

CEAM PRINCIPLES, PROCESSES, AND PRACTICES



Terminology and Principles

- ▶ In the USA, the term cumulative impact (or cumulative effect) is defined as the impact on the environment which results from the incremental impact of the proponent project or action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions.
- ▶ Space crowding and time crowding
- ▶ CEAM



Step-wise Processes

- ▶ USA-CEQ has 11 steps
- ▶ 5 steps and 12 sub-steps in Canadian process
- ▶ 6 steps - CIAM (private sector development banks)
- ▶ USA highway
- ▶ 8 steps - coal-mine protocol -- Australia
- ▶ SEA and incorporation of CEAM studies



Direct and Indirect Effects

- ▶ From construction and operational phases
- ▶ Federal laws and executive orders
- ▶ BPPs for impact assessment (IAIA)
- ▶ Sources of information on direct and indirect effects of multiple types of projects - professional books and reports
- ▶ Professional books on health and social impact assessment
- ▶ Environmental health and safety guidelines - World Bank, etc.
- ▶ Water resources projects
- ▶ Example - cumulative effects on fish habitat and fish populations



Selecting VECs and Boundaries

- ▶ Soliciting CEAM Information in Public and Agency Scoping
- ▶ Scoping Meetings
- ▶ Documentation of Findings (VECs, space, time)
- ▶ Scoping Reports
- ▶ ORMSS Study (continuous scoping)



Selecting Actions

- ▶ USA Case Law
- ▶ Identify past and present actions
- ▶ RFFAs – when to occur, where, size, contributions to CEAM studies
- ▶ Document selections and describe omissions



Connector Methods for VECs

- ▶ Summary tables of features of primary connector methods and special connector methods
- ▶ Suggestions related to developing CEAM interaction matrices
- ▶ Cause-effect networks
- ▶ Conceptual models



VEC-Related Methods

- ▶ Tools for predicting cumulative effects
- ▶ Use scientifically-based prediction methods
- ▶ Table 8.2 – 22 types of methods and 7 study activities
- ▶ Table 8.4 – CEAM methods and tools – (referrals to Canter 1996)
- ▶ Many tools – indicators, indices (water quality), Indices of Biological Integrity (IBIs), etc.



- ▶ Managing downstream flows
- ▶ Biodiversity and ecosystem services
- ▶ Greenhouse gases and climate change (GHG emissions, assessing impacts, climate change effects, and adaptation)



Significance Determinations

- ▶ Context and 10 intensity factors for cumulative effects
- ▶ Example – features of Clean Water Act – specific protocols
- ▶ Lawrence (2007)
 - Technical (scientific) approach
 - Collaborative approach
 - Reasoned argumentation approach
- ▶ Installation Natural Resources Management Plan; and Installation Cultural Resources Management Plan



Environmental Sustainability

- ▶ Definitions of VEC-related sustainability and/or sustainable development
- ▶ Environmental sustainability becoming more used in CEAM work
- ▶ Can develop organized protocols by VECs – can use to develop future plans for enhancing VECs such as water and sediment quality
- ▶ Need to think in a systematic manner
- ▶ Use Expert Elicitation Process involving topical VEC-related experts



Adaptive Management

- ▶ Monitoring and adaptive management related to direct, indirect and cumulative effects
- ▶ Develop means to reduce undesirable effects
- ▶ IAIA – Best Practice Principles for EIA Follow-up
- ▶ Six fundamental elements in water resources



Adaptive Management, cont.

- Six fundamental elements in water resources
 - Management objectives
 - Model of system
 - Range of management choices
 - Monitoring and evaluation of outcomes
 - Incorporating learning in future decisions
 - Collaborative structure for stakeholder participation and learning
- ▶ U.S. Department of Interior



Mitigation and Regional Management

- ▶ Mitigation of effects of proposed project or action (sponsor is responsible) – local area
- ▶ Management – larger scale, need collaboration from sponsor and other past, present, or future actions (larger area to regional area)
- ▶ Governmental environmental programs – VEC standards, restoration, and remediation (improvements)



Communication of CEAM Findings

- ▶ Use as basis for decision-making
- ▶ Explanation of findings
- ▶ Numerous appendices may be required



12 Suggestions for CEAM Studies

1. Become familiar with terminology – CEAM, VECs, etc.
2. Incorporate a CEAM-focused segment within public and agency scoping processes.
3. Query, select, and summarize appropriate Internet and governmental and private sector sources of information (past to future).
4. Document selection of VECs and spatial and temporal boundaries for the CEAM study.



12 Suggestions for CEAM Studies, cont.

5. Think like you are one or more of identified study VECs, and consider the cumulative consequences on each of the VECs.
6. Identify and classify actual or potential contributed effects of past, present, and future actions within spatial and temporal study boundaries.
7. Address relative impacts of proposed projects or actions, along with the impacts of other past, present and future actions, within the spatial and temporal boundaries.



12 Suggestions for CEAM Studies, cont.

8. Develop and implement appropriate local mitigation measures for the incremental effects of the proposed project or action on selected VECs.
9. Explore systematic collaboration with other governmental or private sector companies which could contribute to reductions in cumulative effects on selected VECs.
10. Recognize that cumulative effects on specific VECs can serve as integrators of project or action effects at local and regional levels.



12 Suggestions for CEAM Studies, cont.

11. As appropriate, consider VEC-to-VEC relationships within CEAM studies.
12. The study team should give early attention to developing topical outlines which are focused on information gathering, selection of VECs and boundaries, and the incorporation of direct, indirect, and cumulative effects.



To learn more about CEAM

- ▶ Cumulative Effects Assessment and Management by Dr. Larry Canter, published in 2015 by EIA Press. Available for purchase at www.eiatraining.com
- ▶ Cumulative Effects Assessment Training courses available at www.EIACampus.com

