# OCP Scenarios Workshop

Thursday 26 May, 2016

OCEAN CANADA

# OCP Timeline

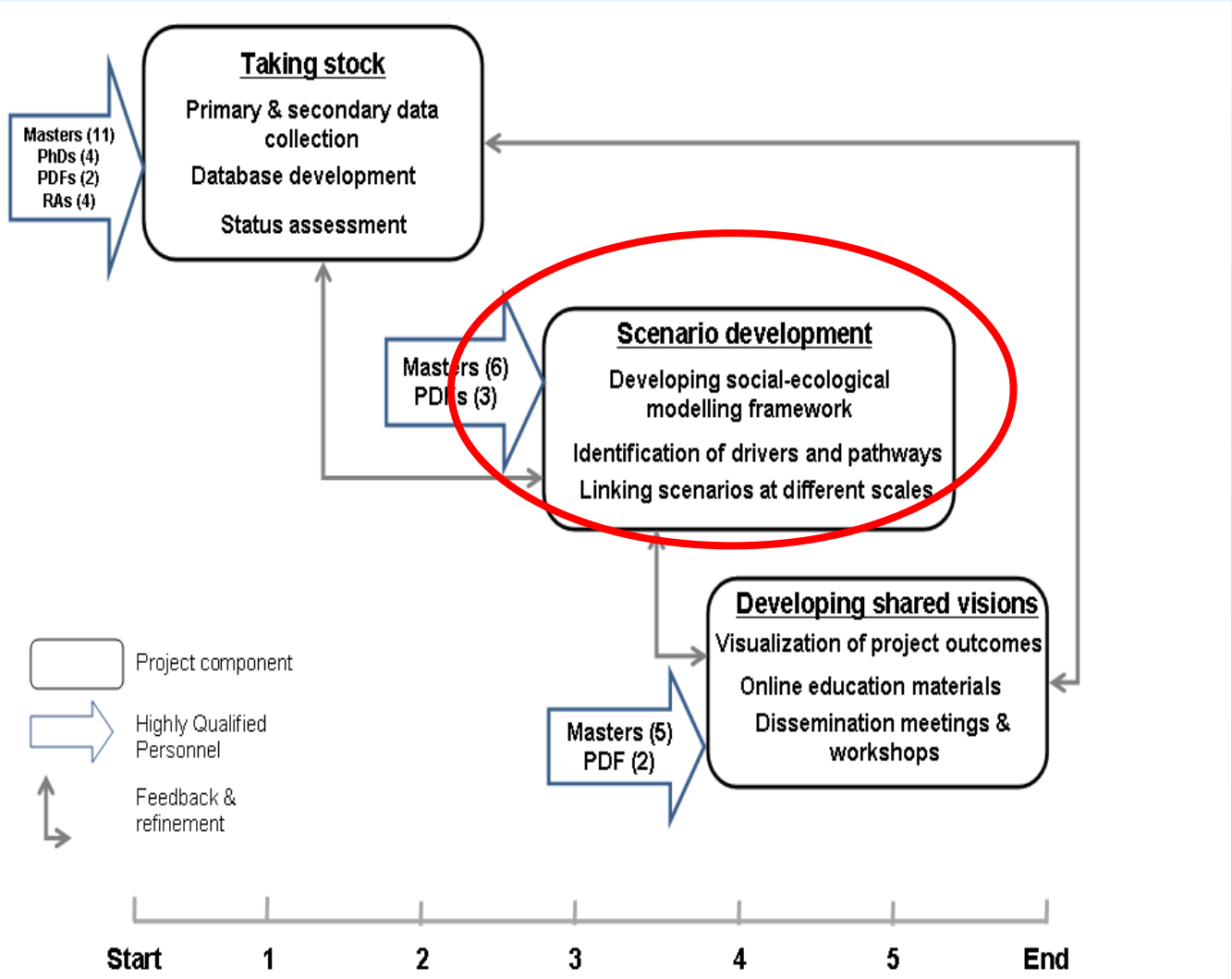



Figure 2. Partnership components with key activities, time frame, and involvement of HQPs.

# Scenarios Workshop Objectives

**Purpose:** Provide an overview about developing integrated OCP scenarios

**Aims:**

1. Summarise previous scenario work on Canadian oceans

2. Present framework for developing national scale scenarios

3. Identify key drivers, outputs, and potential avenues for linking regional and national level scenarios

# What is a scenario?

"a coherent, internally consistent, and plausible description of a possible state of the world"

- IPCC (2013)

- Not a projection or prediction about the future

# Scenarios in OCP Proposal

"we will *Build Scenarios* with input from the Regional WGs to project possible qualitative and quantitative outcomes for our oceans, under different scenarios of socio-economic and biophysical changes. We adopt the scenario development approach used by the Intergovernmental Panel on Climate Change (IPCC) Assessment Report 5 (van Vuuren *et al*., 2012)"

# Scenarios Review

**Objective:** Review existing scenario studies to evaluate whether they provide an integrated social-ecological perspective about alternative futures for Canada's oceans.

**Criteria:**

- Scenarios had to describe future drivers and responses
- Focus on fisheries and marine-related activities

Teh, Cheung, Sumaila (*in revision, Reg Env Change*)

# Scenarios Review

How we defined **‘Integrated’**:

- Considers interactions and feedback between social and ecological systems

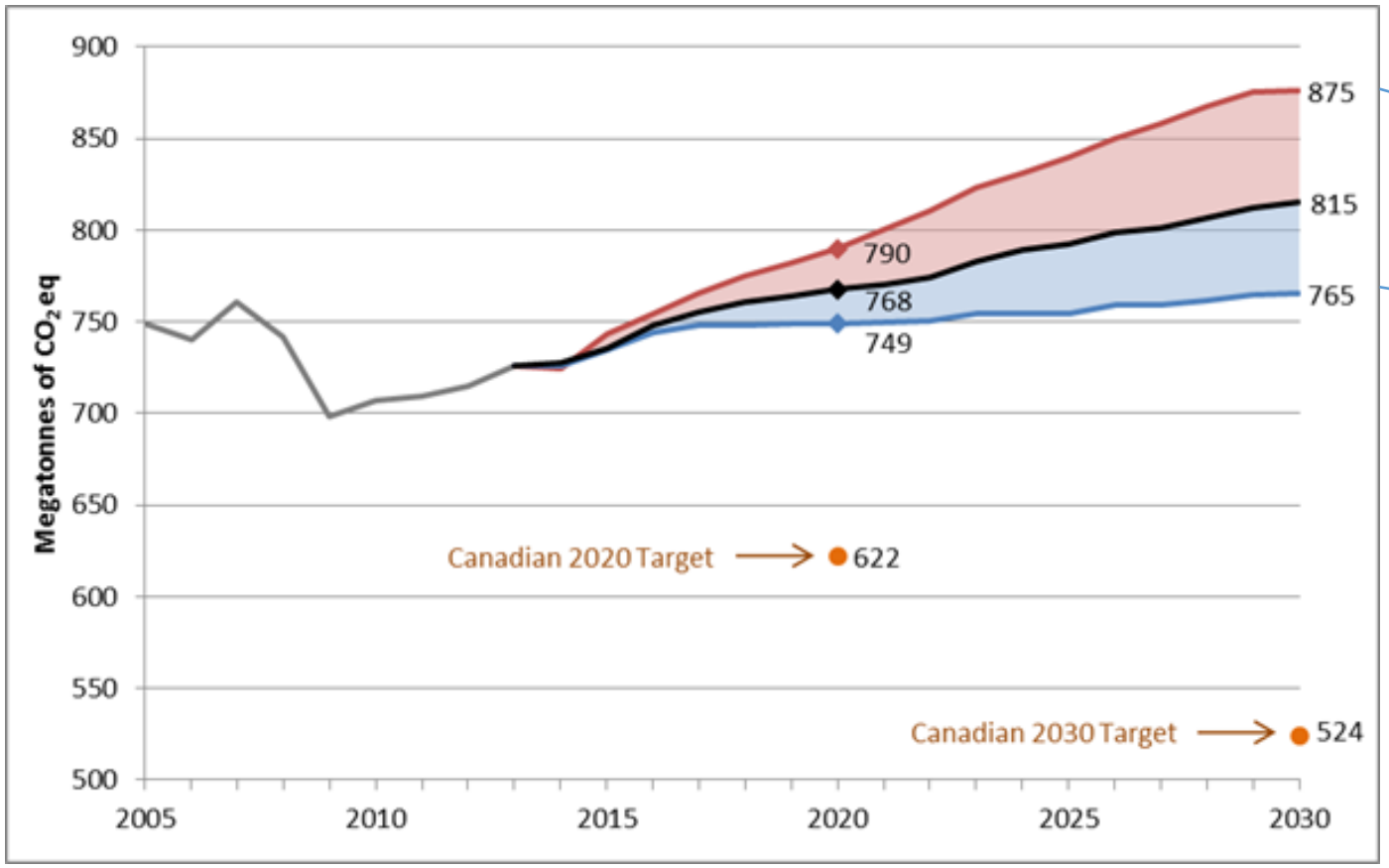
- Combine models of climate, socio-economic, and environmental systems

- ‘Global Environmental Assessments’ (e.g. IPCC, MA, GEO) as benchmark for ‘integrated’ scenarios

# Scenarios Review

| Available Models & Projections | |
|---|---|
| Climate | √ |
| Ecosystem<br>*e.g., Ecopath/Ecosim models of Pacific, Arctic, Scotian Shelf* | √ |
| Biological<br>*e.g., Stock recruitment, species distribution* | √ |
| Socio-economic<br>*e.g., Population growth, GDP* | √ |

# Emissions Projection

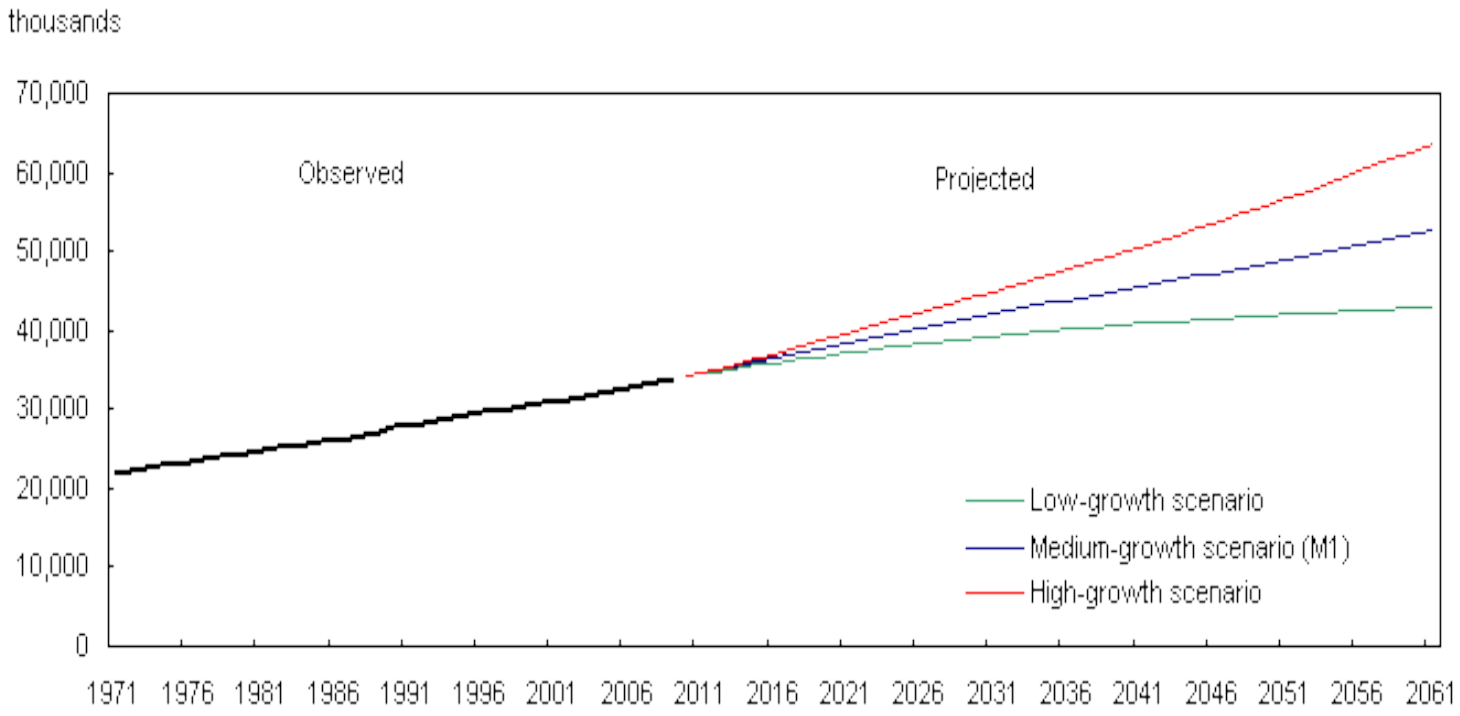



**High GDP growth**

**Low GDP growth**

Source: Environment Canada

# Population Projection




Source: Statistics Canada

# Scenarios Review

| Scenario Type | Approach | Research question/ Purpose | Data & Models | Scale of coverage |
|---|---|---|---|---|
| **Fisheries & marine ecosystems** | Mainly quantitative, 1 participatory | Investigate effect of climate change on fish biology, fisheries, fish prices, habitats, marine ecosystem | Environmental, biological, ecosystem modelling, fisheries, economic | Regional, with tendency to focus on Pacific |
| **Coastal zone management** | Quantitative | Investigate economic or biological impact resulting from climate change and coastal activities | Climate projections, socio-economic, environmental | National and regional (Pacific and Atlantic) |
| **Community management and livelihoods** | Participatory, quantitative | Support possible pathways to sustainable future (species recovery, marine spatial planning) | Biological, economic | Local, primarily on Pacific coast, 1 NWT |

# Scenarios Review: Main Findings

- Sufficient data and quantitative methods to draw upon (e.g., climate projections, marine ecosystem modelling, biological responses)
- Scenarios lack an integrative approach:
    a. Research questions too narrow in scope
    b. Did not utilise framework that enabled the consideration of multiple drivers simultaneously
    c. Most scenarios did not explicitly specify pathway linking socio-economic development, climate projections, policy options, and resulting impacts and feedback

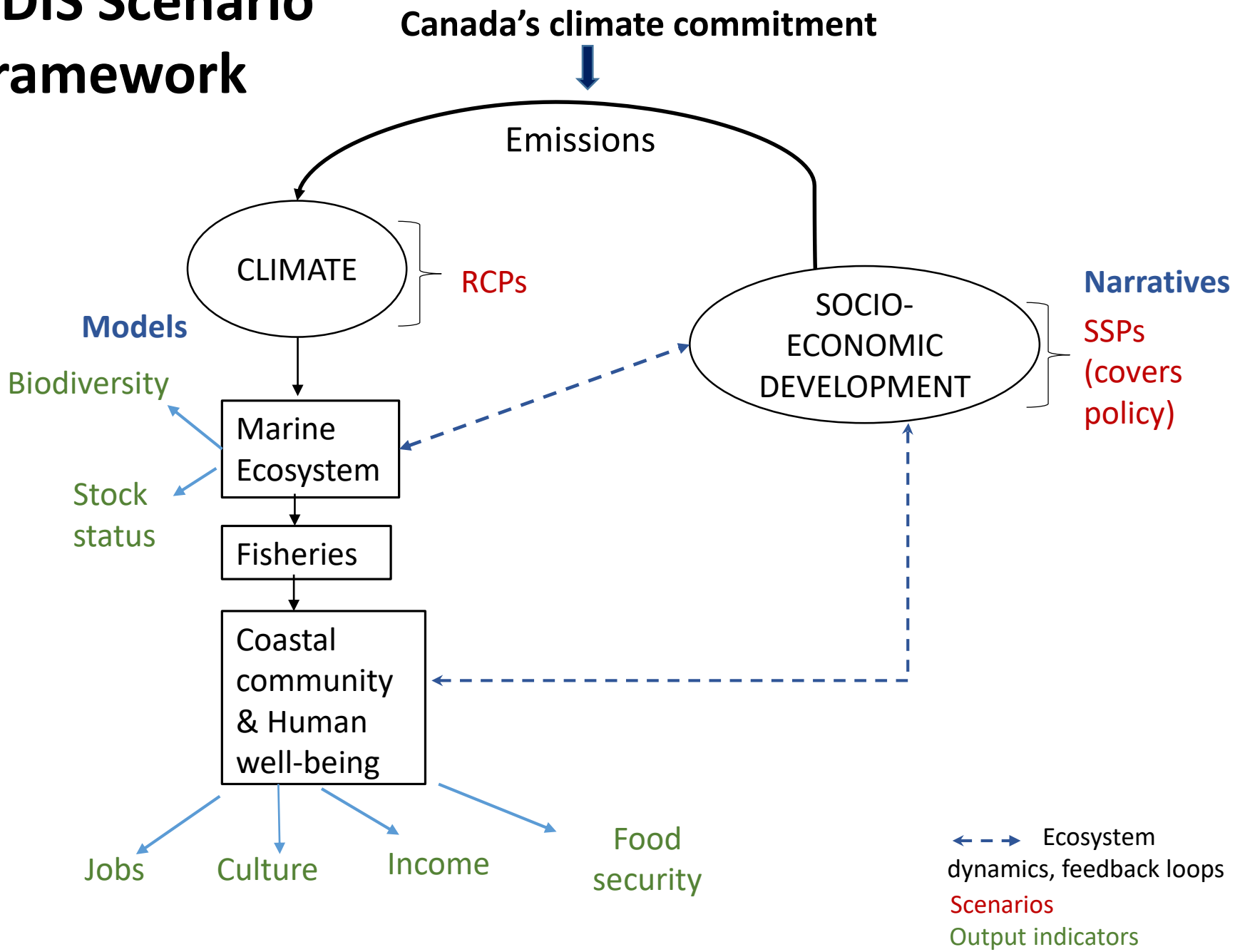
# Scenarios Review: Gaps

- Mostly focus on future climate change impact on marine species and ecosystems, particularly salmon on Pacific Coast

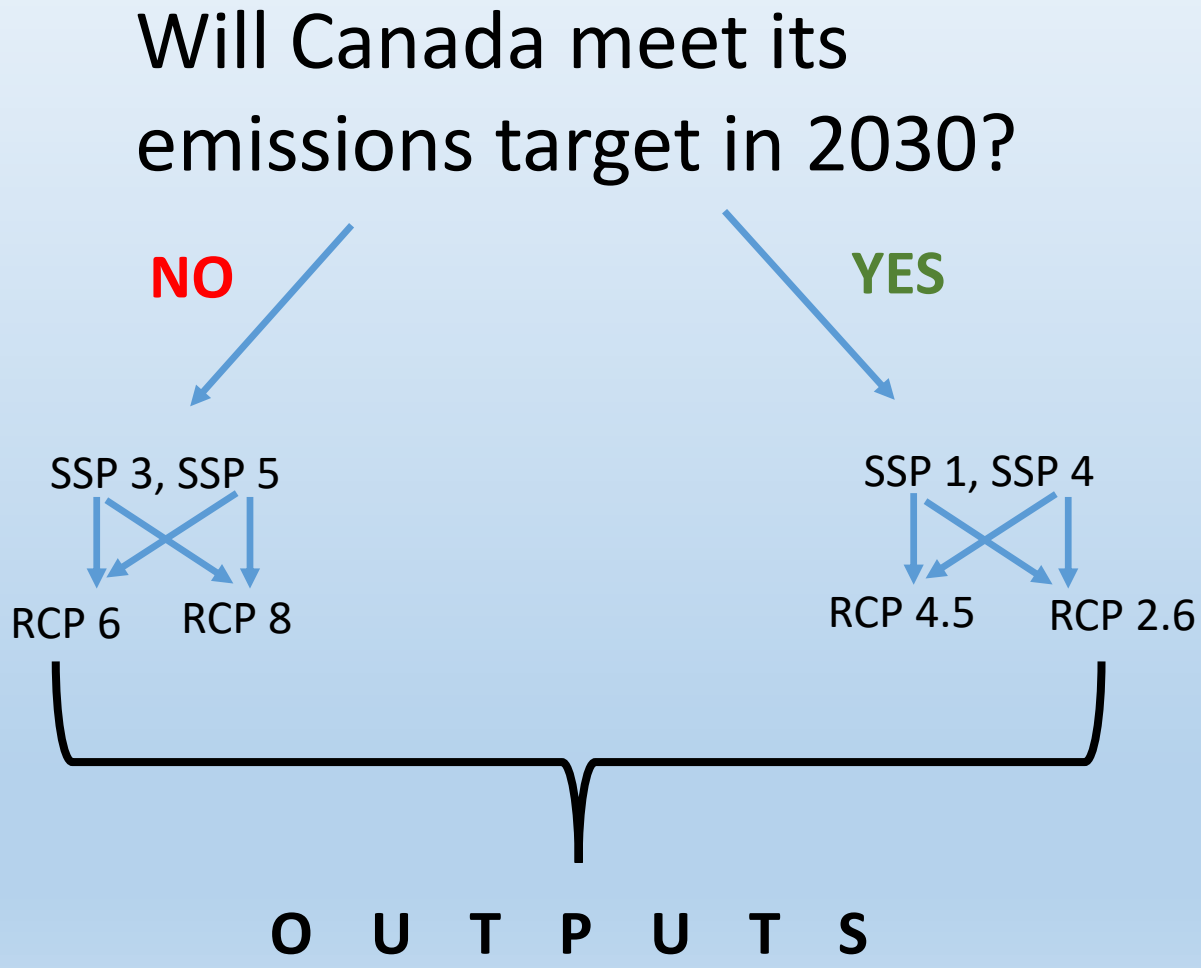
- Limited focus on societal and economic impacts arising from future change
  - Those that did looked at measurable costs and benefits
  - No clear indication about human and policy dimensions

- No scenarios that looked at all 3 Canadian coasts simultaneously
  - Available national scale scenarios were not specific to fisheries and associated coastal fishing communities

# NDIS Scenario Framework



# Framing scenarios at the national level



# Shared Socioeconomic Pathways

SSP1: Taking the Green Road – Gradual, persistent shift towards sustainable and environmentally conscious development

SSP2: Middle of the road – social, economic and technology trends do not shift much from historical trends

SSP3: Regional rivalry – weak global institutions for addressing environmental concerns

SSP4: Inequality – increasing inequality and stratification across and within countries

SSP5: Fossil fueled development – accelerated globalisation and rapid development

O'Neill et al. 2015 *Global Env Change*

# Representative Concentration Pathways

| RCP | Radiative forcing | Pathway | Temp anomaly (°C) |
|---|---|---|---|
| RCP 8.5 | 8.5 $Wm^2$ in 2100 | Rising | 4.9 |
| RCP 6.0 | 6 $Wm^2$ post 2100 | Stabilization after 2100 | 3.0 |
| RCP 4.5 | 4.5 $Wm^2$ post 2100 | Stabilization after 2100 | 2.4 |
| RCP 2.6 | 3 $Wm^2$ before 2100, declining to 2.6 $Wm^2$ by 2100 | Peak and decline | 1.5 |

# Matrix Framework

| | SSP1 | SSP2 | SSP3 | SSP4 | SSP5 |
|---|---|---|---|---|---|
| RCP2.6 | | | | | |
| RCP4.5 | | | | | |
| RCP6.5 | | | | | |
| RCP8 | | | | | |

**Output Indicators**

# Identifying scenario drivers and outputs

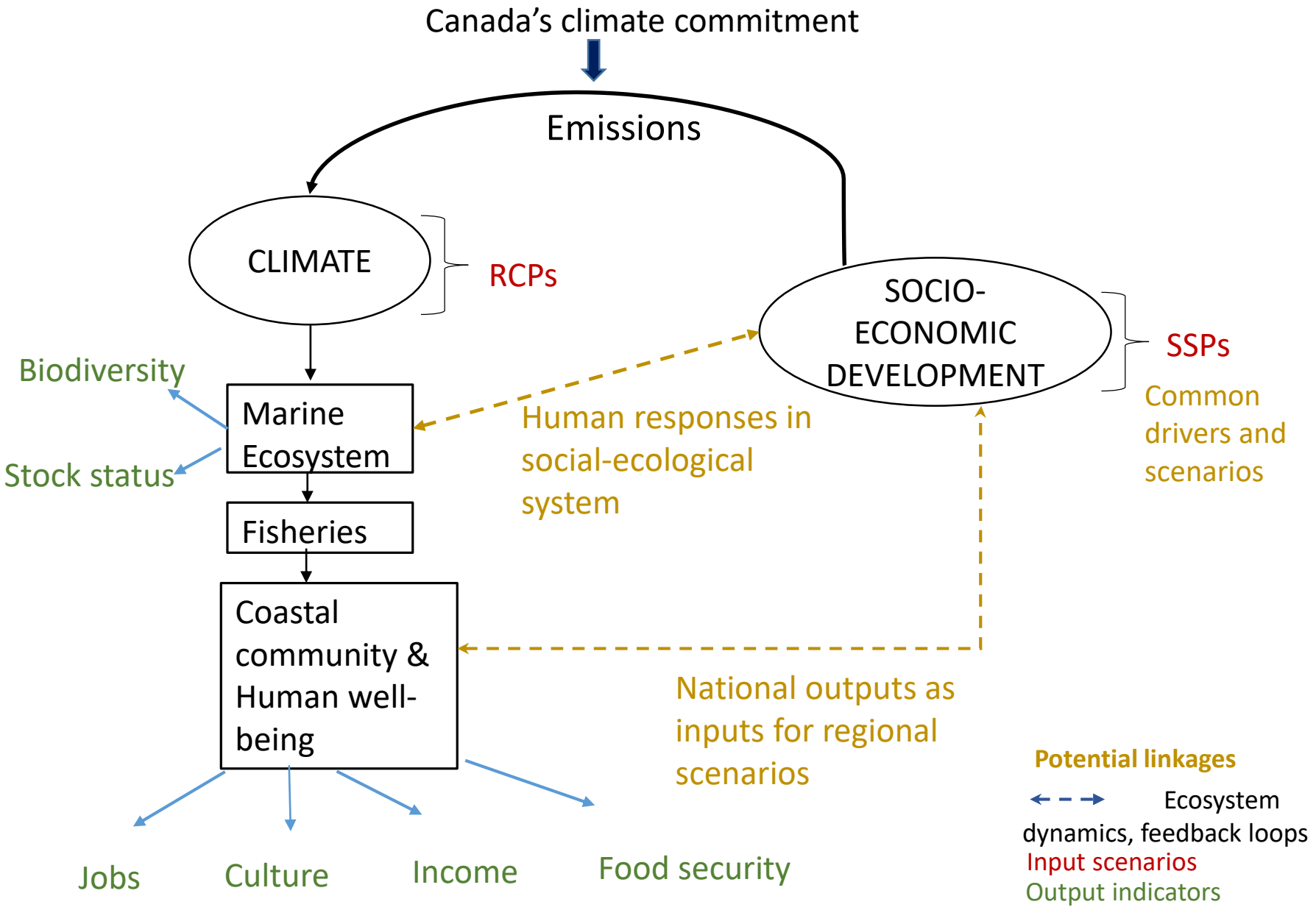
Purpose: To provide a pool of drivers and outputs so that all WG scenario narratives cover a common set of drivers and examine the impact of future change on a common set of outputs

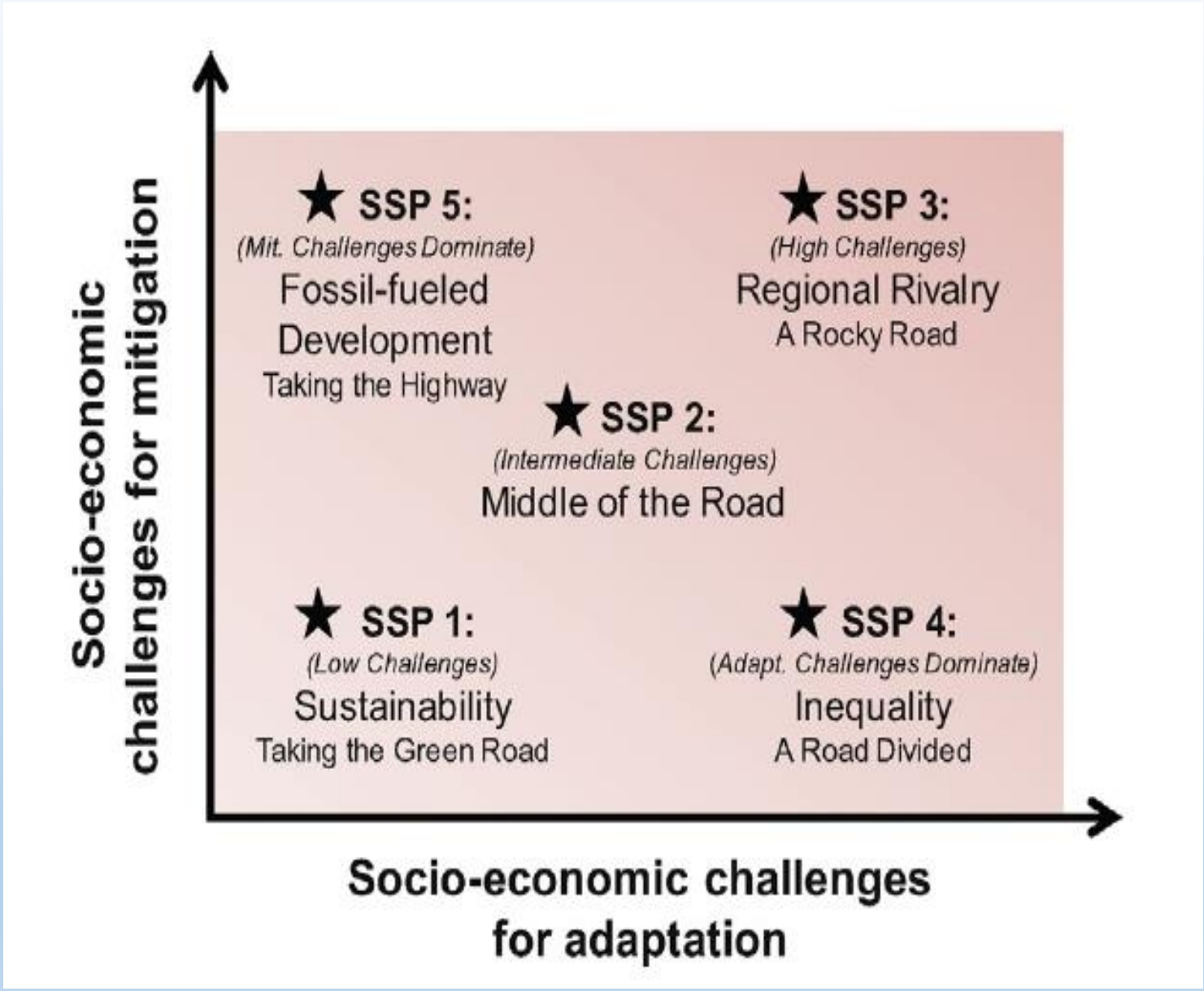
# Linkages between national-regional scenarios

What are the linkages between national and regional scenarios in terms of:

- Research questions
- Process - Output (results) and data/input
- Scale

# Linkages between national-regional scenarios






O'Neill et al. (2015)