Finding Balance Between Energy and Conservation During Hydropower Development

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DRAMATIC DECLINES IN FRESHWATER ECOSYSTEMS

Source: WWF, Living Planet Index – D, 2014
Global database of existing, under construction, and planned dams
The majority of hydropower expansion will occur in basins with the greatest freshwater fish harvests (and other ecosystem services of value to rural communities) and greatest richness of fish species.
In a number of important river basins, the length of river channel (km) unaffected by dams will decline dramatically with business-as-usual expansion of hydropower (length of river channel include main-stem river and major tributaries).
Site-scale impacts and mitigation
Location, location, location
Tapajos River, Brazil
Hydropower and fragmentation, Tapajos River
Alternative scenarios for Tapajos

These two scenarios provide same level of energy development (65% of basin inventory), but Scenario 22(left) maintains nearly twice as much connected channel network with 5% greater overall cost.
Cost curves for hydropower projects on the Tapajos River

Figure B.1a. Scenario 27

Figure B.1b. Scenario 22
Coatzacoalcos River, Mexico

Baseline Scenario

Longest Connected Network

(CFE, CONABIO, TNC 2014)
Hydropower and fragmentation, Coatzacoalcos River

(CFE, CONABIO, TNC 2014)
Alternative scenarios for Coatzacoalcos

These two scenarios provide the same level of energy development (67% of basin inventory), but Scenario 7 (right) maintains nearly twice as much connected channel network

(CFE, CONABIO, TNC 2014)
At the global scale, application of Hydropower by Design could reduce the amount of river length lost to fragmentation by approximately 100,000 km compared to business-as-usual approaches under a wide range of development levels.
“The significant increase in hydropower capacity over the last 10 years is anticipated in many scenarios to continue in the near term (2020) and medium term (2030), with various environmental and social concerns representing perhaps the largest challenges to continued deployment if not carefully managed.”

Opportunities and challenges

- **First estimate**: best practices at project and system scale would add 5 - 20% in costs
- **Business case**: potential benefits in terms of risk management
- **Economic case**: broader benefits for countries
Opportunities and challenges – durable protection for rivers

- Designation as protected area
- Offset or compensation site
- Removed from planning, licensing systems