IFC GOOD PRACTICE HANDBOOK ON CIA

SIX-STEP APPROACH

IFC International Finance Corporation WORLD BANK GROUP

In partnership with

Australian Aid

Pablo Cardinale
pcardinale@ifc.org

INTRODUCTION TO CONCEPTS

Common understanding of principles, basic concepts and terminology of Cumulative Impact Assessment and Management.

CUMULATIVE IMPACT

"The environmental and social impacts that result from the incremental impacts of one action/activity when added to past, present, and reasonably foreseeable future actions/activities."

The major environmental and social management challenges that we face today – loss of biodiversity, the decline of ocean fisheries, and climate change - are all the result of cumulative impacts from a large number of activities that are for the most part individually insignificant, but which together have had global repercussions.

FIND THE ORDER

18 5 41 9 1 76 3 22

Eighteen, five, forty-one, nine, one, seventy six, three, twenty two

CIA : We use same tools as ESIA, same information, data, similar uncertainties, knowledge, BUT a different perspective

LOGICAL FRAMEWORK

- Scoping.
- Description of Environment and Social characteristic/ Potential Impacts.
- Determination of Consequences: Significance of Impacts.
- Effect/Impact Management: Mitigation Hierarchy: avoid, minimize, mitigate or compensate.

ESIA vs CIA

Basic Conceptual Assessment Paradigm Change

1. Focus: Project Impacts vs Condition of Valued Environmental and Social Components (VECs).

2. Scope: Expanded spatial and temporal boundaries for the analysis.

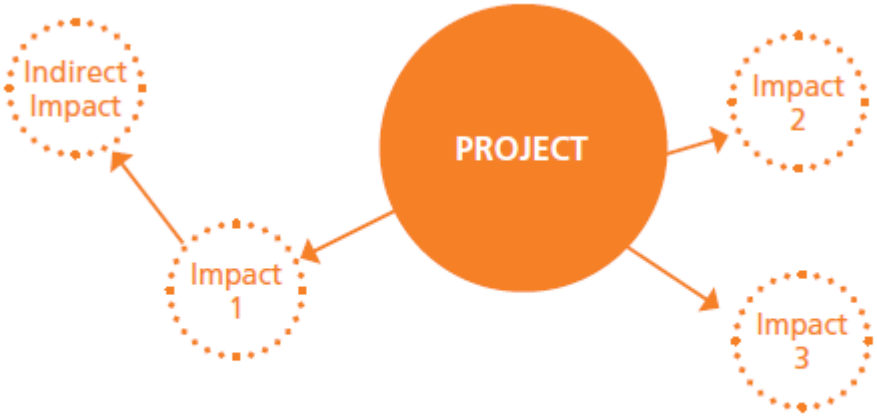
VALUED ENVIRONMENTAL AND SOCIAL COMPONENTS (VEC)

Sensitive environmental or social receptors, affected resource, ecosystem, or human community:

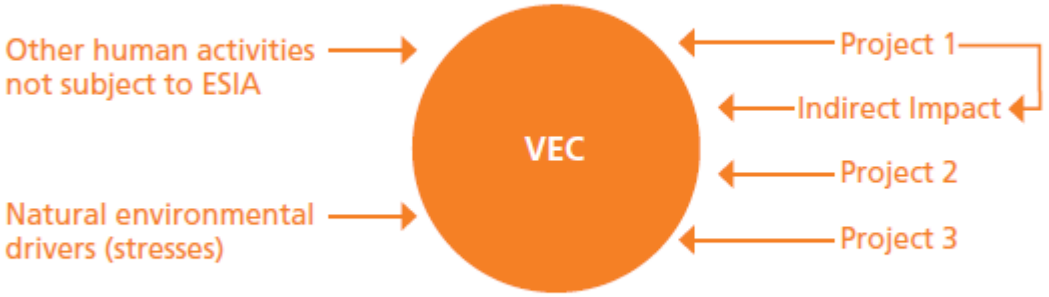
- ***Air shed.***
- ***Watershed.***
- ***Forest resource.***
- ***Resident wildlife.***
- ***Migratory wildlife.***
- ***Fisheries resource.***
- ***Historic / Socio-cultural resource.***
- ***Land use.***
- ***Community Structure.***
- ***Coastal zone.***
- ***Recreational.***

FOCUS: PROJECT CENTERED vs VEC CENTERED

ESIA

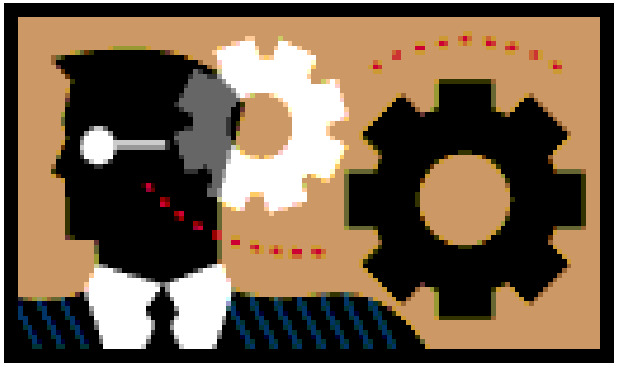


CIA



In partnership with

The different views taken in ESIA and CIA can be seen in how indicators are used to characterize an impact. In the case of ESIA indicators may be chosen to reflect the incremental change in a VEC, while in CIA indicators are chosen to reflect the resulting condition of the VEC.



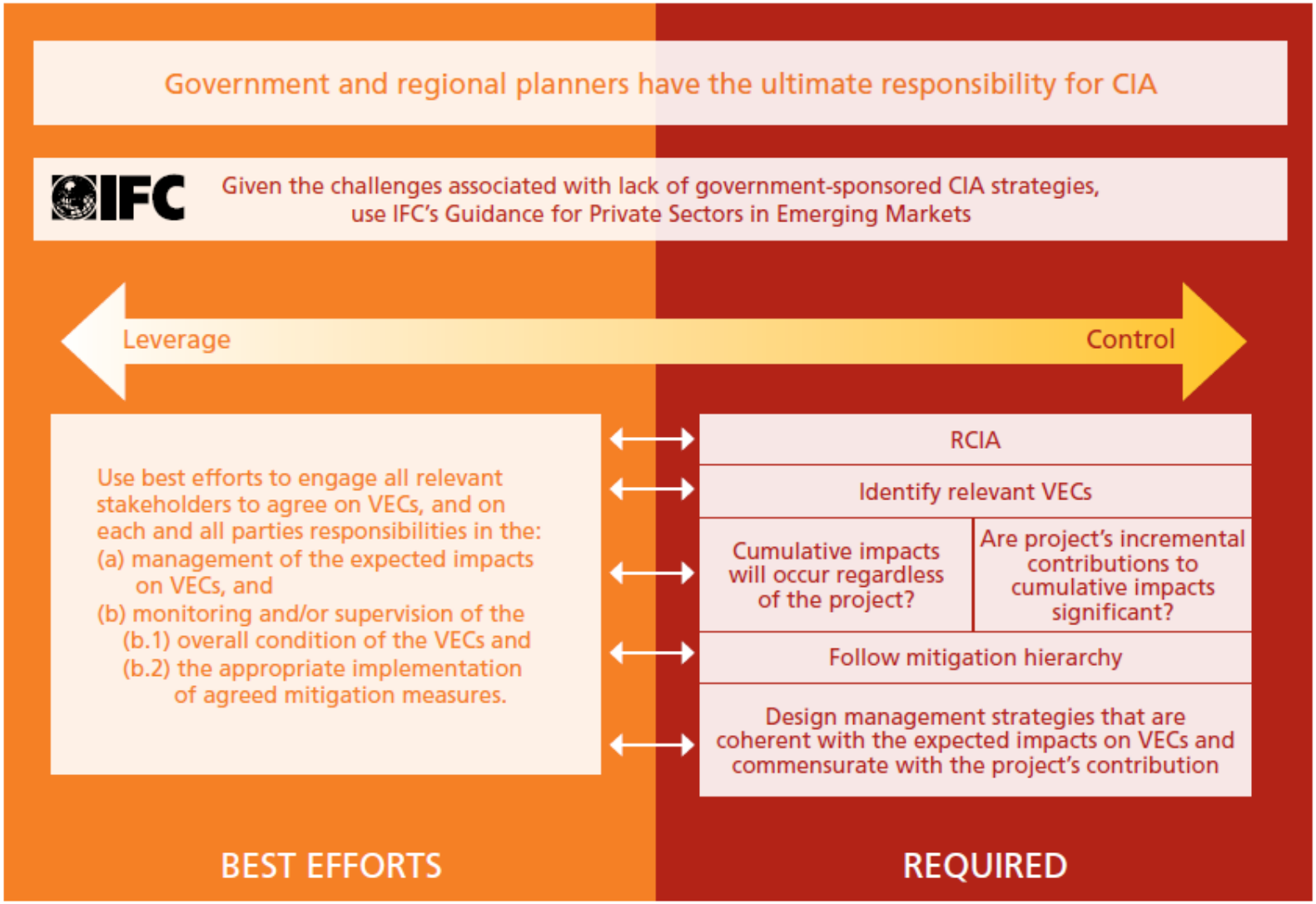
TYPES OF CUMULATIVE IMPACTS

Type	Main Characteristic	Example
Time crowding	Frequent and repetitive	Fish passing through cascading turbines.
Time lags	Delayed effect	Exposure to carcinogens
Space crowding	High density of effect on VECs	Discharges into stream from several mines
Cross-boundary	Away from the source	Acid rain
Fragmentation	Change in landscape pattern	Migratory routes fragmentation from cascading dams.
Compounding effects	Effects from multiple sources or pathways	Synergism among pesticides
Indirect effects	Secondary effects	Induced development after highway construction
Triggers and thresholds	Changes in systems or structure	Climate change

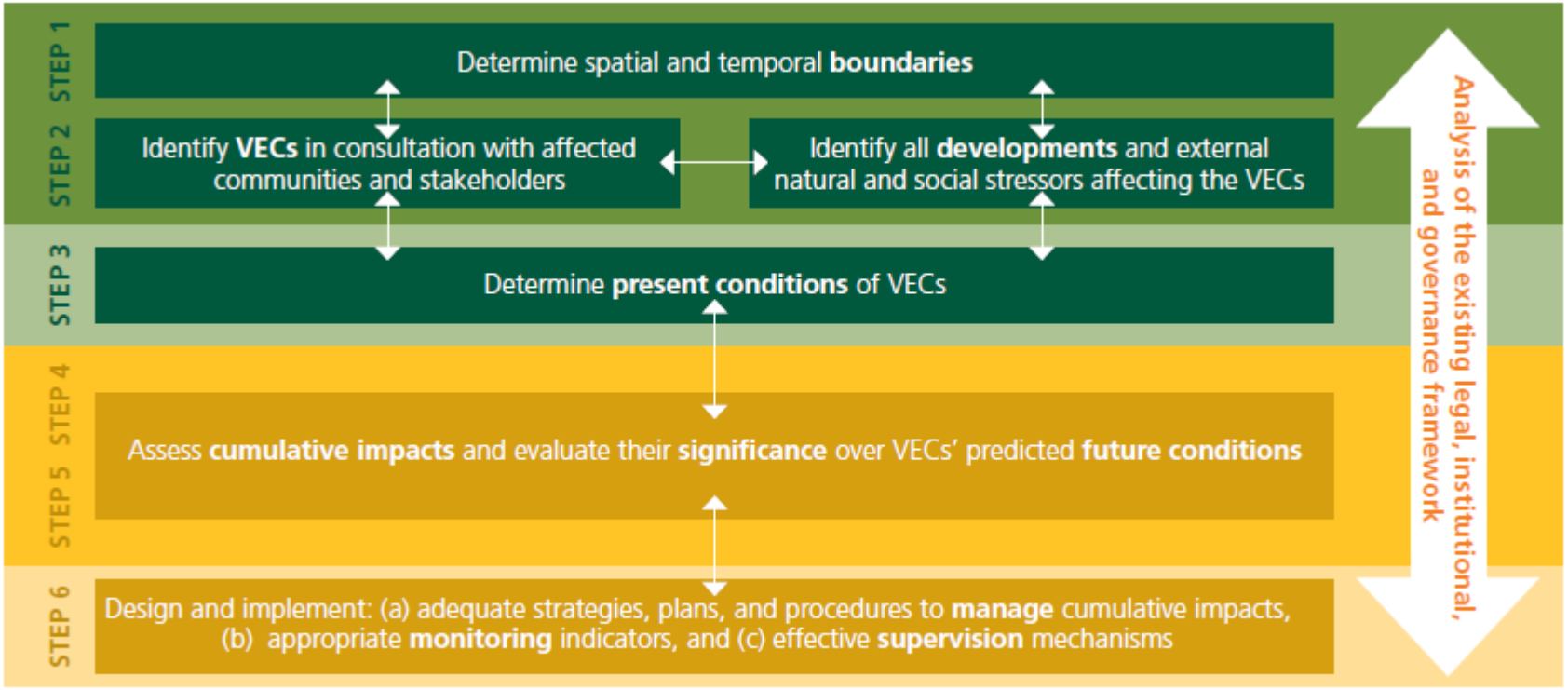
VEC	Cumulative Effect / Change of condition
Air	•Health hazard, poor visibility from elevated levels of ozone or particulates.
Surface Water	•Water quality degradation from multiple point-source discharges. •Water shortages from uses that exceed capacity
Ground Water	•Aquifer depletion
Land and Soil	•Diminished land fertility / productivity
Wetlands	•Diminished flood control capacity
Ecosystems	•Habitat fragmentation •Loss of fish and wildlife populations
Socioeconomics	•Overburden services •Unstable labor markets
Community structure	•Changes in community dynamics as a result of displacement of critical community members.
Cultural Resource	•Cultural site degradation / vandalism •Fragmentation of historic district

Reference: CEQ NEPA (1997)

IFC PROPOSED APPROACH



SIX-STEP PROCESS



In partnership with
IFC International Finance Corporation WORLD BANK GROUP
Australian Aid

CIAM - SIX STEP PROCESS

Step 1: Scoping I: VECs & Boundaries

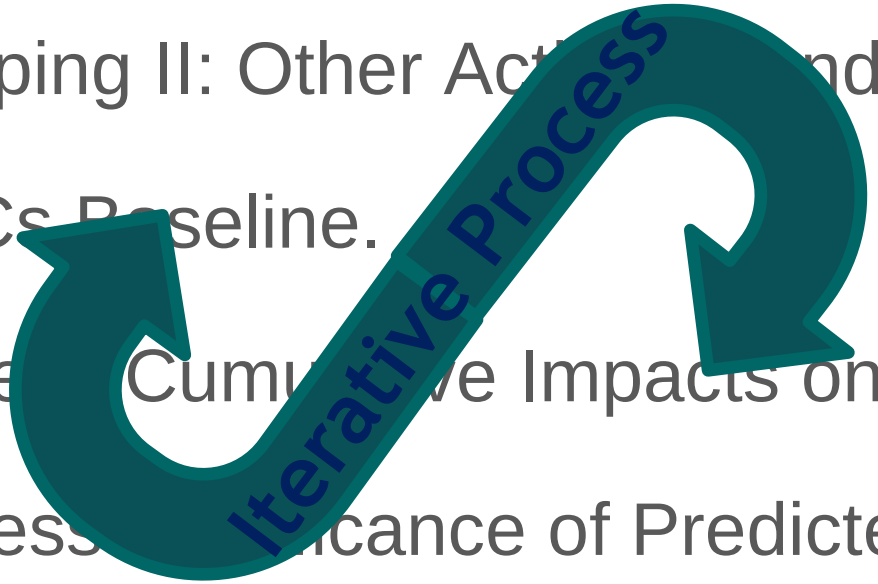
Step 2: Scoping II: Other Act[illegible]nd Drivers.

Step 3: VECs B[illegible]seline.

Step 4: Asse[illegible] Cumu[illegible]ve Impacts on VECs.

Step 5: Assess[illegible]icance of Predicted Cumulative Impacts.

Step 6: Design Management Strategies.



STEP 1: SCOPING I: VECS & BOUNDARIES

Objectives:

- Identify and agree on VEC consulting with all relevant stakeholders.
- Include past, present and foreseeable future activities.
- Establish the geographic scope of analysis.
- Focus on meaningful impacts/ effects.

Questions to answer:

- Who needs to be involved?
- Which are the resources, ecosystem or human activities affected (i.e. VECs)?
- Which of these effects may be important from a cumulative effect perspective?

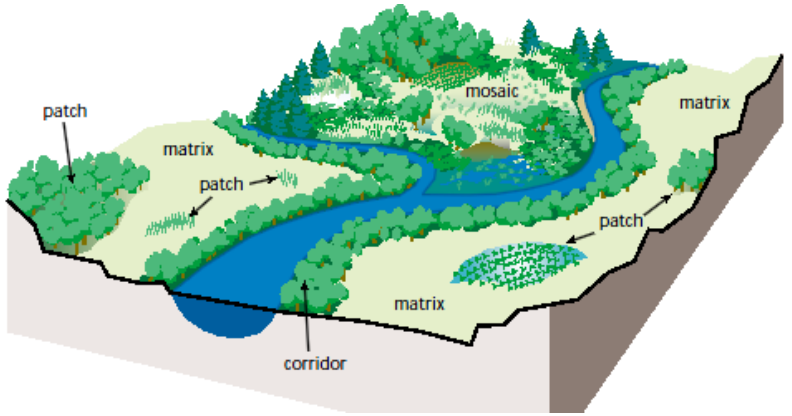
In partnership with
IFC International Finance Corporation WORLD BANK GROUP
Australian Aid

STEP 1: BOUNDARIES

Geographical:

Ecological/Social Relevance:

- Watershed, Air shed
- Human community
- Landscape Level



Rules of Thumb:

- Area that will be affected by the action
- List of resources within that area
- Wider area occupied by those resources
- Consider the distance an effect can travel

STEP 1: BOUNDARIES

Temporal:

- Past, existing activities.
- Foreseeable planned activities.
- Reasonably predicted.

Rules of Thumb:

- Timeframe of effect of proposed action.
- Determine if effect can last longer than the timeframe of proposed action.
- Balance between overestimate/underestimate
- Exclude futures action if (a) outside geographical boundary, (b) does not affect VEC, or (c) its inclusion seems arbitrary.

Boundaries are expanded to the point at which the resource is no loner affected significantly or the effects are no longer of interest to the affected parties.

STEP 1: HOW IS THIS DONE?

Sector/Regional assessment.

Known cumulative impacts within a Region.

Concerns from stakeholders/ affected communities – Consultation.

ESIA/CIA from other developments.

Information from NGOs.

Good common sense!!!!

STEP 1: EXPECTED OUTCOME

List of VECs to be analyzed:

- Few, agreed by stakeholders, relevant.

Define boundaries:

- Geographical limits.
- Timeframe of analysis.

STEP 1: CLOSING REMARKS

Scoping has to be reasonable – but at the same time it has to provide assurance that cumulative environmental and social impacts will not threaten the project or that the project will not contribute to serious long-term degradation of environmental and social conditions;

Scope creep should be prevented; expansion of the CIA scope beyond the impacts and risks related to a project is not good practice;

Focus on a small number of key VECs. But to identify the correct issues, careful analysis, skilled expertise and effective engagement and input from stakeholders all are needed to do scoping well.

STEP 2: SCOPING II: OTHER ACTIVITIES AND DRIVERS

Objectives:

- Identify other past, existing, or planned activities within the analytical boundaries.
- Assess potential present of natural influences/ stressors. (e.g. droughts, extreme climatic events).

Questions to answer:

- Are there any other existing or planned activities affecting the same VEC?
- Are there any natural forces / phenomena affecting the same VECs?

STEP 2: HOW IS IT DONE?

Types, distribution, and intensity of key activities.

Classify activities / common characteristic / triage importance – impossible and impractical to do an inventory of all activities.

Based on existing knowledge (e.g. increase population greater pressure on biodiverisity or water withdrawals greater impact during droughts).

In partnership with
IFC International Finance Corporation WORLD BANK GROUP
Australian Aid

STEP 2: EXPECTED OUTCOME:

List of potential stressors on selected VECs:

- Past, existing, and planed activities that could affect/ stress the condition of the VEC.
- Natural drivers that could exert an influence on VEC condition.

STEP 3: VEC STATUS / BASELINE

Objectives:

- Define existing condition of VEC.
- Understand its potential reaction to stress - resilience / recovery time.
- Assess trends.

Questions to answer:

- What is the existing condition of the VEC?
- What are the indicators used to asses such condition?
- What additional data is needed?
- Who may already have this information?

STEP 3: HOW IS THIS DONE?

Define Indicators, Trends and Thresholds:

Data intensive – but many sources available (e.g. EISA, schools/universities, research institutes, government agencies, historical societies, NGO, individuals, etc).

Define appropriate indicators.

Refer to existing regulations (e.g. water quality/ air quality).

Understand VECs – trends / thresholds.

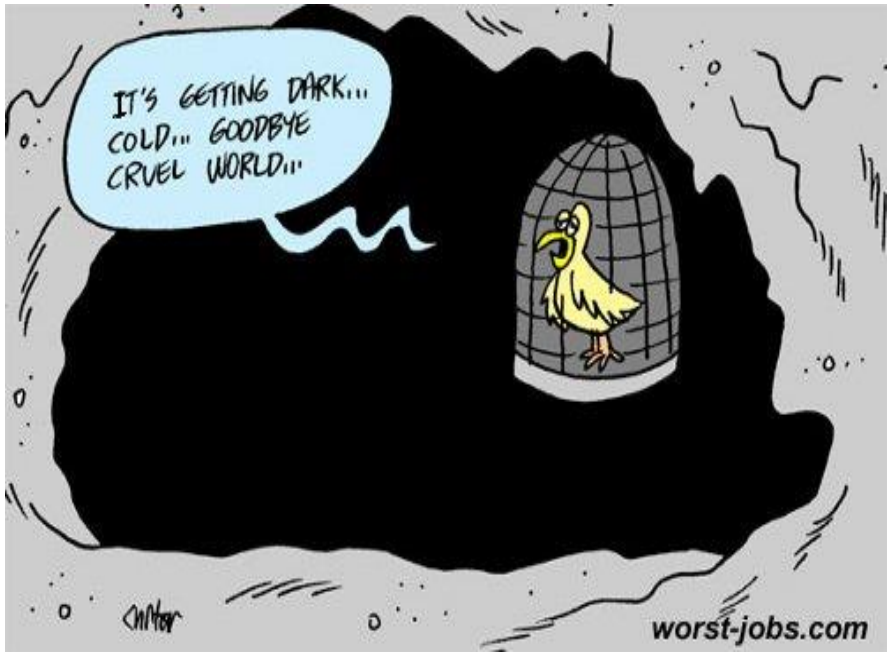
STEP 3: INDICATORS

Exposure oriented:

- Contaminant concentration level.

Effect oriented:

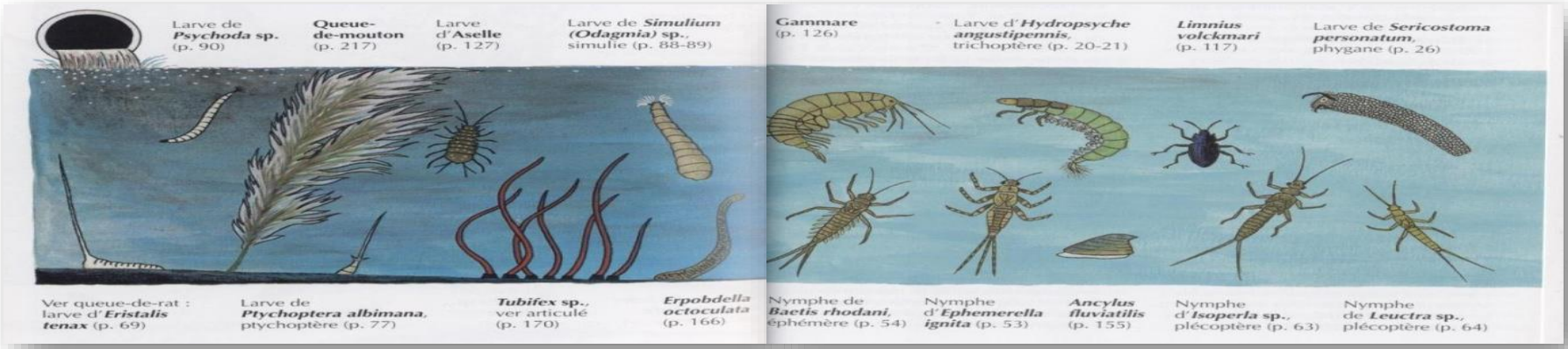
- Loss of biodiversity.
- Population characteristics.



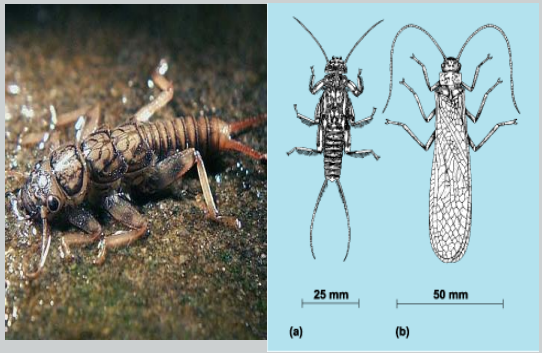
STEP 3: INDICATORS

Effect Oriented:

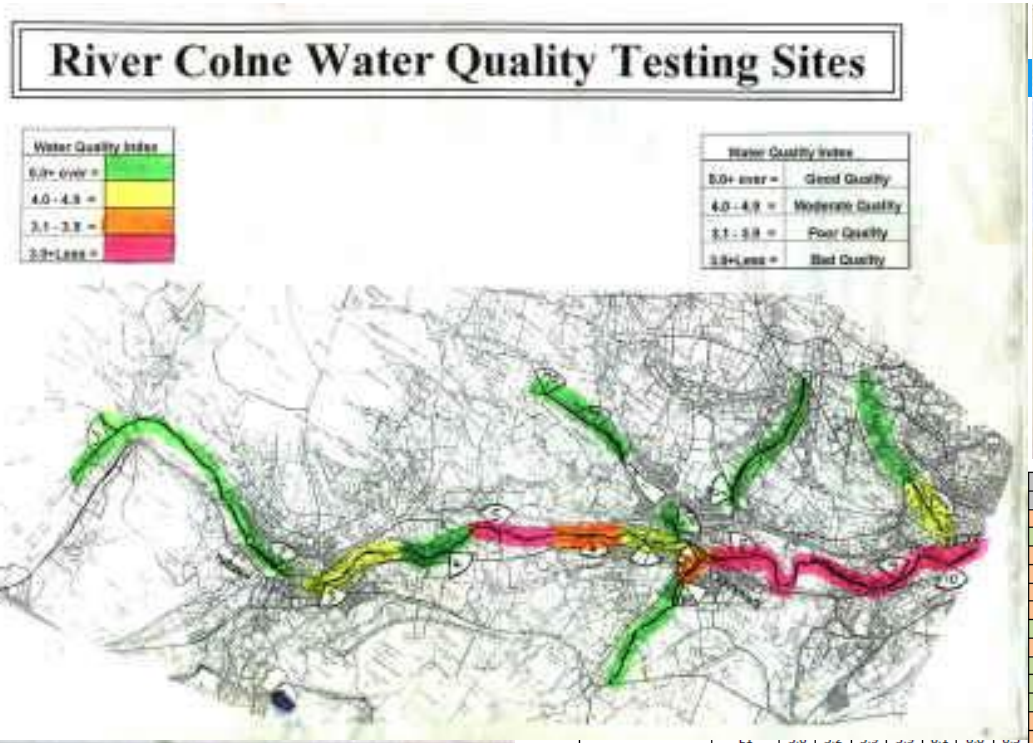
- Biological Indexes: good integrators of multiple stresses over time.
- Habitat fragmentation: ground cover, patterns, connectivity.
- Landscape Metrics.
- GIS/ remote sensing/ satellite imagery.
- Social Indexes: quality of life, social service coverage, accessibility, etc.



Biological Monitoring Working Party - BMWP

Chironomidae. Family known to be pollution tolerant		**RED**
Plecoptera. Family characteristic of good water quality.		GREEN

BMWP INDEX



									Salud						
									C1	C2	C3	C4	C5	C6	C7
HLC	El Manzano	E2	5,6	0,0	0,0	4,0	0,0	5,7	0,0	Regular	Mala	Mala	Mala	Regular	Mala
		E3	6,6	5,4	5,8	6,8	7,2	6,1	7,0	Buena	Mala	Regular	Muy Buena	Muy Buena	Regular	Muy Buena
		E4	7,3	6,1	6,0	4,0	6,6	3,8	7,0	Muy Buena	Regular	Regular	Mala	Buena	Mala	Muy Buena
	El Rápido	E1	4,6	5,6	5,9	5,7	6,8	5,6	5,6	Buena	Muy Buena	Muy Buena	Muy Buena	Muy Buena	Muy Buena	Muy Buena
		E2	4,0	4,0	4,0	5,7	4,7	5,6	6,0	Buena	Buena	Buena	Muy Buena	Buena	Muy Buena	Muy Buena
		E3	6,0	5,6	4,8	5,1	5,7	4,9	5,3	Muy Buena	Muy Buena	Buena	Buena	Muy Buena	Buena	Muy Buena
		E4	5,9	5,2	5,0	5,0	4,6	5,2	5,4	Muy Buena	Muy Buena	Buena	Buena	Buena	Muy Buena	Muy Buena
	Portal Portillo	E3	7,2	6,5	5,4	5,5	6,5	6,8	6,7	Muy Buena	Buena	Regular	Regular	Buena	Buena	Buena
		E4	6,0	6,4	6,4	6,1	6,5	5,6	6,6	Muy Buena	Buena	Buena	Regular	Buena	Regular	Buena
	Portal Tinguiririca* El Ciruelo	E1	4,9	NA	5,1	5,0	5,1	NA	NA	Muy Buena	NA	Muy Buena	Muy Buena	Muy Buena	NA	NA
		E2	5,3	4,5	4,0	5,3	4,9	NA	NA	Muy Buena	Buena	Buena	Muy Buena	Muy Buena	NA	NA
		E3	5,9	4,7	4,4	4,3	6,7	5,3*	NA	Muy Buena	Buena	Buena	Buena	Muy Buena	Muy Buena*	NA
		E4	5,6	4,5	3,3	5,0	6,7	5,1*	NA	Muy Buena	Buena	Buena	Buena	Muy Buena	Buena*	NA
	P4	E3	5,6	5,2	5,7	6,0	5,4	5,1	4,9	Muy Buena	Muy Buena	Muy Buena	Muy Buena	Muy Buena	Buena	Buena
		E4	5,3	4,0	4,9	5,3	6,7	4,5	5,0	Muy Buena	Buena	Buena	Muy Buena	Muy Buena	Buena	Buena
	H4	E3	5,7	5,0	6,0	4,5	5,7	4,7	4,6	Buena	Regular	Buena	Regular	Buena	Regular	Regular
		E4	5,3	4,6	4,8	4,5	4,0	4,6	4,3	Regular	Regular	Regular	Regular	Mala	Regular	Mala
	Planta de Áridos	E1	5,2	NA	NA	5,7	NA	NA	NA	Muy Buena	NA	NA	Muy Buena	NA	NA	NA
		E2	5,7	6,0	NA	4,7	NA	NA	NA	Muy Buena	Muy Buena	NA	Buena	NA	NA	NA
		E3	5,7	5,5	5,5	4,7	5,7	NA	NA	Muy Buena	Muy Buena	Muy Buena	Regular	Muy Buena	NA	NA
		E4	6,3	7,7	4,6	4,5	5,8	NA	NA	Muy Buena	Muy Buena	Buena	Regular	Muy Buena	NA	NA

NA, No Analizado; C1, Diciembre 2009; C2, Marzo 2010; C3, Junio 2010; C4, Octubre 2010; C5, Enero 2011; C6, Abril 2011; C7, Julio 2011; *, correspondes solo al monitoreo del Portal Tinguiririca.

IFC International Finance Corporation WORLD BANK GROUP

Australian Aid

STEP 3: TRENDS

Need to assess if VEC's condition is stable, deteriorating, improving?

Concept of thresholds

- State beyond which the VEC condition is unsustainable / unviable / degraded.

Concept of recovery / resilience

- Capacity of VEC to sustain itself and remain productive.
- Effects accumulate when second perturbation occurs before the VEC can rebound from the first.

In partnership with
IFC International Finance Corporation WORLD BANK GROUP
Australian Aid

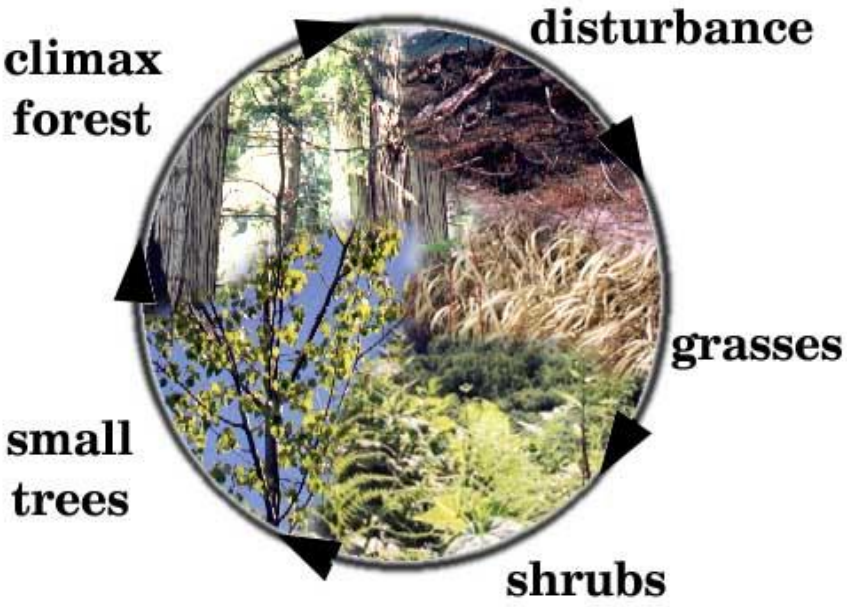
STEP 3: EXPECTED OUTCOME:

Definition of Indicators.

Characterization of VECs:

- Existing condition/ status.
- Historical / expected trends.
- Expected reaction to stress.

Identify data gaps / additio



STEP 4: IMPACT ASSESSMENT

Objectives:

- Identify potential environmental and social impacts and risks.
- Address expected impacts over the condition of the VEC (i.e. sustainability).
- Identify any potential additive, countervalling, and/ or synergistic affects.

Questions to answer:

- What are the key potential impacts and risks that could affect the long term sustainability/ viability of the VEC?
- Are there known/predictable cause-effect relationships?
- Can these impacts/risks interact with each other?

In partnership with
IFC International Finance Corporation WORLD BANK GROUP
Australian Aid

HOW IS IT DONE?

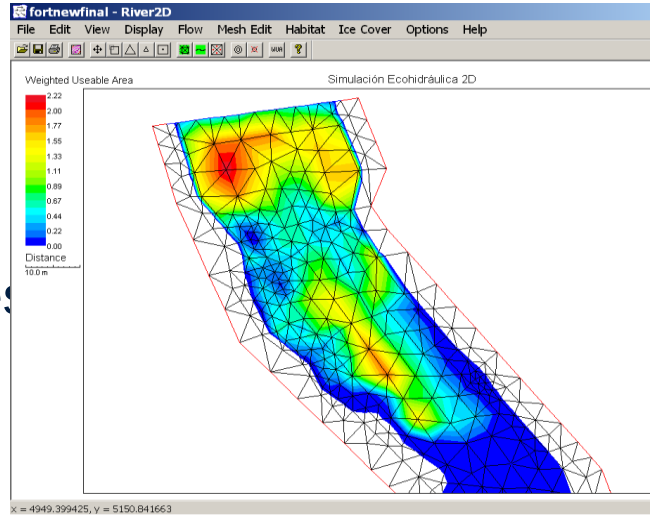
Alternative analysis.

- Hydro vs Thermal vs Nuclear

Cause effect-curves.

- Linear (e.g. additive)
- Non linear (e.g. synergies)

Environmental Changes/Modeling Analysis of res

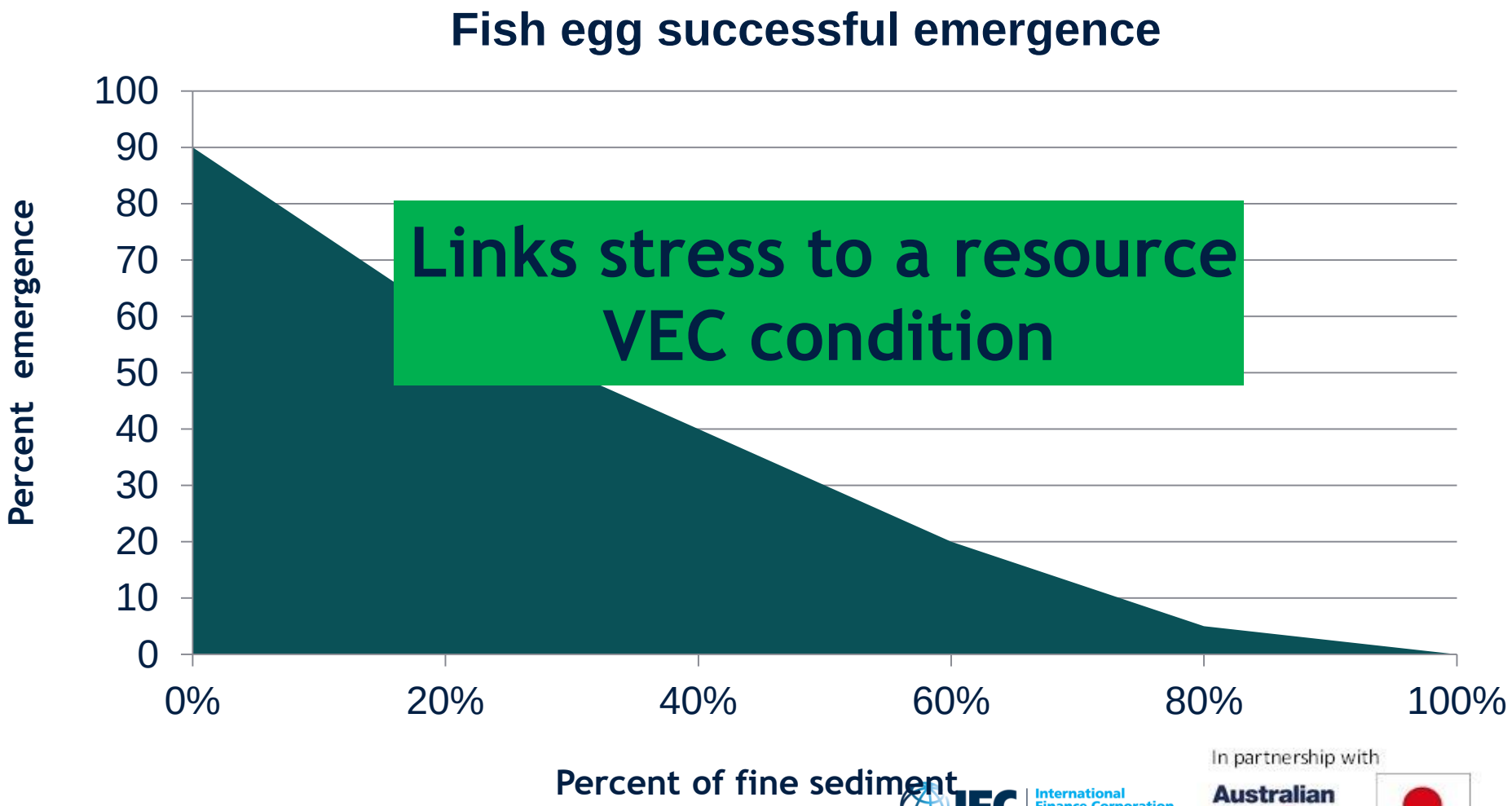


In partnership with

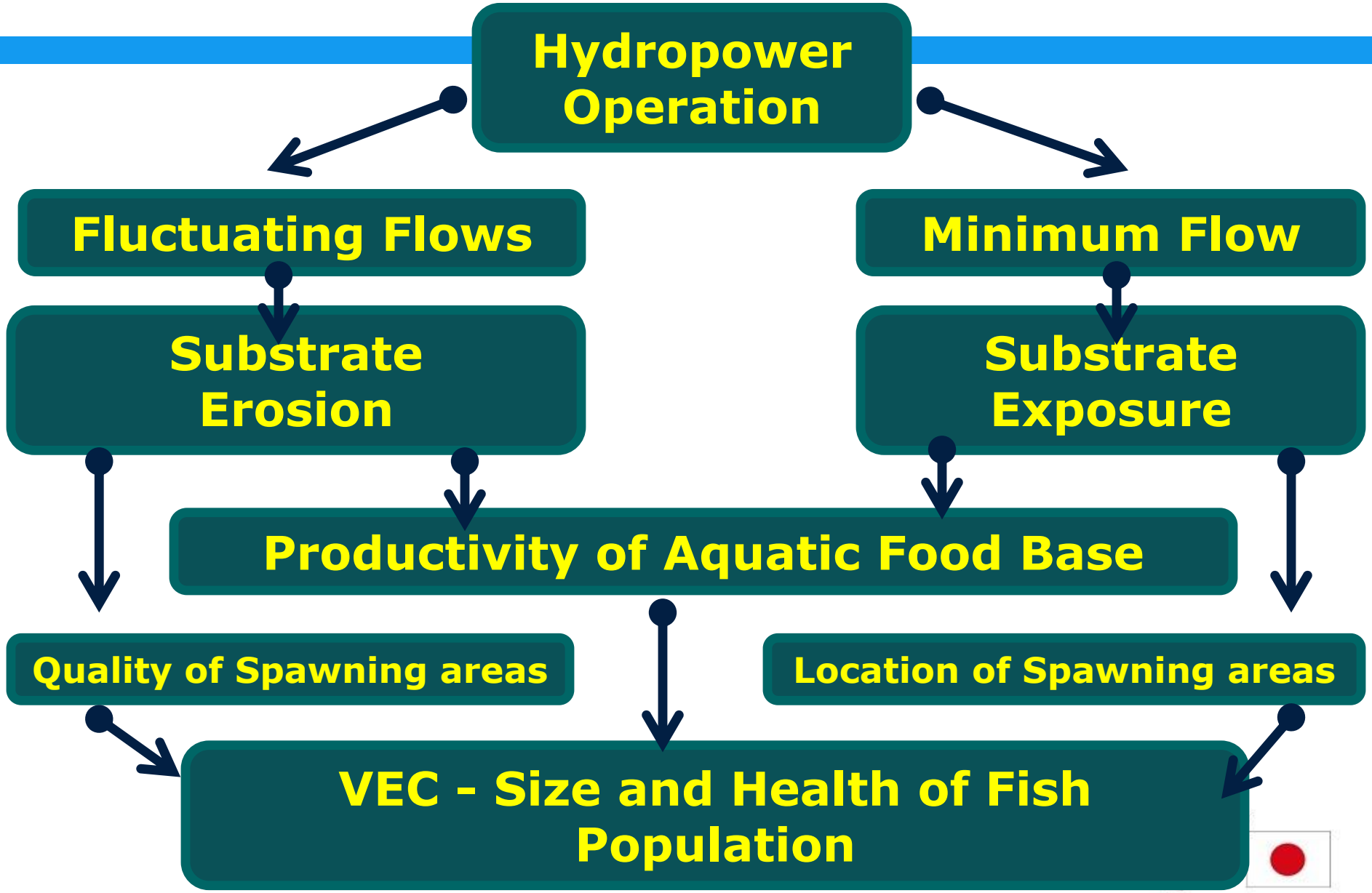
IFC International Finance Corporation WORLD BANK GROUP

Australian Aid

CAUSE-EFFECT CURVE

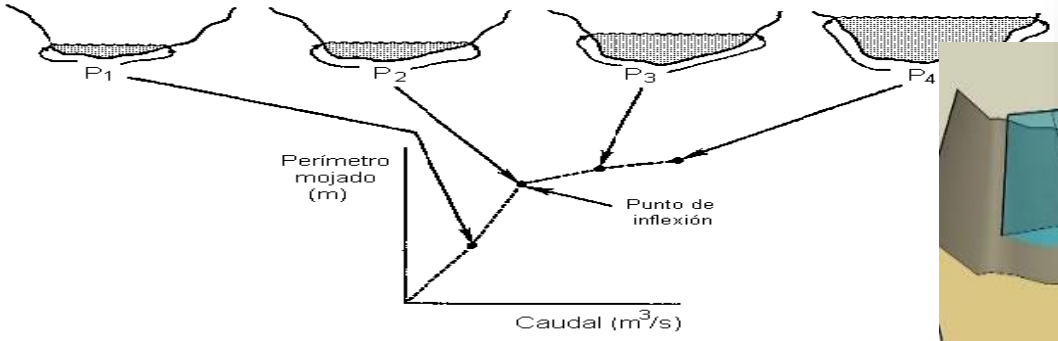


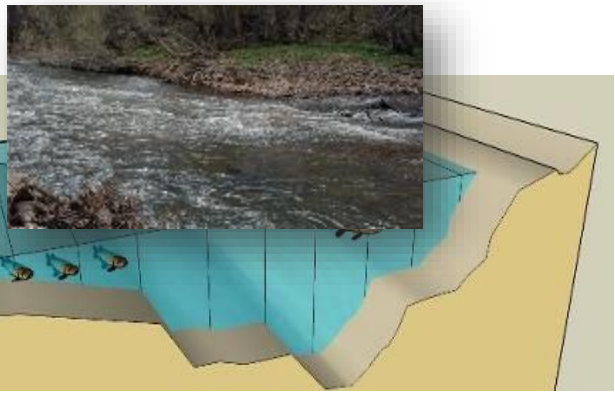
SIMPLE MODEL ANALYSIS



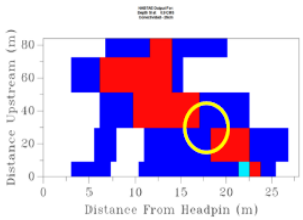
MORE COMPLEX MODELS

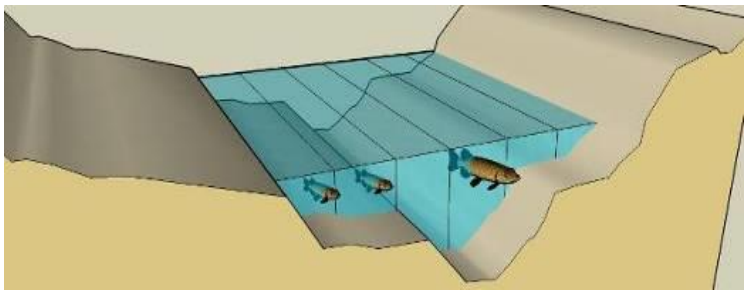
Hydraulic Models or Habitat Preference Models



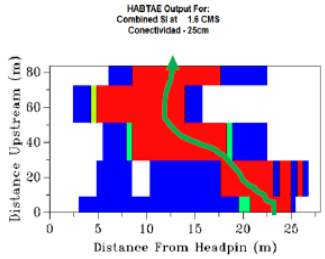


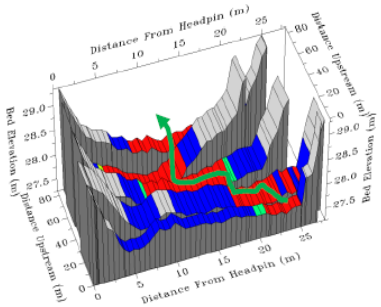
Trucha adulto (25cm) Q = 0.85 m³/s.





Trucha adulto (25cm) Q= 1.50 m³/s





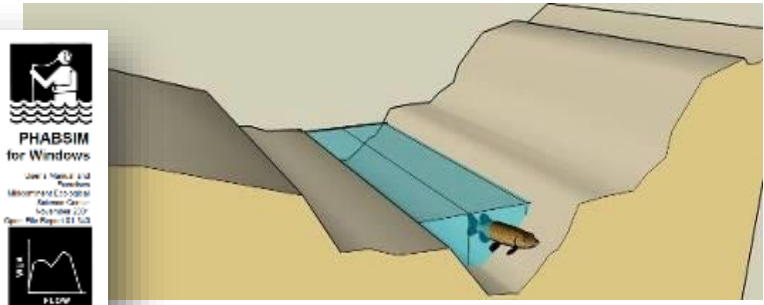
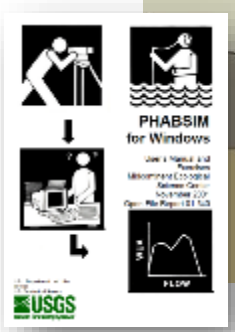


Figura 1. Ejemplo de análisis de conectividad fluvial para la trucha adulta durante caudales bajos. (Arriba) Con 0.85 m³/s el tramo resulta infranqueable debido a la barrera (por caudal) localizada a unos 30 m de abscisado (círculo amarillo). (Abajo) Sin embargo, el tramo se vuelve transitable con 1.50 m³/s al aparecer un camino de paso evidente (flecha verde).



In partnership with

IFC International Finance Corporation WORLD BANK GROUP

Australian Aid

STEP 4: EXPECTED OUTCOME

Impact Matrix.

Cause effect analysis.

Identification of potential linear and non-linear cause-effect relationships (antagonistic/ synergies).

STEP 5: IMPACT SIGNIFICANCE DETERMINATION OF SIGNIFICANCE

Objectives:

- Determine impact and risk magnitude and significance in the context of past, present and future actions.
- Define appropriate "threshold" and indicators.
- Identify trade-off.

Questions to answer:

- Does these impacts affect the sustainability/ viability of the resource / VEC?
- What are the consequences / trade-off of action/ no action?

IFC International Finance Corporation WORLD BANK GROUP

In partnership with Australian Aid

HOW IS IT DONE?

Appropriate baseline/thresholds/indicators.

(e.g. levels of acceptable change)

Historic Trends.

(e.g. 50% of wetland gone – further depletion can significantly reduce the capacity of a watershed to withstand floods)

Ambient Quality.

(e.g. degraded vs non –degraded air-sheds)

Scientific/traditional knowledge.

(e.g. colder water good for trout / warm good for bass)

Experience from similar projects/areas.

(e.g. additive – stress from passing through turbines, slow fish down, more vulnerable to predation / pollution)

STEP 5: EXPECTED OUTCOME:

Definition of acceptable / non acceptable level of impact -> degraded VEC condition.

Agreement on potential trade-off.

Thresholds.

STEP 6: IMPACT MANAGEMENT

Objectives:

- Use mitigation hierarchy.
- Design management strategies to address significant cumulative impacts over selected VECs.
- Engage other parties for effective collaboration.
- Propose mitigation and monitoring program.
- Manage uncertainties with informed adaptive management.

Questions to answer:

- How can cumulative impacts be avoided, minimized or mitigated?
- How can effectiveness of proposed management measures be assessed?
- What are the triggers for specific adaptive management decisions?



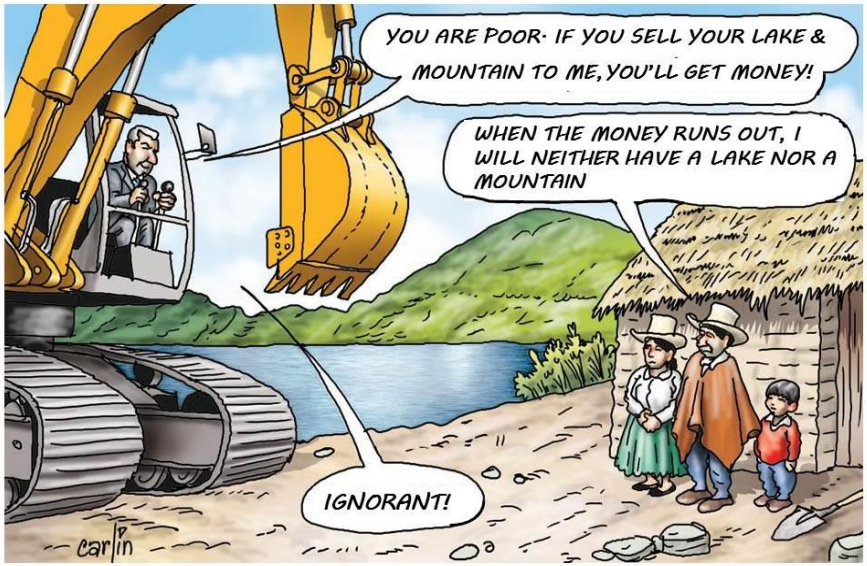
STEP 6: EXPECTED OUTCOME:

Series of tools/plans to manage Cumulative Impacts agreed and to be used by all parties involved.

Acceptance of “uncertainties”.

Monitoring Program.

Adaptive Management Strategy.



Source: http://www.larepublica.pe/carlincaturas/carlincaturas-05032012-2012-03-05 . Reviewed 07 March 2012. Translated: Sandra J. Velarde.

EXPECTED OUTCOMES CIAM

Identification of relevant VECs that may be potentially affected by the development (Stakeholders engagement);

Assessment/estimation of the future condition of affected VECs, as the result of the cumulative impact of the project with other reasonably predictable projects and natural influences;

Evaluation of the future condition of the VECs relative to threshold(s) of VEC condition (Stakeholders engagement);

Avoidance and minimization of the development's impact on the VECs for the life of the development;

Monitoring and management of impacts and risks to the project over its life-span from VECs reaching their limits (Stakeholders engagement);

Compilation and sharing of project-related monitoring and VEC condition data to governments and other stakeholders for the life of the development.

Thank You

धन्यवाद

Gracias