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Council Study

BioRA setup and response curve development for the DRIFT-DSS for LMB

6th RTWG Meeting
Phnom Penh, Cambodia
17-18 December 2015

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Objective of BioRA

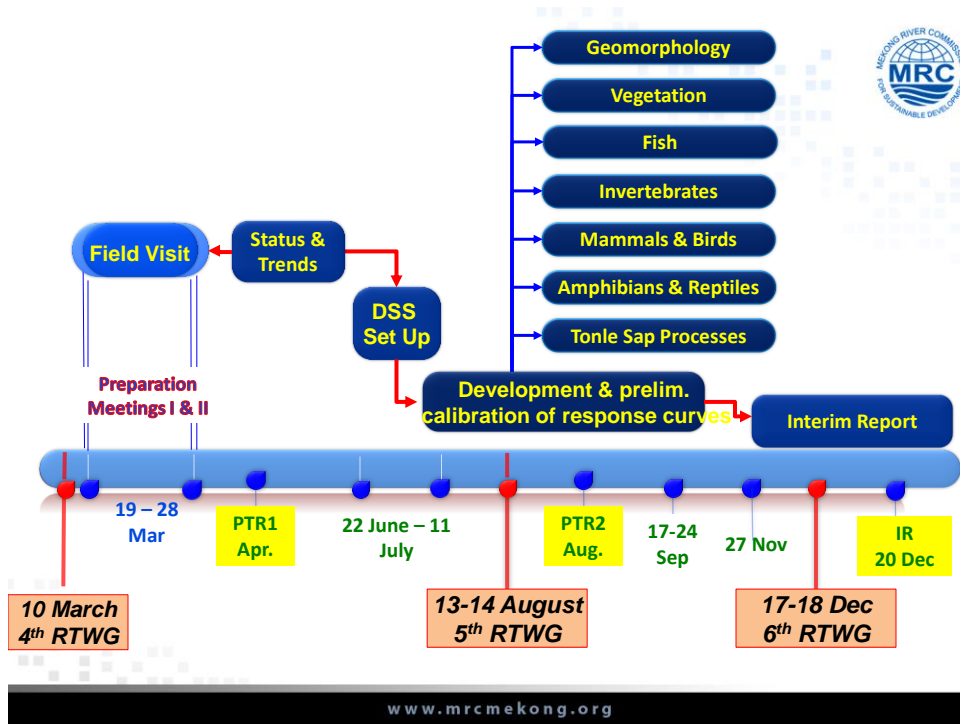


To estimate the ecological responses to hydrological, sediment and water quality changes that are caused by water resource developments in each thematic area and cumulatively – i.e. changes in key biophysical indicators.

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PROGRESS

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BioRA Interim Technical Report



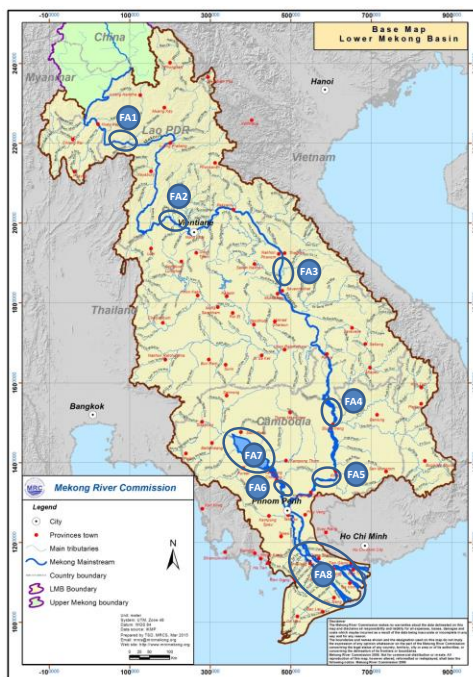
Interim Technical Report (20 December 2015)

- **Specialist reports: 7 disciplines, for each discipline:**
 - Description of Focus Areas
 - Indicators and links: characterisation and reasons for selection
 - Status and trends assessment
 - Evidence-based explanations for Response Curves
- **Results of preliminary calibration**
- **Technical Specifications and User's Guide of BioRA DRIFT DSS of the LMB**



DSS SETUP AND CALIBRATION

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Focus Areas



- FA1** Mekong River upstream of Pak Beng
- FA2** Mekong River upstream of Vientiane
- FA3** Mekong River upstream of Xe Bang Fai
- FA4** Mekong River upstream of Stung Treng
- FA5** Mekong River upstream of Kampong Cham
- FA6** Tonle Sap River at Prek Kdam
- FA7** Tonle Sap Great Lake
- FA8** Mekong Delta

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		1	2	3	4	5	6	7	8
geomorphology									
Erosion (bank / bed incision)	NA								
Average bed sediment grain size in the dry season	NA								
Availability exposed sandy habitat in the dry season	NA								
riparian									
Availability of inundated sandy in the dry season	NA								
Availability of exposed rocky habitats in the dry season	NA								
Availability of inundated rocky habitats in the dry season	NA								
Depth of bedrock pools in the dry season	NA								
Water clarity in the dry season	NA								
vegetation									
Riparian trees	NA								
Extent of upper bank vegetation cover	NA								
Extent of lower bank vegetation cover	NA								
Extent of herbaceous marsh vegetation (submerged, floating and emergent)	NA								
Weeds and grasses on sandbanks and sandbars	NA								
Biomass of riparian vegetation	NA								
Biomass of algae (periphyton, plankton, benthic)	NA								
Extent of flooded forest	NA								
Extent of herbaceous marsh vegetation	NA								
Extent of grassland vegetation	NA								
Biomass of riparian/aquatic vegetation	NA								
Biomass of algae (periphyton, plankton, benthic)	NA								
Extent of invasive riparian plant cover	Mimosa pigra								
Extent of floating and submerged invasive plant cover	Hyacinth								
macroinvertebrates									
insects on stones	Heptageniid mayflies								
insects on sand	Baetid mayflies								
urrowing mayflies	Palingeniid mayflies								
nail abundance	NA								
diversity of snails	NA								
terrestrial arthropod abundance	Neotricole arthropods								
valves abundance	NA								
glochial worms	NA								
trilobes and crabs	NA								
terrestrial invertebrate diversity	NA								
invertebrate diversity	NA								
zooplankton abundance	NA								
zooplankton diversity	NA								
composite: Benthic invertebrate abundance	NA								
composite: Invertebrate biomass	NA								
composite: Emergence	NA								
fish									
lithon resident species	NA								
lain channel resident (long distant white) species	NA								
lain channel spawner (short distance white) species	NA								
loodplain spawner (grey) species	NA								
uvytic generalist species	NA								
loodplain resident (black)	NA								
stuarine resident species	NA								
nomadous species	NA								
atadromous species	NA								
laine visitor species	NA								

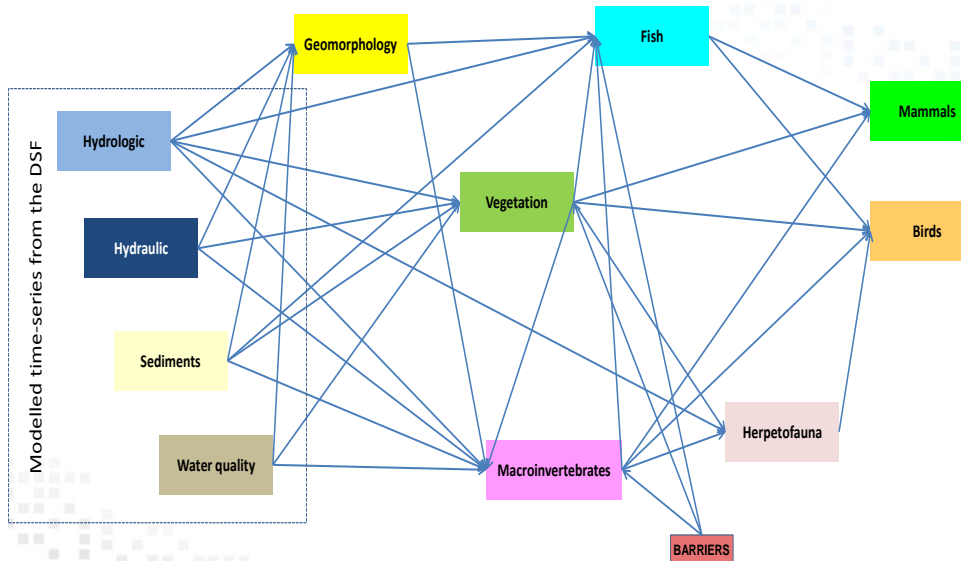
BioRA Indicators



72 indicators

1. Geomorphology
2. Vegetation
3. Invertebrates
4. Fish
5. Herpetofauna
6. Birds
7. Mammals

Links in BioRA



BioRA DSS



- Set-up and preliminary calibration completed for 5 FAs: 1, 2, 3, 5 & 7
- Except FAs 4, 6 and 8

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Data use for preliminary calibration



The hydrological time-series modelled data obtained by using:

- 1985-2008 climate (rainfall) data;
- 2007 level of infrastructure development;
- 2003 level of landuse;
- a daily time set.

The hydraulics were supplied by IKMP using a combination of the DSF models (ISIS-ID) and WUP-FIN models, excepting FA4 (Stung Treng), FA6 (Prek Kdam) and FA8 (Delta)

For water quality and sediment the preliminary calibration time-series were derived using the results from the Water Quality Monitoring Network, for the period 1985 – 2008.

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Response curves



RCs complete for 5 FAs: 1, 2, 3, 5 & 7:

- 67 indicators of 7 disciplines (1. geomorphology, 2. vegetation, 3. macroinvertebrates, 4. fish, 5. herpetofauna, 6. birds, and 7. mammals)
- 1,520 response curves

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The BioRA DSS can be used for testing and training, but will require additional calibration once the **full suite of Reference Scenario 2007 sediment and water quality data** become available from IKMP modelling team before it can be used to assess the Council Study scenarios.

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This will involve the following:

- Obtain hydrology, hydraulic, water quality and sediment modelled outputs for the Reference Scenario 2007 for calibration for all FAs
- Recalibrate the DSS for FA1, 2, 3, 5 & 7
- Develop response curves and calibrate the DSS for FA4, 6 and
- Update the specialists' report
- Rewrite the calibration report
- Obtain modelled data for the cumulative and thematic development scenarios for all FAs
- Run the development scenarios
- Write up the cumulative and thematic reports based on the outputs of the DSS for these development scenarios.

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Way forward (2016)

1. Training workshop to test the BioRA DSS developed to date for LMB (six days in February 2016)

DAY 1: Guide to using the DSS and concepts

DAY 2: Introduction to calibration scenarios, computations, review and testing

DAY 3: Test/review of response curves

DAY 4: Test outcomes for FA 1, 2; adjustments as required

DAY 5: Test outcomes for FA 3, 5 and 7; adjustments as required

DAY 6: Revision of adjustments and way forward

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2. Completion of the BioRA tasks:

- Response Curves and calibration for remaining FAs (c. June 2016)
- Scenario assessment
- Final report preparation



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The RTWG is requested to:

- Take note of the progress
- Provide feedback on proposed MC DSS testing workshop in February
- Provide overall feedback and guidance at this time when necessary



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Thank You



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