



AQUACULTURE IN CHANGING WATERS

Cecilia Engler

**PhD Candidate, Schulich School of Law
Dalhousie University**



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Halifax, NS**

Outline



**OceanCanada Law and Policy Group
and Aquaculture**

**Aquaculture, Climate Change and
Ocean Acidification**

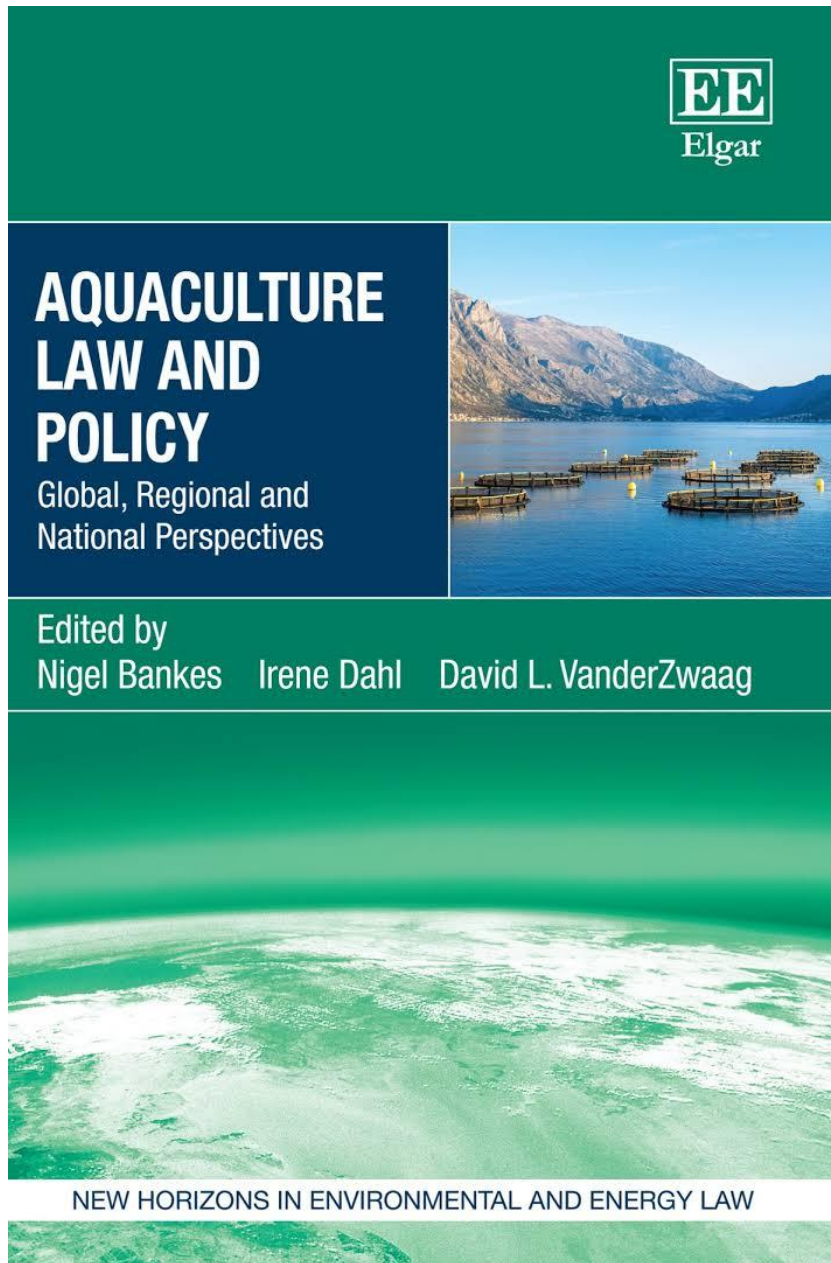
**Climate Change and Aquaculture Law
and Policy**

I. OceanCanada Law and Policy Group and Aquaculture

Aquaculture Law and Policy: Global, Regional and National Perspectives

(in collaboration with K. G. Jebsen Centre for the Law of the Sea at the
University of Tromsø)

- Aquaculture Law and Policy Workshop, Oslo, 21-22 April 2015
- Publication: Edward Elgar, 2016



Part 1. Global perspectives

- **International law and policy: navigating tangled currents**
- **Aquaculture and trade**
- **Access and benefit sharing in aquaculture**

Part 2. Regional perspectives

- **Regional approaches to aquaculture and a case study of NASCO**
- **EU aquaculture law and policy**

Part 3. National perspectives

Australia

Canada

Chile

China

Iceland

India

New Zealand

Norway

Philippines

South Africa

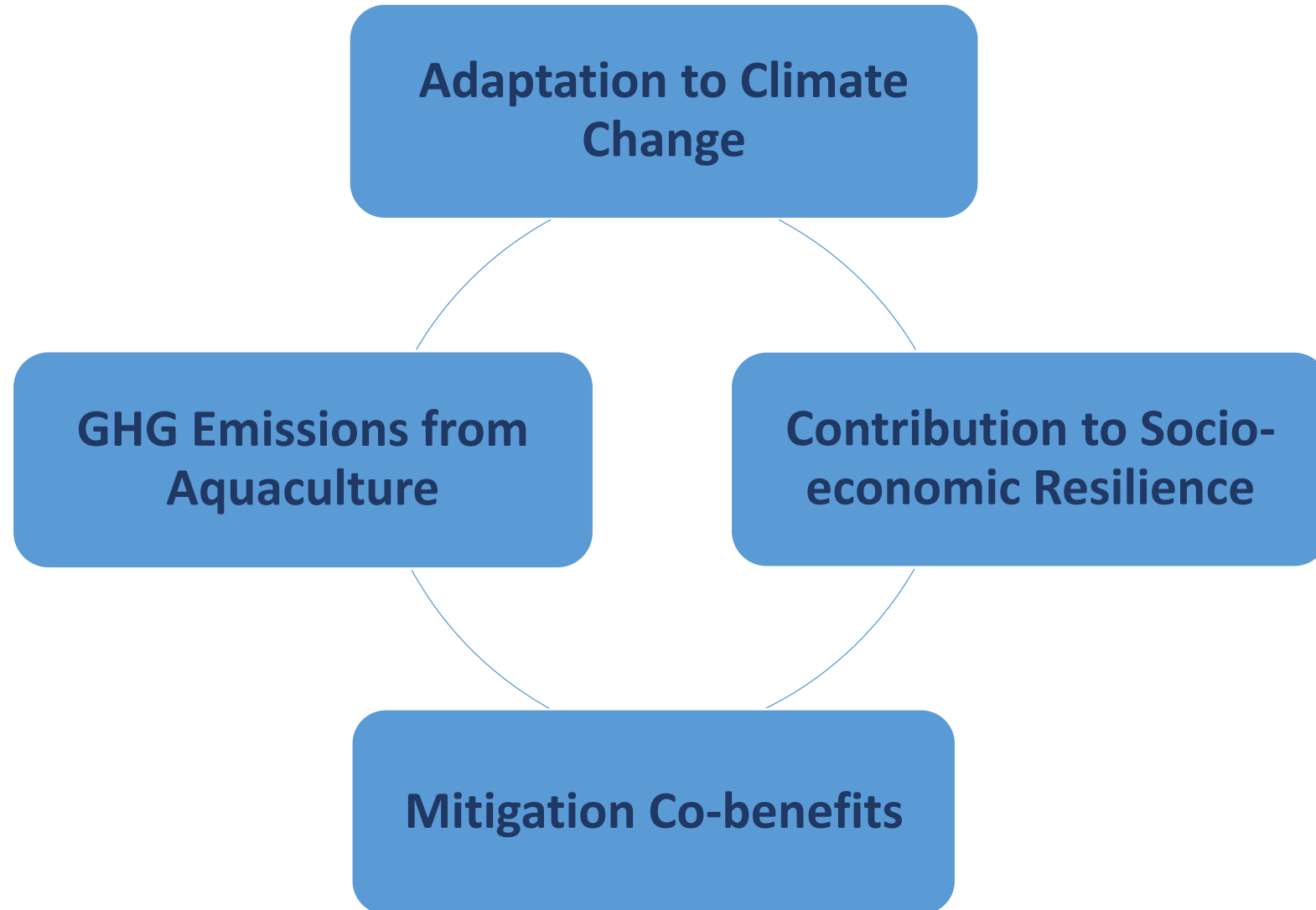
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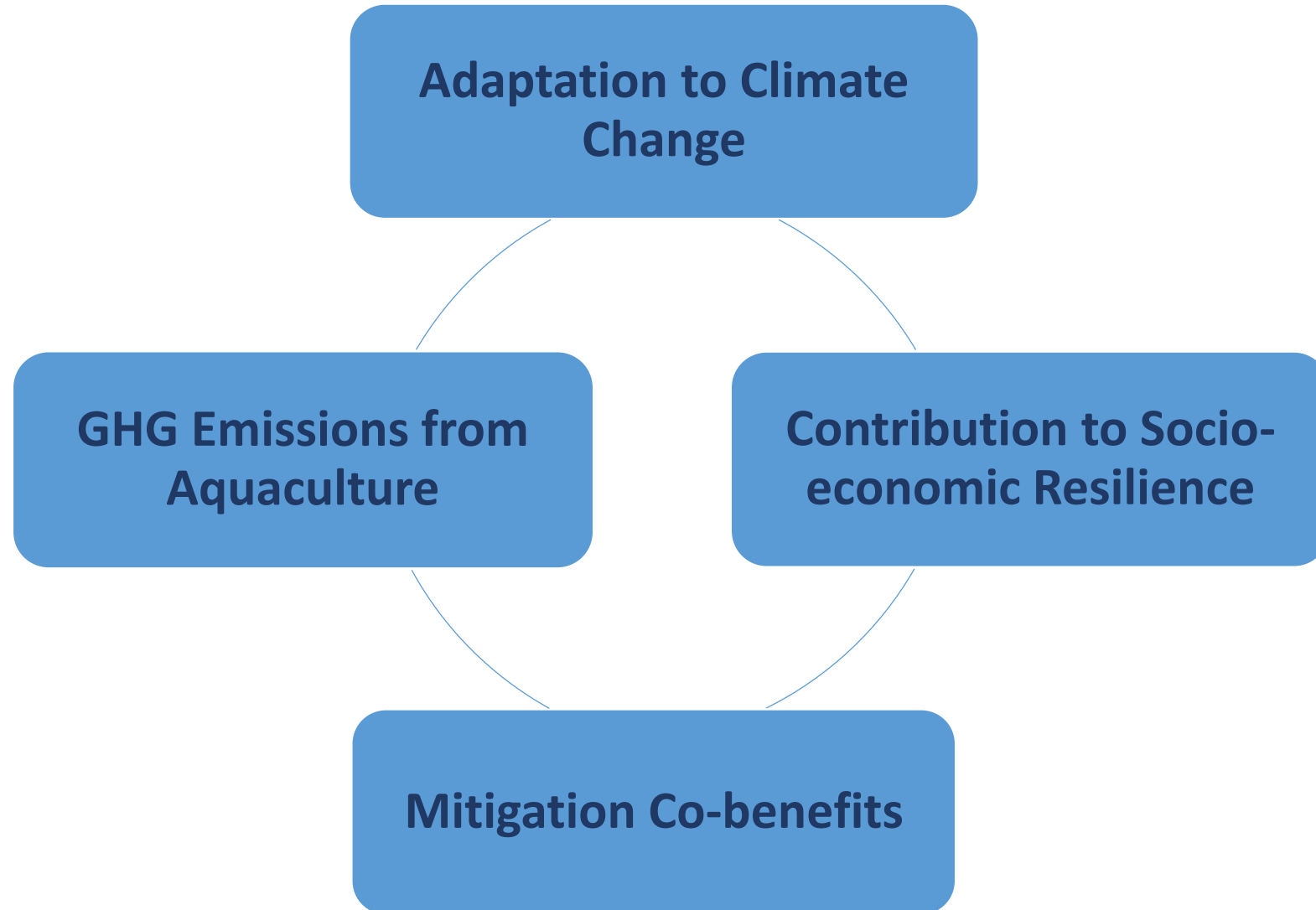
Aquaculture in OceanCanada

- M.A. Oyinlola, G. Reygondeau, C.C.C. Wabnitz, M. Troell, W.W.L. Cheung, “Global estimation of areas with suitable environmental conditions for mariculture species” (2018) PLoSOne <https://doi.org/10.1371/journal.pone.0191086>
- R. McIver, I. Milewski, R. Loucks and R. Smith, “Estimating nitrogen loading and far-field dispersal potential from background sources and coastal finfish aquaculture: a simple framework and case study in Atlantic Canada” (2018) 205 Estuarine, Coastal and Shelf Science 46-57.
- I. Milewski, R.H. Loucks, B. Fisher, R.E. Smith, J.S.P. McCain and H.K. Lotze, “Sea-cage aquaculture impacts market and berried lobster (*Homarus americanus*) catches” (2018) 598 Marine Ecology Progress Series 85-97.
- L.Q.J. Yu, Y. Mu, Z. Zhao, V.W.Y. Lam and U.R. Sumaila, “Economic challenges to the generalization of integrated multi-trophic aquaculture: an empirical comparative study on kelp monoculture and kelp-mollusk polyculture in Weihai, China” (2017) 471 Aquaculture 130-139.
- L.V. Watherdon, A.K. Magnan, A.D. Rogers, U.R. Sumaila and W.W.L. Cheung, “Observed and Projected Impacts of Climate Change on Marine Fisheries, Aquaculture, Coastal Tourism, and Human Health: An Update” (2016) Front. Mar. Sci. 3, <https://doi.org/10.389/fmars.2016.00048>

II. Aquaculture, Climate Change and Ocean Acidification



II. Aquaculture, Climate Change and Ocean Acidification



III. Climate Change and Aquaculture Law and Policy

Research Themes

- 3.1 Aquaculture in Climate Change Law and Policy
- 3.2 Climate Change in Aquaculture Law and Policy

3.1 Aquaculture in Climate Change Law and Policy

How is aquaculture considered in the climate change regime and mitigation and adaptation strategies and plans?

Review of primary sources of climate change regime:

- IPCC, UNFCCC
- NDCs, Adaptation Communications, National Communications

Review of secondary sources (FAO; academic literature)

3.2 Climate Change in Aquaculture Law and Policy

- a) **Does aquaculture law and policy allow for adaptation to:**
- unpredictable, short-term “anomalies” (in temperature, pH, droughts, storms)
 - slow-onset changes in the marine environment?

Critical review of legal primary and secondary sources of selected jurisdictions*, with focus on:

- Planning instruments (e.g. aquaculture zoning, area-based management, lease tenure and relocation, diversification)
- Management instruments (e.g. early warning systems; insurance)

(* Canada, Chile, Norway, U.K-Scotland)

3.2 Climate Change in Aquaculture Law and Policy

b) How does aquaculture law and policy need to change to allow for required adaptation?

Broader theoretical framework: ecosystem law, adaptive law

(J.B. Ruhl, J.C. Nagle, K. Robbins, B. Cosens, R.K. Craig, K. Bosselman, E. Biber, C.Voigt, C.A.Arnold)



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