

Presentation

Presentation from the 2009 World Water Week in Stockholm
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WORLD
in Stockholm,
August 16–22, 2009 **WATER**
WEEK

Environmental flows as a tool for Sustainable Hydropower

Adressing environmental flows in sustainability guidelines

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Hydropower Impacts

Hydropower projects have significant environmental and social impacts.

Alot of the downstream problems can be minimised and mitigated through an adequate environmental flow.



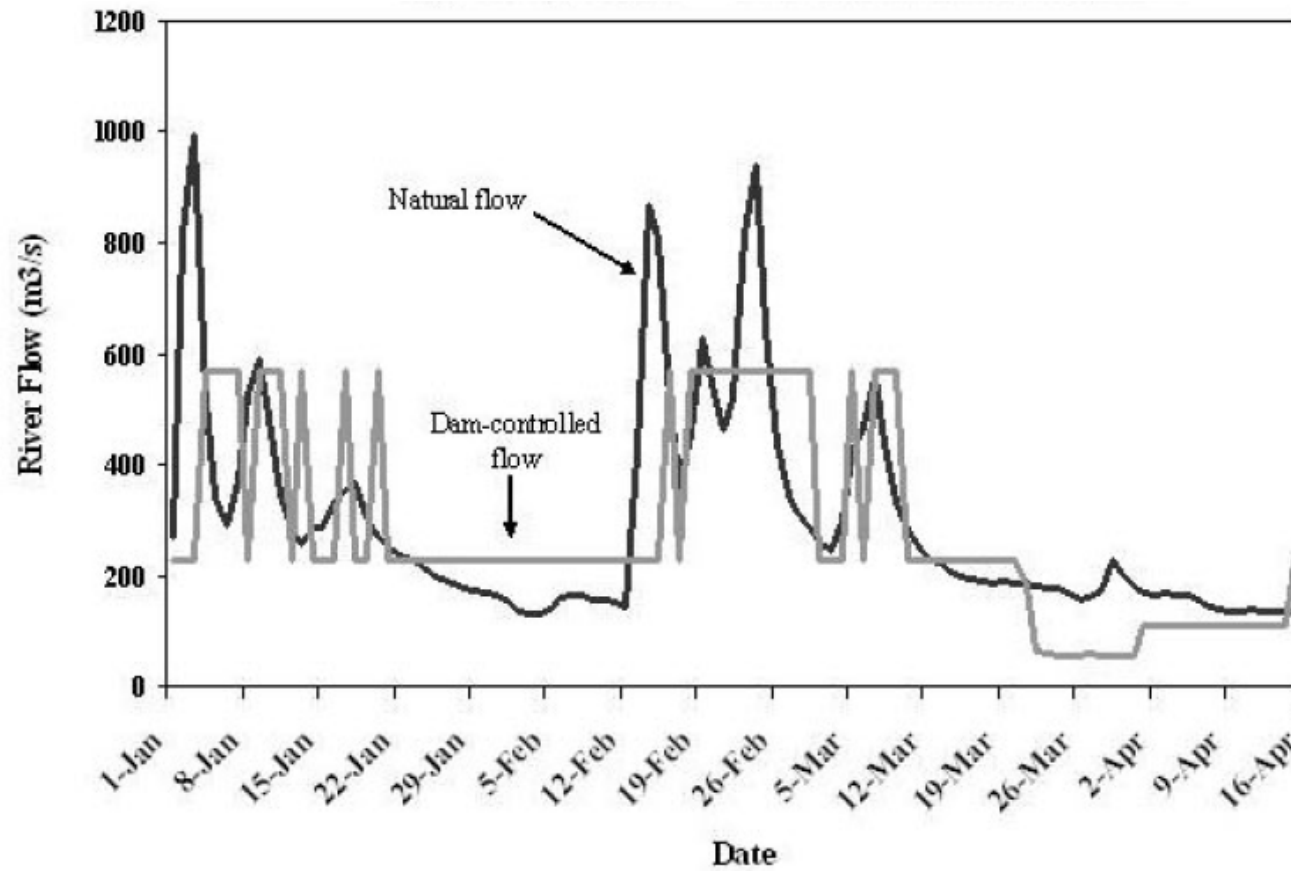
2 cases of environmental flow requirement

An environmental flow is necessary when:

1. The project causes a dry riverbed stretch.
2. The project causes an altered downstream flow regime (regulated generation)

Environmental flow = spilled water = less \$\$\$

Hydropower operations



Sustainable Hydropower

What is a sustainable hydropower project?

Guidelines and recommendations:

- World Commission on Dams (2000)
- IFC: Performance Standards (2005), not hydropower specific
- International Hydropower Association (IHA): Sustainability Guidelines (2004, 2006)
- IHA, TNC, WWF, WB: Hydropower Sustainability Assessment Forum (HSAF)
- NGOs (i.e. International Rivers): Endorses WCD, criticises HSAF



World Commission on Dams – Environmental Flows

”Large dams provide for releasing environmental flows to help maintain downstream ecosystem integrity and community livelihoods and are designed, modified and operated accordingly.”

”Dam owners should undertake regular monitoring and a five yearly evaluation of environmental performance.”

Environmental Flows requirements and assessments are integrated in each stage of the project, from investigative studies to operation.

The key phrasing is “suitable”.



Hydropower Sustainability Assessment Protocol – Environmental Flows

PROCESS ATTRIBUTES:

- Quality of identification of environmental, social and economic objectives for environmental flows
- Level of understanding of relationship between hydrology, ecosystems and social uses
- Level of understanding of relationship between hydrology and environmental, social and economic objectives
- Quality of design of the environmental flow
- Quality of participatory process

Hydropower Sustainability Assessment Protocol

PERFORMANCE ATTRIBUTES:

- Degree to which the flow regime is likely to achieve environmental, social and economic objectives
- Degree to which the monitoring and adaptive management programme is adequately resourced and likely to achieve desired outcomes
- Degree to which the environmental flow is fully integrated in infrastructure design, operations management and economic analyses
- Level of regulator support
- Level of stakeholder support

Application of Sustainability Guidelines

- Banks, Funding, Corporate Social Responsibility, Environmental Management Plans, etc.
- Clean Development Mechanism, large hydropower projects aiming to sell carbon credits under the Kyoto protocol must comply with the **WCD guidelines**.
 - >500 planned hydropower projects must comply to WCD, and thereby their definition of an environmental flow.

At least theoretically.

Reality check for CDM projects

Approved hydropower CDM projects are considered to be sustainable, and they are also providing environmental flows according to the requirements of the World Commission on Dams

WCD compliance is assessed by DNV, TÜV-SÜD etc.

WCD sets ambitious targets – but no minimum requirements

Rio Esti, Panama

Rio Esti complies with the WCD and provides an environmental flow to the Chiriqui river.



Example from Panama, Rio Esti



Rio Chiriqui, Panama. Normal flow during the rainy season

Example from Panama, Rio Esti



Rio Chiriqui, Panama. Environmental flow.= 1,5 m³/s

Bhilangana, India

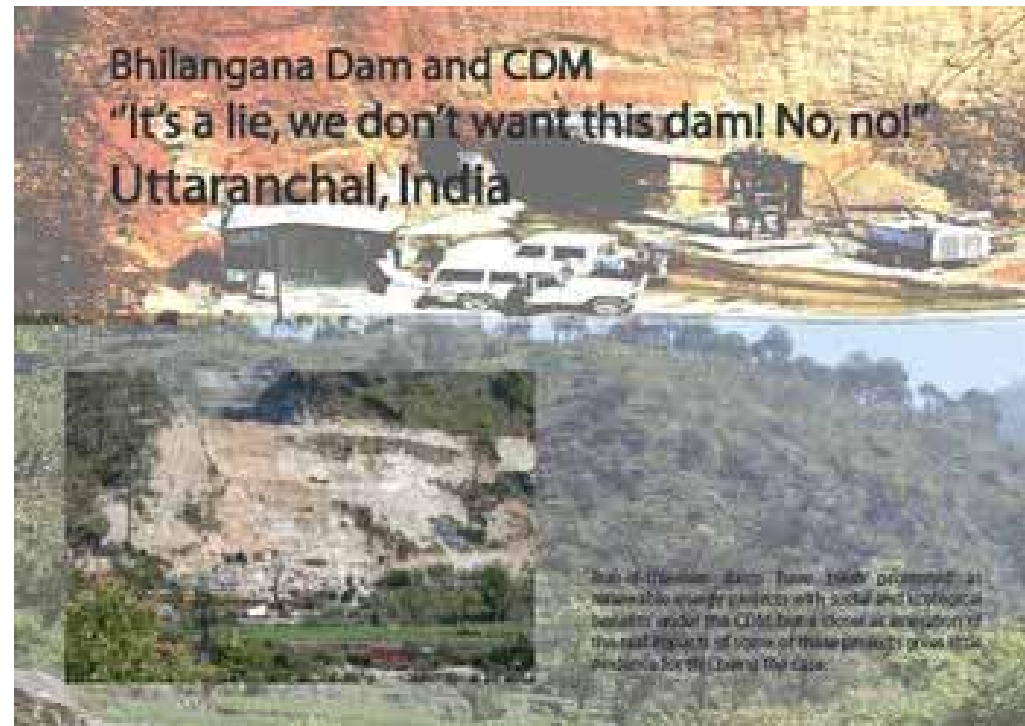
- Smaller run-of-river project, 22 MW. Water released to irrigation channels as well as an environmental flow of 0,25 m³/s



Bhilangana, India

$0,25 \text{ m}^3/\text{s} = 2\%$ of mean natural flow during the dry season

Would the water be of more use in the irrigation channels?
- or in the turbines?



Environmental flow guidelines/criteria

- How should Environmental Flows requirements be addressed in sustainability guidelines?
- Applicability?
- Minimum requirement?
- *Suitable, When possible, When necessary etc*
- Level of detail?

Thank you

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