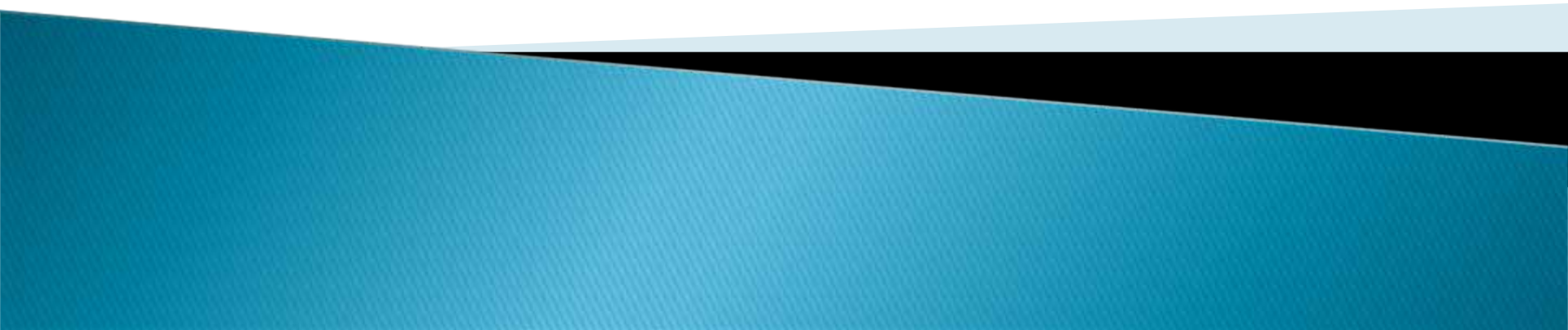



Chapter 3: Human Use of Lakes




Key Questions

1. What are the common human uses of a lake?
 2. What problems interfere with such uses?
 3. How are these problems addressed (management)?
- 

The Story of a Lake

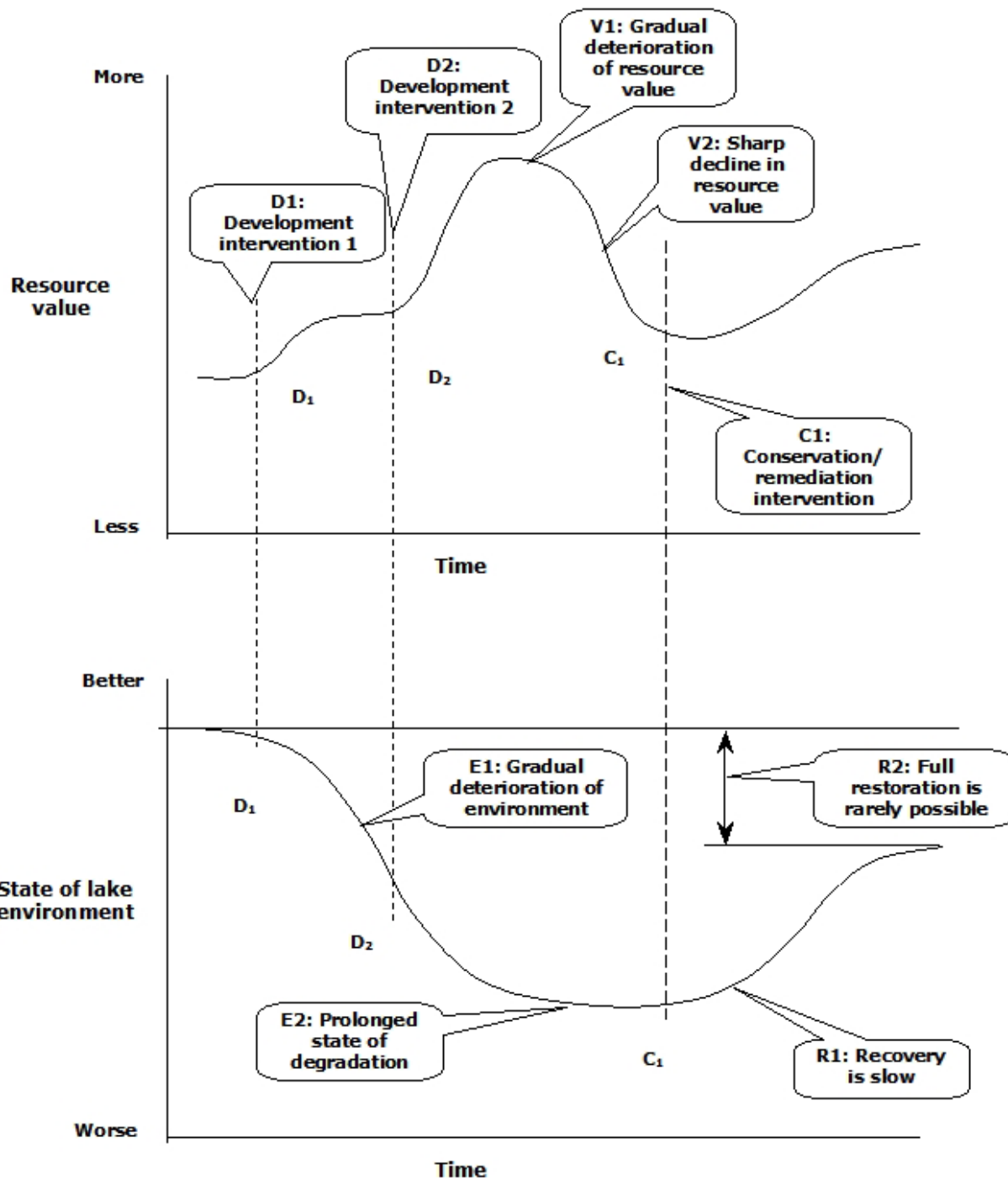
- ▶ The report presents a “story” of a fictional lake that illustrates the following points:
 - Lakes provide a variety of values to people and these values change over time
 - There are potential limitations on the use of these resources as the demand for them increases
 - Competition for these resources intensifies and authorities intervene to resolve conflicts
 - Rules of behavior are set and institutions are established to administer and apply these rules.

The Story of a Lake


- Uncertainty is central to management
 - Local experience and scientific knowledge can play a central role in management
 - Lakes are not worlds unto themselves
 - Developments outside the region can affect decisions within the region
 - The choices that a decisionmaker faces are heavily constrained by other developments
- 

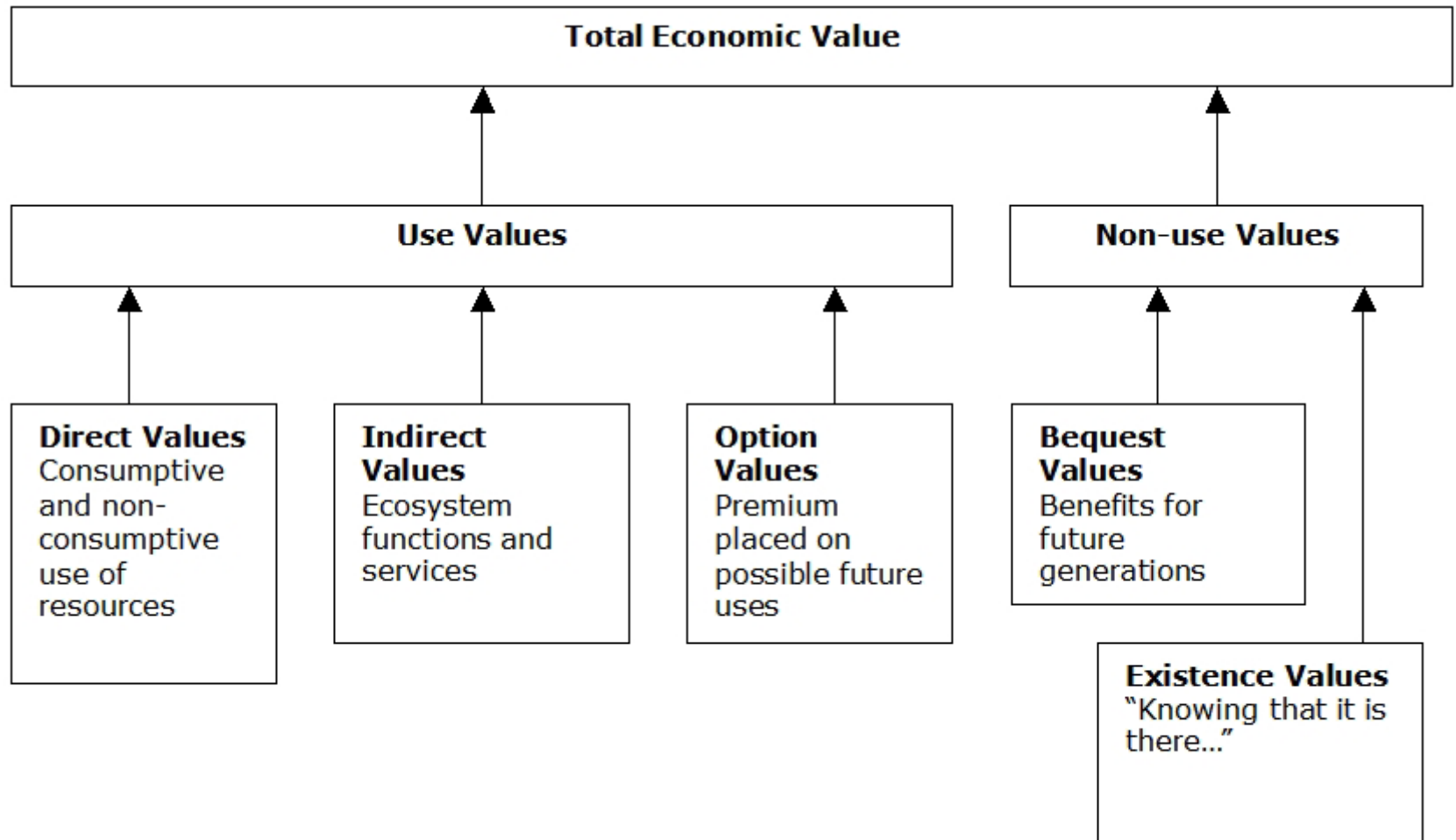
The Story of a Lake

- An alternative view of the relationship between development and conservation at an “average” lake can be seen in the following diagram.




Valuation of Lake Resources

- ▶ One possible approach to valuing the resources of a given lake is the TEV (Total Economic Value) approach (shown in next slide)
 - ▶ While not all values can be reduced to monetary units, the TEV approach provides a framework for evaluating a wide-range of values
- 




Problems affecting Lake Values

- ▶ It is ironic that the values that draw people to lakes often lead to problems (caused by those people) that impair the value of the lake.
 - ▶ Some typical problems seen at lakes around the world are given in the following figure.
 - ▶ They can be classified based on origin: in-lake, basin, or outside of basin.
- 

Lake Basin	In-lake						Basin origin						Regional/Global		
	① Unsustainable fishing practices	② Introduced faunal species	③ Salinity changes	④ Weed infestations	⑤ Nutrients from fish cages	⑥ Loss of wetlands	⑦ Excess sediment inputs	⑧ Non-point source nutrients	⑨ Agro-chemicals	⑩ Water abstraction and changes in run-off	⑪ Effluents and stormwater	⑫ Industrial pollution	⑬ Atmospheric nutrients	⑭ Atmospheric industrial contaminants	⑮ Climate change
Aral Sea			→			→				→					
Baikal							↓			↓	→		→		
Baringo	→						↓			↓					↓
Bhoj Wetland							→	→	→		→	↓			
Biwa				→		↓		→	→	↑	↑				↓
Chad						↓	↓			↓					↓
Champlain								↑			↑			→	
Chilika Lagoon			↑	↑			↓	↓	↓	↓					
Cocibolca/Nicaragua							↓	↓	↓	↓					
Constance		↓				→		→	→		→				
Dianchi					↑	↓	↓	↓	↓	↓	→		→		
Great Lakes (N.Am.)		↓						↓	↓		↑	→		→	
Issyk-Kul		→					↓	↓	↓			↓			↓
Kariba Reservoir						↓		↓			→				↓
Laguna de Bay	→	↓	→	→	↓		↓	↓		↓	→				
Malawi/Nyasa	↓			↓			↓	↓	↓	↓			↓		↓
Naivasha	↑	→		↑		→	↓			→	↓		↓		
Nakuru							→	→		↓	↓				
Ohrid	→	↓				↓	↓	↓	↓		↓				
Peipsi/Chudskoe	↓			→				→			↓	→			
Sevan	↓	↓				↓	↓			↓	↓				
Tanganyika	↓						↓			↓	↓				↓
Titicaca		↓					↓			↓	↓				
Toba	↓	↓		↓	↓	↓	→	→	↓	↓	↓		↓		
Tonle Sap	↓	↓					↑			↓					
Tucurui Reservoir				→			→								
Victoria	→	↓		↑		↓	↓	↓		↓	↓	↓			
Xingkai/Khanka	↓					↓	↓		↓	↓	↓				
Total	12	11	3	9	4	11	21	16	12	11	23	12	4	4	7

Problems affecting Lake Values

- ▶ Overall, based on the current situation at the 28 LBMI lakes, it can be seen that many of the threats to lakes is coming from activities in their drainage basins.
 - ▶ Nevertheless, in certain cases “in lake” pressures like overfishing, or “beyond the basin” influences like regional nutrient deposition can be of greatest influence.
- 


Management Response

- ▶ How societies respond to these threats to lake values is the core of the ILBM approach.
- ▶ It is essentially the act of “governing”, which can be defined as “controlling, influencing, regulating, or determining...the course or issue of events.”

Management Response

- ▶ The sort of governing acts common in the 28 lake briefs include:
 - Forming organizations that provide development of plans, representation of the goals of different groups, implementation and management of structural investments, and enforcement of decisions (Module 4)
 - Developing rules, including regulatory powers as well as financial incentives, about sharing the lake basin's resources and limiting externalities for other users (Module 5)

Management Response

- Changing people's values, so that the net benefits gained from the use of a lake basin's resources are maximized (Module 6)
 - Engaging people in management through devolution of responsibilities (Module 6)
 - Introducing technological measures to reduce or ameliorate adverse impacts (Module 7).
- 

Management Response

- ▶ Management also requires:
 - A solid base of information (Module 8)
 - Money to pay for the activities (Module 9)
- ▶ All the above activities must come together in
 - Planning (Module 10)

Further Reading

- ▶ In addition to the main module 3 [report](#), additional information on the human use of lakes can be found in the following presentations
 - [Kondo](#) on some fundamental concepts of environmental economics
 - [Niren](#) on the valuation of the “ecosystem services” provided by lakes and how these values are taken into account in the management process.
 - [Verma](#) on valuation of Bhoj Wetland, India
 - [Mendiando](#) on the management challenges particular to reservoirs.