Cumulative Effects Assessment (CEA) Workshop

Workshop proceedings

January 25 & 26, 2010

Sumas Mountain Road
Abbotsford, BC

Prepared for

Watershed Watch Salmon Society
1037 Madore Avenue
Coquitlam, British Columbia
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In collaboration with

Stó:lō Tribal Council

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1.0 Introduction – What is Cumulative Effects Assessment (CEA)?

Activities related to resource extraction or industrial development can have complex and long-lasting effects on terrestrial and aquatic resources. When considered in isolation, individual activities may appear to have minimal effects, but the overall consequences of recurring activities may be substantial. This is especially true when activities are considered across broader space and time scales. Cumulative effects are therefore defined as the change in the environment resulting from the incremental impact of a particular action when added to other past, present, and reasonably foreseeable future actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. Formal cumulative effects assessment (CEA) is now an integral component of many environmental impact assessment (EIA) processes. In Canada, CEA is a requirement in support of project Environmental Impact Assessments (EIAs) under the Canadian Environmental Assessment Act of 1995, section 16(1) which demands consideration of ‘‘any cumulative effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out.’’

The following four characteristics of activities illustrate how cumulative effects may occur (from USFS 2009):

> 1: *Coincidence*—Coincident effects occur where two activities co-occur. Given the lingering effects of many activities, both the onset and duration of multiple activities will relate to this. In general, the closer together two events are in time (or space) the greater the coincident effect is likely to be
>
> 2: *Sequence*—Sometimes coincident activities can result in different effects dependent on the order in which they occur. One activity may precondition/sensitize the system and subsequently accentuate the effects of the second activity.
>
> 3: *Addition*—Recurrent activities with small individual effects may have substantial effects when considered together. For example, the effects of repeated logging activities may result in an undesired additive effect on watershed processes.
>
> 4: *Synergy*—In some cases, individual activities may interact with other ongoing or past activities to result in amplified effects that can be more substantial than the sum of the individual effects would be otherwise.

Regardless of the mechanisms by which cumulative effects occur <u>a more critical issue</u> is whether a particular suite of activities is likely to generate, or has already generated, significant negative impacts on valued components of an ecosystem. Determining impact consequences within CEA evaluations generally requires development of “thresholds of concern” for different valued ecosystem components. When such response thresholds are crossed, the condition or behaviour of ecological components can change in ways that may be difficult and perhaps impossible to reverse (Duinker and Greig 2006). Ecological thresholds can provide a yardstick to help land use managers decide when the effects of an action are unacceptable. Clearly defined and defensible

thresholds of concern can then be used as constraints that provide managers with flexibility to address the tradeoffs that surround different management alternatives. Determining thresholds for different valued ecosystem components can be difficult but, in general, managers have defined thresholds in different ways in dynamic systems: (1) using "background levels" or "reference conditions" that were typically obtained from a less altered period or location (or using these to define some 'desired future state'), and (2) assessing whether specific values of concern are at risk based on modeling. Balancing multiple resources is only possible when the acceptable range of effects is known.

Analyses in regard to cumulative effects need to consider areas large enough for the most important cumulative impacts to be evident; to evaluate time scales long enough for the potential for impact accumulation to be identified; and to be interdisciplinary enough that interactions among diverse impact mechanisms can be identified and understood. Consequently it has been suggested that the primary application of CEA should be in the realm of regional environmental assessments or regional environmental effects frameworks (REEFs) (Duinker and Greig 2006) and not at the level of individual project EIAs (as is the case currently). This assertion appears in recent revisions to the Canadian Environmental Assessment Act, which suggests that project EIA may be informed by REEFs where they exist. In the long run, what is likely needed is a shift in the practice of CEA away from its current focus on individual project assessment to a broader and more ecologically meaningful regional-based assessment context. Such regionally-based CEAs would better support successful identification of ecologic thresholds at relevant spatial scales of concern and would provide the impetus for regionally integrated threshold monitoring programs.

As meaningful assessment of cumulative effects has been identified as a potentially serious shortcoming in current EIA practices, this workshop was convened to advance the concept of doing better cumulative effects assessment (CEA) and management in BC. We used the growing independent power producer sector (and, more specifically, run-of-river projects) as a topical example for identifying the necessary steps to develop a broader CEA framework that could be used to screen proposed projects within the territories of BC's Stó:lō Nation.

2.0 Workshop Objectives

1. Identify the necessary building blocks for a CEA framework and assess their status/readiness for use in a CEA that could be applied to screening of independent power production (IPP) projects
2. Examine regulatory opportunities and enabling factors for doing CEA using this framework
3. Build interest, momentum and clarity among participants towards CEA implementation
4. Identify next steps.

The workshop agenda, a list of workshop participants and the presentation (*Cumulative environmental effects: Towards an appropriate assessment framework for renewable energy development in BC*) delivered in the first plenary session of the workshop are provided in Appendices A, B, and C respectively.

3.0 Workshop Discussion

3.1 Context: preliminary CEA framework

Traditionally environmental impact assessment has focused on individual projects (a **project-centric** approach**)**. The "project" then becomes the frame of reference and an environmental assessment examines in detail how the project may directly affect different valued components of the environment (e.g. fish, wildlife, etc.) (Figure 1). This sort of analysis is helpful in determining how to design projects in order to reduce and mitigate these direct impacts. However, this approach to EIA examines each project in isolation, and mitigation measures are also prescribed in isolation from other projects.

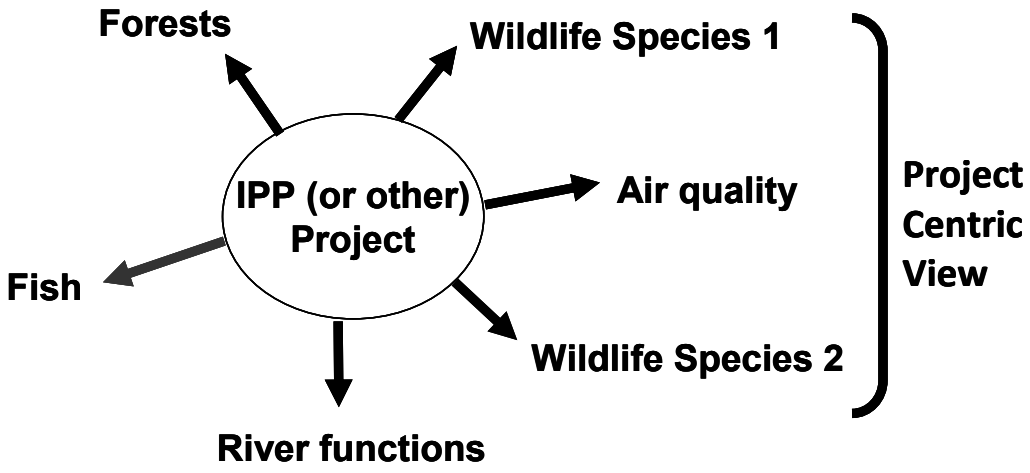


Figure 1. Traditional project-centric approach to environmental assessment, where the effects of a single project on a suite of different valued components are evaluated in isolation from other stressors.

It would be more meaningful to centre environmental assessments not around the project, but instead around the valued components that a community wishes to preserve – which the project may affect (but which are also challenged by other pressures). These could be ecological components such as important fish/wildlife populations, riparian corridors or entire ecosystems (such as a floodplain), or important social, economic or cultural values that the community wishes to sustain. Traditional EIAs are typically too narrow in scope (topically and spatially) to provide insight into whether the valued components will be sustainable or not. For example, an individual EIA review of a project might determine that the project is able to maintain operations conforming to accepted environmental regulations (e.g., for extent of flows, pollutant discharge, etc.) and that there would be no significant effect of project activities. This is the project-centric view. However, if information was included on the state of the broader system it may reveal that the local ecology is already highly stressed or sensitive, and the risks from further incremental

regional impacts could be "significant". From this VEC-centric view, one could come to quite a different conclusion about the significance and acceptability of additional projects in an area. Understanding how a new development project (an IPP project or otherwise) will affect the status of valued ecosystem or cultural components requires that we carefully evaluate the full suite of different stressors that are effecting its status (e.g., logging, mining, urbanization, climate change, etc.) and not just the potential pressure from a single project. This is termed a **VEC-centric** approach (Figure 2) and should provide the foundation for framing regionally-based cumulative effects analyses.

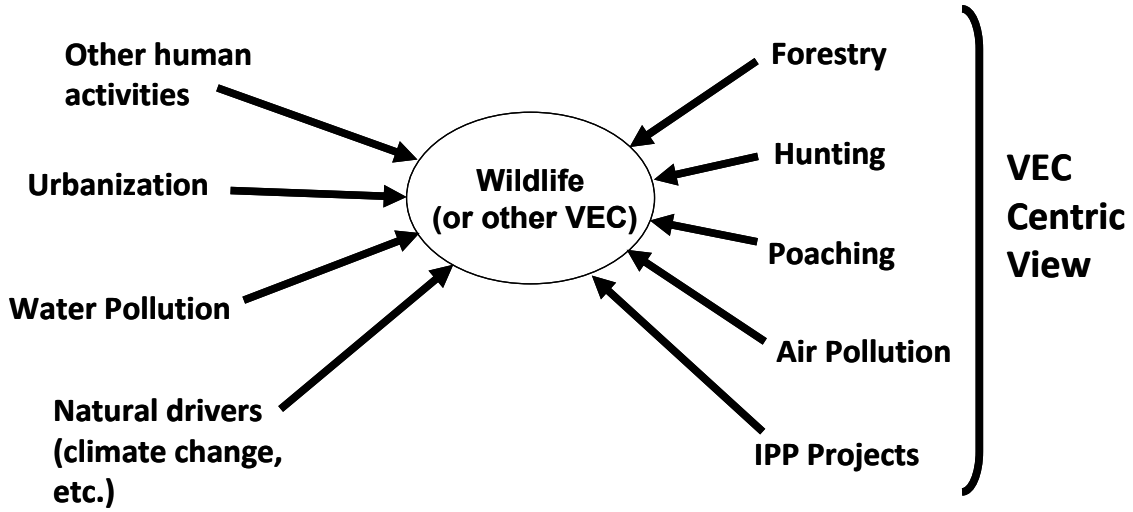


Figure 2. VEC-centric approach to environmental assessment, where the combined effects of a suite of project-based and natural stressors on the status of a key valued component are evaluated. This allows for better assessment of the potential effects of any new, additional projects on VEC status.

The following elements form a preliminary framework for Cumulative Effects Assessment as characterised in Figure 2:

- **Building Blocks**, which form the basis of the cumulative effects analysis.
  a) *Components of the environment* that people care about. These may be ecological, socio-economic or socio-cultural things that people value and want to protect, maintain, sustain or restore. Environmental assessment practitioners typically refer to these as "valued ecosystem components" (VECs) and "valued social components" (VSCs) although at the workshop it was suggested that these terms may not be meaningful to a non-technical audience and alternatives should be sought.
    - Characteristics about these components, such as their current health/status and trends over time over spatially meaningful scales, and targets/thresholds.
  b) *Pressures or stressors* that are affecting these components, These may be anthropogenic (human-caused) or natural drivers, and include those which *already exist* as well as any new pressures from future activities that might be proposed or planned
    - Characteristics about these pressures/stressors, in both space and time.

- **Tools** for conducting CEA. Four main types are important, and together would lead to well-informed decisions based on an assessment of cumulative effects:
  a) Monitoring and reporting initiatives and products that provide information on the *status and trends* in environmental components, and status and trends in existing pressures and stressors.
  b) Studies that provide information on *how* key pressures/stressors affect key environmental components.
  c) *Planning* tools that help people determine what they want (and where), with an understanding of the tradeoffs among different options (e.g. tradeoffs between ecological and economic components).
  d) Tools for *comparing alternative futures*; exploring 'what if' questions by developing different scenarios (representing different decisions) and projecting the potential outcomes from future pressures/stressors on environmental components. In other words, which decisions are most likely to get us where we want to be as articulated in the plans?

The workshop sessions were designed around the elements of this preliminary framework.

3.2 The building blocks for CEA on Stó:lō territory

Participants were asked the following questions:

i) What are the ecological and cultural components that members of the Stó:lō community most value and care about across their territory and would not want to lose? Identifying these is an important first step in framing a CEA.

ii) What are the primary human-caused pressures/stressors that are currently affecting these VECs/VSCs in Stó:lō territory? That is, what are the range of development activities that have historically occurred or are currently occurring on Stó:lō lands and that may have negatively impacted the condition of VECs and VSCs? Additionally, what are the natural drivers that may also be affecting the environment in Stó:lō territory? Identifying these elements is the second step in framing a CEA.

iii) What are the proposed activities that may occur on Stó:lō territory in the foreseeable future, either from IPPs or from other development and what additional pressures might they cause? Identifying these is the third step in framing a CEA.

For each of these three steps we need to determine the extent of our current knowledge, and identify the areas where we require more information.

1) VECs and VSCs of concern to the Stó:lō community

1a) VECs identified by Stó:lō elders

Air
- air quality (reduce pollution)

Water
- water quality, water temperature, flow (mother earth's blood)

Fish (food and ceremonial purposes)
- chum, Chinook, coho, sockeye salmon

Wildlife (food and furs)
- deer, muskrat, martin, beaver, raccoon, black bear, cougar, elk, lynx, fox, coyote, ducks

Land
- availability of land for habitats

1b) VSCs identified by Stó:lō elders

Health
- general health (limited respiratory problems, low cancer rates)

Travel
- by land and by water (creek and river travel by canoe)

Gardening
- fruit trees, gardens
- pollination by wild bees

Cultural sites
- culturally important areas where traditional practices can be maintained

Hunting
- access to traditional hunting grounds

Government
- control over environmental issues affecting Stó:lō territory

2) Current pressures/stressors in Stó:lō territory identified by workshop participants

Aggregate gravel extraction
- effects on water quality
- increased truck traffic (dust, air and noise pollution)
- increased barging

Residential development
- Sumas Mountain
- erosion, siltation
- chemical run-off into streams

Agriculture
- pollutants, fertilizer run-off

Forestry
- contaminated materials, spills
- habitat loss (fish, wildlife)
- fires

Transmission Lines
- affects land development
- high voltage electricity
- effects on wildlife, fish, human health

Highway
- air pollution (large trucks, diesel)

Plastics plant
- air pollution
- water pollution

Metro Vancouver
- air pollution
- reduced fruit yields from trees
- silting of Fraser River
- industrial pollutants in Fraser River (sewage, pulp mills, mining)

Human population/urbanization
- increasing pressure from continued growth of lower mainland
- natural areas and agricultural lands converted to homes, malls, etc.
- draining, dyking of Sumas Lake

Climate change
- possible air temperature increases
- possible water temperature increases (thermal stress on cold water dependent fish)
- possible reduced flow

3) Potential future pressures/stressors in Stó:lō territory from run of river IPPs or other foreseeable development activities identified by workshop participants

3a) IPPs (components include: roads, transmission lines, hydro plant, penstock, tailrace, other infrastructure)[1]

- climate change inputs (GHGs)
- air pollution
- changed water flow/hydrology regime

[1] Note that some of these impacts may be mitigated or in some cases enhanced dependent on the construction and habitat rehabilitation practices employed on an individual IPP project.

- changed water temperature
- altered sedimentation regimes
- reduced aquatic habitat quantity/quality, reduced fish passage
- altered terrestrial wildlife habitats (increased edge effects)
- noise pollution
- disruption of traditional activities
- damage to archaeological/cultural sites
- increased poaching access
- direct mortality of fish and wildlife during construction and plant operation
- reduced recruitment of woody debris in streams
- increased winter icing in streams
- change in "cascade" mist-driven habitats (used by salamanders, unique plants)

3b) Other new development proposed on Stó:lō territory

Incinerators

- air pollution

3.2. Tools for CEA that exist or could be developed for use by the Stó:lō

As described in section 3.1, information, analyses or analytical tools that could assist in framing of CEAs could include: 1) methods for evaluating, monitoring and reporting on the status and trends of VECs and VSCs; 2) effects models that can be used to determine how VECs/VSCs will respond to particular stressors; 3) planning products that can tell us what is desired in the future and in what locations; and 4) scenario analysis tools that can help us project the effects of alternative development futures. Existing or prospective analyses/tools identified by workshop participants that could support cumulative effects assessment and management on Stó:lō territory included:

- Watershed vulnerability assessments (focused on sensitivity of watersheds to climate change and other major drivers)
- Summaries and tracking of water license applications
- Tracking of jobs, investments, education level
- Development of a community wellness index
- Archaeological assessments and mapping
- Stó:lō Atlas
- Hectares BC (listing of wildlife species occurrences throughout province)
- Fish Information Summary System (fish species distribution throughout province)
- ALCES – cumulative effects scenario simulator (used in Alberta; unsure of its application in BC)
- Remote sensed imagery for the province at multiple spatial resolutions

3.3 CEA on Stó:lō territory: Institutional/regulatory challenges and opportunities

Cumulative effects framing and management cannot be the sole responsibility of the Stó:lō community but would depend on the coordinated efforts of multiple agencies & other local stakeholders who depend on the resources. This will present various institutional and regulatory challenges to CEA development but there may also be new opportunities for shared engagement on a common issue of concern.

Current regulatory or institutional barriers to developing a CEA framework for the Stó:lō that were identified by workshop participants included:

- No decision making power by the Stó:lō
- Limited or no consultation with the Stó:lō when making development decisions that can effect the environment (e.g., power lines on reserves), and lack of a consultative process for taking Stó:lō concerns into account
- Poor recognition and respect for Stó:lō land use or community plans by municipalities and government agencies
- Lack of a completed Stó:lō land use plan
- Lack of a method for making Stó:lō spiritual values explicit (or if that is not directly possible, lack of a tool that can accommodate different world views)
- Scope and scale of current EIAs too narrow a focus (e.g. activity may be off-reserve but the impacts may be occurring on-reserve)
- Limited capacity of Stó:lō to handle development referrals (e.g., residential, agricultural, forestry, transmission lines, municipal, IPPs)
- EIAs and CEAs (to the extent they are developed) do not currently take a community watershed perspective; this needs to be changed
- Local knowledge is not utilized generally in EIAs/CEAs
- Impacts of past projects is not the responsibility of proponents in EIAs and is not properly accounted for in current processes (i.e., are project specific)
- CEAA legislation allows for strategic environmental assessments but this is rarely, if ever, done

Opportunities identified by workshop participants for overcoming some of these regulatory or institutional barriers to a CEA framework included:

- The Coast Salish Gathering – an intergovernmental dialogue on the environment, with a focus on water and streams
- Meetings between Stó:lō chief and the mayor of Abbotsford – informal “get to know each other” sessions (in the past this lead to changing the route of trucks to the gravel pits)
- Focus on preserving the Stó:lō language and other cultural traditions in the schools, as a means to instil and share community values
- Develop tourism, infrastructure that features First Nation traditions and knowledge

- Evaluate other processes/programs that have sought to overcome obstacles to cumulative effects assessment (e.g., Foothills Model Forest Program – Hinton, Alberta; other model forest programs; diamond mine assessment processes in the Yukon – structured to account for First Nations decision processes; NWT territorial government's approach to evaluating cumulative impacts of oil and gas development)
- Look for chance to engage on public consultation on reforming the province's Water Act and provide more First Nations focus on water needs in relation to water license adjustments
- Look for opportunities to engage with BCTC within their ongoing planning exercise to assess the cumulative effects of transmission lines
- Look for opportunities to negotiate funds available for agency habitat assessments, SARA processes be redirected for Stó:lō-based environmental assessments, planning processes
- Look for opportunities for shared benefit of development for Stó:lō and outside partners; partner on full cumulative impacts/cumulative benefits analyses to evaluate trade-offs between the potential benefits of IPP and other development (e.g., financial and energy access/independence) and the potential negative impacts to the environment and/or cultural values

4.0 Next Steps

This workshop was designed as an initial step towards developing a conceptual CEA framework that might ultimately provide a basis for evaluating the risks/benefits of new development (IPPs or otherwise) on Stó:lō territory. The process of developing such a framework on Stó:lō land could provide an example that might be applied elsewhere in the province for identification and management of the cumulative effects of different development options. Although the construction of a workable CEA framework for the Stó:lō may be a long term undertaking workshop participants identified some of the early steps that would be required (with a focus on the immediate issue of evaluating the potential cumulative impacts of IPP development):

- Organize a field visit of a run-of-river IPP project site for Stó:lō elders so they can get a reality-based assessment of localized impacts caused by IPPs
- Compile the current process steps that are used by proponents to assist regulators in assessing the effects of IPPs
- Clarify the temporal and spatial resolution of CE assessment that would be appropriate for Stó:lō concerns
- Determine the decision points in a CEA (within current legislation) where the Stó:lō may be able (if at all) to influence the process
- Clearly define the valued ecosystem components (VECs) and valued social-cultural components (VSCs) that are most critical to the Stó:lō and that would become the focus of CEA-based analyses
- Initiate development of analyses/models that could be used to define "thresholds of concern" for these VECs and VSCs
- Define other resource users that are found in the communities surrounding Stó:lō territory

- Establish relevant lines of communication, forums for discussion with all users of the shared resources
- Determine how to establish critical links between the Stó:lō and decision makers in the regulatory agencies
- Resolve/refine the current referral process used by Stó:lō environmental officers so that they can provide timely, relevant guidance on environmental issues
- Work to coordinate the referral process across multiple agencies so that redundancies and inefficiencies are reduced or eliminated (e.g., multiple referrals for the same project)
- Establish different names for the EIA-based technical terms VECS and VSCS that are more meaningful to the Stó:lō and that they can better relate to (e.g., an initial suggestion was Sxoxomes - gifts of the creator)

5.0 References

Duinker, P.N., and L.A. Greig. 2006. The impotence of cumulative effects assessment in Canada: Ailments and ideas for redeployment. Environmental Management 37(2): 153-161.

United States Forest Service (USFS). 2009. Comparative risk assessment framework and tools (CRAFT, Vers. 1.0). Pacific Southwest Research Station, Albany, CA. U.S.A.

Appendix A – Workshop agenda

Cumulative Effects Assessment (CEA) Workshop

January 25 & 26, 2010, 2800 Sumas Mountain Road, Abbotsford, BC

The issue of cumulative effects or impacts has been identified as a serious shortcoming in the current practice of environmental assessment (EA) in BC. The **goal of the workshop** is to advance the concept of doing cumulative effects assessment (CEA) and management in BC, using the independent power producer sector (and, more specifically, run-of-river projects) as an example for developing a CEA framework.

Workshop Objectives:

1. Identify the necessary building blocks for a CEA framework & assess their status/readiness for use in CEA.
2. Examine regulatory opportunities and enabling factors for doing CEA using this framework.
3. Build interest, momentum and clarity among participants towards CEA implementation.
4. Identify next steps.

Session Flow:

Day 1: 9:30am – 4:00pm					Day 2: 9:00am - noon	
Session 1: Intro, CEA Overview	Session 2: CEA Building Blocks	Lunch	Session 2 continued	Session 3: CEA Tools	Session 4: Reorientation, & Opportunities for CEA	Session 5: Review, Next Steps

Workshop Agenda:

January 25

9:30 – 10:30	Session 1: Introduction & CEA Overview - Welcome, opening prayer, introductions, overview of CEA
10:30 – 10:45	Break
10:45 – 12:00	Session 2: Building Blocks for CEA - Valued Ecosystem Components (VECs), Valued Socio-cultural Components (VSCs), human-caused pressures/stressors on VECs and VSCs, Natural drivers in Stó:lō Territory
12:00 – 1:00	Catered Lunch
1:00 – 2:15	Session 2, continued… - Readiness of these building blocks for CEA in Stó:lō Territory
2:15 – 2:30	Break
2:30 – 4:00	Session 3: Tools for CEA - Tools available for CEA in Stó:lō Territory; new ones that may be needed

January 26

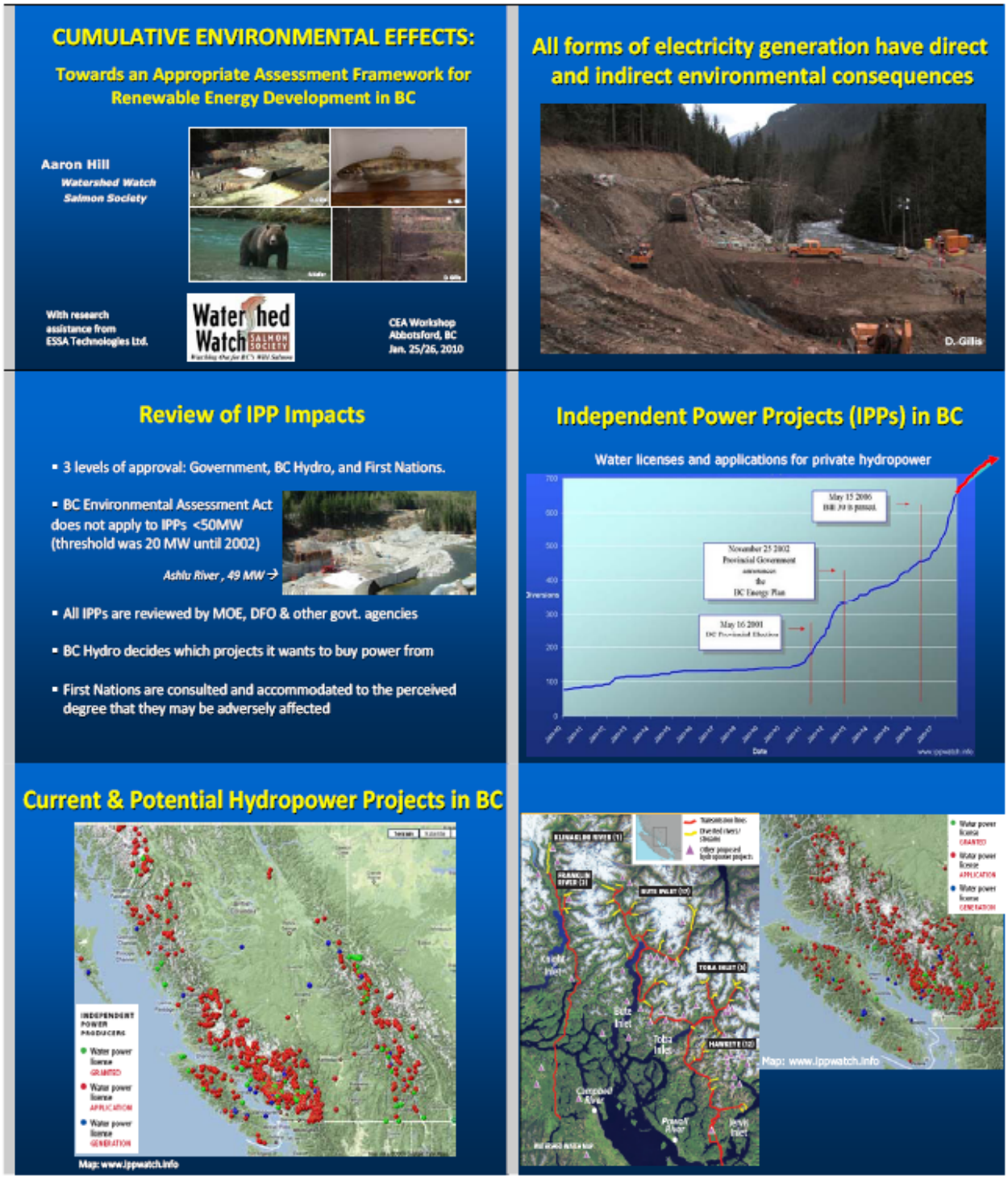
9:00 – 10:15	Session 4: Re-orientation from Day 1, & Opportunities for CEA - Institutional/regulatory opportunities; challenges and potential solutions
10:15 – 10:30	Break
10:30 – 11:00	Session 4, continued… - 'Best bets' for success
11:00 – 12:00	Session 5: Review & Next Steps - Next steps, action items, potential roles, suggested timelines; review; closing

Appendix B – Workshop participant list

Name	Affiliation
Judith Romero	Cloudworks Approval Manager, IPP BC Rep.
Mike Wise	Syntaris Power, Project Development, IPP BC Rep.
Matt Horne	Pembina Institute
Vince Busto	DFO, Project Review
Robyn Heaslip	STC, environmental researcher
Frank Andrew	STC, Land & Resource Coordinator
David Leung	INAC, FNEATWG, Environmental Specialist
Lisa Webster-Gibson	FNEATWG, Coordinator
Craig Orr	Watershed Watch, Executive Director
Aaron Hill	Watershed Watch, Ecologist
Milly Silver	Sumas First Nation, elder
Ray Silver	Sumas First Nation, elder
Larry Ned	Sumas First Nation, elder
Ed Williams	Sumas First Nation, elder
Dalton Silver	Sumas First Nation, Chief
Shira Mulloy	BC Hydro, Project Manager
Nadja Holowaty	BC Hydro, Energy Planning Group
Carol Murray	ESSA Technologies Ltd., workshop lead facilitator
Marc Porter	ESSA Technologies Ltd., workshop co-facilitator

Appendix C – Workshop plenary presentation

Cumulative environmental effects: Towards an appropriate assessment framework for renewable energy development in BC **(Aaron Hill, Ecologist - Watershed Watch)**



Cumulative Effects Assessment (CEA)

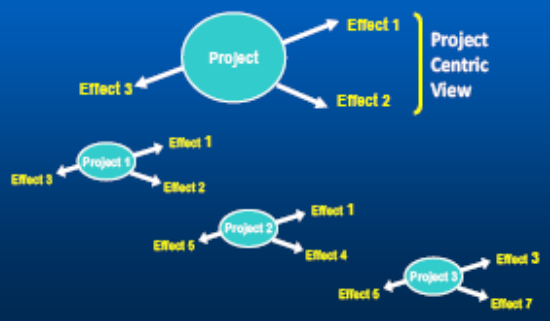
Cumulative Effects: incremental effect of actions when added to other past, present, and reasonably foreseeable future actions*

- Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time
- Performance to date of traditional EIA processes in anticipating and avoiding cumulative effects is considered hugely disappointing**

*US Council of Environmental Quality
**Dunlop and Grieg 2006

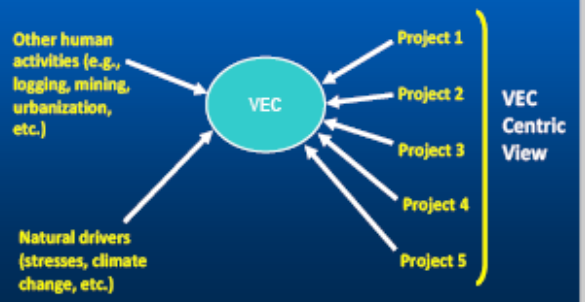
The project-centric approach (what we're doing now)

1. Design a project to reduce and mitigate environmental effects



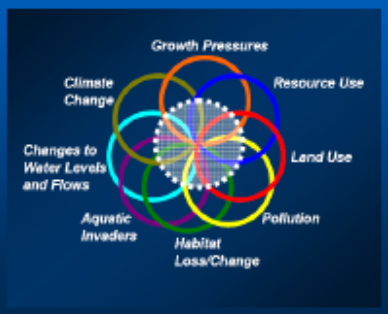
The VEC-centric approach (what we should be doing)

2. Understand the consequences of development for Valued Ecosystem Component (VEC) sustainability



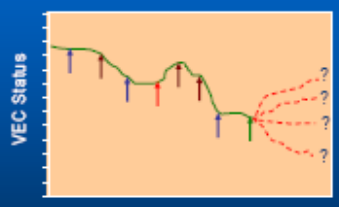
Cumulative Effects

Many natural and human factors act as stressors on Valued Ecosystem Components



Cumulative Effects

- It is critical to understand VEC status and the consequences of the suite of stresses acting on those VECs



A Way Forward

Focus cumulative effects assessment and management at a regional level, by assessing the sustainability of valued ecosystem components (VEC)

- Science that is focused on CEA – outside of individual project assessment
- Assess VEC status and threats – e.g. for populations, communities, and/or ecosystem/habitat types
- Determine thresholds & limits on VEC – i.e. tipping points

"...cumulative effects assessment has little practical value unless it is in relation to allowable limits within regional carrying capacity." (Rees 1992)

The Building Blocks for Proper CEA

1) VECs: status/trends, targets/thresholds for the VECs you want to protect (also VSCs)

2) Pressures – current threats to VECs and those that may evolve in the future

Dimensions of concern – the geographic and temporal scales meaningful for VEC assessment (not just project footprint/timing)

Recognizing uncertainty - about VEC status or thresholds, about possible impacts of projects, about what will happen in the future (e.g., how pressures will grow, what new ones will appear)

Key Tools for Proper CEA

VEC status/trends reports: to assess and track the condition of VECs

Effects models: to determine how VECs respond to particular stressors (e.g. prioritized by development pressures

Planning products: that tell us what we want in the future and where

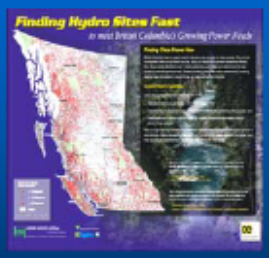
Scenario analysis tools: that project alternative futures

Cumulative Effects Management Toolbox*

- Regional land use & environmental sensitivity mapping/databases
- Identification of VEC thresholds
- Formal risk assessments
- Individual project mitigation & monitoring
- Information sharing from project EIAs (regional databases)
- Joint development plans and combination of infrastructure
- Incorporation of traditional knowledge
- Regional access management/control
- Linear corridor controls
- Species management plans
- Habitat conservation plans

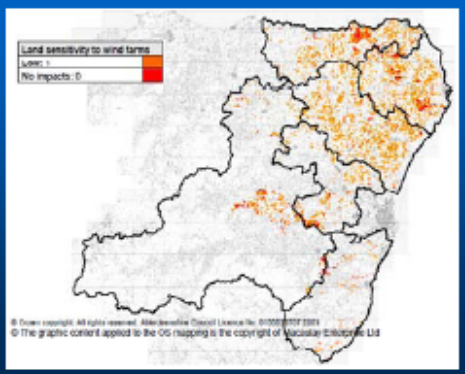
* CEAA 20

Current regional IPP pre-planning in BC: focused strictly on energy potential

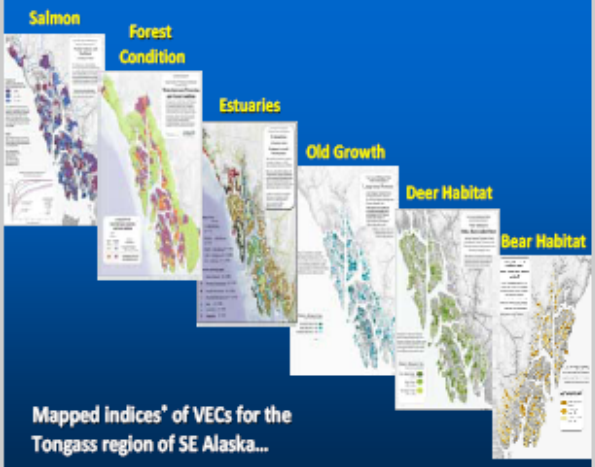


But many examples from other jurisdictions where broad ecosystem values are also incorporated into initial planning ...

*Sensitivity mapping** for siting of wind farms in Scotland (i.e. areas where wind power is technically feasible and of acceptable environmental impact)



* Aberdeenshire Council 2009



Mapped indices* of VECs for the Tongass region of SE Alaska...

* Schoen & Albert 2006

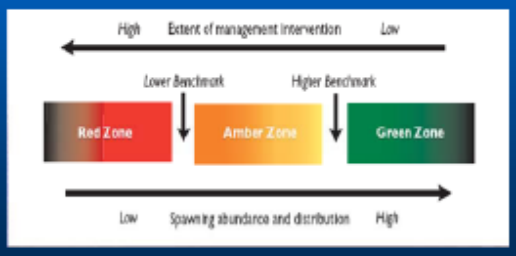
... used for generation of composite ecological "scores" to guide environmentally sensitive regional development

Core areas of Biological Value

Ranking of watersheds for ecological importance

Thresholds for defining zones of concern as related to VEC indicators

e.g. 3 status zones for salmon stocks differentiated by measurable benchmarks*



*DFO 2000

Risk Assessment

Risk: a function of the probability (chance, likelihood) of an adverse or unwanted event, and the severity or magnitude of the consequences of that event

Risk response matrix (probability x consequence)	Consequence				
	Minor	Mod	Moderate	Large	Very large
Probability of Impact: Virtually certain					
Likely		1	1		1
Possible	3	4	2	2	2
Unlikely	3	3	2	2	
Very unlikely	3	3	1		2
Zero					

Summary chart indicating the number of projects of varying risk characterizations planned or ongoing across a region

Implementation of CEA

- Management of cumulative effects requires multi-agency involvement; no one agency can adequately facilitate this
- It is not reasonable to rely on IPP proponents and conventional EIAs to deal with cumulative effects, as proponents have limited ability to identify or control other actions in a region
- Cumulative effects management must depend on the coordinated efforts of multiple agencies & (increasingly) on local stakeholders who depend on the resources

Implementation of CEA

- Regionally focused CEAs – become the responsibility of governments in the context of land use planning and integrated resource management involving stakeholders
- **Not easy** – for example, formal regionally-based CEA-framed management strategies in Alberta (NESREMS and CEMA) appeared well planned but have not fared well in implementation
- Ad hoc multi-stakeholder processes, however, also represent a promising starting point for the needed shift in CEA thinking: e.g. Skeena River, Copper River, Tongass, etc.

In Conclusion

- Cumulative effects assessment should safeguard VECs (and VSCs)
- Unrealistic to achieve a regional level of analysis and decision simply by making it a requirement of project EIAs. Instead:
  1. Replace the currently reactive practice of EIAs with proactive regionally based planning approaches;
  2. Pursue a broad VEC-based focus instead of a project-specific focus to cumulative effects assessments;
  3. Overall objectives & VEC thresholds should be established;
  4. Governments should take responsibility for cumulative effects identification & management