

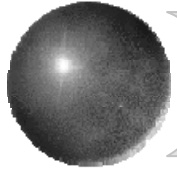
# **Opportunities and Challenges in Integrated Lake Basin Management**

**Dr. Stephen F. Lintner**

**Senior Technical Advisor**

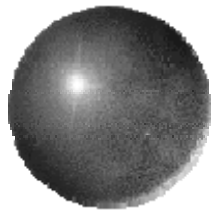
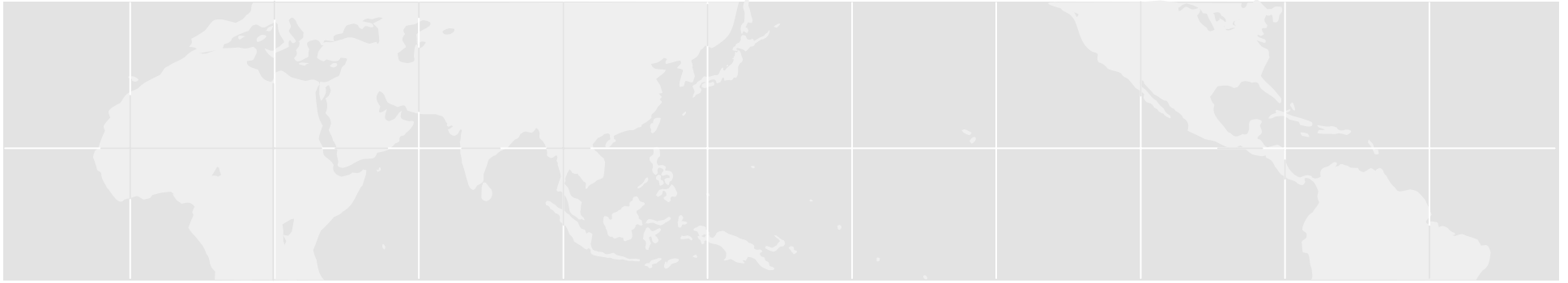
**World Bank**

**September 2007**

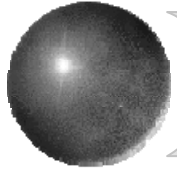


# Overview

- ❖ The World Bank
- ❖ Recent Studies and Experience
- ❖ Opportunities and Challenges
- ❖ Lessons Learned

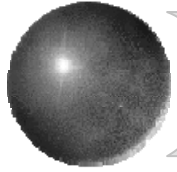


# **The World Bank**



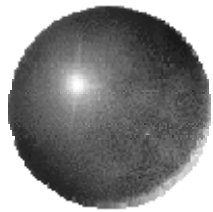
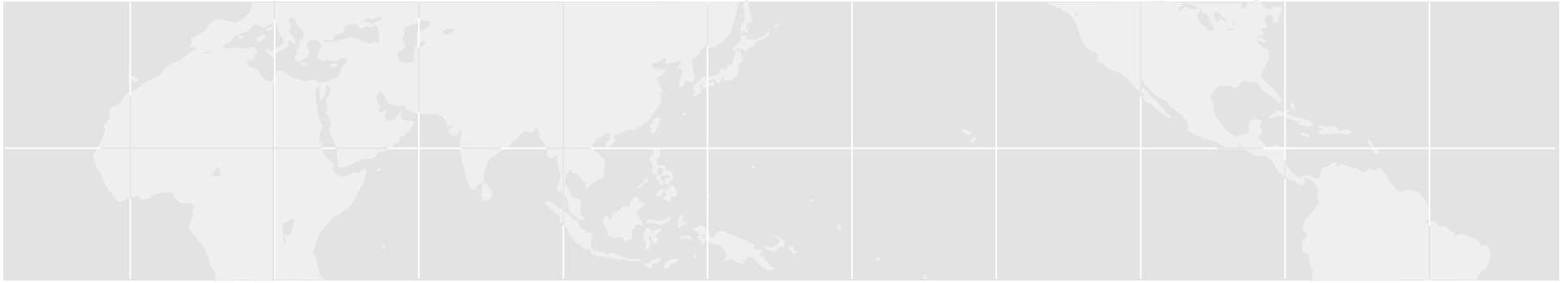
# World Bank

- ❖ Founded in 1944
- ❖ Over 180 Member Countries
- ❖ Headquarters in Washington, DC
- ❖ Offices in Many Countries, including China
- ❖ Provides:
  - Global Expertise and Knowledge
  - Funding for Programs and Projects
  - Analytical Work of a Variety of Types

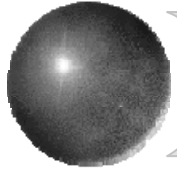


## **World Bank - Four Points of Focus**

- ❖ Focus on Poverty Reduction, including Millennium Development Goals
- ❖ Commitment to Environmentally and Socially Sustainable Development
- ❖ Promoting Country Driven Development Effectiveness
- ❖ Actively Supporting Responsible Growth Worldwide



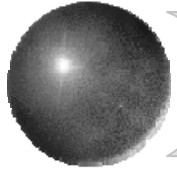
# **Recent Studies and Experience**



# **Integrated Lake Basin Management**

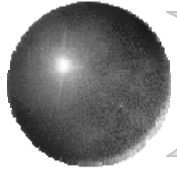
“Managing Lakes and their Basins for Sustainable Use: A Report for Lake Basin Managers and Stakeholders”

2005



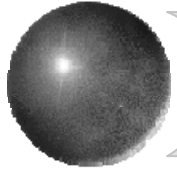
# Integrated Lake Basin Management

- ❖ Global Environment Facility (GEF)
- ❖ International Lake Environment Committee (ILEC)
- ❖ Lake Net
- ❖ Ramsar Convention on Wetlands
- ❖ Shiga Prefectural Government - Japan
- ❖ United Nations Development Programme (UNDP)
- ❖ United Nations Environment Programme (UNEP)
- ❖ United States Agency for International Development (USAID)
- ❖ World Bank



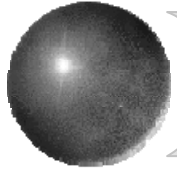
# Integrated Lake Basin Management

- ❖ Product – A Report: “Managing Lakes and their Basins for Sustainable Use”
- ❖ Process – A Three Year Interactive Process with a Wide Range of Stakeholders
- ❖ Outcome – A Global Common View of the Issues, Trends and Opportunities in Lake Basin Management



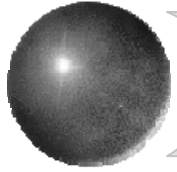
## **Integrated Lake Basin Management**

- ❖ Guided by principles of the World Lake Vision issued at 3<sup>rd</sup> World Water Forum – Kyoto – 2003
- ❖ Shifts from traditional focus on the management of lakes to a more comprehensive focus on management of lake basins
- ❖ Recognizes the importance of lake basins for sustainable management of water resources, conservation of ecosystems and improvement of livelihoods



## **Integrated Lake Basin Management**

- ❖ Mainstreams lake basin management as part of regional, national and local water resources sector strategies
- ❖ Developed lessons learned from three regional conferences, 28 lake basin briefs, and thematic papers
- ❖ Supports development of sustainable institutions – from community based to local/national level to transboundary management structures

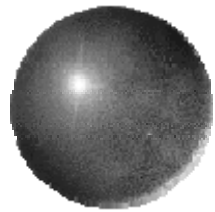
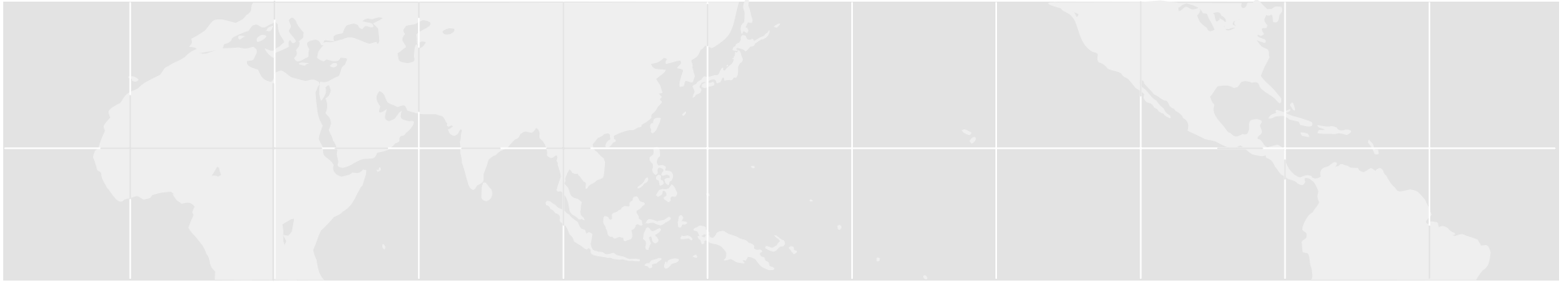


# **Integrated Lake Basin Management**

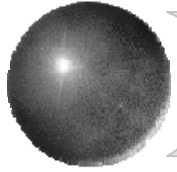
A Complementary Study:

“Lessons for Managing Lake Basins  
for Sustainable Use”

World Bank - 2005

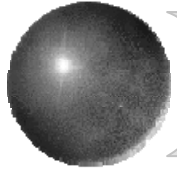


# Opportunities and Challenges



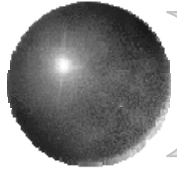
# Importance of Lakes

- ❖ Importance for Biodiversity
- ❖ Major Fishery Resources
- ❖ Economic Importance
- ❖ Transportation and Communication



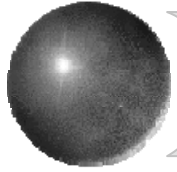
# Importance of Lakes

- ❖ Spiritual and Cultural Value
- ❖ Critical Stores of Freshwater
- ❖ Water Regulation
- ❖ Critical Habitats

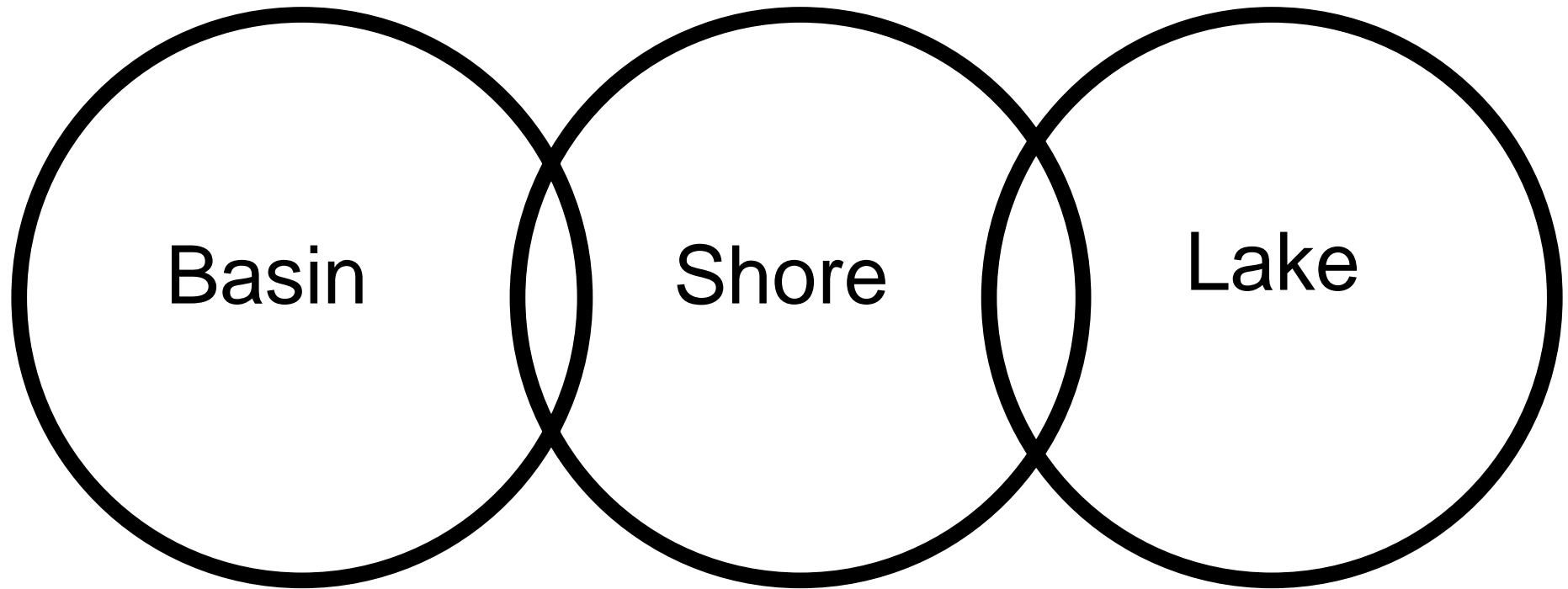


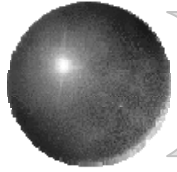
# **A Major Challenge**

Making Sustainable Management of  
Lakes and their Basins  
a Central Element of  
Integrated Water  
Resources Management

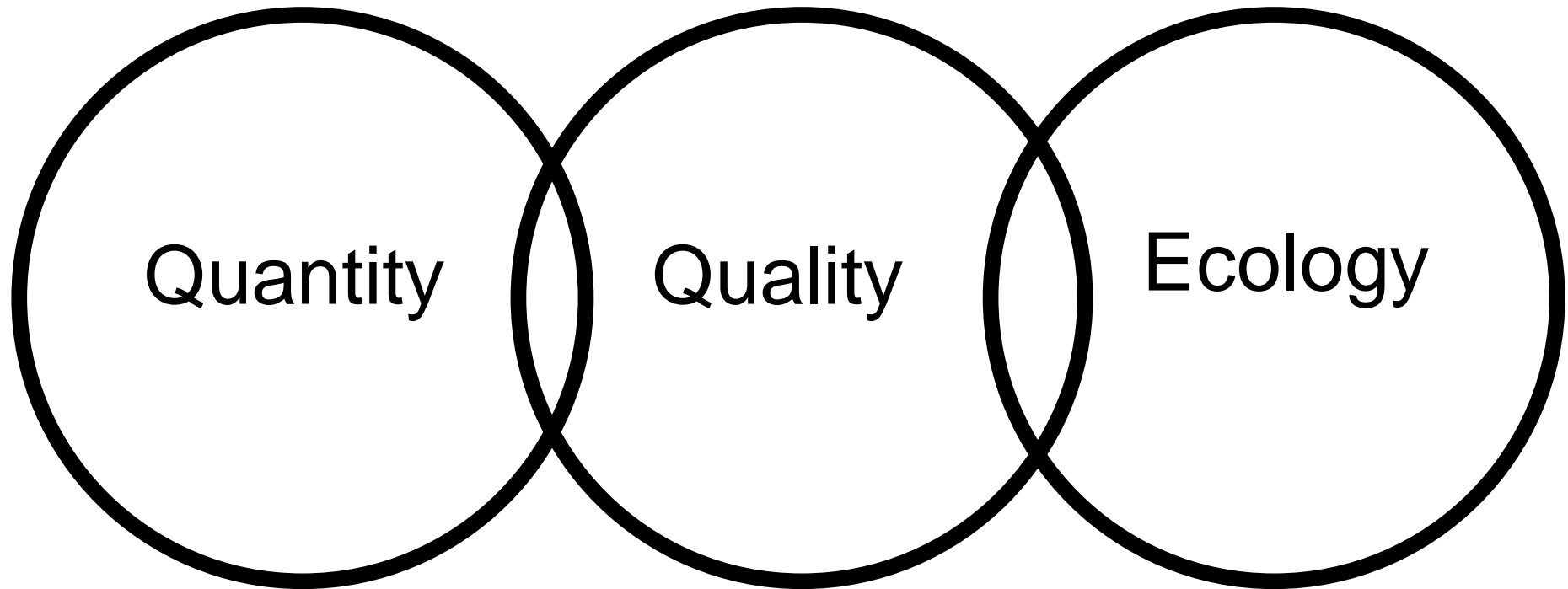


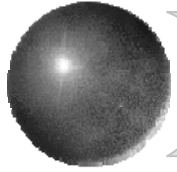
# A Management Continuum





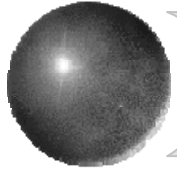
## Three Key Parameters





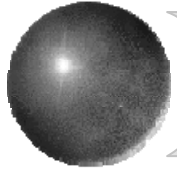
# **Problems Affecting Lakes - Basin**

- ❖ Watershed Degradation including Excess Sediment Inputs
- ❖ Excessive Water Withdrawals and/or Diversions
- ❖ Agro-Chemical Pollution from Non-Point Sources
- ❖ Point Source Pollution from Municipal and Industrial Sources



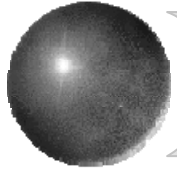
# **Problems Affecting Lakes - Shore**

- ❖ Land Use Change, Habitat Degradation, Conversion of Wetlands
- ❖ Shoreline Effluent and Storm Water Discharge
- ❖ Shoreline Industrial Contaminants
- ❖ Shoreline Water Extraction
- ❖ Shoreline Disposal of Municipal and Industrial Wastes



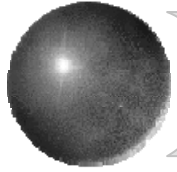
# Problems Affecting Lakes

- ❖ Decreases in Carrying Capacity
- ❖ Increases in Nutrient Levels
- ❖ Decreases in Oxygen Levels
- ❖ Unsustainable Fishing Practices
- ❖ Introduced Faunal and Floral Species
- ❖ Weed Infestations
- ❖ Nutrients from Fish Cages
- ❖ Changes in Salinity Levels



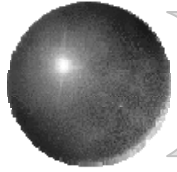
# Lake Basin Governance

- ❖ Policy
- ❖ Institutions
- ❖ Rules
- ❖ Public Participation
- ❖ Information
- ❖ Finance



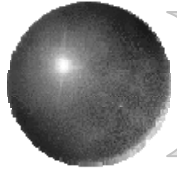
# Diverse Stakeholders

- ❖ National Government
- ❖ Local Government
- ❖ Special Government Authorities
- ❖ State Owned Industries and Enterprises
- ❖ Private Sector and Farmers
- ❖ Universities and Applied Research Institutes
- ❖ Professional Organizations
- ❖ Civil Society Organizations
- ❖ Nongovernmental Organizations
- ❖ Individual Citizens



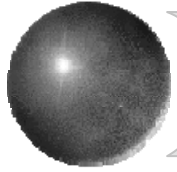
# Fragility of Lakes

- ❖ Vulnerable and fragile systems with special management needs
- ❖ Often closed or semi-closed systems with longer retention periods for pollutants
- ❖ Pollutants in system over long periods
- ❖ Process of mixing and breaking down waste discharges is slow
- ❖ Subject to dramatic system responses



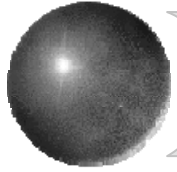
# Management of Lake Basins

- ❖ Complex land and water relationships
- ❖ Competition between resource user groups
- ❖ Often rapid changes in economic activities
- ❖ Ecological integrity of many lake basins has become threatened
- ❖ New issues associated with climate change and hydrological variability



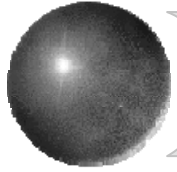
# Management of Lake Basins

- ❖ Political leaders and civil society need to be broadly engaged on a sustained basis
- ❖ Diverse institutional arrangements can be effectively used for management
- ❖ Management decisions often need to be taken with incomplete information
- ❖ Coordination between planners, managers and the public is essential
- ❖ Limited integration of priorities into budget processes is a key constraint



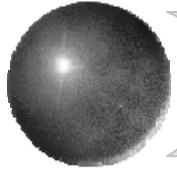
# Support for Lake Management

- ❖ Chilika Lagoon – India
- ❖ Lake Baikal – Russian Federation
- ❖ Lake Chad – Central Africa
- ❖ Lake Ohrid – Southeast Europe
- ❖ Lake Sevan – Armenia
- ❖ Lake Skhoder – Southeast Europe
- ❖ Lake Victoria – Eastern Africa
- ❖ Laguna de Bay – Philippines



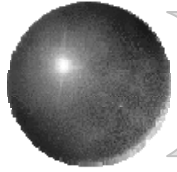
# Support for Lake Management

- ❖ Management Plans
- ❖ Draft Legislation and Regulations
- ❖ Baseline Data Collection
- ❖ Institutional Development
- ❖ Training
- ❖ Information Programs
- ❖ Public Participation



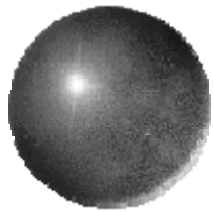
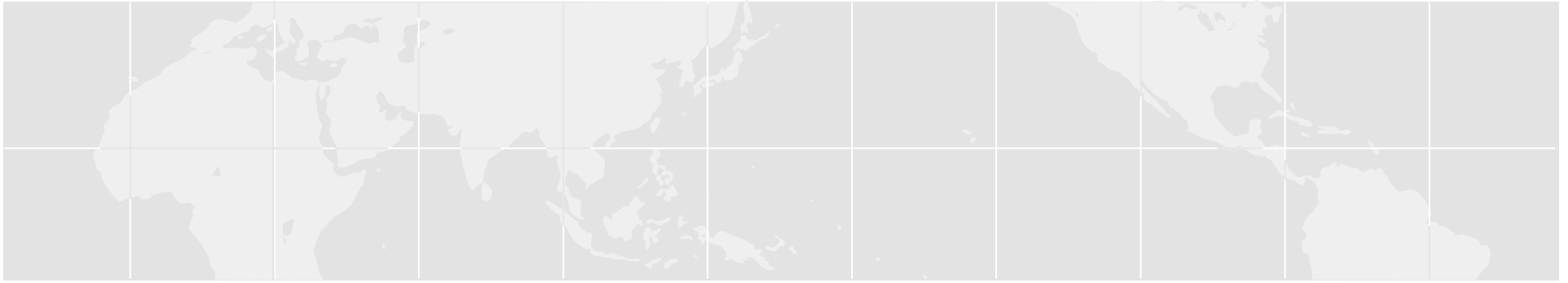
# Support for Lake Management

- ❖ Watershed, Shoreline and Lake Management
- ❖ Water Supply
- ❖ Water Quality Management
- ❖ Urban and Community Development
- ❖ Biodiversity, Habitat and Fisheries
- ❖ Environmental Restoration
- ❖ Recreation/Ecotourism

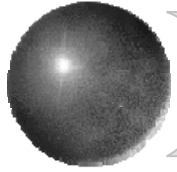


# Investment and Advisory Support

- ❖ National and Local Governments
- ❖ International Loans from Multilateral Development Banks
- ❖ European Union and Bilateral Grants
- ❖ Private Sector and Private Foundations
- ❖ Innovative Mechanisms – Global Environment Facility (GEF)

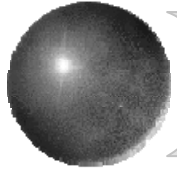


# **Lessons Learned**



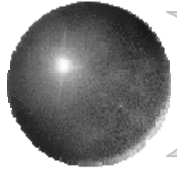
## Key Lessons

- ❖ Shared Vision
- ❖ Sustained Political Commitment
- ❖ Sustained Public Commitment
- ❖ Broad Based Partnerships
- ❖ Integration into Planning
- ❖ Integration into Budget
- ❖ Updating Vision to Address Change
- ❖ Public Awareness and Education



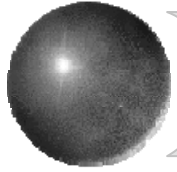
## Lessons Learned – Development

- ❖ Lake basin management is critical for sustainable development and responsible economic growth
- ❖ Lakes and their basins are fragile and complex ecosystems under serious stress
- ❖ Successful management requires long-term political and public commitment
- ❖ Management approaches need to include a diversity of stakeholders



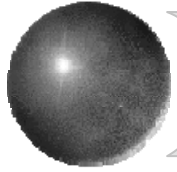
## **Lessons Learned – Complexity**

- ❖ Individual lakes have unique physical, chemical and biological attributes
- ❖ Lakes are more complex to manage than rivers and wetlands
- ❖ A greater diversity of specialists is needed for planning and management activities
- ❖ Our ability to predict the behavior of lakes remains limited



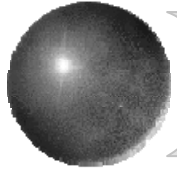
## **Lessons Learned – Policies**

- ❖ Science should inform policies
- ❖ Need to move beyond good science
- ❖ Management decisions often need to be taken with incomplete information
- ❖ Policies need to be updated and adjusted to meet changing knowledge and conditions



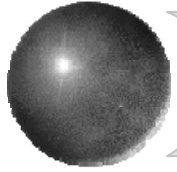
## **Lessons Learned – Institutions**

- ❖ Diverse institutional arrangements
- ❖ Limited linkage between planners and managers
- ❖ Weak coordination and competition between institutions
- ❖ Limited integration of priorities into budget processes



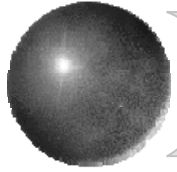
## **Lessons Learned – Planning**

- ❖ A wide variety of planning tools have been used for lake basins and lakes
- ❖ It is critical to combine information on physical and biological conditions with that on economic and social conditions
- ❖ Plans need to be dynamic in their approach and address current and emerging issues



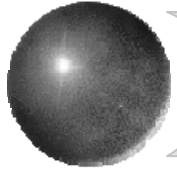
## **Lessons Learned – Management**

- ❖ Lakes and their basins should serve as management units
- ❖ Lakes need to be managed on site
- ❖ Multiple levels of government need to be involved in planning and management
- ❖ Civil society needs to be broadly engaged



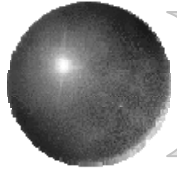
## **Lesson Learned – Change**

- ❖ Critical for long-term success
- ❖ Recognition of political and institutional changes
- ❖ Periodic updating of strategy to reflect changes in the lake basin and lake
- ❖ Identification of emerging issues
- ❖ Finding opportunities for new partnerships



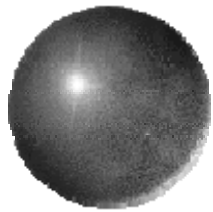
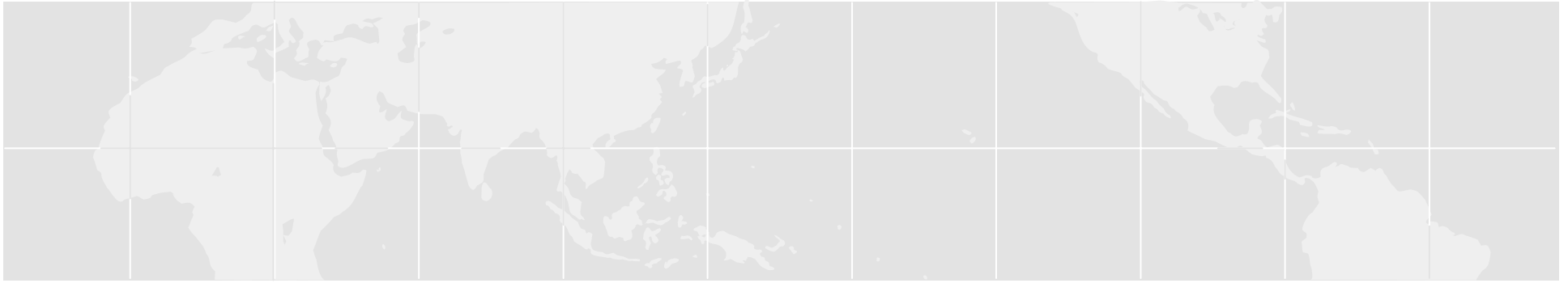
## **Lesson Learned – Integration**

- ❖ Making Integrated Management of Lake Basins a Long-Term Element of:
  - Government and Public Priorities
  - Planning Processes
  - Integrated Water Resources Management
  - Habitat and Biodiversity Conservation Programs
  - Economic Development Programs

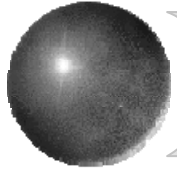


# Summary

Successful Management of Lakes  
Requires Use of an Integrated  
Approach to Lake Basin Management  
That Fully Links Land Use, Water Use  
and Social and Economic Factors



# Contact Information



# Contact Information

Dr. Stephen F. Lintner

Senior Technical Advisor

The World Bank

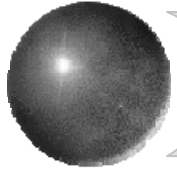
1818 H Street, NW

Washington, DC 20433

USA

E-Mail: [slintner@worldbank.org](mailto:slintner@worldbank.org)

Web: <http://www.worldbank.org>



## **Contact Information**

Managing Lakes and their Basins for  
Sustainable Use: A Report for Lake Basin  
Managers and Stakeholders

International Lake Environment Committee  
Foundation (ILEC)

<http://www.ilec.or.jp>