Objective of BioRA

To provide clear and comparable information on the impacts of proposed thematic developments on the aquatic resources of main-stem Lower Mekong River, inclusive of the Tonle Sap Great Lake and the Mekong Delta.

• Great detail than in SEA or BDP
• Transparent
• Repeatable
**BioRA Approach**

- **Hydrology / Hydraulics**
- **Water Quality**
- **Sediments**
- **Geomorphology / Habitats**
- **Vegetation**
- **Macroinvertebrates**
- **Fish**
- **Reptiles and amphibians**
- **Mammals and birds**

**DRIFT**

- Knowledge management system for use where quantitative models are not available:
  - Incorporates time-series data from calibrated hydraulic, sediment and water quality models
  - For other aspects of the ecosystem, it captures expert opinion; where possible calibrated with time-series data
- Software and a structured process
- Main BioRA task is to set up and calibrate the DRIFT DSS and provide supporting motivations and documentation
- Allow for consideration of a range of scenarios
**BioRA Team**

**Management:**
- Dr So Nam, Dr Peter Degan, Dr Cate Brown; Dr Alison Joubert

**International and Regional Consultants:**
- Geomorph/WQ: Dr Lois Koehnken
- Vegetation: Dr Andrew MacDonald
  - Macrophytes (delta): Dr Nguyen Thi Ngoc Anh
  - Algae (delta): Ms Duong Thi Hoang Oanh
- Invertebrates: Dr Ian Campbell
- Fish: Dr Ian Cowx, with Dr Kenzo Utsugi (Delta support)
- Mammals and birds: Mr Anthony Stones
- Frogs and reptiles: Dr Hoang Minh Duc
- Tonle Sap processes: Dr Dirk Lamberts

**National Counterparts:**
- Geomorph/WQ; Vegetation; Fish; Fauna (excl. fish)

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**Main steps in BioRA**

1. **Step 1:** Select scenarios
2. **Step 2:** Select focus areas
3. **Step 3:** Model hydrology, hydraulics, sediments, WQ
4. **Step 4:** DRIFT Indicators
5. **Step 5:** Assign Baseline Status and trends
6. **Step 6:** Knowledge capture
   - Set up DRIFT all sites
   - Create response curves
7. **Step 7:** Calibration
8. **Step 8:** Analysis
   - Run DRIFT for all scenarios and generate prediction of change
Summary of main data flow

Six Thematic Teams PLUS Climate Change

Hydrology
Water Balance
IKMP
Hydraulics
Sediment
Water quality
DRIFT
Biological resource
Social
Economics and resource economics
Economic
Indirect Social
Environment

Contracts: Feb/Mar 2015
Preparation Meetings: March 2015
Field Visits: March 2015
Baseline Status and Trends: May 2015
Field Visit 2: May/June 2015
KCW – river/TLS: June 2015
Calibration – river/TLS: August 2015
KCW – Delta: October 2015
Calibration – Delta: November 2015
Specialist Reports: December 2015
Scenario Assessment & Reporting: March/June 2016

Deliverables
Report 1: Indicators and Focus Area
Report 2: DSS Set-up
Report 3: Specialist Reports
Report 4: Populated and calibrated DRIFT DSS
Report 5: Thematic scenarios
Report 6: Cumulative scenarios

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Outputs of Preparation Meetings and Field Visits

- Report: Site Selection and Field Visits. This will contain, *inter alia*:
  - Proposed final selection of focus sites/areas
  - Site descriptions from individual specialists for the Tonle Sap rivers, the Tonle Sap Great Lake and the Delta

- Report: BioRA Indicator Selection
  - The preliminary lists of BioRA drivers and indicators
  - Linkages between BioRA drivers and indicators (BioRA assessment framework)
  - Relationship to MRC/BDP/Scenario indicators
  - Suggested additions/adjustments to MRC/BDP/Scenario indicators
  - Schedule of follow-up activities
  - Summary of main issues arising for Preparation Meetings Part 1 and 2
  - Copies of presentations made at Preparation Meetings Part 1 and 2

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Key points

• Water-resource scenarios
• National Counterparts
• Focus Areas
• Indicators and Linked Indicators
• Baseline Status Assessments
• Knowledge Capture
• Calibration
• Specialist Reports
• Scenario Evaluation and Reporting

Water-resource development scenarios

• Themes: Irrigation; Agriculture and land-use; Domestic and industry; Flood infrastructure; Hydropower; Navigation; Climate change
• Location: Mainstem and/or tributaries
• Direct effects: Hydrology, sediment supply and transport, water quality, channel shape, habitat loss (inundation), connectivity (migration)
• Hydrological period: - probably 1985-2007
• Scenarios: 2020; 2040; exploratory scenarios (2040/2060)
National Counterparts

• c. 4 counterparts from each MC"
  – Water quality and geomorphology
  – Fish
  – Animals, excl. fish
  – Plants
• Letter submitted to MCs
• Names received – selection on going
• Link with relevant lead specialists
• Involved in all activities

Selection of focus areas

1. Location of developments in scenarios not known
2. Reaches/areas rather than sites
3. Structure delineation selection process

• Establish a network of biophysical nodes:
  – Mainstem
  – Tonle Sap System
  – Delta
• Group river nodes into Integrated Units of Analysis
• Select focus areas within each IUA
• Allocate nodes to socio-economic indicators
**Indicators and Linked Indicators**

- Compile preliminary list
  - Working from draft lists
  - Workshop tomorrow – linked indicators
  - Session at Siem Reap
- Submit preliminary list of indicators and linked indicators
- Review by Council Study team members
- Set-up DRIFT
- Knowledge capture

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**Baseline status and trends**

- Current (2015) status and trajectories of change for each indicator at every focus area:
  - Identify main driving forces influencing baseline status
- ‘Exogenous’ baselines:
  - Past conditions:
    - 1900; 1950; 1990; 2000; 2007
  - Future conditions:
    - Situation in absence of water-resource development
    - 2020; 2040; 2060
Knowledge Capture

- Sequential/staggered drafting of Response Curves
  1. Geomorphology
  2. Biota
- Individual sessions ahead of main workshop
- Iterative
  - Indicators and linked indicators may change
  - Motivations for RC must be provided

Calibration

- Run ‘calibration’ scenarios to assist with calibrating RCs:
  - Naturalised scenario
  - Extreme scenarios
  - Stepped scenarios
  - Development and exogenous scenarios
- Workshop(s) in Vientiane
- One-on-one sessions facilitated by Skype/email
Specialist Reports

1. Discipline-specific description of study area

2. Indicators:
   1. Reasons for selection
   2. Description

3. Baseline status and trends

4. Response curve evidence-based motivations

Scenario Evaluation and Reporting

- Run scenarios through the DRIFT DSS
- Specialists to review outcomes
- Make adjustments to Response Curves if and where deemed necessary
- Draft the reports:
  - Thematic
  - Cumulative
- Specialists to review and discipline-specific inputs to reports
Thank you