Looking Back, Looking Forward: Cumulative Impacts of Resource Development in Northern BC

Wednesday October 26, 2016
Fort Nelson, BC

CIRC
The Cumulative Impacts Research Consortium

UNBC UNIVERSITY OF NORTHERN BRITISH COLUMBIA

Agenda

9:00 – 9:30	*Welcome and Opening Remarks*
9:30 – 10:30	*Perspectives on Cumulative Impacts Monitoring and Assessment: Part 1*
10:45 – 11:45	*Perspectives on Cumulative Impacts Monitoring and Assessment: Part 2*
12:00 – 12:30	*Lunch*
12:30 – 1:00	*Orientation to the Cumulative Impacts Research Consortium (CIRC)*
1:00 – 2:30	*Roundtable Discussions*
2:45 – 3:15	*Values Activity*
3:15 – 3:45	*Integration and Debrief*
3:45 – 4:00	*Evaluation, Closing Remarks*

Workshop Objectives

LEARN
about perspectives and practices in cumulative impacts assessment

SHARE
your knowledge, experiences and ideas

ENVISION
the next generation of integrated assessment tools

Informed Consent

- Please open your welcome packages to view the informed consent document
  - What is informed consent and why is it important?
  - What does participation look like?
  - What are your rights as a research participant?
    - Risks and benefits of participating
  - How can you raise any concerns about the process?

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Perspectives on Cumulative Impacts Monitoring and Assessment: Panel 1

- Jaylene MacIver, Mike Gilbert, Northern Rockies Regional Municipality

- Sean Curry, British Columbia Oil and Gas Commission

Cumulative Impacts & Local Government

"Looking Back, Looking Forward;
Cumulative Impacts & Resource Development
in Northern BC"

Fort Nelson
NORTHERN ROCKIES
Regional Municipality

2011…Emerging concern

- Cumulative Impact v. Socioeconomic Impact
- Increasing number of referrals (2011-2013) as a result of significant growth in the oil & gas sector and the Environmental Assessment process
  - Land sales
  - Applications for oil & gas construction & development (pipelines, facilities, and processing plants)
  - Permit applications for water use related to fracking non-potable facility use

Photo: Chris Gale - Northern Photography

A Local Government's Role

- Where do we fit in?
- What areas of expertise/influence are most appropriate for our input?
- Where/How do we feel cumulative impacts? Services? Public Safety? Amenities?
- What can we do to reduce any negative impacts?
- How can we be better prepared?

What don't we know?

- DATA!
  - Appropriate indicators
  - Transient/temporary populations (resource-based workforce and the "shadow population")
  - Sources of data – who knows what, collects what, why, how, and can it be shared?

Photo: Chris Gale – Northern Photography

What else don't we know?

- Anticipated demand – getting it right…or not
  (is your crystal ball solar powered or does it plug in?)

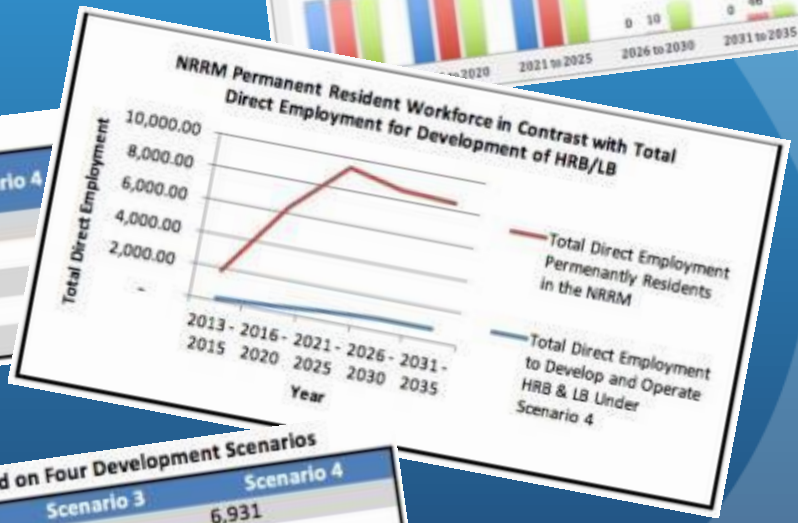

Figure 12: Projection of Housing Requirements by Scenario

Additional Housing Units	Scenario 1	Scenario 2	Scenario 3	Scenario 4
2013-2015	525	525	525	525
2016-2020	202	541	672	699
2021-2025	379	694	692	1,015
2026-2030	196	29	10	-8
2031-2035	82	53	46	0

Figure 11: Growth in NRRM Permanent Population Based on Four Development Scenarios

	Base Case	Scenario 2	Scenario 3	Scenario 4
2013-2015	6,931	6,931	6,931	6,931
2016-2020	7,345	8,040	8,309	8,364
2021-2025	8,122	9,462	9,728	10,444
2026-2030	8,525	9,522	9,749	10,436
2031-2035	8,694	9,630	9,844	10,438

How can we be better prepared?

- **Recognize the gaps**
  - Mechanism for consultation (there is no legal obligation in the Provincial or Federal consultation processes to regard Local Governments). Local Governments are not on the "need-to-know list"
  - ***Let's fix that!***
    OCP revisions in the NRRM, why and what?

How can we be *even* better prepared?

- **Actively participate and be informed (getting a seat at the adults'table)**
  - e.g. Northeast Strategic Advisory Group (NESAG), CIRC, UNBC, Provincial Boreal Caribou Strategy, etc.
  - Go to the source – ask!
  - Share what you have – others will reciprocate

How can we be better prepared *still*?

- **Develop tools to better measure & collate what we do have**
  - **EDISON** – Economic Development Indicators System Online

- **Foster partnerships**
  - Fort Nelson First Nation (Healthcare Working Group, shared services i.e. fire protection, water servicing, wildfire mitigation, etc.)

- **Getting others to do some heavy lifting**
  (*enter CIRC - stage left*)

Cumulative Impacts & Local Government

"Looking Back, Looking Forward;
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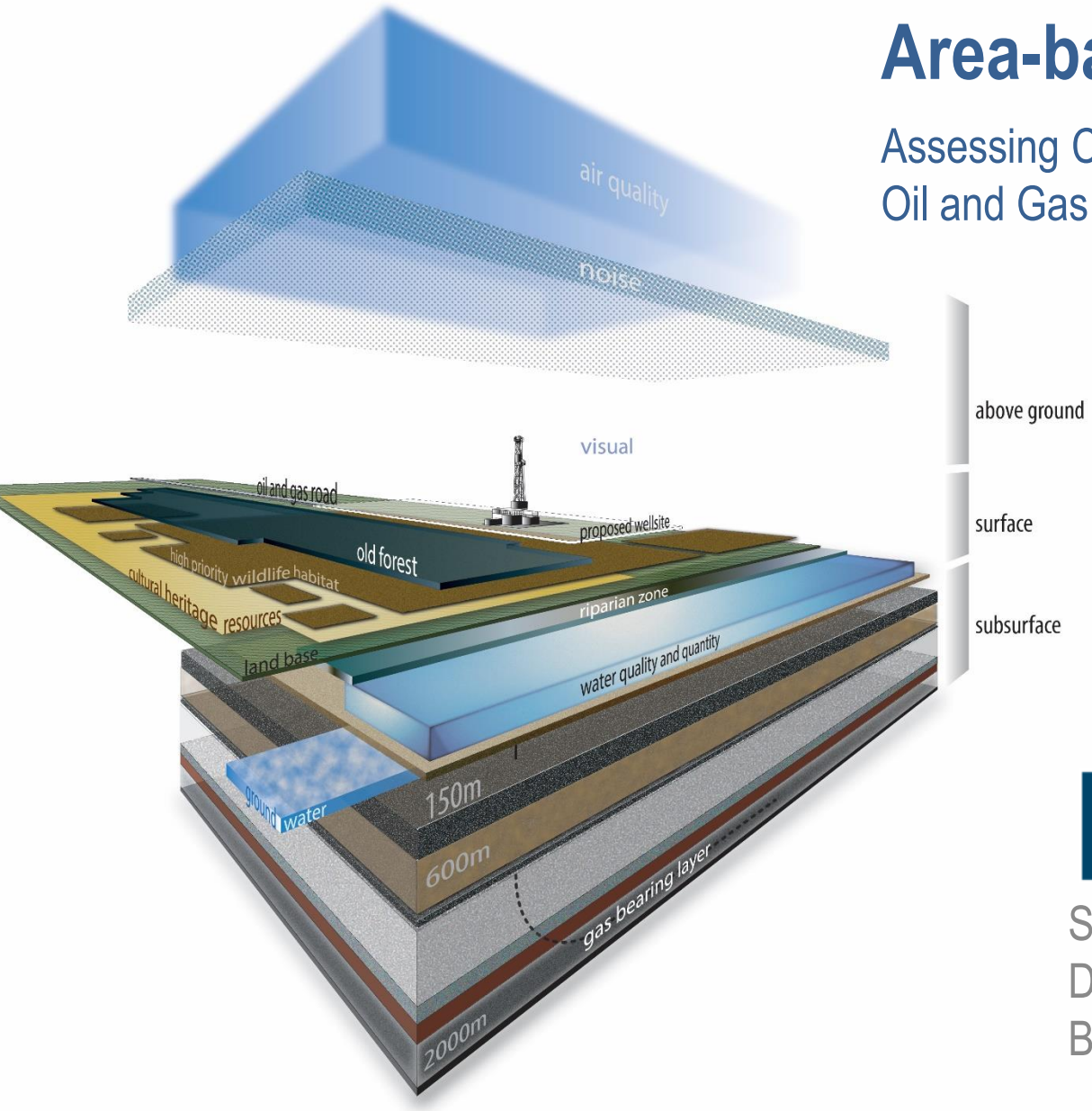
Area-based Analysis

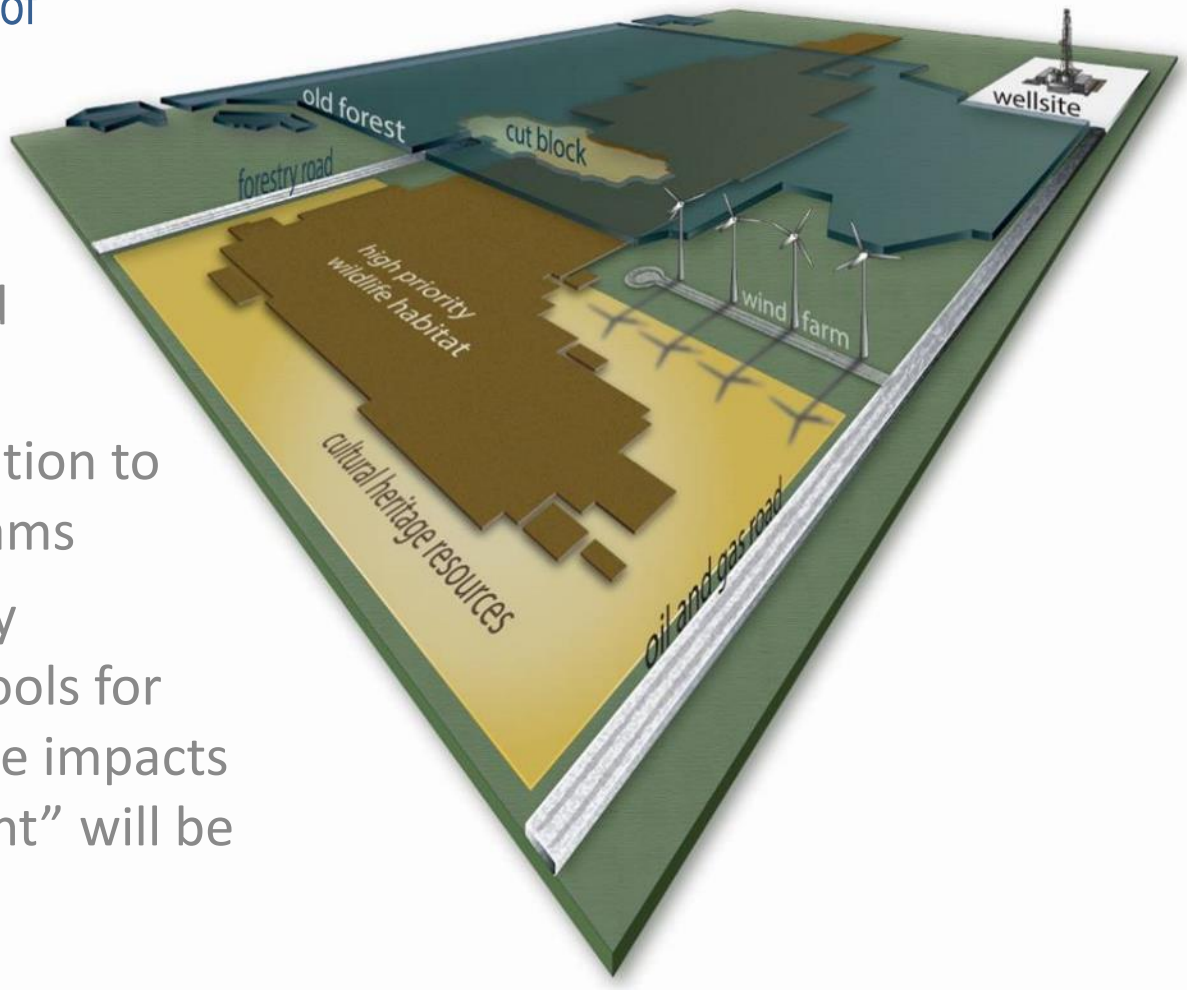
Assessing Cumulative Impacts of Oil and Gas Applications



Sean Curry
Director, Stewardship
BC Oil and Gas Commission

Area-based Analysis

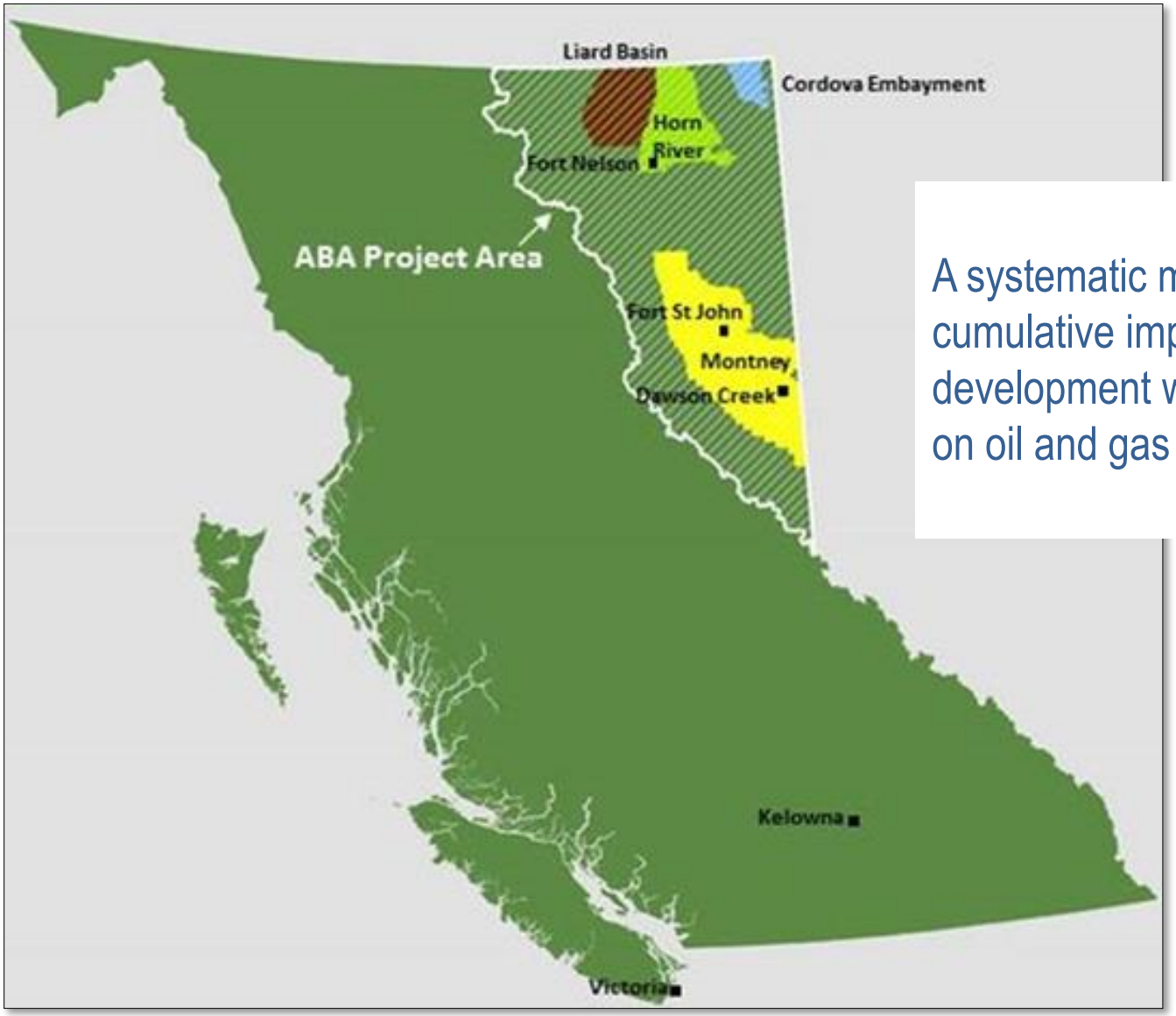
Assessing Cumulative Impacts of Oil and Gas Applications



Accomplish three things:

1. Overview of Area Based Analysis (ABA).
2. Perspective: ABA in relation to the Provincial CE Programs
3. Challenge CIRC to clarify where/how the “new tools for assessing the cumulative impacts of resource development” will be used to affect change.

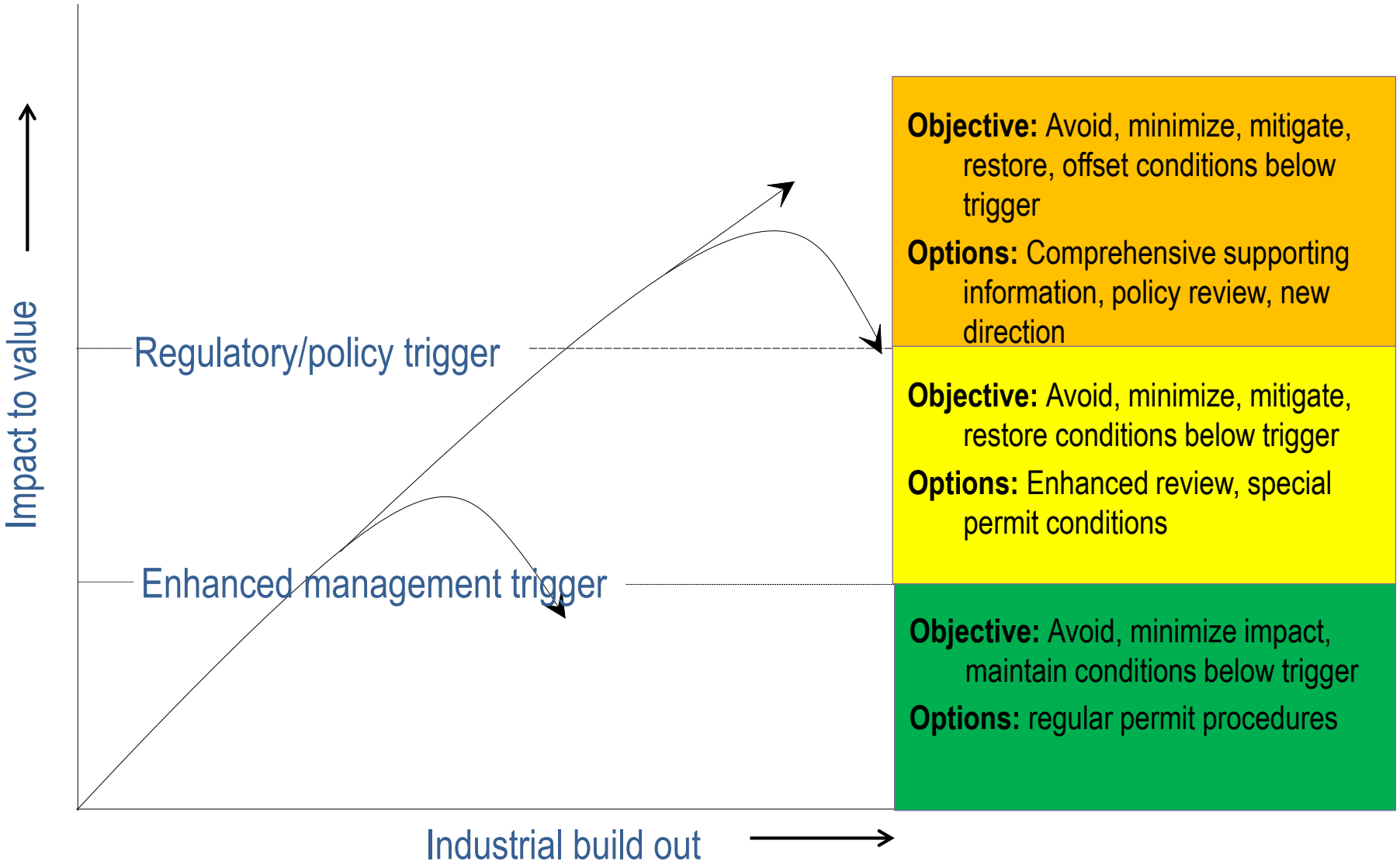
What is Area-based Analysis



A systematic method of analyzing the cumulative impacts of all industrial development when making decisions on oil and gas applications.

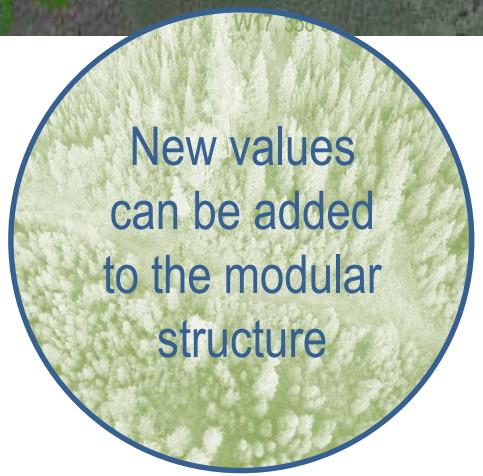
Area-based Analysis

Decision making framework



Area-based Analysis

Decision support tool enhances application review process



Area-based Analysis

Current and Proposed Values

LAND

WATER

AIR

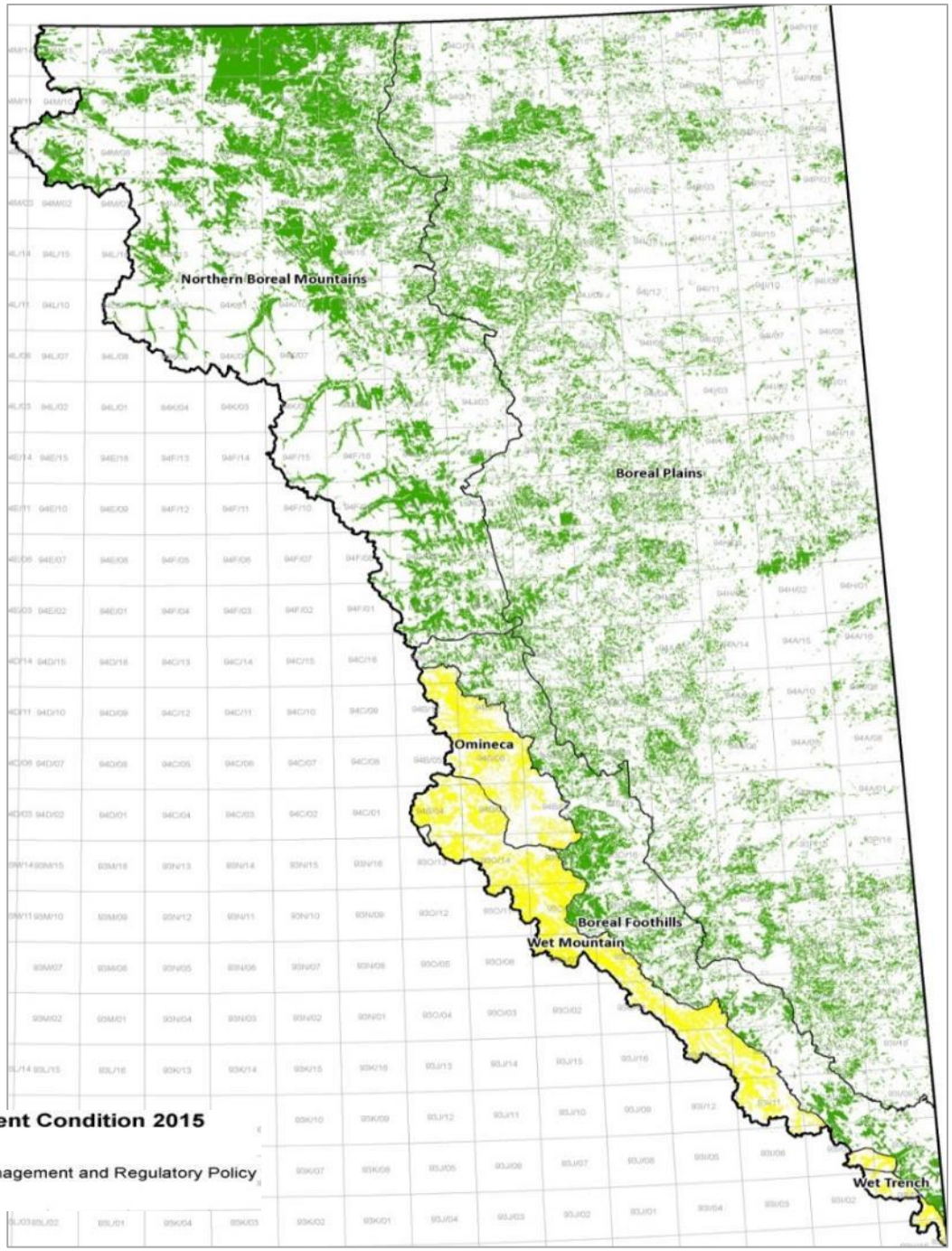
Old forests
Riparian habitat
Wildlife
Cultural heritage

Water quantity
Water quality
Ground water

Air quality

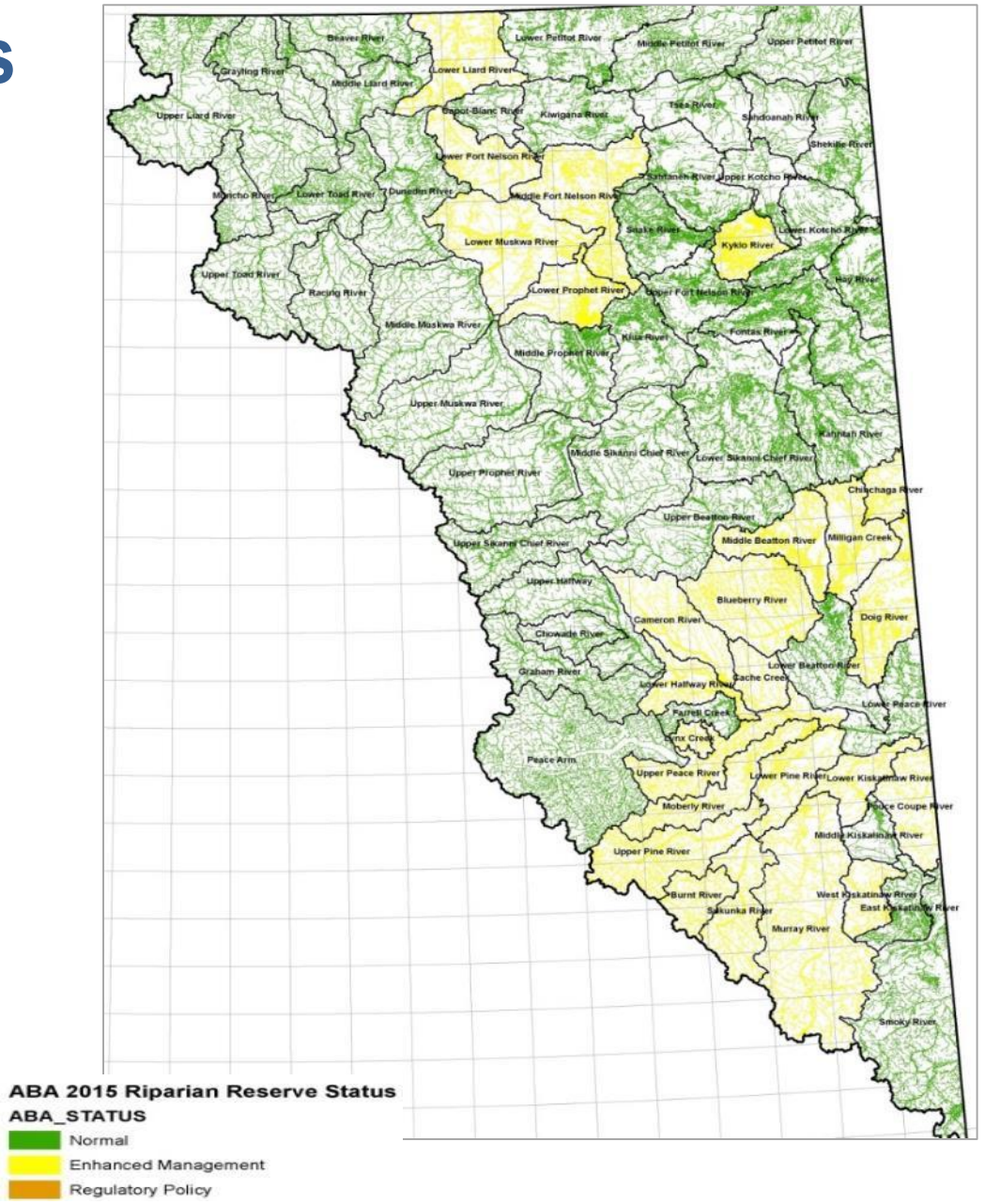
Area-based Analysis

Old Forest Values

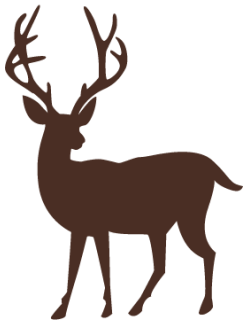


Area-based Analysis

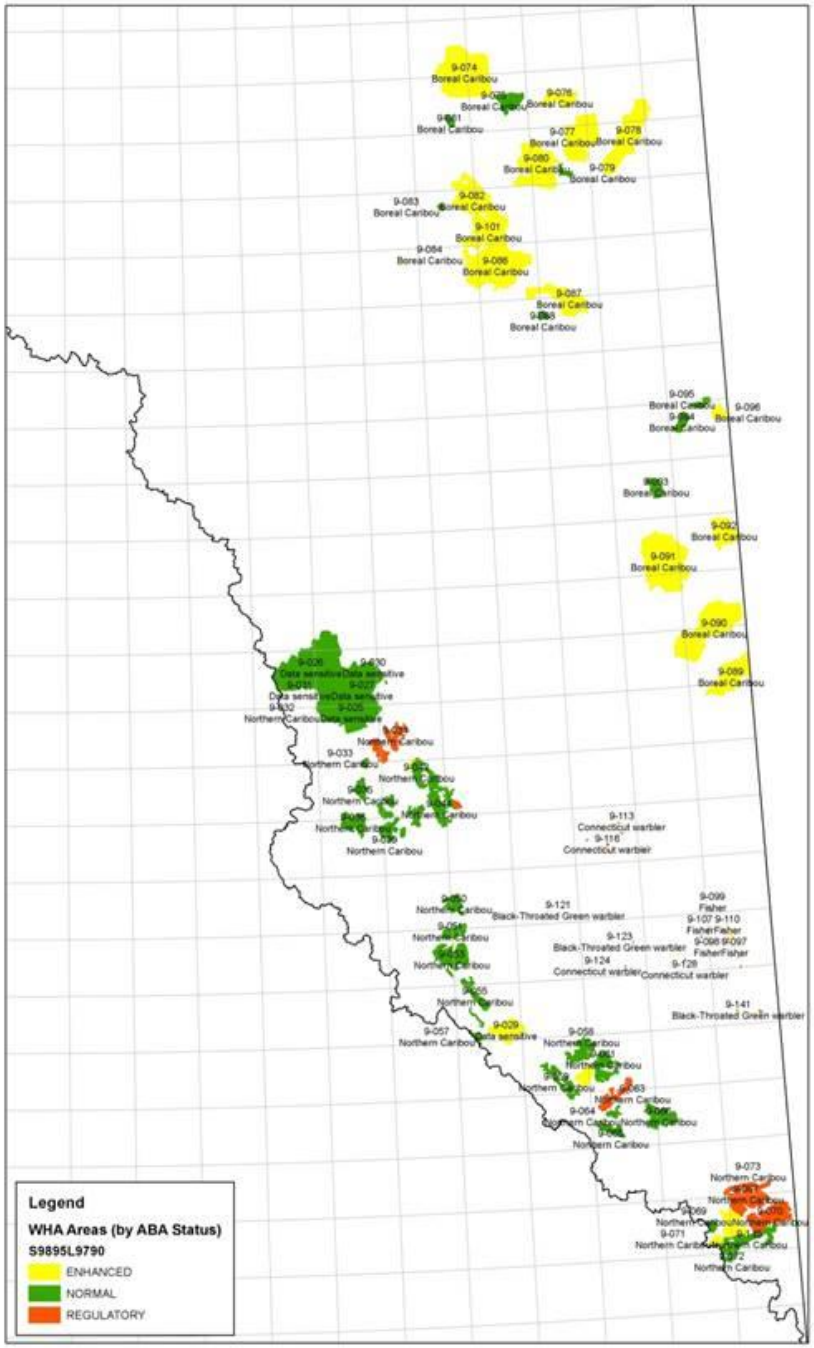
Riparian Value



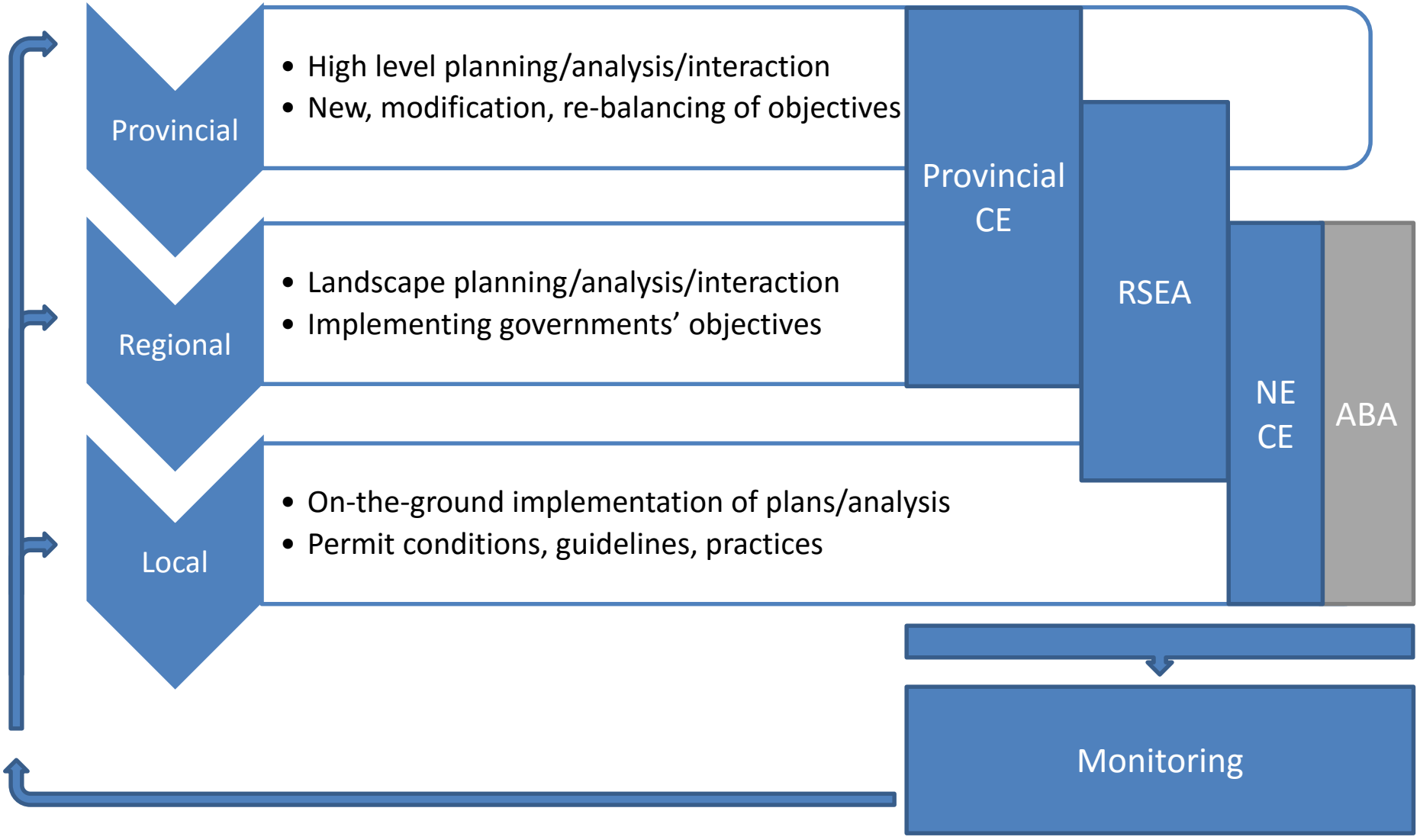
Area-based Analysis



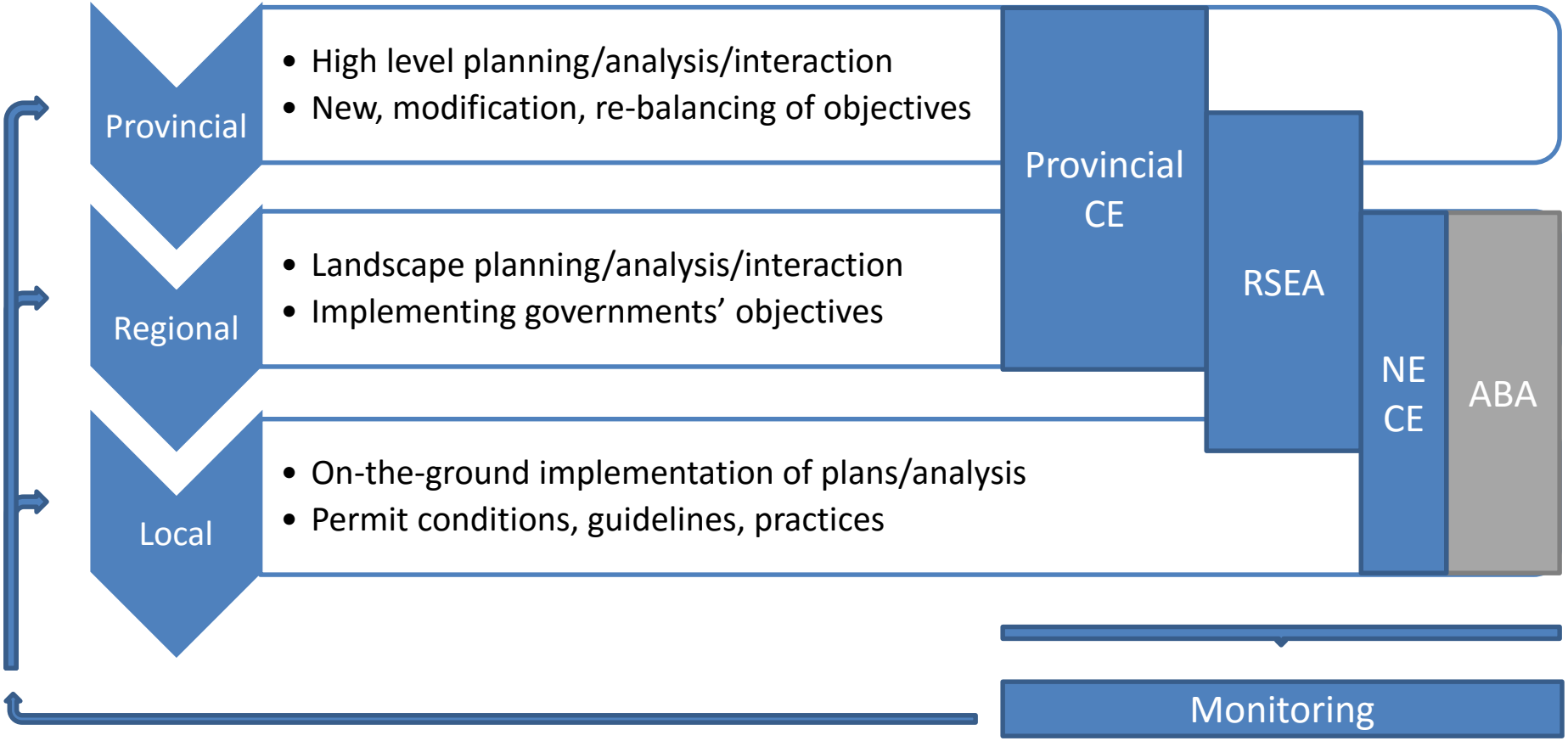
Designated Wildlife Value
Stage 1



How does ABA fit with Provincial CE programs?



Where/how does CIRC fit with Provincial CE programs?



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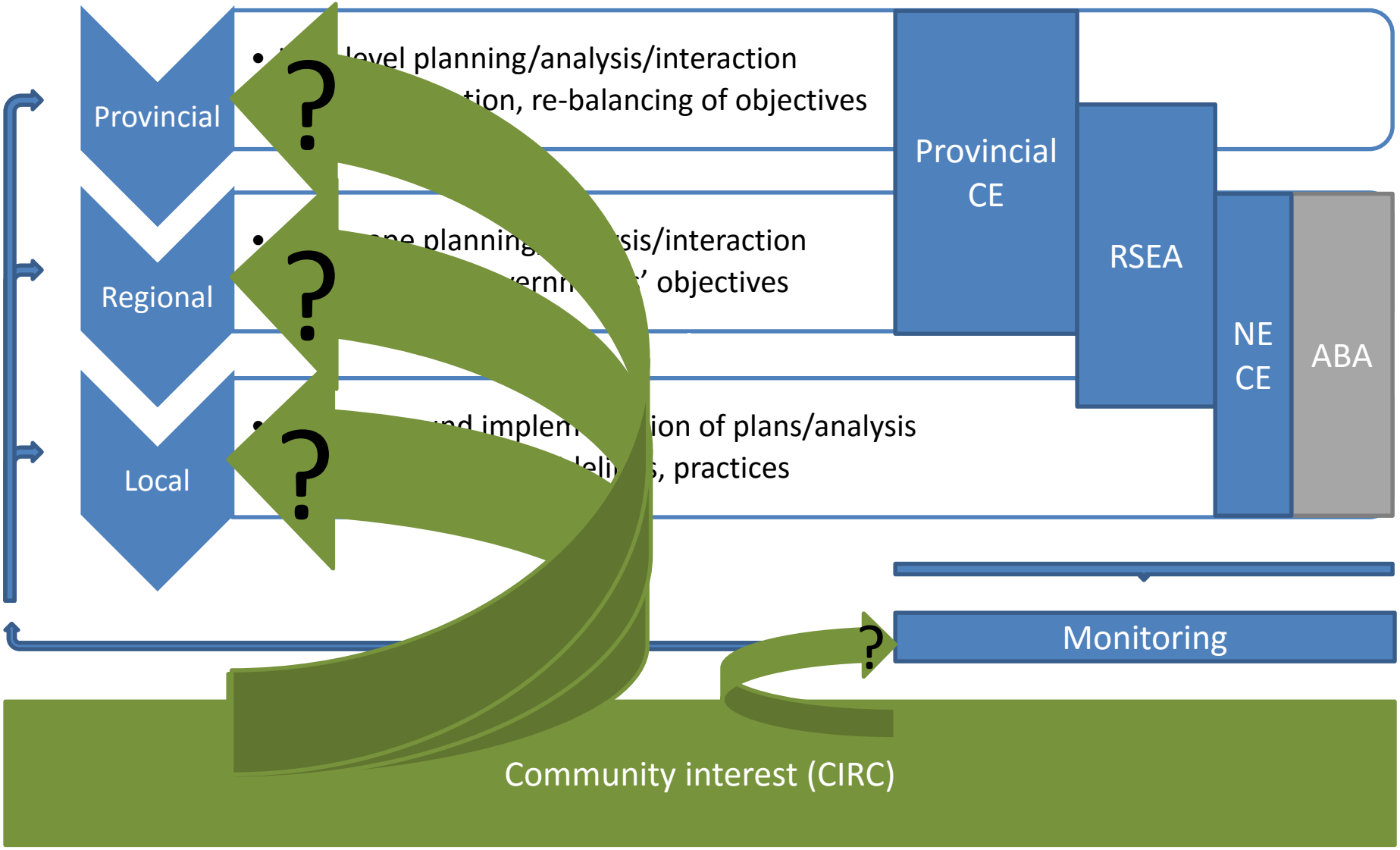
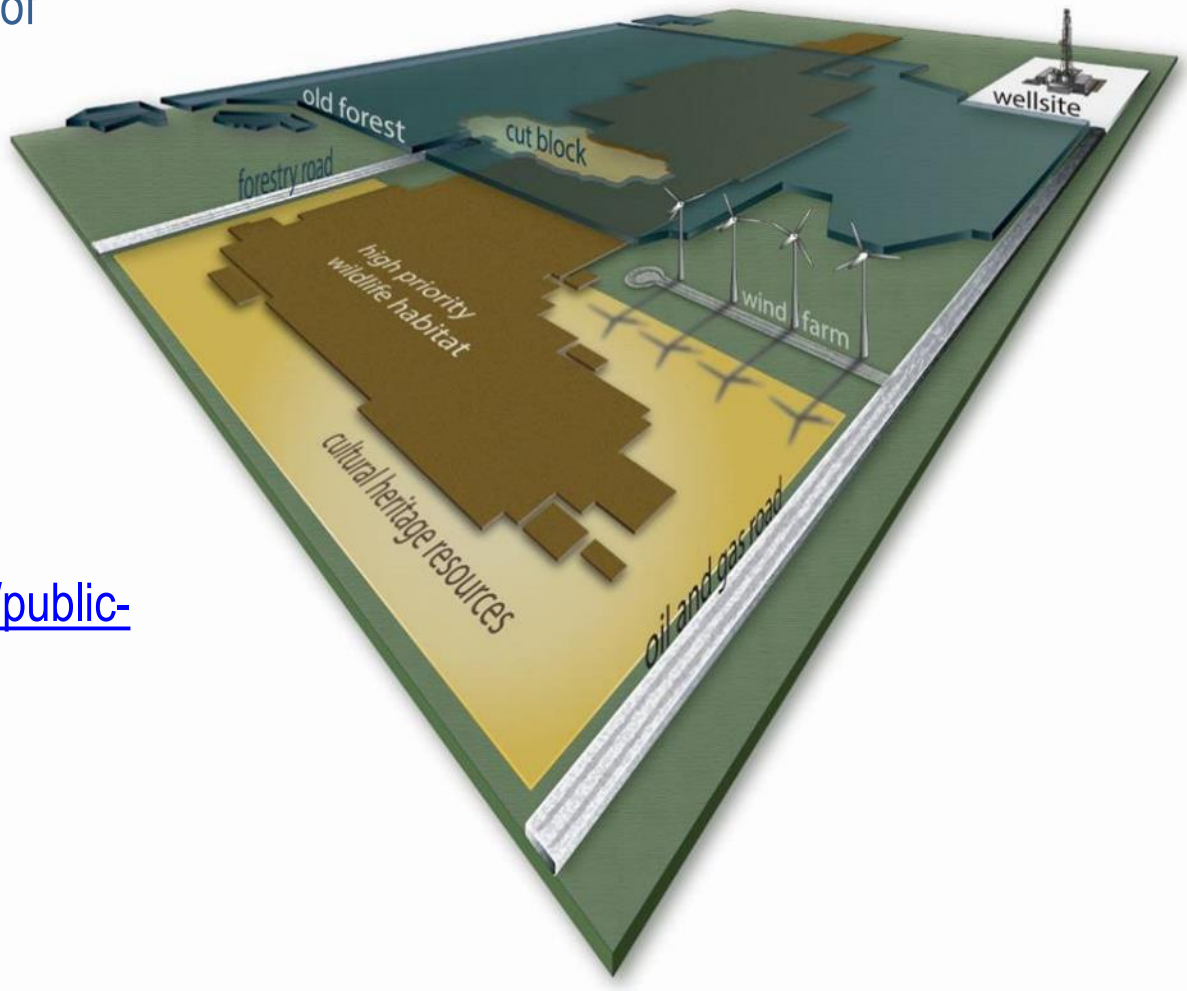


Area-based Analysis

Assessing Cumulative Impacts of
Oil and Gas Applications



Questions

More Info: http://www.bcogc.ca/public-zone/area-based-analysis-aba

Sean Curry
Director, Stewardship
BC Oil and Gas Commission
Sean.curry@bcogc.ca

Refreshment Break

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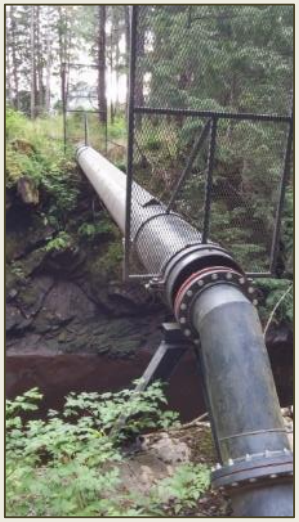
Perspectives on Cumulative Impacts Monitoring and Assessment: Panel 2

- Art Fredeen, University of Northern British Columbia

- Lana Lowe, Fort Nelson First Nation; Alistair MacDonald, The Firelight Group

Cumulative Impacts:
A Natural Scientist's Perspectives



Art Fredeen, PhD

Professor

CIRC Steering Committee

Ecosystem Science and Management Program

Natural Resources & Environmental Studies Institute

University of Northern BC

Prince George, BC V2N 4Z9

"Developing new tools for assessing the cumulative impacts of resource development across northern British Columbia: Integrating environmental, socioeconomic, and human health assessment methods."

Fort Nelson, BC

Oct. 26th, 2016

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The Cumulative Impacts Research Consortium

CANADA'S GREEN UNIVERSITY™

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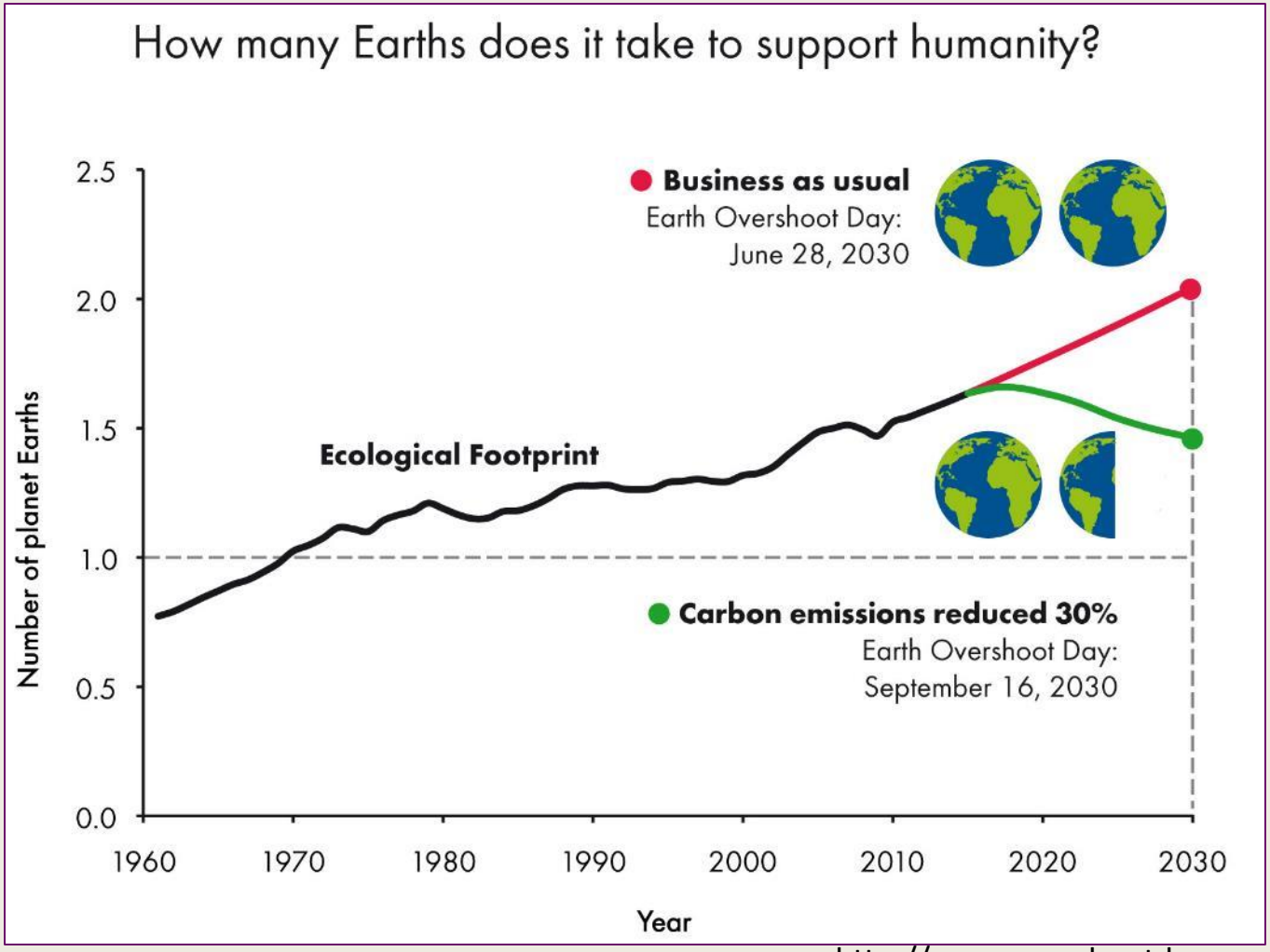
Roadmap

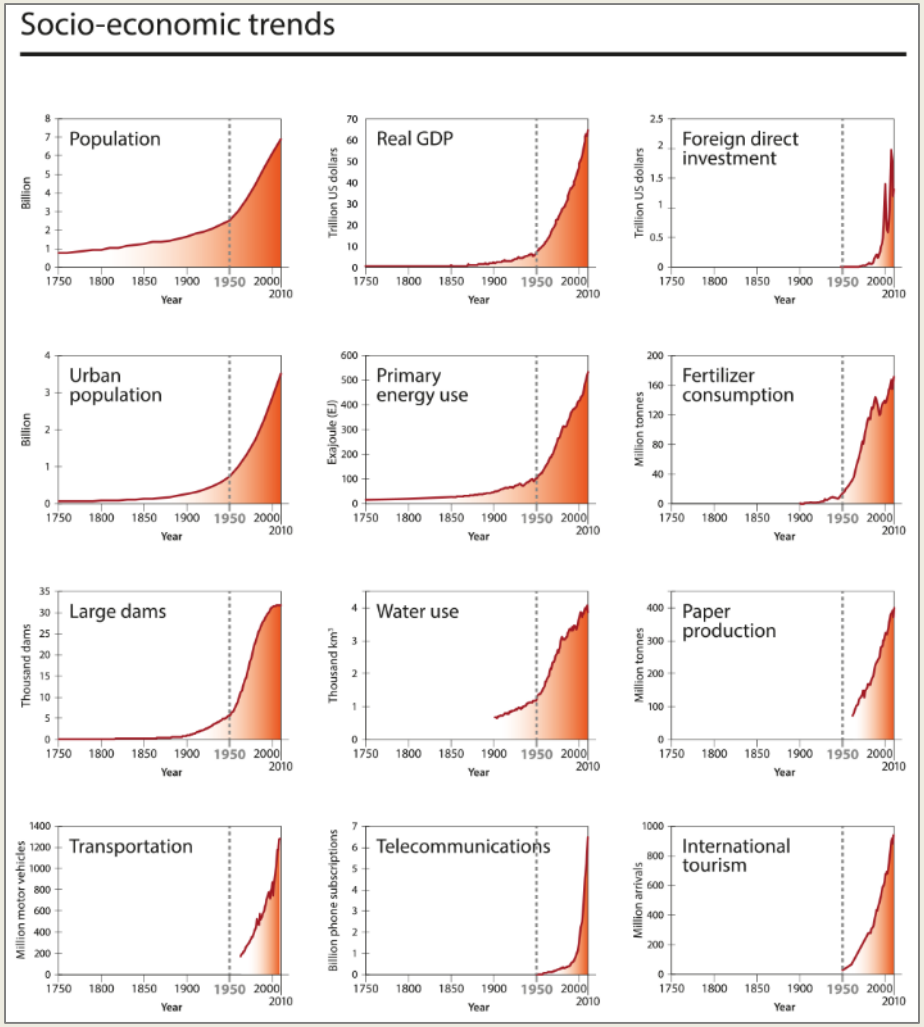
- Welcome to the Anthropocene: We live in challenging times
- Effects & Impacts → Cumulative Impacts
- Current challenges with CEA
- CIRC Research Project: What should CEA look like in BC?
- Closing thoughts

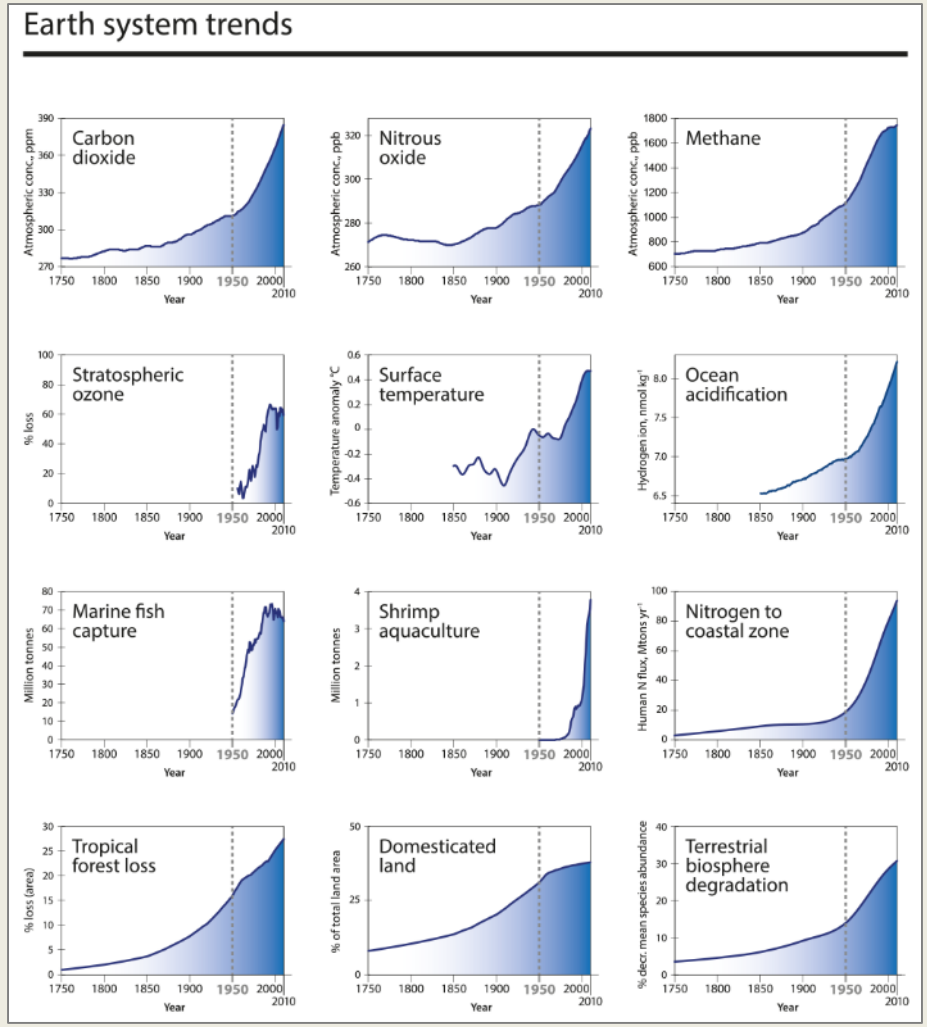
Global crisis of overshoot



http://www.overshootday.org

Welcome to CE in the Anthropocene





Steffen et al. 2015. The trajectory of the Anthropocene: the great acceleration. *The Anthropocene Review*

CIRC
The Cumulative Impacts Research Consortium

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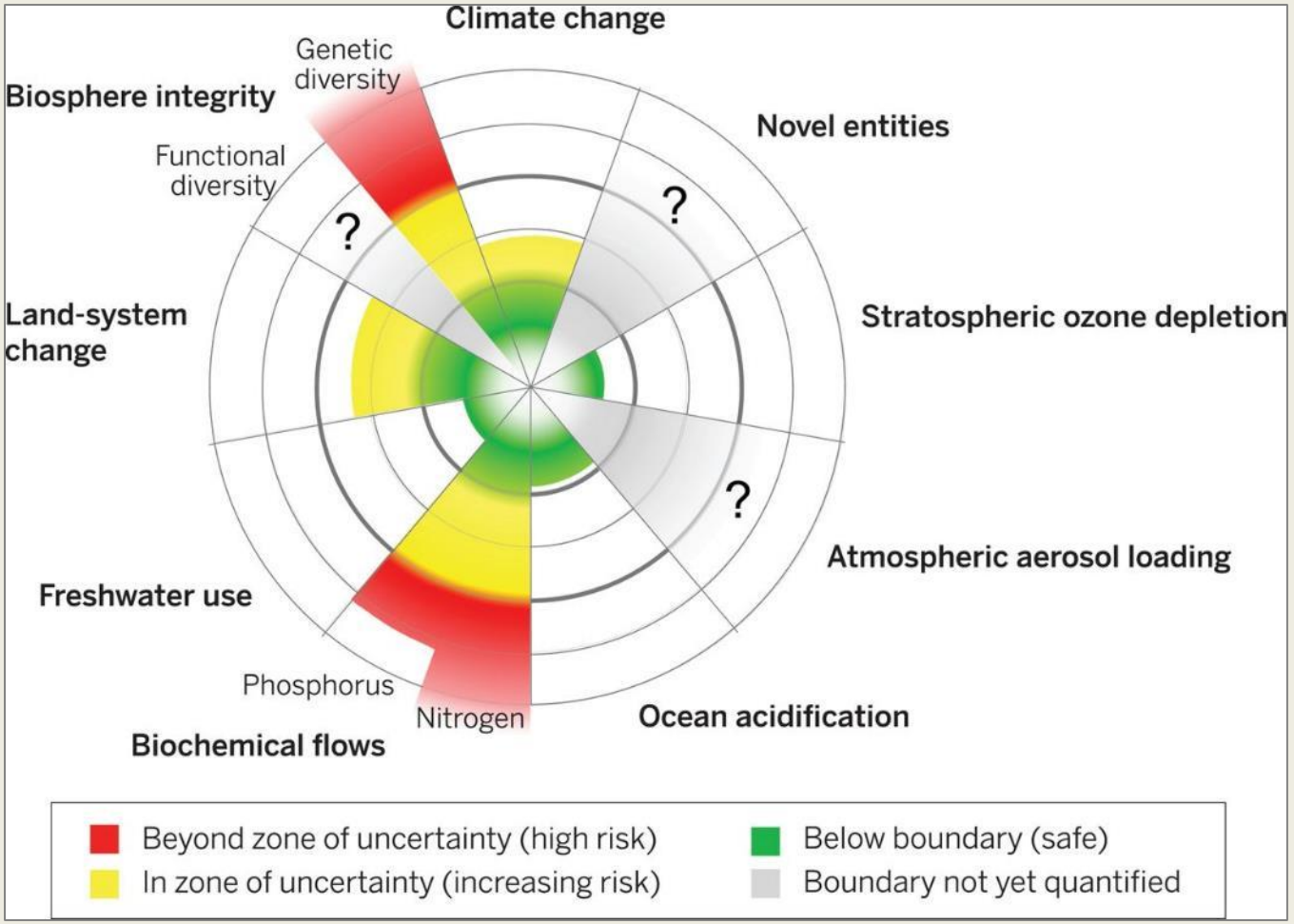
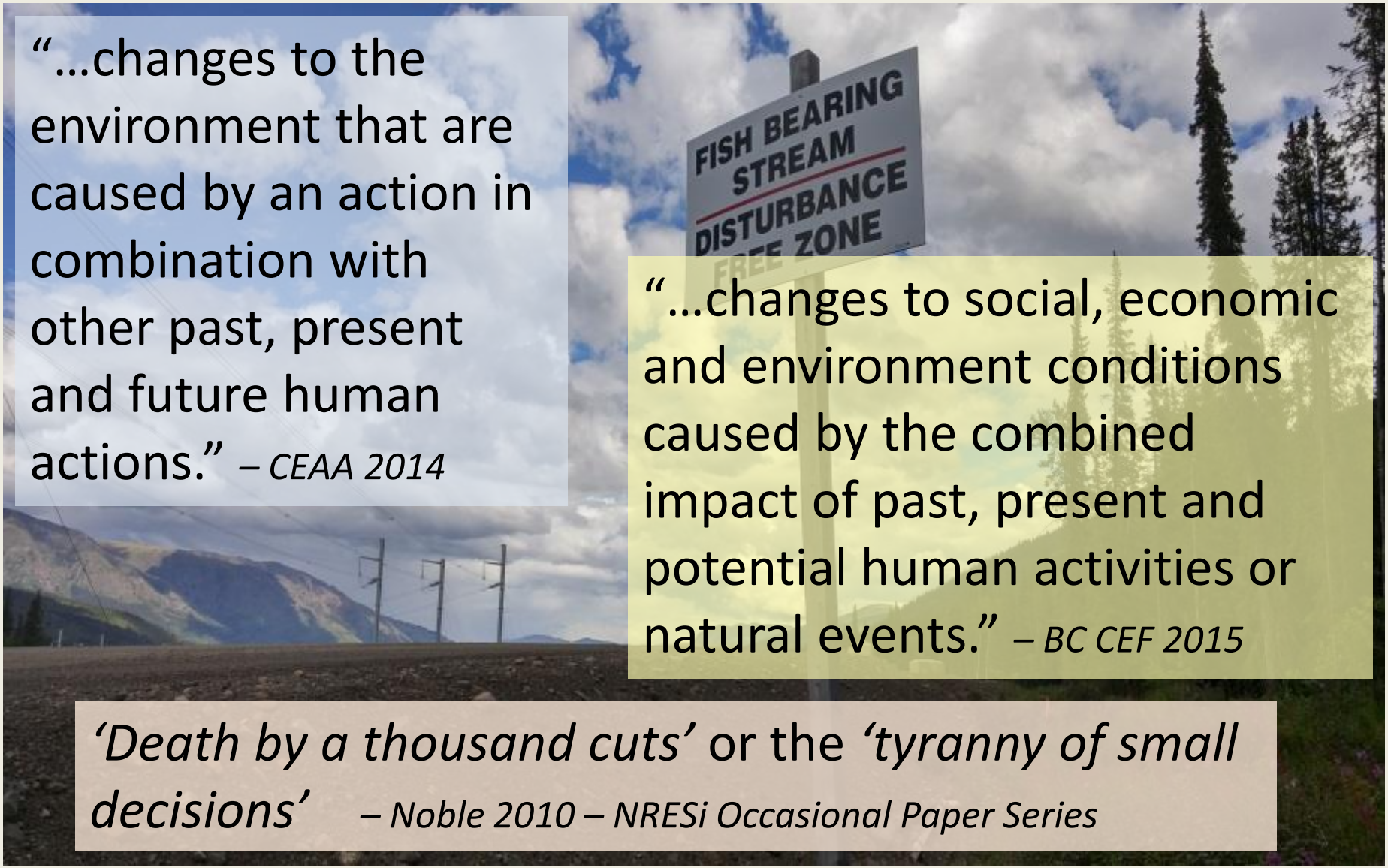
Planetary Boundaries



Steffen et al. 2015. Planetary boundaries: Guiding human development on a changing planet. Science. 347(6623)

Cumulative ‘effects’



“…changes to the environment that are caused by an action in combination with other past, present and future human actions.” *– CEAA 2014*

“…changes to social, economic and environment conditions caused by the combined impact of past, present and potential human activities or natural events.” *– BC CEF 2015*

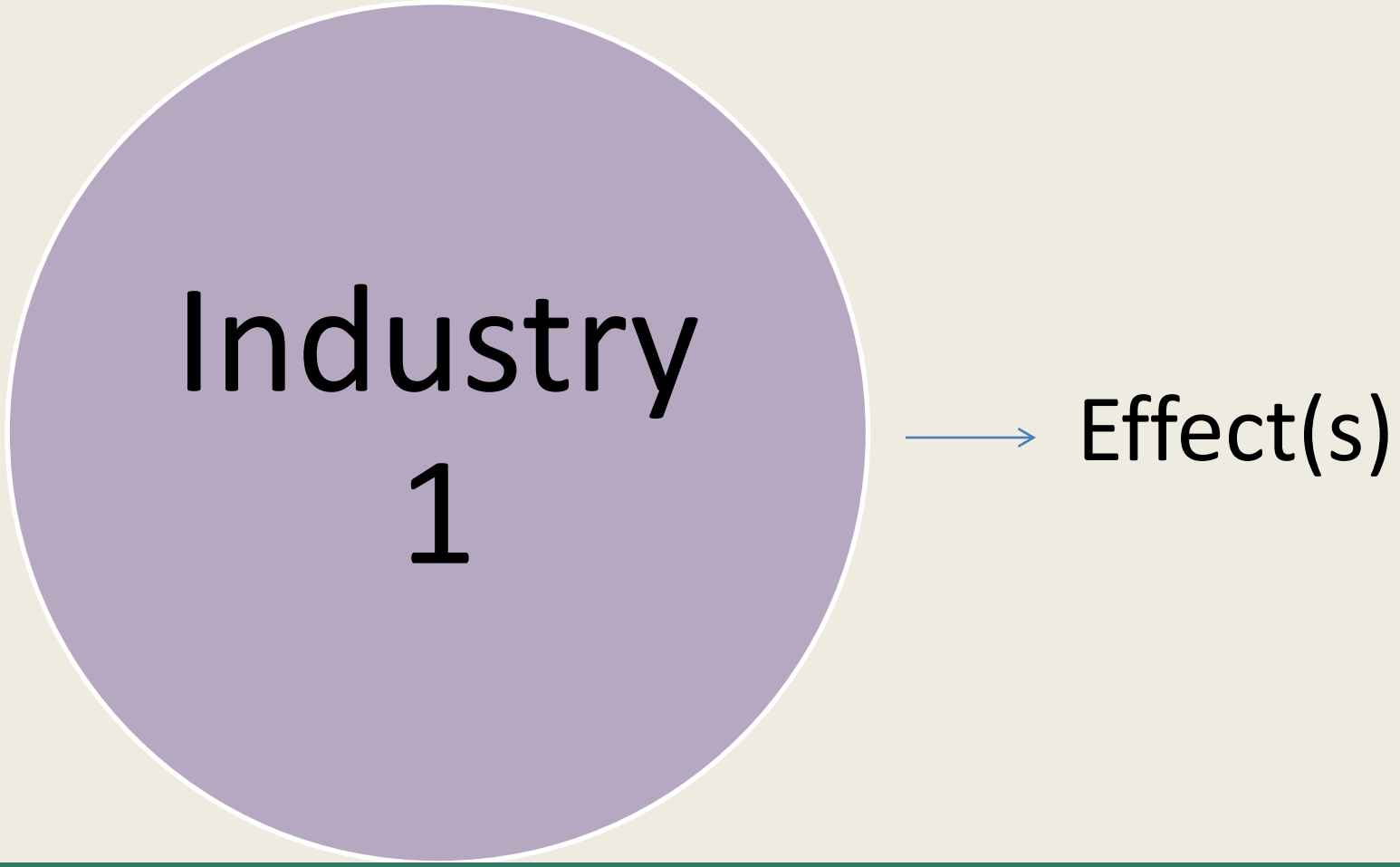
‘Death by a thousand cuts’ or the *‘tyranny of small decisions’* *– Noble 2010 – NRESi Occasional Paper Series*

(Cumulative) 'Impacts' vs. 'Effects'

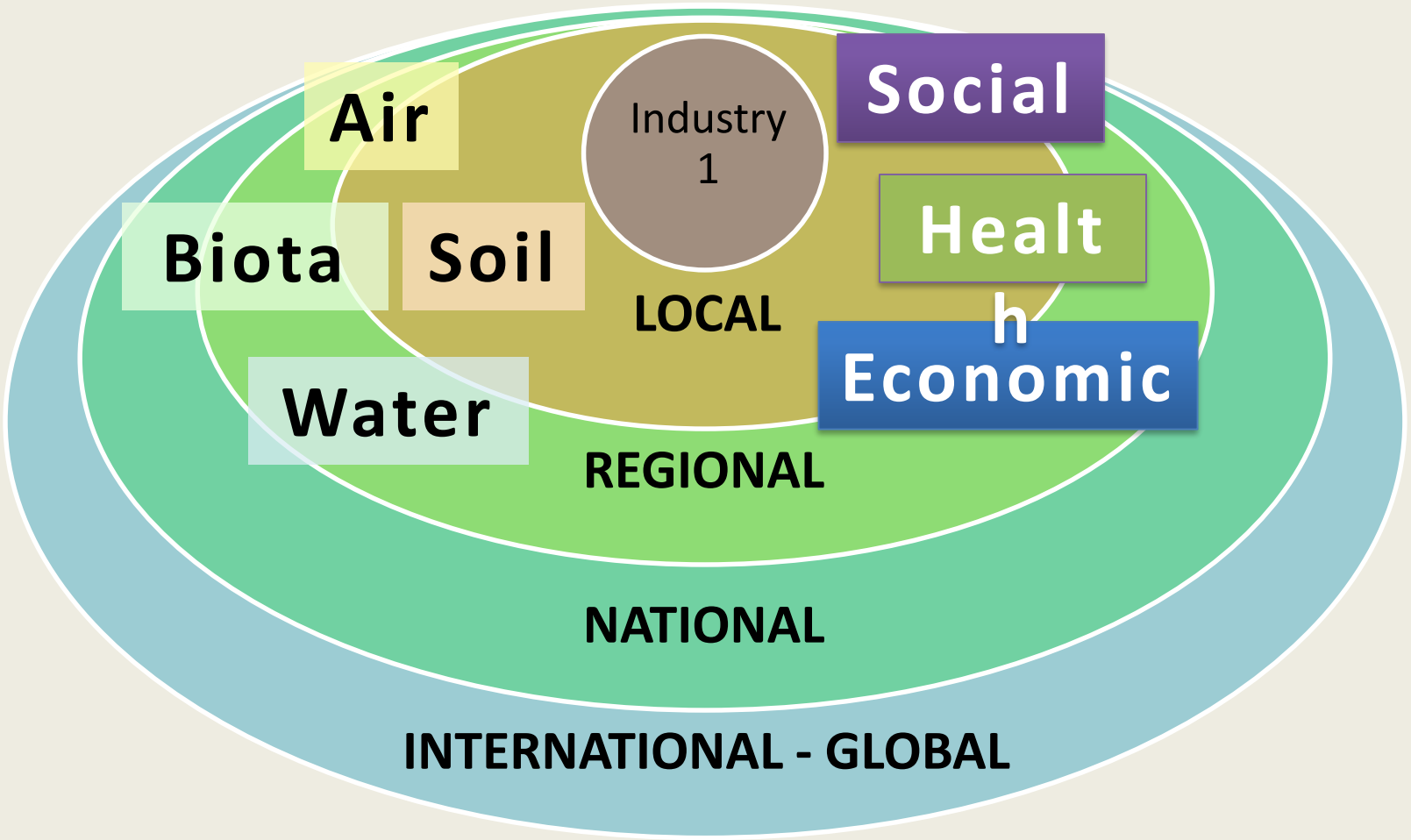
- **'Impacts'** = emergent, unintended and/or long term consequences of an effect or effects
  - can be thought of as *'effects of effects'*

- **'Cumulative Impacts'** = when a resource development is superimposed over previous land use and/or development activities in ways that leave lasting consequences for people, their communities, and the broader environment

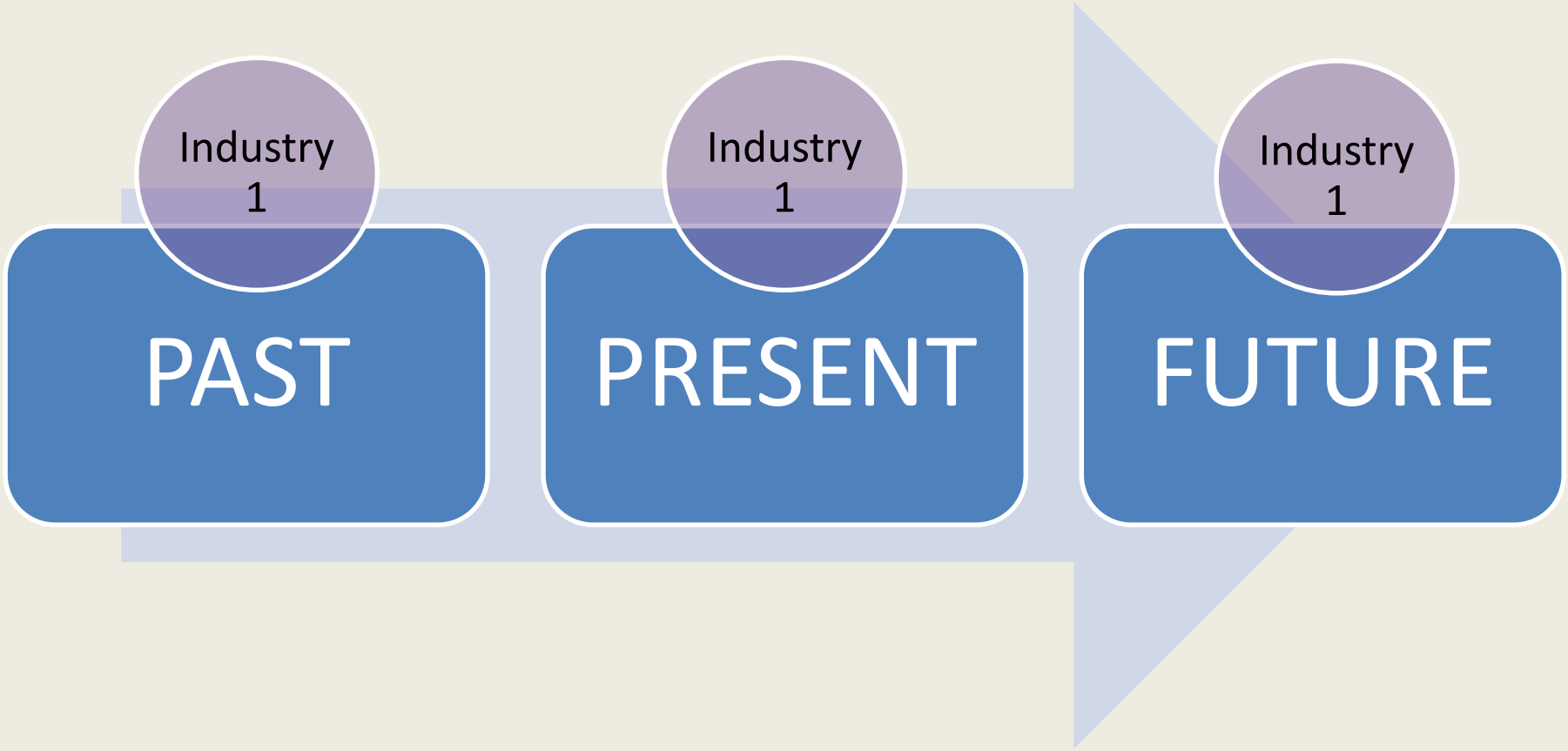
Business as Usual



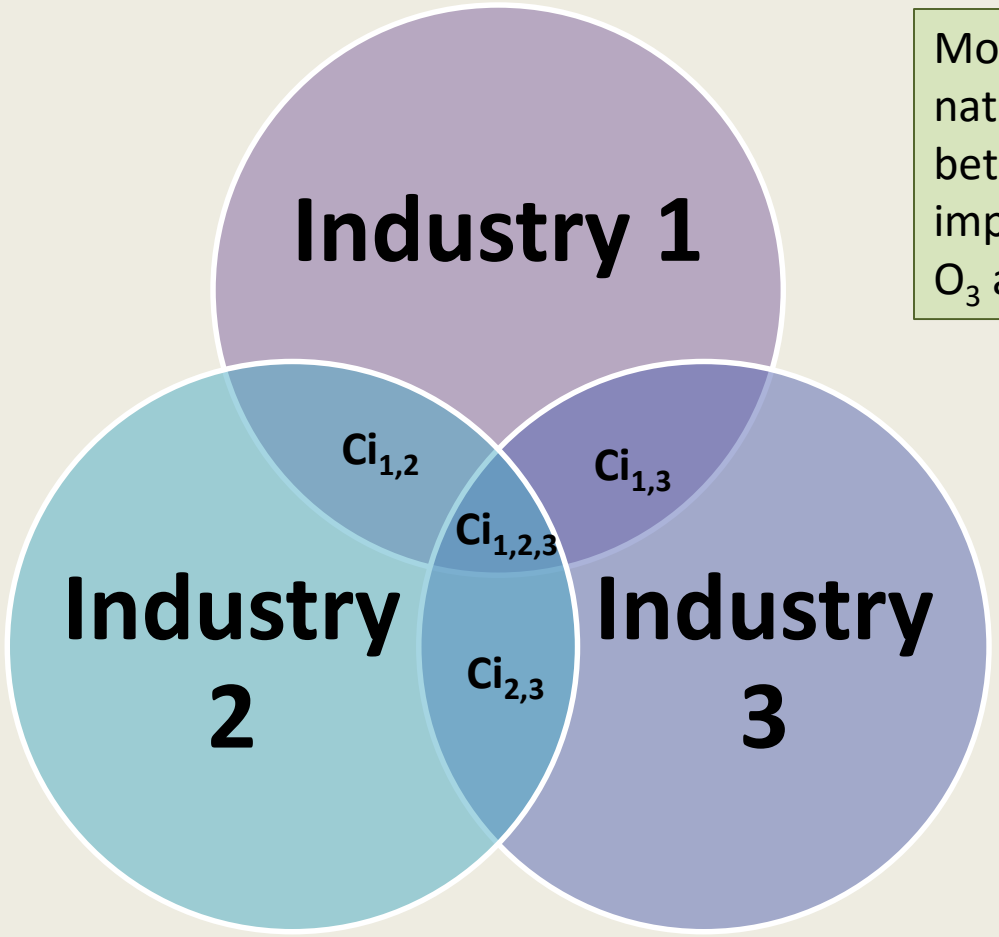
Integration Imperative



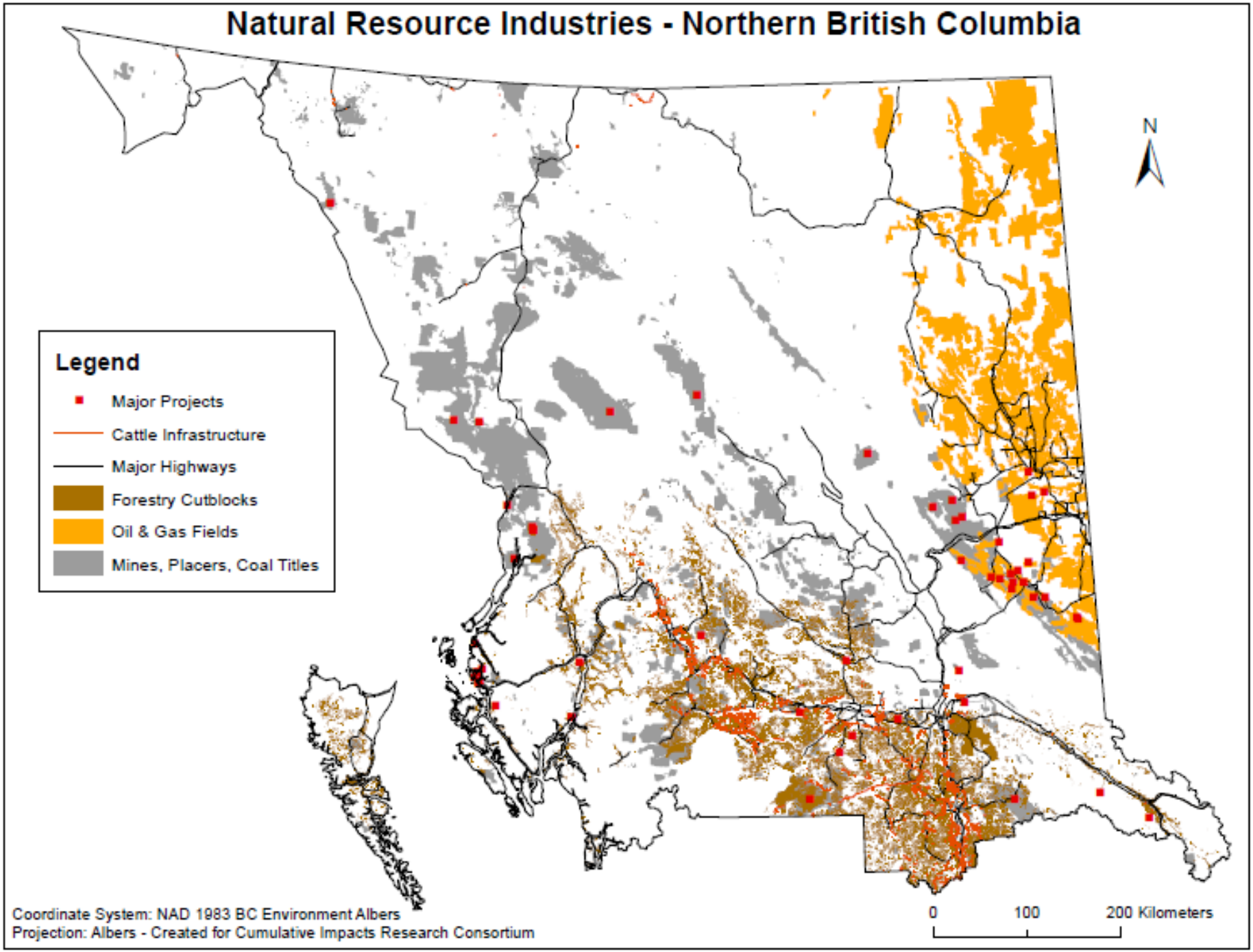
Integrated across time



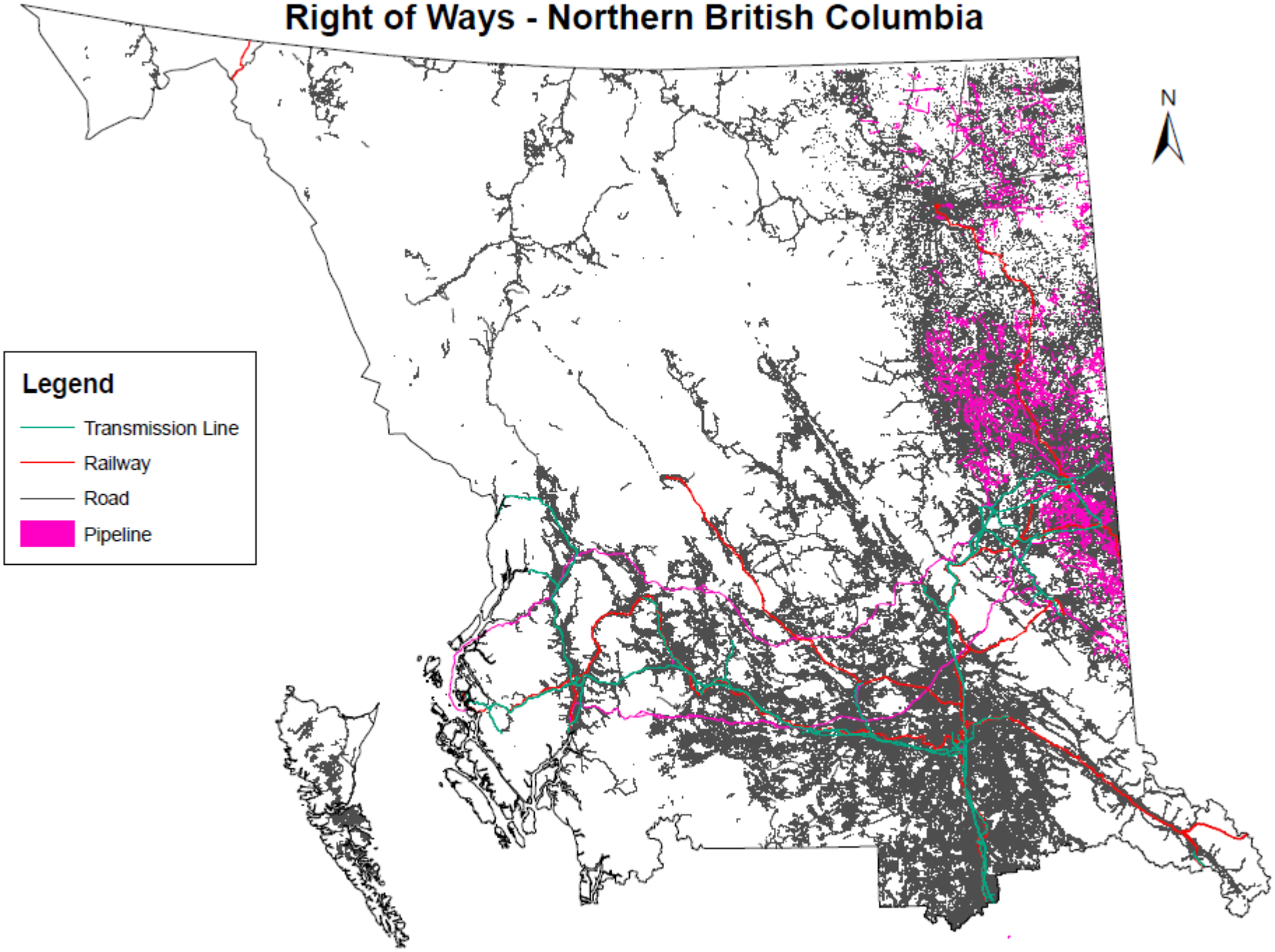
Integrated across sectors



Moreover, what are the nature of interactions between superimposed impacts, e.g., elevated O_3 and CO_2 conc's?


Natural Resource Industries - Northern British Columbia
N
Legend
Major Projects
Cattle Infrastructure
Major Highways
Forestry Cutblocks
Oil & Gas Fields
Mines, Placers, Coal Titles
Coordinate System: NAD 1983 BC Environment Albers
Projection: Albers - Created for Cumulative Impacts Research Consortium
0
100
200 Kilometers

Right of Ways - Northern British Columbia



Coordinate System: NAD 1983 BC Environment Albers
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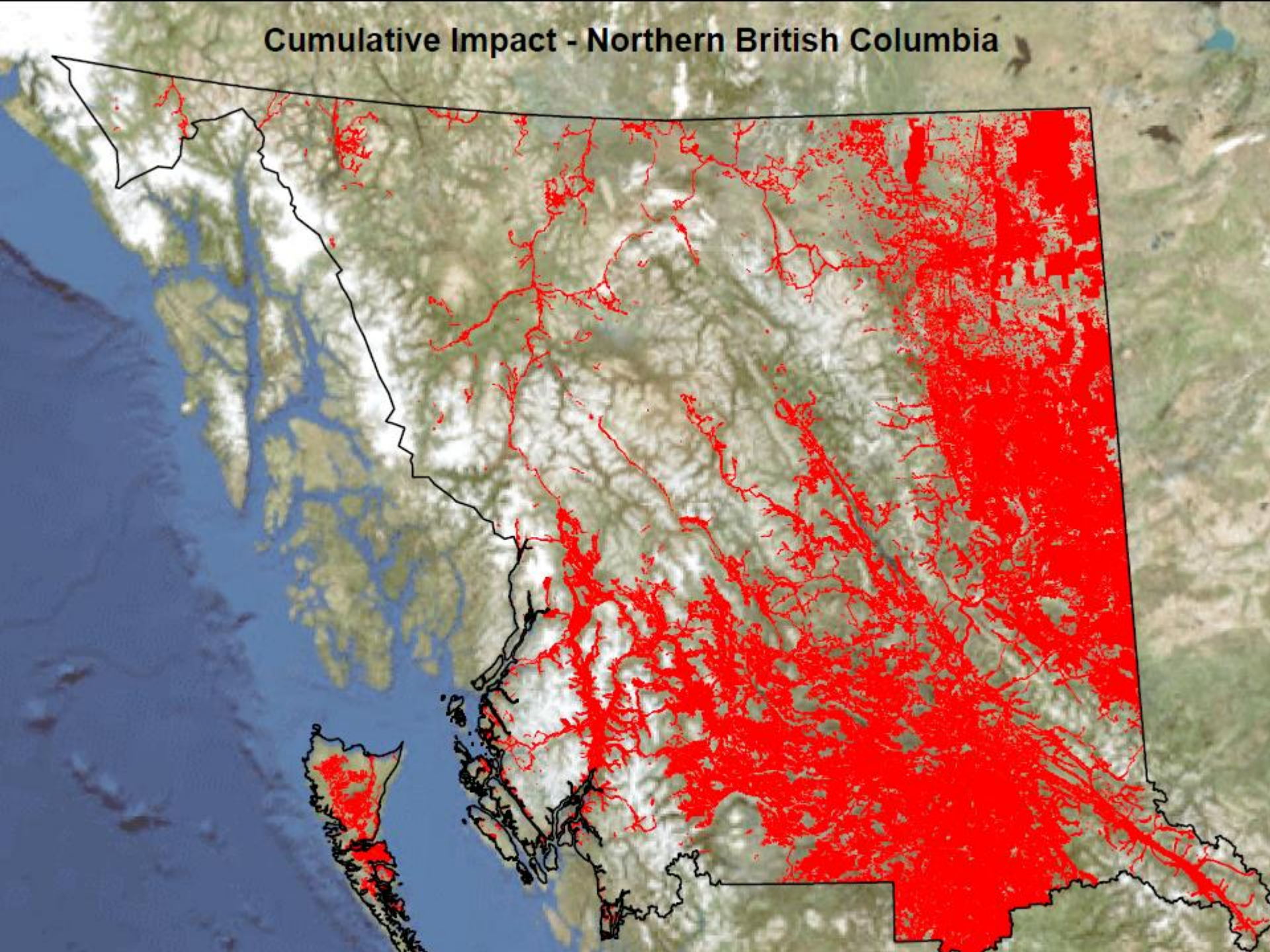
0 100 200 Kilometers


Cumulative Impact - Northern British Columbia

Challenges for Cumulative Effects Assessment

(1) Narrow understanding of effects & thresholds

- Primarily associated with environmental change and a small number of *'valued ecosystem components'* (VECs)
- Largely proponent driven through EA process (at least in BC)
- Lack of thresh-holds: these should be conservative given the poor understanding of most ecosystems.

"The literature is clear…if thresholds can not…be defined for VECs, it will be impossible to assess significance of the cumulative effects."

"Physical thresholds *[e.g. air, water and soil quality]* are much easier to find or develop than biotic and social thresholds." *Duinker et al. 2013*

Challenges for Cumulative Effects Assessment

(2) Limited spatial and temporal scale of assessment protocol

- CEA primarily limited to project footprint
- 'Baseline' generally unknown, may already be affected or influenced by other developments
- Lack of clarity around enforcement and requirement for long-term monitoring

<u>CEA methods deficient in at least 6 ways</u>:
i) Data not available, ii) overreliance on quantitative modeling, iii) methods difficult to follow or duplicate, iv) approaches to assessing significance of CEs limited, v) lack of time and money, vi) method complexity – can't be understood by agency and/or public. *Damman et al. 1995*

Challenges for Cumulative Effects Assessment

(3) Weighting and valuation of 'positive' &'negative' impacts

- Difficulty in computing and weighting of + & - social, environmental, economic impacts across temporal and spatial scales
- Potential impacts and interactions between impacts difficult to compute or model
- Ultimately, project decisions are typically political ones, where weighting of impacts becomes more value(s) based & objective

"Whereas in theory EIA is about environmental protection and VEC sustainability; in practice it is about project approval."

Duinker and Greig 2006

Challenges for Cumulative Effects Assessment

(4) Mitigation and remediation

- In reality, mitigation of negative impacts and remediation attempts range from imperfect to impossible, e.g. tarsands, oil spills, mine tailings ponds, and higher level restorations of fisheries and primary forest conditions
- Mitigation can fall more on individuals and taxpayers shoulders – and less on limited liability partnerships and corporate entities that proposed and profited from the resource development.

"*Fracking* operations pose a staggering array of threats to our environment and health – contaminating drinking water, harming the health of nearby residents, marring forests and landscapes, and contributing to global warming. Many of these damages from drilling have significant 'dollars and cents' costs. Requiring [financial] assurance *up front* – i.e., before drilling occurs – helps ensure that the public is not left holding the bag when the boom is gone and drilling operators have left the scene." Dutzik et al. 2013

CIRC Research Project

Examining a 'state of the art' CEA for BC through interjurisdictional comparative case studies (UNBC / NSERC)

- Project officially launched in September 2016
- Postdoctoral fellow is conducting a review of the literature to determine best best practices for CEA
- This project has had direct communication with the current BC Government CEF team: we hope to provide advice on the future of the framework
- Our next project meeting set for Nov. 1st at UNBC.
- Updates and research products will be made available to all interested parties

Concluding remarks on resource use in BC & a sustainable future."

- must learn to listen to our long-time stewards of the land, particularly our First Nations elders & leaders
- strive to be sustainable in all ways and long term
- truly consider cumulative effects & impacts
- invest in & value our **renewable** resources
- turn wasteful linear systems into **circular** ones
- minimize waste and harmful pollution
- share resources equitably *(e.g. nature vs. human)*
- avoid creation of sacrifice zones – all spatial scales need to be considered

Thankyou!

Art.Fredeen@unbc.ca | 250.960.5847

References: Damman et al. 1995. Cumulative effects assessment: the development of practical frameworks. Impact Assessment. 13: 433-454. Duinker & Greig 2006. The impotence of cumulative effects assessment in Canada; ailments and ideas for redeployment. Environmental Management. 37:153-161. Duinker et al. 2013. Scientific dimensions of cumulative effects assessment: toward improvements in guidance for practice. Environmental Reviews 21:40-52. Dutzik et al. 2013. Who pays the costs of fracking? Environment Colorado Research & Policy Center. pp. 52

Measuring and Managing Cumulative Effects of Resource Development on the Land, Water, Air & Our Way of Life

Cumulative Impacts and Resource Development in Northern BC
Cumulative Impacts Research Consortium Workshop
Fort Nelson, BC

October 26, 2016

Lana Lowe
Fort Nelson First Nation

Alistair MacDonald
The Firelight Group

"For as long as the sun shines, the grass grows and the rivers flow"

Cumulative Effects Assessment and Management

- FNFN has a fundamental interest in the full assessment and ongoing monitoring of cumulative impacts in FNFN territory
- The Problem:

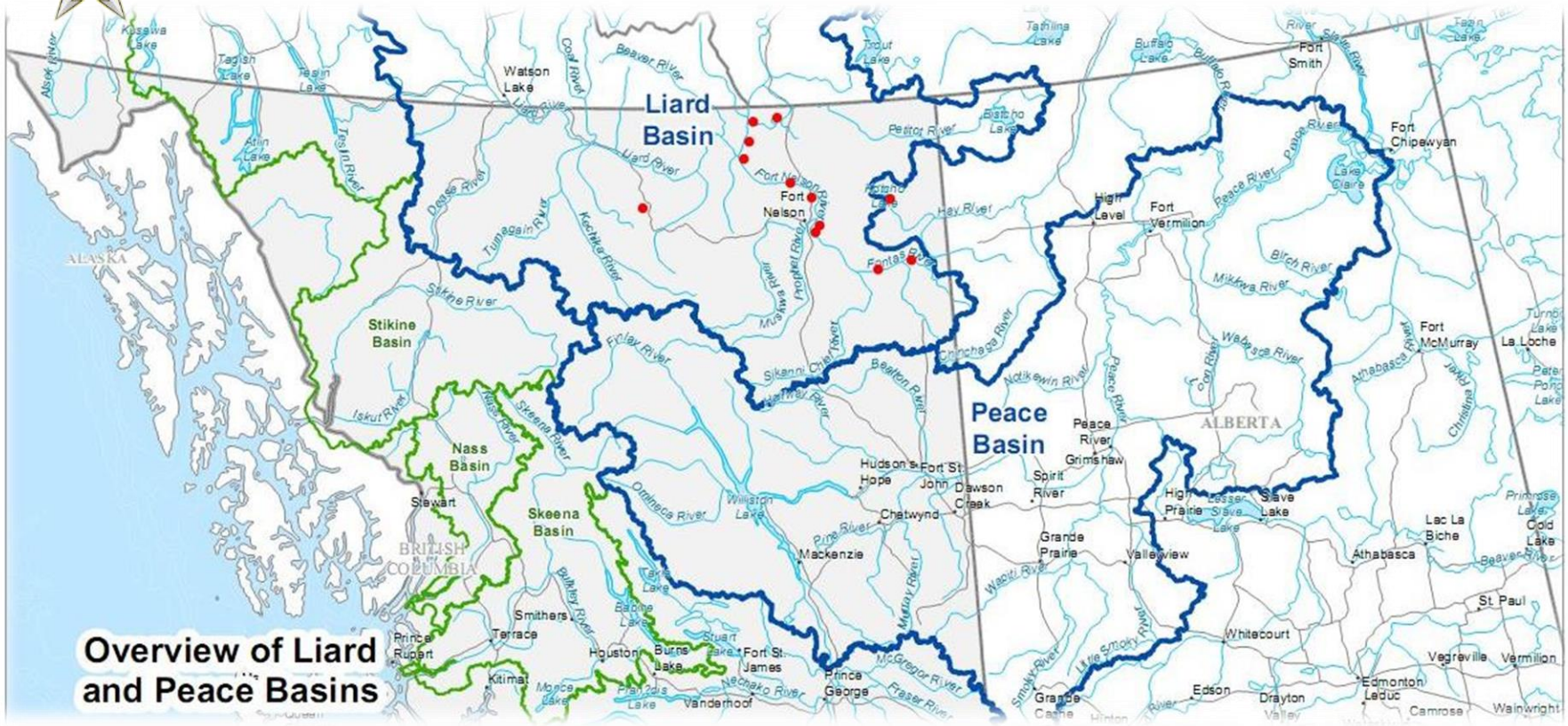
  While the environmental footprint of any one project might appear modest, the eventual cumulative impact of development on the rights and traditional interests of Aboriginal peoples can be quite profound.

- The Solution:

  A cumulative effects assessment and management framework for FNFN territory that fits the principles of good practice of CEA and is responsive to the Treaty rights of FNFN.

“For as long as the sun shines, the grass grows and the rivers flow”

Our Land – Southern Denendeh



"For as long as the sun shines, the grass grows and the rivers flow"

We are “People of the Land”

Our connection with the land and the resources of our territory goes back many generations.

- Our grocery store, our pharmacy, our church, our school
- Seasonal Rounds
- Cultural Integrity
- Spiritual Attachment

“For as long as the sun shines, the grass grows and the rivers flow”

What Matters Most: Using the Land

- **Our members rely upon:**
  - **A large land base for practice of seasonal rounds, e.g.,**
    - Beaver, muskrat, ducks and geese in the spring
    - Berries, medicines, fish and game in the summer – camp close to the rivers and take part in large, communal gatherings
    - Moose hunting in the fall
    - Trapping in the winter
  - **Abundant, healthy and naturally distributed game and plant populations**
  - **Knowledge of lands and waters passed down through generations**
  - **Sense of safety and security on the land**

“For as long as the sun shines, the grass grows and the rivers flow”

What Matters Most: Land and Water Protection

- Specific Interests:
  - ***Water*** sustainability and quality;
  - Preserving and restoring the ***ecology*** of our territory;
  - ***Cumulative Effects/Impacts*** analysis and monitoring;
  - ***Data*** Collection for various resources and values;
  - ***Wildlife*** management, including important species for our people; and
  - ***Access*** management

“For as long as the sun shines, the grass grows and the rivers flow”

Fueling Change: Gas Development in FNFN Territory

- Over the past ten years there has been enormous oil and gas development in Fort Nelson First Nation territory
- Mostly due to hydraulic fracturing in the Horn River Basin
- Impactful activities include:
  - Seismic testing
  - Construction of access roads, well pads and gas plants
  - Water withdrawals and waste water disposal
- Activity regulated on an incremental basis; little or no attention to cumulative impacts

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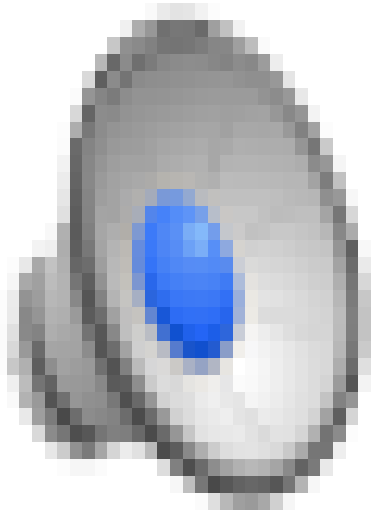
Cumulative Impacts in FNFN Territory 1951-2016



“For as long as the sun shines, the grass grows and the rivers flow”

Effects of development on the land

- Fragmentation of landscapes and habitat destruction
- Impact to wildlife movement and populations, and animal and plant health
- Potential pollution caused by spills and leaks

"Oil and gas development is proceeding very quickly, and the protection of the land has not kept pace"

- FNFN community member

"For as long as the sun shines, the grass grows and the rivers flow"

Effects of development on water

- Roads, surface construction, and clearing land can involve draining wetlands, redirecting water flow, creating barriers to surface water flow, and the removal of vegetation

- Direct withdrawals from surface water bodies and shallow aquifers, reducing flows & water levels

- Spills and discharge of wastewater, much of which contains toxic chemicals

- Impacts to deep formations and aquifers as a potential result of fracking

"It is estimated that 30,000 to 100,000 m^3 of water per well is required for hydraulic fracturing in the Horn River Basin" – taken from FNFN's submission on the new *Water Sustainability Act*

"For as long as the sun shines, the grass grows and the rivers flow"

Impacts on Treaty Rights and FNFN Way of Life

- Water contamination
- Country food contamination
- Reduced harvesting success
- Increased noise, smells & interference

"I drank every bit of water in this land, now you can't do that. In just 50 short years this water has become unfit to drink."
-FNFN community member

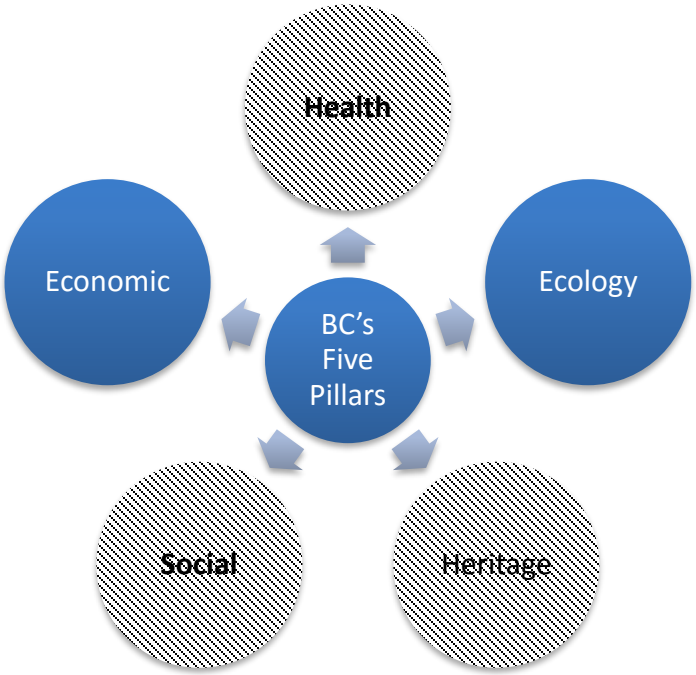
"For as long as the sun shines, the grass grows and the rivers flow"

What is Fort Nelson First Nation Doing About Cumulative Effects

- Adopting an **ecosystem-based management approach**
- Adding a **First Nations cultural and rights lens**
- Scenario analysis – **identifying realistic future trends**
- **Mapping and planning around landscape-level** values, protection and risk
- Developing a **management system** for cumulative effects

“For as long as the sun shines, the grass grows and the rivers flow”

Changing the Primary Focus



Focus on project-specific, individual biophysical VCs, and Crown decisions within confined regulatory mandate

FNFN on the outside looking in…

- Culture
- Treaty Rights/ Practices
- Focus on total cumulative effects load, ecosystem integrity, long-term landscape level management planning

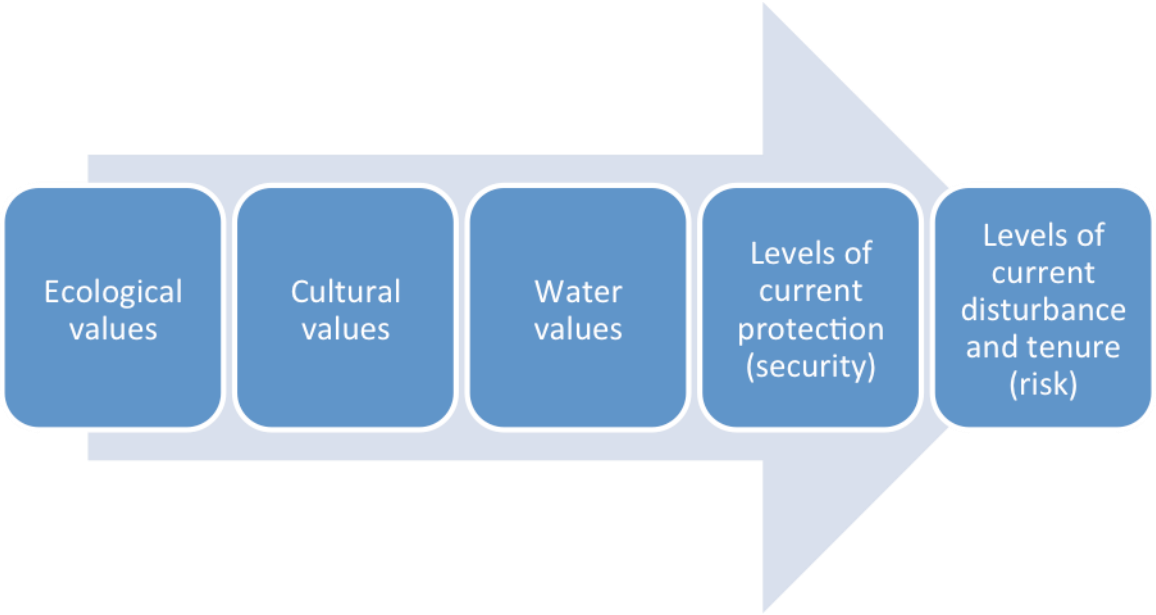
"For as long as the sun shines, the grass grows and the rivers flow"

What are we trying to manage?

- Ecosystems are fine on their own, and don't need managing
- People and their industrial use of ecosystems DO need managing
- **Ecosystem-based Management** is an adaptive approach to managing human activities that seeks to ensure the coexistence of healthy, fully functioning ecosystems and human communities.

"For as long as the sun shines, the grass grows and the rivers flow"

Establishing the Context: Values/Protection/Risk Levels



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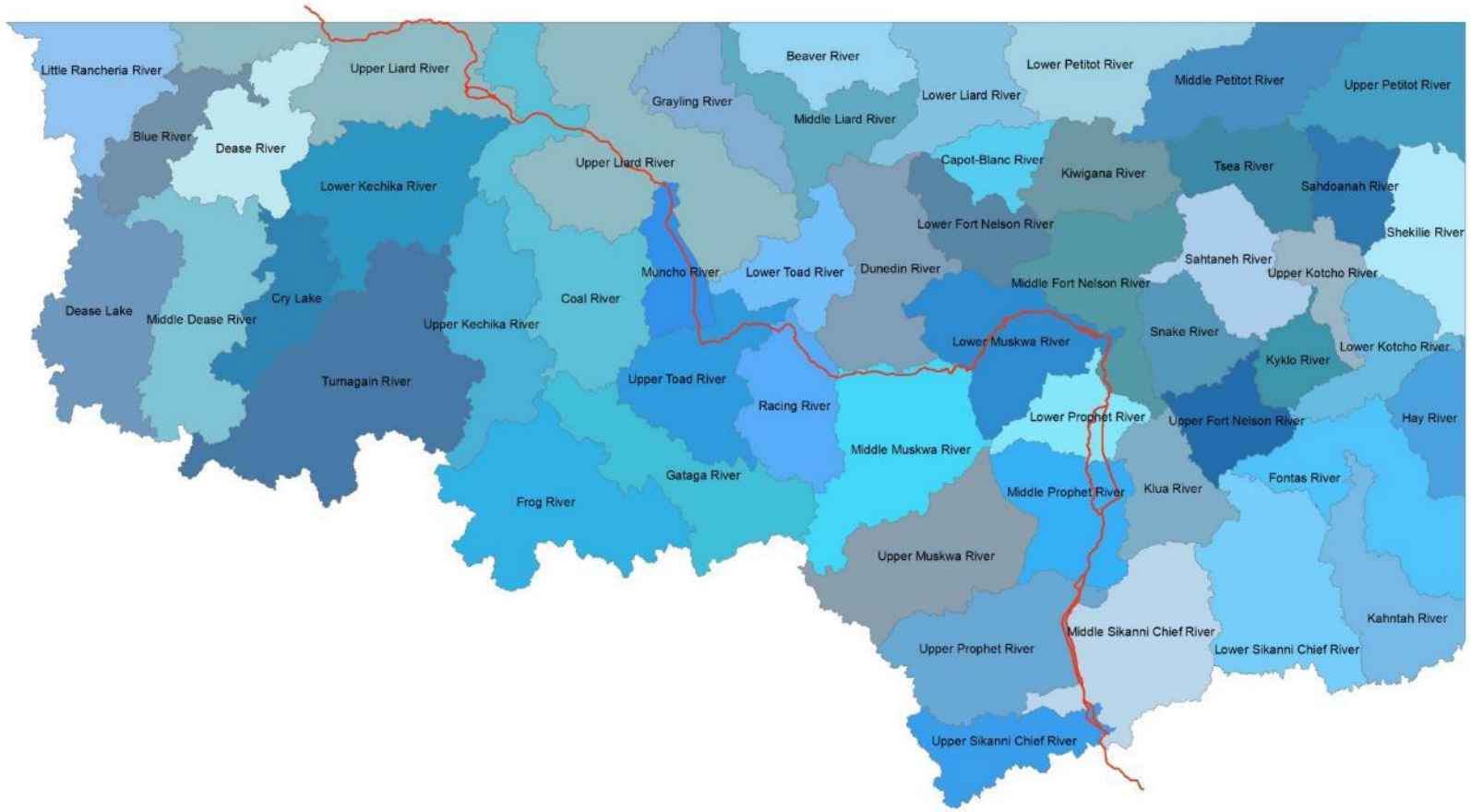
Study Area Watersheds

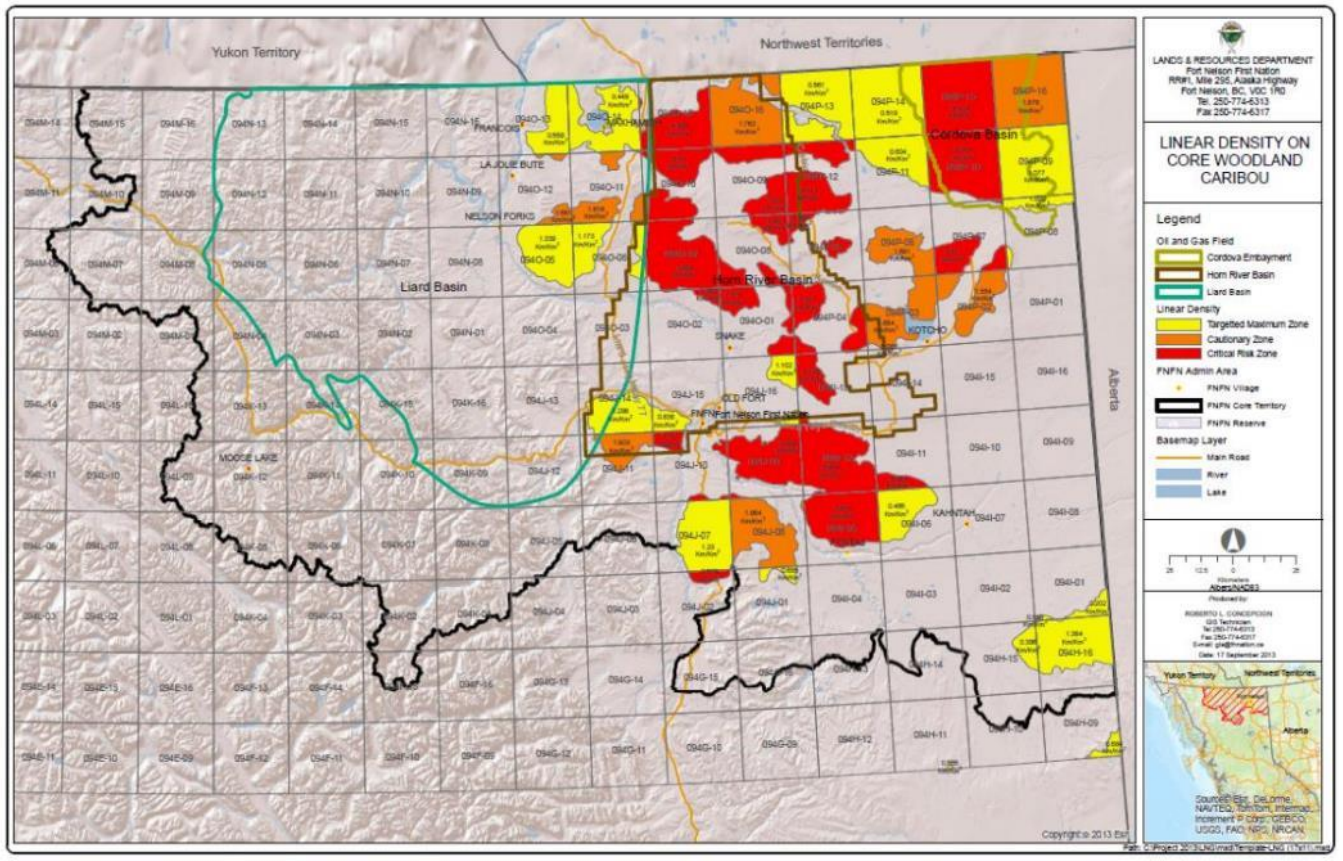


Legend

AlaskaHighway

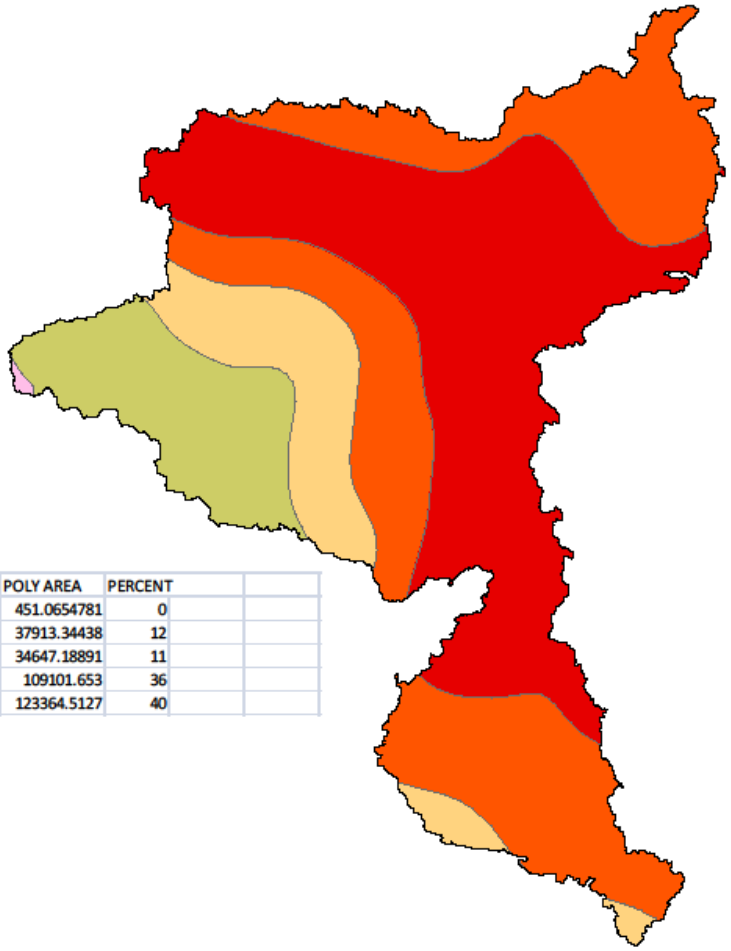
0 125 250 500 Kilometers

Ecological Layer Example

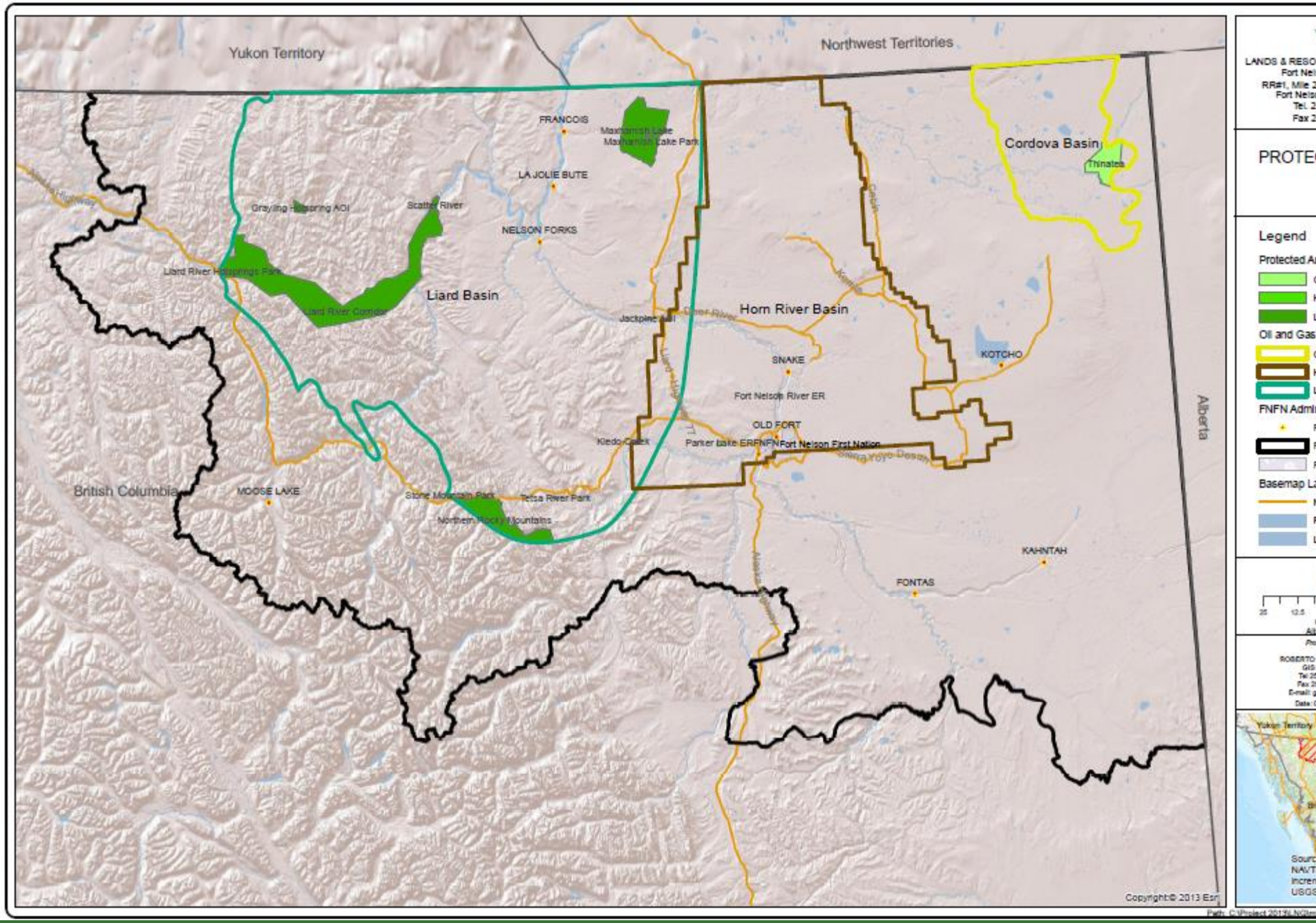


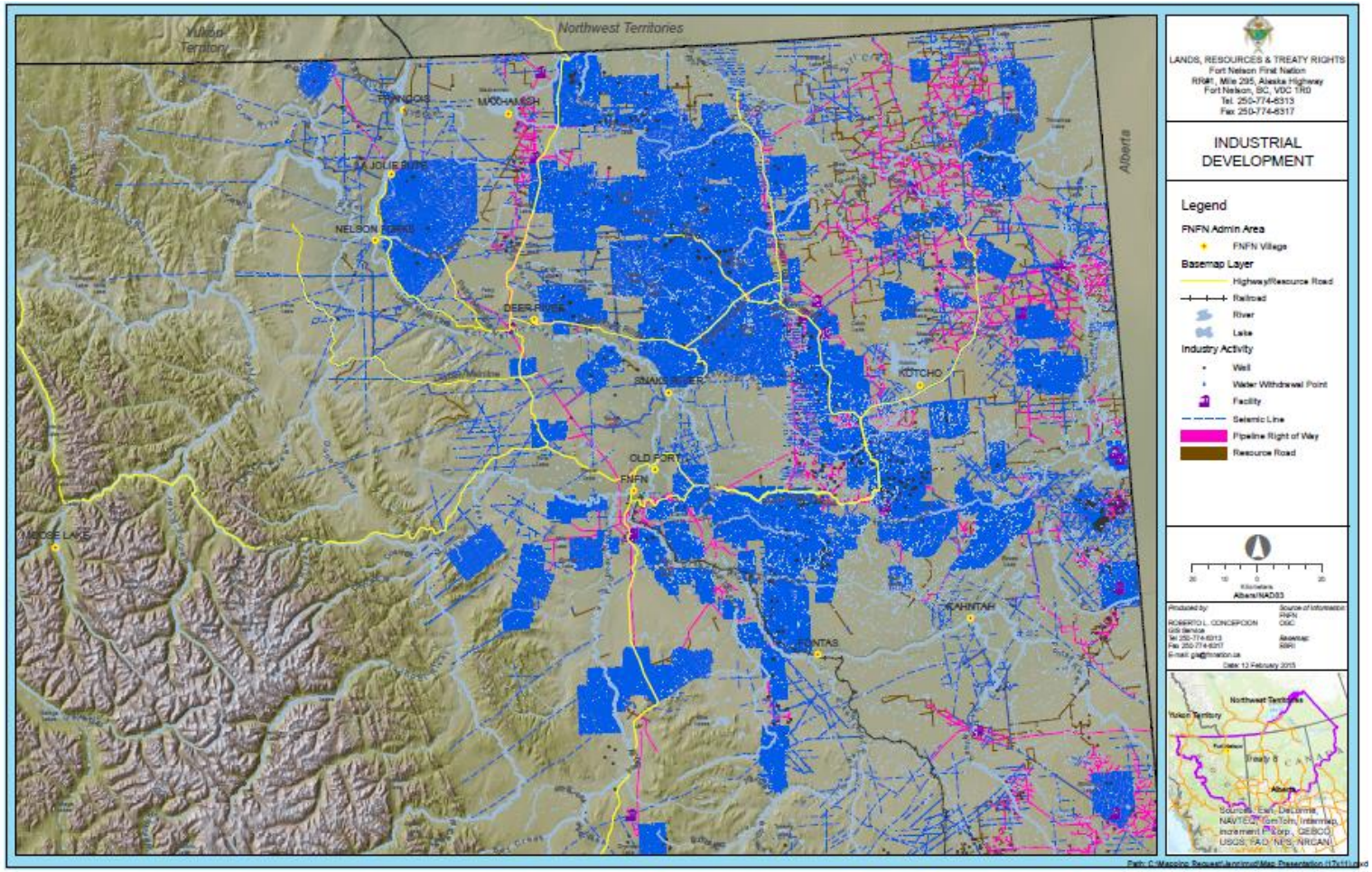
“For as long as the sun shines, the grass grows and the rivers flow”

Example Cultural Values Heat Map for a Liard Sub-Watershed



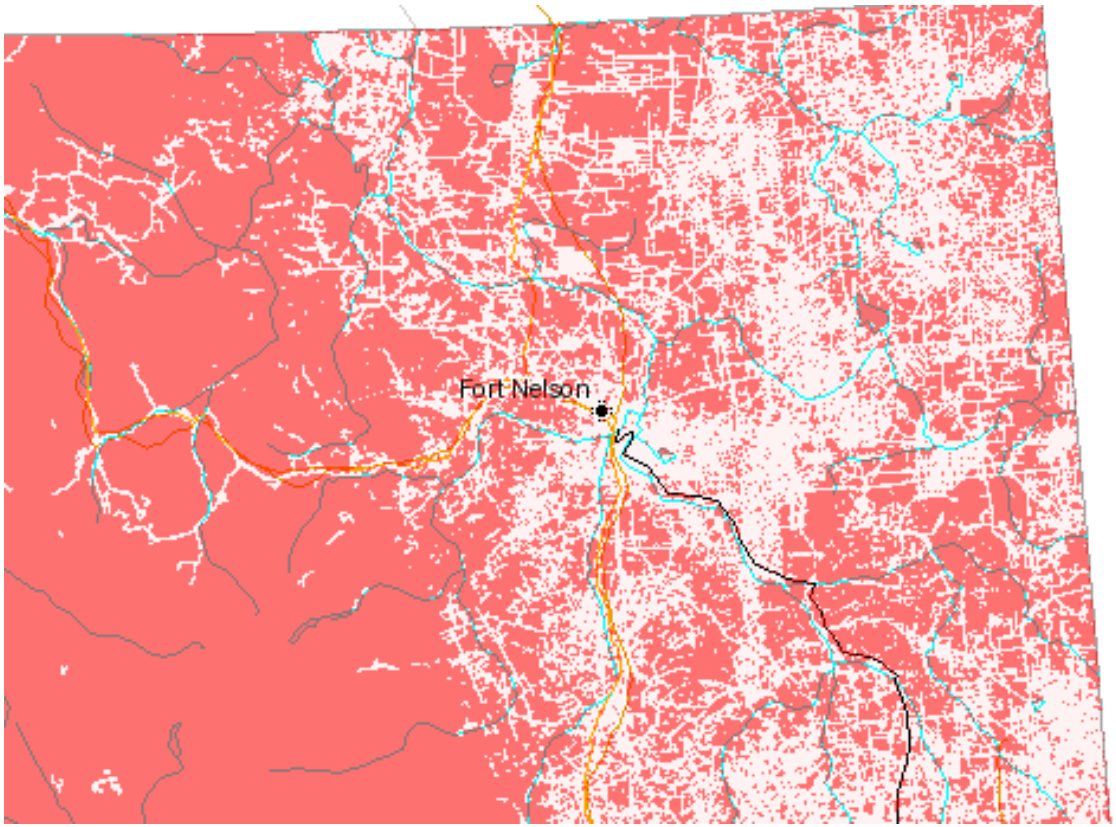
GRIDCODE	POLY AREA	PERCENT		
1	451.0654781	0		
2	37913.34438	12		
3	34647.18891	11		
4	109101.653	36		
5	123364.5127	40		


Yukon Territory
Northwest Territories
Alberta
British Columbia
FRANCOIS
Maxhamish Lake
Maxhamish Lake Park
LA JOLIE BUTE
Grayling Hotspring AOI
Scatter River
NELSON FORKS
Liard River Hotsprings Park
Liard River Corridor
Liard Basin
Horn River Basin
Cordova Basin
Thinatea
Jackpine Hill
SNAKE
KOTCHO
Fort Nelson River ER
OLD FORT
Kledo Creek
Parker lake ER
FNFN
Fort Nelson First Nation
MOOSE LAKE
Stone Mountain Park
Tetsa River Park
Northern Rocky Mountains
KAHNTAH
FONTAS
Legend
Protected Are
Oil and Gas
FNFN Admin
Basemap La
Copyright© 2013 Esri



Risks include Existing Oil and Gas Disturbance and Tenure

“For as long as the sun shines, the grass grows and the rivers flow”



Mapping changes to the landscape

Red - shows areas >500m from roads, with no industrial features.
This type of approach can identify remaining opportunities for preservation of 'wilderness' type areas

"For as long as the sun shines, the grass grows and the rivers flow"

Watershed	Baseline Condition	Cultural Values	Ecological Values	Existing Protection	Tenured %	Existing Footprint
A		Lower	Higher	High	Low	Lower
B		Higher	Higher	High	Low	Higher
C		Medium	Medium	Medium	Medium	Medium
D		Lower	Lower	Low	High	Lower
E		Higher	Lower	Low	High	Higher

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One Possible Future: LNG development

- between 356 and 3,995 new hydraulically fractured shale gas wells
- 1,440 to 16,000 km of new seismic lines
- 150 to 1,665 km of new roads
- 135 to 3,333 km of new pipeline ROWs
- 1 to 5 large 600 Mmcf/day sales gas plants
- additional GHG emissions of between 2.6 and 15.1 million tonnes per year
- water usage in the hydraulic fracturing process alone of between 11 and 320 billion litres of water
- clearing for and construction of hundreds of thousands of other physical works to support gas sector

- FNFN commissioned 2014 LNG Demand Study

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Ongoing Fort Nelson Cumulative Effects Actions: Differing Scales

- Liard Basin Monitoring Initiative – 3 year program with NRCAN on cumulative effects identification, development of monitoring framework
- Tenure-based land and water management and monitoring frameworks with major tenure holders in our territory
- Piloting habitat restoration to reduce cumulative effects, with Environment Canada

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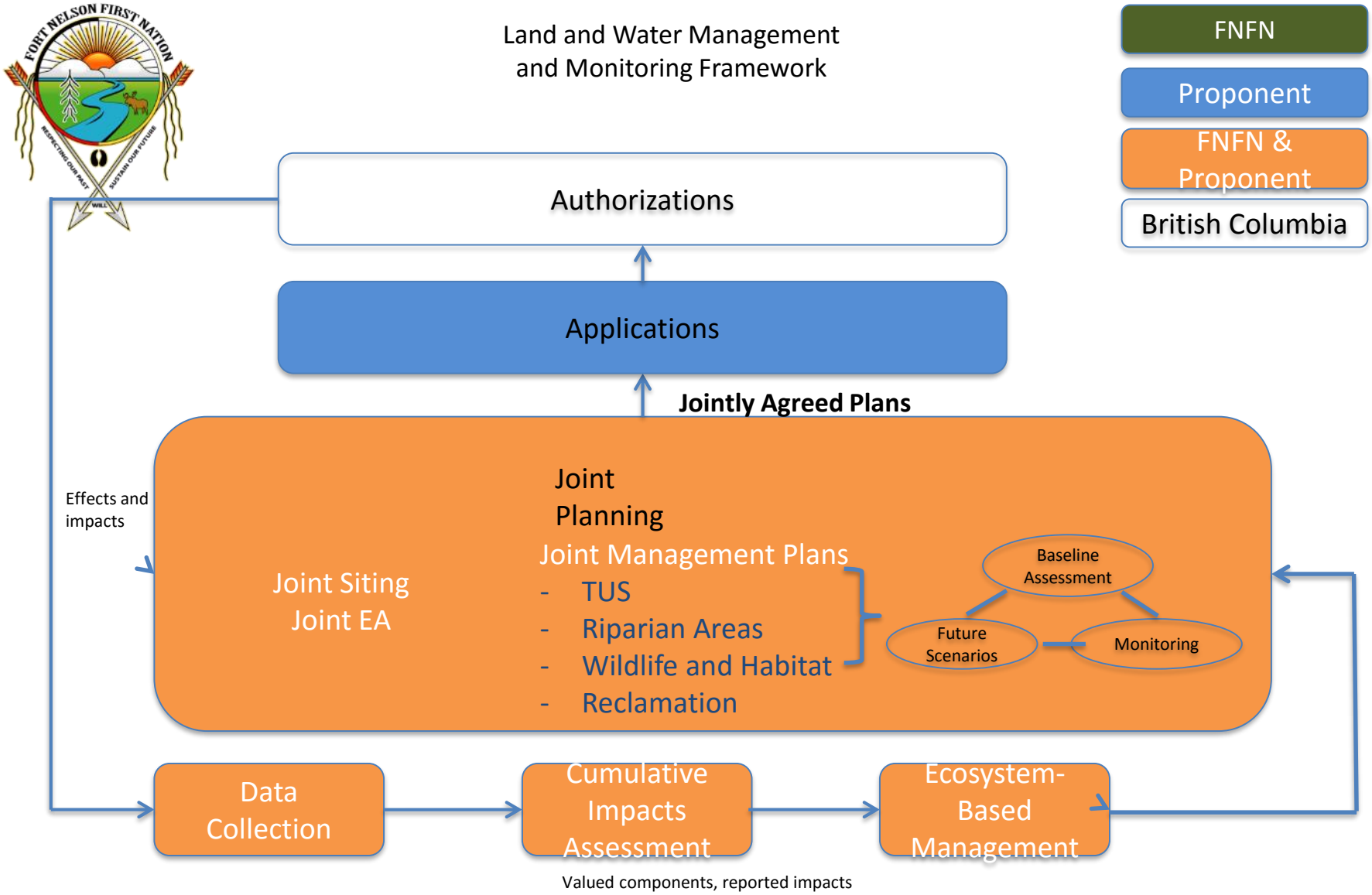
Land and Water Management and Monitoring Framework



"For as long as the sun shines, the grass grows and the rivers flow"

For CEA to be meaningful in FNFN territory, it must…

- Involve FNFN in all phases
- Be focused on effects management, not just effects identification
- Include thresholds of acceptable change tied to decision-making
- Measure cultural and use values alongside biophysical
- Be precautionary, recognizing priority rights
- Include meaningful futuring exercises

“For as long as the sun shines, the grass grows and the rivers flow”

Mussi Cho

Lana Lowe
Fort Nelson First Nation
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“For as long as the sun shines, the grass grows and the rivers flow”

Questions and Discussion

Agenda

9:00 – 9:30	*Welcome and Opening Remarks*
9:30 – 10:30	*Perspectives on Cumulative Impacts Monitoring and Assessment: Part 1*
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3:45 – 4:00	*Evaluation, Closing Remarks*

Lunch Break

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Understanding the cumulative community, health and environmental impacts of resource development in northern BC

Madeline Wilson
Communications Lead, CIRC
University of Northern British Columbia

Chris Buse, PhD
Project Lead, CIRC
Postdoctoral Fellow, MSFHR
Adjunct Professor, School of Health Sciences
University of Northern British Columbia

October 26, 2016
Fort Nelson, BC

Overview

- What is the CIRC?
- CIRC's ongoing research and engagement
- "Developing new tools for assessing the cumulative impacts of resource development across northern British Columbia: Integrating environmental, socioeconomic, and human health assessment methods"

Introducing the Cumulative Impacts Research Consortium

CIRC is a UNBC initiative that provides a platform for research and community dialogue to understand the cumulative environmental, community and health impacts of resource development across northern BC

Introducing the Cumulative Impacts Research Consortium

Acknowledgements

Steering Committee

Present: Greg Halseth (CDI); Marleen Morris (CDI); Margot Parkes (HRI); Henry Harder (HRI); Rachael Wells (HRI); Art Fredeen (NRESi); Al Weinczysk (NRESi); Michelle Connolly (PICS)

Past: Kyle Aben (PICS); Leanne Elliott (NRESi)

Advisory Committee

Present: John Disney; Lana Lowe; Joan Chess; Jennifer Pighin; Nicole Cross; Andy Ackerman; Viva Wolf; Richard Kabzems; Wayne Salewski; Sandra Harris; Charl Badenhorst; Alan Madrigga; Rob Spitzer

Funding Support

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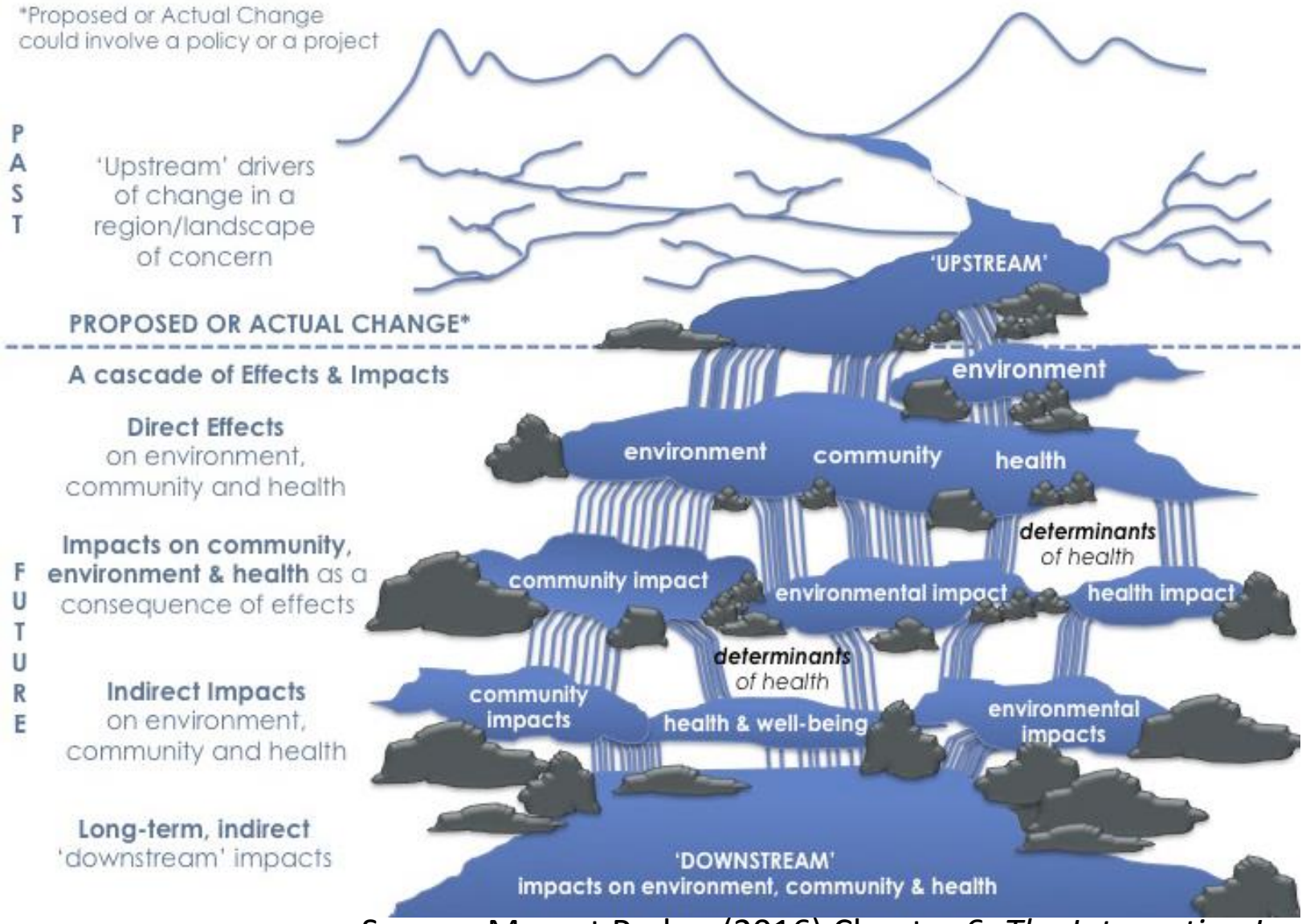
Canada

What are cumulative impacts?

Source: https://www.sitecproject.com/business-and-job-opportunities/procurement-update/worker-accommodation

What are cumulative impacts?



Source: Margot Parkes (2016) Chapter 6, *The Integration Imperative*

Community Engagement

- Rooted in 3 interrelated goals:
  1. Learning 2. Sharing 3. Knowledge to action

On-going Research

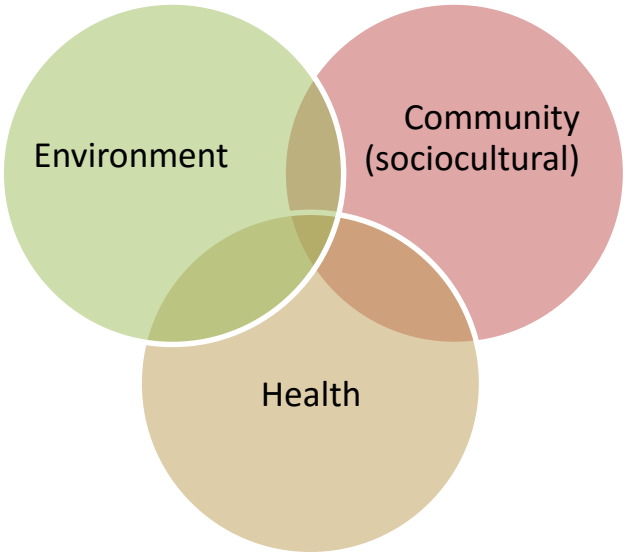
1. **Living library of CE Projects (PICS)**
2. Examining the 'state of the art' of CEA in BC through interjurisdictional comparative case studies (UNBC / NSERC)
3. Examining the community impacts of unconventional natural gas development in BC along the supply chain (SSHRC)
4. Health Impacts of Resource Extraction and Development (Northern Health/First Nations Health Authority)
5. Socioeconomic indicator development and storage (HRI w/ Northern Health and BC CDC)
6. Analyzing the health equity impacts of unconventional natural gas development (Michael Smith Foundation for Health Research)
7. **Developing new tools to assist decision-makers in assessing, monitoring and planning for cumulative impacts (BC Real Estate Foundation)**

New tools in cumulative impacts monitoring and assessment

How to integrate community, health, and environmental values into tools that help communities understand and address the issue of cumulative impacts and support local decision-making processes?

“New tools”: Project process

- Three case study regions: the District of Vanderhoof, the Northern Rockies region, and the Peace River region
- Project just beginning—currently in Phase 1 of 3
- **Key deliverable**: On-line tool capable of integrating environmental, socioeconomic, and health indicators to understand cumulative change in relation to regionally-specific values



“New tools”: In relation to today’s workshop

- An exercise in thinking through ‘what’s possible?’
- How can we help fill capacity gaps at the local level?

- Examples:
  - Indicator lists and data sources (Vital Signs)
  - Geospatial monitoring/modeling (ABA)
  - Multiple Criterion Analysis (value monitoring and weighting)
  - Citizen science

We want to hear from you!

www.unbc.ca/cumulative-impacts

cumulativeimpactslivinglibrary.ca

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chris.buse@unbc.ca | 778.349.4242

@CIRC_UNBC

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Roundtable discussions

OBJECTIVE: The purpose of this activity is to have a discussion around environmental, health, and community values; to identify and surface information around local values.

Questions for discussion

- What's important to you now in relation to the environment, community, and health?
- What do we know about the state of these values?
  - Are there particular information gaps that, if addressed, might give us a better understanding of how these values are changing?

Refreshment Break

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Values Activity

OBJECTIVE: To move through a guided process focused on discussing the challenges associated with prioritizing particular values (i.e. identify what are the MOST important values).

-How can we begin to collectively prioritize various values?

Values Activity – Phase 1

- You only have 10 'votes' () that you will distribute across each value set (30 total)
  - 10  for Environment
  - 10  for Community
  - 10  for Health
- Distribute your allotted stars under each heading however you want

Remember! You are only assigning 10 stickers for each board.
No more, no less!

Values Activity – Phase 2

- You only have 15 ‘votes’ () that you will distribute across the entire set of values

- You can assign as many or as few  as you like to any value or combination of values

Remember, you only have 15 ’votes’ total to be divided across all values listed under the environment, community and health sets!

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Integration and debrief

Q1: Is integration a helpful concept in the context of cumulative impacts? Why or why not?

Q2: How can we work better together to address cumulative impacts in this region?

Q3: In light of the above, how can the CIRC best support on the ground capacity related to the issue of cumulative impacts?

Q4: Is there anything else that we have not discussed today that you think is important to discuss?

Thank you!

www.unbc.ca/cumulative-impacts

cumulativeimpactslivinglibrary.ca

madeline.wilson@unbc.ca | chris.buse@unbc.ca