Monitoring Transboundary Landscapes of the Mekong Sub-region

Eric Wikramanayake, PhD
Consultant, Landscape Conservation Specialist
Ecosystems, the biodiversity that comprises them and the benefits they provide to people (ecosystem services) are the fundamental units for life support on Earth.

They are the foundation for the natural processes of climate regulation and are a vital support for water quality, food security, and flood protection, amongst many others.

(http://www.millenniumassessment.org/en/index.aspx)
Conservation Landscapes in the GMS

• Represent ecosystems and habitats representative of the region’s biodiversity

• Provide ecological requirements for globally threatened species populations

• Link core areas with habitat linkages to facilitate species movement and maintenance of viable metapopulations

• Capture and sustain ecosystem processes and services

• Transboundary areas have most intact forest areas
No single definition of a conservation landscape.

Variously described as:
“a heterogeneous land area composed of a cluster of interacting ecosystems” (Forman and Godron, 1986)

“a mosaic of heterogeneous land forms, vegetation types, and land uses” (Urban et al., 1987),

“a spatially heterogeneous area” (Turner 1989).

For conservation, the ecological elements of a landscape should include “the structure, spatial configuration, and context of these places, and the ways in which these influence ecological processes and undergo change…” (Wiens 2008).

Based on these criteria it represents a mosaic of habitat types managed at spatial scales necessary to capture and sustain viable ecological patterns and processes of conservation targets. These spatial scales generally range from thousands to tens of thousands of square kilometers.
Drivers of ecosystem degradation:

Forest conversion, degradation and fragmentation
• Forests converted forestry plantations, agricultural lands, logging and mineral extraction concessions
• Shifting cultivation expanding into old growth forests,
• Infrastructure,
• Unsustainable extraction of forest products.

Hunting, poaching, and wildlife trade
• From subsistence use to regional commercial trade – includes insects, amphibians and reptiles to birds and mammals are killed for food, to concoct traditional medicines, aphrodisiacs, elixirs, and to use as trophies and adornments.

Climate change
• Shifts in the distribution of ecosystems and change the composition of natural communities
• Catastrophic natural disasters such as floods, hurricanes, landslides, forest fires etc.
The rapid changes from development, unsustainable natural resource extraction, and uncertainties from climate change requires **adaptive management**.

- To evaluate how short- and long-term natural resource goals are met
- Allows for timely adjustment of management strategies in response to change
- Especially important because of the uncertainties associated with climate change, and the rapid development in the region

Mekong region has lost a third of its forests in 30 years, may lose another third by 2030

mongabay.com

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Adaptive management

- Requires monitoring and feedback to assess management interventions

- Key indicators to track ecological responses to climate change and development must be identified

- Long term monitoring program should be sustained
For Effective and Efficient Adaptive Management:

- Natural resource organizations should coordinate and collaborate

- Allows for more efficient use and synergy in resources and data sharing and fund leveraging

- Develop key spatial and temporal indicators together

- Use and share information for better decision making on future directions
Monitoring

A priority for Phase 2 of the CEP-BCI

To establish a hierarchical biodiversity monitoring system with capacity for spatial analyses
The objectives of the TBL monitoring system:

1. to identify threats and threat sources to biodiversity, including ecosystem services;

2. to identify and develop key indicators to monitor biodiversity and social-economic status for each TBL;

3. to use the information in adaptive management and to improve conservation management of TBLs

4. to provide a platform and protocol for GMS and partners, stakeholders to exchange information on and for conservation management of the TBLs
The monitoring system will:

- focus primarily (but not exclusively) on the transboundary landscapes
- comprise of information on biodiversity, socio-economics, and economic development relevant to conservation of the TBLs
- have spatial analytical capability
- be a web portal-based repository of databases accessible to registered users who will be able to deposit, access, and share information through the web portal.

Users include conservation partners and collaborators from the government and non-government sectors, donor agencies, academics, managers and other relevant stakeholders
The monitoring system will:

- have a formal data sharing, access, and use protocol and agreement that will be developed in consultation with key partners who sign on to establish the database.

Protocol will include formal permission and approval to use specific datasets in publications from the original ‘owners’ of the specific data, with ‘owners’ being the institution or person(s) that deposited the data in the database.
Indicators

Landscape-scale indicators will be selected to monitor pressure, state, and response of the forest ecosystems

These will include:

- forest cover – state, extent and quality
- state of aquatic ecosystems
- selected key species sensitive to change
- selected key ecosystem goods and services
- livelihoods of rural communities
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<thead>
<tr>
<th>Landscape-scale Indicator</th>
<th>State Indicator</th>
<th>Pressure Indicator</th>
<th>Response Indicator</th>
<th>Data Source</th>
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<tbody>
<tr>
<td><strong>Landscape-scale integrity of ecosystems and habitats</strong></td>
<td>Forest cover in landscape: extent, distribution, coverage of conservation areas</td>
<td>Forest cover loss, degradation, and fragmentation in landscape: extent, distribution, and coverage of conservation and watershed areas, water sources</td>
<td>Forest Cover gain due to restoration in landscape and conservation areas and watershed areas, water sources.</td>
<td>Global Forest Watch database</td>
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Global Forest Watch

A dynamic online forest monitoring and alert system that empowers people everywhere to better manage forests.

PROJECT SITE: HTTP://WWW.GLOBALFORESTWATCH.ORG

The mapping application unites satellite technology, open data, and crowdsourcing to guarantee access to timely and reliable information about
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<td>Bird species compositions in protected areas, KBAs, corridors, and buffer zones. Presence of intact bird communities and assemblages and rare, endemic, and habitat specialist birds</td>
<td>Bird species compositions in protected areas, KBAs, corridors, and buffer zones. Loss of rare, endemic, and habitat specialist bird species from expected bird communities and assemblages, appearance and dominance of common, commensal, and invasive bird species</td>
<td>Bird species compositions in protected areas, KBAs, corridors, and buffer zones. Appearance of rare, endemic, and habitat specialist bird species</td>
<td>Contracted surveys</td>
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<td>Forest Primate Assemblages</td>
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<td><strong>Biodiversity of Aquatic Ecosystems: Fish diversity, and species composition</strong></td>
<td>Fish species compositions in key/selected rivers and streams. Presence of intact fish communities and assemblages; rare, endemic, and habitat specialist fishes</td>
<td>Fish species compositions in key/selected rivers and streams. Loss of rare, endemic, and habitat specialist fishes; Dominance by common and habitat generalists and invasive species</td>
<td>Fish species compositions in key/selected rivers and streams. Appearance of rare, endemic, and habitat specialist fish species</td>
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<td><strong>Ecosystem Services: Forest Carbon stocks</strong></td>
<td>Forest carbon. Baseline stocks in landscape forests.</td>
<td>Loss of forest Carbon</td>
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<td>Google Earth Engine/ Claslite with Lidar based baseline</td>
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<td>Livelihoods: Forest resources</td>
<td>Income and dependency on forest resources by selected communities in monitoring sites</td>
<td>Loss of income and negative change in forest resource availability for dependent communities in selected monitoring sites</td>
<td>Increased income and positive change in forest resource availability for dependent communities in selected monitoring sites</td>
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<td>Livelihoods: water for agriculture</td>
<td>Availability of water for irrigation and crop productivity in selected monitoring sites</td>
<td>Negative change in crop productivity due to lack of irrigation water in selected monitoring sites</td>
<td>Positive change in crop productivity due to availability of irrigation water in selected monitoring sites</td>
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<td>Development Pressures: infrastructure footprints</td>
<td>Development footprint in natural land cover and ecosystems</td>
<td>Ecosystem degradation, loss, and fragmentation due to development footprints at landscape scales</td>
<td>Mitigation measures to reduce the impacts from development footprints in natural ecosystems, land cover, and habitats</td>
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