Dec 11th, 1:30 PM - 3:10 PM

Assessing fisheries and environmental impacts and proposing policy recommendations for sustainable development of Mekong River Basin

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MRC Council Study:

Assessing Fisheries and Environment Impacts and Proposing Key Policy Recommendations for Sustainable Development of the Mekong River Basin

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Outline

- Introduction
- Methodology
- Summary of key results
- Key conclusions and policy recommendations

Water-resource developments can affect river ecosystems by changing:

- flow regimes
- sediment regimes
- water chemistry and temperature regimes
- erosion rates and habitats
- migration paths (dams act as barriers)
- abundance and diversity of plants and animals
- ecosystem services (fisheries and OAAs)

Approaches

CAUSE

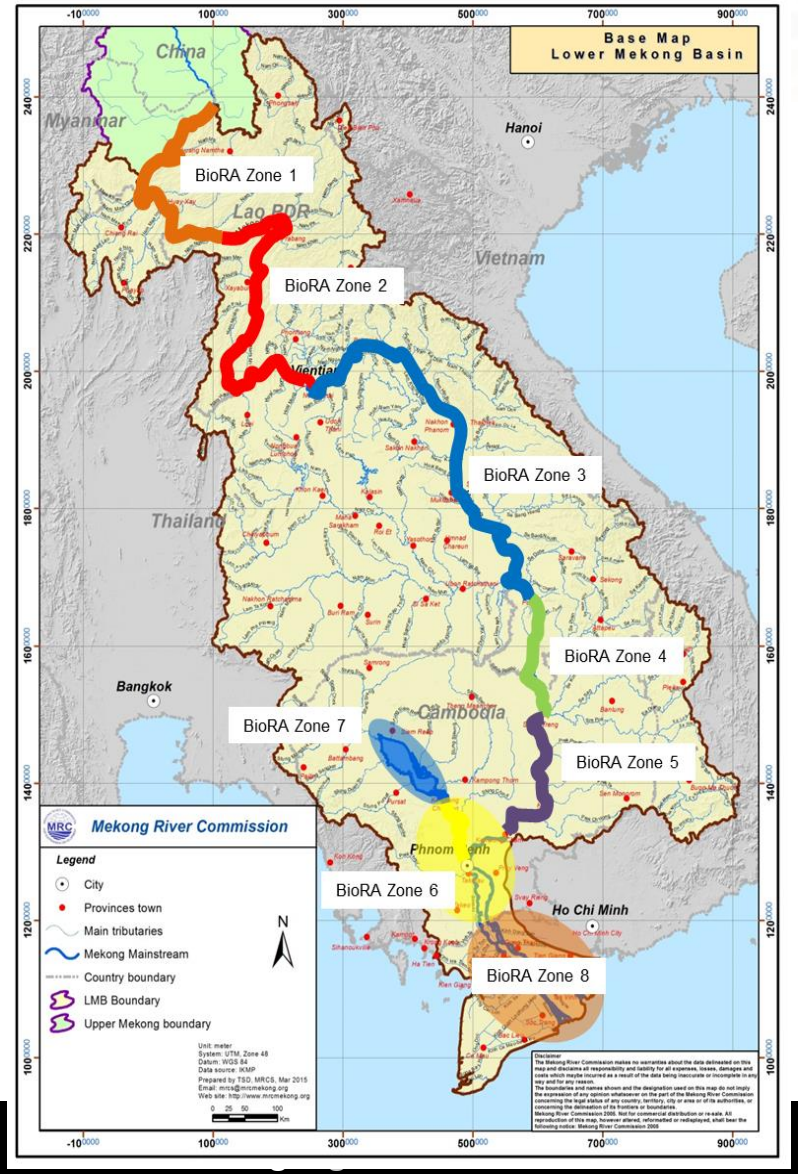
- flow regimes
- sediment regimes
- water chemistry and temperature regimes
- barriers

EFFECT

- Aquatic habitats
- Aquatic fauna and flora (biodiversity)
- Aquatic ecosystem services on which people depend.

BioRA Zones and Focus Areas

- Eight BioRA Zones, each with one or more Focus Areas
- MT provided scenario outputs at Focus Area
- BioRA Results reported by Zone



BioRA: 47 key Indicators

Geomorphology (6)
- Erosion
- Bed sediment size
- Sandy habitat
- Rocky habitat
- Depth of bedrock pools
- Water clarity

Vegetation (6)
- Riparian trees
- Bank vegetation cover
- Herbaceous marsh
- Weeds and grasses
- Flooded forest
- Grassland vegetation

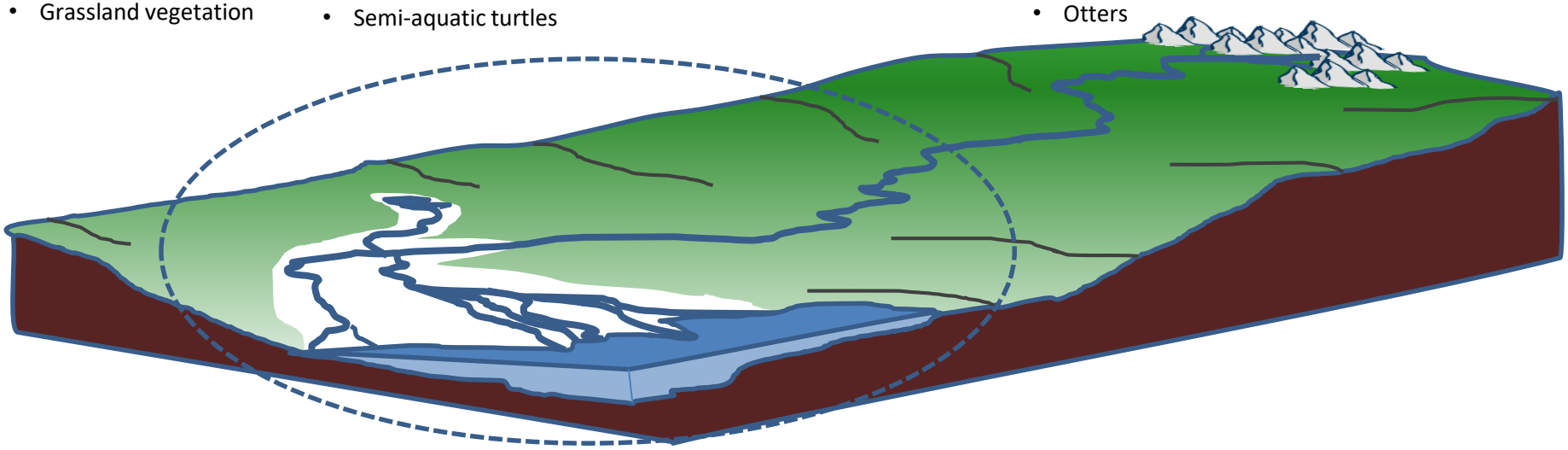
Macroinvertebrates (8)
- Burrowing mayflies
- Snail abundance
- *Neotricula aperta* abundance
- Bivalve abundance
- Polychaete worms
- Shrimps and crabs
- Diversity
- Emergence

Herpetofauna (4)
- Ranid amphibians
- Aquatic serpents
- Aquatic turtles
- Semi-aquatic turtles

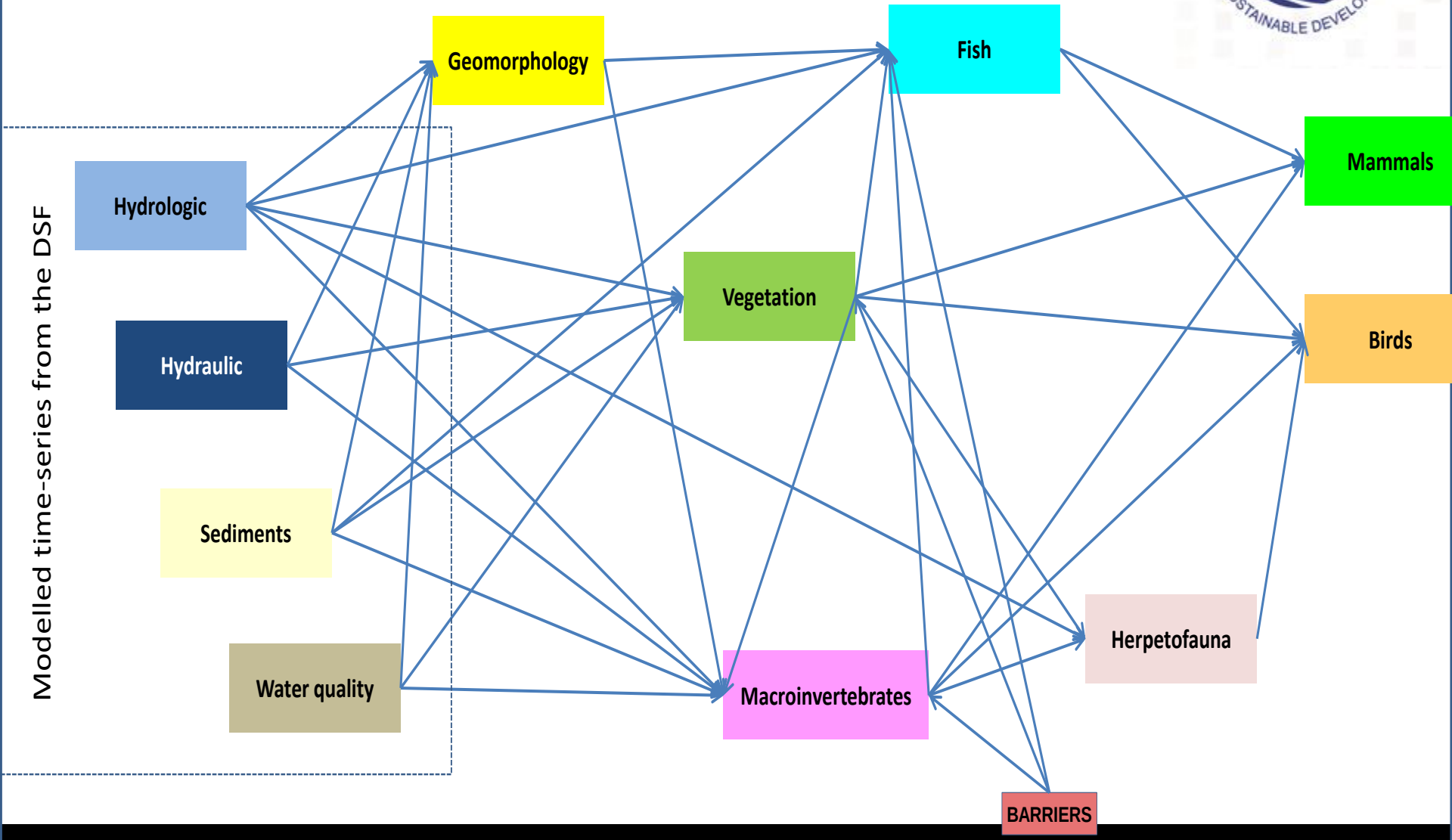
Fish (11)
- Rithron residents
- Main channel residents
- Main channel spawner
- Floodplain spawner
- Generalist species
- Floodplain resident
- Estuarine species
- Anadromous species
- Catadromous species
- Marine visitor species
- Non-native species

Birds (9)
- Medium/large ground-nesting channel species
- Tree-nesting large waterbirds
- Bank-/hole-nesting species
- Flocking non-aerial passerine of graminoid beds
- Large ground-nesting species of floodplains
- Large species using bank-side forest
- Rocky-crevice nester in channels
- Dense woody vegetation / water interface
- Small non-flocking using seasonally-flooded plants

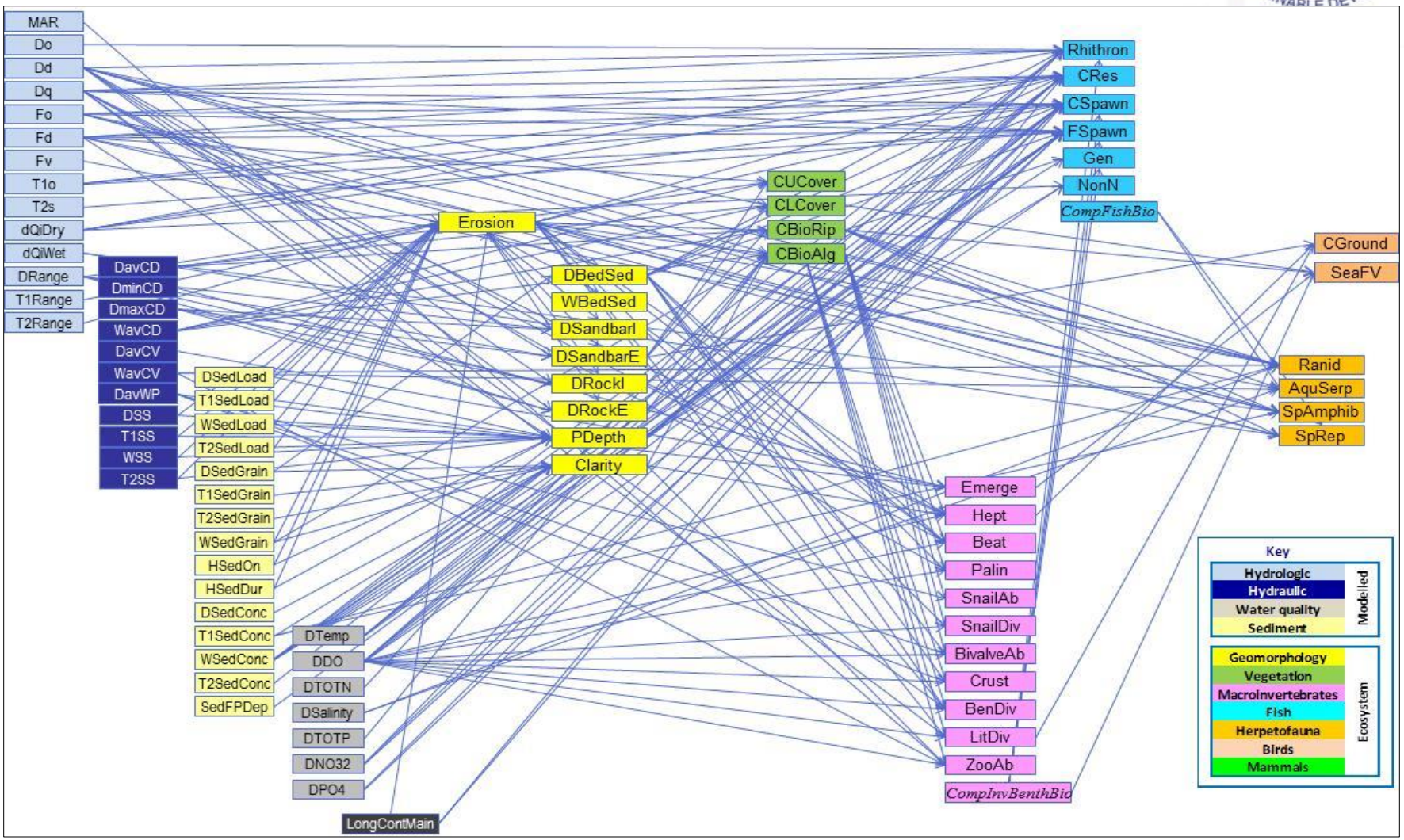
Mammals (3)
- Mekong dolphin
- Hog Deer
- Otters

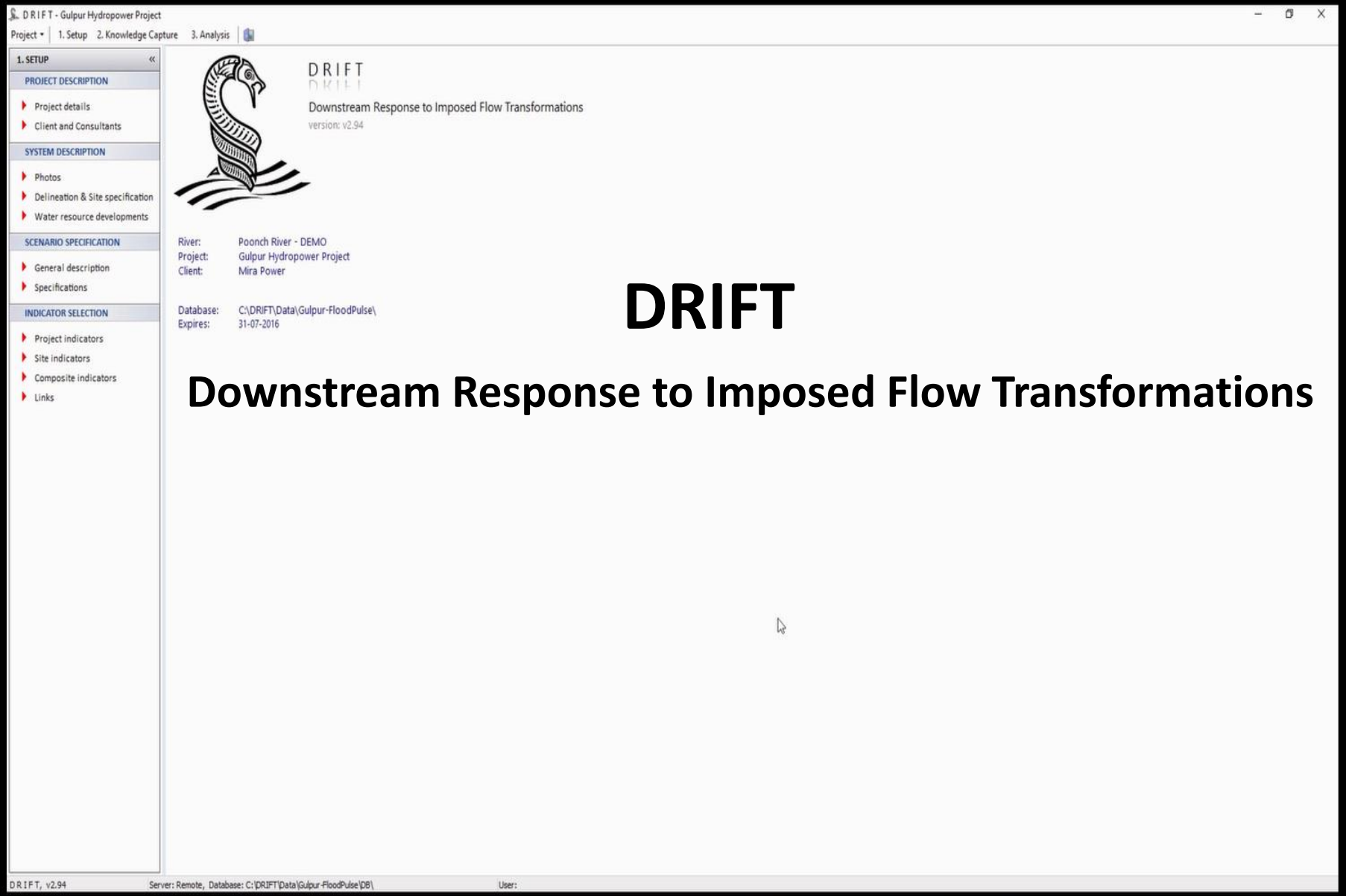


Links in BioRA



~76 BioRA indicators
~ 12 composite indicators




DRIFT - Gulpur Hydropower Project
Project
1. Setup
2. Knowledge Capture
3. Analysis
1. SETUP
PROJECT DESCRIPTION
Project details
Client and Consultants
SYSTEM DESCRIPTION
Photos
Delineation & Site specification
Water resource developments
SCENARIO SPECIFICATION
General description
Specifications
INDICATOR SELECTION
Project indicators
Site indicators
Composite indicators
Links
DRIFT
Downstream Response to Imposed Flow Transformations
version: v2.94
River: Poonch River - DEMO
Project: Gulpur Hydropower Project
Client: Mira Power
Database: C:\DRIFT\Data\Gulpur-FloodPulse\
Expires: 31-07-2016
DRIFT
Downstream Response to Imposed Flow Transformations
DRIFT, v2.94
Server: Remote, Database: C:\DRIFT\Data\Gulpur-FloodPulse\DB\
User:
EN
17:52
23/07/2017

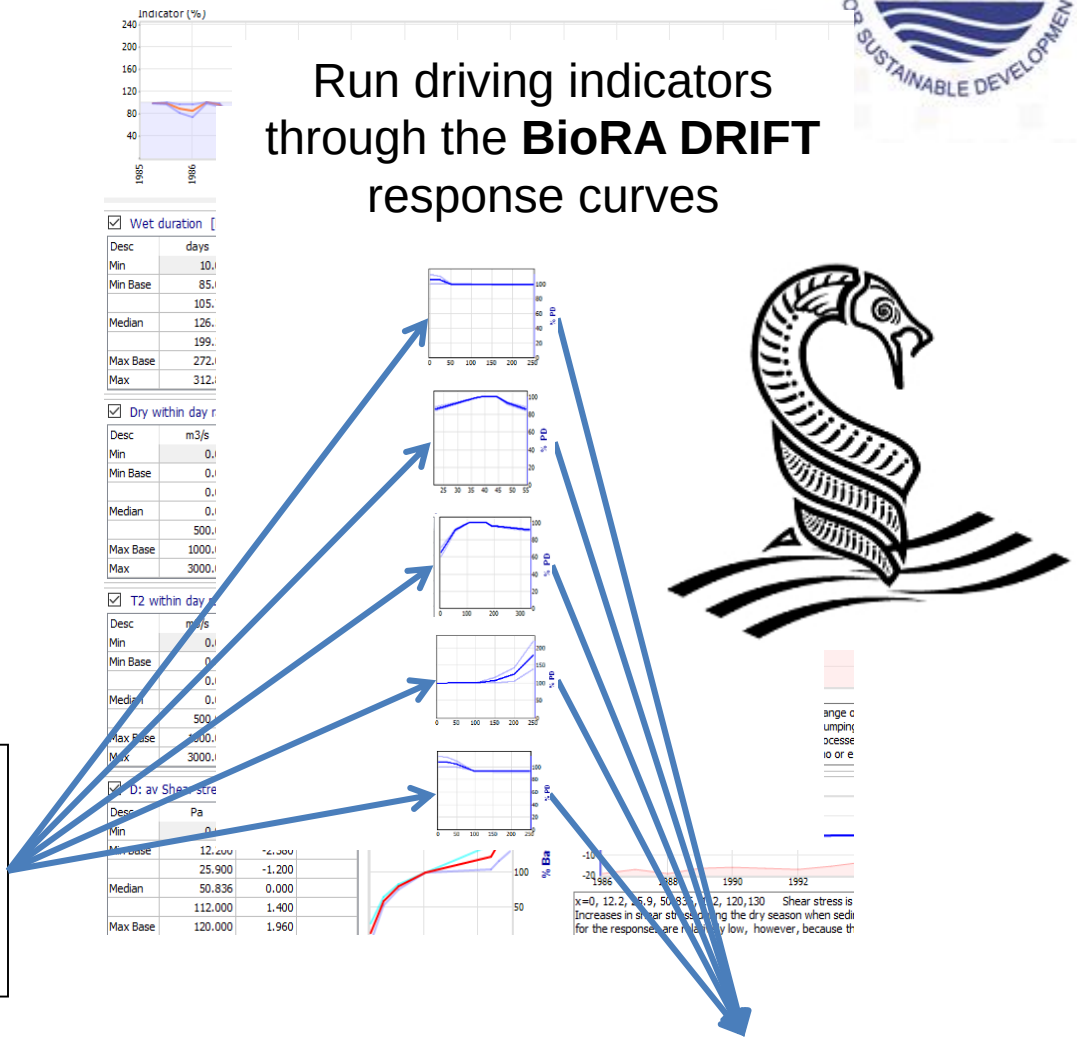
BioRA DRIFT

Modelling Team
1985-2008 with 2007, 2020 and 2040 level of development

Time-series of hydrology, hydraulics, sediment, nutrients

Imported into BioRA DRIFT and transformed into time series of driving indicators

Run driving indicators through the **BioRA DRIFT** response curves



Predictions of change

Scenarios assessed

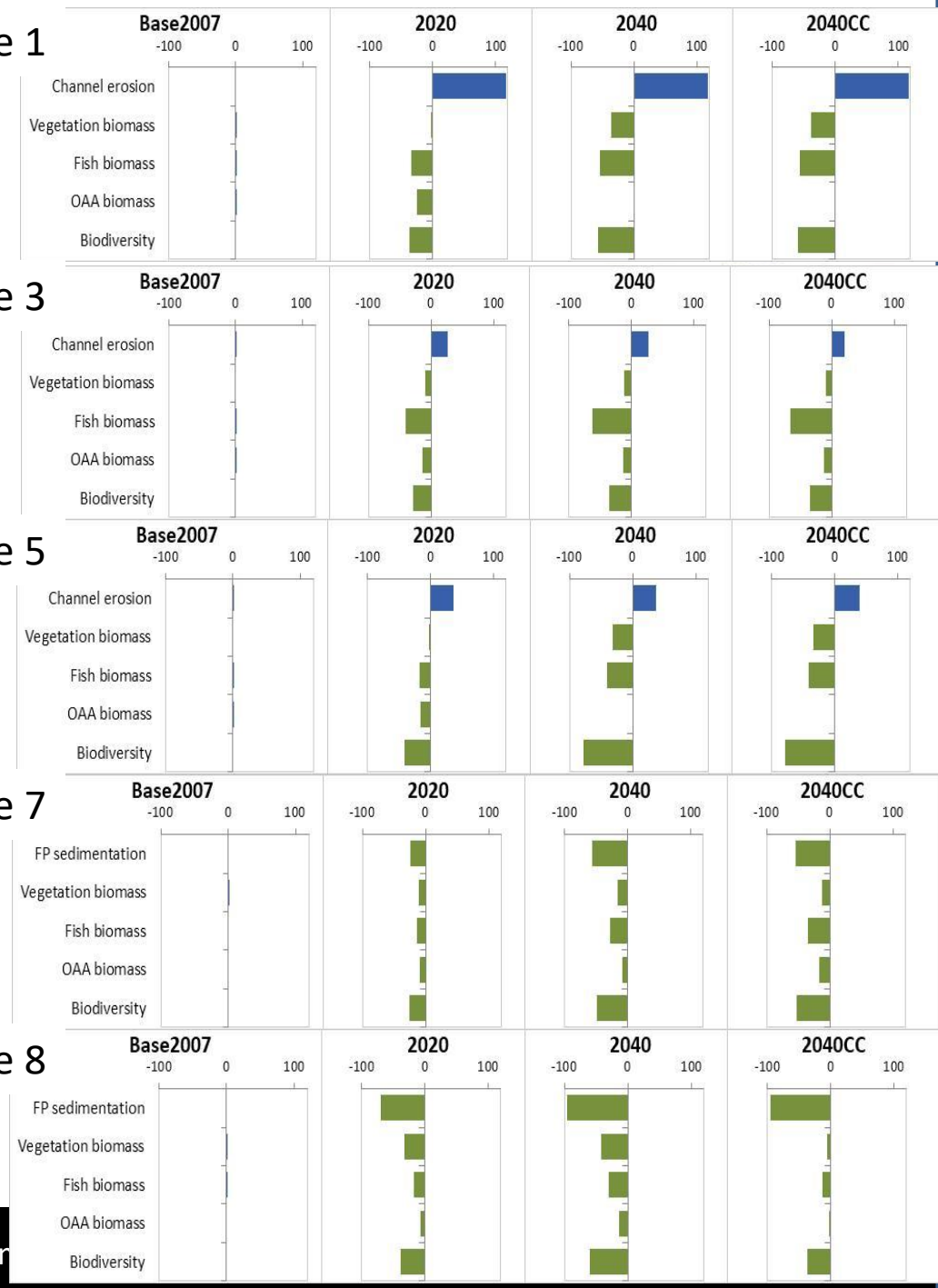
- Four main national development plan scenarios:
  - 2007- early, 2020- definite, 2040- planned, 2040CC
- Thirteen sub-scenarios
  - Variations in climate change, agriculture and land use, irrigation, flood protection, navigation and hydropower
- For each Focus Area
- Change reported relative to 2007 Baseline

Summary of main results

- Impacts driven by:
  - Reduced floodplains
  - Very reduced sediments
  - Barriers to fish and prawn migration
  - Inundation of mainstream river
- Predictions for every indicator:
  - Only summaries shown here

Change in key indicators

- Increased:
  - Channel erosion
  - OAAs
- Decreased:
  - FP sedimentation
  - Vegetation biomass
  - Fish biomass
  - Biodiversity

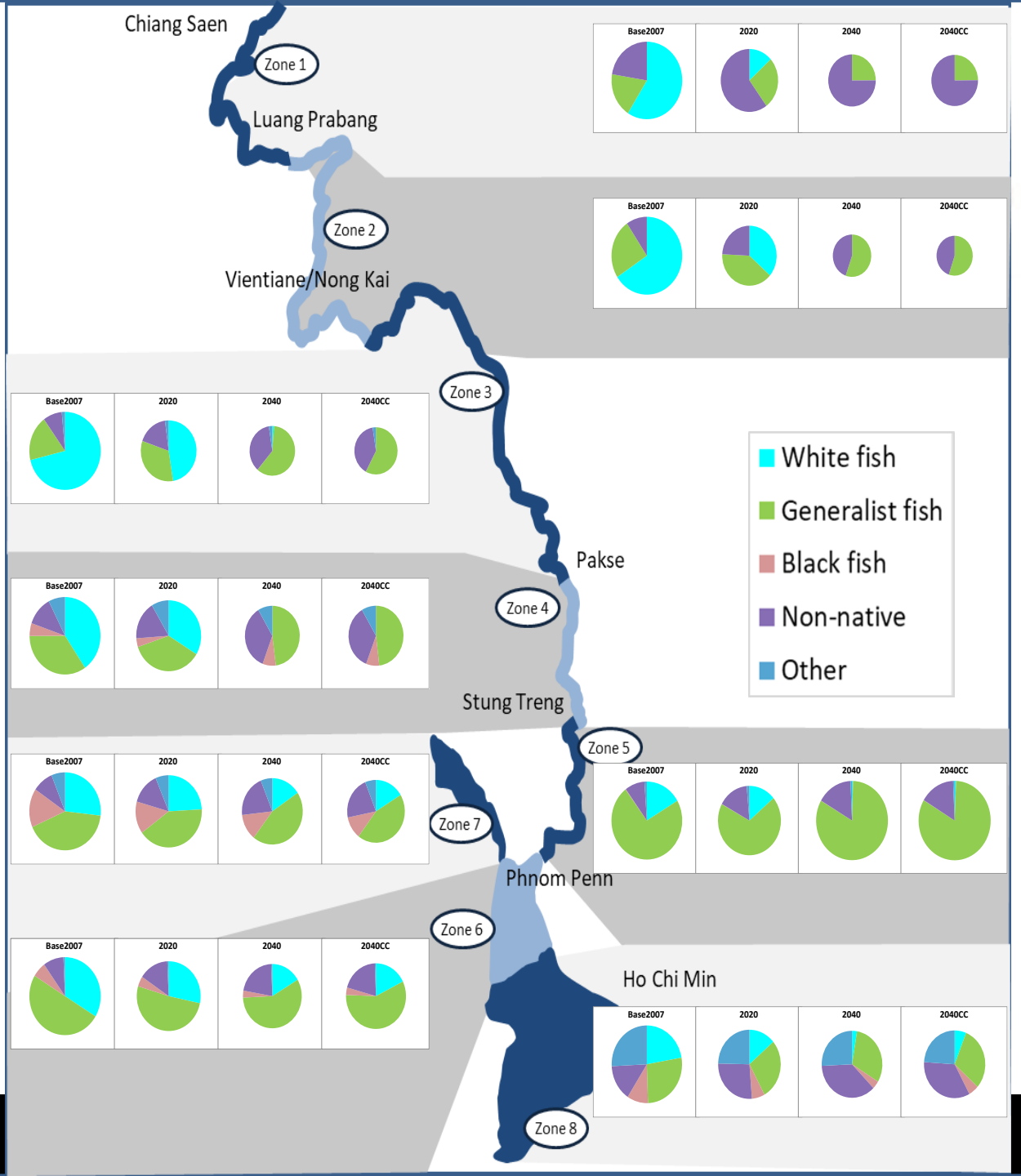


FISH and FISHERIES:

Fish biomass drops

White fish lost

Alien fish dominate

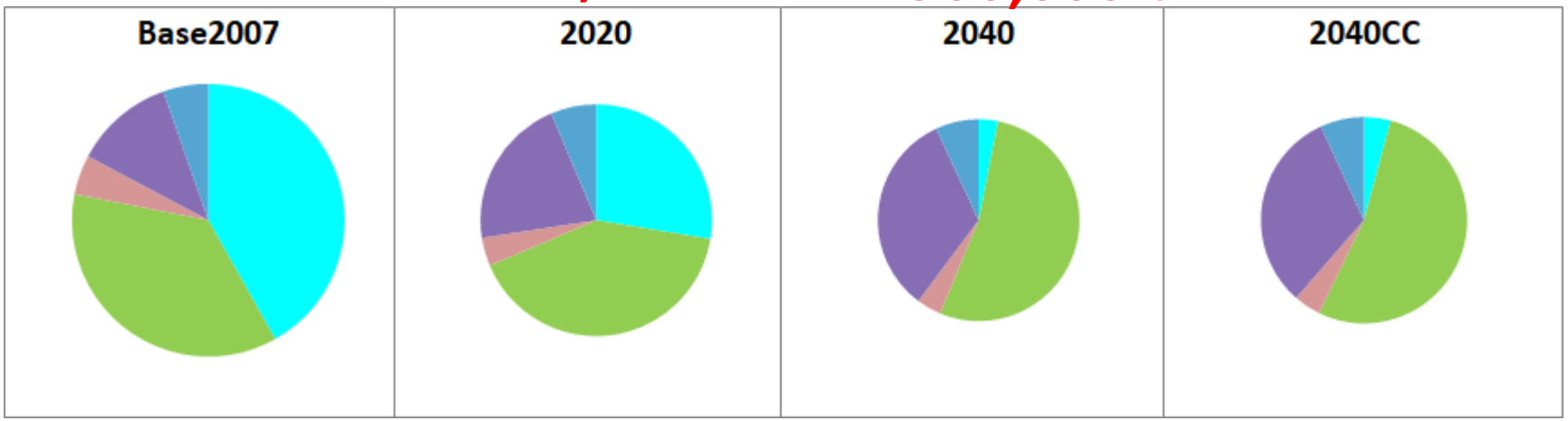


Fish biomass – whole LMB

-25%
-600,000 t

-39%
-900,000 t

-38%



-US$2,700 million

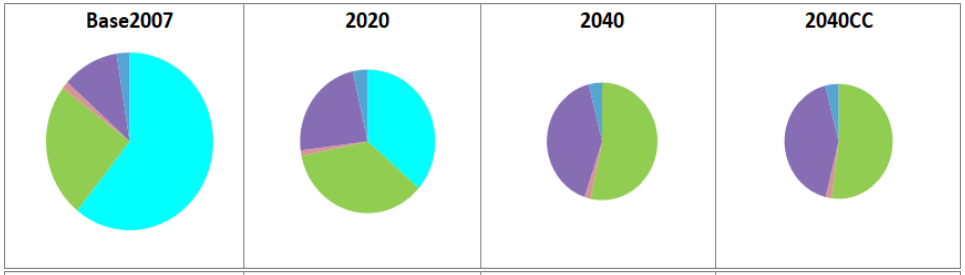
-US$4,300 million

-30%

White fish
Generalist fish
Black fish
Non-native
Other

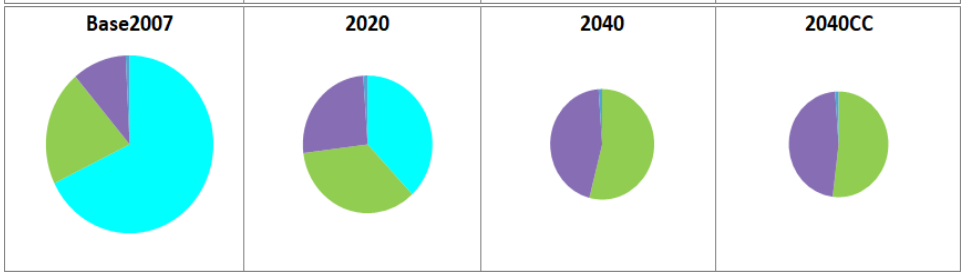
Fish biomass – country level

Lao PDR



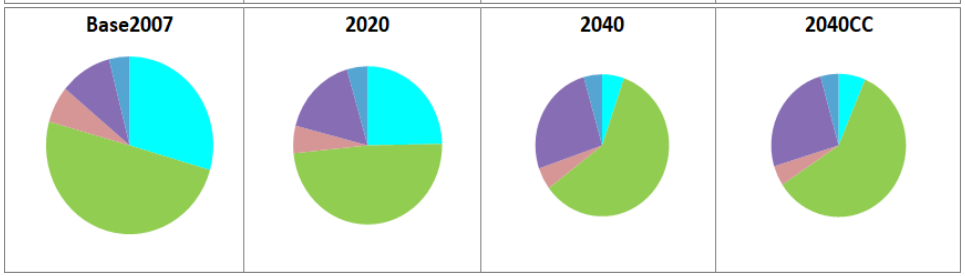
-35%; -50%; -51%

Thailand



-40%; -55%; -56%

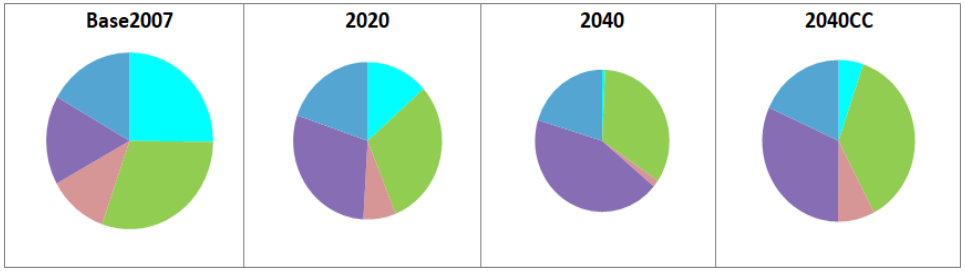
Cambodia



White fish
Generalist fish
Black fish
Non-native
Other

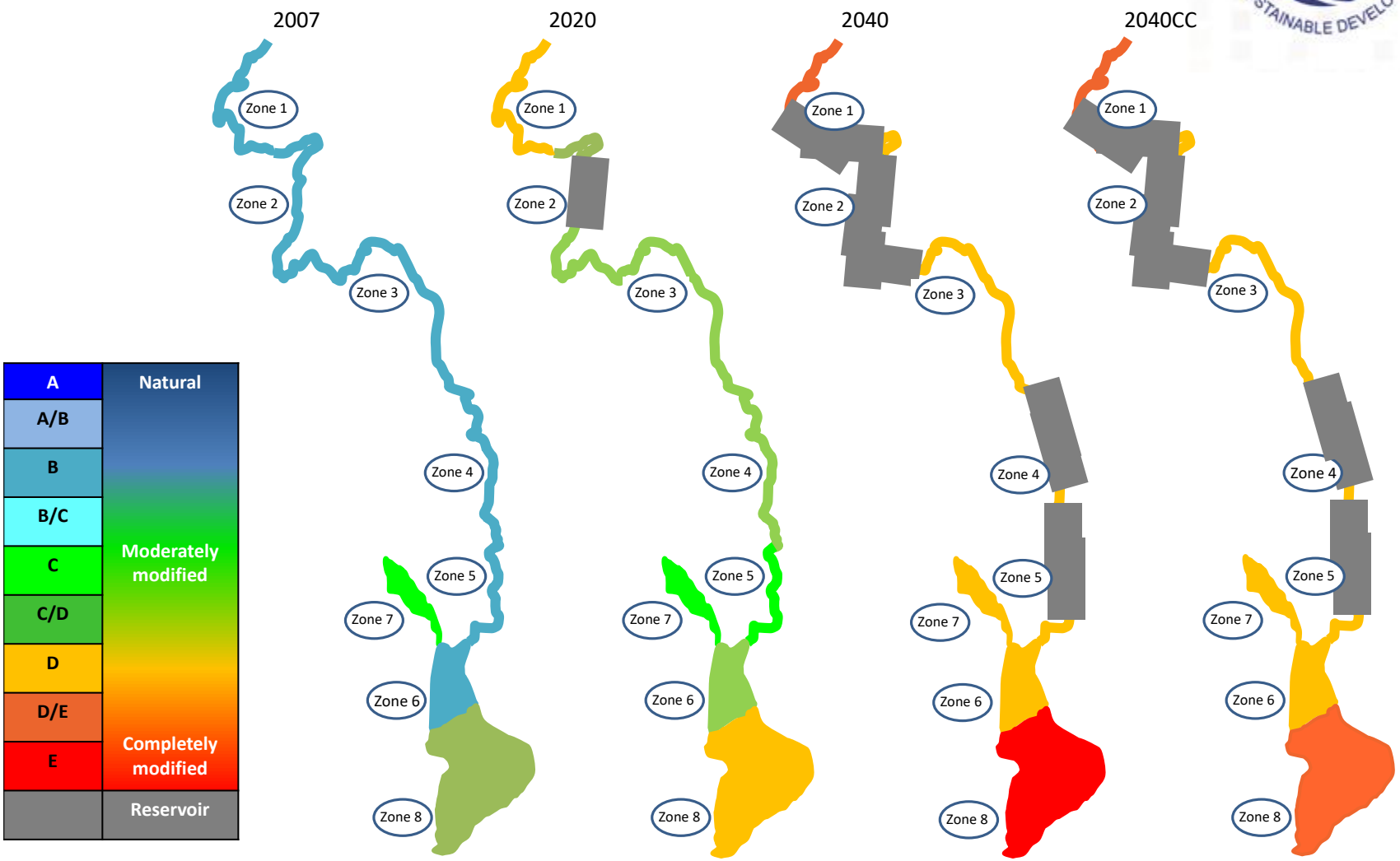
-20%; -35%; -36%

Viet Nam

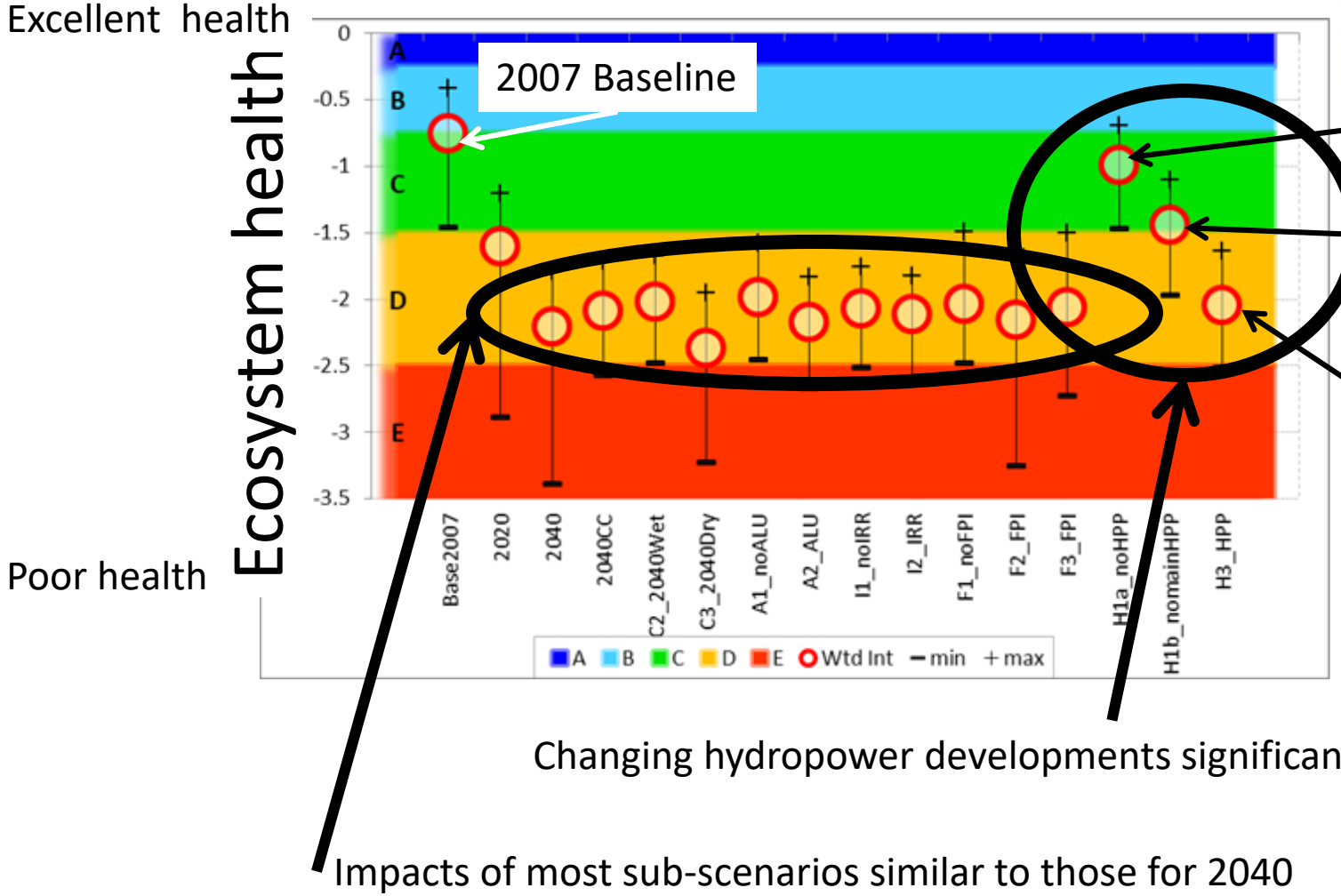


-15%; -30%; -11%

Overall ecosystem condition



Thematic sub-scenarios



Key Conclusions

- The MRC CS found that combined investments in water resources for 2020 and 2040 national plans were likely to negatively affect community resilience and vulnerability as well as sustainability and that the main trade-off was benefits accrued by power companies at the expense of fishing households.
- Excessive investment in hydropower and labour-intensive agriculture is likely to reduce both food security and GDP growth in the Lower Mekong Basin.
- The planned expansion of traditional agricultural activities is likely to increase demand for labour at the same time as the manufacturing and service sectors expand.
- Over investment in agriculture also raises the prospect of underused or abandoned infrastructure.

Policy Recommendations (1)

How can we stimulate strong economic growth without compromising environmental sustainability and leaving anyone behind?

1. Only low impact and high return hydropower and agricultural projects should be progressed for implementation: **project-by-project assessments are needed that adequately consider cumulative impacts**
2. **Managing trade-offs between hydropower and fisheries** is more efficiently achieved by sharing benefits across sectors rather than compensating losses between countries. A possible solution to reallocate benefits acquired by power companies at the expense of fishing households faced with lower catches in all four countries could be **a levy** of **19%** on annual earnings for plants on the Mekong mainstream and **9%** for those on tributaries.

Policy Recommendations (2)

3. Member Countries may wish to consider **renewable power-generation technologies** competitive with hydropower. Assessing emerging new technologies (i.e. wind and solar) would provide major insights for managing the nexus of water, energy and food in the Lower Mekong Basin.
4. **Effective impact mitigation measures** can reduce fisheries and sediment losses. Mitigation measures for fish and sediment management should be considered during the design phase and operation of dams to reduce impacts.
5. Small and more focused **intensification agriculture and aquaculture** extension combined with productivity improvements for existing areas would lead to more sustainable outcomes.

Thank you!