Cumulative Impact Assessment
Determining the Significance of Impacts

January 2018

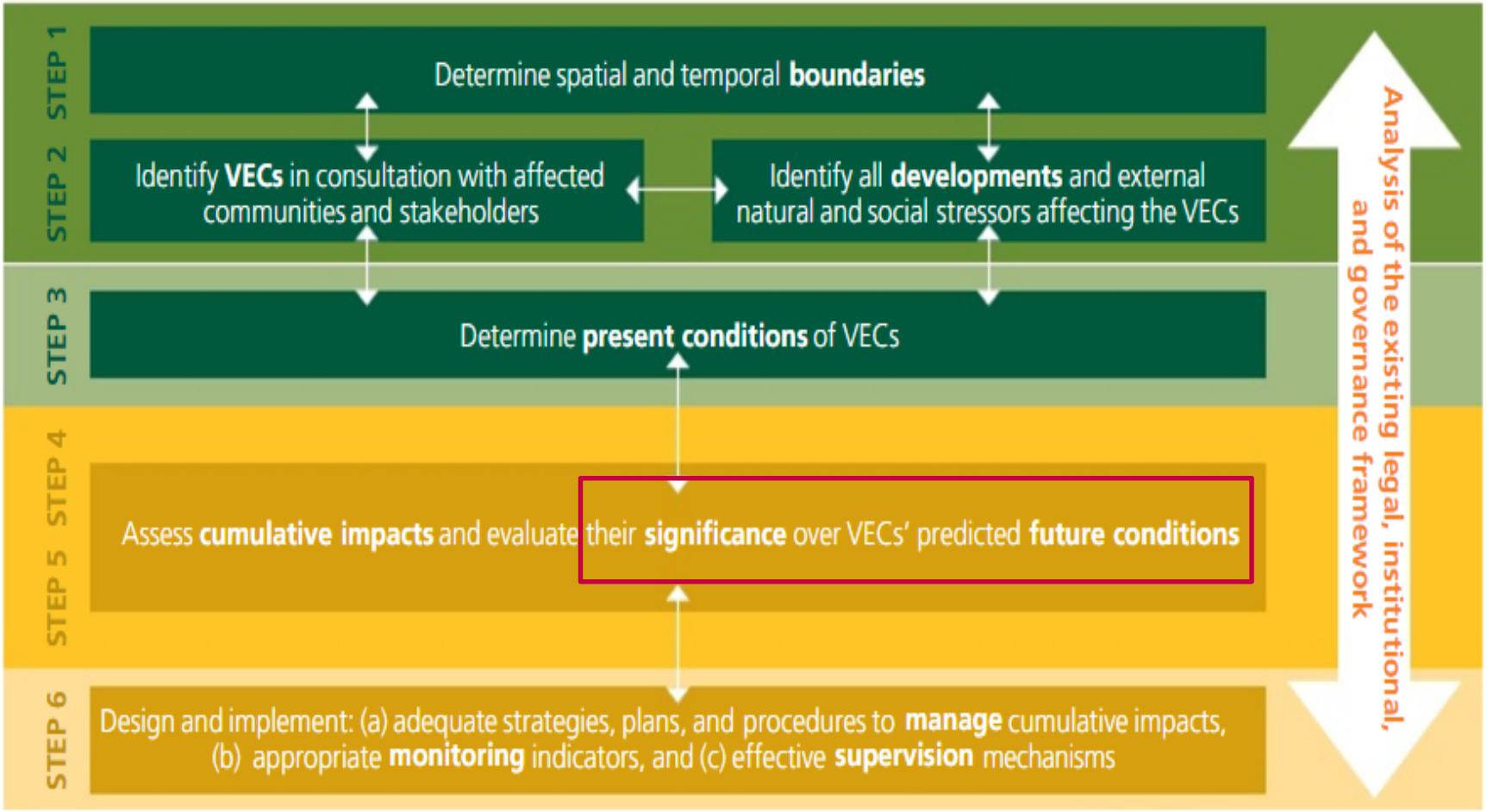
The business of sustainability

ERM

CIA is Challenging

- Lack of data on baseline conditions
- Determining likelihood of future developments
- Obtaining data on future developments
- Assessing climate change and predicting natural stressors
- Incorporating community concerns
- Understanding and quantifying additive (1+1+2) or synergistic (1+1=3) effects
- *Determining significance of impacts*

Determining "Significance" in the CIA Process



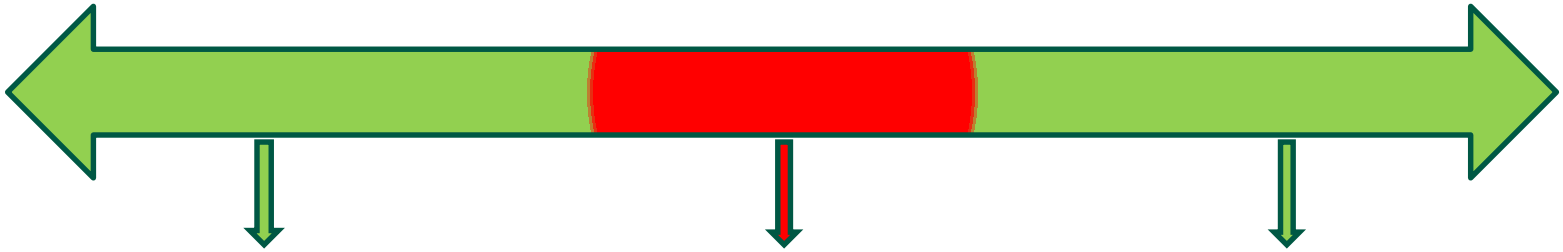
Definition of "Significance"

sigˈnifikəns/
noun
1. the quality of being worthy of attention; importance.
synonyms: importance, import, consequence, seriousness, gravity, weight, magnitude, momentousness; "a matter of considerable significance"

- Sounds simple, but it gets complicated quickly:
  - Significant to who?
  - Significant at what scale?
  - At what point does something become significant?
- "Determination of significance can be difficult and it is often controversial" (IFC, 2013)

Significance Continuum

Not Significant Where is the breakpoint? Significant



Relatively Easy to Determine	Difficult to Determine	Relatively Easy to Determine
• Physical – water quality meets regulatory standards • Biological – 5% reduction in mahaseer pop. (EN) • Social – whitewater boating season reduced by 5%	• Physical – water quality may be unsafe for livestock • Biological - 40% reduction in mahaseer pop. (EN) • Social – whitewater boating season reduced by 40%	• Physical – water quality is unsafe for human consumption • Biological - 95% reduction in mahaseer pop. (EN) • Social – whitewater boating season reduced by 80%

Factors to Consider

- Extent of impact
- Sensitivity of the VEC
- Resilience of the VEC
- Persistence of impacts
- Status of VEC – what condition is the VEC in now
- Societal value – does this VEC hold special societal value?

- Probability of impact – how likely development/stress will occur?
- Degree of uncertainty – how confident are we about the magnitude of impact?

Questions to Answer

- Do these impacts affect the sustainability or viability of the VEC? For example, with Biological VECs
  - How much of the original or current population/habitat area would be affected?
  - What degree of recovery of the population or habitat is possible (complete, partial, none)?
  - How soon would restoration to acceptable conditions occur (e.g., <1 generation, 1 – 2 generations, more?)
- What are the consequences or trade offs of action versus no action?
- What is the likelihood of success of potential mitigation measures?

Approach to Determining Significance

1. Determine risk
2. Define appropriate threshold for VEC
3. Determine magnitude of impact
4. Compare Impact with Threshold

Step 1: Determine Risk

- Based on sensitivity and likelihood of effect
- Example – Golden mahseer (*Tor putitora*)
  - Sensitivity: High - migratory species classified as EN
  - Likelihood of Effect: High - dams have been documented as a major cause of reduction in mahseer population
- Example – Aquatic Ecosystem Integrity
  - Sensitivity: Medium - rivers are sensitive but resilient
  - Likelihood of effect: High - dams alter riverine hydrology and ecology - high

SPECIES SENSITIVITY	LIKELIHOOD OF EFFECT			
	High	Medium	Low	Negligible
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Minor	Negligible

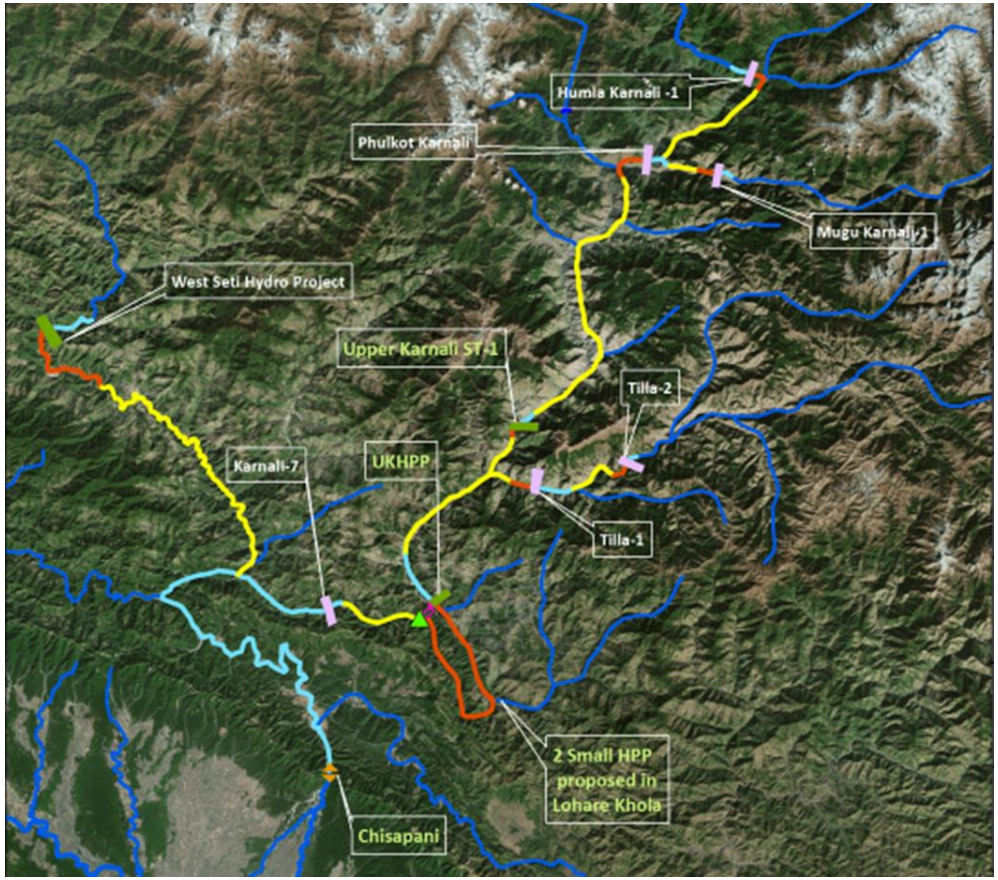
Step 2: Define Appropriate Threshold for VEC

- Thresholds should reflect scientific data, society values, and stakeholder concerns
- Determining thresholds can be difficult
- Potential Methods
  - Physical VECs - regulatory/engineering standard
  - Biological VECs - conservation guidance/Carrying Capacity/PVA
  - Social VECs – Limits of Acceptable Change
- Often application of professional judgement is required, but need to document rationale

Ecological category	Description of the habitat condition
A	Unmodified. Still in a natural condition.
B	Slightly modified. A small change in natural habitats and biota has taken place but the ecosystem functions are essentially unchanged.
C	Moderately modified. Loss and change of natural habitat and biota has occurred, but the basic ecosystem functions are still predominantly unchanged.
D	Largely modified. A large loss of natural habitat, biota and basic ecosystem functions has occurred.
E	Seriously modified. The loss of natural habitat, biota and basic ecosystem functions is extensive.
F	Critically / Extremely modified. The system has been critically modified with an almost complete loss of natural habitat and biota. In the worst instances, basic ecosystem functions have been changed and the changes are irreversible.

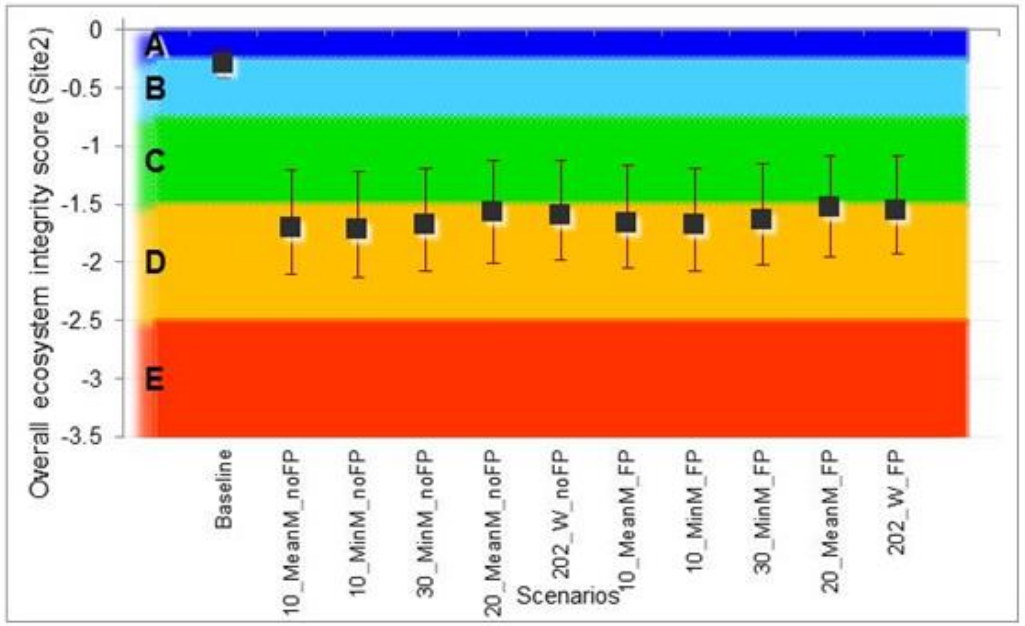
Step 3: Determine Magnitude of Impact

- Typical Methods
  - Historic trends
  - Scientific knowledge
  - Other project experience
  - Quantitative assessment
    - DRIFT Model
    - HEC-RAS
- Typically significance is evaluated after mitigation measures are considered (i.e., residual impacts)



Step 4: Compare Impact with Threshold

- Is Impact > Threshold?
- No – congratulations!!!
  - But you should still monitor
- Yes/Maybe - now what do you do?
  - Reduce magnitude of impact by applying the Mitigation Hierarchy
    - Avoid/Minimize/Restore/Offset
  - Manage Uncertainties using Adaptive Management
    - Establish “Triggers”
    - Monitor
    - Adapt



धन्यवाद !!!

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