Alternatives Analysis

GEMS Environmental Compliance-ESDM Training Series
Senegal, February, 2014

How do you know what is best?

vs

Both?

vs

Session Objectives:

Alternatives

- *Identify*
- *Define Issues*
- *Screen and Select Alternatives*
- *Analyze and Compare Alternatives*

Why Alternatives

Inherent to good decision making:

- Helps integrate environmental and social sustainability into project planning
- Reg 216 requires alternatives for an Environmental Assessment

Identify:

Alternatives Analysis:

- **Starts during scoping**
  - Consultations can lead to reasonable alternatives that meet the need of the affected community-the community know the area
  - Preliminary Alternatives, area and receptors of influence are an output to scoping but may change during the analysis
- **Is dependent on a strong purpose and need:**
  - A purpose and need statement are the goals and objectives for the project: When, where, what, who, and issues
  - Bounds and narrows the selection of alternatives
- **And rigorous background data**
  - Amount of data collected should be commensurate with the potential significance
  - Baseline data serves as a benchmark for impacts prediction and future monitoring

Identify: cont'd

- **Establish decision criteria for screening and selection final alternative**
  - Use both exclusionary and evaluative criteria for selection of alternatives
- **Find a range of reasonable alternatives:**
  - Reasonable means the alternative is implementable, and/or achieves all or most of the purpose and need
  - Reasonable may also mean financially feasible
  - Financially feasible means a cost benefit analysis should be performed using environmental and social costs as well as the overall project costs
    - Costs may include the cost of lost public goods/non-market (the value of having something like a national park), market value costs (cost of lost fisheries, public health cost) and mitigation costs

Types of Alternatives

No Action	Establishes baseline for comparison of alternatives and for monitoring
Policy change	Changing policies to achieve the purpose and need
Location	Change the siting of a project
Type/Process/Technology	Change the methods, technology or process of a technology to achieve the purpose and need (renewables vs fossil fuels, different road surfaces etc)
Scheduling of project	Changes to the timing of a project to avoid impacts

To the extent possible: include environmental costs in the comparison of alternatives

What are the potential alternatives to:

Increasing crop yield

- *Different location*
- *Changed techniques*
- *Irrigation types*
- *Change seed variety*

Getting electricity to the local population

- *Renewables*
- *Fossil Fuels*
- *Privatization*
- Change policies to ensure strong distribution
- Better grids/smart grids

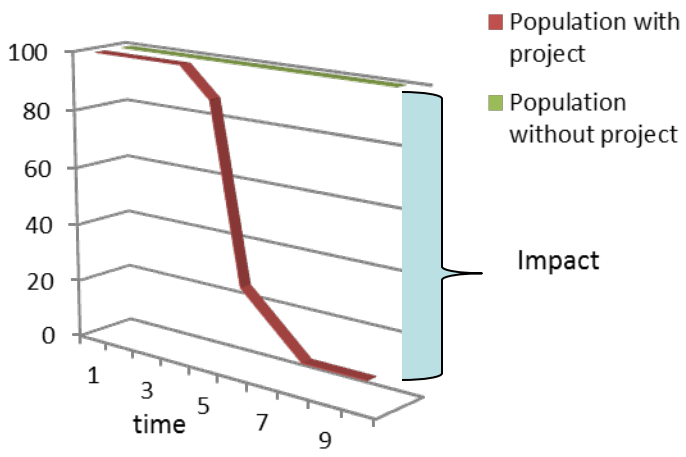
Don’t forget the No Action Alternative

Define the Issues:

- **Using available and collected baseline data:**
  - Finalize receptors of concern and the area of influence
    - Methods such as Matrices and Conceptual models can assist
  - Consider flora, fauna, ground and surface water, air etc. of the project and it's associated facilities
  - Alternatives may be refined as new data and analyses become available.

- **Each alternative must be objectively examined**

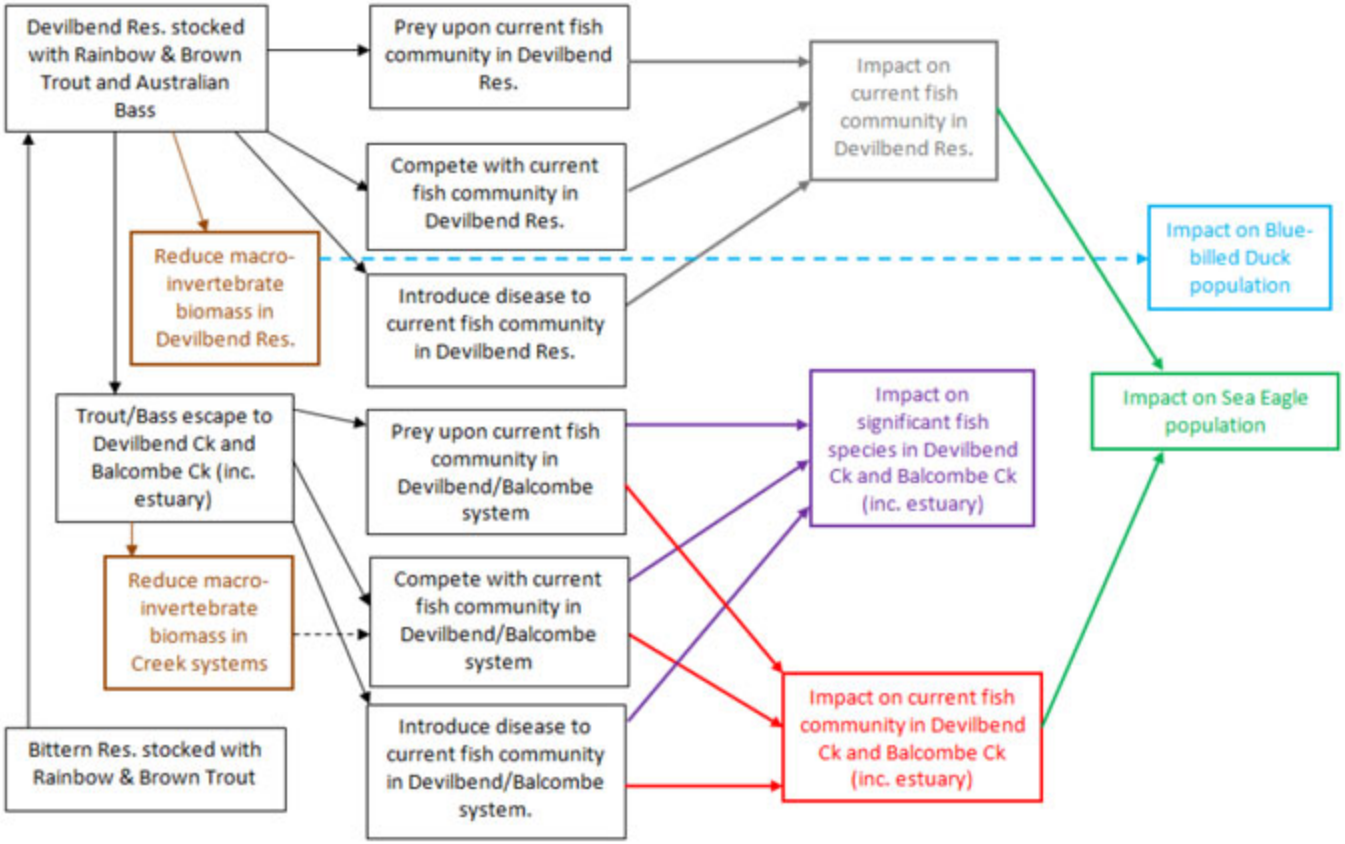
Impact Identification



Types of Identification Methods	
Checklists	Matrices (Leopold)
Networks (conceptual models)	Overlays
GIS	

- Requires a multidisciplinary technical and experienced team
- Is systematic and transparent
- Uses physical, biological, socio-economic and cultural data
  - Should integrate health, social and ecological analysis into one impact assessment
- Refines the project alternatives:
  - area of influence,
  - vectors of ecological concern/receptors,
  - temporal boundaries
- When feasible, and in proportion to significance of impacts, should be quantitative

Identification of Impacts: Conceptual Models



Identifying Impacts: Leopold Matrix

		ACTIVITIES																		RESULTS
		Port Authority							Port Area											
									Tenants							Other Agencies				
		Port Engineering	Dredging	Marine engineering	Administrative and Planning Activities	Shipping and Navigation	Emergency Plans	.....	Cargo handling operations	Cargo storage	Port based industry	Fisheries & Aquaculture	Ship building and repair	Stakeholders activities	.....	Waste Management	Port installations maintenance	Land traffic	Recreation and tourism	Bunkering	
ASPECTS	Emissions to air					x	x											x			3
	Discharges to water	x	x	x		x	x		x			x		x					x	x	10
	Emissions to soil								x	x				x							3
	Emissions to sediments		x								x									x	3
	Noise													x				x			2
	Waste production				x				x		x	x	x				x		x	x	8
	Changes in terrestrial habitats	x		x																	2
	Changes in marine ecosystems	x	x	x		x						x	x							x	7
	Odour																				0
	Resource consumption					x				x	x		x			x		x		x	7
	Port development (land)	x		x							x							x			4
	Port development (sea)	x																	x		2
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

Identifying Impacts:

You may need to collect more data:

- To understand presence/absence
- To define habitats
- To reduce uncertainty
- To clarify significance

When there is uncertainty with the data, decision makers should be precautionary in their decision making

Analysis:

- Focus on the significant impacts
- Use technical experts for each impacted receptor and media (soil, air, water)
- Be certain to analyze:
  - direct and indirect impacts
  - cumulative impacts
  - associated facilities/connected actions
  - negative and positive impacts of the project

Analysis:

- The analysis is a PREDICTION, against the baseline, of impacts based on scientific evidence
  - May require the use of modelling, statistics etc (air and water quality depending on the significance of the impact)
  - When possible, the analysis should be quantitative
  - Requires technical experts

- Analysis is systematic and balanced between Alternatives

- The consequences of the No Action, and other Alternatives should describe the risks and benefits (e.g. if the no action alternative is chosen, a road will be built through a critical habitat)

The degree of analysis should not to be substantially different from the proposed project

Analysis: Significance

Magnitude of Impact

Magnitude is a change in a measurable parameter compared to baseline

Impact Importance

Frequency is the number of times it occurs
Nature of impact
Duration is the amount of time it occurs
Extent
Reversibility is the likelihood that a parameter will recover from an effect

Impact Significance

Define unacceptable, normally unacceptable, may be acceptable with avoidance or mitigation measures,

Includes extinction, exceeds legal threshold or carrying capacity, increases public health risks above a certain criteria, decrease in livelihoods

Analyze and Compare:

	Flora	*Fauna*	*Surface Water*	*Soil*	*Surface Water*
Alternative 1					
Alternative 2		***Briefly describe (quantify if possible) the potential impacts here***			
No Action					

Compare:

	Selection Criteria 1	*Selection Criteria 2*	*Selection Criteria 3*		
Alternative 1					
Alternative 2	**Describe the extent that each alternative meets the criteria**				
No Action					

Note on Mitigation

- Mitigation measures, where possible, should be integrated into design of alternatives to avoid, and minimize impacts
    - Mitigation measures can be assessed as an alternative.
    - Costs should be integrated into the analysis

Questions?