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ISH0306 - Consultancy for the Development of Guidelines for Hydropower Environmental Impact Mitigation and Risk Management in the Lower Mekong Mainstream and Tributaries

MRC Mitigation Guidelines for Sustainable Hydropower Practice on the Lower Mekong Basin



By Leif Lillehammer and many more

Hydropower Sustainability Forum, Oslo
4-5 September 2017





Mekong River

Mae Nam Khong

«Khong, the Mother of Water»

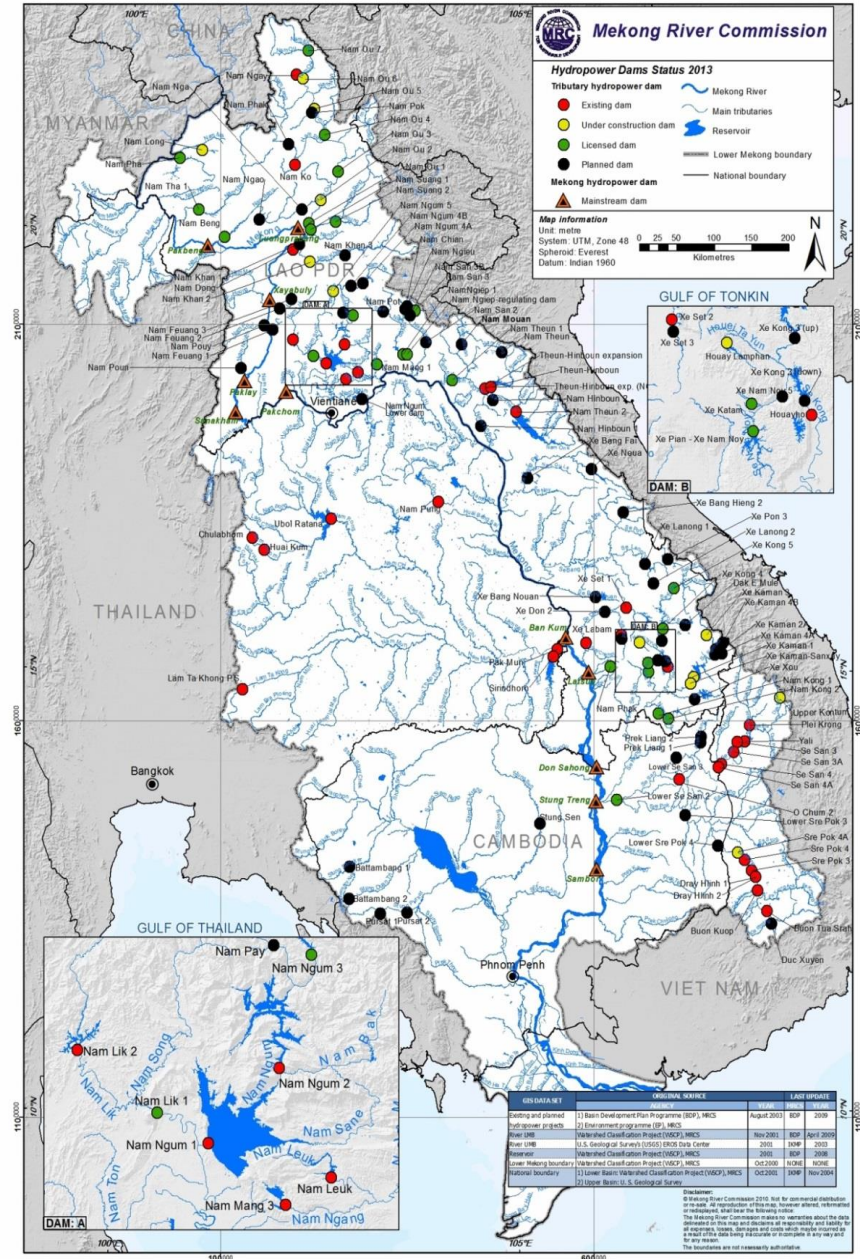
Introduction - Study objective

Providing measures, **GUIDELINES** and good industrial practice and state of the art insight into the sustainable development of hydropower in the Lower Mekong Basin. By also linking it to the Mekong 1995 Vision

“an economically prosperous, socially just and environmentally sound Mekong River Basin”

Assessment in LMB, UMB, GMS and Internationally

Existing and planned hydropower projects



Introduction - Process for for Risk and Impact Mitigation Assessment Multiconsult.no

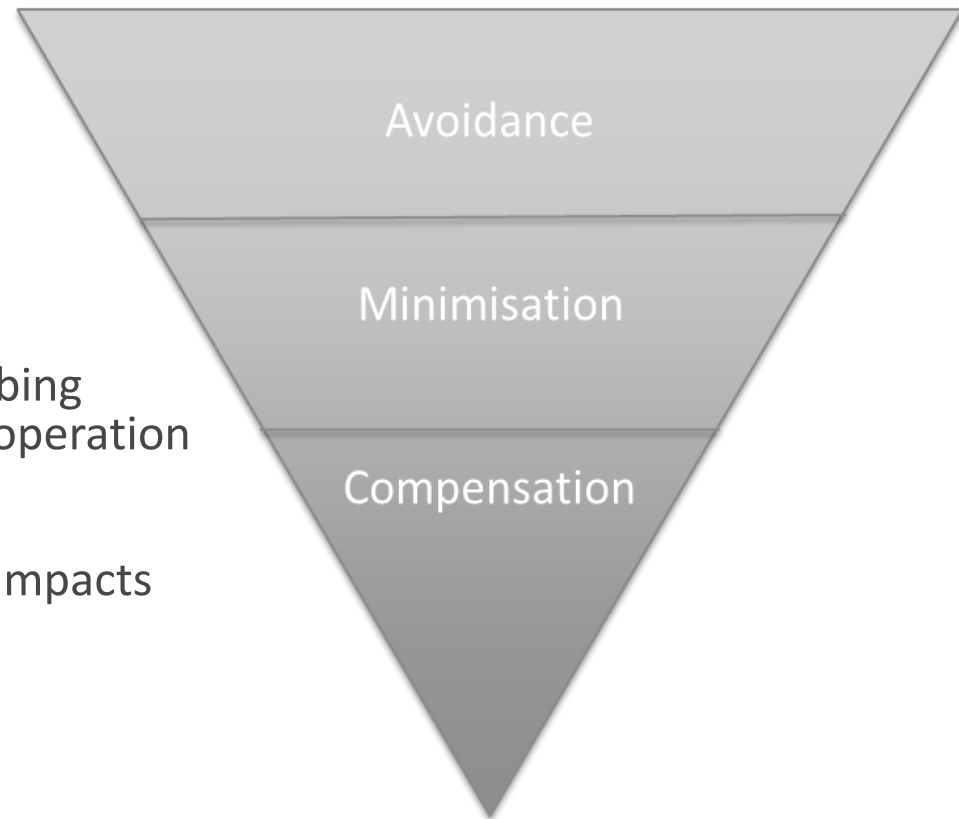
Article 7 – Mekong Agreement (1995) «To make every effort to avoid, minimize and mitigate harmful effects.....»

Mitigation Hierarchy

Avoidance = Identifying alternative sites or technology to eliminate Impacts (Master plans, Pre-feasibility, Feasibility)

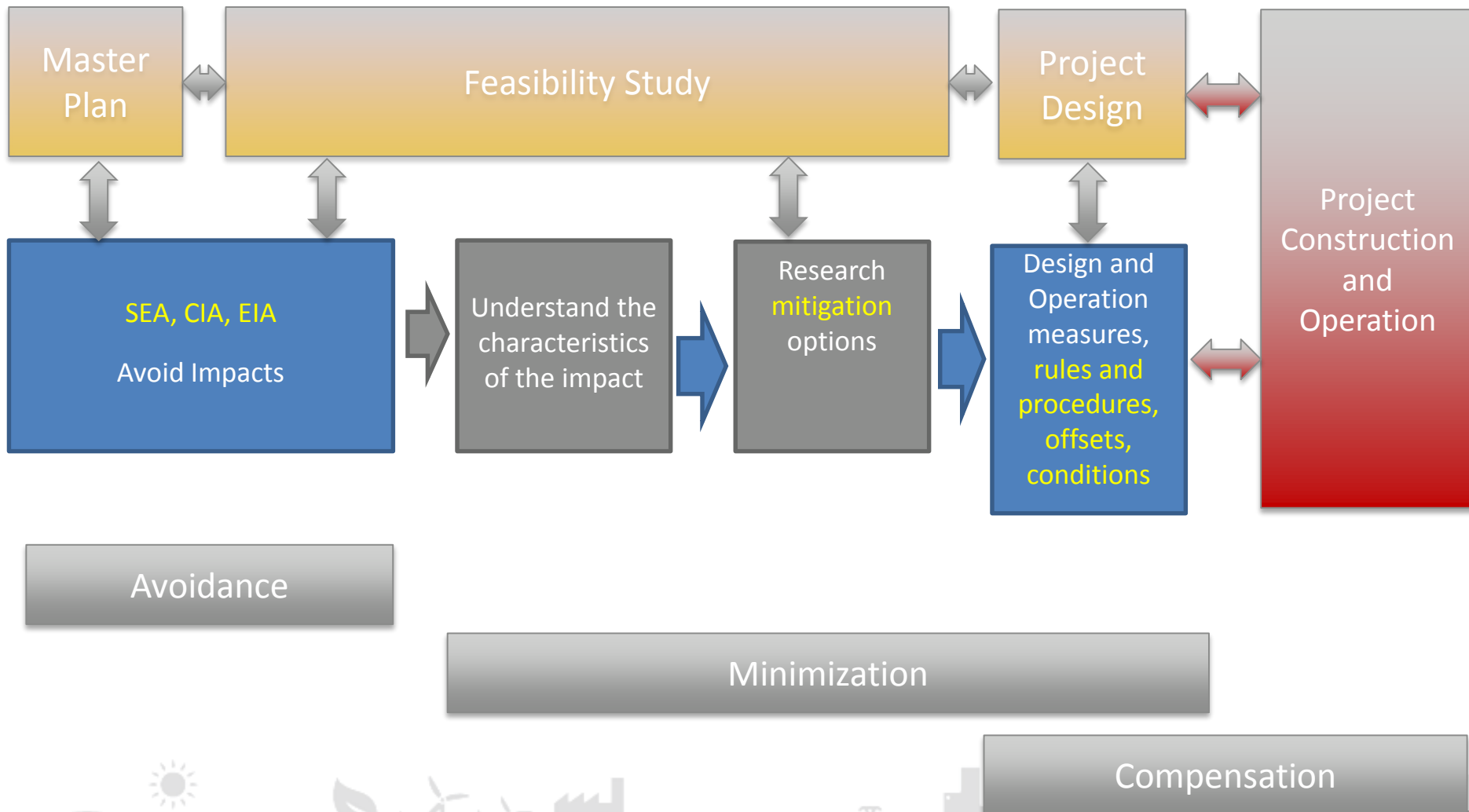
Minimization = most often used prescribing actions during design, construction and operation stage to minimize or eliminate impacts

Compensation = used to offset residual impacts identified at different stages



Introduction - Process for for Risk and Impact Mitigation Assessment

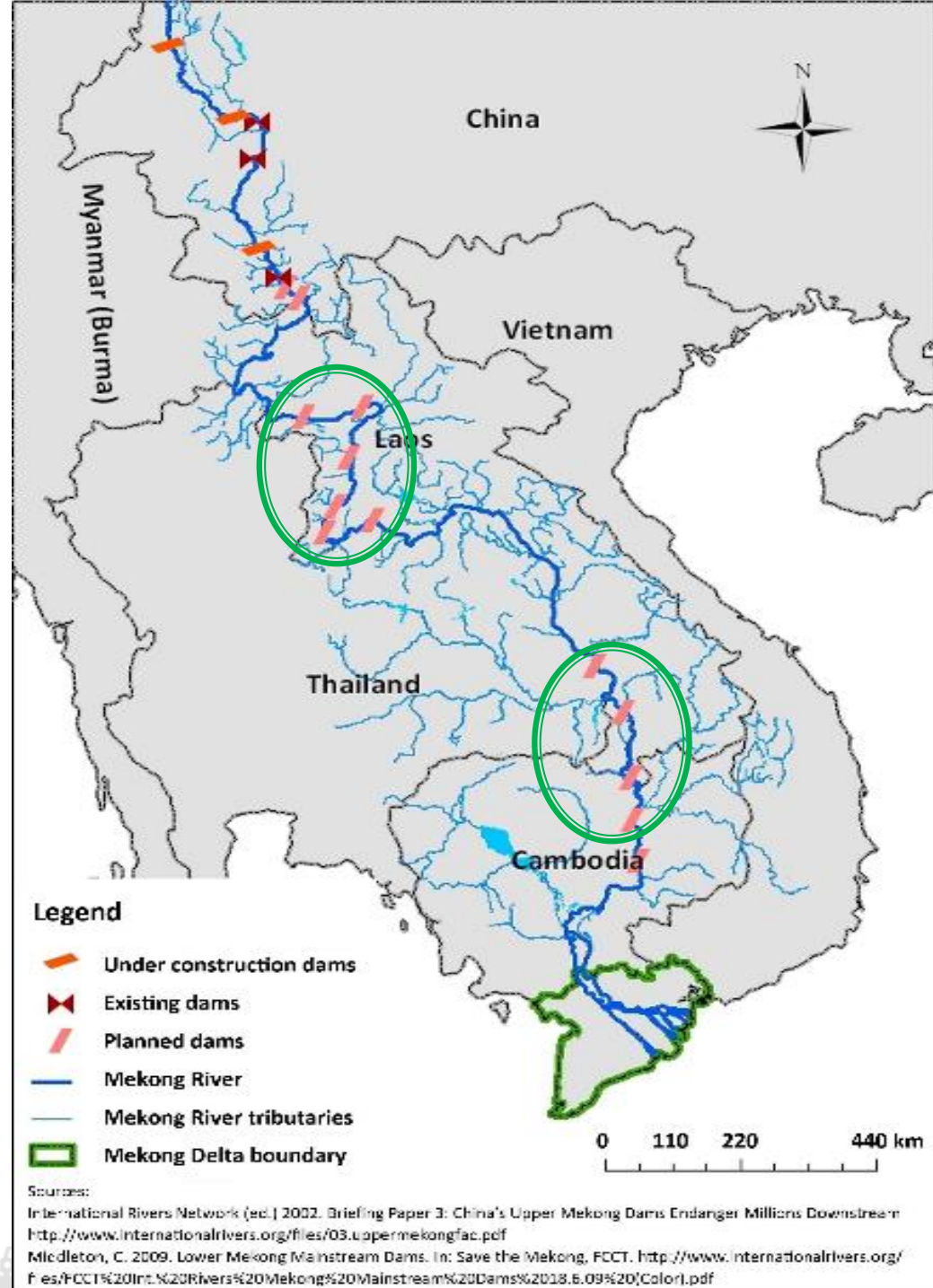
MRC Generic Practical Process for Risk and Impact Mitigation - Project Life Cycle



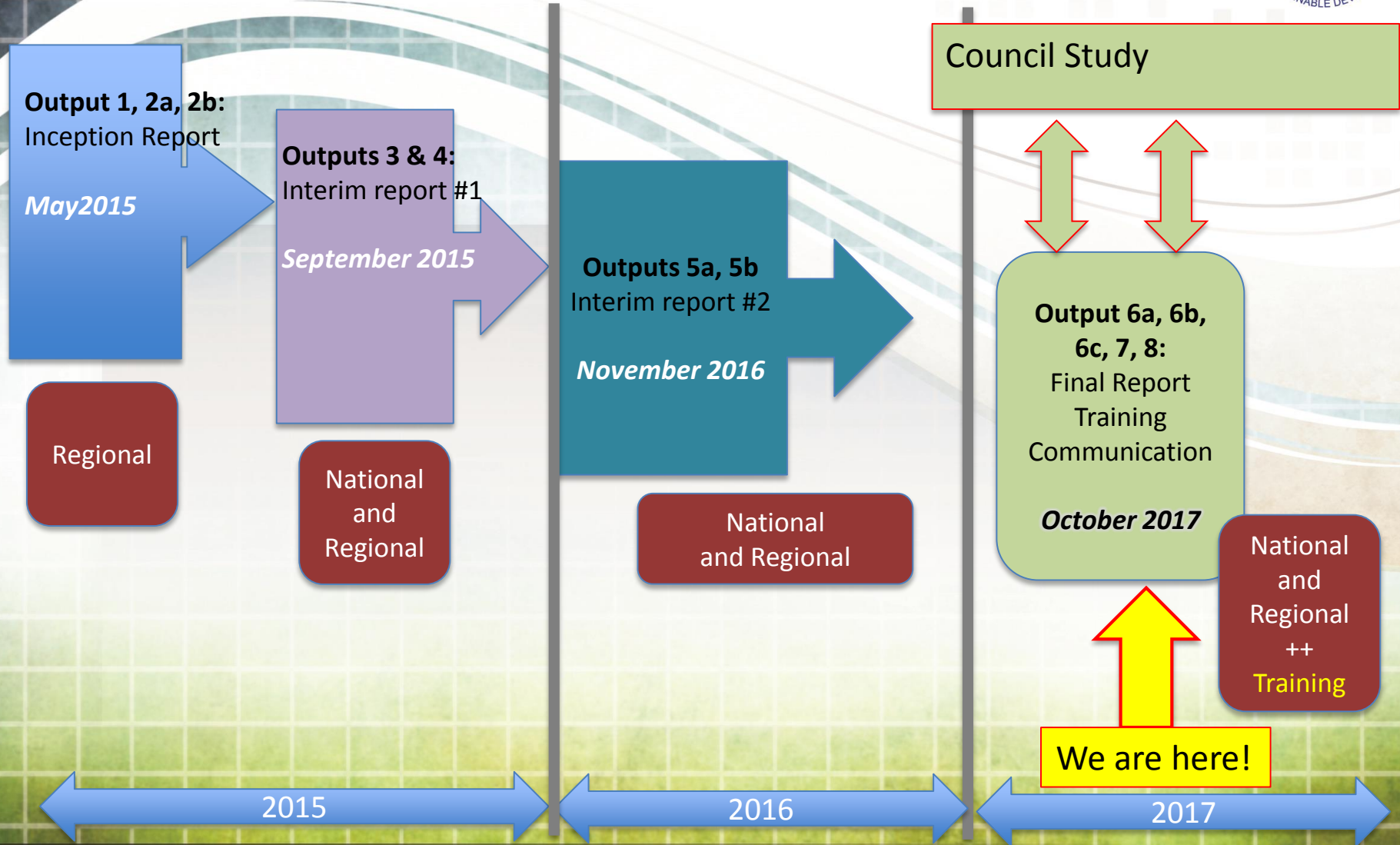
Study Scoping and Planning Geographic Scope

Twofold:

- 1) A general assessment at the basin level for the Lower Mekong, including its tributaries (Phase 1 and 2)
- 2) A more detailed assessment of the 5 mainstream cascade dams planned to be constructed in Lao PDR (Phase 3 and 4) and downstream mainstream dams (Phase 4)

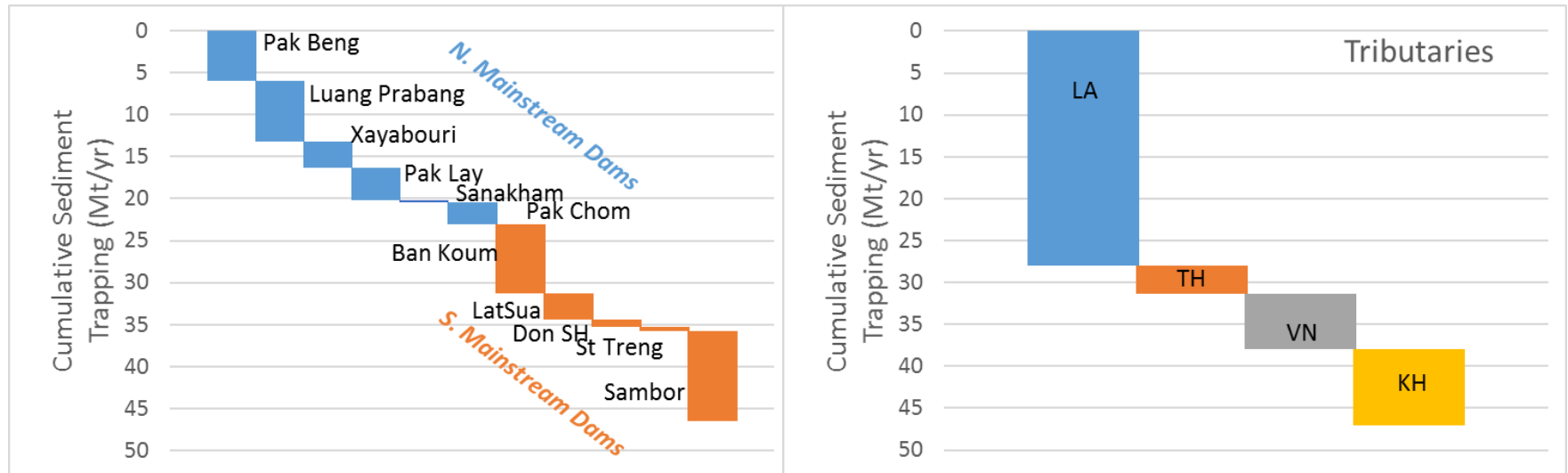


Study Phases - ISH0306 Regional and National Consultation



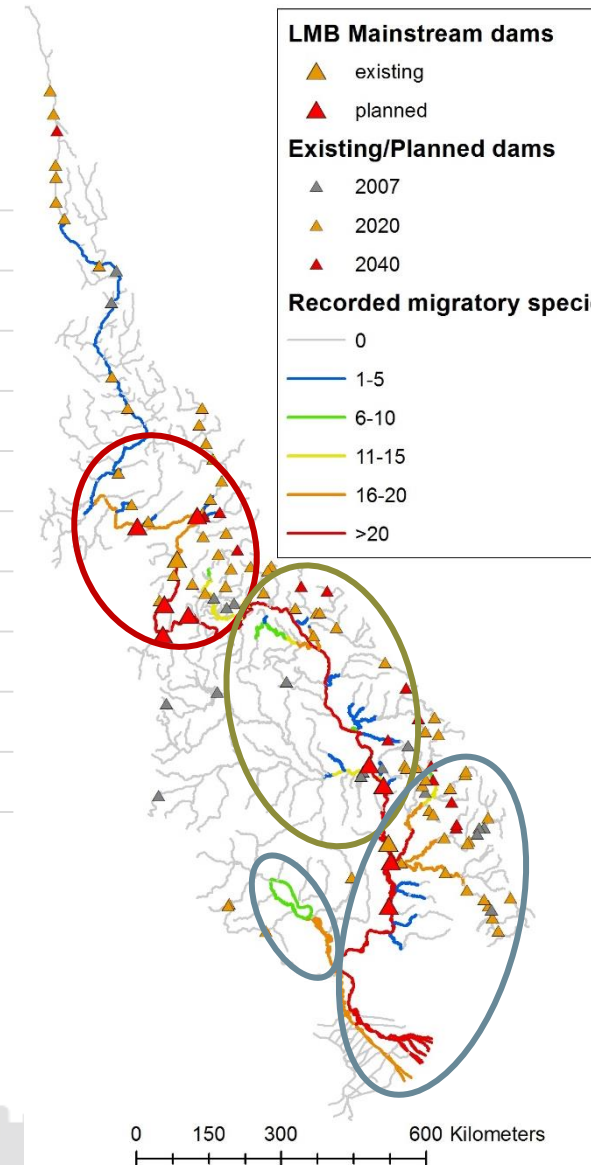
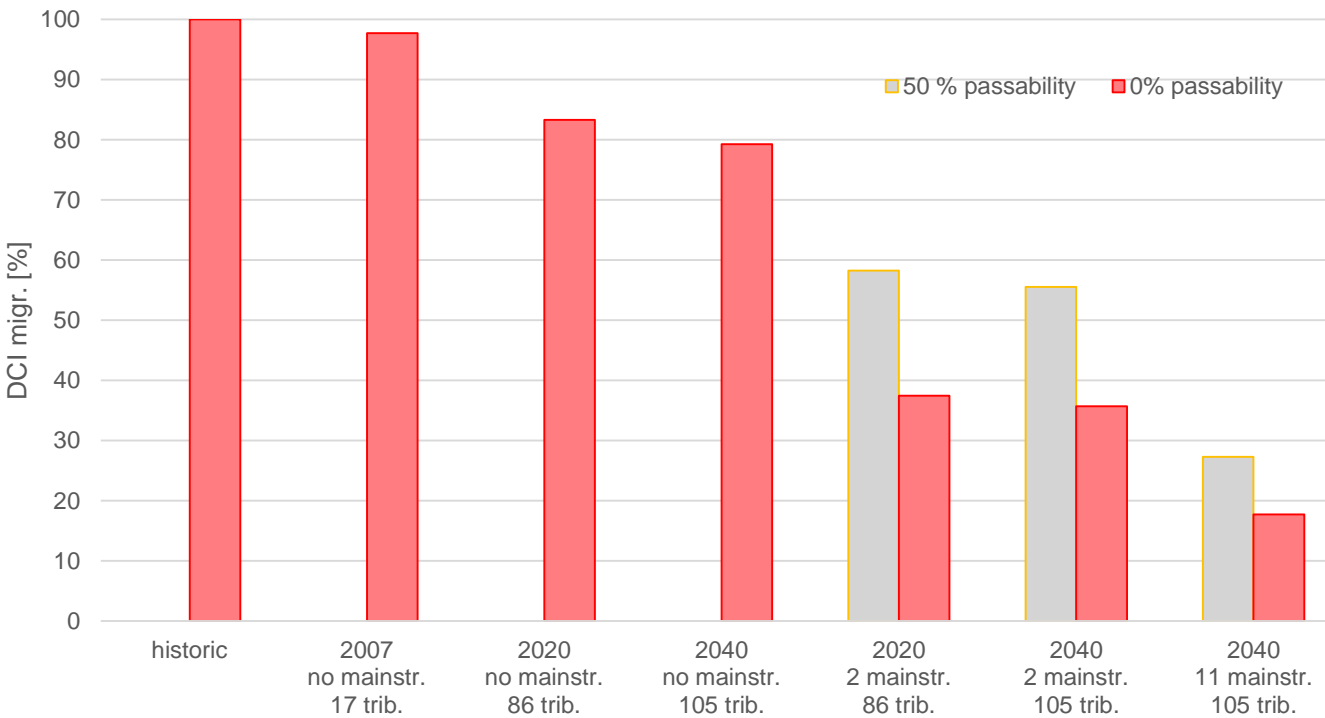
Basin Scale Risks and Impacts Examples

Distribution of Sediment Loss (2040)



Basin Scale Risks and Impacts Examples

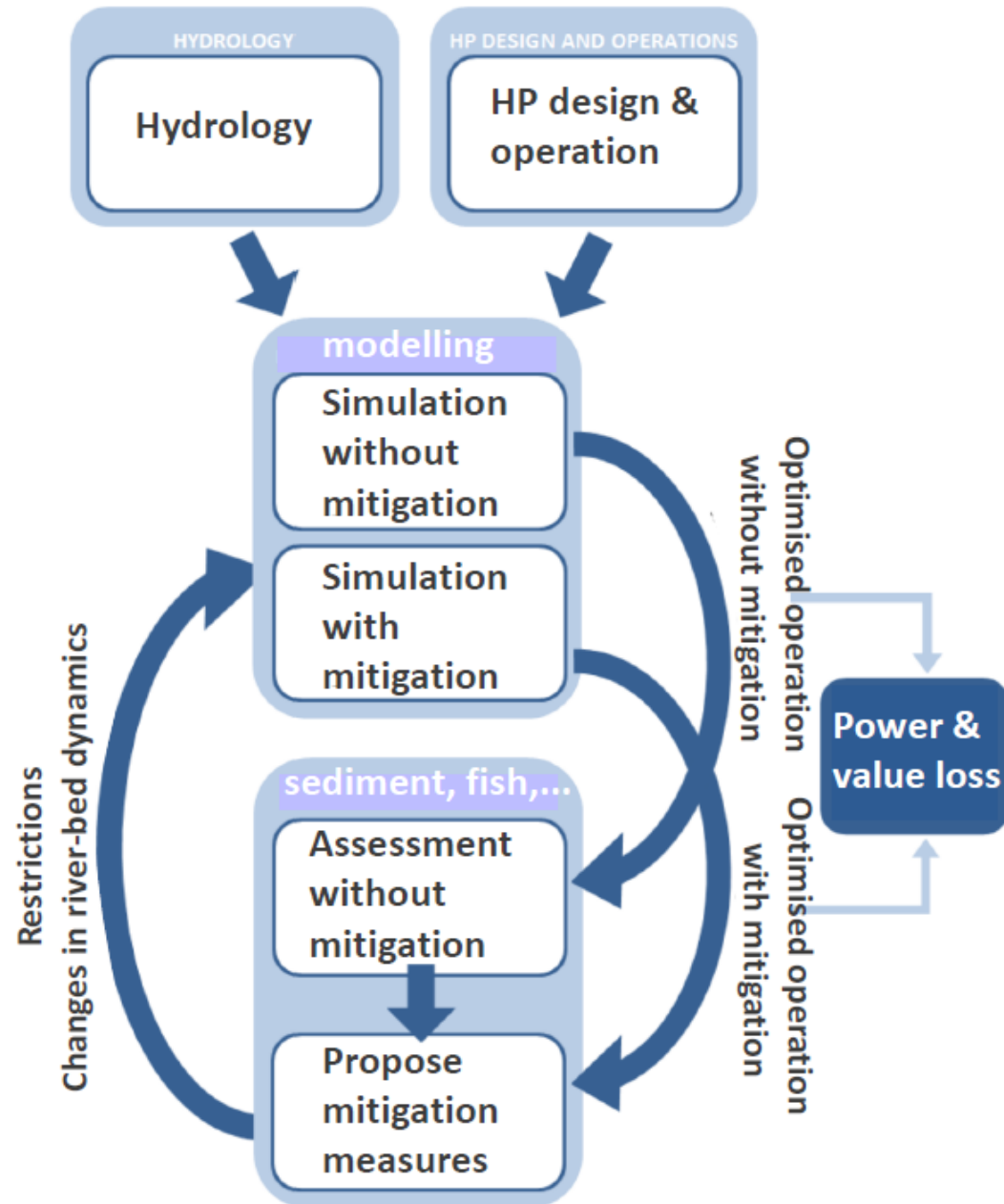
Connectivity Loss (Fish Migration)



Interim Phase

Constitutes the following:

1. Case Study – Lao Cascade: Testing of Mitigation Options and analysis of scenarios (Detailed Modelling and Assessment) – Impacts on Environment, Power Generation and Economics
2. Update Guidelines and Manual with Basis in Case Study Results
3. 2nd Interim Phase Knowledge Base (Report, Data Inventory Sheet, ISH0306 Library)



Overview of Final Phase

Constitutes the following

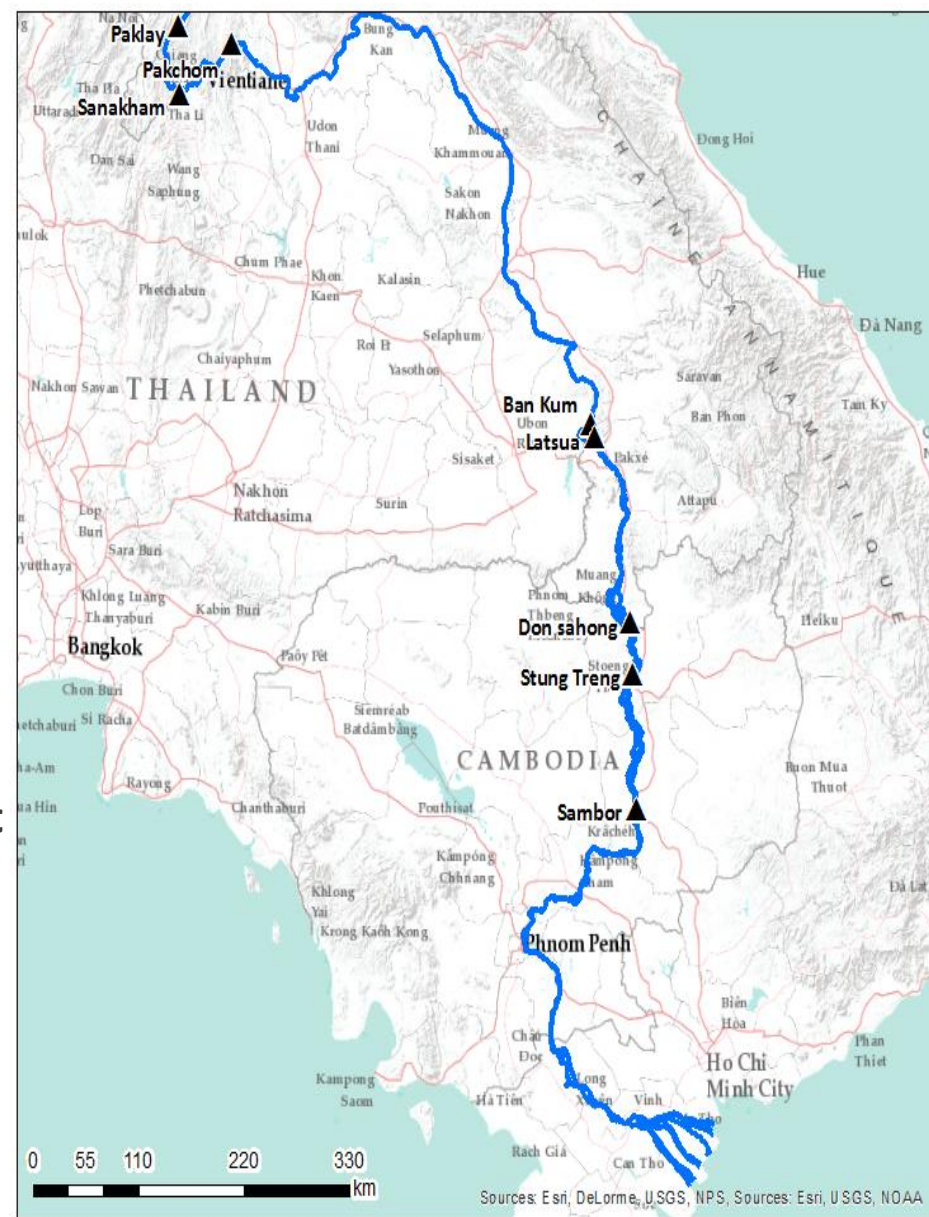
1. Case Study continuation

Conceptual level assessment –

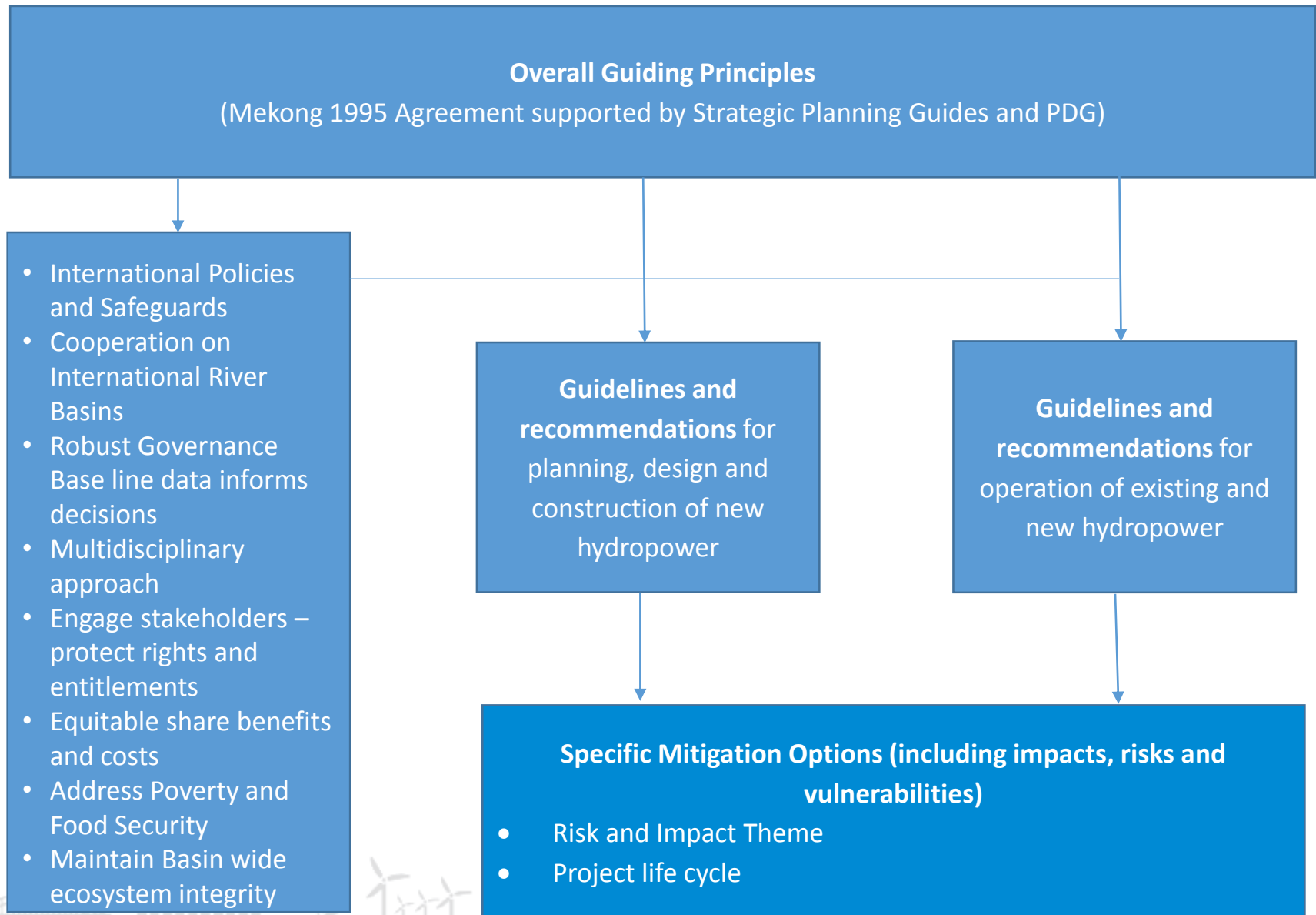
- Lao Cascade: Alternative scheme layouts and Partial Cascade Development (based on 2nd Interim Phase)
- Downstream Dams (alternative layouts and design options)

Assessment of Modelling Results

- Liaison, coordination and assessment of the HP Thematic Council Study Sub-Scenarios (all mainstream dams)
2. Review and Update of the PDG and HDS – (part of Discussion Notes on Research Needs)
 3. Final Update of Guidelines, Manual and Knowledge Base + Final Closure Report
 4. Training and Communication Documentation

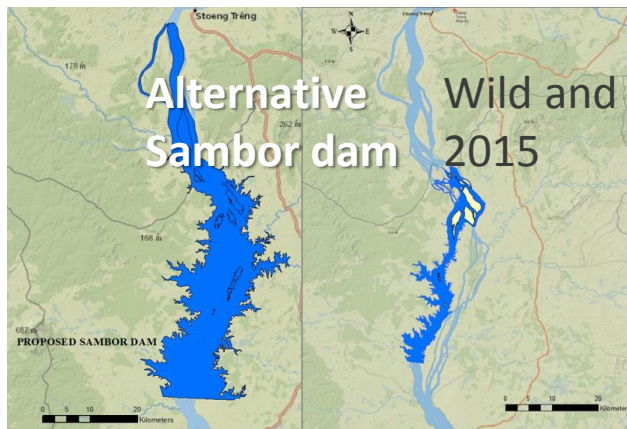
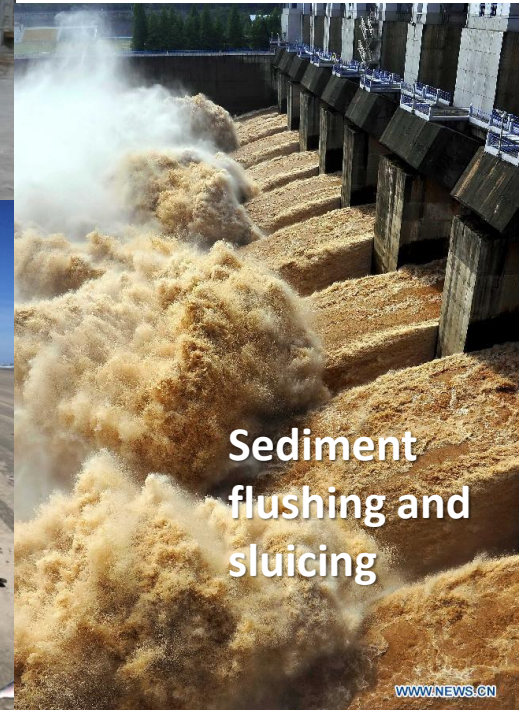
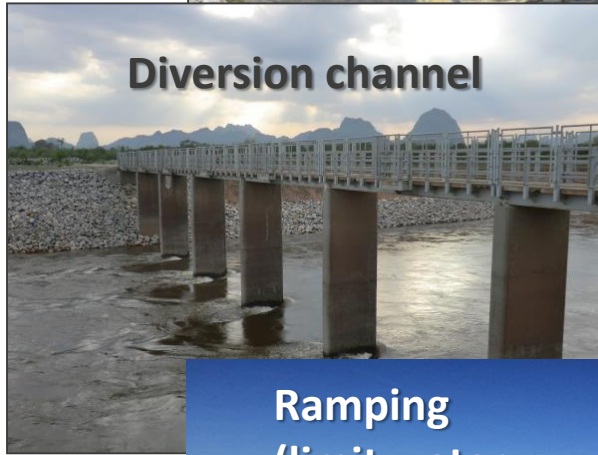
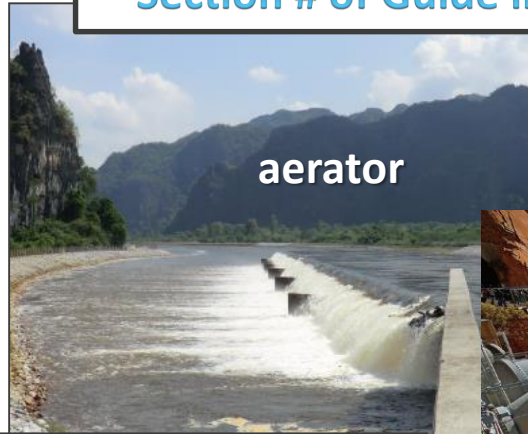
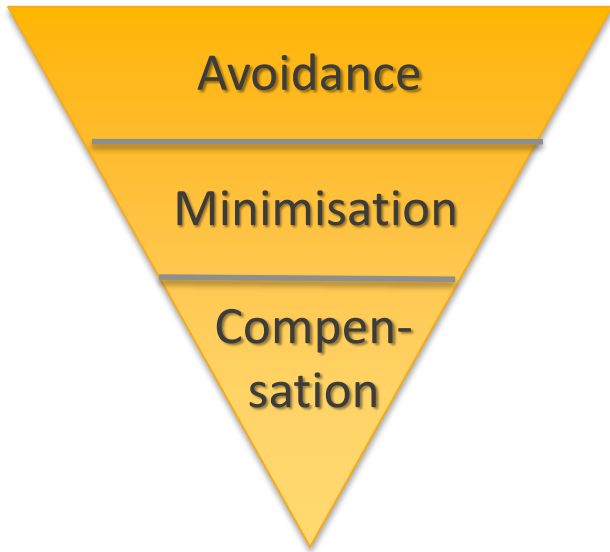


Overall Framework for the Hydropower Risks and Impact Mitigation Guidelines and Recommendations



Exampmples Specific Mitigation

Mitigation hierarchy

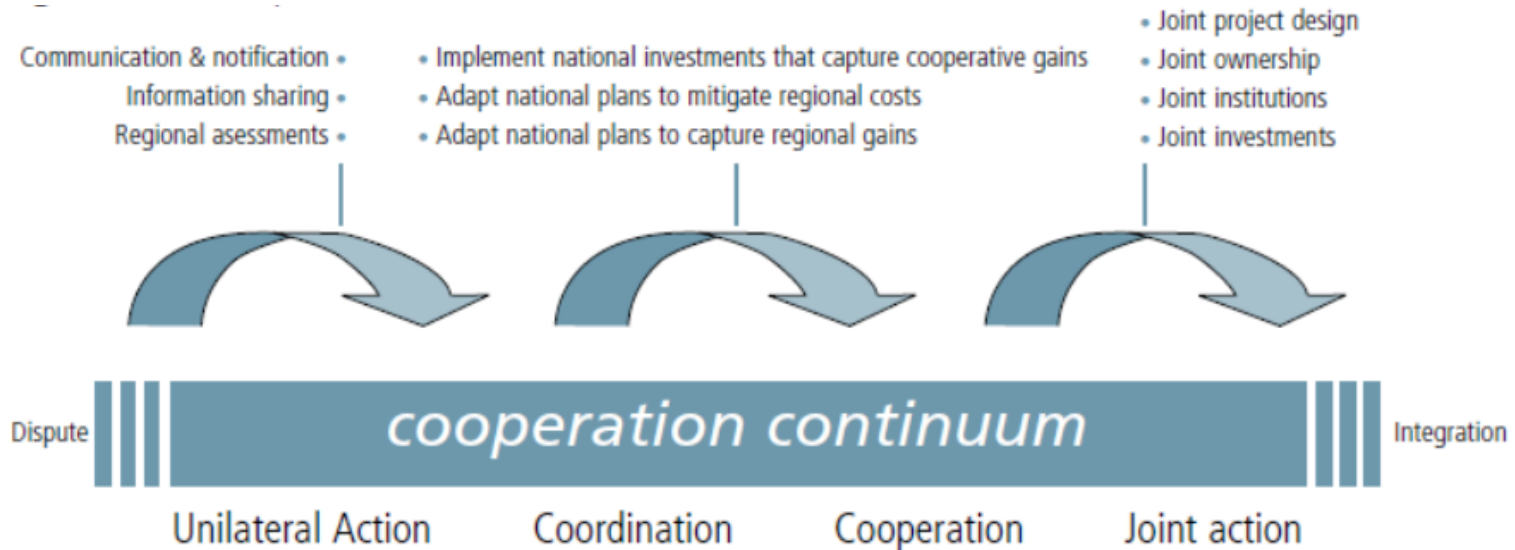


Wild and Loucks, 2015

Mitigation Issues and Techniques Basin Scale

Case study (Phase 3 and 4) points toward that the investigated risks needs basin or catchment management approaches

Institutions and Cooperation
More Joint Action and Benefit Sharing?

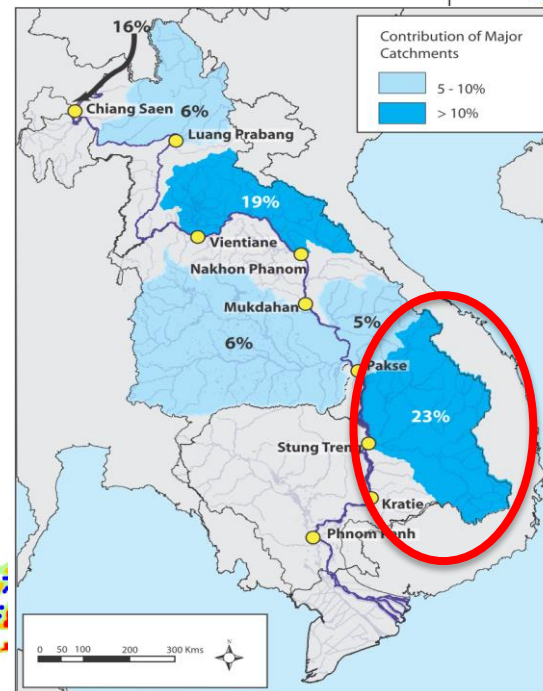
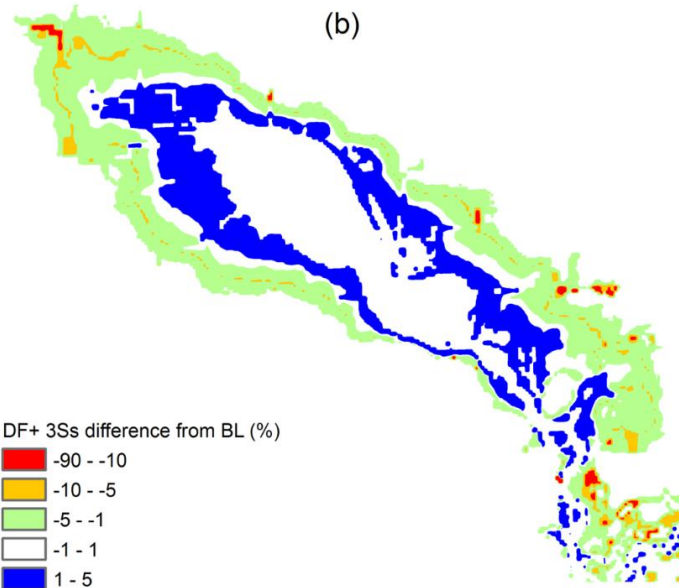
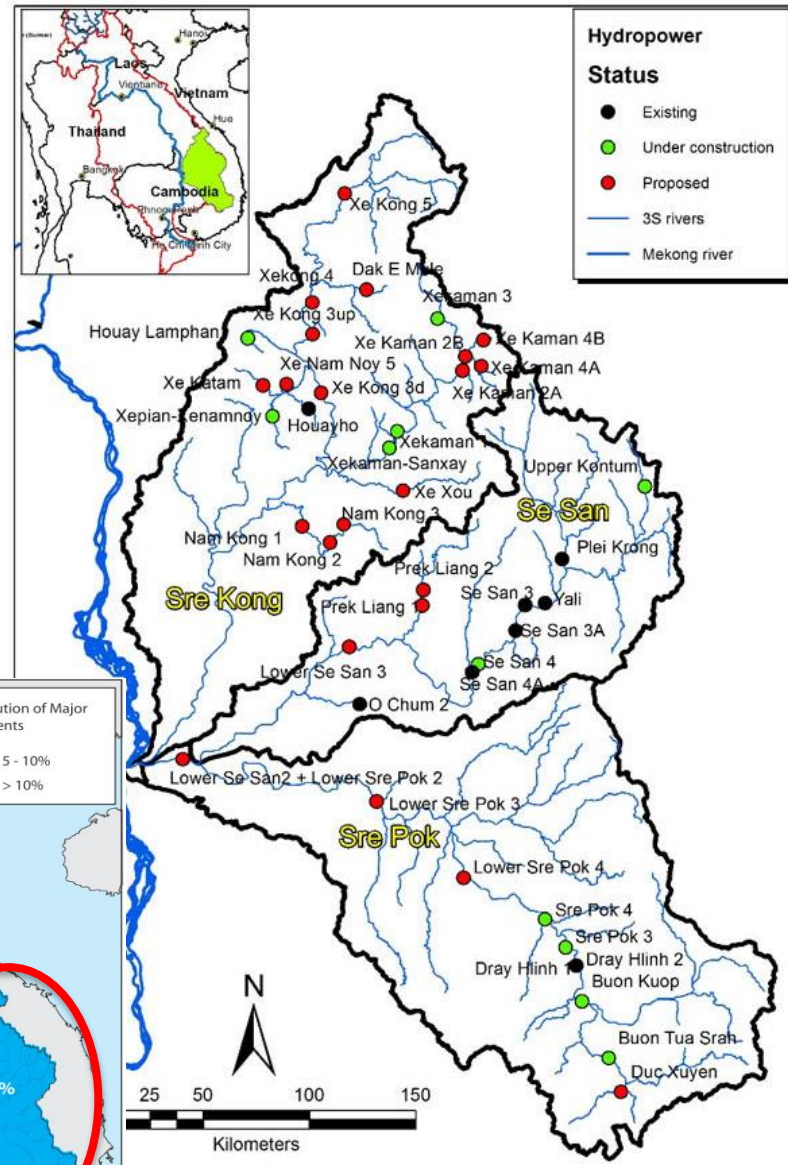


Mitigation Issues and Techniques Basin Scale

Joint Operation of tributary systems

- Coordinated Flow Releases (3S System)
- Coordinated Flushing and Sluicing (Nam Ou example)

Siting in Relation to (Fisheries) Connectivity



Mitigation Issues and Techniques Basin Scale

Integrated System Spatial Planning – The New Frontier in HP Planning (IDB/Nature Conservancy, 2013 and Nature Conservancy 2017, Schmitt et al. 2017)

Site-by-site planning

- Plan and develop dams **site-by-site**
- **No strategic vision** on final cumulative impacts and benefits

Strategic assessment

- Evaluate impact and benefits of dam portfolios on **network scales**
- Make **informed decisions** and **select optimal trade-offs**

System reconnaissance

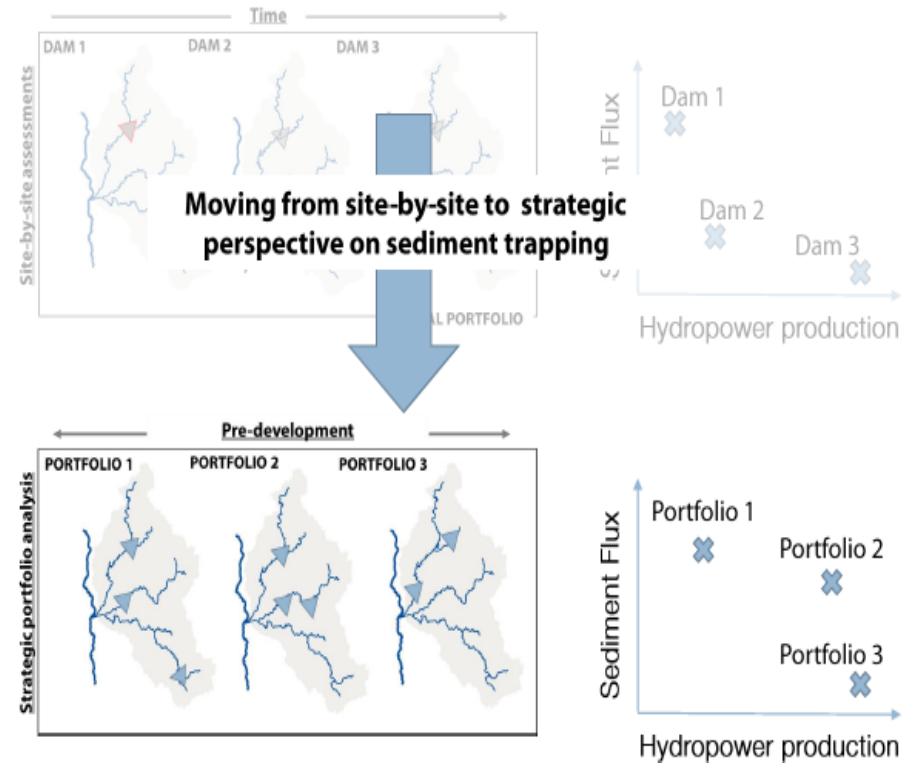
- Spatio-temporal diversity in basin-scale sediment transport

Predictive modelling

- Modeling network-scale cumulative dam impacts

Optimal portfolio selection

- Evaluate a large number of dam portfolios



Main Deliveries Final Phase

- **Vol 1 - Updated Guidelines Version 3.0 (with Inputs from the Case Study)**
- **Vol 2 - Updated Manual Version 3.0 (with inputs inputs from the Case Study)**
- **Vol 3 – Knowledge Base (Structure, Usage, manual and Update on regional and international practise)**
- **Vol 4 - Case Study Report Version 2.0 (including downstream dams and inputs from Council Study)**
- **Vol 5 – Discussion Note on Review of Update of PDG (2009) and HDS (2001)**
- **Vol 6 – Final Closure Report**





Thanks for your attention