XIV International Environmental Forum “Baltic Sea Day”
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Trilateral co-operation of Estonia, Finland and Russia on the Gulf of Finland

Project SE 717 and its significance for the catchment area of Gulf of Finland

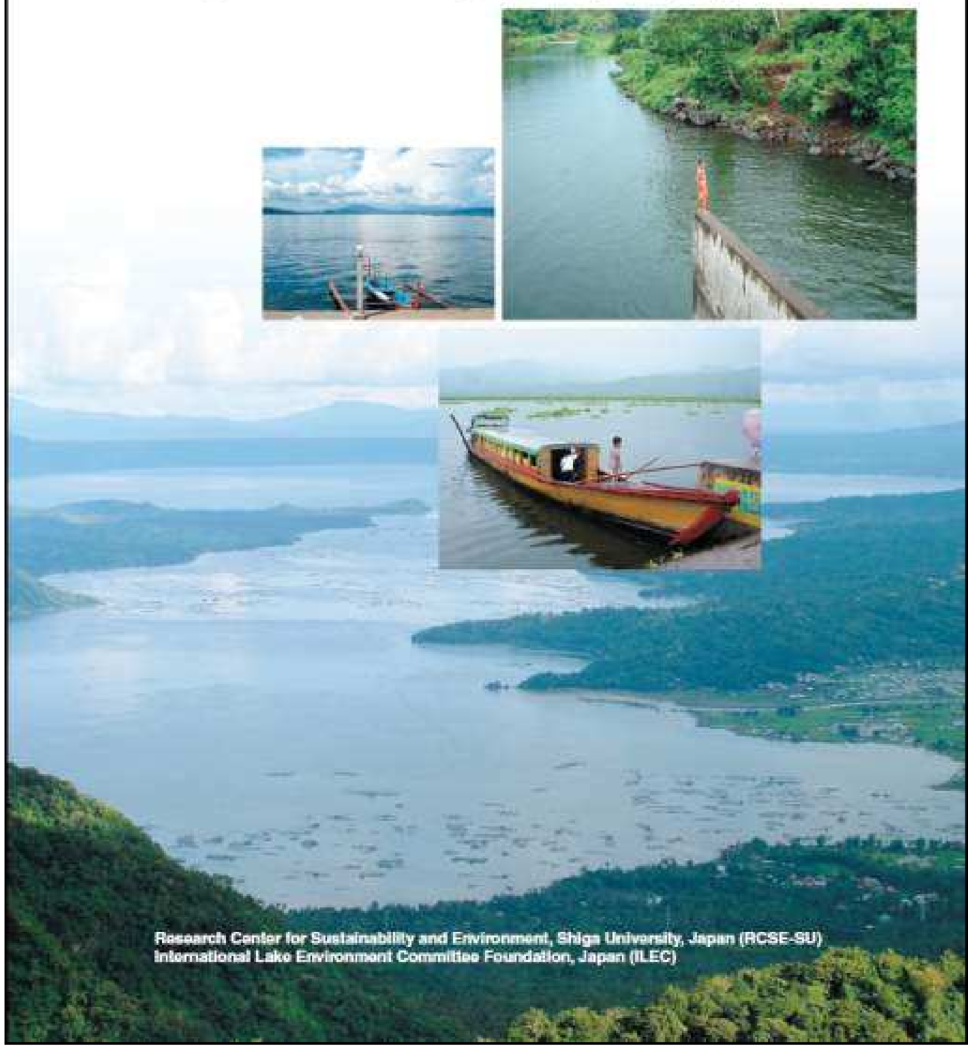
Aladin N.V.[1], Asanova T.A.[2], Dianov M.B.[1], Egorov A.N.[3], Melnikov S.P. [4], Minin V.B.[5], Nakamura M.[6], Nikitina T.V.[2], Plotnikov I.S.[1], Rast W.[7], Zhakova L.V.[1]

[1] Zoological Institute RAS, [2] Novgorod department of State Research Institute for Lake and River Fishery, [3] Institute of Limnology RAS, [4] Saint-Petersburg State Agrarian University, [5] The Regional Public Organization “Association for Assistance of Field Research and Development of Rural Territories”, [6] Shiga University, [7] Texas State University

During the Round Table on trilateral cooperation on the Gulf of Finland, which took place in March 2012 in the framework of the Environmental Forum “Baltic Sea Day”, to moderators (Prof. Dr. Karlin L.N. and Prof. Dr. Myrberg K.) it was given 20 books “Development of ILBM Platform Process”. The ideas presented in this document were used by us in the preparation of the project SE 717 “Clean Rivers to healthy Baltic Sea”. This project is funded by the European Union, Finland and Russia. Let us briefly tell you what Integrated Lake Basin Management (ILBM) is.

Development of ILBM Platform Process

Evolving Guidelines through Participatory Improvement



Research Center for Sustainability and Environment, Shiga University, Japan (RCSE-SU)
International Lake Environment Committee Foundation, Japan (ILEC)

Development of ILBM Platform Process:
Evolving Guidelinesthrough Participatory Improvement

Research Center for Sustainability and Environment, Shiga University
2-5-1 Hiratsu, Otsu City, 520-0862, Japan
http://rcse.edu.shiga-u.ac.jp/eng/

International Lake Environment Committee Foundation (ILEC)
Kusatsu, Shiga 525-0001, Japan
http://www.ilec.or.jp

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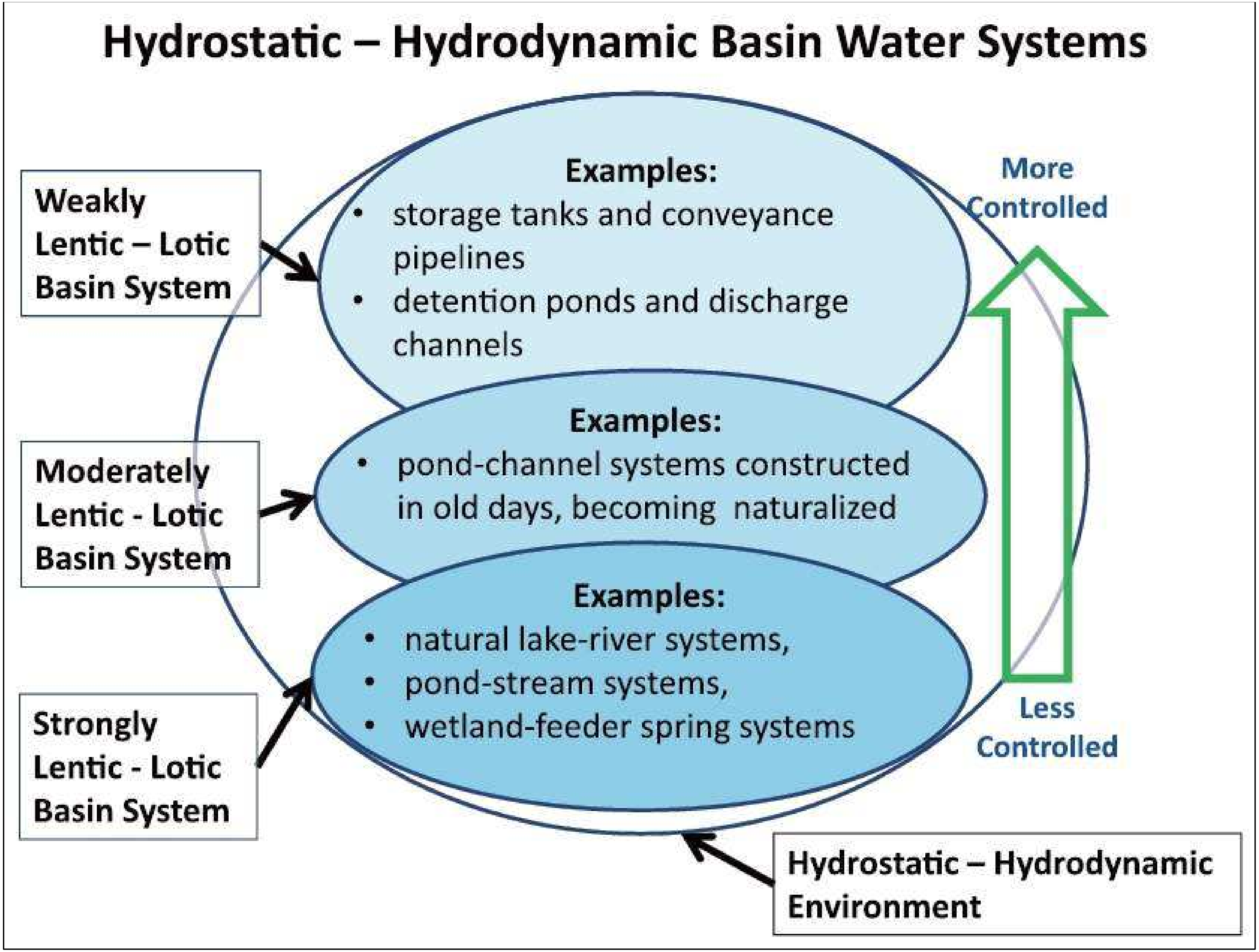
- Integrated Lake Basin Management (ILBM) is an approach for achieving sustainable management of lakes and reservoirs through gradual, continuous and holistic improvement of basin governance, including sustained efforts for integration of institutional responsibilities, policy directions, stakeholder participation, scientific and traditional knowledge, technological possibilities, and funding prospects and constraints. It has been conceptualized on the basis of the premise that achievement in managing lakes and their basins is facing a serious global challenge.
- ILBM also takes the position that the problems facing individual lakes cannot be properly addressed unless the fundamental issue of sustainable resource development, use and conservation facing the lakes is address globally, and with strong, long-term political commitment.
- The ILBM process also is designed for lake basin stakeholders collectively to fill the gaps between what has already been achieved, and what remains to be achieved realistically in continuing governance improvements over time.

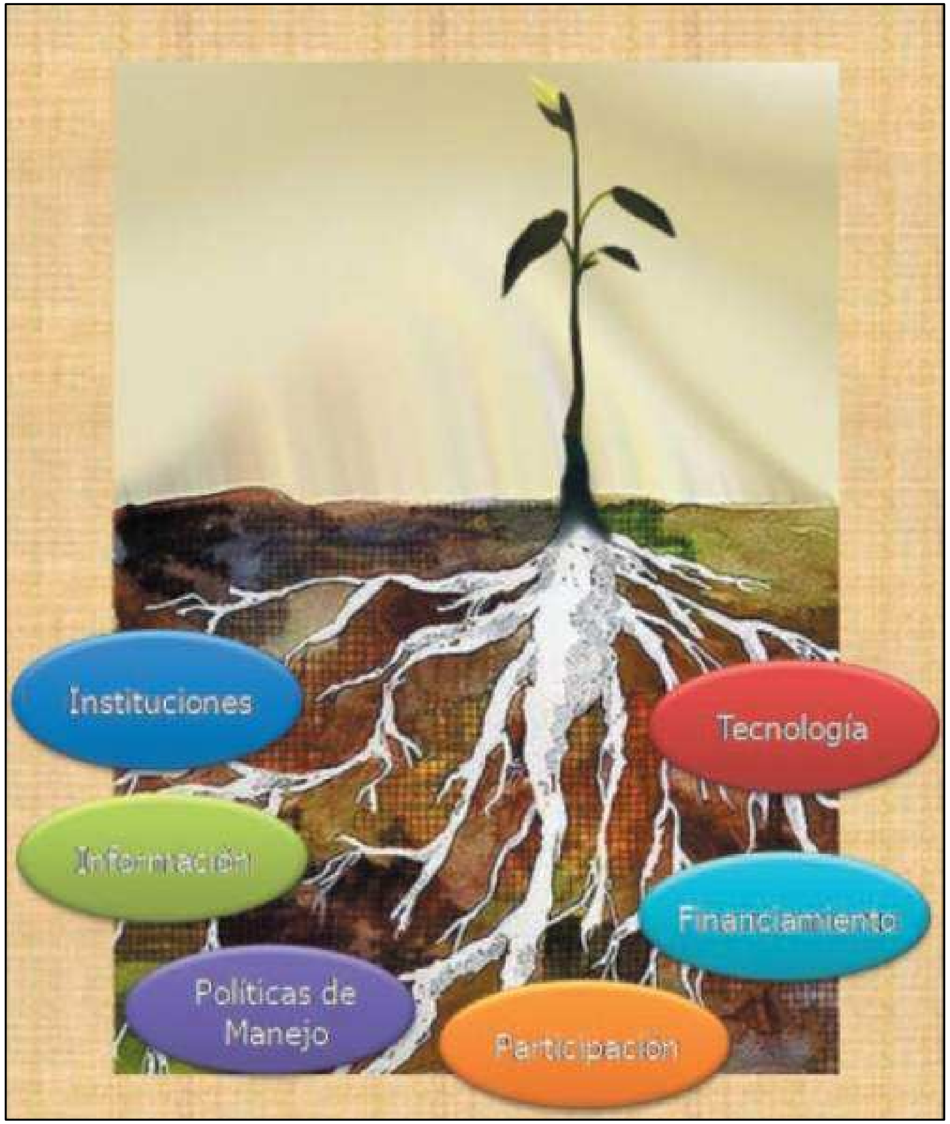

Hydrostatic – Hydrodynamic Basin Water Systems
Weakly Lentic – Lotic Basin System
Moderately Lentic - Lotic Basin System
Strongly Lentic - Lotic Basin System
Examples:
• storage tanks and conveyance pipelines
• detention ponds and discharge channels
Examples:
• pond-channel systems constructed in old days, becoming naturalized
Examples:
• natural lake-river systems,
• pond-stream systems,
• wetland-feeder spring systems
More Controlled
Less Controlled
Hydrostatic – Hydrodynamic Environment

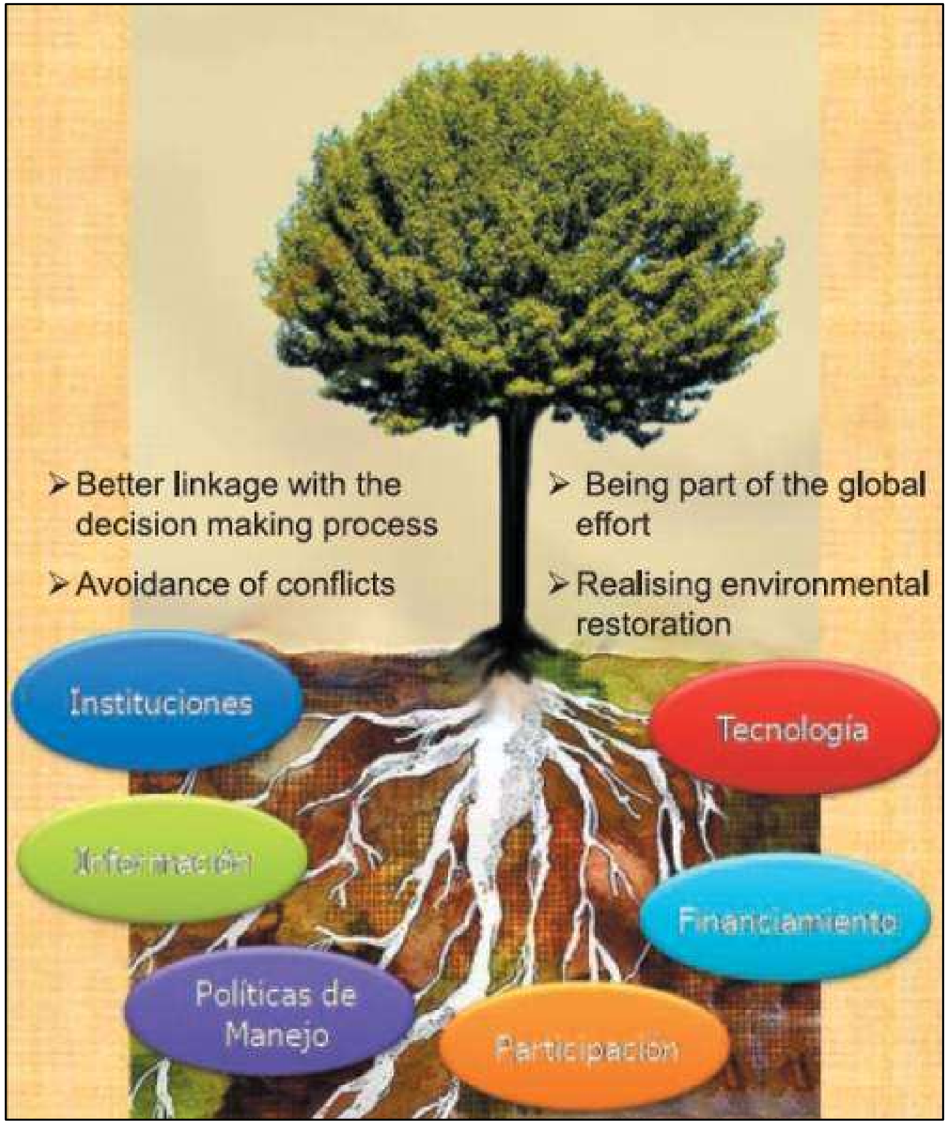
- Lakes and reservoirs are broadly considered as “standing” or “static” water systems or, using a hydrologic term, they are designated “hydrostatic” systems. In contrast, “moving” waters, such as rivers, can be regarded as “hydrodynamic” systems.
- Similar expressions exist in the ecology literature as well. The descriptive terms are “lentic” and “lotic” systems. The meaning of “lentic” is basically the same as for hydrostatic, and the meaning of “lotic” is the same as for hydrodynamic. The term “lentic” also connotes the ecological properties unique to a standing body of water, while the term “lotic” also connotes the ecological properties unique to a moving water system. Lentic water can be either fresh or saline/brackish.
- Thus, natural basin water systems, such as lake-river systems, pond-stream systems, wetland-spring systems, and even constructed, but naturalized, dam-river systems are hydrostatic-hydrodynamic systems, as well as being lentic-lotic systems, because of their historically-fostered ecosystem functions. On the other hand, a water supply storage tank of treated water, with inflowing and outflowing conveyance pipelines, would be regarded only as a hydrostatic-hydrodynamic system, and only marginally as a lentic-lotic system because of its suppressed natural ecosystem functions.

- The natural lake-river systems, pond-stream systems, and wetland-feeder spring systems are strongly lentic-lotic in character. The pond-channel systems constructed in past times, becoming naturalized after many decades and centuries, may be regarded as moderately lentic-lotic in character. On the other hand, the artificially constructed storage tank -conveyance pipeline and detention ponds - discharge channel systems cannot be characterized as lentic-lotic systems.
- Most basin systems constitute a complex combination of these three types of lentic-lotic systems. The flow regime changes as flow control measures are introduced, and, consequently, the management implications also differ depending on the flow regime. Management of a basin that consists mostly of a strongly lentic-lotic regime, for example, requires a different management approach than that for a basin consisting primarily of weakly lentic-lotic regime.
- Most water systems have properties that lie somewhere between being totally lentic (totally hydrostatic) and totally lotic (totally hydrodynamic). The water in some parts of a river may become stagnant or non-flowing and be regarded as being lentic (hydrostatic), for example, while some portion of the water in a lake may move very rapidly at some times, thereby being regarded as lotic (hydrodynamic).

ILBM Governance Pillars founded on a lake basin Ecosystem Service Base, supporting the Integration Roof

A Six Root of Governance Tree

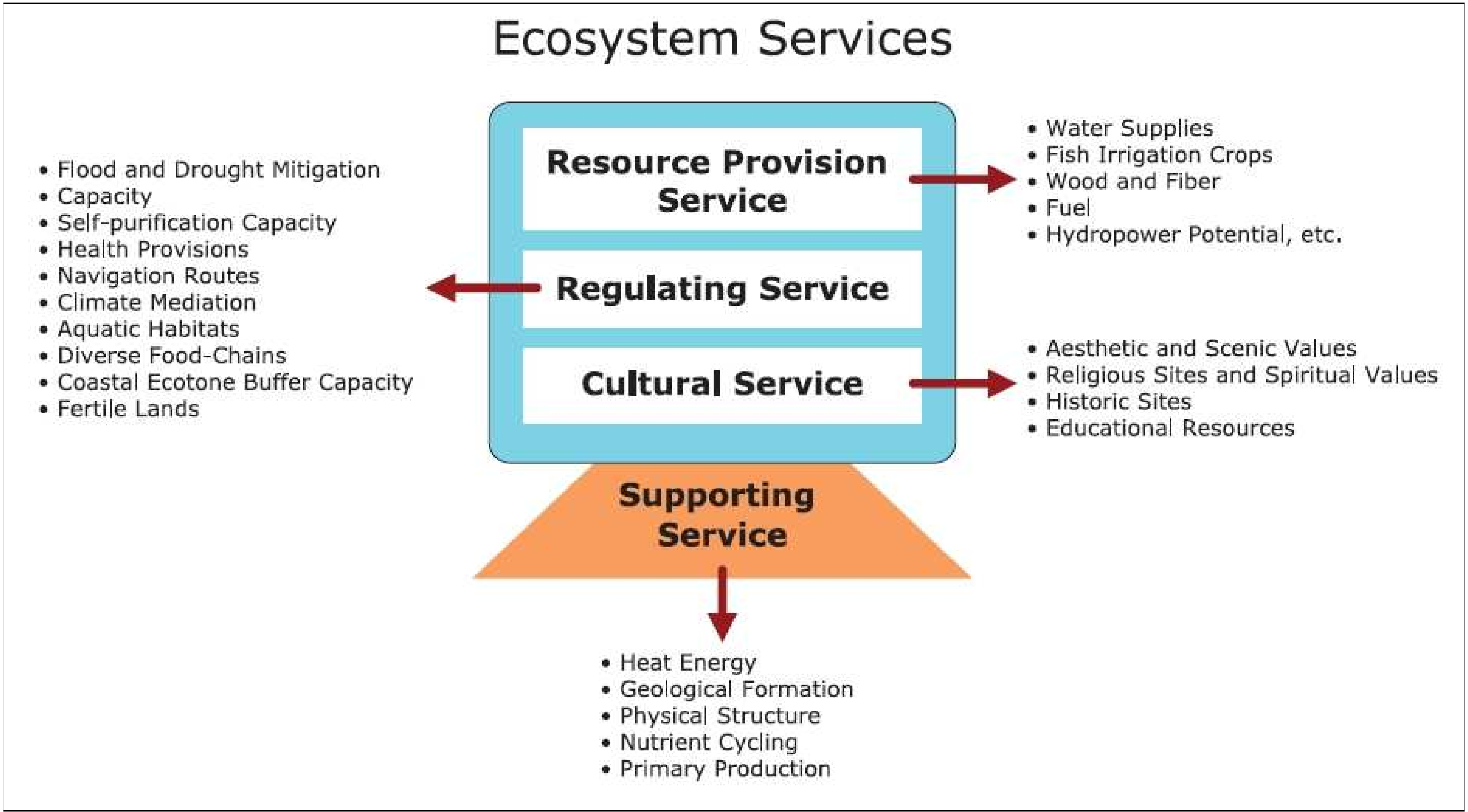




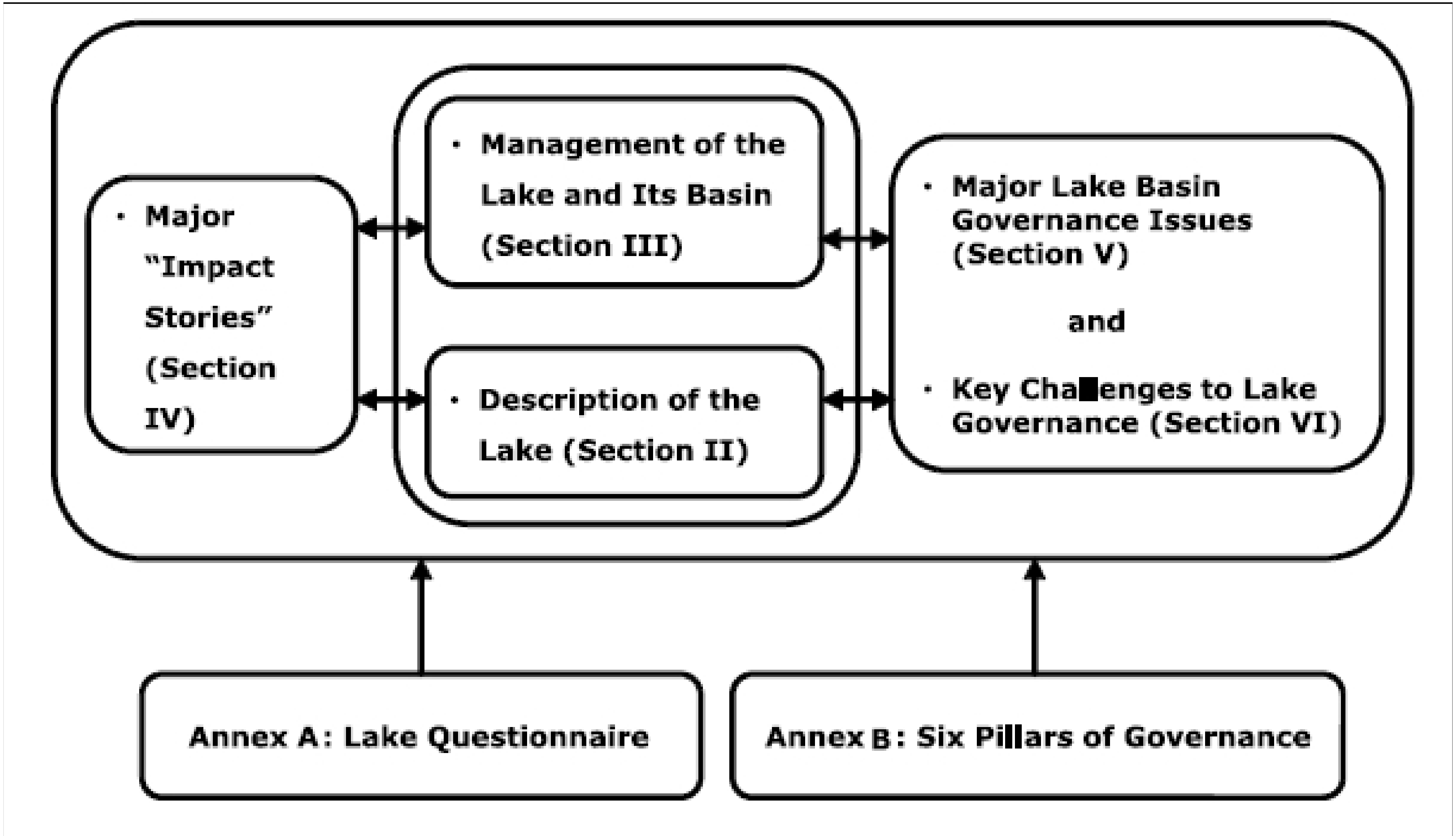
For individual lake basins, the adequacies and inadequacies of lake basin management may be determined by reviewing and assessing the existing activities and practices, with such typical review questions as:

- Is there a focal-point institution in charge? Are the capacity building and training program effective? It is still targeted on priority skills? Is it open to cooperating agencies, community groups, etc.? What mid-course corrections are needed?
- Is there a management plan with realistic scope for its implementation? Do we have an adequate management plan, or should it be updated? Are the relevant priorities and phasing clear? Are the resources sufficient? Have we established the necessary coalitions to enable the required actions to be implemented? Is the coordination adequate? Have either technology options or costs changed, and are such changes reflected in the management plan?
- Is there strong political will to support sustainable management? Is sustaining and building the political will and commitment appropriately place as part of the management program? How well is it working? What can we do more of, what should we do less of, and what can we do better?
- Are effective mechanisms in place for participatory implementation? Do the plan and its implementation include all stakeholders? What has been the change in awareness and understanding of the problems and their linkages to stakeholder activities? What is the perception of program stakeholders?
- Is there a common and shared knowledge about the management challenges? Is a monitoring system in place that would enable one to measure changes in key indicators? Is the data base sufficient? What are the remaining key gaps? Are information management tools adequate to be deployed effectively?

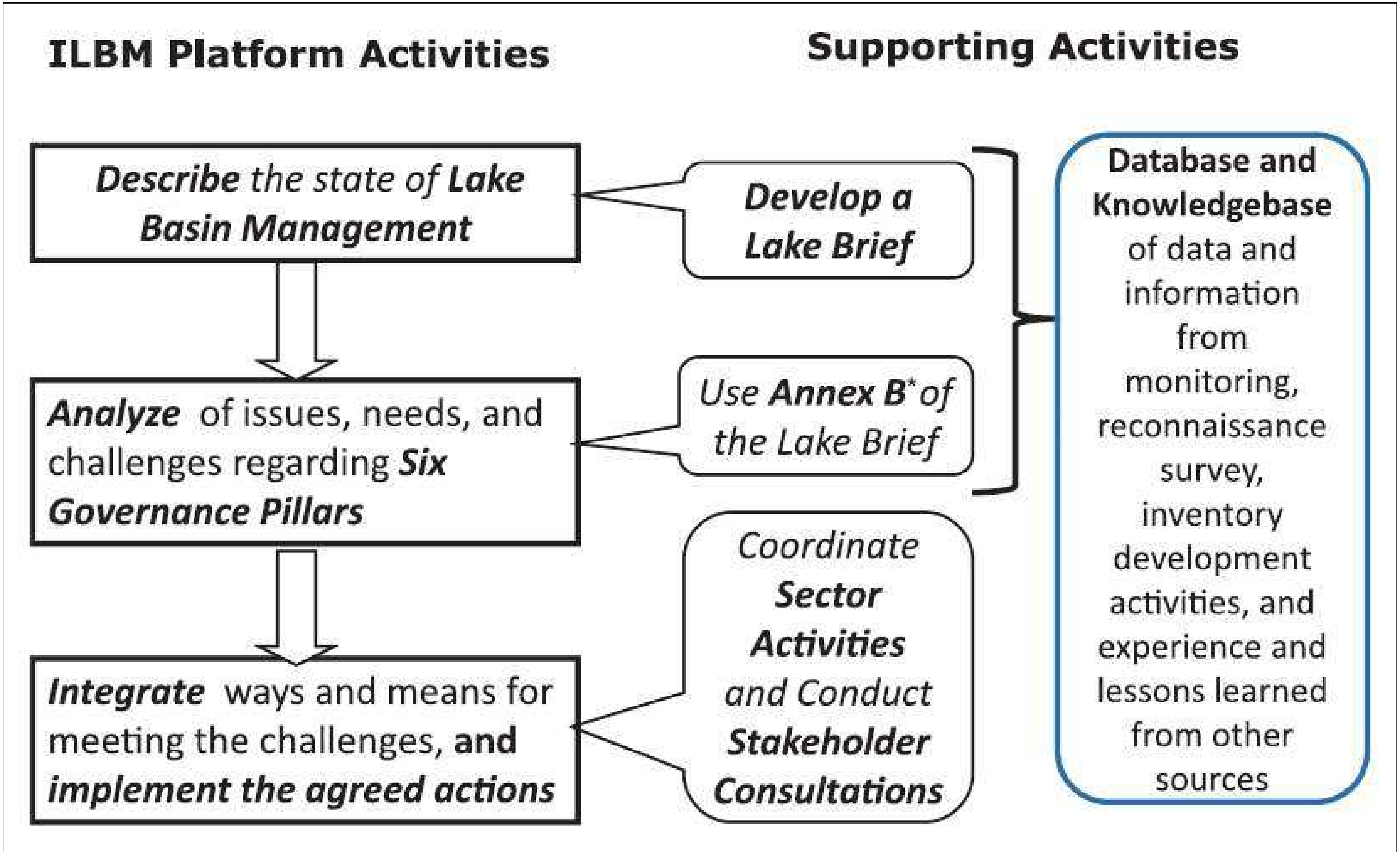
Four classes of Ecosystem Services



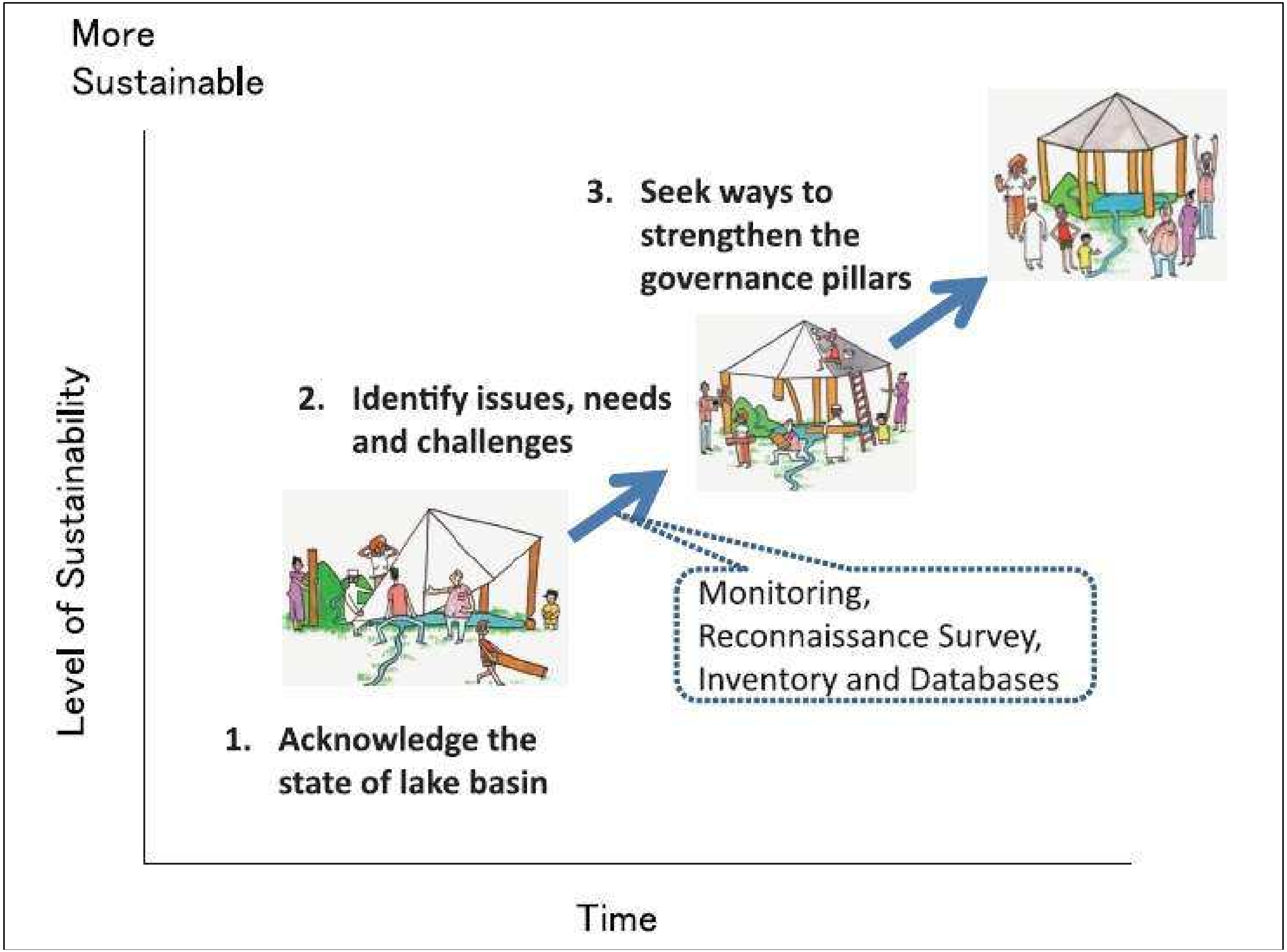
General Structure of a Lake Brief



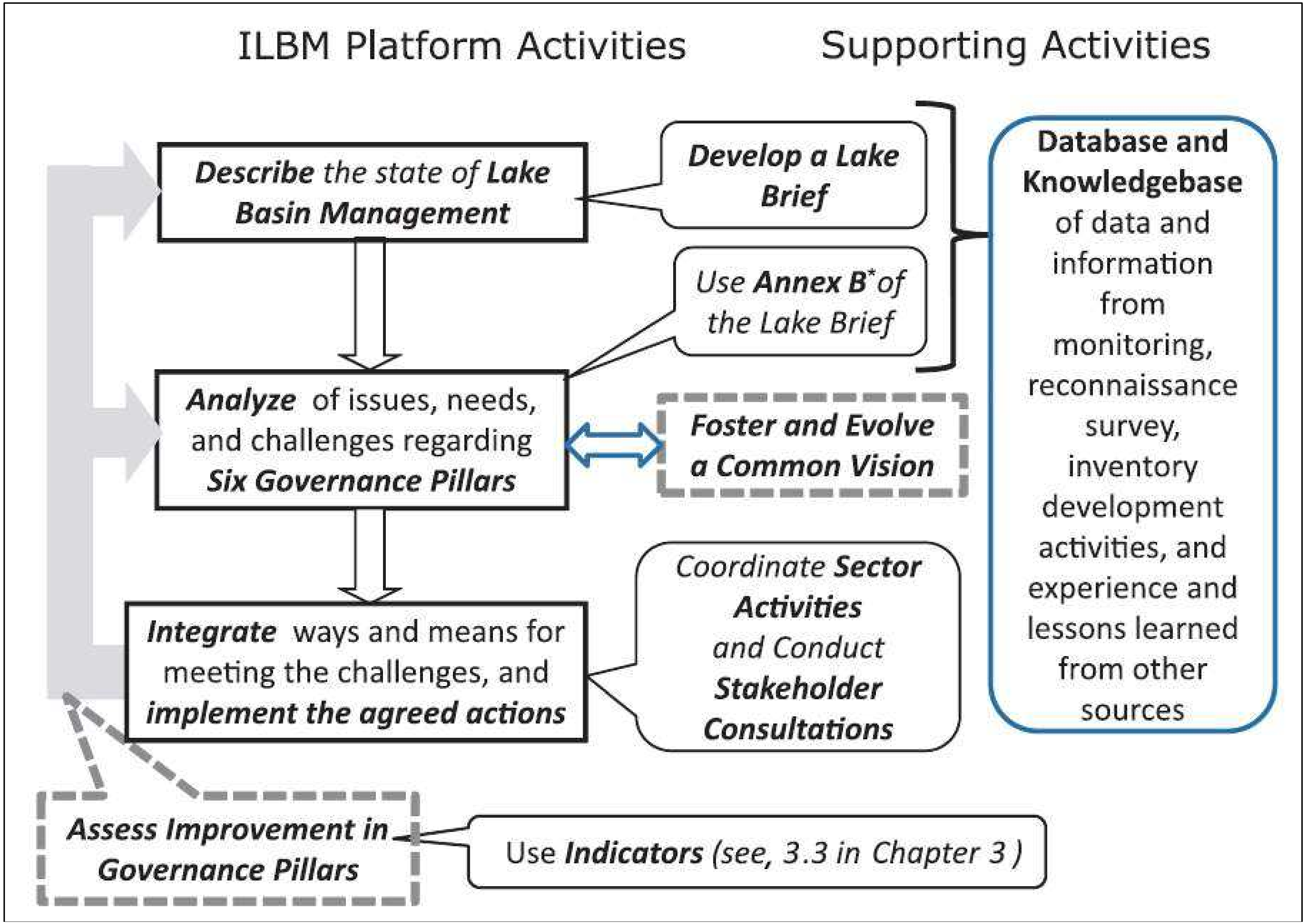
Activity Flow of a ILBM Platform Process



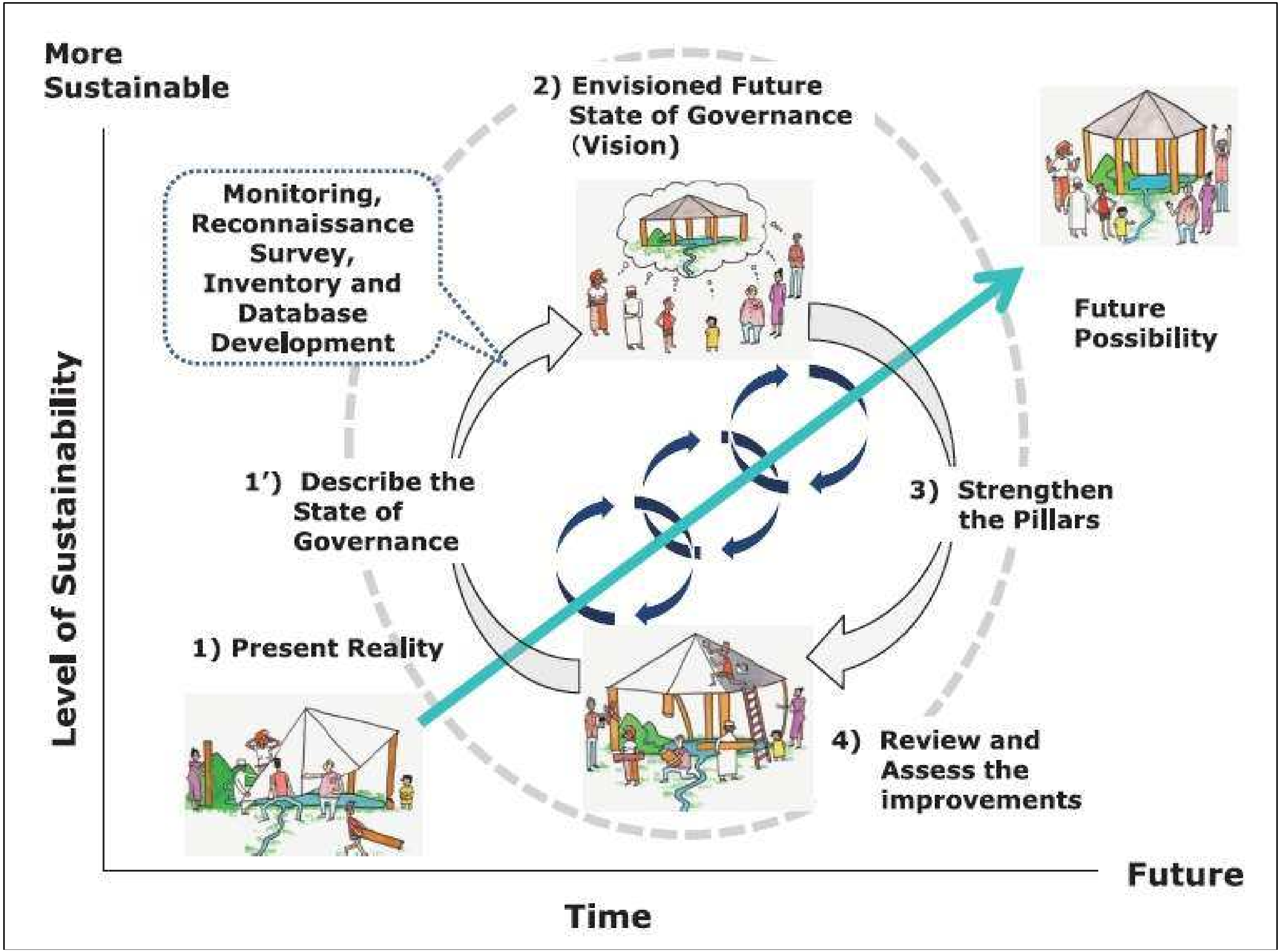
Schematic illustration of a Basic ILBM Platform Process



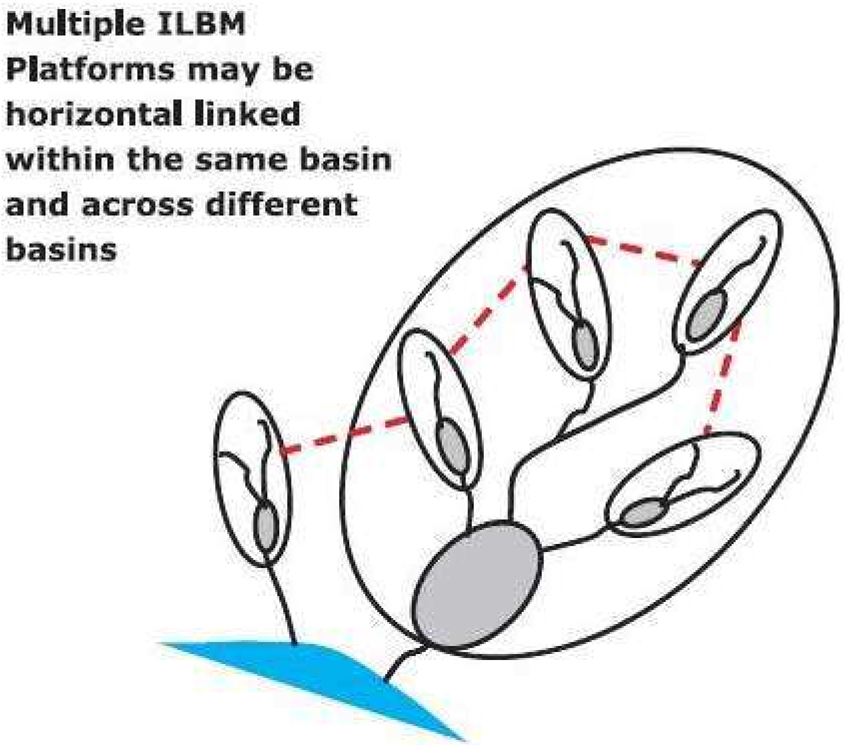
Activity Flow of a Cyclic ILBM Process



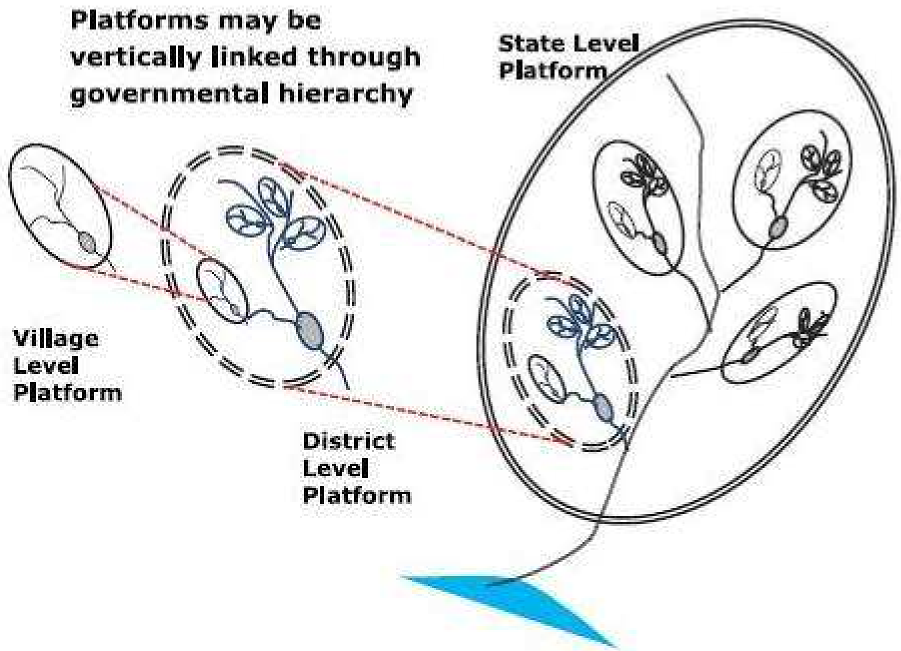
Schematic illustration of a Cyclic ILBM Platform Process



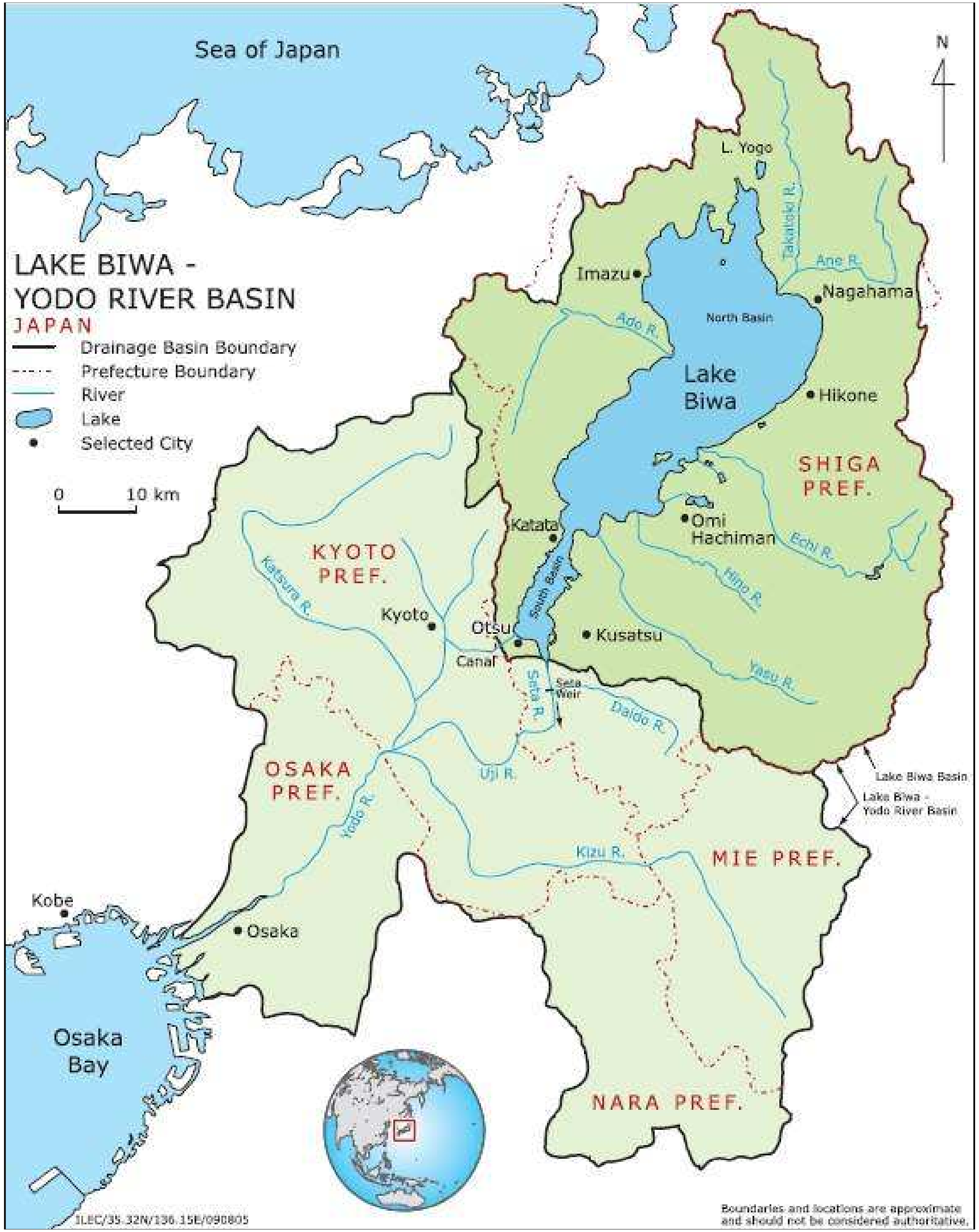
Horizontal Linkage Must Exist Among the Micro-Scale Basins Within a Meso-Scale Basin



Vertical Linkages of Lake Basin Governance

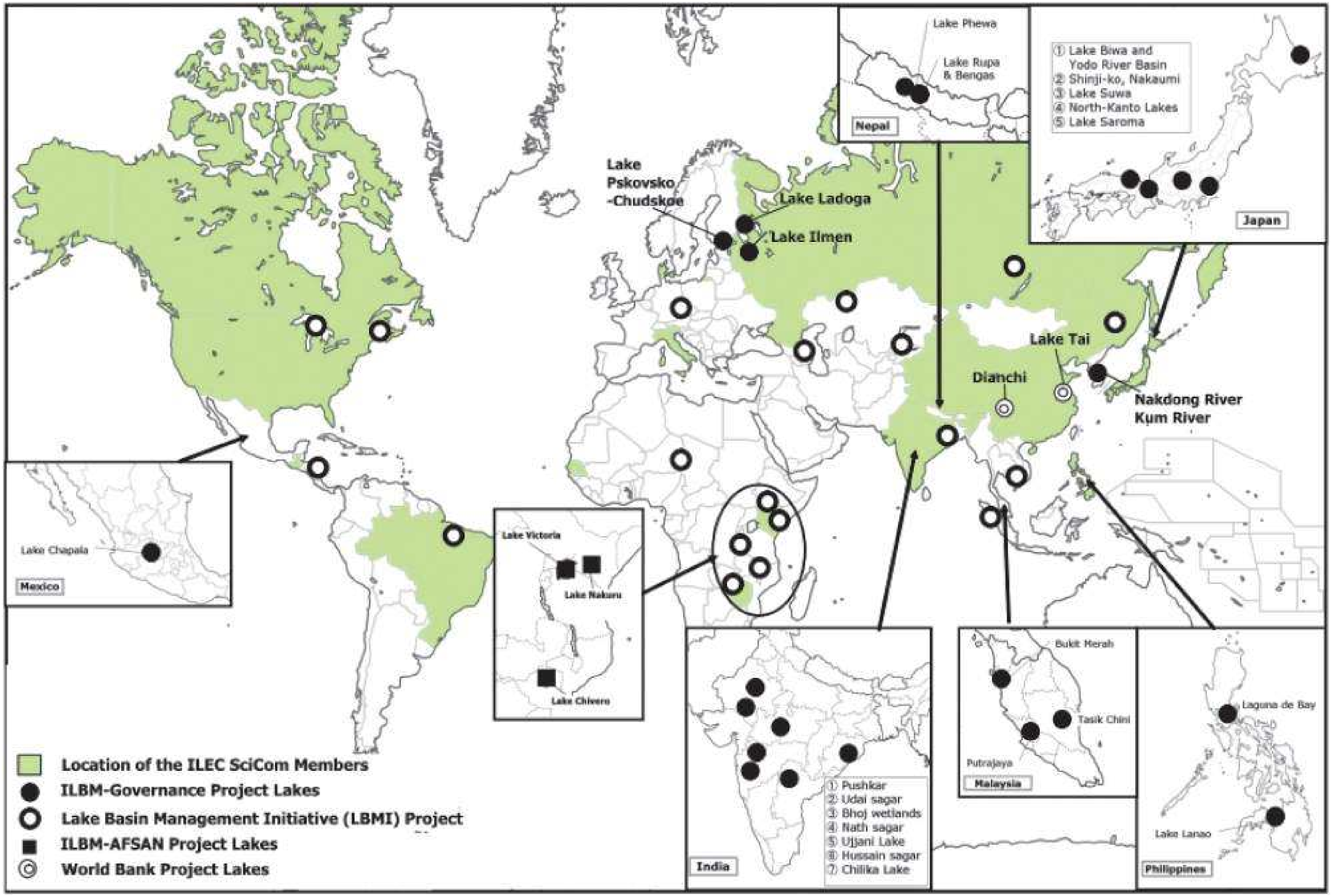



CHILIKA LAGOON BASIN
INDIA
Drainage Basin Boundary
River
Lake
Selected City
0
20km
N
The Mahanadi River starts far to the west and is not fully depicted on this map.
Mahanadi R.
Cuttack
Bhubaneshwar
Begunia
Bologarh
Mahanadi Catchement
Khurda
Jatani
Daya R.
Pipili
Ranpur
Delang
Malaguni R.
Kanas
Satyabadi
Western Catchment
Tangi
Salia R.
Kusumi R.
Nuna R.
Bhargavi R.
Kansari R.
Chilika
Northern Sector
Puri
Chilika Lagoon
Brambagiri
Banapur
Magarmukh Channel
Central Sector
NALABANA IS.
Old Mouth
Outer Channel
Newly Opened Mouth
Krishnaprasad
Southern Sector
Numerous levees confine the Bhargavi R. flow. Interestingly, the river itself forms the catchment boundary in this area.
Catchment along the Sandbar
Bay of Bengal
Rushikulya R.
Palur Canal
ILEC/19.7SN/85.41E/300106
Boundaries and locations are approximate and should not be considered authoritative.


Sea of Japan
LAKE BIWA -
YODO RIVER BASIN
JAPAN
Drainage Basin Boundary
Prefecture Boundary
River
Lake
Selected City
0
10 km
N
L. Yogo
Takatoki R.
Ane R.
Imazu
Nagahama
Ado R.
North Basin
Lake
Biwa
Hikone
SHIGA
PREF.
Katata
Omi
Hachiman
Echi R.
KYOTO
PREF.
Katsura R.
South Basin
Hino R.
Kyoto
Otsu
Kusatsu
Canal
Seta R.
Seta
Weir
Daido R.
Yasu R.
OSAKA
PREF.
Uji R.
Lake Biwa Basin
Lake Biwa -
Yodo River Basin
Yodo R.
Kizu R.
MIE PREF.
Kobe
Osaka
Osaka
Bay
NARA PREF.
ILEC/35.32N/136.15E/090805
Boundaries and locations are approximate
and should not be considered authoritative.

ARAL SEA BASIN
Drainage Basin Boundary
International Boundary
River
Lake
Selected City
0 200 km
N
Northern Aral Sea
Aralsk
Ayteke Bi
KAZAKHSTAN
Large Aral Sea
2001 shoreline of Aral Sea
1960 shoreline of Aral Sea
Kyzl Orda
Syr Darya R.
Muynak
Lake Sudoche
Turkestan
Bishkek
Issyk-kul
Sarykamysh Lake
Nukus
Aris
KYRGYZ REP.
Amu Darya R.
UZBEKISTAN
Toktogul Reservoir
Naryn R.
Tashauz
Tashkent
Urgench
Karasu R.
Aydarkul Lake
Fergana
Osh
Kara-Bogaz-Gol Bay of the Caspian Sea
TURKMENISTAN
Zeravshan Darya R.
CHINA
Bokhara
Vakhsh R.
Chardzhou
Dushanbe
TAJIKISTAN
Karshi
Murgab R.
Karakum Canal
Kulyab
Ashgabat
Kirki
Khorog
Mary
Bayram Aly
Pyandzh R.
Termez
Tedzhen R.
Murghab R.
ISLAMIC REP. OF IRAN
AFGHANISTAN
PAKISTAN
ILEC/45.27N/59.90E/160106
Boundaries and locations are approximate and should not be considered authoritative.

ILBM-related Case Study Lake Locations



- In Russia by program of ILEC beginning from 2008 it was made the case study lake basins are Lakes Ladoga, Chudskoe (Peipsi) and Illmen in northwestern Europe (Lake Chudskoe/Peipsi is a transboundary lake between Russia and Estonia, while the other two lakes are located entirely in Russia).
- Their Lake Briefs were prepared as an initiative of the Zoological Institute and Institute of Limnology of the Russian Academy of Sciences, St. Petersburg. These Lake Briefs are the first batch of such reports in Russia under umbrella of ILEC, and there is an ongoing effort to expand these activities to other major lakes in the region.
- These activities are expected to be linked to the activities of the International Data Centre on the Hydrology of Lakes and Reservoirs (HYDROLARE), the latter operated by the Hydrological Institute, Russian Academy of Sciences, which is also spearheading the ILBM promotion in other parts of Russia, as well as in the Baltic Sea Region.

Sub-regions of Baltic Sea and its catchment area

1. Baltic proper
2. Kattegat
3. The Sound
4. Western Baltic
5. Bothnian Bay
6. Bothnian Sea
7. Archipelago Sea
8. Gulf of Finland
9. Gulf of Riga

The catchment area of the Gulf of Finland is 421 000 km^2
(Estonia 35 000 km^2, Finland 110 000 km^2, Russia 276 000 km^2)

Southern part of the Gulf of Finland catchment area

Gulf of Finland

- surface area 29,500 km^2
- length 428 km
- width 120 km
- mean depth only 38 metres
- salinity by the salt-free river estuaries – 0.8 %
- large cities on its shores: St. Petersburg, Helsinki and Tallinn
- Russia's most important oil ports are on the east coast of the Gulf of Finland, around St. Petersburg
- In the middle of the Gulf of Finland, the largest islands are Suursaari, Tytärsaaret, Lavansaari and Seiskari
- busy shipping: Helsinki-Tallinn, Russian oil ports, Kotka-Hamina, Sköldvik near Porvoo

- The Gulf of Finland is the most eutrophic area of the Baltic Sea. More than 10 million people live in the catchment area, and agriculture, habitation and industry in the countries along its coast subject the sea area to pollution of around 6,000 tonnes of phosphorus and 120,000 tonnes of nitrogen each year.
- More than 50% of the nitrogen load and 75% of the phosphorus originate from Russia. Both Finland’s and Estonia’s share of the load is around 10%, and the proportion of nitrogen carried through the air is almost 20%.
- The heavy load of nutrients causes the most serious problem in these waters – eutrophication, which is apparent every summer sometimes as substantial blooms of blue-green algae.
- The Gulf of Finland is one of the world’s busiest areas for sea traffic. On the coast there are many oil refineries, and these are served by many oil tankers. The volumes of oil transported are continually increasing. In 2009, around 150 million tonnes of oil were transported, and it is estimated that this level will grow to 200-250 million tonnes by the year 2015.
- A leak in an oil tanker’s container would devastate the natural environment.


Лужская губа
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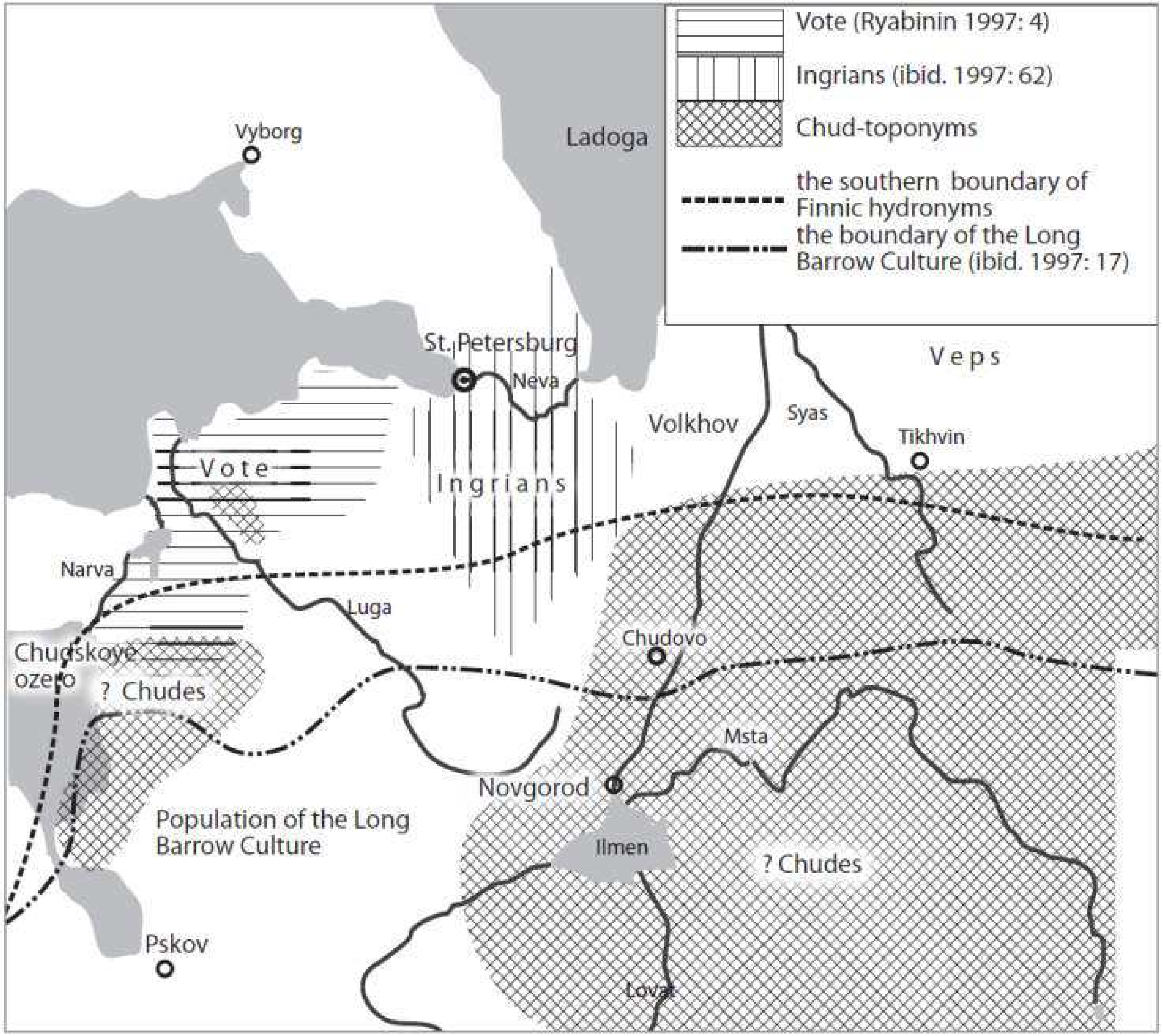
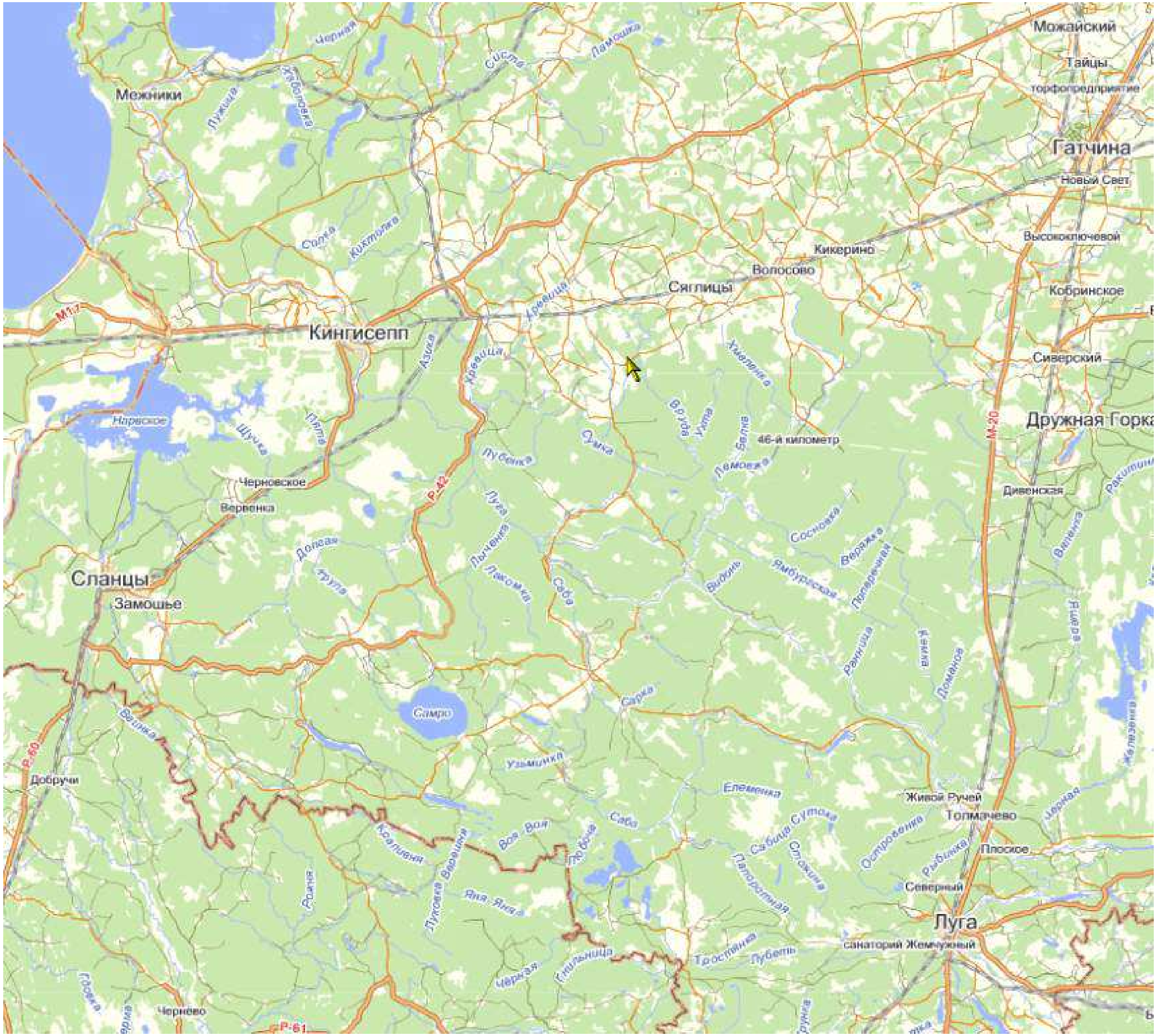
Долгая
Луга
Ящера
Саба
Оредеж
Луга
ПСКОВСКАЯ ОБЛАСТЬ
НОВГОРОДСКАЯ ОБЛАСТЬ

The medieval ethnographic situation of Finno-Ugrian tribes in Leningrad, Pskov and Novgorod oblasts.The principal area of the Chud-toponyms and the southern boundary of Finnic hydronyms (from: Rahkonen, 2011).



Luga River

- Luga River starts from Tesovo wetlands in Novgorod oblast.
- Length 353 km.
- Catchment area 13,200 km^2.
- Luga River flows into the Luga Bay of the Gulf of Finland.
- The main tributary is the Oredezh River.
- The mouth of the Luga is the site of the Ust-Luga container terminal.
- The towns of Luga and Kingisepp are situated on the Luga River.



Можайский
Тайцы
торфопредприятие
Межники
Гатчина
Новый Свет
Высокоключевой
Кикерино
Волосово
Сяглицы
Кобринское
Кингисепп
Сиверский
Нарвское
46-й километр
Дружная Горка
Черновское
Верменка
Дивенская
Сланцы
Замошье
Самро
Добручи
Живой Ручей
Толмачево
Плюсское
Северный
Луга
санаторий Жемчужный
Чернево
М-20
Р-42
Р-60
Р-61
Черная
Систа
Ламошка
Лужица
Хаболовка
Солка
Кихтолка
Азика
Кревица
Шучка
Пята
Лубенка
Сумка
Вруда
Ухта
Хмеленка
Белка
Лемовжа
Луга
Лычелка
Лакомка
Долгая
Крупа
Саба
Сосновка
Веряжка
Ямбурская
Поперечная
Вейкова
Вядка
Ящера
Ранница
Кемка
Доманов
Сарка
Узьминка
Елеменка
Саба
Сабица
Сутока
Островенка
Рыбежка
Вяжица
Ящера
Вайка
Кролевка
Луковка
Верещня
Вод Воя
Яня Яня
Черная
Гнилушица
Тростянка
Лубеть
Гдовка
Папоротная
Окина

- Started project 717 SE “Clean rivers to healthy Baltic Sea” will cover the middle reaches of the Luga River.
- Given all the above, it will be examined not only the river itself but also some its tributaries:
  - western (Vrevka, Naplatinka, Southern and Northern Kamenka, Obnova and Saba);
  - eastern (Udrayka, Merevskaya, Oredezh, Yaschera, Infenka, Kamenka, Bezhanka , Olshin, Rannitsa, Rytskiy, Vyazovik, Kabatsky, Losinka, Kobielskiy, Peretskiy, Srenskiy, Vidon’, Lemovzha, Koronetskiy, Tikhonovskiy and Holodniy). However, taking into consideration specifics of the project, the main focus will be on eastern tributary Saba and western tributary Yaschera.
- The authors have no doubt that the developed by ILEC ILBM approach will improve the environmental situation in the catchment of the Gulf of Finland. Problems of this territory have been raised and studied under several joint Russian-Finnish projects, such as: RUSFINNONPOINT - project TACIS TSP/RL/9803/52 (Finnish-Russian program to reduce diffuse loads and improve the ecological state of the Gulf of Vyborg – 1998-2001), SELEGORO (1-4) D71-413-416 – Finnish-Russian project on the ecology of rivers Seleznevka and Gorohovka (Karelian isthmus) 2001-2007, RUSBIOHALO – Russian-Finnish project program “Neighborhood” 2006/122-062 – 2006-2008 on development of environmental waste management practices in rural areas and in the areas of recreation of Karelian isthmus – catchment area of Lake Ladoga and the Gulf of Vyborg, etc.

Thank you for your attention