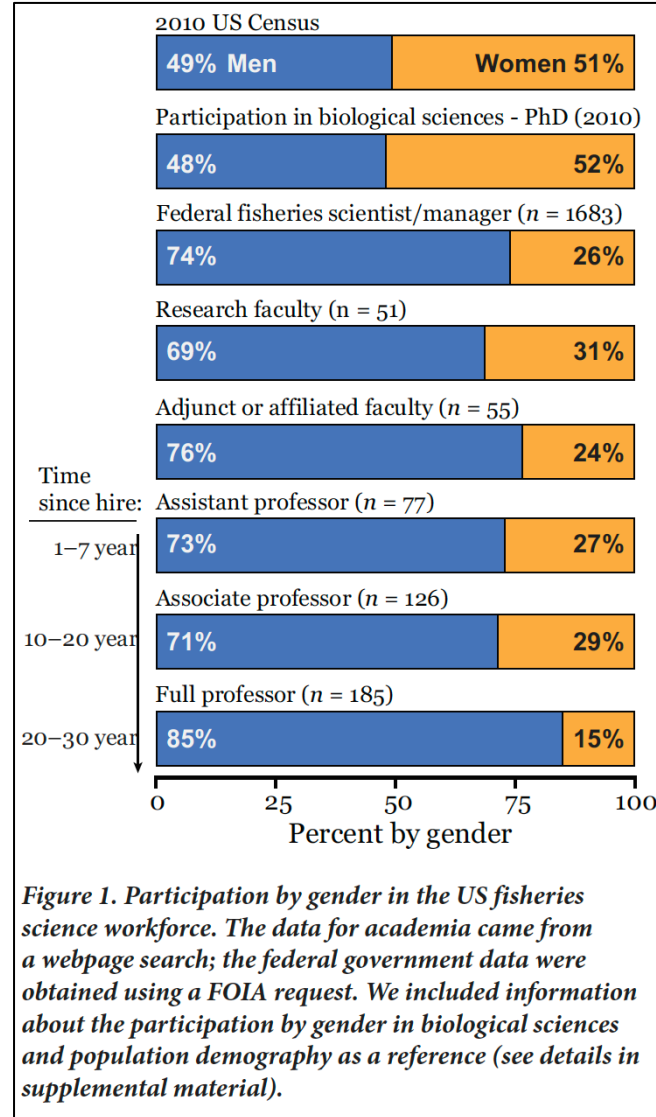
Examining Diversity Inequities in Fisheries Science: A Call to Action

IVAN ARISMENDI AND BROOKE E. PENALUNA

A diverse workforce in science can bring about competitive advantages, innovation, and new knowledge, skills, and experiences for understanding complex problems involving the science and management of natural resources. In particular, fisheries sciences confronts exceptional challenges because of complicated societal-level problems from the overexploitation and degradation of aquatic ecosystems worldwide. Here, we examine the status of gender and race or ethnicity among the US fisheries science workforce on the basis of a survey of 498 faculty members from 56 institutions of higher education and 1717 federal employees. Our findings show that women and minorities are still a small portion of tenure-track faculty and federal-government professionals, likely because of systemic biases and cultural barriers. This forum provides a starting point for discussions about how the disparities of diversity in fisheries compares with other disciplines and what might be done to improve the climate and conditions for the successful inclusion of diverse scientists.

Keywords: education, tenure track, environmental sciences, aquaculture, academia

“The fisheries science workforce is strikingly not diverse” (p. 590)



Arismendi & Penaluna (2016) call attention to the urgent need for:

- Mentors & Roll Models
- Anti-bias training and approaches in recruitment & hiring
- Eliminating barriers & putting policies in place that support flexibility for care-giving

For statistics on PhD awardees in ocean science more broadly, also see: Bernard, R. E., & Cooperdock, E. H. (2018). No progress on diversity in 40 years. *Nature Geoscience*, 11(5), 292-295.

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SPECIAL SECTION

Fish, People, and Systems of Power: Understanding and Disrupting Feedback between Colonialism and Fisheries Science*

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“As fisheries industrialized around the world, countries clamored to extend their geopolitical reach, secure access to distant stocks, and protect domestic fisheries and fleets. For political-economic reasons, the United States and other Western countries strongly favored knowing and representing fish in aggregate and/or as biomass.”

“Understandings and approaches from fisheries science developed and evolved, were taken up, and are now institutionalized within state-led agencies—notably, single-species models that feed into structured decision-making and evaluation processes. **These outcomes are typically described as a matter of the best available science being eagerly adopted by state agencies concerned with economic development and responsible for conservation.**”

“However, following Liboiron (2021)*, it is vitally important to understand them as direct reflections of particular outlooks (i.e., techno-optimist postwar ideas about “modernization”), sets of relations (i.e., capitalist), and objectives (i.e., the globalization of food systems).”

*Liboiron, M. (2021). *Pollution is colonialism*. Duke University Press.

Re-imagining the precautionary approach to make collaborative fisheries management inclusive of Indigenous Knowledge Systems

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Abstract

Fisheries science uses quantitative methods to inform management decisions that reflect cultural preferences which, in turn, indirectly influence the states of ecosystems. To date, it has largely supported Eurocentric preferences for the commodification of marine organisms under the tenets of maximum sustainable yield, whereby abundances are intentionally maintained far below their historical baselines despite broader socio-ecological trade-offs. In contrast, Indigenous Knowledge Systems (IKS) adhere to the principle of “take only what you need and leave lots for the ecosystem,” implementing lower fishery removals to support socio-ecological resilience. Despite the power imbalance favouring Eurocentric preferences in decision-making, fisheries scientists increasingly recognize that the pairing of IKS and Western science, or Two-Eyed Seeing, would lead to more holistic management goals. For recognition to transcend tokenism, meaningful collaborations and co-governance structures underlying knowledge co-production must carry through to legislated policy changes. Using recent co-governance developments for fisheries management and spatial protections involving federal, provincial and Indigenous governments in Pacific Canada, we illustrate how the precautionary approach, including reference points and harvest control rules broadly applied in international fisheries, could be revised to make collaborative fisheries management compatible with IKS and improve biodiversity and fisheries protections. Our recommendations may create socio-economic trade-offs at different timescales for commercial fishers. Pre-empting that challenge, we discuss IKS-compatible economic approaches for addressing shorter term costs arising from reduced exploitation rates. Although our case study derives from Pacific Canada, the insights provided here are broadly applicable elsewhere in the world.

KEYWORDS

biological reference points, ecosystem-based fisheries management, harvest control rules, indigenous co-governance, size and age structures, two-eyed seeing

Indigenous Systems of Management for Culturally and Ecologically Resilient Pacific Salmon (*Oncorhynchus* spp.) Fisheries

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Pacific salmon (Oncorhynchus spp.) are at the center of social-ecological systems that have supported Indigenous peoples around the North Pacific Rim since time immemorial. Through generations of interdependence with salmon, Indigenous Peoples developed sophisticated systems of management involving cultural and spiritual beliefs, and stewardship practices. Colonization radically altered these social-ecological systems, disrupting Indigenous management, consolidating authority within colonial governments, and moving most harvest into mixed-stock fisheries. We review Indigenous management of salmon, including selective fishing technologies, harvest practices, and governance grounded in multigenerational place-based knowledge. These systems and practices showcase pathways for sustained productivity and resilience in contemporary salmon fisheries. Contrasting Indigenous systems with contemporary management, we document vulnerabilities of colonial governance and harvest management that have contributed to declining salmon fisheries in many locations. We suggest that revitalizing traditional systems of salmon management can improve prospects for sustainable fisheries and healthy fishing communities and identify opportunities for their resurgence.

Keywords: traditional knowledge, salmon, sustainable fisheries, mixed-stock fisheries, Indigenous governance

3 QUESTIONS BEING ASKED OF INSTITUTIONS & THAT INSTITUTIONS CAN ASK OF THEMSELVES:

- **WHAT FORMS OF KNOWLEDGE ARE PRIVILEGED & INFLUENCE DECISION-MAKING?**
- **(HOW & WHO) DO LEGAL STRUCTURES & INSTITUTIONAL PROCESSES MARGINALIZE?**
- **DO THE GOVERNANCE SYSTEM & MANAGEMENT PROCESSES OVERSEEN ENJOY LEGITIMACY? DO THEY ACCOMMODATE OR RESIST PLURALISM?**

Refracting the State Through Human-Fish Relations: Fishing, Indigenous Legal Orders and Colonialism in North/Western Canada

Zoe Todd
Carleton University

Abstract

This piece explores how human-fish relations in a) Paulatuuq, NWT in arctic Canada and b) amiskwaciwāsakahikan (Edmonton, Alberta, Canada) in Treaty Six Territory act as a 'micro-site' where Indigenous peoples have negotiated, and continue to negotiate, concurrent and often contradictory 'sameness and difference' vis-à-vis the State and its ideologies about lands, waters and the more-than-human in order to assert and mobilize imperatives of reciprocity, care and tenderness towards fish as more-than-human beings. I put forth a theory of fish 'refraction' and dispersion, which is a process through which Indigenous peoples in Paulatuuq and amiskwaciwāsakahikan bend and disperse state laws and norms through local relations to fish and waters. Exploring the ways that humans and fish alike work to navigate the complexities and paradoxes of colonialism in Alberta and the Northwest Territories in the past and present, I theorize a fishy and watery form of refraction of state laws, imperatives and colonial paradigms by Indigenous peoples in Canada. In a time of rapid fish decline across the country—which some argued is tied to the global realities of the Sixth Mass Extinction Event—I argue for the urgency and necessity of centering human-fish relations, alongside other fleshy engagements, in contemporary and future political struggles.

Keywords: Paulatuq, amiskwaciwâskahikan, human-fish relations, refraction, law

Research, part of a Special Feature on [Coupled Human-Coastal Ecosystems: Building Resilience Through Teaching and Research Partnerships](#)

Ecologically sustainable but unjust? Negotiating equity and authority in common-pool marine resource management

Sarah C. Klain¹, Rachelle Beveridge² and Nathan J. Bennett^{3,4}

ABSTRACT. Under appropriate conditions, community-based fisheries management can support sound resource stewardship, with positive social and environmental outcomes. Evaluating indigenous peoples' involvement in commercial sea cucumber and geoduck fisheries on the central coast of British Columbia, Canada, we found that the current social-ecological system configuration is relatively ecologically sustainable according to stock assessments. However, the current system also results in perceived inequities in decision-making processes, harvesting allocations, and socioeconomic benefits. As a result, local coastal resource managers envision a transformation of sea cucumber and geoduck fisheries governance and management institutions. We assessed the potential robustness of the proposed institutions using Elinor Ostrom's common-pool resource design principles. Grounded in the region's legal, political, and historical context, our analysis suggests that greater local involvement in these invertebrate fisheries and their management could provide more benefits to local communities than the status quo while maintaining an ecologically sustainable resource. Our research highlights the importance of explicitly addressing historical context and equity considerations in social-ecological system analyses and when renegotiating the institutions governing common-pool resources.

Key Words: *benthic fisheries; common-pool resources; CPR design principles; environmental governance; indigenous or aboriginal peoples; resource management; small-scale fisheries; social-ecological system framework*

ORIGINAL ARTICLE



Racial capitalism and the sea: Development and change in Black maritime labour, and what it means for fisheries and a blue economy

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Abstract

The 'Blue Economy' is often framed as a revolutionary and transformative approach to marine and fishery development. However, scholars increasingly critique the Blue Economy in hopes that equity-related concerns can become more prevalent. While these efforts are important, historical materialist perspectives can more deeply challenge the assumptions and limits of economic thinking. In that vein, Racial Capitalism posits that capitalist markets promote, solidify and rely on racial hierarchy to secure differential value accumulation. This study applies a Racial Capitalist analysis to illustrate how the expansion of capitalist social relations corresponded to the re-solidification of white supremacy to (re)produce systemic inequality in Black maritime labour, and specifically fisheries labour, on the U.S. eastern seaboard. In this case, which occurred across several states and in a critically important marine-fishery system, the expansion of market relations corresponded with labour exploitation, naturalization of hierarchy and inequitable distribution of socioeconomic harm for Black workers. I identify three lessons from this case that Blue Economy and fisheries scholars should heed; specifically, be wary of market utopianism, technological innovation is not inherently progressive, and systemic exploitation still matters.

KEYWORDS

Blue Economy, exploitation, inequality, labour, race, racial capitalism

The livelihoods approach and management of small-scale fisheries

Edward H. Allison*, Frank Ellis

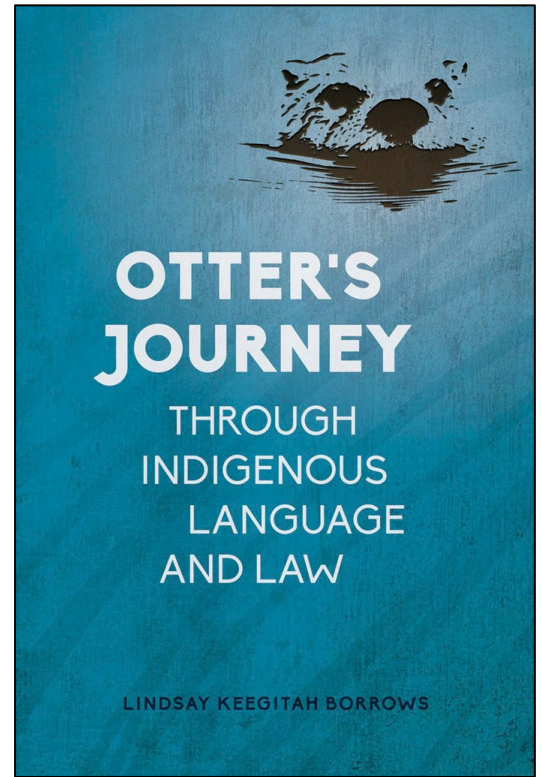
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Abstract

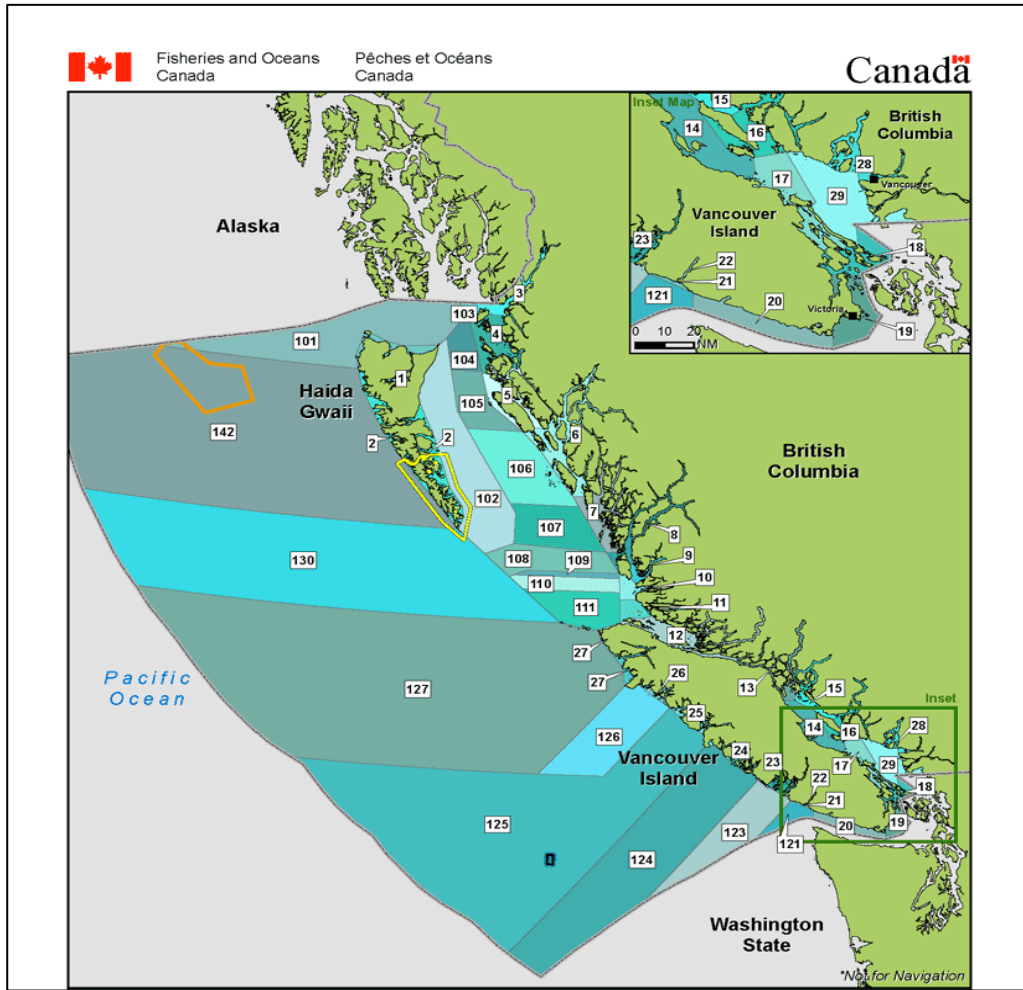
An approach to poverty reduction in low-income countries known as the 'sustainable livelihoods approach' is applied to understanding the strategies of artisanal fisherfolk confronted by fluctuating fisheries resources. The livelihood approach is explained, and the insights it provides into conventional fisheries management policies in developing countries are explored. It is argued that both state-led management and some of the newer, community or territorial use-rights approaches, if predicated on an incomplete understanding of livelihoods, can result in management directives incompatible with both resource conservation and the social and economic goals of management. © 2001 Elsevier Science Ltd. All rights reserved.

Keywords: Rural development; Livelihood diversification; Artisanal fisheries



WHAT FORMS OF KNOWLEDGE ARE PRIVILEGED & INFLUENCE DECISION-MAKING?

Pacific Region Fisheries in Canada



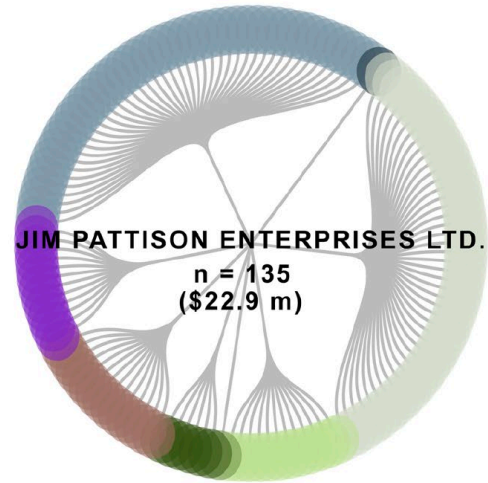
- Indigenous use and management
- Post-confederation development & industrialization (1871-late 1960s)
- Licence limitation (1960s-1990s)
- Individual transferrable quota (1980s-early 2000s)

(HOW & WHO) DO LEGAL STRUCTURES & INSTITUTIONAL PROCESSES MARGINALIZE?

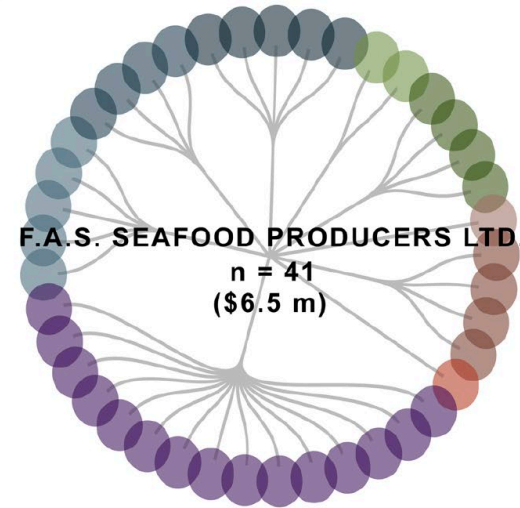
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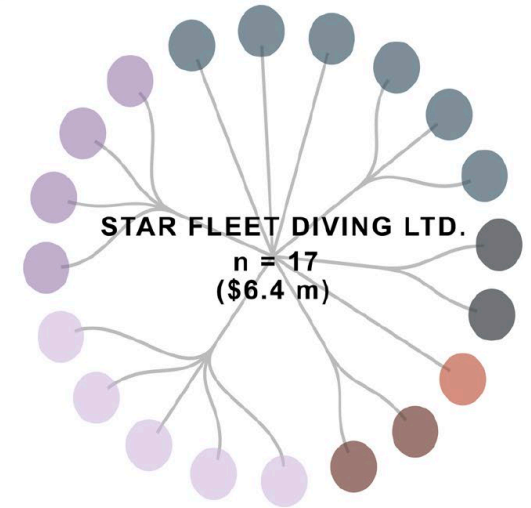
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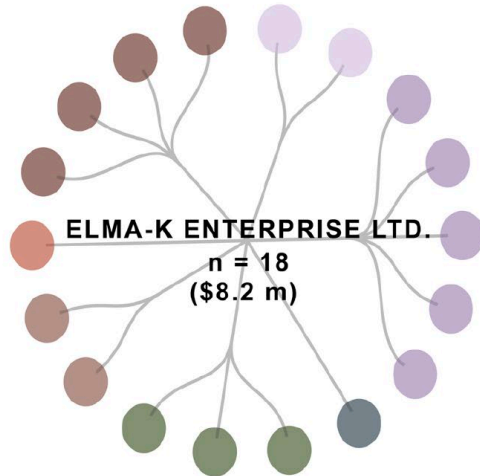
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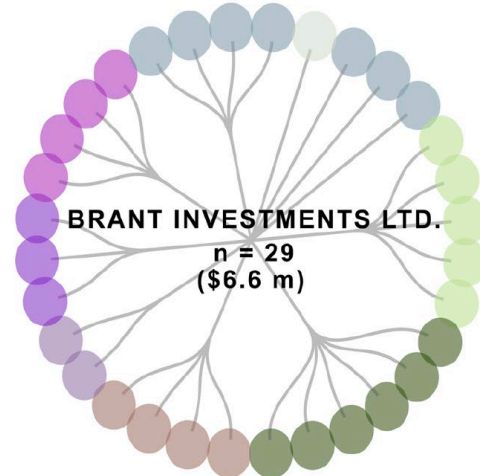
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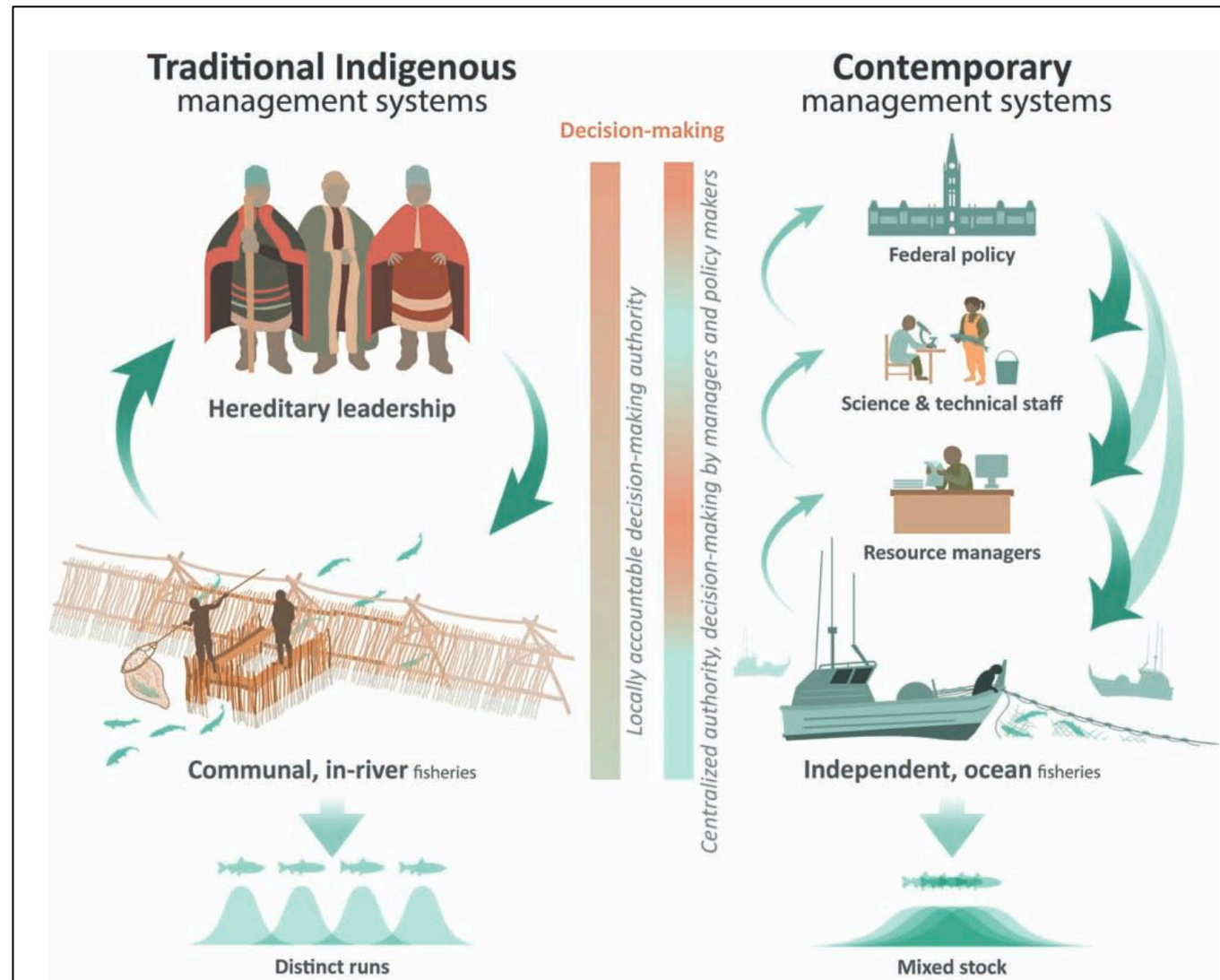


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Silver, J. J., & Stoll, J. S. (2022). A framework for investigating commercial license and quota holdings in an era of fisheries consolidation, concentration and financialization. *Marine Policy*, 143, 105179.

(HOW & WHO) DO LEGAL STRUCTURES & INSTITUTIONAL PROCESSES MARGINALIZE?



Atlas, W. I., Ban, N. C., Moore, J. W., Tuohy, A. M., Greening, S., Reid, A. J., ... & Connors, K. (2021). Indigenous systems of management for culturally and ecologically resilient Pacific salmon (*Oncorhynchus* spp.) fisheries. *BioScience*, 71(2), 186-204.

DO THE SYSTEM & PROCESSES OVERSEN ENJOY LEGITIMACY? DO THEY ACCOMODATE OR RESIST PLURALISM?

“Along with traditional epistemic values, i.e. values that promote the attainment of truth, such as accuracy and consistency, the new picture of desirable epistemic values includes diversity as an indispensable indicator of critical scrutiny [...]

Objectivity is in this new understanding achieved through diversity and inclusion of different perspectives open to mutual criticism. Diversity as a safeguard against individual and group biases is especially acknowledged in its critical role by feminist contributions to philosophy of science.”

Thank You!



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