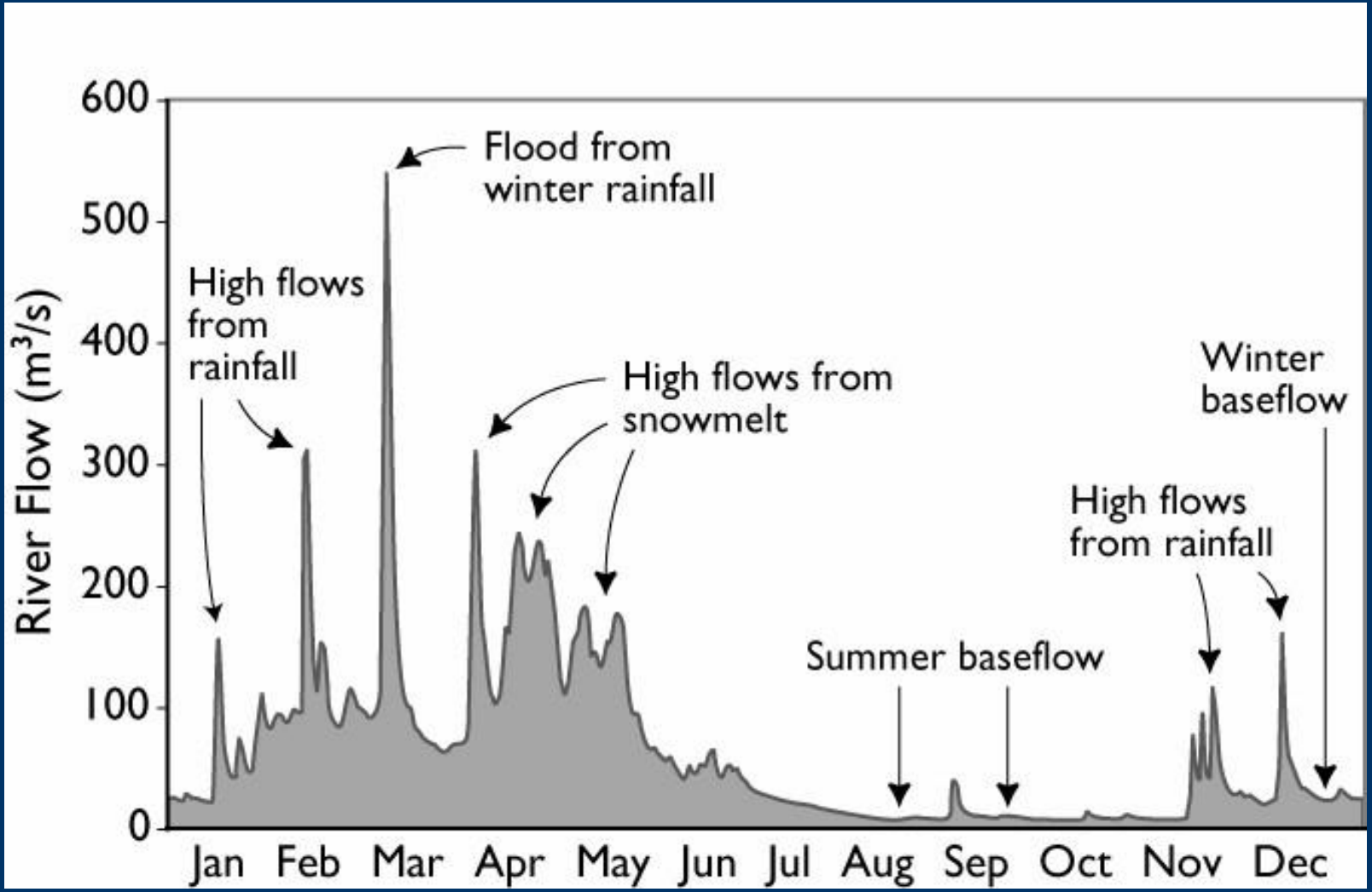
Tools, Strategies, Issues: Is lack of information or certainty really holding us back?

The Nature Conservancy
Protecting nature. Preserving life.™

Brian Richter, The Nature Conservancy

“Adapting to Insufficiency”

Natural Flow Paradigm

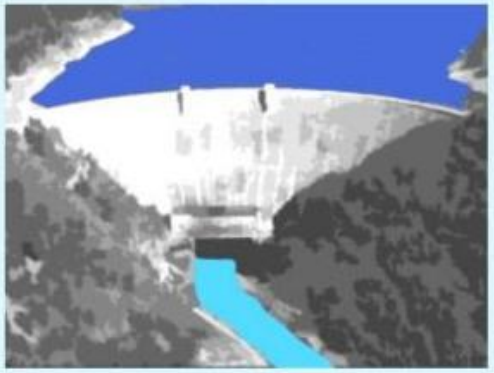


How much water does a river need?
Richter, B.D., J.V. Baumgartner, R. Wigington, and D.P. Braun. 1997. *Freshwater Biology*

The natural flow regime: a paradigm for river conservation and restoration
Poff, N.L., J.D. Allan, M.B. Bain, J.R. Karr, K.L. Prestegaard, B.D. Richter, R.E. Sparks, and J.C. Stromberg. 1997. *BioScience*

IHA Options Window Help

Welcome to



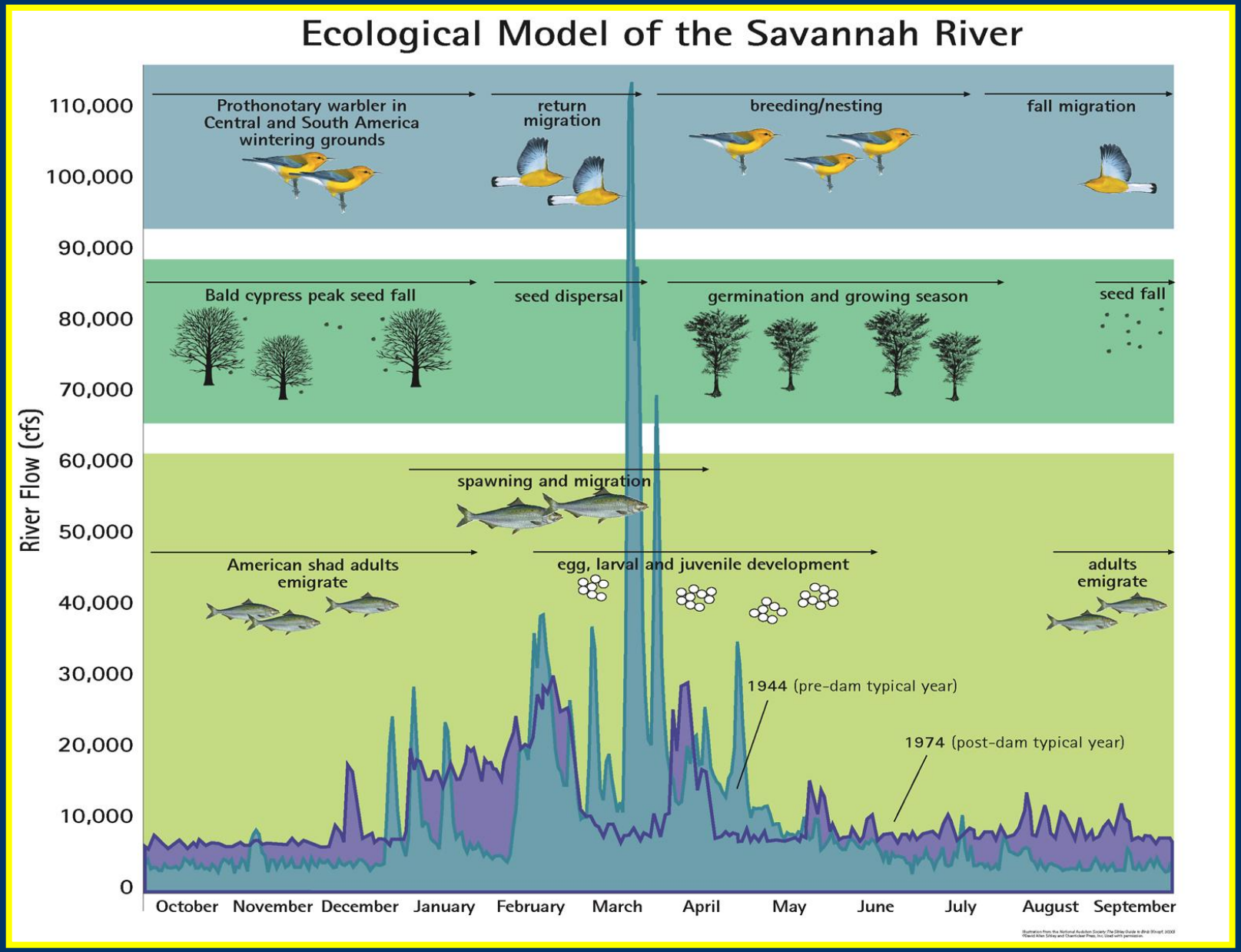
IHA

The Indicators of Hydrologic Alteration

A method for assessing hydrologic alteration within ecosystems

Richter, B.D., J.V. Baumgartner, J. Powell, and D.P. Braun. 1996 *Conservation Biology*

Welcome. Start by opening either a Hydro Data File or a Project



A collaborative and adaptive process for developing environmental flow recommendations
Richter, B.D., A.T. Warner, J.L. Meyer, and K. Lutz. 2006 *River Research and Applications*

ELOHA

SCIENTIFIC PROCESS

Step 1. Hydrologic Foundation

Baseline Hydrographs

Hydrologic Model and Stream Gauges

Developed Hydrographs

Step 2. Stream Classification

Stream Hydrologic Classification

Geomorphic Stratification

Step 3. Flow Alteration

Degree of Hydrologic Alteration

Hydrologic Alteration by River Type

Monitoring

Step 4. Flow-Ecology Relationships

Flow - Ecology Hypotheses

Ecological Data and Indices

Flow Alteration-Ecological Response Relationships by River Type

SOCIAL PROCESS

Implementation

Environmental Flow Standards

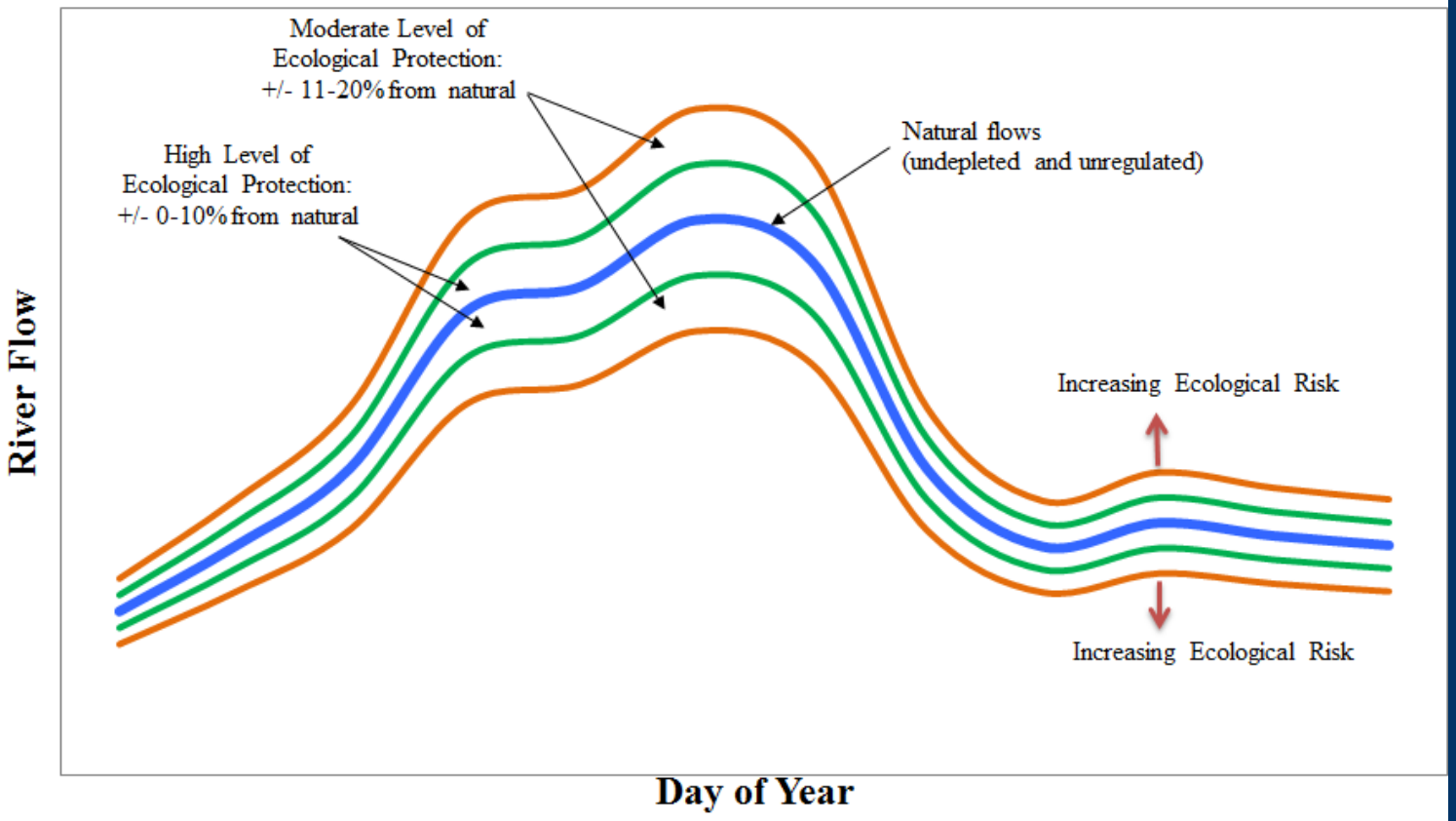
Acceptable Ecological Conditions

Societal Values and Management Needs

Adaptive Adjustments

The ecological limits of hydrologic alteration (ELOHA): a new framework for developing regional environmental flow standards Poff, NL and 18 others 2009.. *Freshwater Biology*

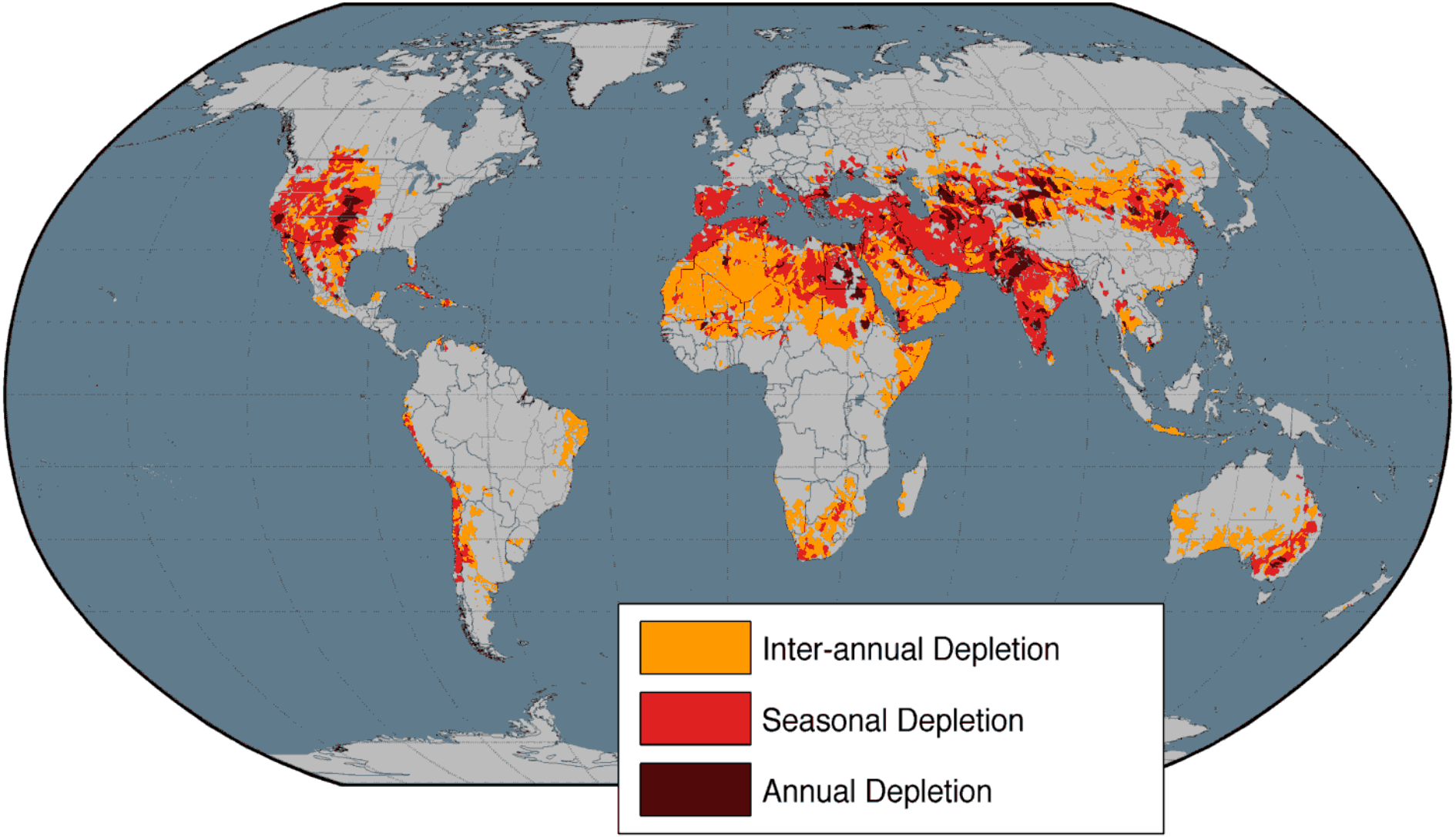
Presumptive Standard



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

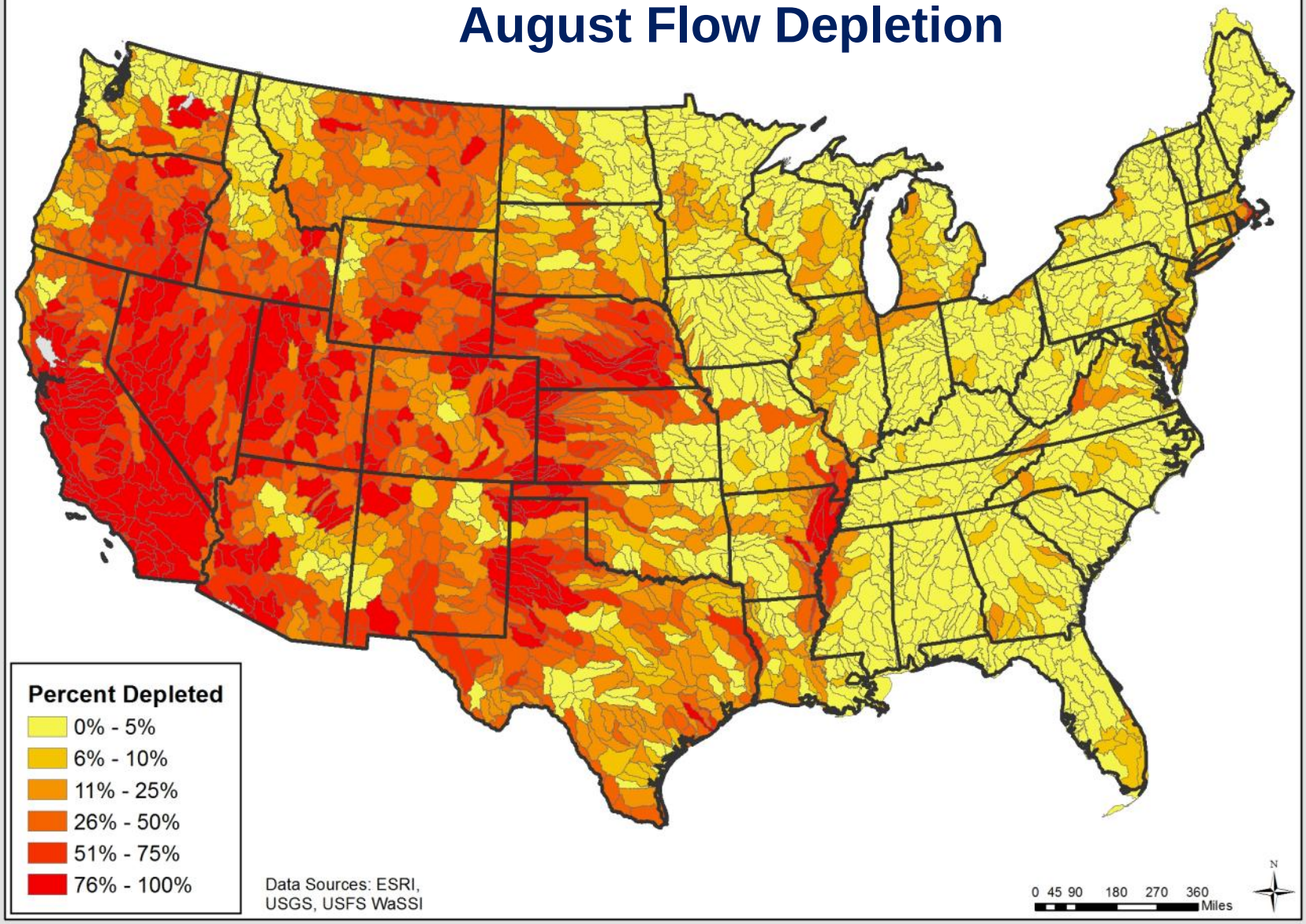
A presumptive standard for environmental flow protection
Richter, B.D., M. Davis, C. Apse, and C. Konrad. 2011. *River Research and Applications*

Running Dry



Water shortages are occurring in 1/3 of the planet's watersheds and aquifers
1/2 of the world's population is affected
3/4 of the world's irrigated acreage is affected

August Flow Depletion



Water Policy 15 (2013) 335–363

Tapped out: how can cities secure their water future?

Brian D. Richter[a], David Abell[b], Emily Bacha[b], Kate F
Stavros Calos[d], Alex Cohn[e], Carlos Disla[d], Sa
Friedlander O'Brien[d], David Hodges[d], Scott Kaiser[b], Ma
Cristina Mestre[b], Melissa Reardon[d] and Emma S

author. The Nature Conservancy, 5834 St George Avenue, Cro
E-mail: brichter@tnc.org
School of Architecture, Charlottesville, Virg
on the Environment, St Paul, Mi
Applied Sciences, Charl
ces, Charlo

OPERATION & MAINTENANCE

Dam good operations

A primary challenge in water resource development is siting, designing and operating infrastructure projects to provide social benefits while protecting the natural environment. Brian Richter and Gregory A Thomas illustrate how ecosystem benefits can be restored through dam re-operati

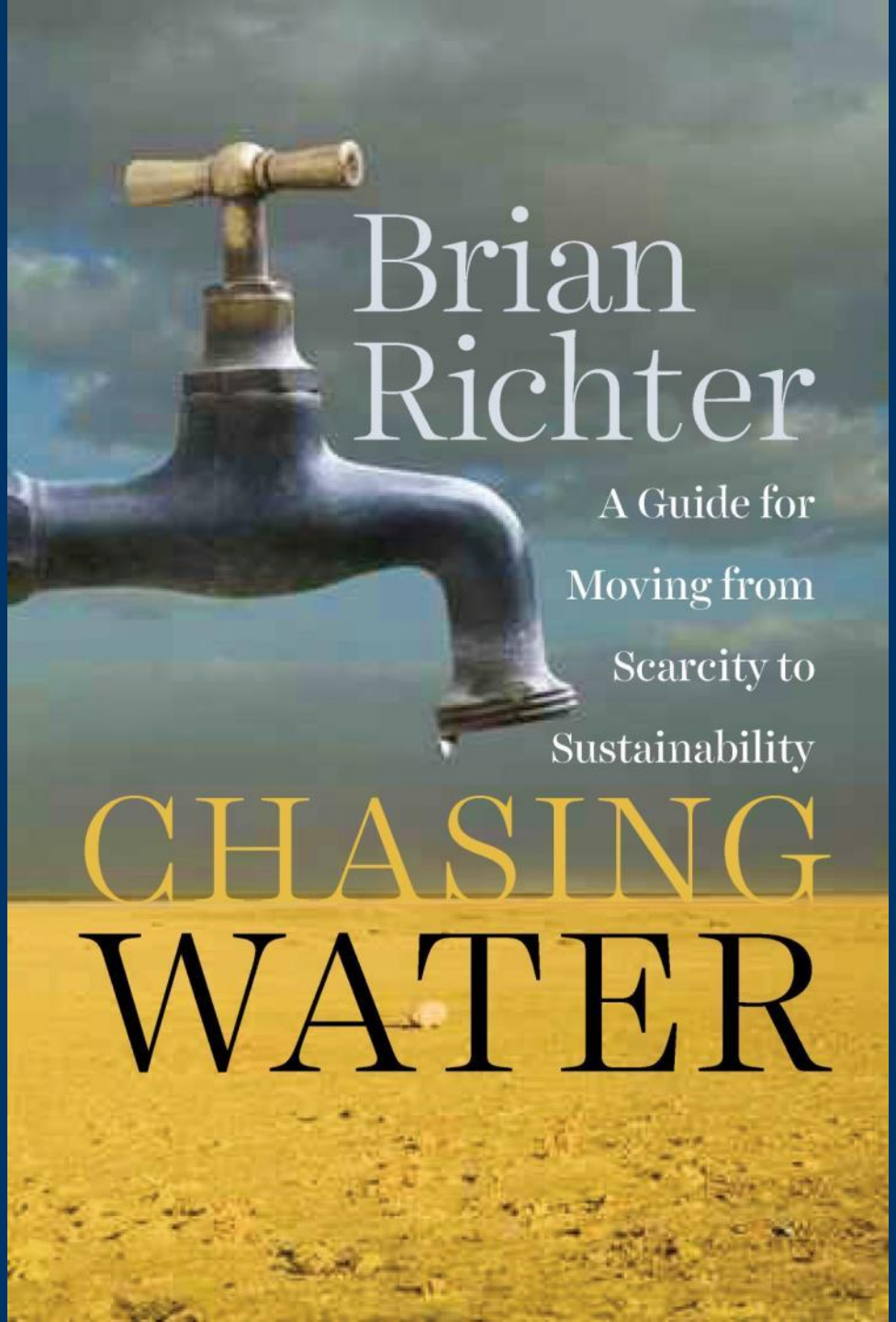
Brian Richter

Sustainable Water Use: Can Certification Show the W

Water Policy 16 (2014) 625–649

Water markets as a response to scarcity

Peter Debaere[a], Brian D. Richter[b], Kyle Frankel Davis[c], Melissa
S. Duvall[c], Jessica Ann Gephart[c], Clark E. O'Bannon[c],
Pelnik[d], Emily Maynard Powell[e] and Tyler William Smit


Brian
Richter
A Guide for
Moving from
Scarcity to
Sustainability
CHASING
WATER

Is it scientific uncertainty that is holding us back from securing instream flows?

OR

Do we need to pursue other strategies for keeping water in rivers?

Our Panelists

Jonathan Kennen, US Geological Survey

Angela Arthington, Griffith University, Australia

Dave Murray, Kerr, Wood, and Leidal Associates

Stuart Orr, World Wildlife Fund International

Michael Spencer, Alliance for Water Stewardship