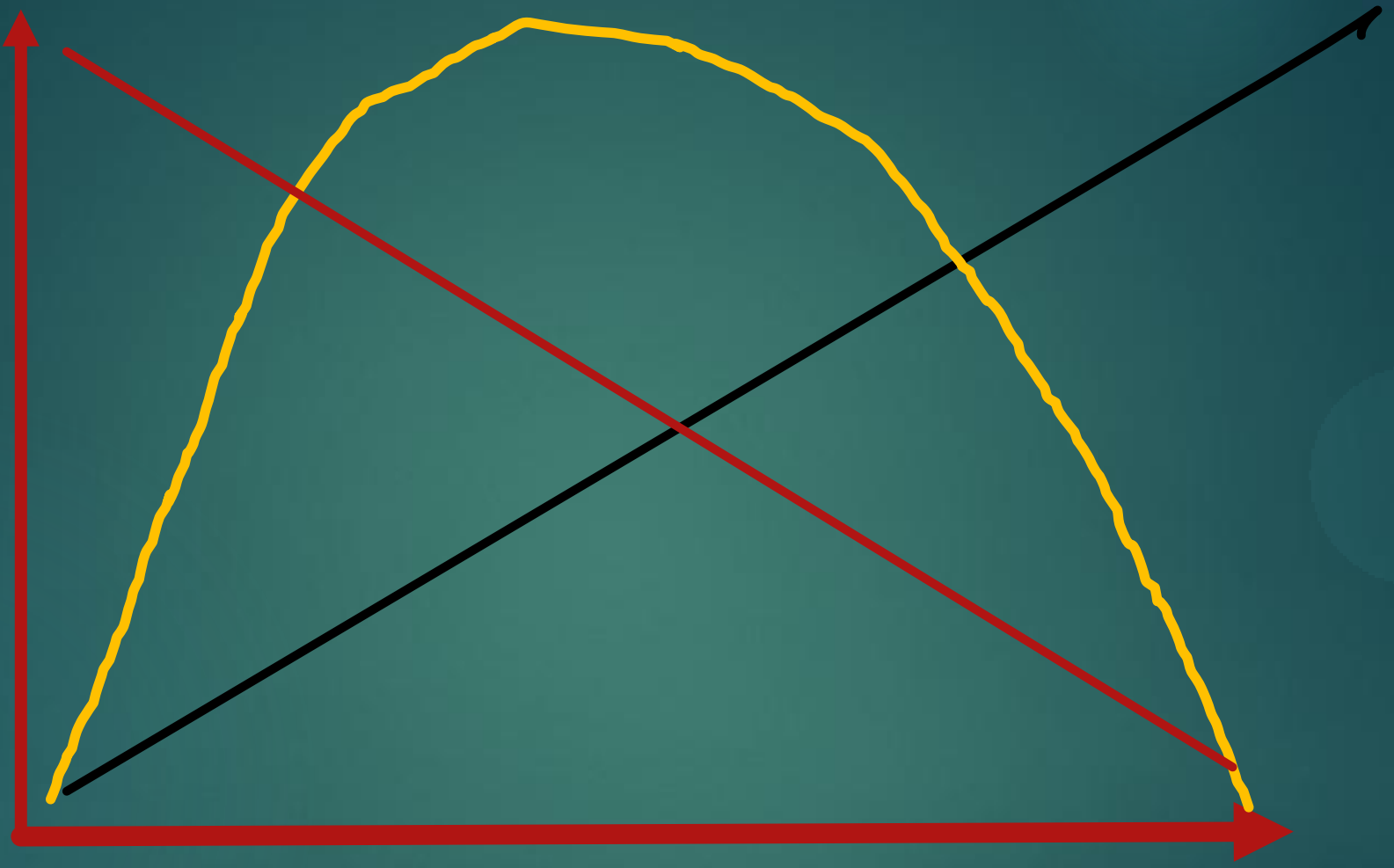
New Methods
Old Dogs doing New Tricks?

- Linking ecosystem components (i.e., hydrology, biology, geomorphology, connectivity, water quality).
- How do new methods compare to historical methods? Are they better or just more complicated.

Reduced Uncertainty



Money Spent

Technilogical Tools

An orange, wrist watch and a stream

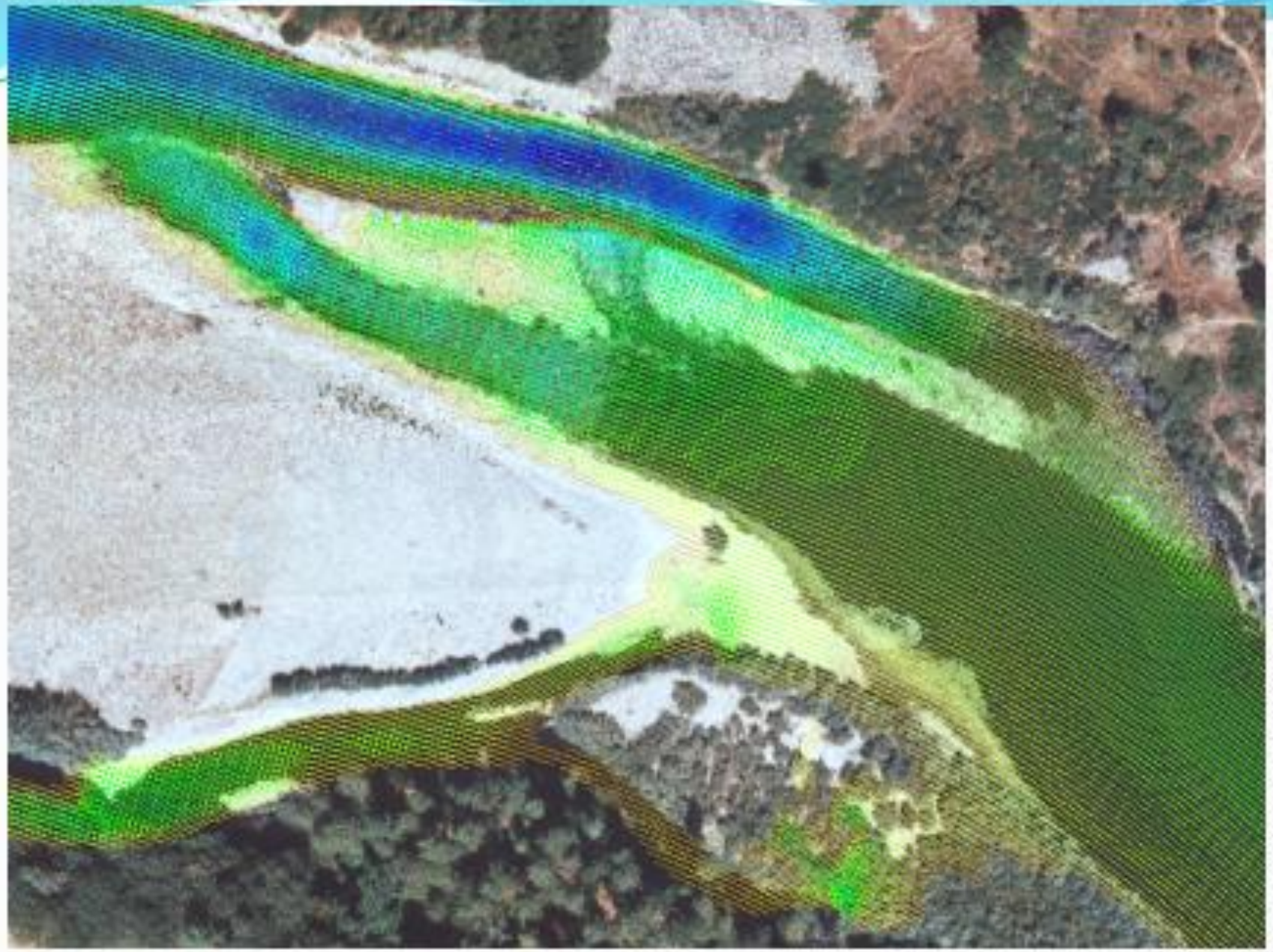
- 1978
- Bob, Bubba, and Elroy
- Stream side quantitative assessment of minimum instream flows

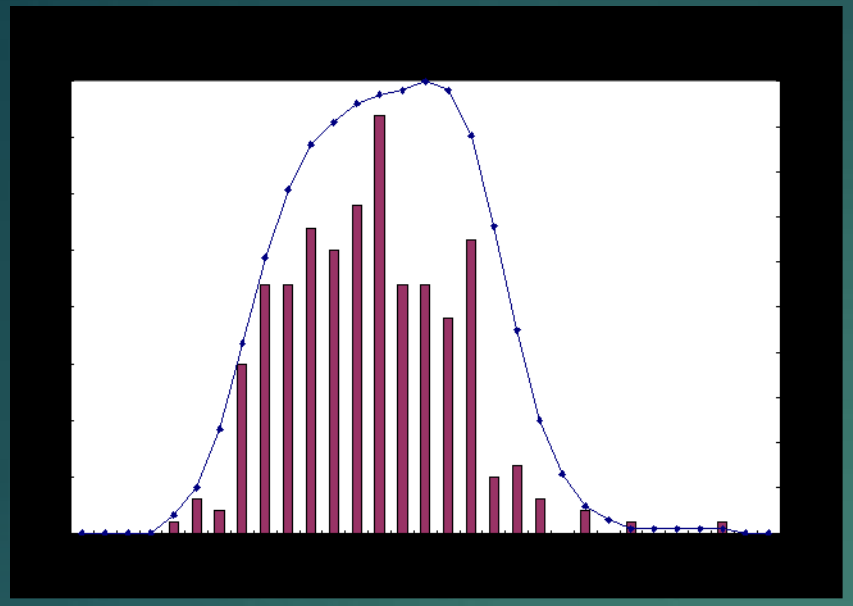
Let's get Sophisticated 1982

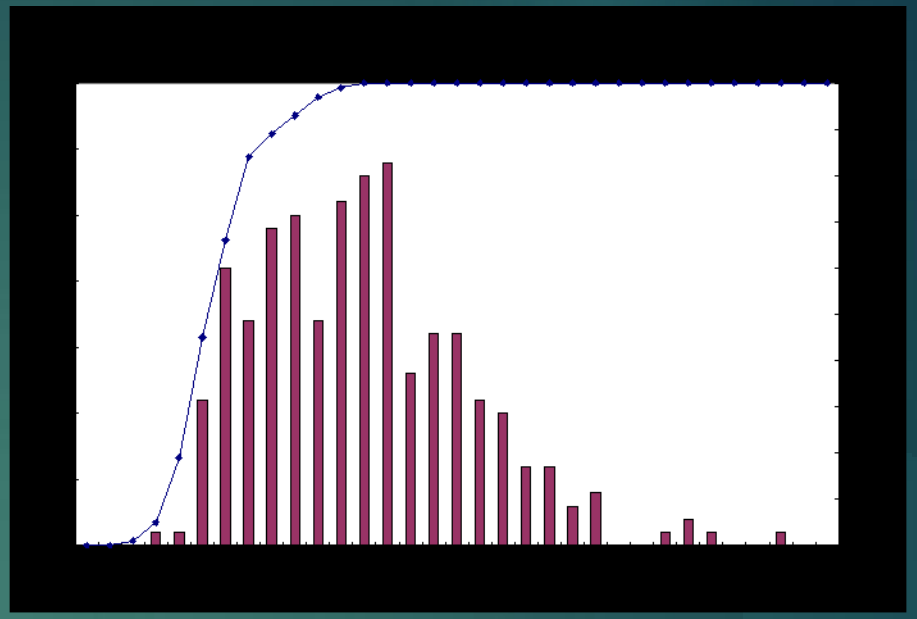
- Hardy, T.B., C.G. Prewitt, and K.A. Voos. 1982. Application of a physical habitat usability model to the fish community in a spring-fed desert stream. In: Analysis of Ecological Systems: State-of-the-Art in Ecological Modeling (Lauenroth, Skogerboe, and Flug, Eds). Developments in Environmental Modeling 5. Elsevier Scientific Publishing Company. 391-397 pp.
- Exponential Probability Density Functions to fit the joint distribution of depth and velocity frequency distributions for availability and fish use to derive preference curves for several species
- Examined predicted habitat suitability spatially with species distribution

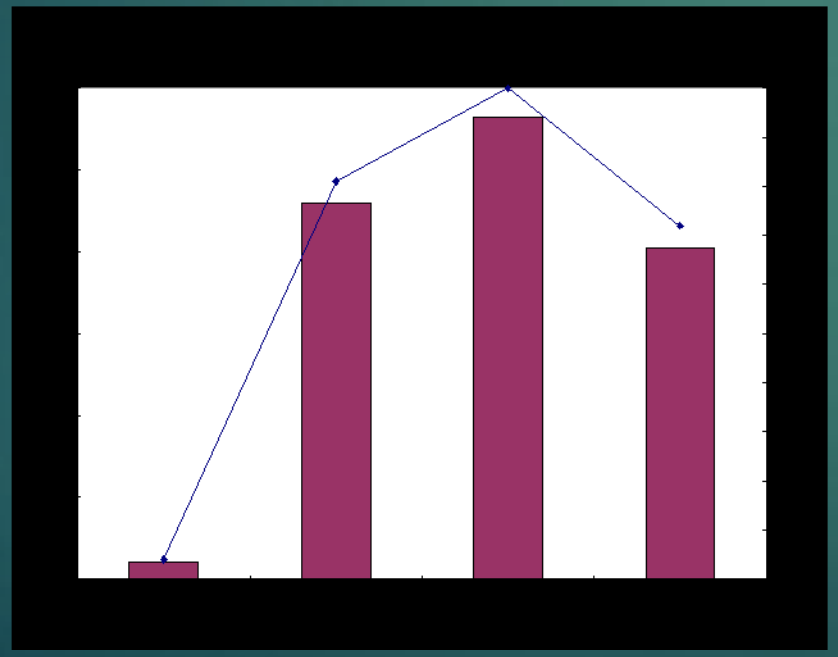
“The Technological Avalanche”

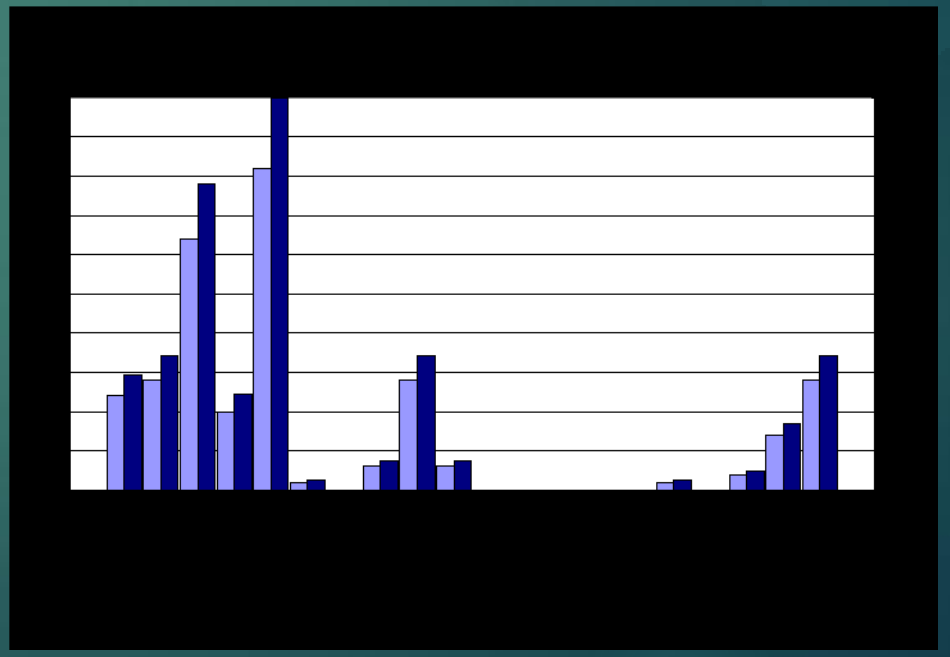
- Computing power – from punch cards to workstations
- Advanced spatial data collection
  - Aerial photogrammetry
  - LIDAR
  - ADCP
- Availability of Computational Software
  - PHABSIM
  - River2D
  - SWMDMS
  - EVA
  - CASHMIR



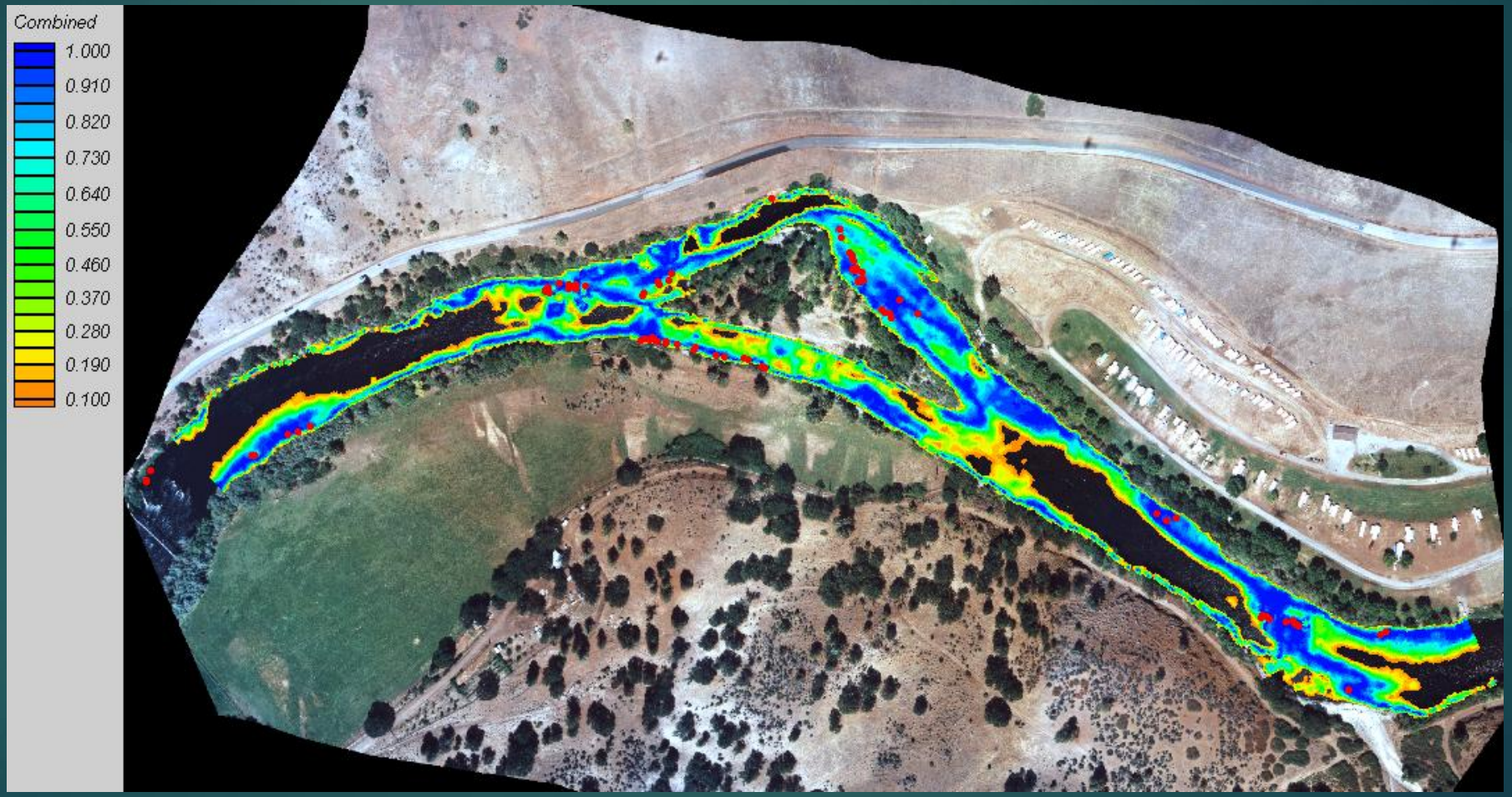








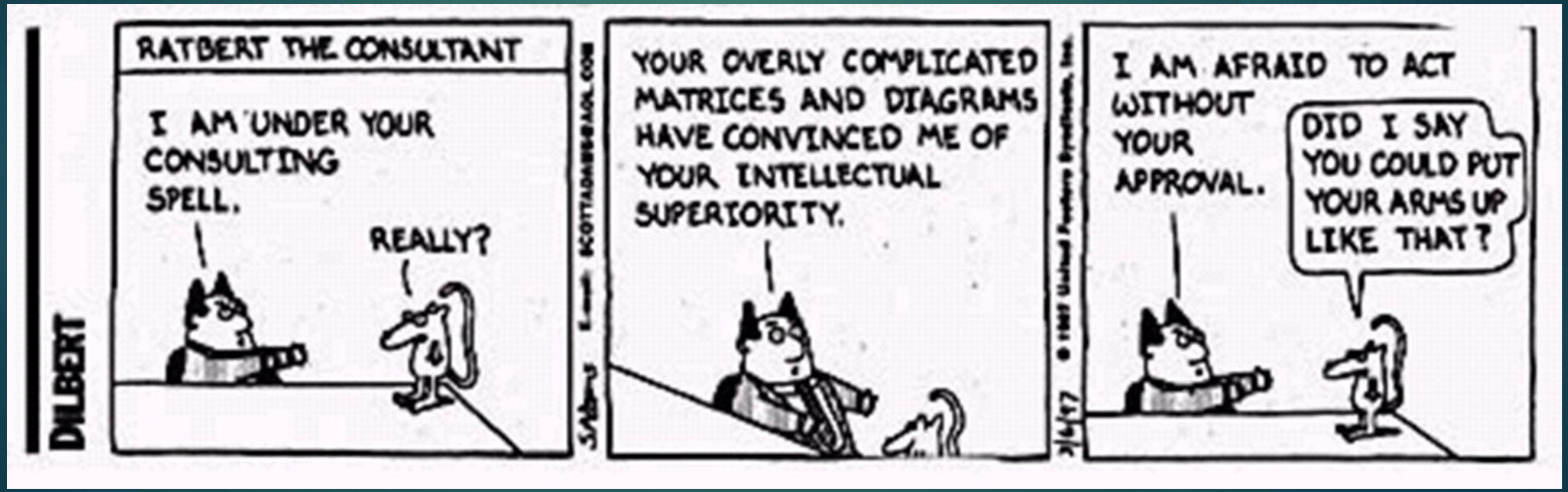
Steelhead 1+ modeled habitat at 38 cms



Oranges to Multidimensional Integrated Modeling

- New techniques do not necessarily invalidate historical methods whether they are hydrology based on simplified habitat modeling
- Emerging techniques trend toward more spatial resolution on the engineering (hydraulic) components, sometimes better temporal resolution, multi-disciplinary integration….. but the biology resolution is lagging (still just physical habitat)
- Most newer techniques are contingent on high data collection and analysis needs – Means more time and money
- We are still faced with situations where data is lacking but decisions are necessary… what to do?
  - Hydrology Methods remain a viable tool

Are we really doing better or just making pretty pictures with more complicated methods?



Holistic Method: integration of multiple components in flow modeling
Tom Payne – Normandeau Associates

The San Juan River population model: linking ecosystem components, management actions and fish numbers to address uncertainty in new ways
Bill Miller – Miller Ecological Consultants

Dealing with uncertainty: statistical analysis and risk assessments – tools for establishing robust instream flows
Dorian Turner – British Columbia Hydro

Bayesian probability modeling
Jim Peterson – Oregon Cooperative Fish and Wildlife Research Unit, Oregon State University