The 5th Regional Stakeholder Forum
Basin Planning and Environmental Management
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Joint Environmental Monitoring (JEM)

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Background

- The MRC current **environment monitoring** activities include:

    1) *Hydro-meteorological / near real-time rainfall and water levels;*
    2) *Discharge and sediment;*
    3) *Water quality;*
    4) *Aquatic ecology;*
    5) *Fisheries.*

- The **main objectives** of the above environment monitoring activities are to monitor environment and fisheries indicators in the LMB contributing to the interpretation of the **status and trends** of basin-wide environment and fisheries.
- The MRC Joint Committee at its 44th Meeting, held in Phnom Penh, Cambodia on 27-28 July 2016, requested MRC Secretariat to develop "**Joint Environment Monitoring**" for Mekong mainstream hydropower projects.

JEM Objectives

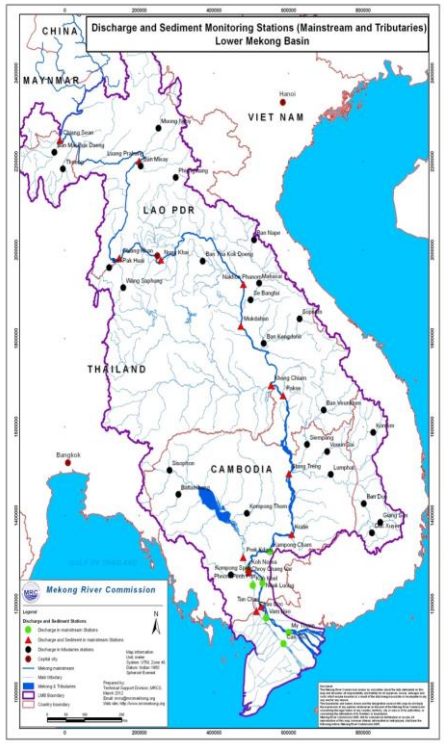
1. Develop a common, **standardized and scientifically robust joint programme** for monitoring the effects of Mekong mainstream hydropower projects on key environmental indicators.
2. To fill the **gaps of environmental data** and information for Mekong mainstream hydropower project planning and design.
3. To support MCs to **jointly monitor and report the transboundary environmental impacts** of Mekong mainstream hydropower projects during construction and operation to inform mitigation and management measures.
4. To facilitate environment data, **information sharing and exchange** among the concerned MCs.

Summary of MRC Monitoring Programmes

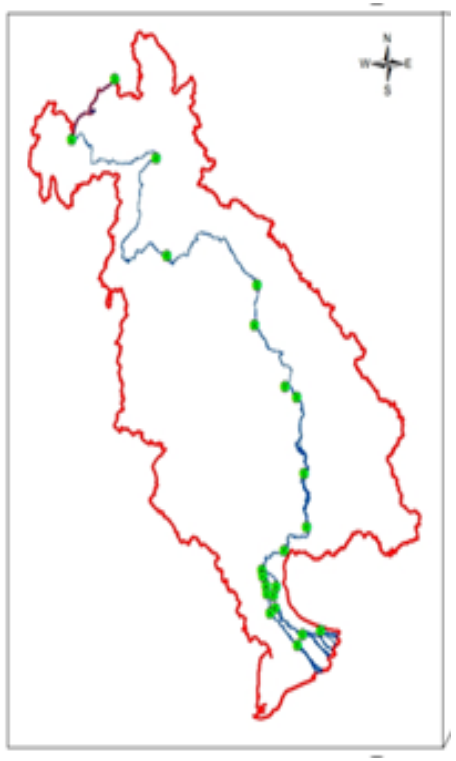
Hydrology
(since 1900)

HYCOS (2008-Date)

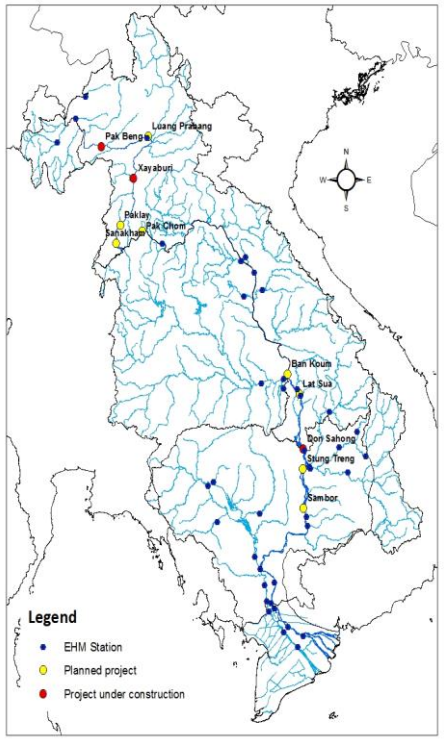
58 stations



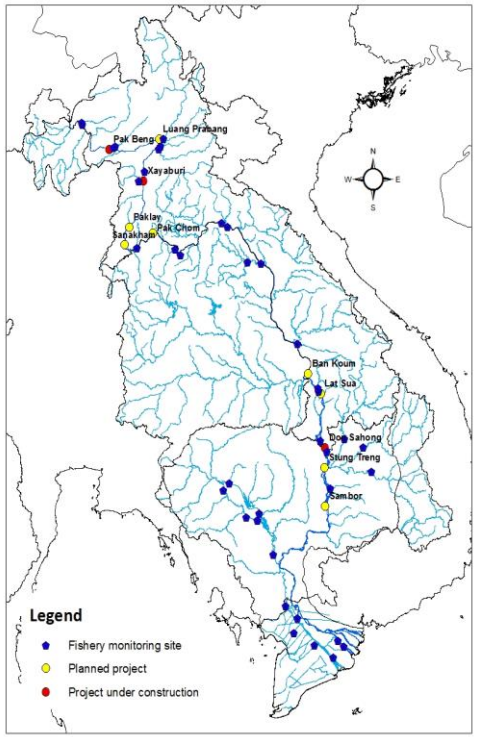
Discharge & Sediment
DSMP
2009 – Date
17 sites



Water Quality
WQN
1993 - Date
22 sites



Aquatic Ecology
EHM
2003 - Date
41 sites



Fisheries
FADM + others
1994 – Date
38 sites

MRC monitoring strengths

- Provides **good coverage** of the LMB mainstream
- Uses **standardized best practice** techniques with established quality assurances
- **Coordinated monitoring** between countries
- **Long-term records** in LMB can be used to detect and identify the large-scale alterations
- **Regular review & analysis** of results has provided good understanding of environmental in the LMB


MRC monitoring weaknesses

- Monitoring **not implemented on a continuous basis**
  - Critical gaps in data, especially since 2014
- **Few tributaries** included
  - Difficult to interpret changes between mainstream sites without tributary information
- **Additional sites** and parameters required
- **Objectives** ***are not always connected between disciplines*** (including locations, frequency) and not proposed for impact assessment of specific projects;
- Not all sites use **same sampling methodologies**
- **Maintenance of equipment and maintaining expertise** a major concern
- **Data** not always held centrally or widely accessible

Present responsibilities and data collection

Project:

- Developer

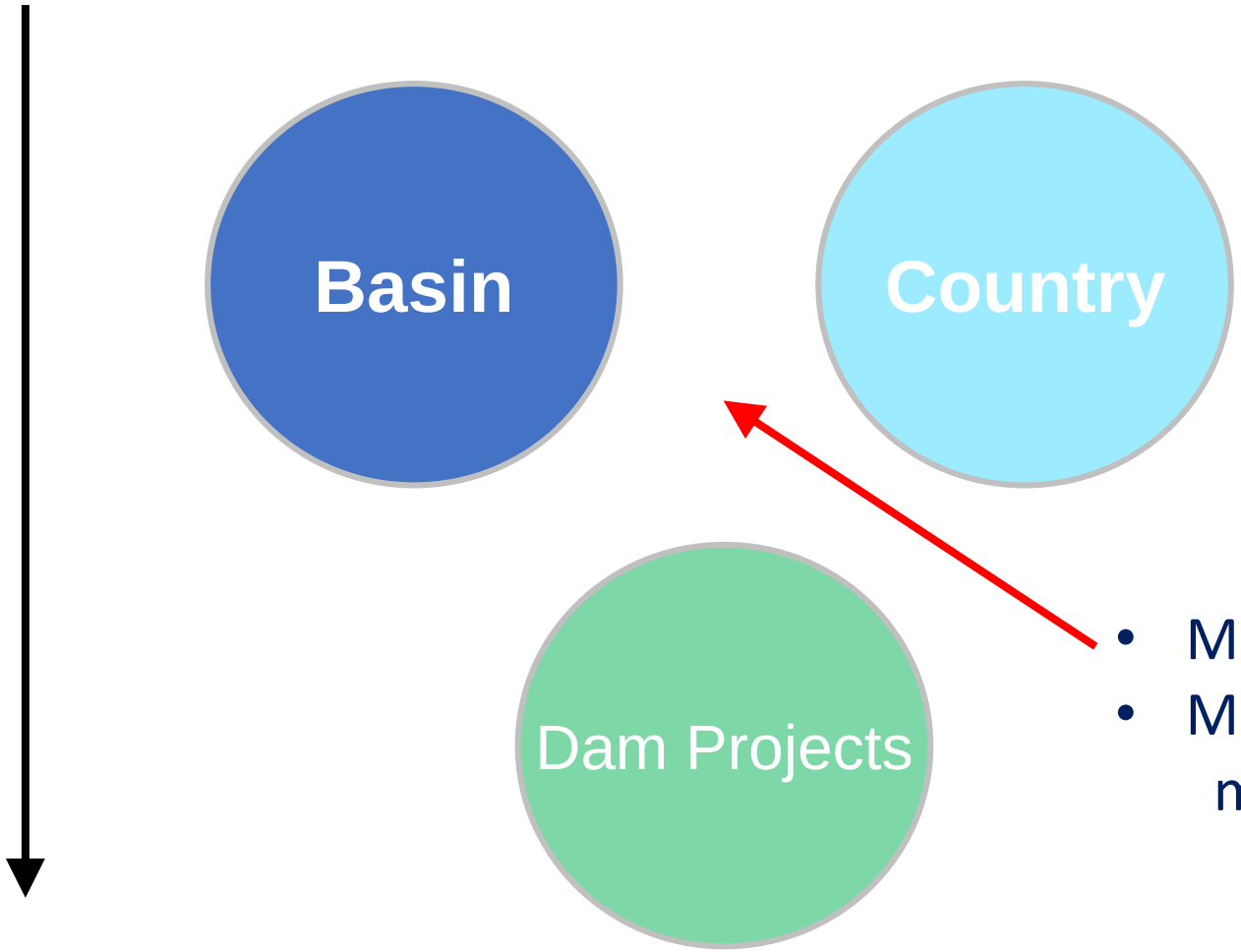
Country:

- NMC/LA

Basin:

- MRC

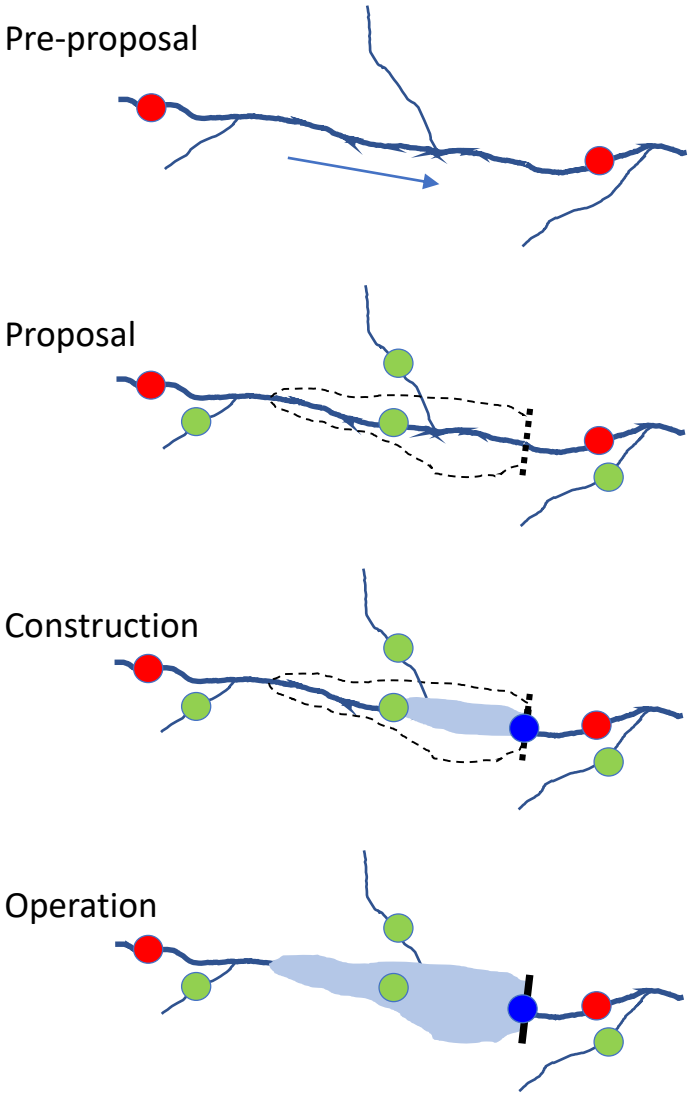
Present data collection - Independent



- Maximise benefits
- Minimise risks, misinformation

Joint Environmental Monitoring – standard/complementary methods

JEM approach



Responsibility

MRC Developer

(dam)

JEM Recommendations: Hydrology

- **Increase number of monitoring stations** and integrate locally installed stations with the existing monitoring network.
- **Integrate the wealth of remote-sensing d**ata, into existing hydrological monitoring.
- **Assess baseline hydrological conditions** prior to project initiation.
- Use a combined **modelling and monitoring approach** to quantify any potential hydrological and hydraulic changes.

JEM Recommendations: Sediment

- **Increase the number of monitoring sites** that determine sediment transport immediately upstream and downstream of impoundments.
- **Include bedload and grain size** monitoring at every monitoring station.
- **Repeat bathymetric profile** monitoring regularly to document change.
- **Improved data management** and analysis
- Potential to trial **new technology**

JEM Recommendations: Water Quality

- **Add to the established water quality monitoring network** using multiple samples to assess the impact of individual dams and detect issues in the reservoir (e.g. **stratification, algae blooms**) and downstream.

- **Ensure high frequency monitoring** of temperature, dissolved oxygen (DO) and turbidity in downstream water to detect changes due to hydropeaking, sediment flushing etc. Include at least monthly measurements of all parameters in the MRC WQN.

JEM Recommendations: Aquatic Ecology

- **Establish monitoring sites upstream and downstream** of dam sites using the existing MRC EHM methods.

- **Monitoring should be conducted annually**, including protocols for assessment of impoundments using phytoplankton, macrophytes, human parasite hosts and potential pest species.

- **Adequate training** must be provided, along with quality assurance procedures.

JEM Recommendations: Fisheries

- Establish **comprehensive standardised monitoring programmes** that monitor fisheries and fish biodiversity before, during and after dam construction.
- **Scope of assessment needs to be widened** beyond the immediate impacts of the dam.
- Monitor the fisheries status within, upstream and downstream of impoundments and **link all assessments to habitat** and environmental variables.
- **Invest in studies to assess the effectiveness of fish passes** to improve mitigation measures.
- **Conduct a food security and livelihoods study** associated with fishing activities in the region to ensure socio-economic impacts are fully recognised.

JEM Outcomes

Standard, Comparative Methods and Sampling

- Provides **standard methodologies** for environmental comparisons, within and between countries;
- **Align MRC, MC, NGO, university and developer monitoring to use common methodologies** for comparative and collaborative purposes;
- **Separate hydropower impacts from other Basin impacts** and climate change;
- JEM proposes **annual in-country workshops** on data;
- **Commercially sensitive data need to be identified** and protected; and
- JEM provides mutual support to **find solutions.**

Good Data, Good Decisions → **Sustainable Development**

Thank you