



# Cumulative Effect Framework

DEVELOPMENT OF A ROAD MAP FOR CUMULATIVE EFFECTS OF  
BEAUFORT REGION

# CUMULATIVE EFFECTS

- ▶ Cumulative effects are changes to the environment that are caused by an action in combination with other past, present and future human actions.
  - This includes direct and indirect effects caused by the combined human activities.
- ▶ Cumulative Effects Assessment is required by legislation
  - ensures that incremental effects of combined actions are assessed and use EAs to contribute to better planning and decision-making
- ▶ Cumulative Effects Monitoring is required to manage unintended or undesirable effects
  - demonstrate that impacts can be and are being managed
- ▶ Project-specific CEA doesn't contribute to better planning and decision-making without broader mgmt framework

# Cumulative Effects - Context

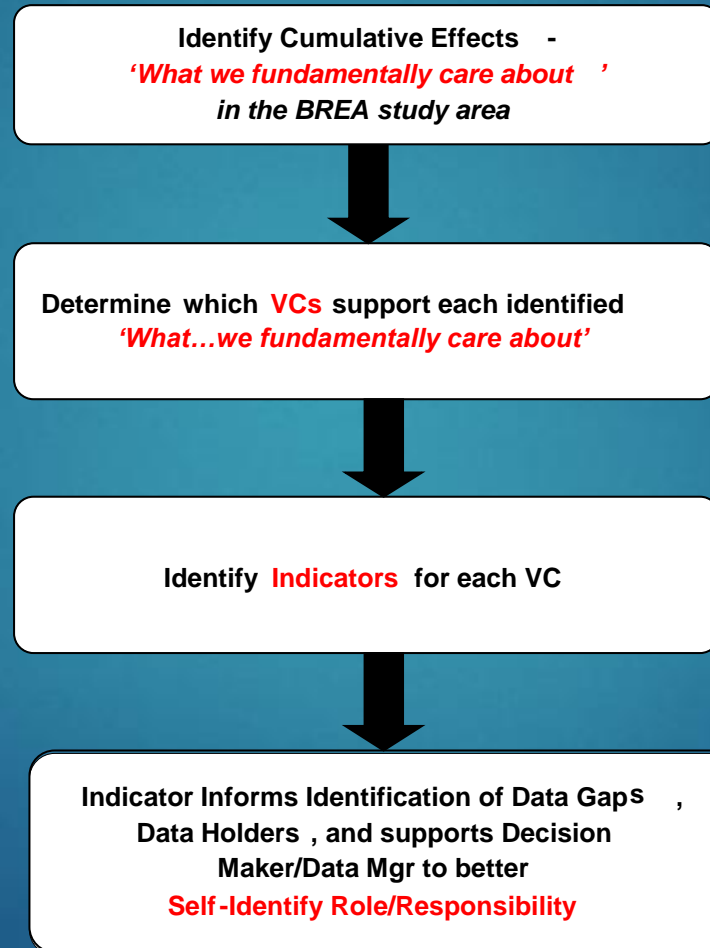
- ▶ CE is a concept which is well defined in literature. Based upon reasonable understanding of historical effects and impacts from development projects.
- ▶ CE Management is a complex matter and must be considered in relation to:
  - Climate change effects and other trans-geographic effects that are beyond local scope
  - Shifting baselines – long term changes change baseline for effects management
  - Segregation of positive CE and negative CE
  - Availability of routine monitoring activities
  - Easy access to research specific data collection activities

# CEM Workshop

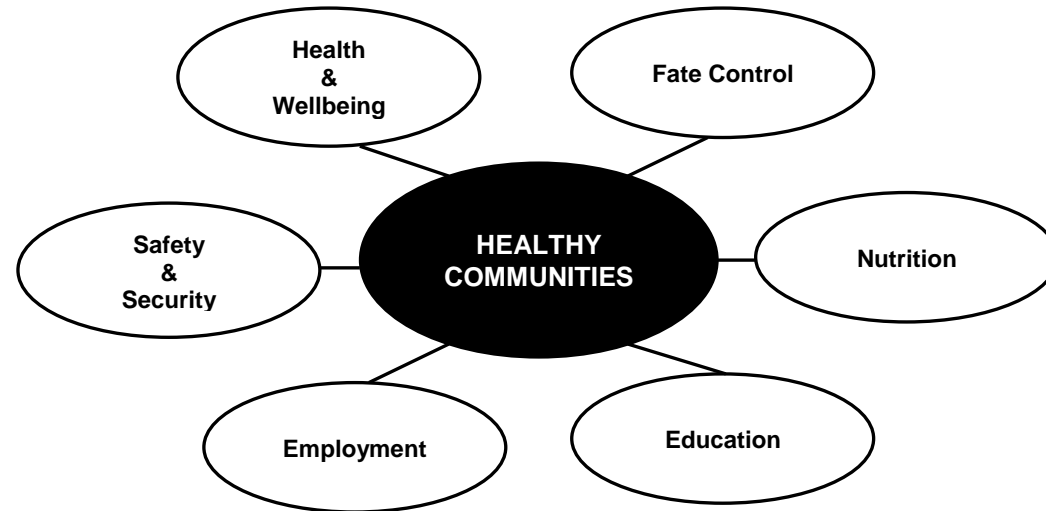
- ▶ AMEC conducted a thorough review of BREAs documents, and undertook a literature review of CEM in other regions (nationally and internationally)
- ▶ Documents were summarized to identify Valued Components (VCs) of the biophysical, social, cultural and economic environment in the Beaufort Region.
- ▶ Workshop participants worked to identify key VCs that could be the focus of pilot monitoring for cumulative effects.

# Selection of VCs and Indicators

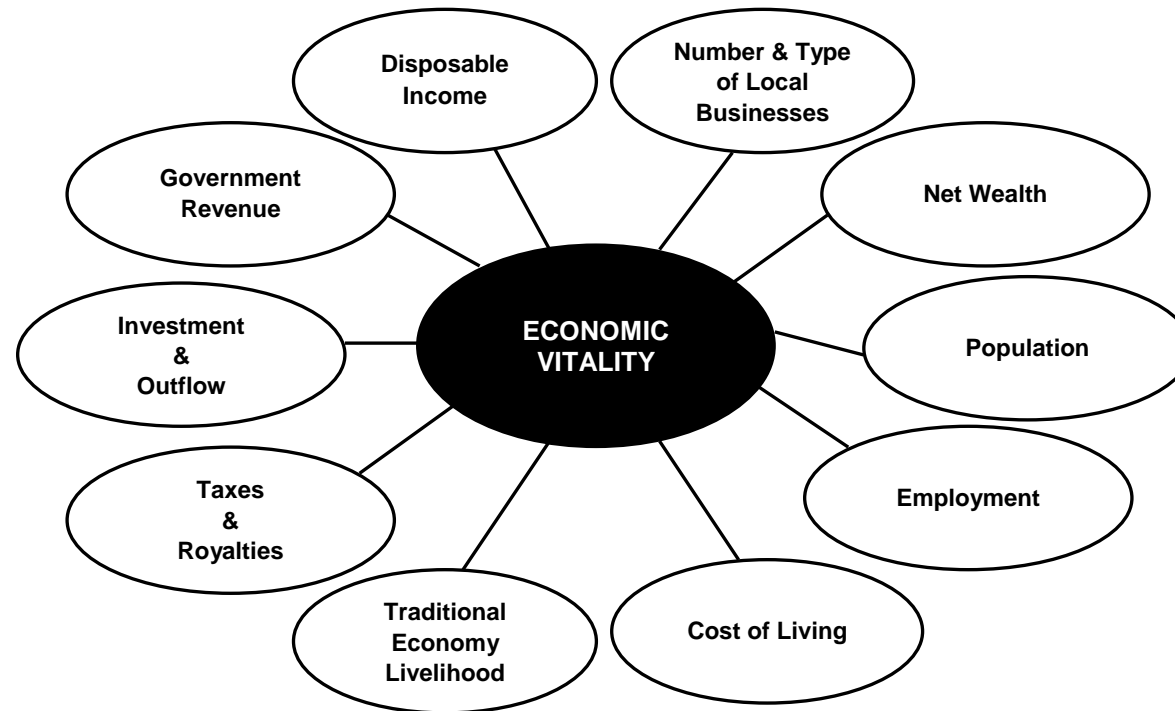
## Conceptual Methodology to Determine Study Area VCs and Indicators



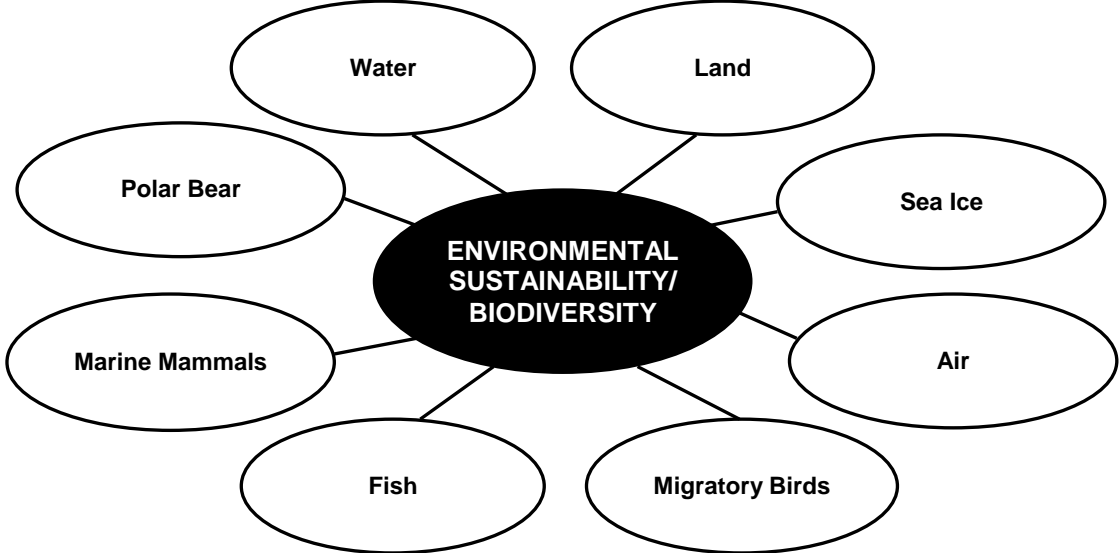
# Valued Components (Healthy Communities)



# Valued Components for Economic Vitality

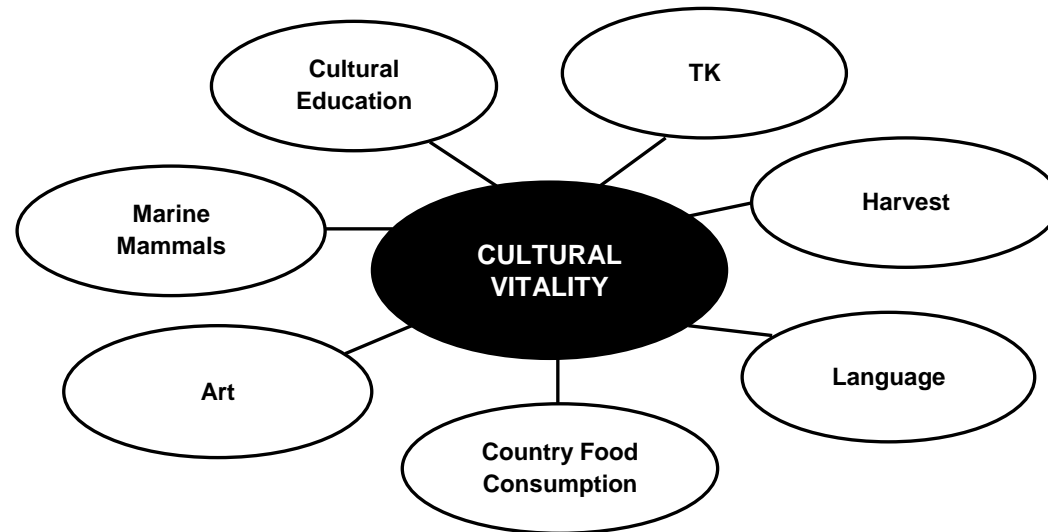


# Valued Components for Environmental Sustainability/Biodiversity





# Valued Components for Cultural Vitality



# CUMULATIVE EFFECTS

- ▶ An observation:
- ▶ Much of the research on CE focuses on a specific environmental characteristic or condition. Determination of the VCs tended to be more focused on those environmental factors that have direct implications to human environmental condition.

# Selection of Pilot VCs

- ▶ Workshop participants narrowed the list of potential VCs to a few pilot VCs to be included in the pilot study through a blind voting process guided by the following principles:
  - Workable – pragmatic and realistic
  - Relevance
  - Feasible with respect to existing capacity to collect data, continuously monitor parameters, and enforce regulations
  - Cognizant of public perception (which may be at odds with science)
  - Designed to address gaps in knowledge or data
  - Designed to capitalize on baseline / existing information
  - Cognizant of technical capacities
  - Amenable to straightforward management procedures

# Top 3 and Pilot Study VCs

Care Item	Top 3 VCs	Pilot Study VC
Healthy communities	Formal education Employment Health and wellbeing	Formal education
Economic Vitality	Number and type of businesses Employment Disposable income	Employment
Environmental Sustainability & Biodiversity	Marine mammals Fish (Arctic Cod/ Arctic Char) Water	Marine Mammal (Beluga) Fish (Arctic Cod/Arctic Char)
Cultural Vitality	Cultural Education Traditional Knowledge Language	Cultural vitality

# PILOT INDICATORS for FORMAL EDUCATION VALUED COMPONENT

Indicators	Data Collection and Management
<b>Early Childhood Development (0-K)</b> [aptitude testing]	NWT Department of Education, Culture & Employment (NWTECE) Note: specifically, the NWTECE's Early Childhood and School Services (ECSS) division
<b>Grade 12 Completion</b>	NWTECE NWTECE-ECSS Statistics Canada
<b>Professional Development</b> <b>Technical Certification</b> <b>Adult Education</b> <b>Enrolment/Completes</b>	NWTECE Community Colleges Training Delivery Organizations Unions Industry (mining Companies)
<b>Post Secondary Completion</b>	Statistics Canada Community Colleges Training Delivery Organizations Academic Research
<b>Literacy</b>	NWT Bureau of Statistics (NWTBS) Statistics Canada
<b>Access / Capacity</b>	NWTECE

# PILOT INDICATORS for EMPLOYMENT VALUED COMPONENT

Indicators	Data Collection and Management
Employment rate (Part Time/Full Time)	<a href="#">Statistics Canada</a> NWTBS
Type of Job	NWTBS
Income (average and by sector)	<a href="#">Statistics Canada</a> NWTBS
Participation rate	Statistics Canada NWTBS
Employment Insurance Claims	Statistics Canada NWTBS <a href="#">Service Canada</a>
Social Assistance	NWT Health & Social Services (NWT HSS)
Number/Type of Local Businesses	Statistics Canada NWTBS
Number of Job Applications	NWTBS
Employment by Sector	<a href="#">Statistics Canada</a> NWTBS

# PILOT INDICATORS for CULTURAL VITALITY VALUED COMPONENT

Indicators	Data Collection and Management
<b>Language</b> <b>[use]</b>	NWTBS <b>Statistics Canada</b> Beaufort Delta Divisional Education Council (BDEC) (language programs in schools i.e., language of instruction at early as well as higher levels) Native Communications Society of the NWT (NCS) Inuvialuit Communication Society (ICS) Media (newsletters, TV/radio broadcasting, etc. in official languages) – APTN, Inuit Broadcasting Corporation, CBC. Hamlet Councils (signage) NWTDT, NWTDECE Aurora College (Aboriginal Languages and Culture Instruction Program)
<b>Traditional Knowledge (TK)</b>	NWTBS Statistics Canada Joint Secretariat Industry BSPWG Academic Research -                      The Inuvialuit Living History Project
<b>Ability to harvest</b> <b>[includes community hunts, equipment, affordability, access to resource]</b>	<b>FJMC</b> <b>Inuvialuit Game Council (IGC)</b> Inuvialuit Regional Corporation (IRC) Industry Regional Organizations
<b>Cultural Education</b> <b>[includes Nordic studies, on-the-land programs]</b>	<b>NWTDECE</b> <b>BDEC</b>
<b>Country food consumption</b>	NWT HSS                      Retail outlets <b>Aborig. Peoples Survey Stats</b> <b>Can</b> Nutrition North (NN) Health Canada (HC)              Academia
<b>Art</b> <b>(includes products, number of artists)</b>	Arts organizations NWT DITI

# PILOT INDICATORS for FISH/WHALE VALUED COMPONENT

Indicators	Data Collection and Management
Catch per unit effort (CPUE)	Fisheries and Oceans Canada (DFO)
Age Distribution	DFO
Health	DFO NWT Environment and Natural Resources Scientific literature
Size	DFO
Spatial/temporal distribution	DFO
Migration patterns	DFO
Quota / Harvest (landings) or No Quota	DFO HTCs FJMC
Number of licenses	DFO HTCs FJMC
Use	IRCs NWTENR



# Cumulative Effects Framework

- ▶ Cumulative Effects Management is dependent on up-to-date accurate information on selected indicators. This information provides the basis for determination of changes over time, perturbations that are outside normal natural cycles.
- ▶ In order to ensure sustainable resource use and development, Cumulative Effects Management is a responsibility. This involves multiple groups including Regulatory Agencies, Project Proponents (Developers and groups benefiting from the development), and communities. Responsibility for CEM does not rest with any one group or sector.
- ▶ As a result, information sharing is essential for CEM. This requires a framework for information storage, exchange (sharing) and management.

# Status of Ongoing Monitoring



- ▶ Not all of the selected VCs are the subject of routine monitoring. Some are the focus of academic research projects. Research reports can provide valuable information but they are one-off activities.
- ▶ Some information sources are very specific, and may require interpretation, i.e. language education programs may reflect non-speakers' interest in learning but not fluent use of the language.

# CUMULATIVE EFFECTS FRAMEWORK

- ▶ The foundation for a framework the better understand Cumulative Effects in the Beaufort region is dependent upon access to information from multiple sources.
- ▶ A Framework for Cumulative Effects requires access to existing routine monitoring initiatives and research activity reports. Information must be:
  - easily accessible
  - easily interpretable
  - regularly updated
  - cost effective

A Framework should be widely accessible, and independent of core funding. It should be a cost effective means to access and share information to determine cumulative effects.

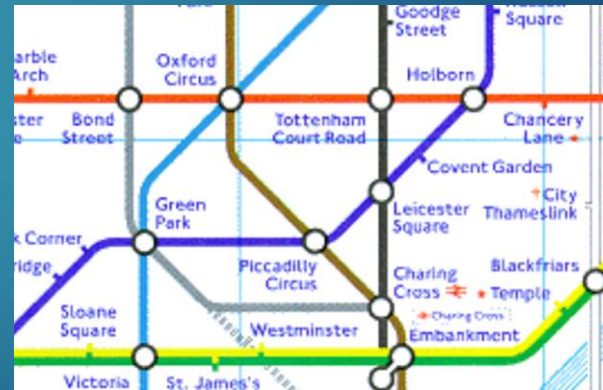
# CONSIDERATIONS FOR AN EFFECTIVE CE FRAMEWORK

- ▶ Considerations for information access include:
  - Consistency in contact personnel
  - Technical specificity of terminology/lack of plain language reports
  - Restrictions on information access
  - Inconsistency in frequency of reporting

Must decouple trans-geographic effects (National policies, economic condition, climate change) to determine local cumulative effects.

# CE FRAMEWORK ROAD MAP

- ▶ Considering the existence of multiple information sources for each indicator VC, the then diversity of types of information available, and the Cumulative Effects Framework should initially provide clear direction of where information can be accessed. This “road map” will provide:
  - Clear direction on location and format of information
  - Contact information for information sources
  - Description of the technical nature of information (terminology, narrative or numeric information, etc.)
  - Access requirements (security, costs etc.)



# Cumulative Effects Framework

▶ Must consider:

- Responsibility for tracking/management of the CE Framework - Information system (within storage nodes and overall system)
- Responsibility for updating information (setting research and monitoring priorities within departments/agencies/user groups)
- Filling information gaps (setting research and monitoring priorities between departments/agencies/user groups)
- Shared decision-making responsibilities (new project approvals, during project implementations, post project monitoring)