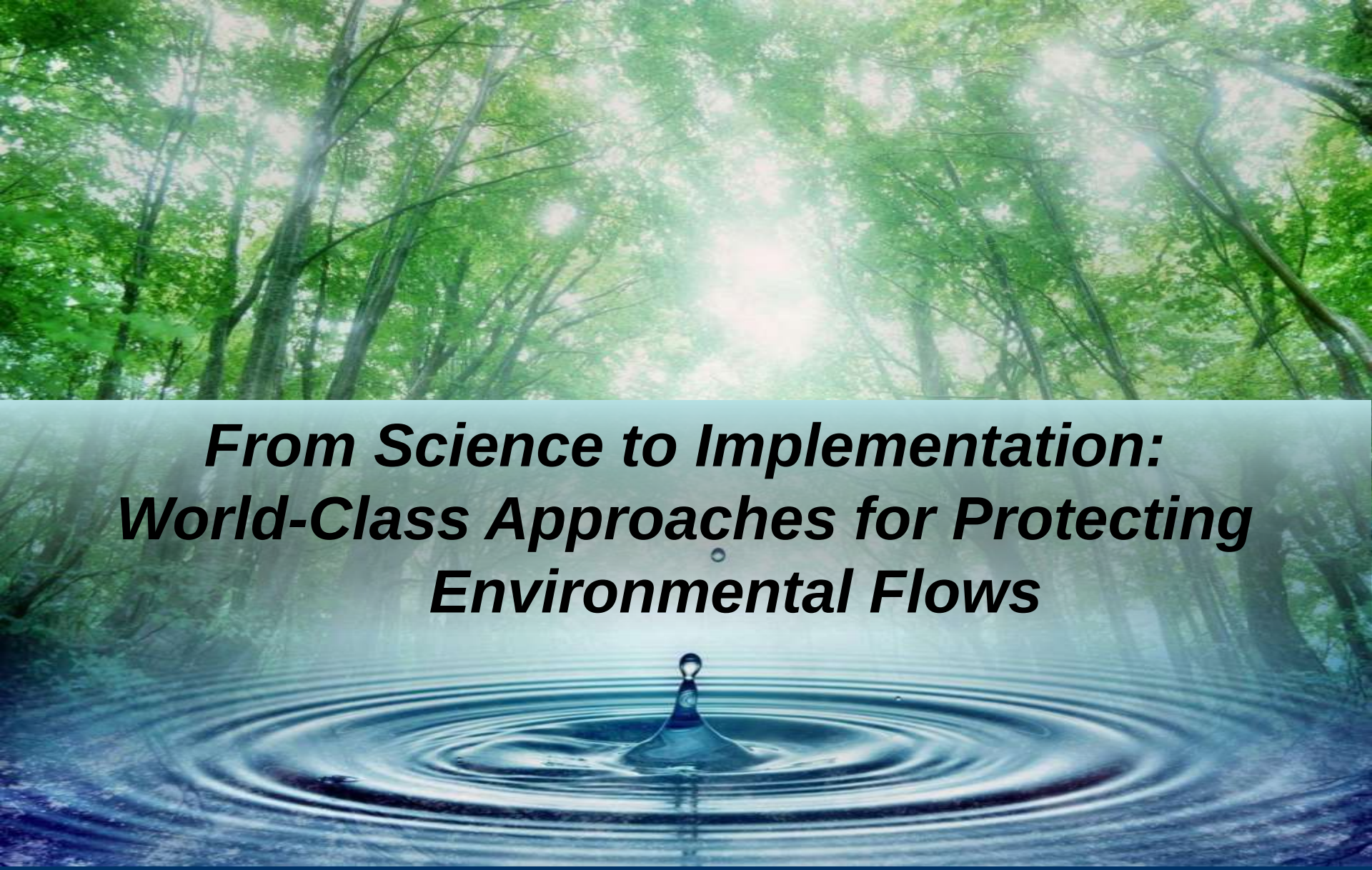


From Science to Implementation: World-Class Approaches for Protecting Environmental Flows

Brian Richter

Chief Scientist, Global Water Program, The Nature Conservancy

President, Sustainable Waters

Key Factors Affecting Freshwater Ecosystems

Hydrologic Regime

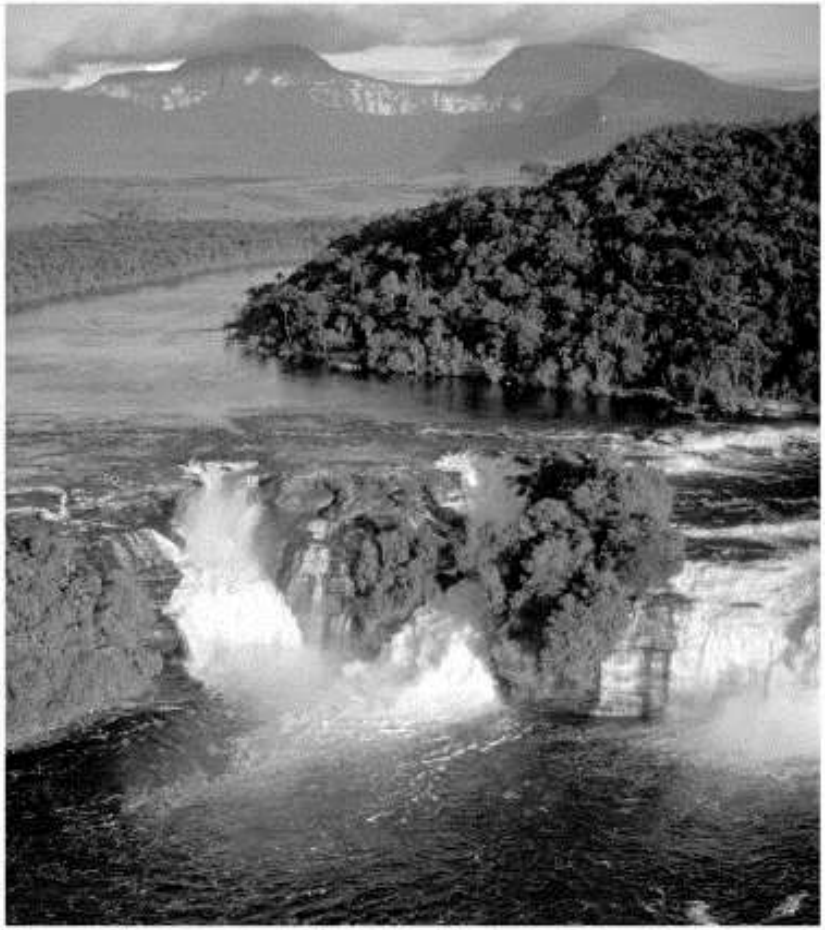
(surface flow, groundwater, surface inundation, and soil moisture regimes)

Physical Habitat Conditions →

(woody debris, riparian canopy, geomorphology, sediment/soil regime)

Biological Composition & Interactions →

(energy regime, feeding, 1· & 2· production, target structure & composition, competition & predation, reproduction, disease & parasitism, mutualism)

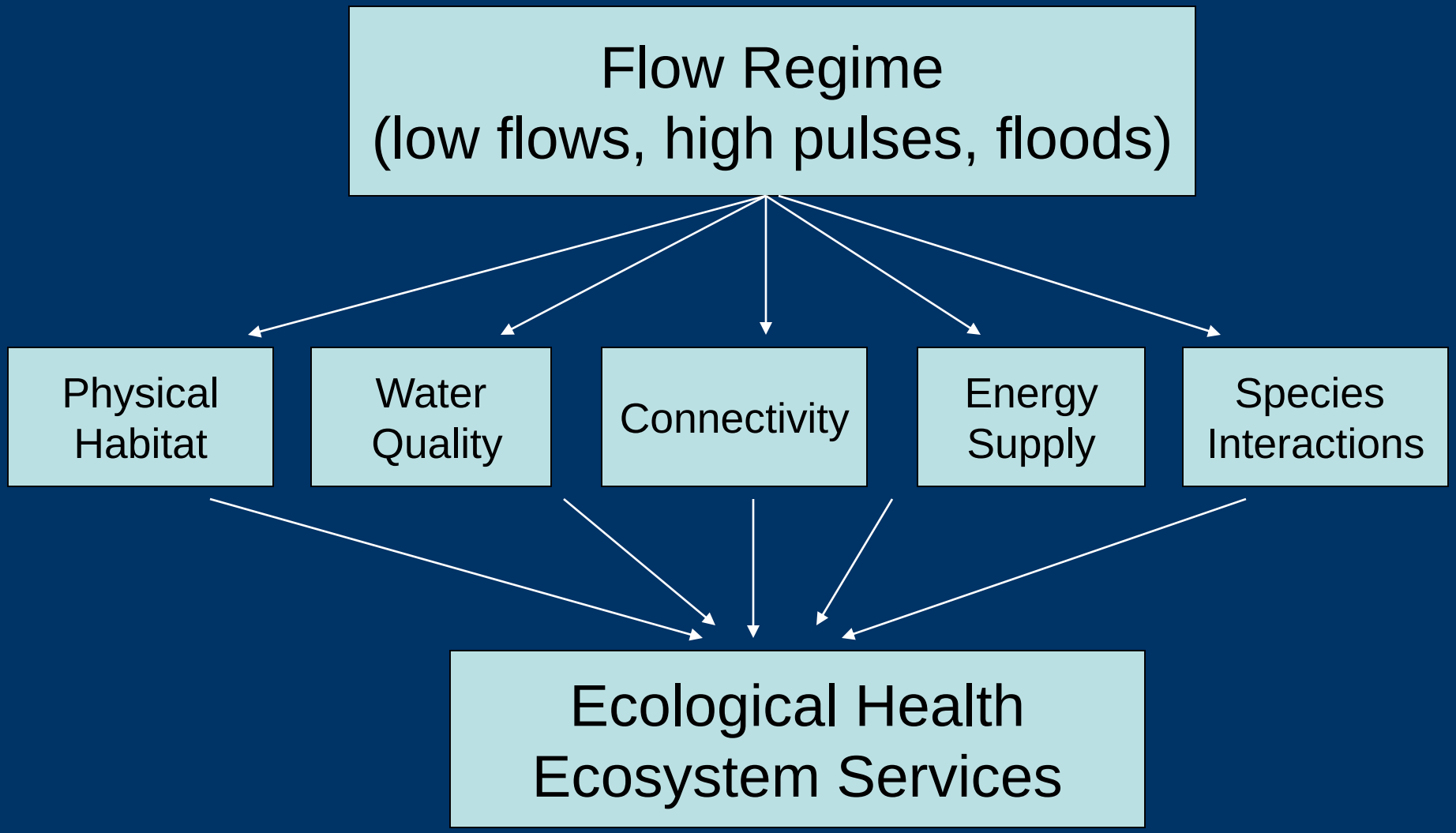


← **Connectivity**

(up-down gradient continuity, water-wetland-land connectivity)

← **Water Chemistry Regime**

(salinity, alkalinity, hardness, temperature, dissolved minerals, dissolved gases, turbidity, pH, ORP, radioactivity, organic compounds)

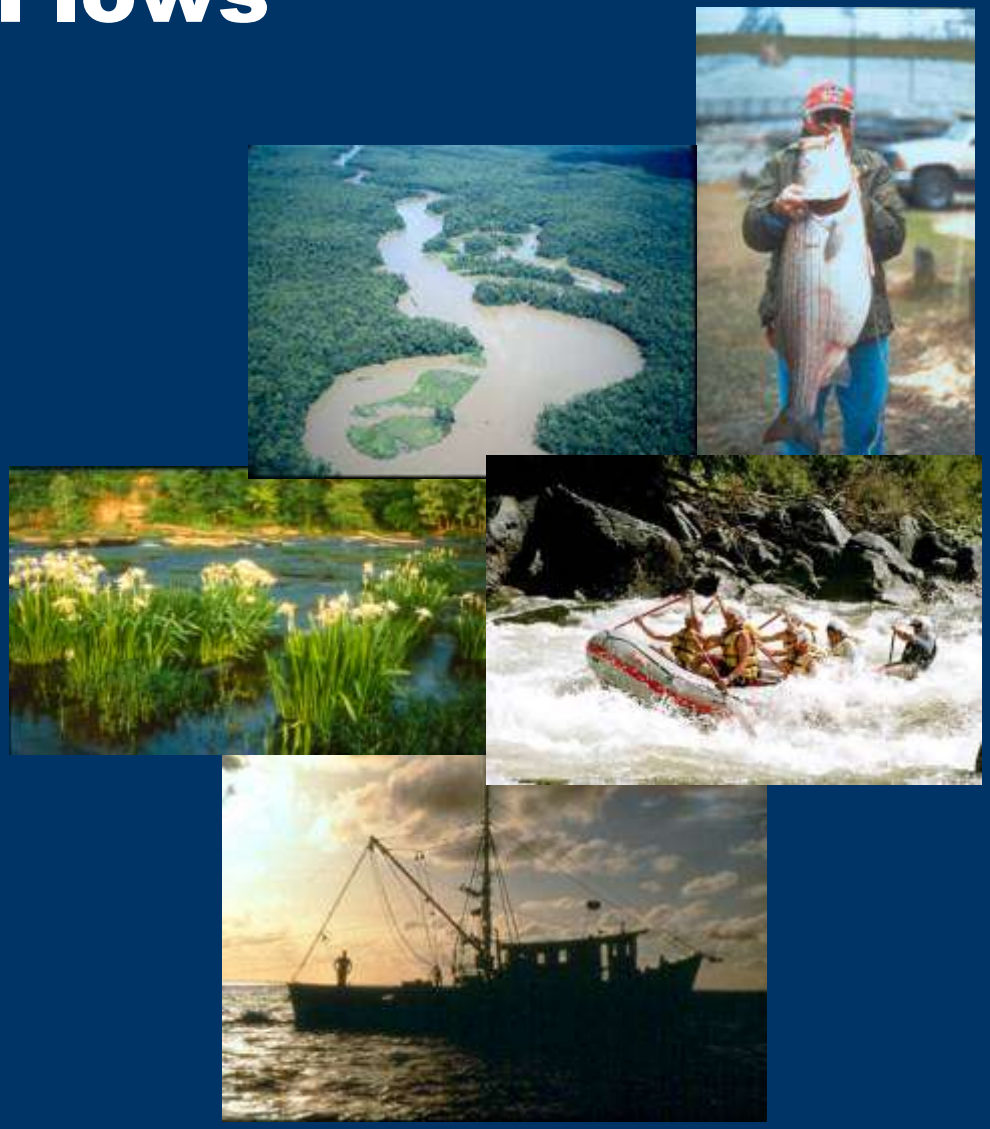


Flow regime is the "master variable"

Environmental Flows

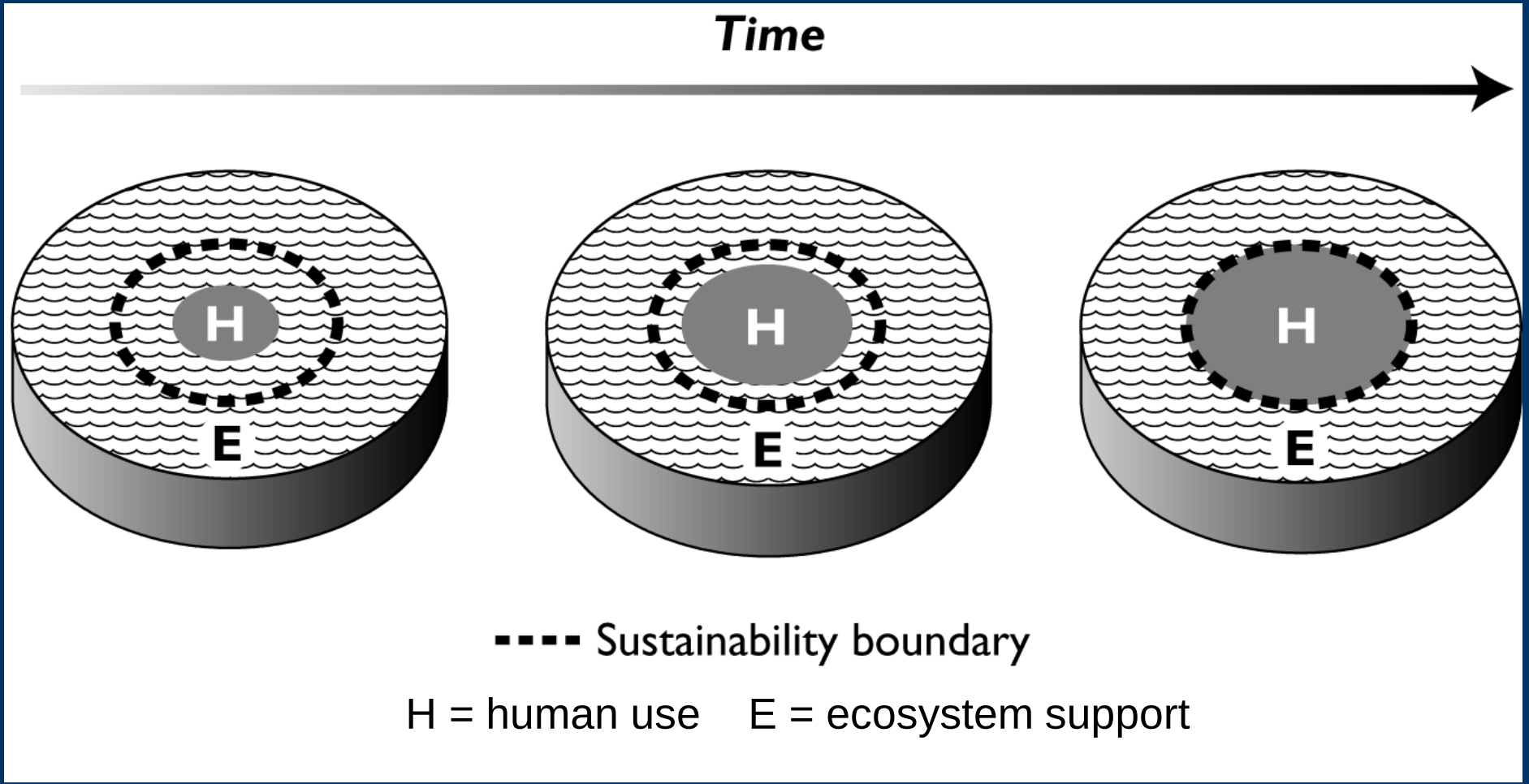
The quantity, timing, and quality of water flows required to sustain freshwater and estuarine ecosystems and the human livelihoods and well-being that depend on these ecosystems.

(from the Brisbane Declaration)



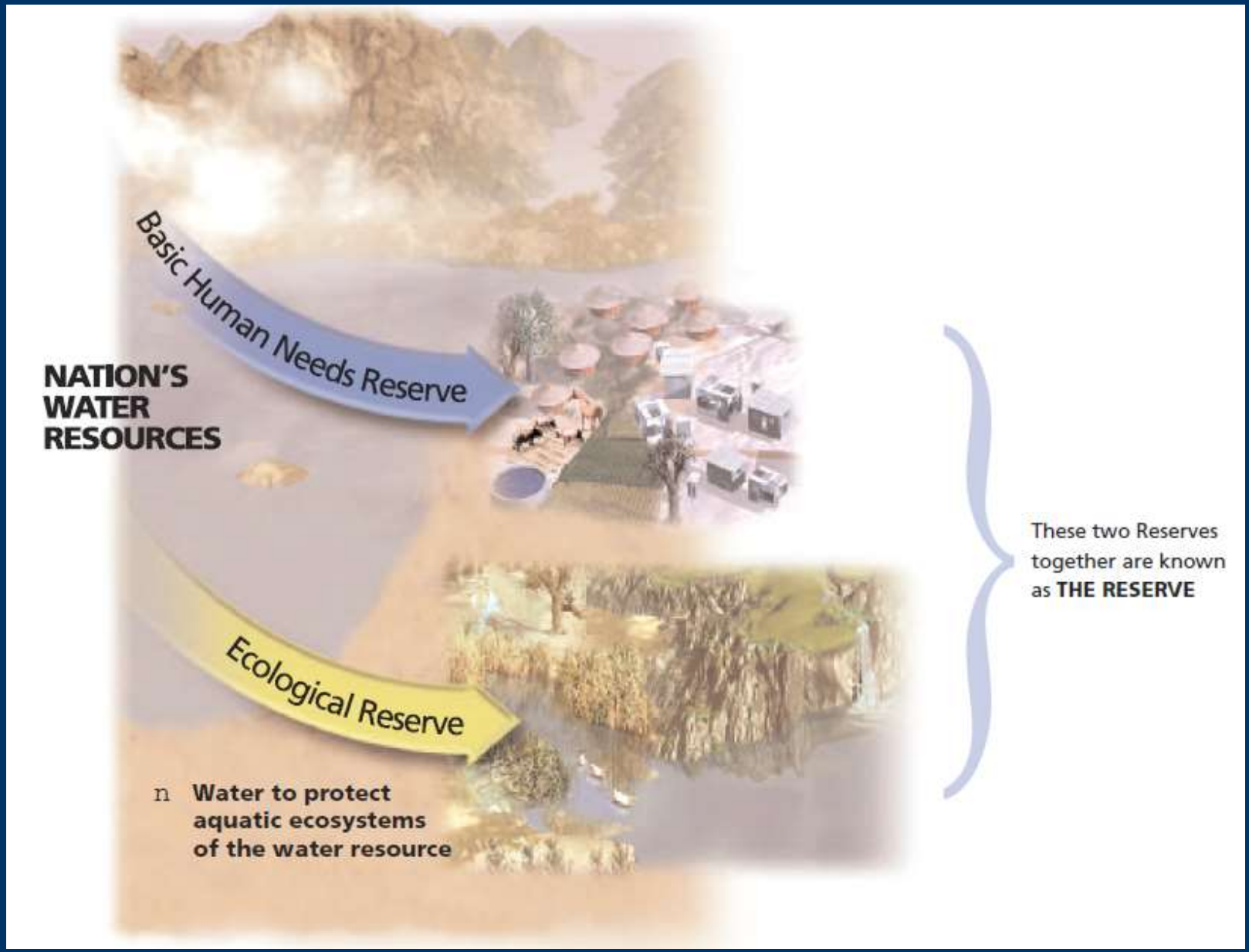
How do we best ensure that we sustain ecosystem health while meeting other needs for water?

The concept of “sustainability boundaries”



From “Rivers for Life: Managing Water for People and Nature”
by Sandra Postel and Brian Richter, Island Press, 2003

South Africa National Water Act (1998)



Texas Senate Bill 3 (2007)

- Determine how much water is needed (and when it is needed) to keep the state's rivers and coastal estuaries healthy,

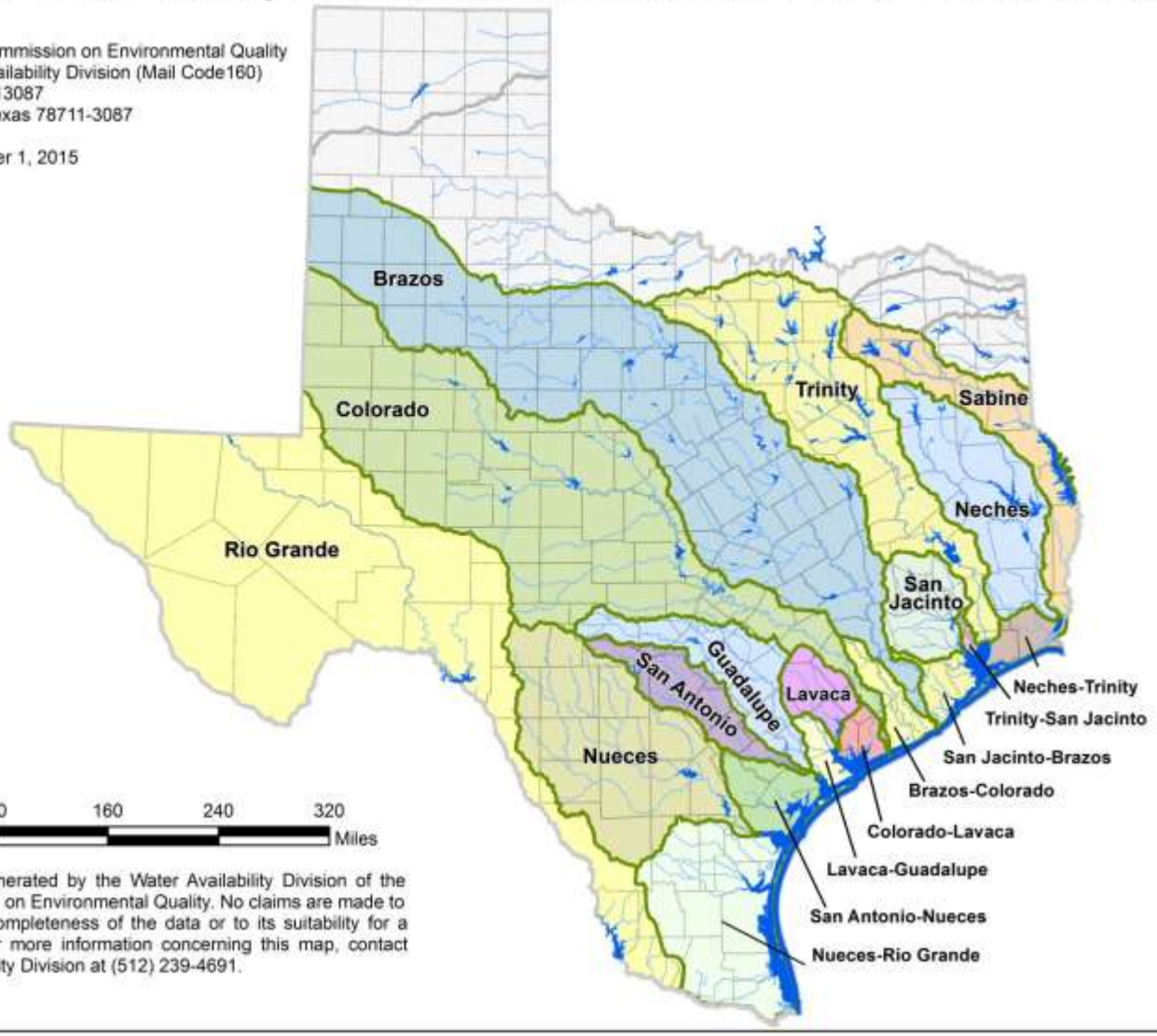
- Determine how much of that needed water, if available, should be protected as new water rights are issued, and,

- If water needed for healthy rivers and estuaries is not currently available, how do we go about making it available so we can pass a healthy natural heritage along to future generations of Texans?

Basins with Adopted Environmental Flow Standards

Texas Commission on Environmental Quality
Water Availability Division (Mail Code160)
P.O Box 13087
Austin, Texas 78711-3087

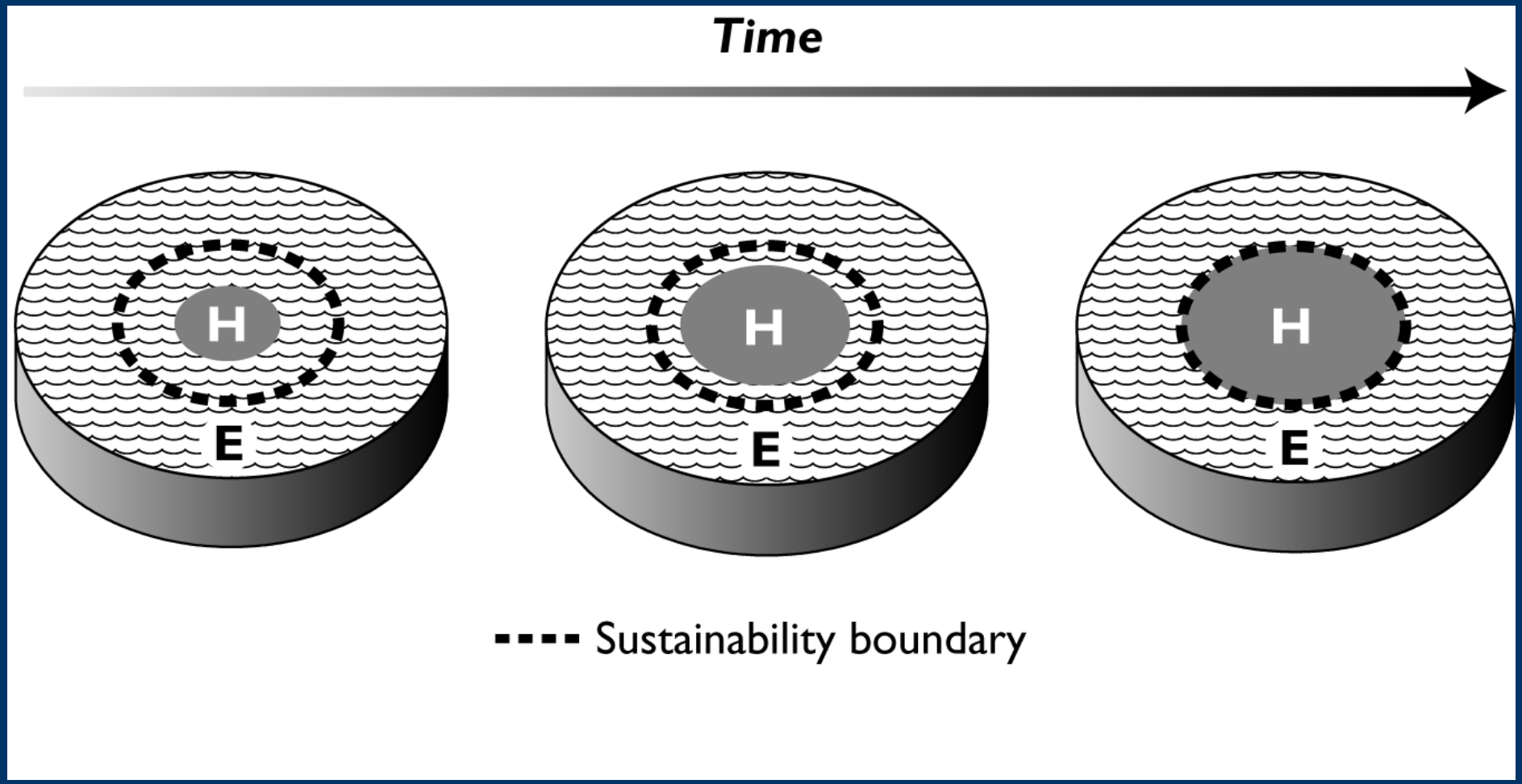
September 1, 2015



0 40 80 160 240 320
Miles

This map was generated by the Water Availability Division of the Texas Commission on Environmental Quality. No claims are made to the accuracy or completeness of the data or to its suitability for a particular use. For more information concerning this map, contact the Water Availability Division at (512) 239-4691.

The concept of “sustainability boundaries”



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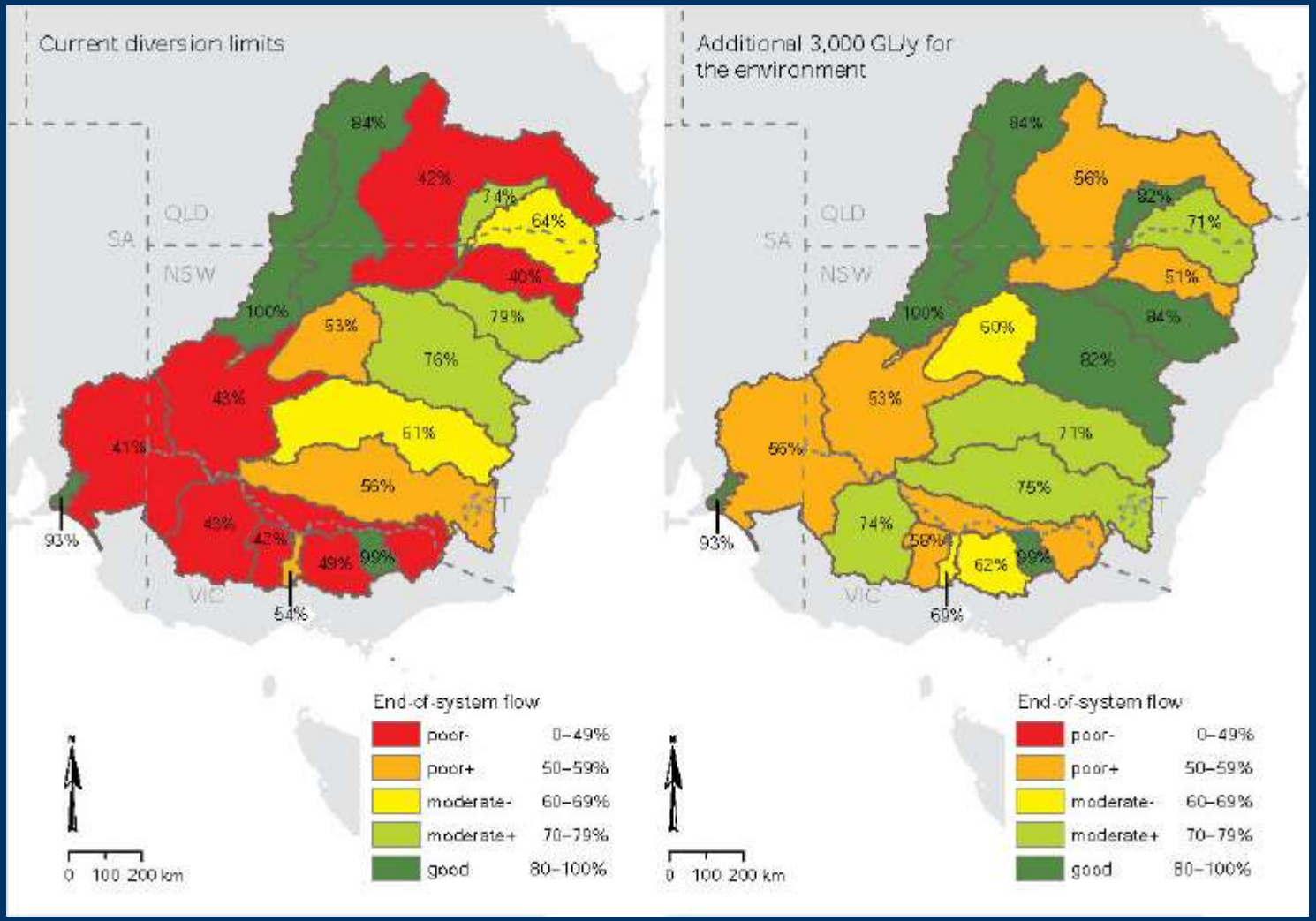
Murray-Darling Basin Plan (2012)



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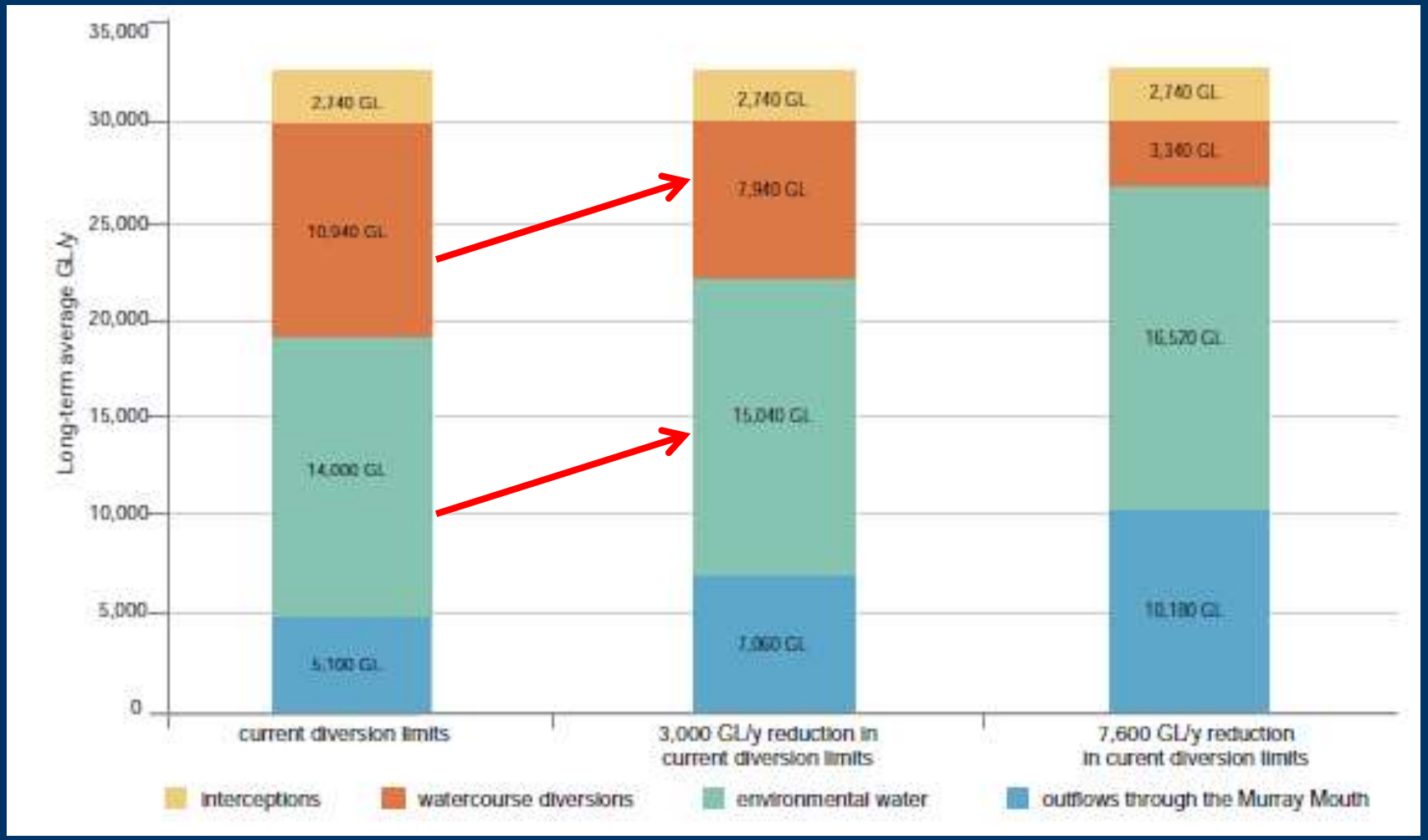
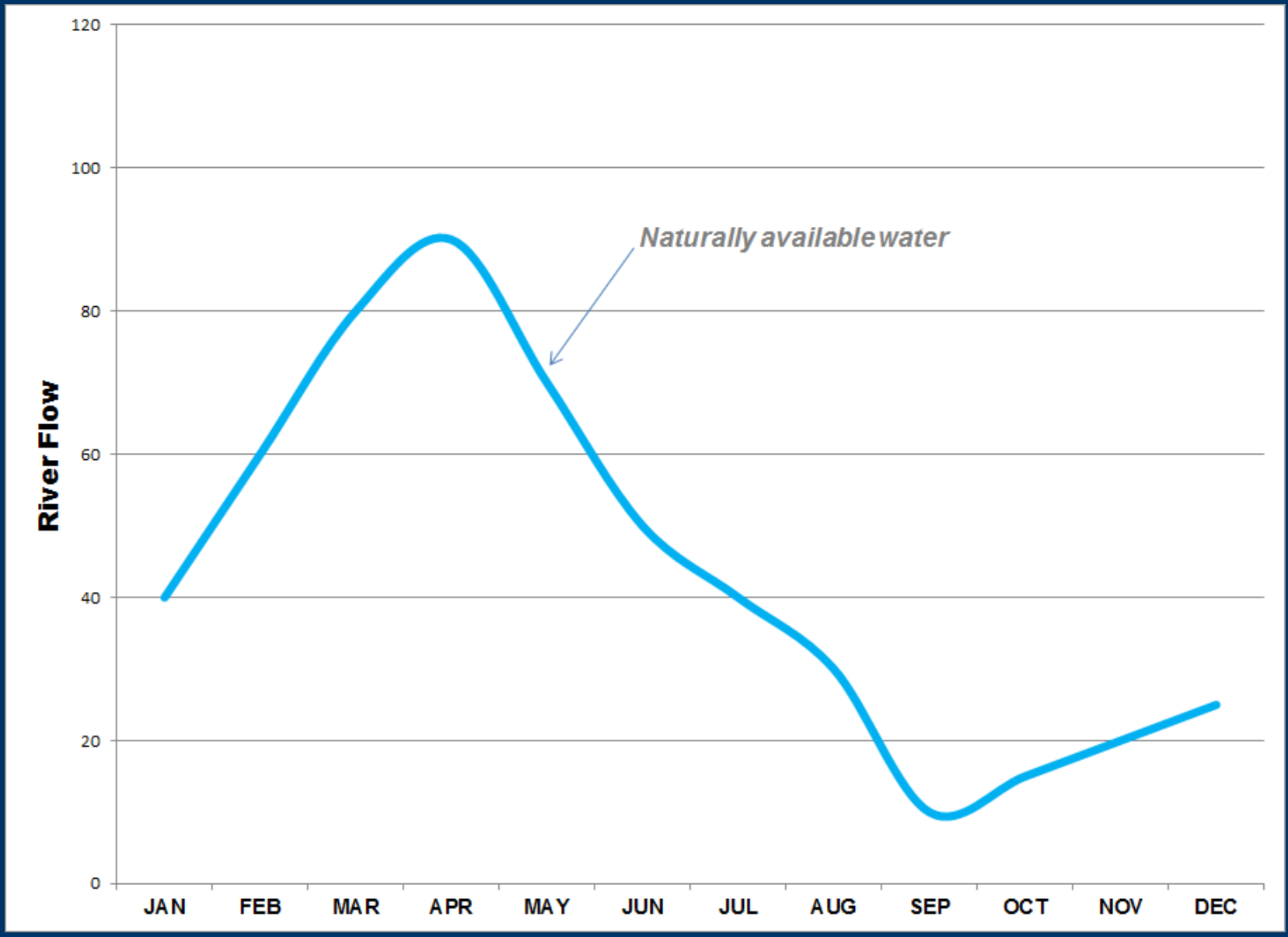
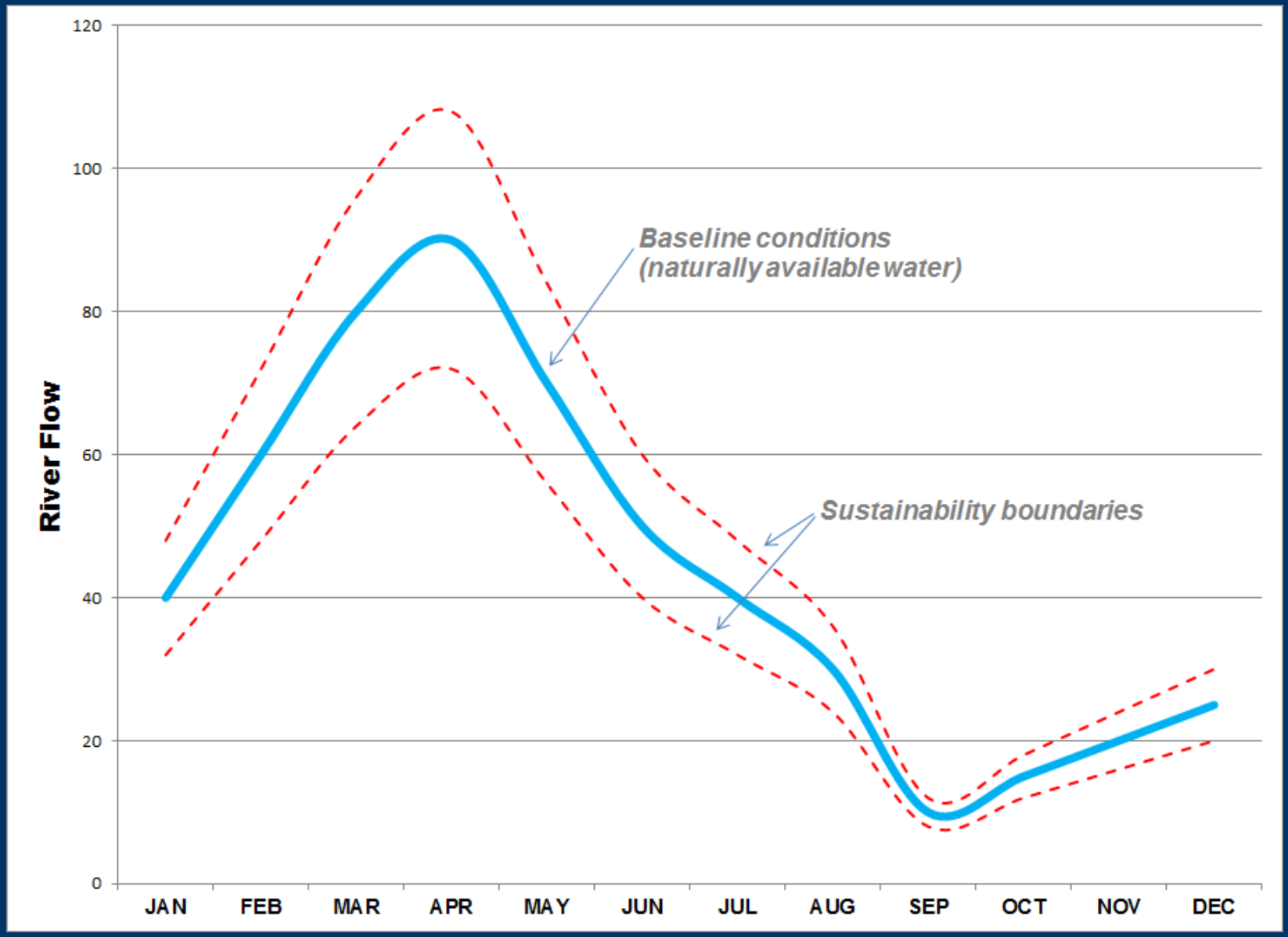


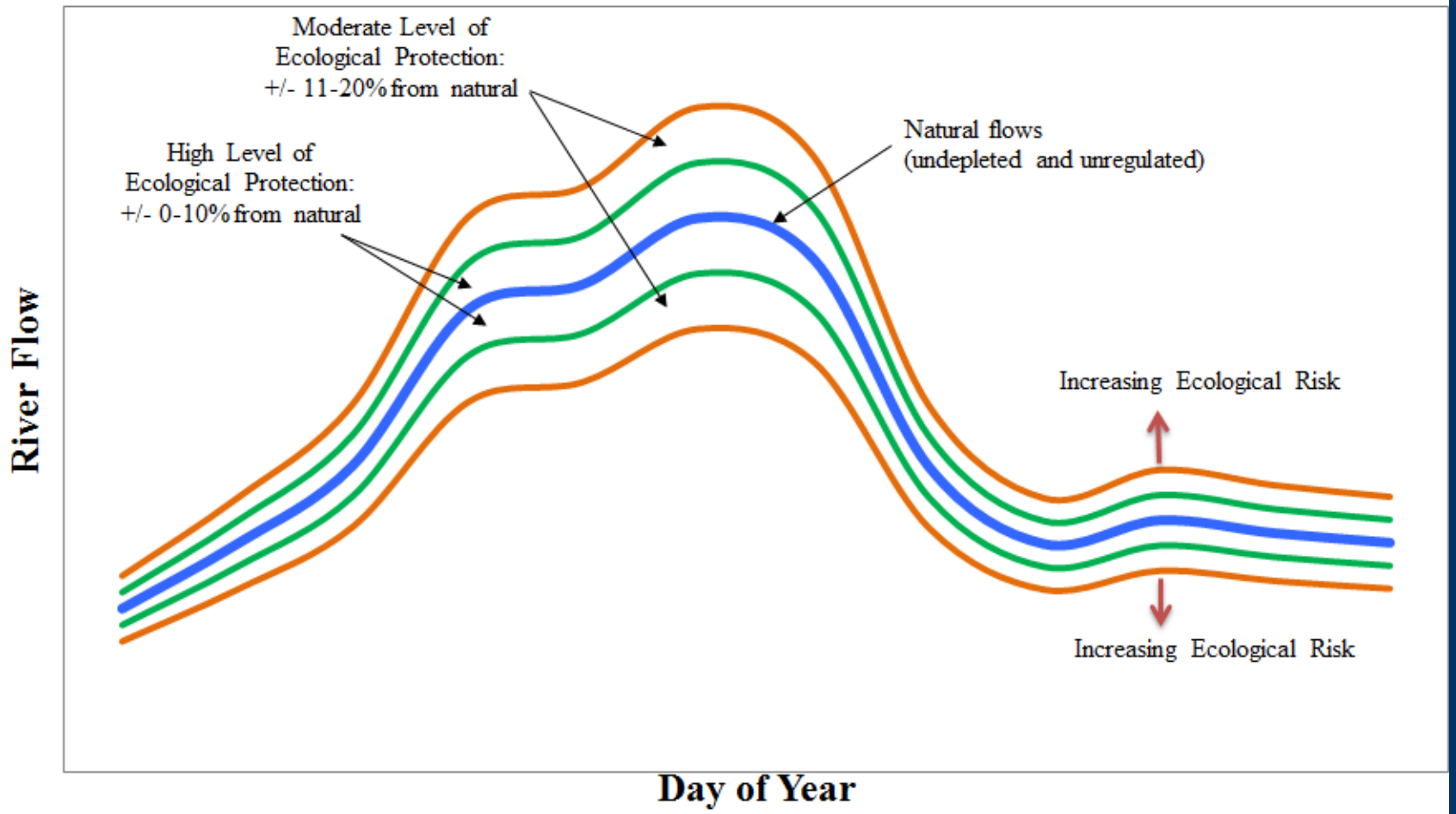
Sustainability Boundary Approach



Sustainability Boundary Approach



A “Presumptive Standard”



Re-thinking environmental flows: from allocations and reserves to sustainability boundaries
Richter, B.D. 2009. *Rivers Research and Applications*

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