

Author Guidelines for Preparation of a Lake Brief

October 17, 2008

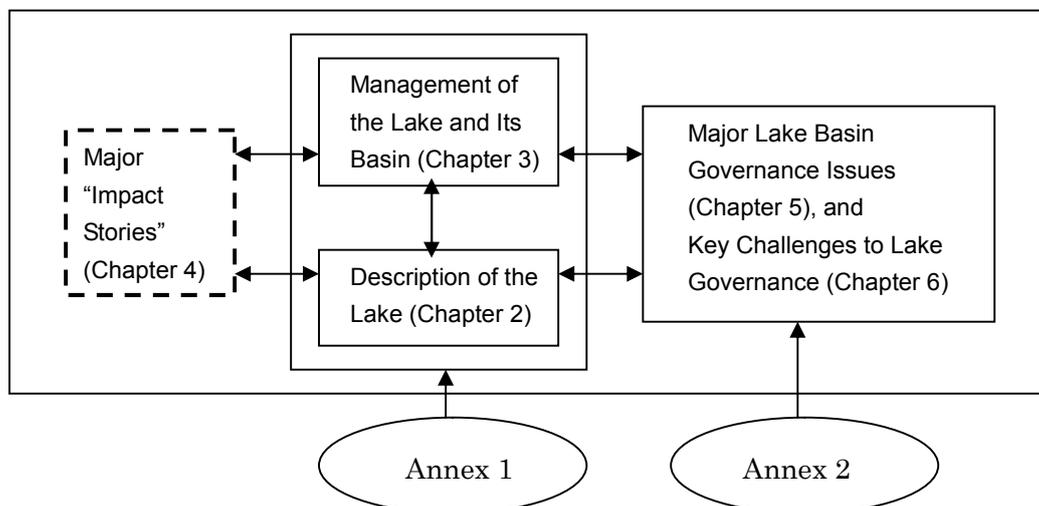
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Preparing a Lake Brief

The Lake Brief should have the following basic chapter structure:

1. **Introduction**
2. **Description of the Lake**
3. **Management of the Lake and Its Basin**
4. **Major “Impact Stories” of the Lake**
5. **Major Lake Basin Governance Issues**
6. **Key Challenges to Lake Governance**
7. **References**

How a Lake Brief may be prepared depends on individual cases. If information on Chapters 2 through 6 is already available, a draft Lake Brief with the above chapter structure may be possible from the outset. In general, however, preparation is typically undertaken easily in stages, starting from ‘Impact Stories’ (Chapter 5) and developing the remaining chapters around it, making best use of such opportunities as the ILBM-Governance workshops for interim reviews and refinements.



The above approach is especially useful when preparation of a Lake Brief is done collectively by more than one Author. That is, the individual Impact Stories prepared by various local stakeholder groups, which may discuss widely-varying subjects of different spatial and temporal scale, can be compiled to form Chapter 5, which may then be related to the other chapters during the course of Lake Brief preparation.

A Lake Brief would be most useful with inclusion of figures, table, illustrations, maps and other visual materials.

1. Introduction (based in part on items 10, 11, 14 and 15 in Annex 1 Questionnaire)

This section should describe the socio-economic context (people, livelihoods, economic characteristics, types of institutions, laws and policies, political structure, etc.) of the region, country, or basin in which the lake is located. It should summarize the overall importance of the lake and its drainage basin, from the perspective of its significance as a natural habitat, and its social, economic, institutional, political, cultural and/or recreational importance to the human population in the region, and its global importance, if any.

2. Description of the Lake (based in part on items 1-9 in Annex 1 Questionnaire)

2.1 Overview

This section should provide information on the biophysical features of the lake, including basic physical characteristics (lake surface and drainage areas, lake depth and volume, water residence time, etc). It also should describe the drainage basin characteristics (the lake watershed and the upstream and downstream river basins of the lake), including the basin landscape and land use patterns. The Brief also should summarize the environmental state of the lake in relation to its drainage basin. The human and environmental benefits derived from the lake/reservoir and its drainage area also should be identified and discussed.

2.2 State of the Lake

This section should include, with as much scientific findings and data as available, a description of the past and present state of the lake's water environment, including water quantity and quality, aquatic biota (flora and fauna), and the state of its ecosystem health. Any regionally- or globally-important aspects of the lake's environment also should be identified.

3. Management of the Lake and Its Basin (based in part on items 10-14 in Annex 1 Questionnaire)

- What do we know about the management of the lake and its basin ? As examples:
 - What are the major resource values of the lake and its basin, how are they used/exploited economically, and who benefits and who loses in the use/exploitation?
 - What are major socio-economic and political implications of the lake and its basin, particularly with respect to development, use and conservation of their resources, to the drainage population?
 - What are the resource use conflicts, and how are they managed? Are they managed well?
- What is currently wrong with the lake and/or its basin, and how are the problems/issues being managed? As examples:
 - What do the basin inhabitants, including fishermen, consider the overall environmental and ecosystem status of the lake to be? Are their perceptions consistent with scientific findings?
 - What is (are) the apparent and not-so apparent root cause(s) of the identified problems?
 - Who or what suffers from the impacts of these problems/issues, and how?

4. Major “Impact Stories”

The ‘impact stories’ represent the narratives of human interventions, whether successful or not, that were introduced to attempt to deal with management challenges faced by the lake and/or its basin. The stories need to be told simply and concisely, with particular emphasis on the context of their development and their results. As an example, a well-known case of the Soap Movement started by housewives in the Lake Biwa basin in the late-1970s ultimately resulted in development of phosphate-free detergents by the detergent industry, and by enactment of a eutrophication ordinance that later served as a model of the national lake water quality control law. Other well-known cases include:

- 1) Lake Chilika (India) – Fish and prawn stocks have recovered; water weeds have been reduced; and the economic livelihoods of fisher-folk have improved significantly as a result of remedial works, backed by strong political support.
- 2) Laguna de Bay (Philippines) -- The industrial effluent load has been reduced without resorting to technology-based approaches (i.e., by the introduction of an innovative environmental user charge).
- 3) Lake Dianchi (China) – Investments in wastewater treatment and diversion works have brought the waste loads into the lake under control.
- 4) Transboundary Lakes – Although the management of transboundary lake basins is more complex than for national lakes, there are various examples of successful management interventions, including (i) the nutrient and toxic contaminant loads to the North American Great Lakes and Lake Champlain (USA, Canada) have been reduced; (ii) the phosphate loads from detergents have been reduced in the Lake Constance and Lake Biwa basins through coordinated management actions.

The Impact Stories involving (i) engagement of political leaders and civil society, (ii) policy frameworks that enhance cross-sectoral coordination, and (iii) institutions that address specific needs in resource development, use and conservation, etc., are also very important. The Impact Stories associated with a lake do not have to be exhaustive or inter-related, but should be presented in such a way that facilitates better understanding of the governance issues to be discussed in Chapter 5.

5. Major Lake Basin Governance Issues (See Annex 2)

Management of a lake and its basin may be depicted by answering the types of questions exemplified below:

- Who (individuals, groups, institutions) are key players in developing and implementing the actions/programs that need to be undertaken to address the identified lake basin problems?
- What is the existing legal and policy basis for lake basin management?
- What plans and policies have been introduced for managing the lake and its drainage basin, and how well have the problems been addressed?
- What role does the general public and NGOs have in managing the lake and its basin?
- What are the major control measures introduced (e.g., to address domestic, industrial and other pollution loads; urban and agricultural runoff; water flows and withdrawal; commercial fishing; wetlands and riparian zones, etc)?
- What are major financial mechanisms used to facilitate the control measures (e.g., user fees, taxes, fish levies, zoning charges, tradable permit systems, etc).

These questions are more comprehensively listed in the left-hand boxes of the flow diagrams in Annex 2, for each of the lake basin governance categories (i.e., (1) Institutions (2) Policies’ (3) Stakeholder Participation; (4) Knowledge and Information:

(5) Technologies; and (6) Sustainable Finances.

6. Key Lake Basin Governance Challenges (See Annex 2)

Key lake basin governance challenges may be characterized by answering the types of questions exemplified below:

- What attempts have been made to establish sustainable institutions to address multi-national and multi-sectoral issues, and multi-stakeholder interests involved in managing a lake, its basin and its resources for sustainable use?
- Has there been an emergence of political interest and/or commitment to managing and/or using a lake, its basin and its resources in a more sustainable manner and, if so, what were the reasons for this emergence?
- Will efforts be undertaken to establish a new legislative framework and/or policies for managing lake basins for sustainable use and, if so, why?
- Will efforts be undertaken to enhance stakeholder participation in the design and implementation of lake basin management programs?
- Will plans/programs be developed to strengthen linkages between lake basin management programs, and broader national and regional water resources management efforts?
- Will efforts be undertaken to better incorporate scientific information and research results into lake basin management programs?
- Will efforts be undertaken to develop financing and/or subsidizing mechanisms for lake basin management activities that focus on sustainable use?

These questions are more comprehensively listed in the right-hand boxes of the flow diagrams in Annex 2, for each of the lake basin governance categories (i.e., (1) Institutions; (2) Policies; (3) Stakeholder Participation; (4) Knowledge and Information; (5) Technologies; and (6) Sustainable Finances.

References

List useful supplemental reading materials on the lake, its drainage basin, and the region, including your country, that would complement or augment the various topics discussed in the Lake Brief.

Annex 1: The Lake Questionnaire

The list provided below will serve as a useful basis for preparing the Brief. Please fill out as much as possible, but leave out the items for which there is little or no accessible information. The missing information and data may be obtained by the scientific community in the course of revising and improving the Brief. Identify as many reference materials as possible on the subjects being discussed.

(1). Basic Information

1.1 Name(s)

1.1.1 *In English (All official names, if known by different names in different countries)*

1.1.2 *In local language(s)*

1.2 Location

1.2.1 *Latitude (range from West to East)*

1.2.2 *Longitude (range from South to North)*

1.2.3 *Elevation of water surface (relative to mean sea level)*

1.2.4 *Riparian countries and sub-national (state, province, etc.) jurisdictions*

1.2.5 *Non-riparian basin (upstream) countries and sub-national jurisdictions*

1.3 Origin

1.3.1 *In the case of natural lakes:*

- *Origin of the lake (e.g., glacial, tectonic, volcanic)*
- *Estimated age of the lake*

1.3.2 *In the case of artificial lakes (reservoirs):*

- *Describe the physical features*
- *Years of construction in phases*

1.4 Basin and/or Watershed Map(s)

1.4.1 *Major inflowing and out-flowing rivers*

1.4.2 *Main cities and other relevant points of interest in the basin*

1.4.3 *National/sub-national jurisdictional boundaries*

1.4.4 *Other maps as appropriate*

1.5 Basin Demography, Map(s)

1.5.1 *Population numbers, density and distribution*

1.5.2 *Other relevant information (maps and other resource materials containing geographical, demographical, land use, geohydrological information for the lake and its basin and/or watershed, etc.)*

1.6 Landscape and Waterscape

1.6.1 *Visual features of the lake and its basin (photos of various kinds, including landscape, physical facilities, water quality problems, land and water uses in the riparian and upstream regions, biological and ecosystem conditions, including unique fauna and flora, etc.)*

2. Morphology

2.1 Bathymetric Map (if available)

2.2 Lake Volume (km³)

2.3 Lake Surface Area (km²)

2.4 Lake Length and Width (km)

2.5 Length of Lake Shoreline (in km)

2.6 Maximum Depth (m)

2.7 Mean Depth (m)

2.8 Intra- and inter-annual changes in water level and volume; and water level changes due to flow regulation, if available

3. Water Balance

- 3.1 Inflows (annual average, expressed in m³/year)
 - 3.1.1 *Precipitation*
 - 3.1.2 *Rivers (including indication if they are controlled)*
 - 3.1.3 *Groundwater*
 - 3.1.4 *Water diversions*
- 3.2 Outflows (annual average, expressed in m³/year)
 - 3.2.1 *Evaporation*
 - 3.2.2 *Rivers (including indication if they are controlled)*
 - 3.2.3 *Groundwater*
 - 3.2.4 *Water diversions*
- 3.3 Water Retention Times (in years, if information is available)
 - 3.3.1 *Theoretical filling time (lake volume/annual inflow)*
 - 3.3.2 *Theoretical flushing time (lake volume/annual outflow)*
- 3.4 Information on Any Long-Term Changes
- 4. Climate**
 - 4.1 Monthly Average, Minimum and Maximum Temperature (°C)
 - 4.2 Monthly Average, Minimum and Maximum Precipitation (mm)
 - 4.3 Prevailing wind directions by season; wind strength
 - 4.4 Seasonal and Inter-annual Variability (description)
- 5. State of Ecosystem**
 - 5.1 Description of State of Ecological Health, including Conservation of Fauna & Flora
 - 5.2 Description of State of Biodiversity Conservation
- 6. Physical Characteristics**
 - 6.1 Water Temperature
 - 6.1.1 *Versus time*
 - 6.1.2 *Versus depth*
 - 6.2 Freezing Period and Extent of Freezing
 - 6.3 Lake Mixing
 - 6.3.1 *Vertical*
 - 6.3.2 *Horizontal (main bays and sub-basins of lake)*
 - 6.4 Lake Stratification (Period and Extent of Stratification)
- 7. Chemical Data**
 - 7.1 Concentration (general chemical water quality, including state of eutrophication (e.g., oxygen demand; nitrogen and phosphorus concentrations (organic, inorganic, particulate, and total, if available); salinity; organic and inorganic chemical pollution)
 - 7.2 Pollutant Loadings (tons/year) from Rivers, Groundwater and the Atmosphere
- 8. Biotic Data (Main Species, Exotic Species, Productivity Changes Over Time)**
 - 8.1 Overall state of lake ecosystem, including biodiversity
 - 8.2. Phytoplankton; zooplankton; fish
 - 8.3. Benthos; avifauna
 - 8.4. Linkages (e.g., briefly describe the ecosystem/biodiversity issues in general in regard to littoral wetlands, rivers, atmosphere (birds, etc.)
- 9. State of the Lake Basin**
 - 9.1 Description of Catchment Area (including size (km²); general geography of the region in relation to lake and other neighboring waterbodies (e.g., other lakes connected in cascade); catchment (draining-in) system; catchment area of out-flowing river (draining-out) system)
 - 9.2 Basin Hydrology (briefly describe basin hydrology, including active and non-active parts)
 - 9.3 Soil Types (refer to soil map, if available)
 - 9.4 Land Cover, including Changes Over time (briefly describe seasonal land-use

- changes, via reference to land use map)
- 9.5 Sub-surface Drainage (briefly describe underground water flows, referring to hydrographical and hydrological maps, if available)
- 10. Uses of the Lake and Its Resource Development Facilities**
 - 10.1 Water
 - 10.1.1 *Flood/drought control facilities*
 - 10.1.2 *Drinking water withdrawals and facilities*
 - 10.1.3 *Agricultural water withdrawals and facilities*
 - 10.1.4 *Industrial water withdrawals and facilities*
 - 10.2 Fisheries and Facilities
 - 10.3 Tourism Facilities
 - 10.4 Other Uses
- 11. Impairments to Lake Resource Uses**
 - 11.1 Increased Algal Growth
 - 11.2 Increased Salinity
 - 11.3 Destruction of Wetlands
 - 11.4 Declining Fish Stocks
 - 11.5 Other Impairments
- 12. Causes of Impairments**
 - 12.1 Upper-watershed Degradation (including erosion and siltation)
 - 12.2 Point and Non-point Source Runoff from Urban Areas
 - 12.3 Shoreline Degradation and Alterations
 - 12.4 Other Impairments
- 13. Structural Management Response**
 - 13.1 Sewerage Systems
 - 13.2 Industrial Wastewater Treatment Systems
 - 13.3 Solid and Hazardous Waste Management Systems
 - 13.4 Other Relevant Systems
- 14. Non-structural Management Responses**
 - 14.1 Rules
 - 14.1.1 *Informal (informal community rules; voluntary restrictions)*
 - 14.1.2 *Formal (industrial effluent regulations; protected areas (land use restrictions, ecological reserves); etc.)*
 - 14.2 Economic Incentives (subsidies, taxes, etc.)
 - 14.3 Awareness Raising (public awareness, including environmental education, environmental campaigns, activities of environmental NGOs and CBOs, etc.)
- 15. Socioeconomic Information (partial duplication of item 1.5 above)**
 - 15.1 Population Dynamics (numbers, distribution, main cities, percent urban/rural, etc.)
 - 15.2 Education (extent and types of education, literacy rates, etc.)
 - 15.3 Culture (languages, ethnicities, including indigenous peoples, religion, legends and beliefs about the lake)
 - 15.4 Economic Sectors (major industries and production statistics; regional economic development issues, including transportation, commerce sectors, livelihood issues in different parts of lake basin (i.e., coastal, upland and upper watershed regions; Gross National Income per capita within basin [noting also how it might differ from national average(s)])
- 16. Political Situation (partial duplication of Item 1.2 above)**
 - 16.1 Nations Within Lake Basin
 - 16.2 Sub-national Boundaries
 - 16.3 Brief Description of History of Region

16.4 Brief Description of Governance Challenges Facing People

16.4.1 Access to information

16.4.2 Rights to participation

16.4.3 Access to justice

Annex 2: What are the Major Lake Basin Governance Issues? (Getting the clearer picture on Lake Basin Governance)

(A) Institutions:

- *What are the current lake basin management institutions?*
- *What do they do, and what are their strengths and weaknesses with regard to facilitating sustainable use and conservation of lakes and lake basin resources?*
- *What are priority needs for institutional development and/or reform?*

Making Organizations and Programs Most Effective for Action

Developing Organizations for Action

- *Is there a national program specifically directed to institutional development for formulating and implementing individual lake basin management plans and programs (i.e., vertical institutional linkage)?*
- *Do provisions in national programs encourage local governments, industries, scientific institutions and citizen groups to work together (i.e., does horizontal institutional linkage exist)?*
- *What are the priority needs for improving vertical and horizontal institutional linkages?*
- *What improvements are required to enhance institutional capacities, particularly for dealing with command-and-control, economic instruments, as well as voluntary compliance?*

(B) Policies:

- *What are the existing policies?*
- *Have they been properly implemented?*
- *Have they been effective in addressing the identified problem(s)?*
- *If not, can new policy needed to address the problem(s) be identified with the current information and data?*

Identifying Policies and Actions That May be Most Needed and Most Effective

Identifying Effective Actions

- *Is there an overall national policy framework that addresses lake basin management (i.e., Are there national/regional conservation plans)?*
- *Do national/regional development plans recognize the importance of the sustainable use and conservation of lake basin resources?*
- *What are major legislative provisions (laws, regulations, ordinances, etc.) pertaining to development and conservation of lake basin resources.*
- *Are there lake-specific laws, ordinances and/or other regulatory provisions (i.e., effluent standards; ambient standards [e.g., nutrient and chemical concentrations]; source-water protection classifications; etc), and have they been implemented?*
- *What types of policy reforms have taken place, or are being considered, to address the sustainable use of lake and lake basin resources? What is currently being done to strengthen institutional capacity, promote environmental investments, and develop human resources?*

(C) Stakeholder Participation:

- *What are the major lake basin management stakeholder groups (i.e., government agencies and/or sectors; institutions; organizations; interest groups; private sector; lakeshore residents, downstream water users, etc.)?*
- *What mechanisms exist for stakeholder involvement, and how well are they functioning (e.g., how well have non-governmental organizations conveyed their concerns within the context of government plans and programs)?*

Developing Mechanisms and Fora for Obtaining Public Opinion and Input

Involving People and Stakeholders

- *How can existing stakeholder involvement in designing and implementing lake management program(s) be improved?*
- *Has can the involvement of voluntary associations, village organizations, CBOs, NGOs, etc., be better promoted?*
- *How can the involvement of women, the disadvantaged, and affected members of community be promoted/assured?*
- *What are the relevant roles and involvement of international/external NGOs? What are the benefits and disbenefits of their involvement?*

(D) Knowledge and Information:

- *What information and data is available for lake basin management decision-making?*
- *Are the existing information and data sufficient to inform stakeholders? Are they used for lake basin management decision-making?*
- *Do they include sources of information from non-traditional sources, and from local sources?*
- *Does a regular monitoring programs, and have they produced useful research results?*

Informing the Process

- *What scientific information is available to improve lake basin management?*
- *If the knowledge base is inadequate, how can we obtain the needed information and data?*
- *How can collaboration among scientific institutions working on a given lake basin, including universities, governmental/non-governmental research institutes, private sector laboratories, etc., be enhanced?*
- *How can such institutions collaboratively facilitate lake basin management decision-making?*
- *How can information dissemination and sharing be improved?*
- *How can transparency and access to data and information be improved?*

Evaluating Adequacy of Existing Data, Initiating Efforts to Obtain High Quality Information and Data Where Gaps Currently Exist, and Ensuring Ensure Data is in a Form Useful for Lake Basin Management Decision-Making

(E) Technological Opportunities and Limitations:

- *What types of technological interventions been introduced for water resources development, and what have been the resulting impacts on the lake?*
- *What types of technological interventions have been used for lake resource conservation (e.g., sewerage; industrial pollution control; solid waste management; wetland conservation; etc.), and how well have they addressed the adverse impacts?*

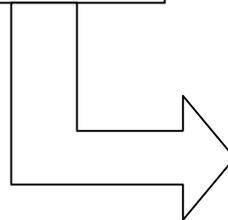
Responding with Technology

- *What are the possible technological innovations?*
- *What is the range of technological interventions facilitating lake basin management that have not yet been explored?*
- *What have been the application results of such technologies elsewhere?*
- *Can a combination of technological and non-technological solutions be usefully combined, and how would they be implemented?*

Keeping in Mind that Technology Alone will not Necessarily Solve Lake Basin Management Problems, Exploring Various Technological as well as Non-Technological Options and their Appropriate Mix

(F) Sustainable Finance:

- *What magnitude of funding is currently available for lake basin management activities, and are these funds sustainable over the long term?*
- *What is the status and sustainability of funding at the national level for lake basin management activities?*
- *What external funding sources are available, and how have they been used for sustainable lake basin management?*
- *What other potential funding sources exist?*



Mobilizing Sustainable Financing: Local, National and External Funds

- *What are the realistic options for raising local funds (taxes; user charges; pollution fines; etc.) for lake basin conservation projects?*
- *How can the existing financial mechanisms be improved to address the conservation of lake basin resources (e.g., pollution charges; tradable permits)?*
- *Can locally-raised revenues from lake basin resources be retained for local use and, if not, what actions might be possible to ensure such funds are retained?*

Considering the Range, Advantages and Limitations of Local and/or National Funding Sources, and Exploring Possibilities of Catalytic External Financial Inputs

(G) Other Important Issues:

- *What other important or emerging issues should be considered within the context of lake basin management (i.e., climate change; ecosystem degradation and loss of associated environmental goods and services; water pollution from medicine and home care products; long-range transport of airborne pollutants; unsustainable water uses; agricultural water implications for growing crops for biofuel production; etc.)?*
- *Are these various issues currently being addressed and, if so, how well are the approaches working? If not, what are the possibilities they will be addressed in the future?*