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# Environmental Mitigation and Monitoring – Make a plan, test, revise, follow, document

Objectives: Understand monitoring mitigation and  
monitoring in the design-procure-implement process

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*[www.usaid.gov/our\\_work/environment/compliance](http://www.usaid.gov/our_work/environment/compliance)  
[ane-environment.net](http://ane-environment.net) [www.encapafrika.org](http://www.encapafrika.org)*

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# Definitions

## ◇ Mitigation

- ◆ actions to reduce undesirable impacts on the environment from proposed actions
  - prevention
  - remediation
  - ongoing maintenance and operations
  - offsetting actions



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# Definitions

## ◇ Monitoring

- ◆ systematic measurement of *key environmental indicators* over time, and within a particular geographic area
  - ➔ geographic area = area in which environmental impacts of the project may be significant (water body, watershed, ecosystem, country, multi-country region)
  - ➔ Indicators = signals of/proxies for environmental or ecosystem health (e.g., a key species)
- ◆ Env. Monitoring is an aspect of overall monitoring of project results



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## Relation to ESD

- ◊ Mitigation and monitoring are necessary elements of ESD
  - ♦ Mitigation = minimizing adverse environmental impacts
  - ♦ Monitoring = necessary complement to mitigation



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# Summary

- ◆ ESD does not stop when project or program environmental effects have been identified or decisions have been reached



# Mitigation and monitoring for conservation-based projects

- ◇ Monitoring of project results may equal environmental monitoring
- ◇ Project's activities may themselves be *environmental mitigation* measures to correct trends in the baseline situation



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## The mitigation plan

- ◆ Mitigation is planned and coordinated through a project's mitigation (or environmental management) plan.
- ◆ Mitigation plans include
  - ◆ actual mitigation measures
  - ◆ specification of monitoring results that trigger mitigation
  - ◆ implementation details: *how, by whom, and with what funding* mitigation will occur



# When are mitigation measures planned?

- ◇ **During design.** *Preferred.* Incorporating mitigation in design can result in
  - ◆ prevention through changes to project or program configuration, content, implementation, timing, technology employed in some activities, material used, etc.
  - ◆ other mitigation, e.g. inclusion of operating practice specifications, corrective, rehabilitative or compensatory activities in bids and tenders
- ◇ **During construction and implementation.** Monitoring uncovers adverse impacts that may jeopardize activities, the environment or the natural resource base
- ◇ **After a project or program ends.** If there are results of adverse effects associated with the activities carried out, **mitigation costs may become significant**, e.g., toxic or radioactive waste cleanup, desalinization of soils, etc.





# Mitigation Strategy by Activity Phase

Mitigation Strategy	Phase			
	Planning/ Design	Construction	Operation	Decommissioning
<i>Avoid Impact</i>				
<i>Minimize or Diminish Effect</i>				
<i>Rectify by Repair or Rehabilitation</i>				
<i>Reduce or Eliminate over Time</i>				
<i>Provide Compensation</i>				
<i>Other</i>				



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## Types of mitigation

See

World Bank Sourcebook extract  
Agency, ANE, AFR guidelines

*[www.usaid.gov/our\\_work/environment/compliance](http://www.usaid.gov/our_work/environment/compliance),*

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*[www.encapafrika.org](http://www.encapafrika.org),*

*[dec.usaid.gov](http://dec.usaid.gov)*



# Funding/Budgeting for mitigation

- ◆ The later mitigation is considered, the greater the costs
- ◆ If mitigation costs appear too high, redesign or rethink interventions
- ◆ Effective mitigation design should not significantly increase costs



# Sustainability of mitigation

Sustainability of mitigation activities depends on

- ◇ availability of funds
- ◇ rank in the priority of decision-makers
- ◇ effectiveness as a problem-solving tool
- ◇ incorporation in tenders, implementation plans, monitoring



# Environmental monitoring

## ◇ Monitoring requirements

- ◆ Reg 216 requires monitoring where EAs have been prepared
- ◆ Monitoring strongly recommended in other cases where forecasted impacts are uncertain
- ◆ Extent of monitoring based on severity of expected environmental impacts



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- ♦ Categorical Exclusions typically **will not** require extensive monitoring, evaluation, or mitigation
- ♦ **Activities with some foreseeable potential adverse impacts on the environment**
  - ➔ Monitoring during life of activity to make sure adverse impacts on environment are minimized
  - ➔ Mitigation measures likely required such as avoidance or changes in design



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- ♦ **Activities with potential for significant negative impacts**
  - Monitoring program that can be incorporated into the project
  - Review/ ID mitigative measures



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## Environmental monitoring plan

- ◊ Monitoring is planned and coordinated through the monitoring plan
  - ◆ should be integrated in the mitigation plan
- ◊ Monitoring plans should clearly identify
  - ◆ indicators used, level of detail, analysis performed, dissemination
  - ◆ institutions responsible
  - ◆ funding mechanisms
  - ◆ triggering events





# Gathering, analyzing, and disseminating data

- ◆ These are need-driven activities
  - ◆ focus on most significant impacts identified by the EA process
- ◆ Cost of data collection and analysis is driven by
  - ◆ temporal resolution - how often data is collected
  - ◆ spatial resolution - how widely (or closely) spaced data points are



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## Gathering data: example indicators

### ◇ Water

- ◆ quantity, quality, reliability, accessibility

### ◇ Soils

- ◆ erosion, productivity, land resources and their potential, fallow periods

### ◇ Vegetation/Flora

- ◆ permanent vegetation ratio, composition and density of natural vegetation, cleared zones, productivity, key species

### ◇ Fauna

- ◆ populations, habitat

### ◇ Unique zones & special ecosystems



# Gathering, analyzing, and disseminating data

## ◆ Objective

- ◆ least cost/simplest indicator set and level of detail that meets environmental objectives.
- ◆ Key considerations
  - ➔ data needs often overestimated.
  - ➔ time and cost required for data analysis usually underestimated
  - ➔ timing and frequency of data collection depends on project timetable and seasonal factors.
  - ➔ Requirements for baseline and close-out data often ignored



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## Counterfactual challenge

- ◆ When monitoring reveals changes, the key question is: Are they due to the project?
- ◆ Requires knowledge of the counterfactual - What would have happened in the absence of the project
- ◆ The problem - Counterfactual is imaginary or hypothetical



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◇ Good monitoring strategies are designed to provide a *continuous benchmark* of “background” or “normal” change. E.g.

- ◆ monitor actual project, plus a similar non-project area (a “control”)
- ◆ multiple stations/sampling locations
- ◆ good baseline data, establishing normal variability of indicators



# Gathering, analyzing, and disseminating data

## ◇ Analysis and dissemination

- ◆ Analysis - raw environmental data not useful to decision makers
  - e.g., leaves of a indicator species turn yellow. What does this mean? Soil quality change? Water quality change? More mitigation?
- ◆ Dissemination - Data is not useful unless it is in the timely hands of decision-makers



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# Gathering, analyzing, and disseminating data

## ◇ Dissemination

- ◆ List all potential users and why they need the information
- ◆ Determine format most suitable for use
- ◆ Determine level of required accuracy and reliability
- ◆ Devise suitable reporting format and the dissemination mechanism



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## Who conducts the monitoring?

- ◆ Environmental monitoring plan should specify
  - ◆ *Who, specifically, collects which information*
  - ◆ Who manages the information
- ◆ key considerations
  - ◆ Conflict of interest - need for an independent firm or institution?
  - ◆ Local participation? (can be a way to stretch monitoring resources)





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# Funding

- ◇ Historically, funding is inadequate
  - ◆ Usually because monitoring requirements considered as an afterthought
  - ◆ Monitoring plan development - not only monitoring itself - needs resources/ time
  - ◆ Project/funding cycles are 5-yr max - impacts may occur over decades



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# Funding

- ◆ Key questions for funding
  - ◆ How long will the monitoring be needed?
  - ◆ What human, financial and material resources will be required over the monitoring period?
  - ◆ How to make it sustainable after USAID?



# Project management tactics

- ◇ Goal - Avoid the situation in which “there’s no time left to do it right”
  - ◆ Problem: M&M plans can’t be finalized until environmental impacts are assessed
  - ◆ Some tactics:
    - ➔ TORs need to spell out clearly # days to be devoted to M&M workplan development
    - ➔ EA team leader chosen in part on M&M qualifications
    - ➔ Involve field staff early in M&M plan development; field test the plans; revise



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# Queries?

