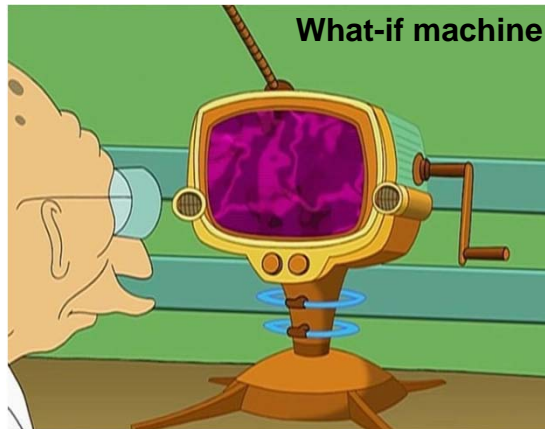


NEAR-CENSUS RIVER SCIENCE

Frontiers of River Science

Let's prognosticate on the wildest ideas we've got for the next 10-30 years of scientific and technological development



NEAR-CENSUS RIVER SCIENCE

Challenges in The 21st Century

- Ecological collapse is underway
- Intent to solve problems and confidence in simple conceptions *far exceed* scientific and technological capabilities.
- Rate of technological advance is increasing, and it is already faster than we use to produce science.



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Our Job As Team Players

- The role of the river scientist is one-part educator and one-part doer.
- The goal is to bring the idea of a link between dynamic landforms, ecological functions, and society's use of rivers into meeting rooms.
- Envision new way to answer the fundamental questions about river behavior.
- More emphasis on problem-oriented science rather than discipline-oriented science.

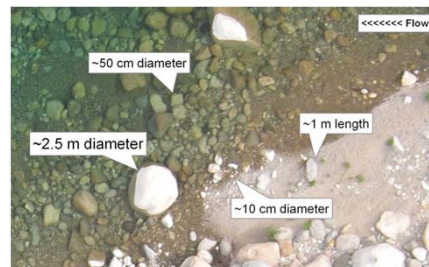
p. 1-3

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What-if Scenario 1

Near-census maps & models scale up at an increasing rate.

Year	Extent (km)	Res.
2000	$\sim 10^0$	1-2 m
2010	$\sim 10^{1.5}$	<1 m
2020	$\sim 10^3$	0.1 m
2030	network	0.1 m



Benefits

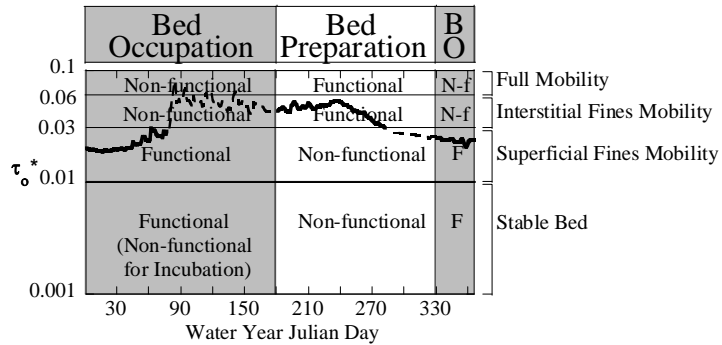
- **Highly accurate depictions of geomorphic and ecological indicators.**
- **Direct accounting of rare entities and functions.**

p. 1-4

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What-if Scenario 2

Bio-Chem-Geo-Hydro-Hydraul links used to determine how many days each year that each function occurs



Benefit

- Move from concepts (i.e. “Natural Flow Regime”) to predictive capability (Fn(A) will occur 35 days in 2019)

p. 1-5

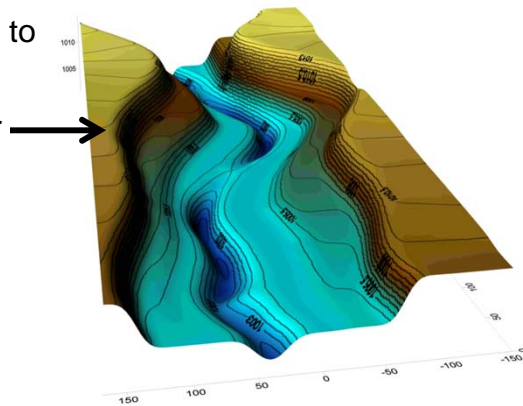
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What-if Scenario 3

River synthesis catches up to river analysis

6-layer synthetic corridor

- Valley width undulation
- Channel meandering
- Slope
- Bed undulation
- Bank undulation
- XS asymmetry



Benefits

- Start with desired palette of geomorphic and ecological functions, yield multi-layered river corridor structure necessary to achieve it.

p. 1-6

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What-if Scenario 4

Experiential capabilities to interact with real-reconstructed and synthetic rivers

show movie



Benefits

- Experience and troubleshoot designs for ecological functions individually and holistically.
- Allow stakeholders to experience and buy in.

p. 1-7