Assessing Law, Resilience and Governance in Basin Scale Water Systems Facing Changing Climate: The Adaptive Water Governance Project

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Social-Ecological System Resilience, Climate Change and Adaptive Water Governance

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NATIONAL SOCIO-ENVIRONMENTAL SYNTHESIS CENTER

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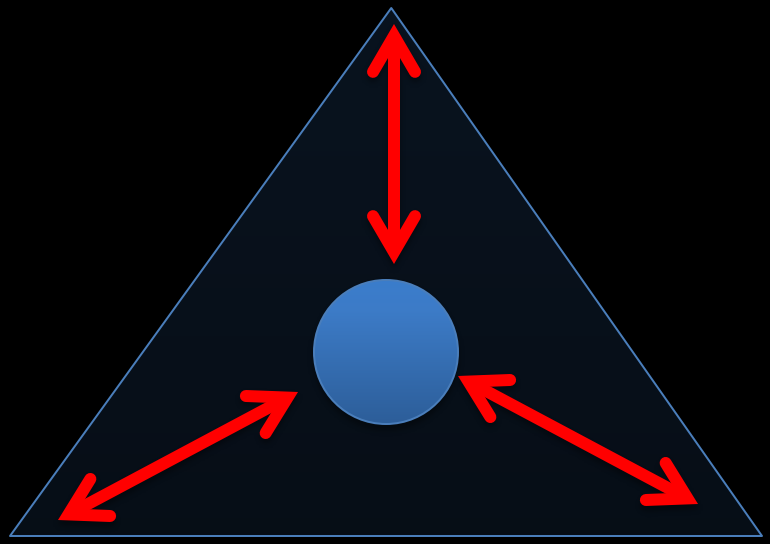
Bridging: Three Concepts

General Resilience



Changing Climate

Adaptive Governance

The Role of Law

What does the Anthropocene Mean for Water Governance?

- Water governance must consider the unprecedented **RATE** of change
- Water governance must consider that change will be **NON-LINEAR**

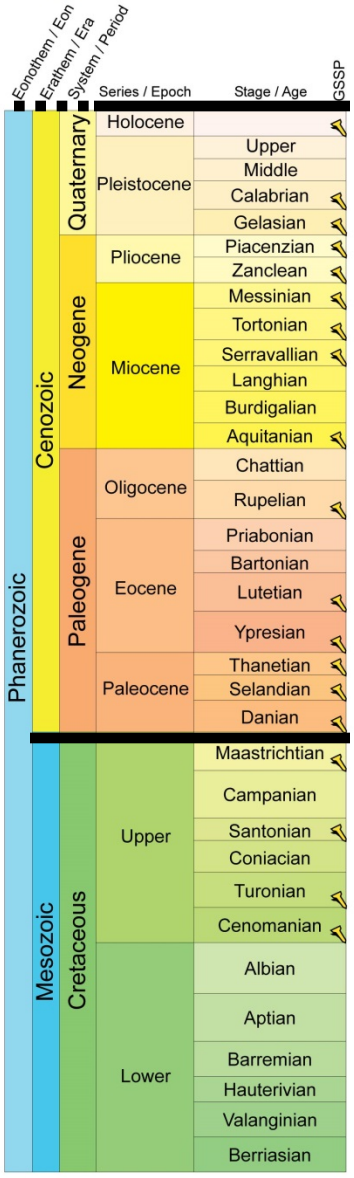
INTERNATIONAL CHRONOSTRATIGRAPHIC CHART

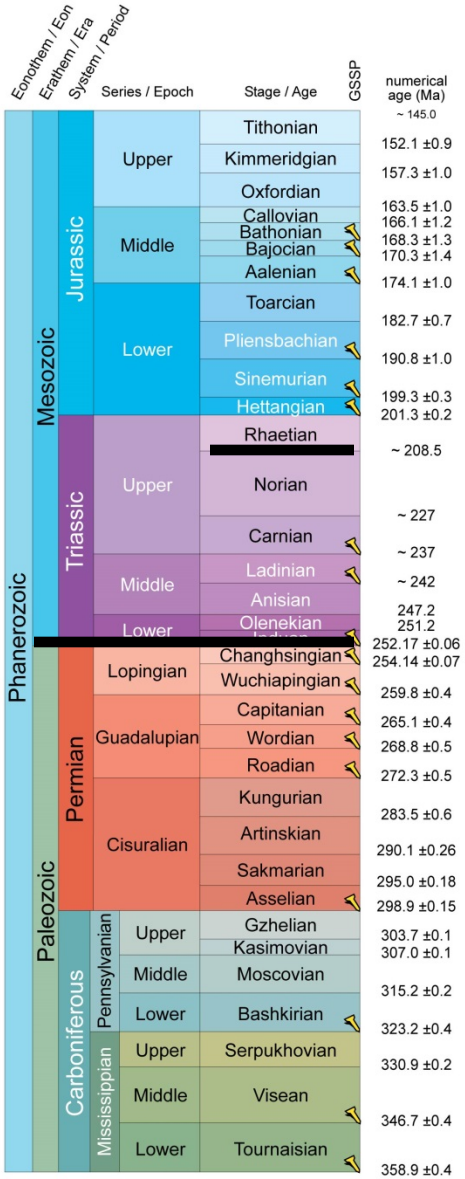
IUGS

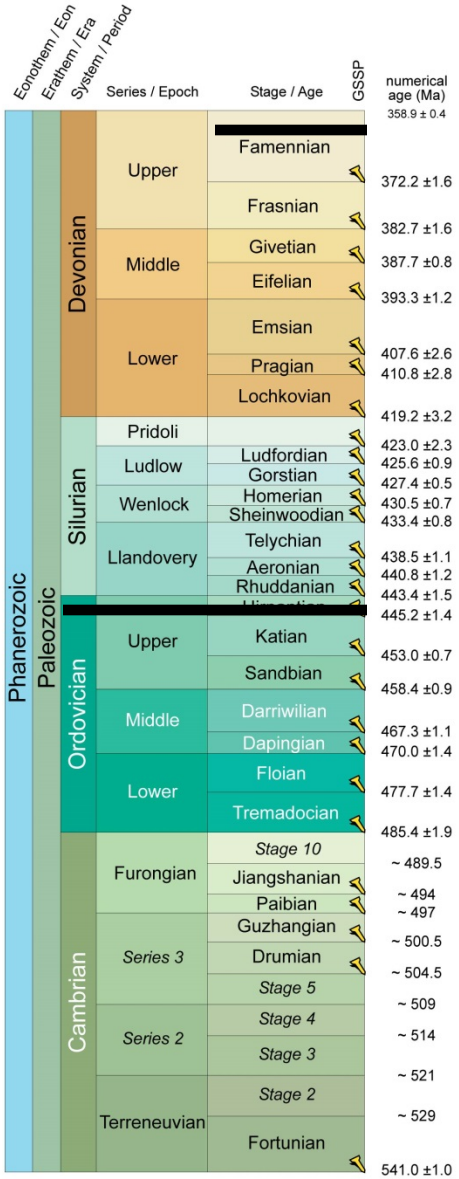
www.stratigraphy.org

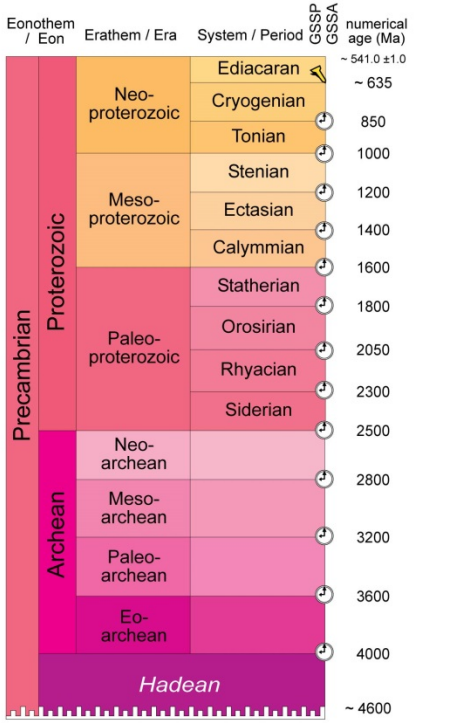
International Commission on Stratigraphy

v 2014/02









Units of all ranks are in the process of being defined by Global Boundary Stratotype Section and Points (GSSP) for their lower boundaries, including those of the Archean and Proterozoic, long defined by Global Standard Stratigraphic Ages (GSSA). Charts and detailed information on ratified GSSPs are available at the website http://www.stratigraphy.org. The URL to this chart is found below.

Numerical ages are subject to revision and do not define units in the Phanerozoic and the Ediacaran; only GSSPs do. For boundaries in the Phanerozoic without ratified GSSPs or without constrained numerical ages, an approximate numerical age (~) is provided.

Numerical ages for all systems except Lower Pleistocene, Permian,Triassic, Cretaceous and Precambrian are taken from 'A Geologic Time Scale 2012' by Gradstein et al. (2012); those for the Lower Pleistocene, Permian, Triassic and Cretaceous were provided by the relevant ICS subcommissions.

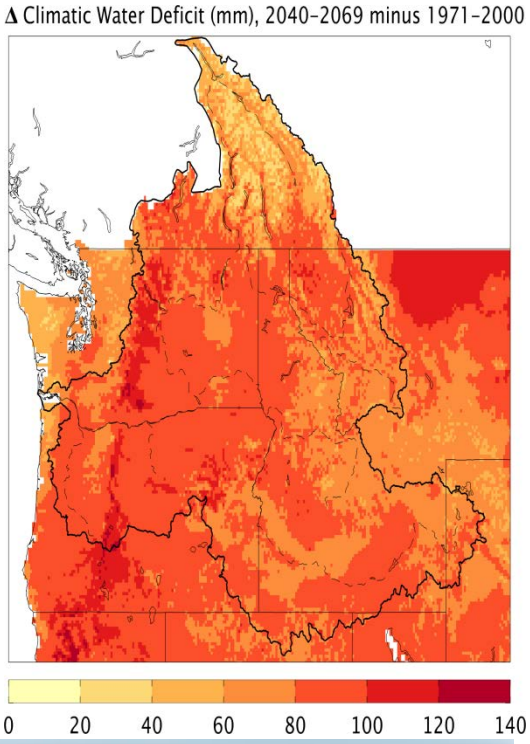
Coloring follows the Commission for the Geological Map of the World (http://www.ccgm.org)

CCGM CGMW

Chart drafted by K.M. Cohen, S.C. Finney, P.L. Gibbard (c) International Commission on Stratigraphy, February 2014

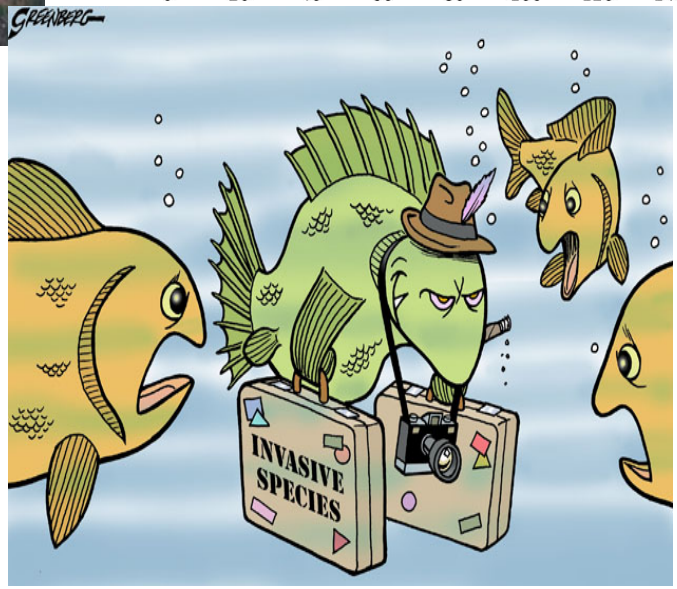
To cite: Cohen, K.M., Finney, S.C., Gibbard, P.L. & Fan, J.-X. (2013; updated) The ICS International Chronostratigraphic Chart. Episodes 36: 199-204.

URL: http://www.stratigraphy.org/ICSchart/ChronostratChart2014-02.pdf



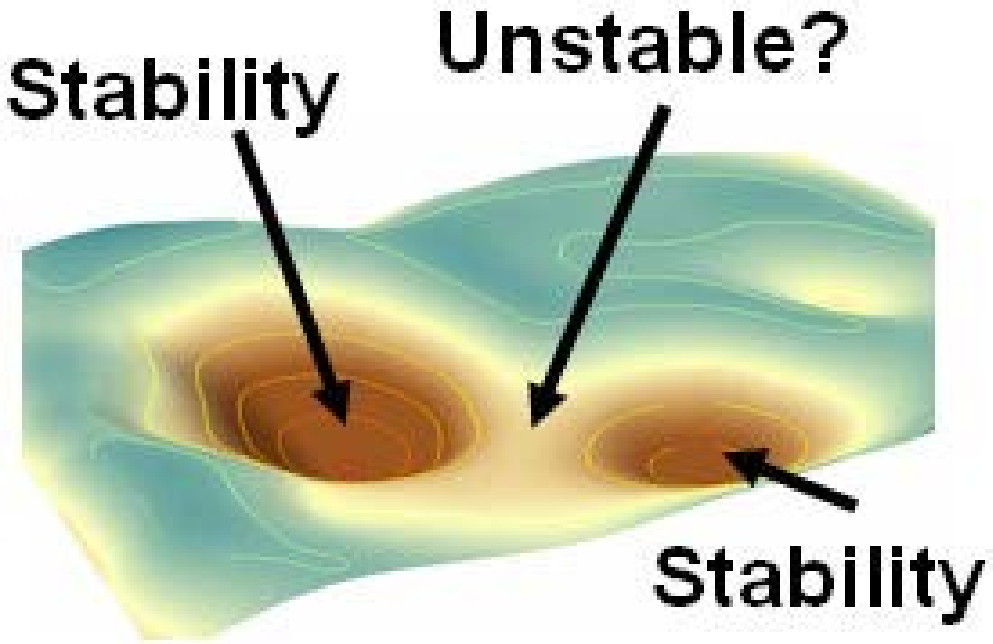
Climate Change

Habitat Loss



Invasive Species

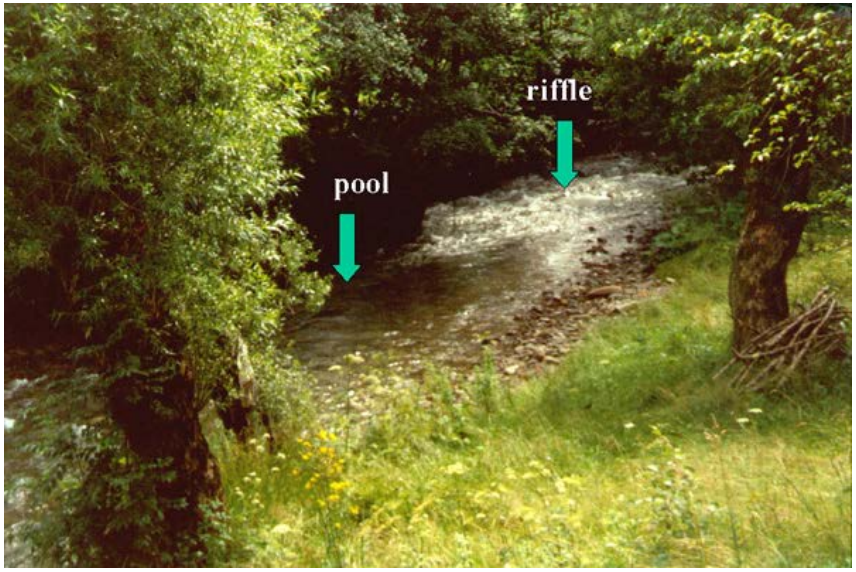
Ecological Resilience



Source: Protecting and Enhancing Landscapes and Rural Communities, The Macaulay Land Use Research Institute
http://www.macaulay.ac.uk/issues/ProtectionEnhancementofLandscapesRuralCommunitiesAims.php

Self-Organization – Discontinuities – and the quantum nature of systems

Pool/riffle sequences in gravel bearing streams



Lake eutrophication

Governance

- Governance ≠ Management:
  - “governance is the process of resolving trade-offs and of providing a vision and direction” . . ., management is the operationalization of this vision...”.
- Governance ≠ Government:
  - governance includes laws, policies, regulation, institutions, and institutional structures that both enable and constrain the process of governing [i.e. government], but also the informal norms and interactions that influence decisions including those of private and nongovernmental actors.
- Adaptive Governance: *governance that allows adaptive processes to emerge*

Adaptive governance is appropriate

when. . .

- System is complex;
- System faces change with a degree of uncertainty; and
- System is approaching a potential threshold or regime shift.

Examples

- Lies within multiple jurisdictions
- Climate change
- Evidenced by increasing conflict over resources (e.g. litigation), increasing scarcity, or actual identification of an approaching threshold by law and/or science (e.g. listing of species).

Adaptive Water Governance Project: Resilience assessment of 6 North American basins

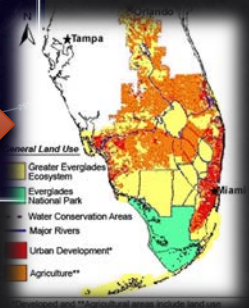
COLUMBIA

ANACOSTIA

KLAMATH

MIDDLE RIO GRANDE

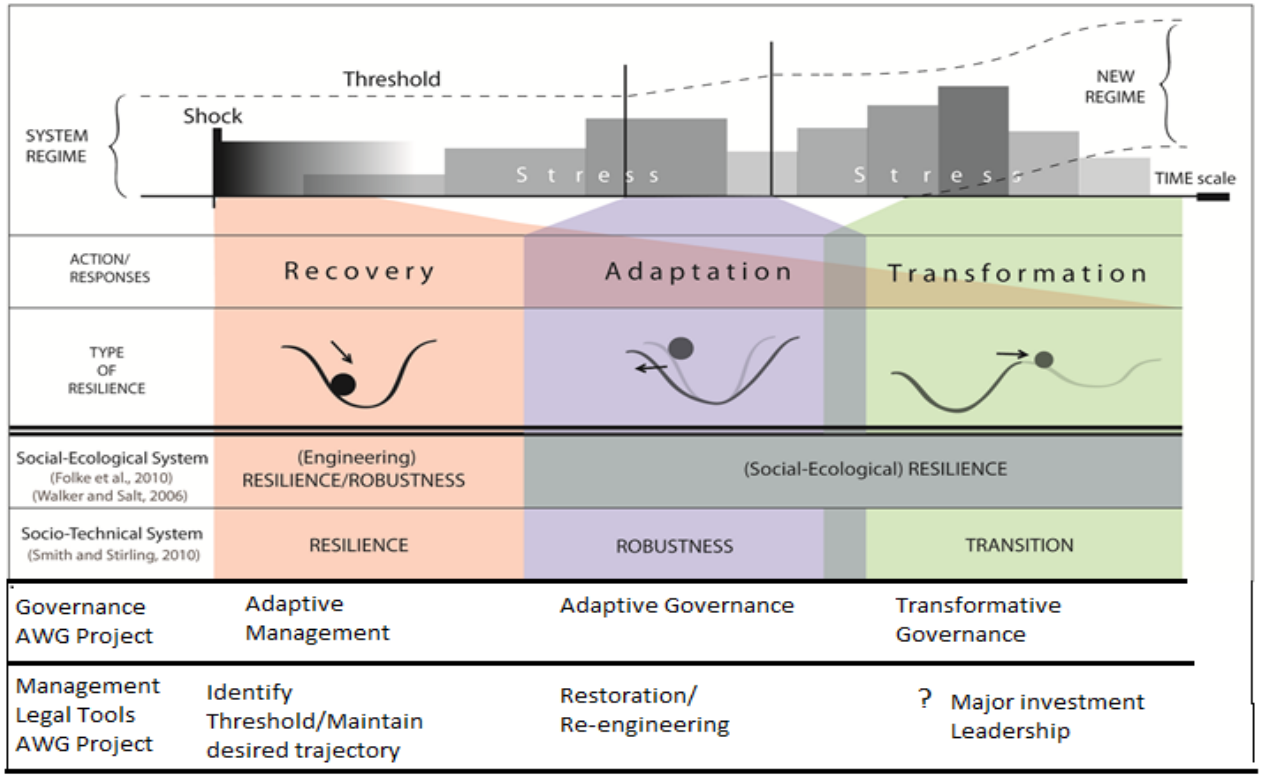
PLATTE



EVERGLADES

Next Step: Assessment of Governance Trajectory Today

Adapted from: Chelleri, L; Waters JJ; Olazabal, M and Minucci G (in press) "Addressing multi-scale and temporal aspects of urban resilience to climate and environmental changes", Environment and Urbanization Journal"



The Role of Law: Preparation for Adaptive Governance

Facilitation and Barriers

- Structure
  - Redundant
  - Polycentric
  - Nested
  - Integrated
- Capacity
  - Adaptive
  - Participatory
- Process
  - Legitimacy
  - Procedural justice/self-determination
  - Problem solving approach
  - Balance stability and flexibility
  - Opportunity for reflection and learning
  - Dispute resolution

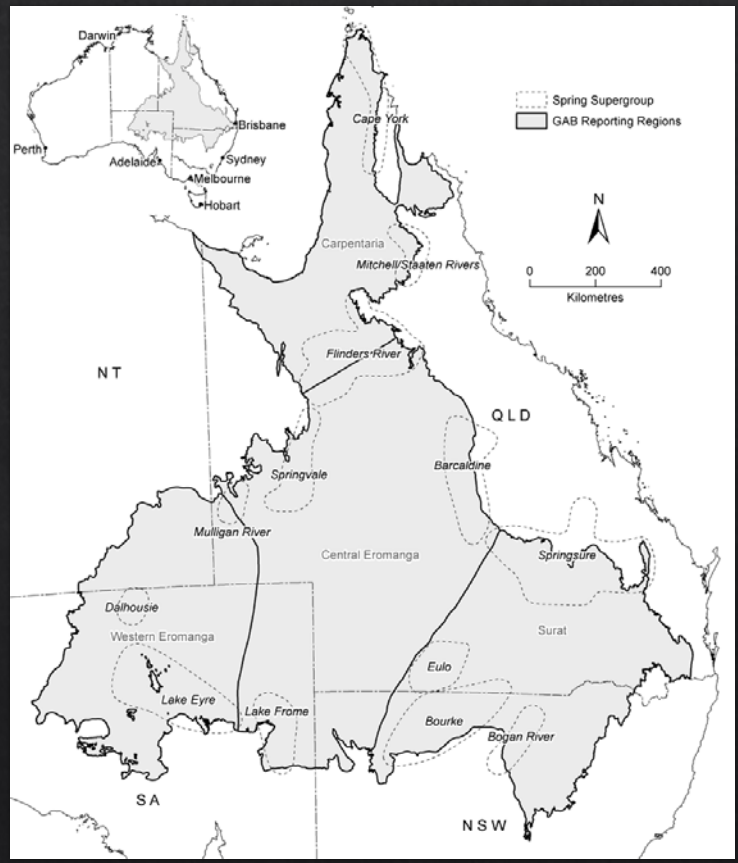
Window of Opportunity

- Perturbation
- Disturbance

Threshold Identification

- In combination with science

Application of AWG Project in Australia



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To come to terms with the Columbia, we need to come to terms with it as a whole, as an organic machine, not only as a reflection of our own social divisions but as the site in which these divisions play out. If the conversation is not about fish and justice, about electricity and ways of life, about production and nature, about beauty as well as efficiency, and about how these things are inseparable in our own tangled lives, then we have not come to terms with our history on this river.

Richard White, The Organic Machine