

IAIA 2024, DUBLIN

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THURSDAY APRIL 25, 16:00-17:30

PANEL: IMPACT ASSESSMENTS AND JUST ENERGY  
TRANSFORMATION IN ATLANTIC CANADA

PAPER #4 INSHORE FISH HARVESTING VERSUS OFFSHORE  
WIND DEVELOPMENT: PATHWAYS FORWARD

PRESENTER: IAN G. STEWART, UNIVERSITY OF KING'S COLLEGE, HALIFAX, CANADA

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This talk will...

- Report on ongoing Regional Assessment (RA) of offshore wind (OSW) in Nova Scotia, Canada
  - Political and geographical context
  - Methods used for initial stages of RA as 'marine spatial planning'
- Illustrate challenges of finding 'consensus' in where to site OSW
- Suggest why 'social ecological systems' is a relevant (and useful?) concept for RA work on OSW as an energy transformation





Dr. Ian Stewart,  
U. of King's College, Halifax

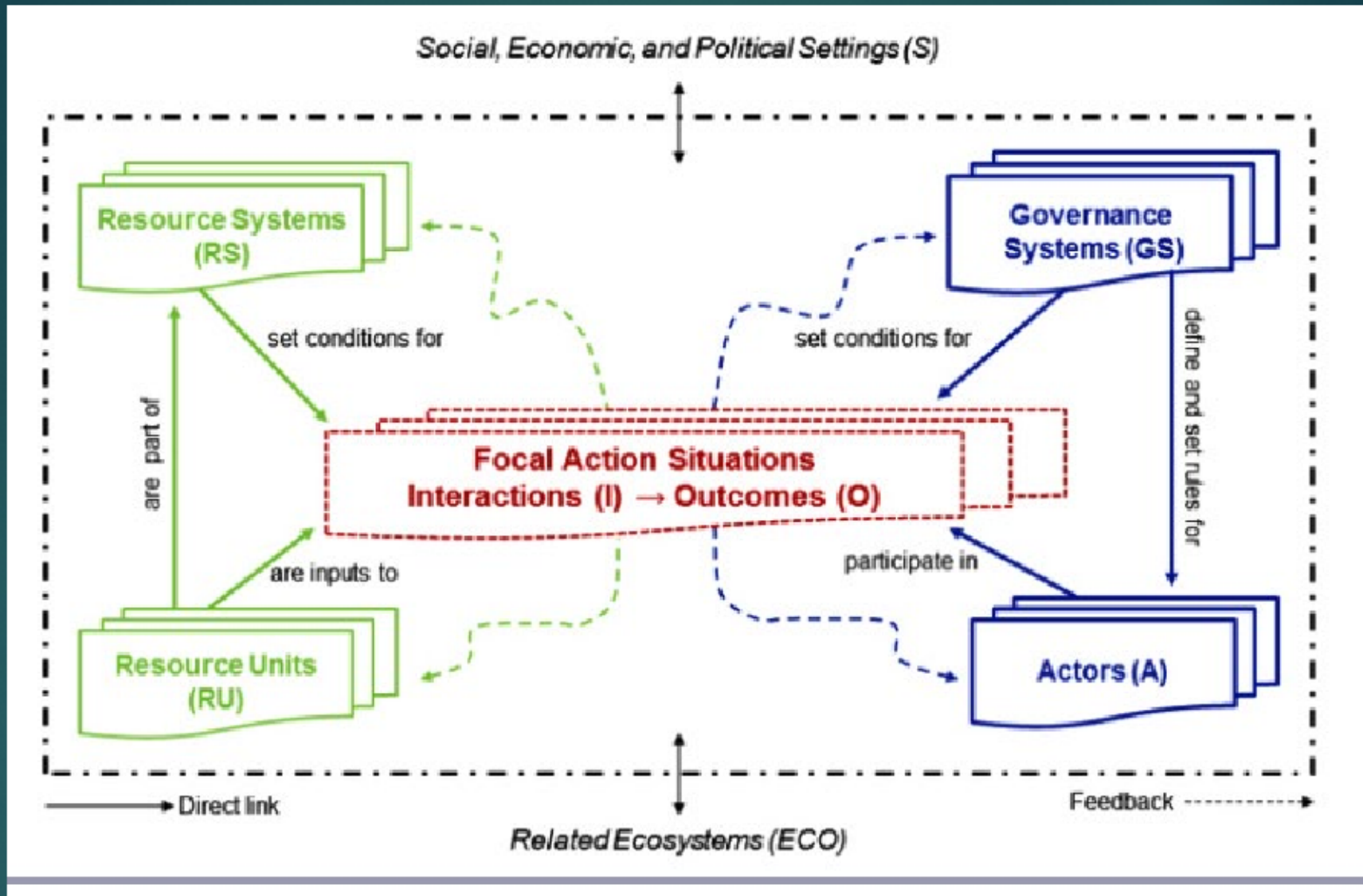
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Advancing Impact Assessment for Canada's Socio-Ecological Systems



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McGinnis, M. D., and E. Ostrom. 2014. Social-ecological system framework: initial changes and continuing challenges. *Ecology and Society* 19(2): 30. <http://dx.doi.org/10.5751/ES-06387-190230>







Transformation to renewable energy is a *transformation of a complex socio-ecological system:*

*>>more than an environmental engineering challenge of mitigating biophysical impacts, or a marine spatial planning exercises in minimizing spatial conflict with humans through stakeholder engagement?*

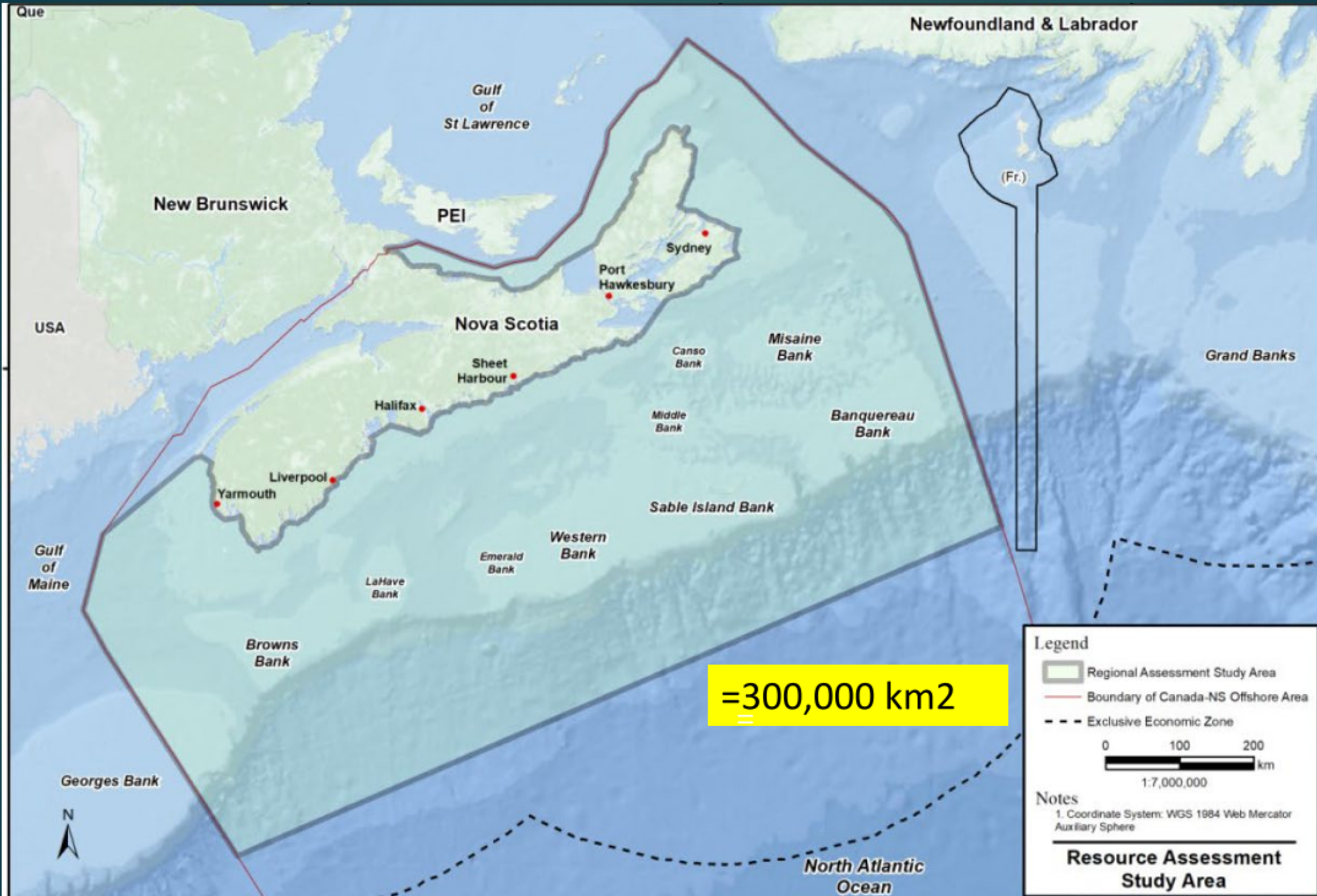
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Lessons learned from other regional-scale planning exercises e.g. RAs and SEAs for o&g exploration; MPAs and other conservation efforts.

Governance challenges in multi-stakeholder involvement in such transition, with plural cultures of knowledge, operating at and multi-scalar spaces.

How IA can be used to pursue energy transition that is attuned to the dynamic, adaptive nature of social-ecological systems





$=300,000 \text{ km}^2$

**Legend**

- Regional Assessment Study Area
- Boundary of Canada-NS Offshore Area
- Exclusive Economic Zone

0 100 200 km  
1:7,000,000

**Notes**

1. Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere

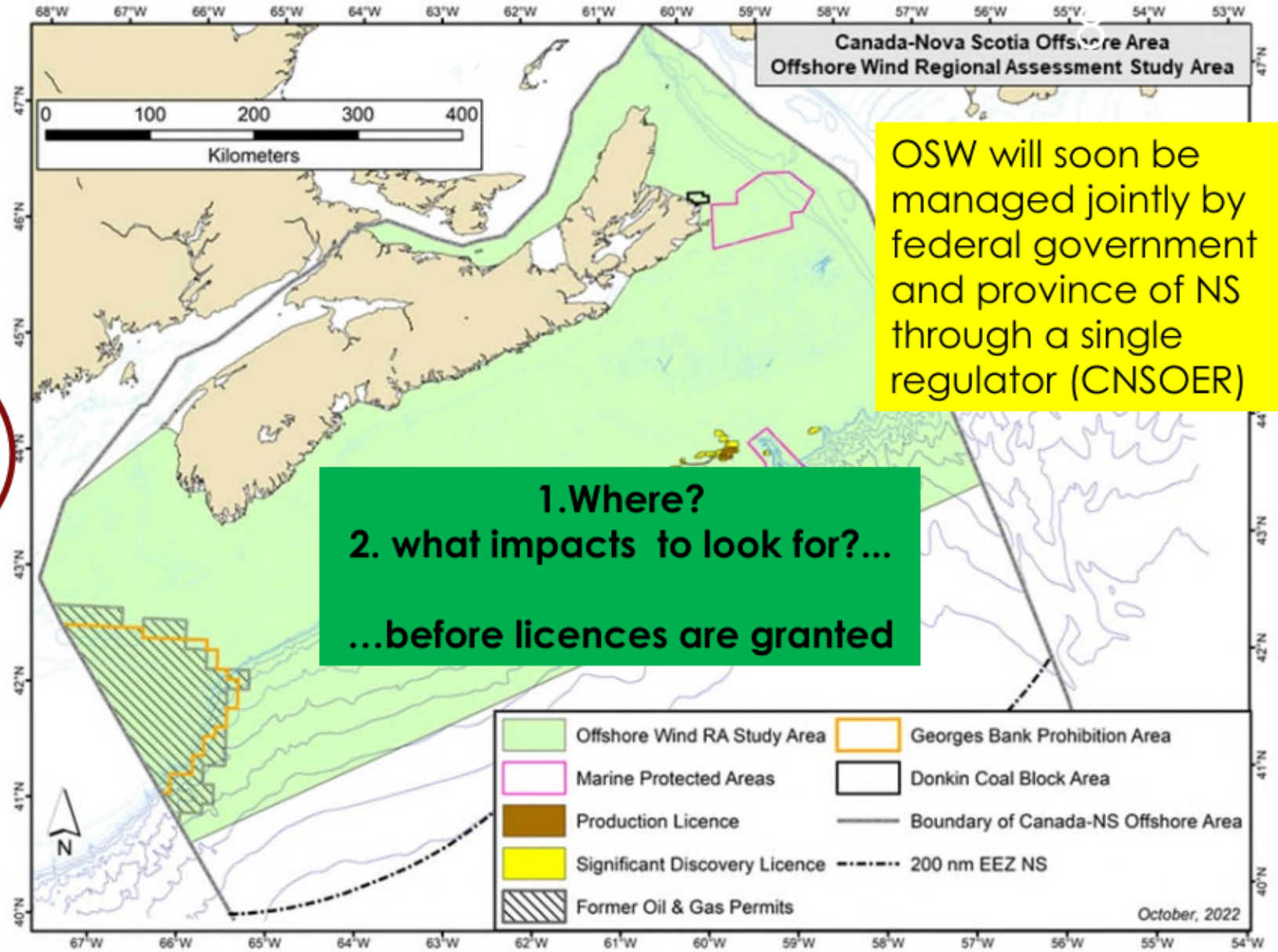
**Resource Assessment Study Area**

# REGIONAL ASSESSMENT OF OFFSHORE WIND DEVELOPMENT IN NOVA SCOTIA

*“To provide information, knowledge and analysis regarding future offshore wind development activities in the Study Area and their potential effects, in order to inform and improve future planning, licencing and impact assessment processes for these activities in a way that helps protect the environment and health, social and economic conditions while also creating opportunities for sustainable economic development.”*

--from the Final Agreement and Terms of Reference between GoC and NS

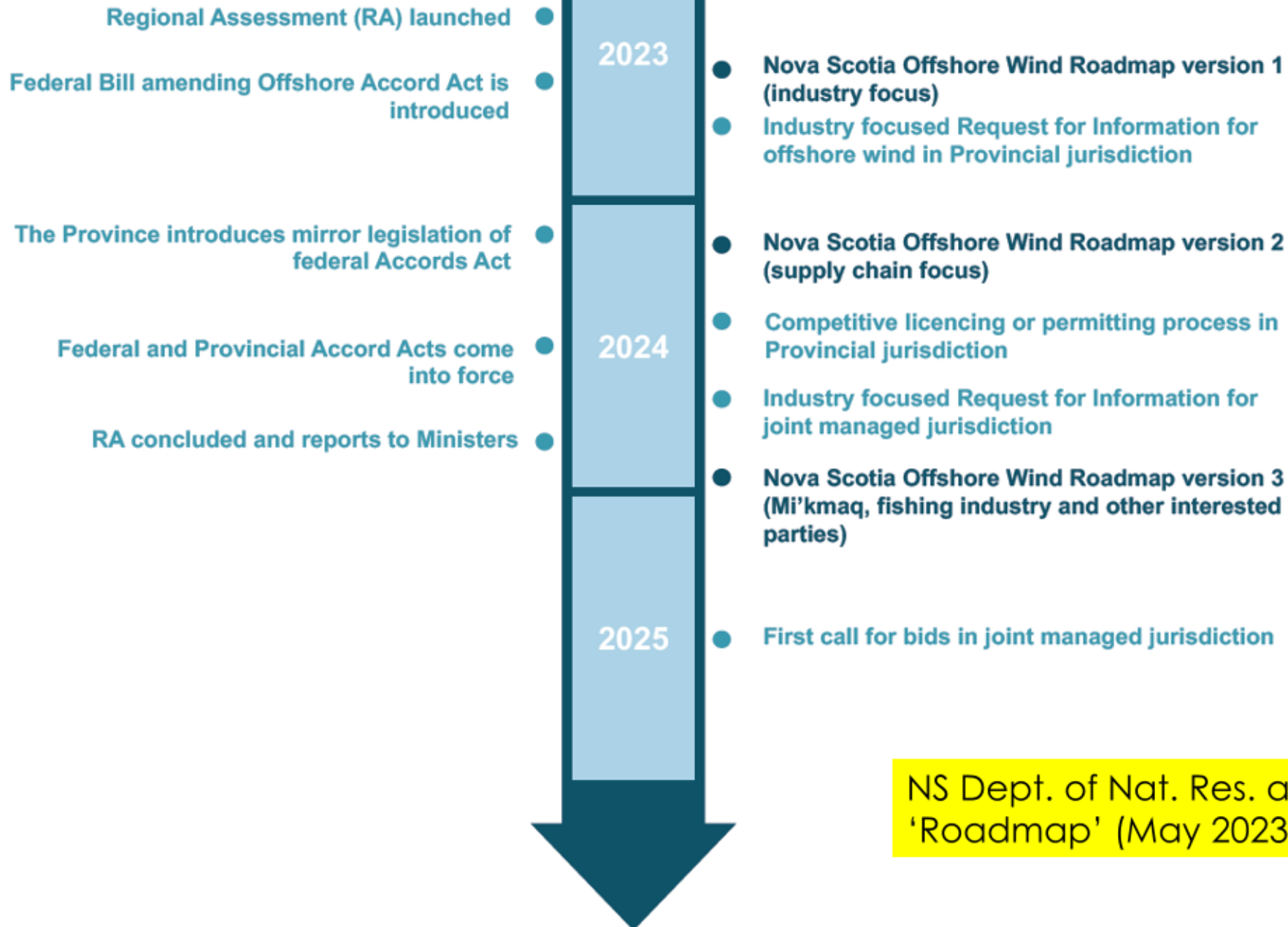
Figure 1.1: Regional Assessment Study Area (Nova Scotia)



OSW will soon be managed jointly by federal government and province of NS through a single regulator (CNSOER)

**1. Where?**  
**2. what impacts to look for?...**  
**...before licences are granted**





NS Dept. of Nat. Res. and Renewables  
'Roadmap' (May 2023 version)

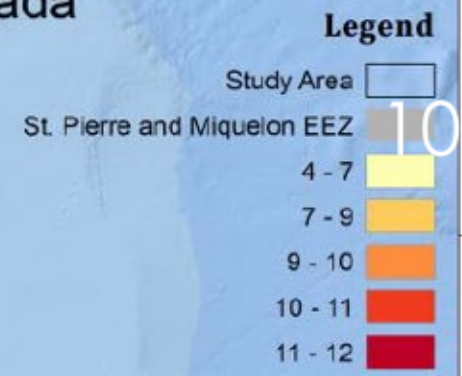
Goal: leases awarded for total of 5 GW of OSW power

# Preliminary Considerations Analysis of Offshore Wind in Atlantic Canada

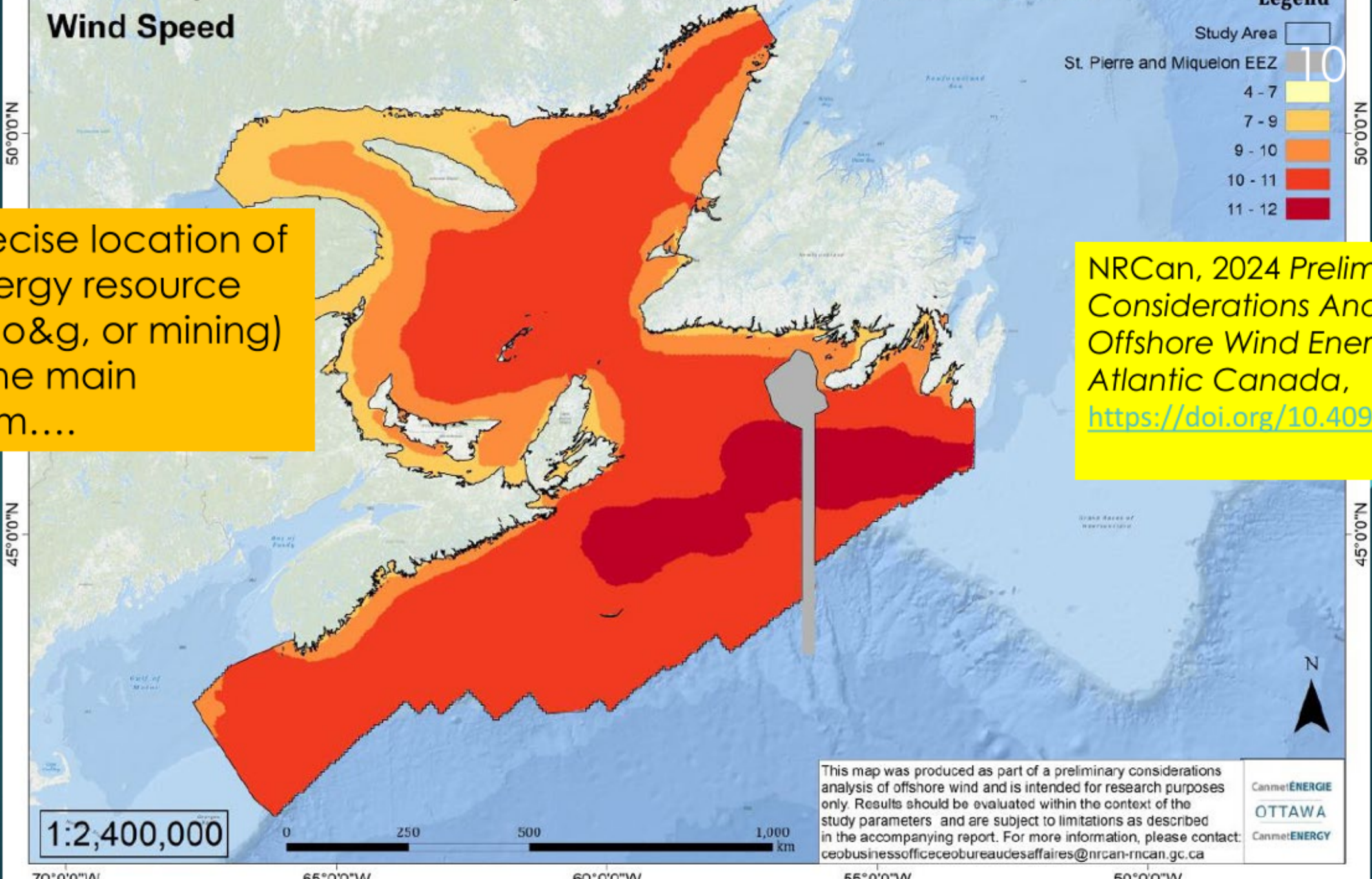
## Wind Speed



The precise location of the energy resource (unlike o&g, or mining) is **not** the main problem....



NRCan, 2024 *Preliminary Considerations Analysis of Offshore Wind Energy in Atlantic Canada*, <https://doi.org/10.4095/331855>



1:2,400,000

This map was produced as part of a preliminary considerations analysis of offshore wind and is intended for research purposes only. Results should be evaluated within the context of the study parameters and are subject to limitations as described in the accompanying report. For more information, please contact: [ceobusinessofficeceobureaudeaffaires@nrcan-rncan.gc.ca](mailto:ceobusinessofficeceobureaudeaffaires@nrcan-rncan.gc.ca)

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### 3.3 Engagement Topics

In conducting their analysis, the Committee will engage on topics as per section A1.6 of the TOR, which includes:

- existing environmental, health, social and economic conditions;
- information and knowledge gaps;
- positive and adverse effects, including cumulative effects of future offshore wind development activities;
- effects on any Indigenous peoples, and any impact that they may have on the rights of the Indigenous peoples recognized and affirmed by section 35 of the *Constitution Act, 1982*;
- mitigation and follow-up measures;
- existing legislation, regulations, guidelines and standards, and associated approvals or authorizations;
- sustainability and climate change;
- intersection of sex and gender with other identity factors; and
- scientific information, Indigenous knowledge — including the knowledge of Indigenous women — and Community knowledge.

Canada's  
IA Act  
(2019)



# Impact Assessments of OSW projects: when in doubt (which we still largely are), site well...



CONSERVATION HANDBOOKS



CONSERVATION HANDBOOKS



EDITED BY  
**Martin R. Perrow**  
**Wildlife and Wind Farms, Conflicts and Solutions**

**WV PELAGIC PUBLISHING**  
VOLUME 3  
**Offshore: Potential Effects**



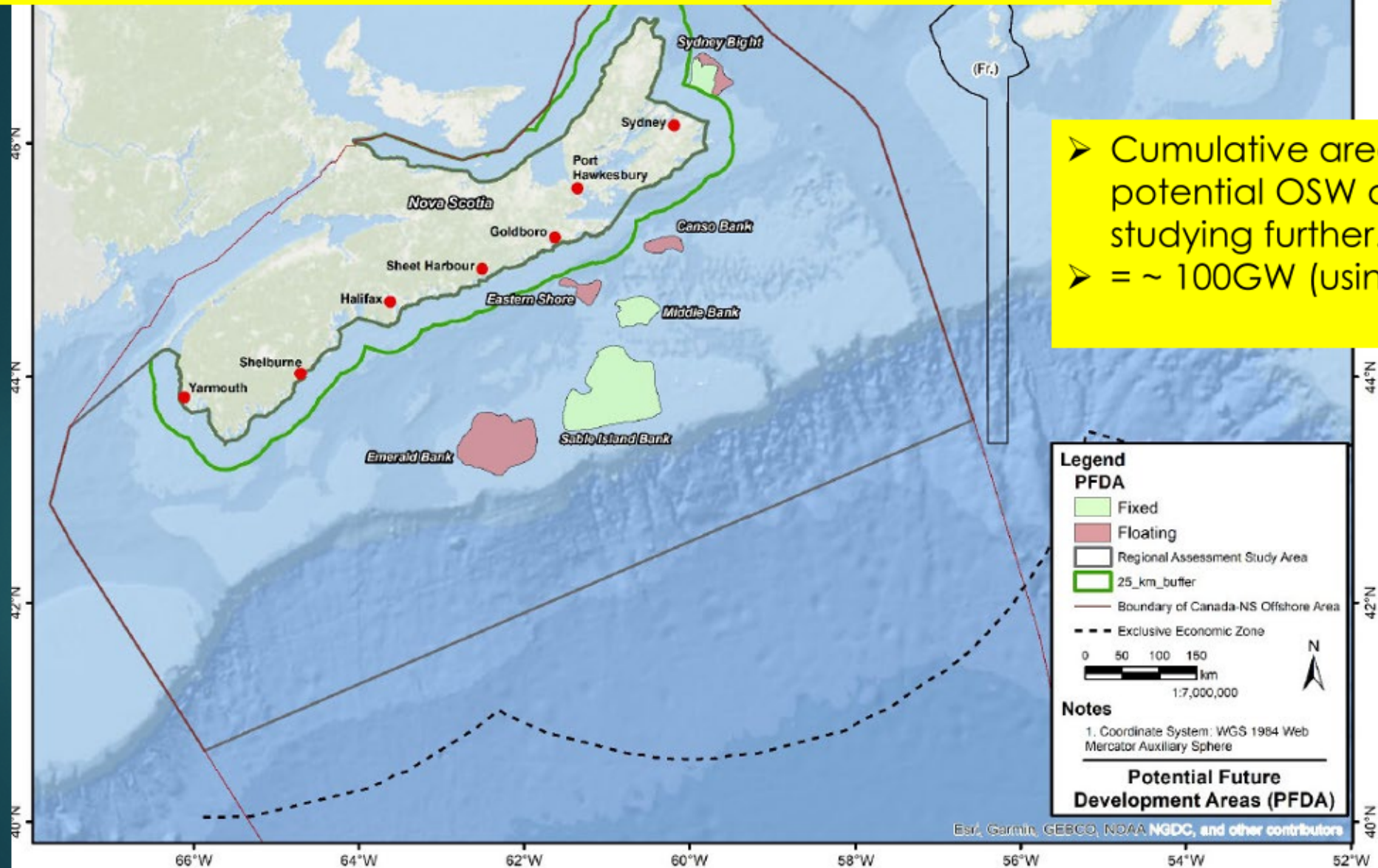
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“cumulative effects have barely begun to be addressed and little targeted research has yet been conducted to detect population-scale impacts. In essence, wind farms are likely to induce a number of top-down or bottom-up cascading effects through the food web via diverse mechanisms, which can only be understood through integrated ecosystem-based research.

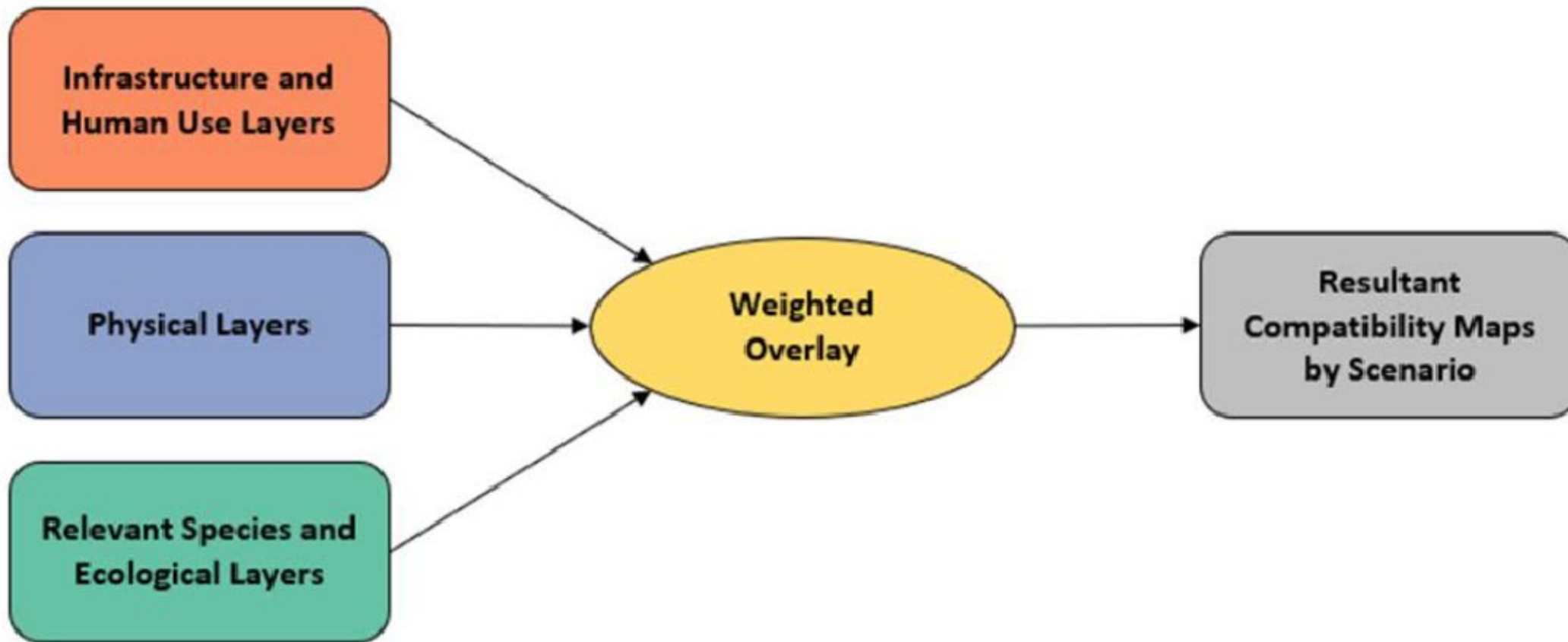
Until knowledge gaps are filled, uncertainty should be embraced by avoiding possible conflict through careful site selection to achieve the ultimate goal of a ‘win-win’ for wind energy and wildlife.” (III:234)





➤ Cumulative area of >20,000 sq. km of potential OSW development worth studying further...  
➤ = ~ 100GW (using 5 MW/km<sup>2</sup> capacity)

Figure 3 – Potential Future Development Areas



*Figure 2: Weighted Overlay process diagram.*

What are in fact reciprocally linked social and ecological dimensions of OSW in complex causal pathways are here connected by simple addition (weighted function) through varying the relative 'weights' of layers



“Although fished and studied for centuries, the area is still only partially characterized, in part because of the extensive resources required to study such a large and complex system. While considerable knowledge is held by various groups, including Indigenous communities, fishers and fishing companies, government agencies, universities and some non-government organizations, the information has not always been shared, or adequately supported by systematic, independent surveys.”

RA for OSW Committee, *Interim Report* , p. 8



## Recommendation 1: Nova Scotia Offshore Wind Collaborative Research Initiative

“The fundamental issue is one of governance...: a structure that can effectively and transparently manage the process will, to a large extent, determine the level of public, stakeholder, and rightsholder confidence in Nova Scotia’s anticipated venture into this new industry.” (RA OSW Interim Report, p. 30)

Fishing industry produces its own maps...



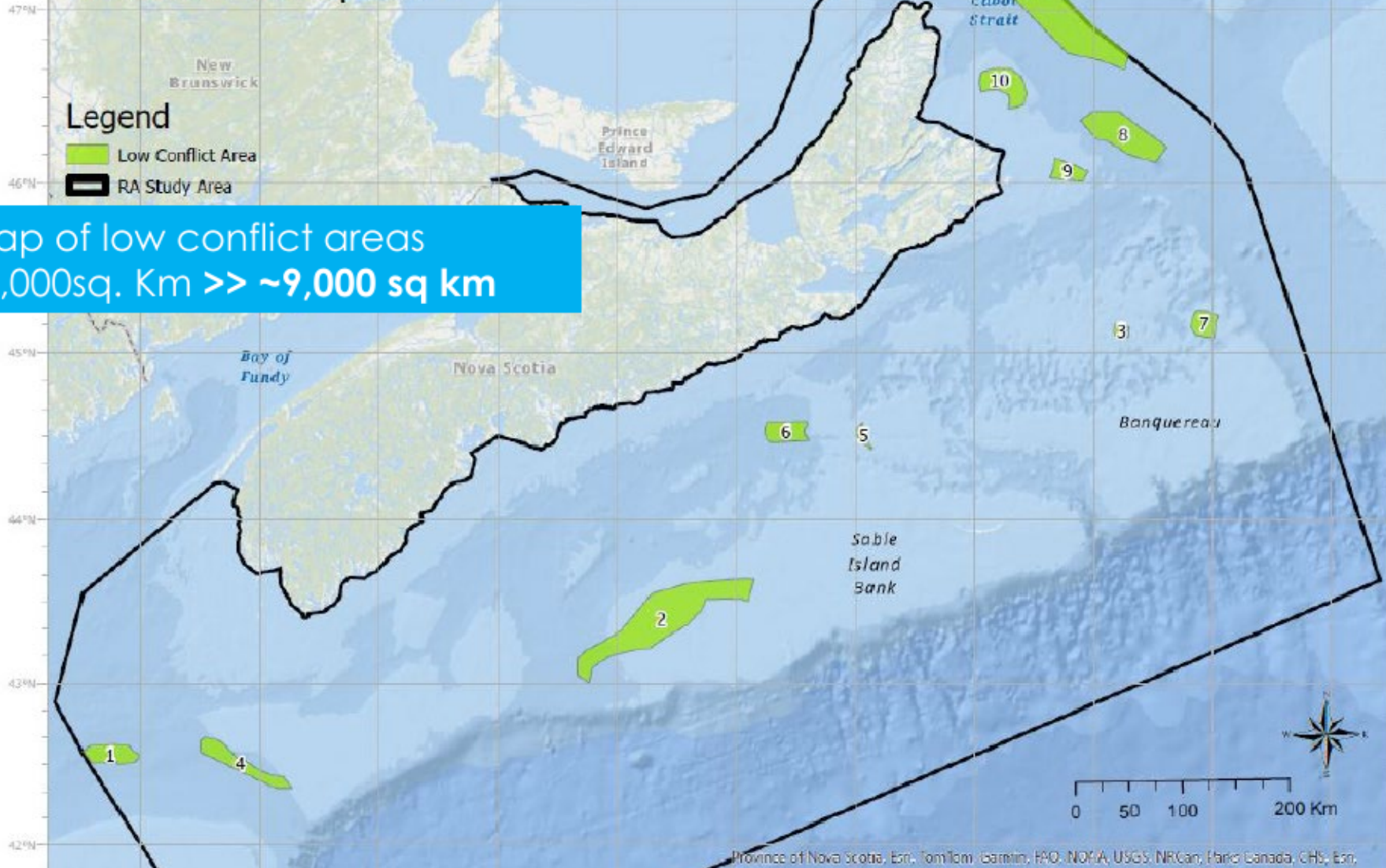
Area 19 Snow Crab Association	Scotia Fundy Inshore Fishermen's Assoc.	Eastern Shore Fisherman's Protective Assoc.	Nova Scotia Seafood Alliance	Brazil Rock 33/34 Lobster	Southwest Nova Tuna Association	Richmond Co. Inshore Fishermen's Assoc.
ASPANS	Seafood Producers Association of Nova Scotia	Gulf Nova Scotia Tuna Fishermen's Assoc.	NS Swordfishermen's Association	Cape Breton Fish Harvesters Association	SHQ Swordfish Harpoon Quota Group	Maritime Fishermen's Union – Local 4, 6 & 9
Atlantic Groundfish Council	Shelburne County Quota Group	Guys. Co. Inshore Fishermen's Assoc.	Tuna Charter Nova Scotia Association	Clearwater Seafoods Limited Partnership	Coldwater Lobster	Bay of Fundy Inshore Fishermen's Association

“To unite the Nova Scotia fishing industry; ensuring the emerging renewable offshore energy sector is developed in a manner that respects fisheries, coastal communities, and the marine environment.”

NSFAEE submission to RA Committee, Feb 6, 2024



# Regional Assessment for Offshore Windpower



NSFAEE map of low conflict areas (initially 79,000sq. Km >> ~9,000 sq km)

Rationale of *exclusion* rather than *interpenetration*; >> OSW sited on areas already excluded from fishing due to conservation measures

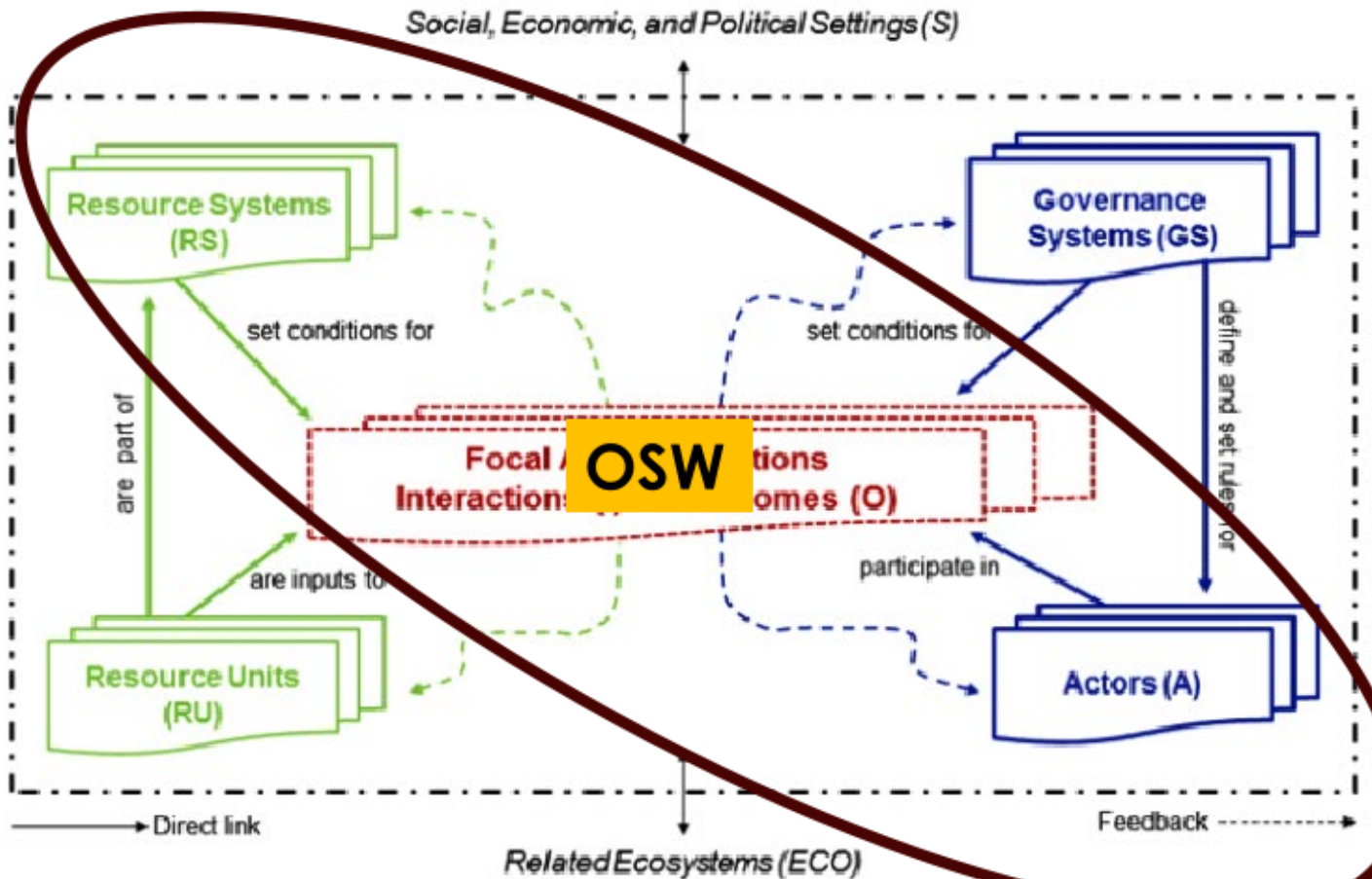


Lyle Porter

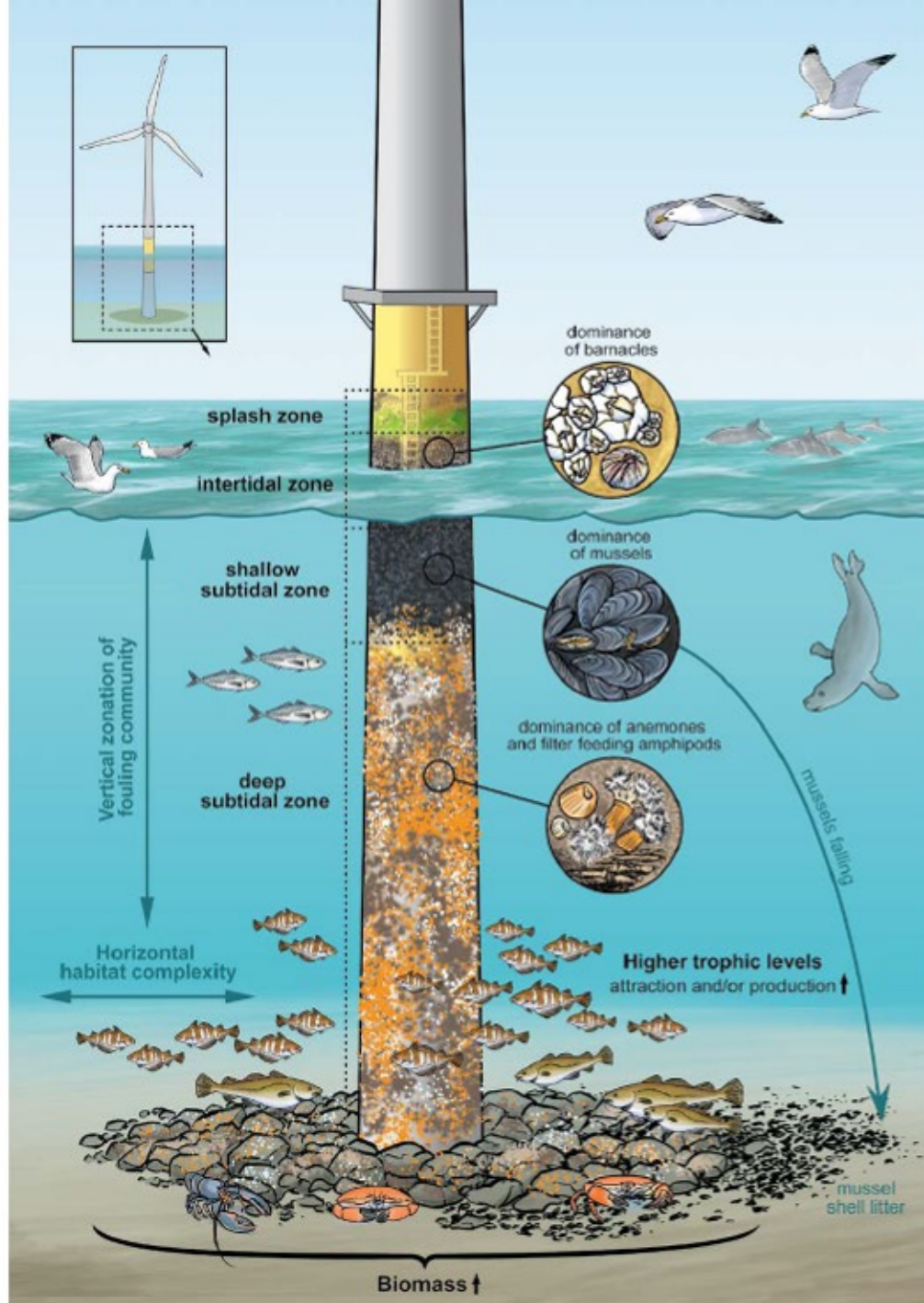
Masters of Marine Management graduate (2024)  
--Marine Affairs Program,  
Dalhousie University, Halifax

## Applying Socio-Ecological Systems thinking to Canadian Regional Assessment (MMM thesis)

\* a desktop case study of lobster harvesting industry and OSW interactions in Nova Scotia using socio-ecological systems (*sensu Ostrom*)







The 'reef effect' as a potentially positive impact on biodiversity/population and also potentially harvesting rates

**FIGURE 1.** Offshore wind farm structures provide habitat for invertebrate organisms that foul the foundation along the depth gradient and attract predator fish, seabirds, and marine mammals. *Illustration by Hendrik Gheerardyn*

Degraer, S., et al. (2020). OFFSHORE WIND FARM ARTIFICIAL REEFS AFFECT ECOSYSTEM STRUCTURE AND FUNCTIONING: A Synthesis. *Oceanography (Washington, D.C.)*, 33(4), 48–57. Available at: <https://doi.org/10.5670/oceanog.2020.405>

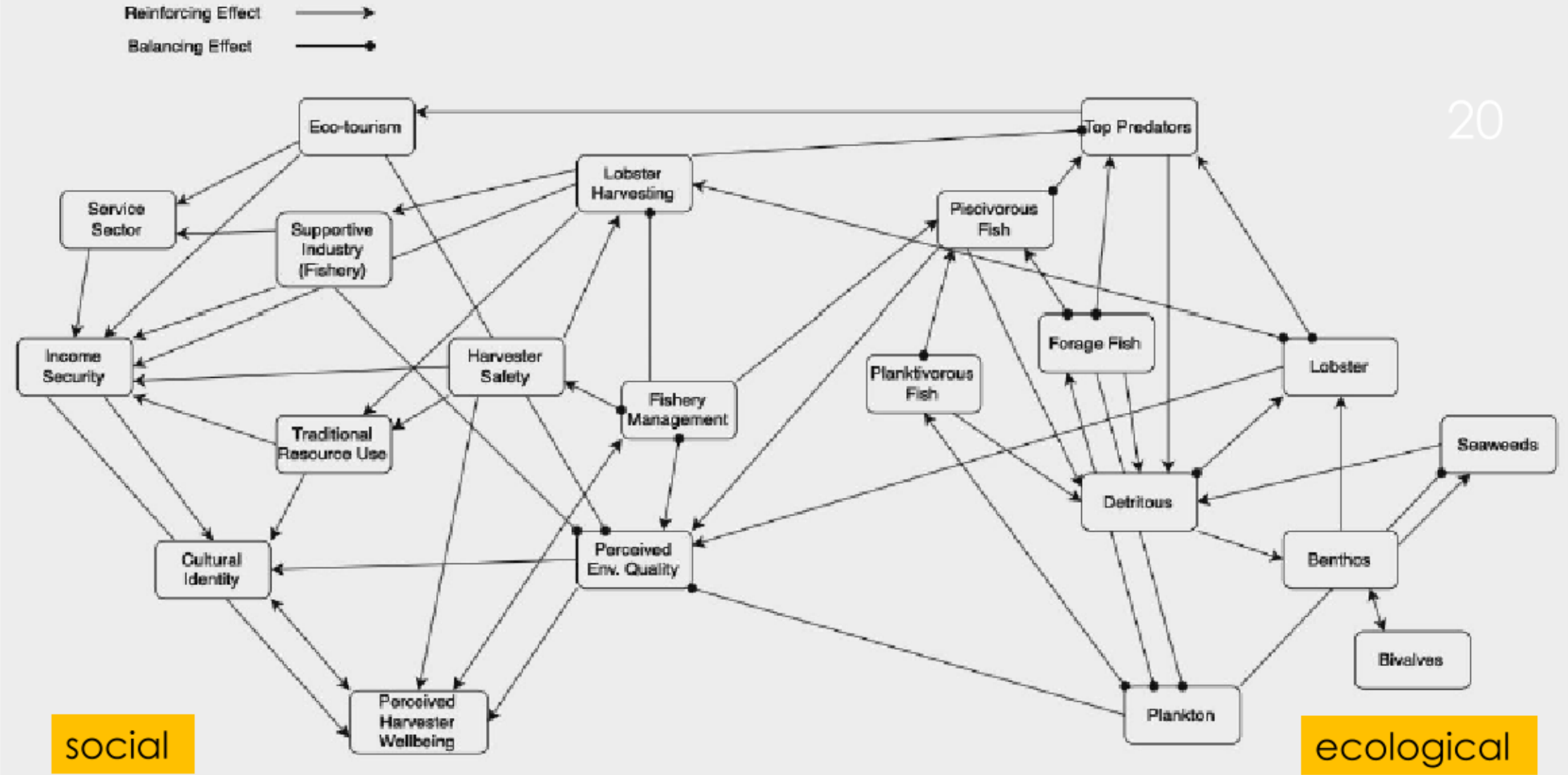


Fig 7. Signed diagram of the representative SES prior to OSW development. The diagram visualizes the system interaction outlines in Table 2. Reinforcing effects between system components are represented by an interaction terminating in an arrow, and balancing effects are represented by an interaction terminating in a dot.



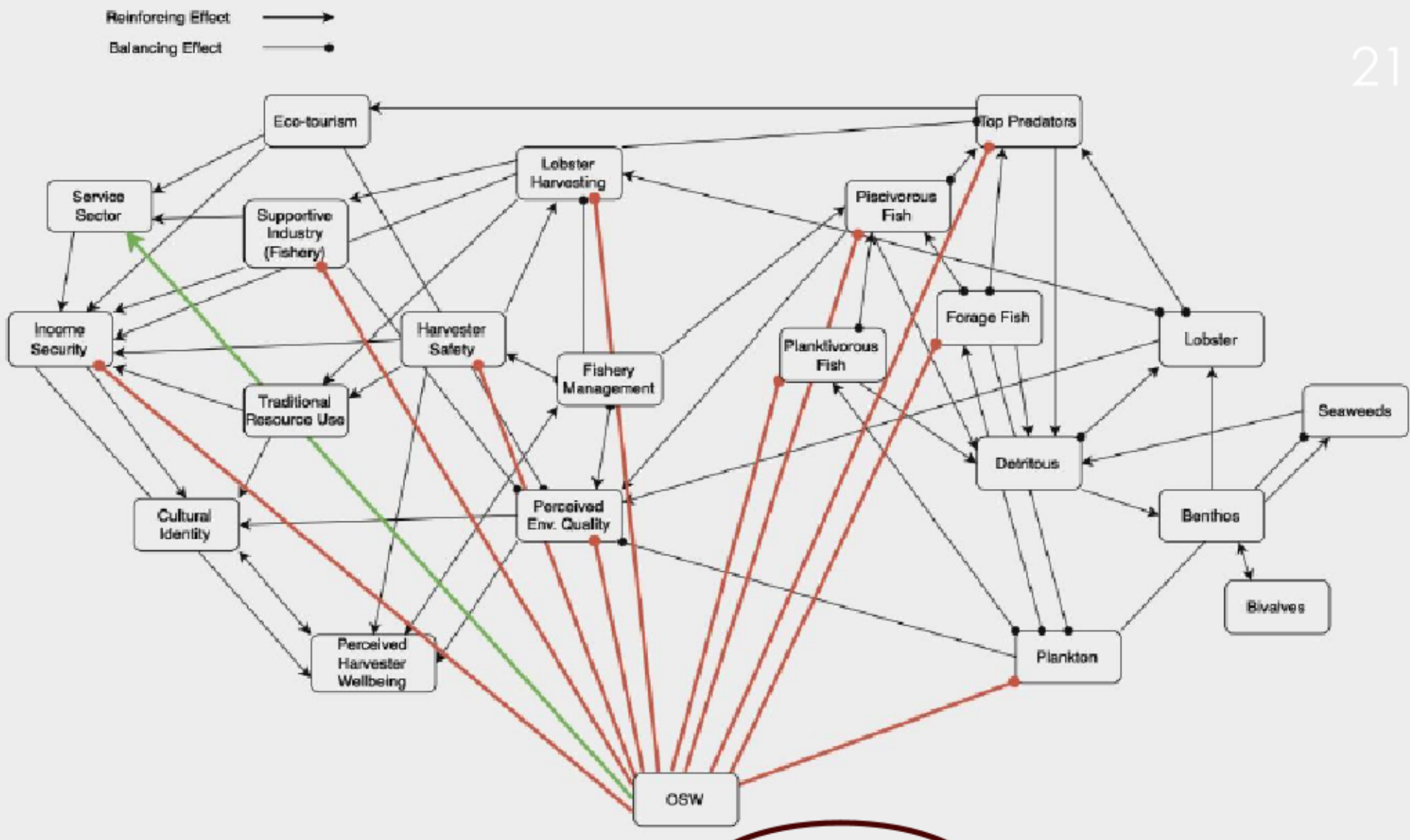


Fig 8. Signed diagraph of the representative SES as impacted by site surveying and construction activity. New reinforcing direct interactions within the system are denoted by a green interaction terminating in an arrow, and new balancing interactions are depicted by a red interaction terminating in a dot.

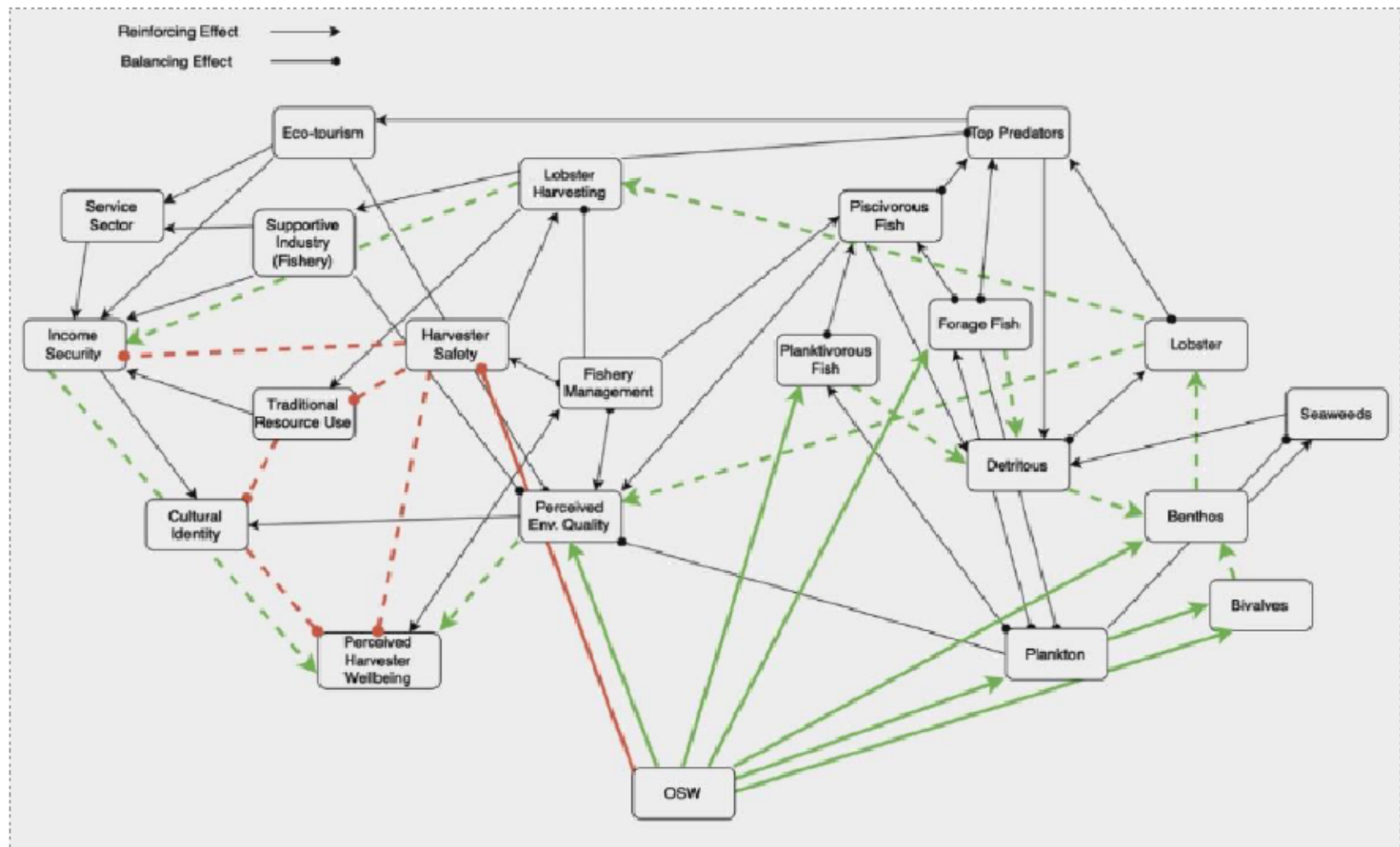


Fig 10. Cumulative socio-ecological effects of site operation and decommissioning are illustrated by dashed lines. Dashed green lines terminating with an arrow are positive cumulative effects, and dashed red lines terminating with a dot indicate negative cumulative effects. Note that cumulative effects can be recognized across social and ecological system



## Takeaways...

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- Regional (and project based) Assessment for OSW, although increasing in sophistication and sensitivity to IA issues (e.g. VC impacts, cumulative effects) is still in its infancy, with new monitoring technologies emerging;
- The case of NS, as a mature district (scientifically) with a new industry (OSW) illustrates the challenge of IA for renewable transitions: doing it right will take new thinking;
- Understanding how human and natural systems interact reciprocally (SES) is one of *the biggest* challenges going forward for IA community engaged in OSW;
- OSW as an energy transformation is itself an SES that is dynamic, requiring attention to temporal and spatial scales on both human and ecological sides.

**Thank you for your attention!**

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