A Pragmatic Cycle for On-Going Water Resources Research & Management

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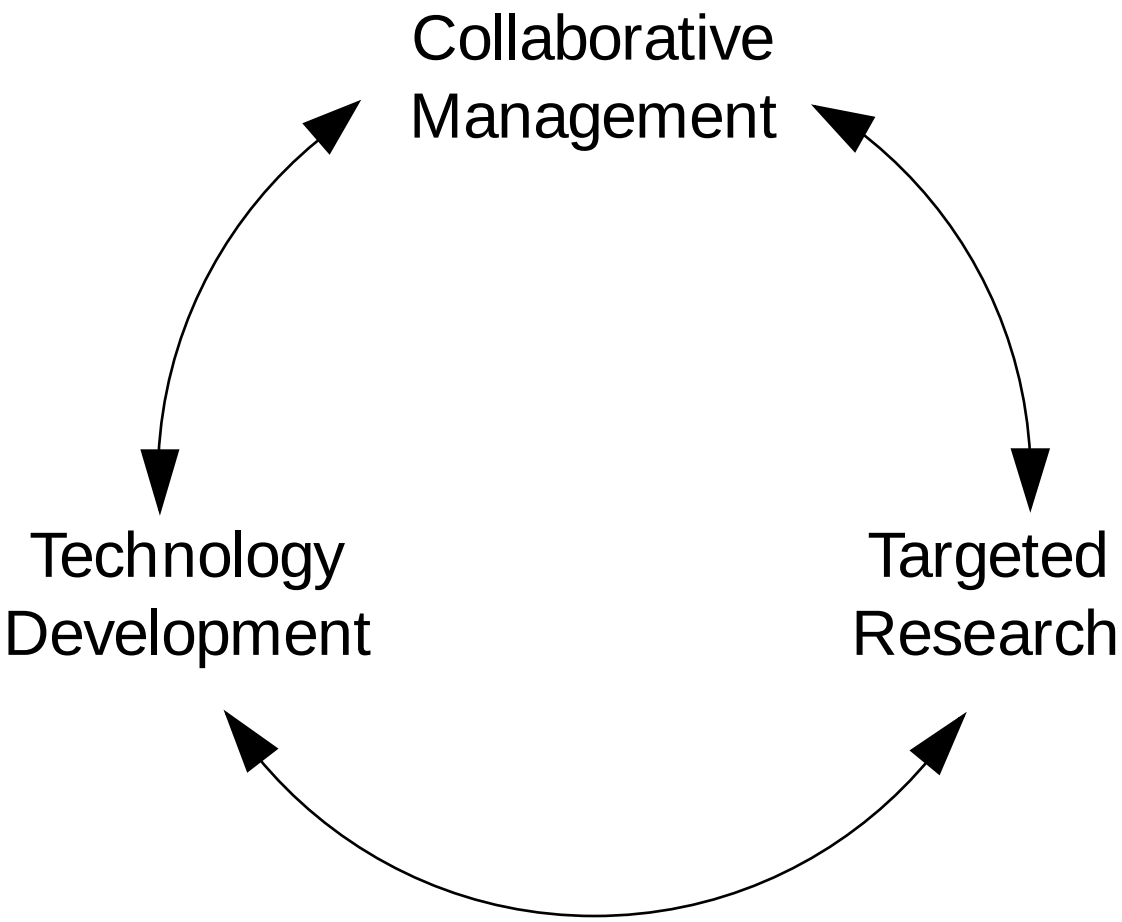
Presentation Overview

- Development of a Decision Support System: *as an iterative process*
  - Technical details, sister presentation Thursday at 11AM Physical & Biological Characterizations II Session, *Building a GIS-Based Analytical Framework for Coastal & Estuarine Study, Sandra Fox, et al.*
- Overcoming the obstacles to the synthesis of data & information
- 3 case studies

Development of Decision Support Systems: *as an iterative process*



Development of Decision Support Systems: *as an iterative process*

- Stakeholder workshops to specify the DSS requirements formulate its design, & review its use are critical
- The DSS must be built progressively first focusing on pilot areas & tractable research problems & eventually moving to a national scope
- To motivate continued development, rapid prototyping is an ideal tool for achieving early success
- The DSS—& the entire cycle—must also be self-maintaining

Development of Decision Support Systems: *as an iterative process*

- Adaptive management process for identifying data & information needs
- Mechanism for targeting & funding the necessary research
- Inclusive, collaborative management process to assist in understanding these complexities & arrive at better, scientifically sound management decisions
- The development of a comprehensive solution for managing, sharing, & using information is a major element of a DSS solution

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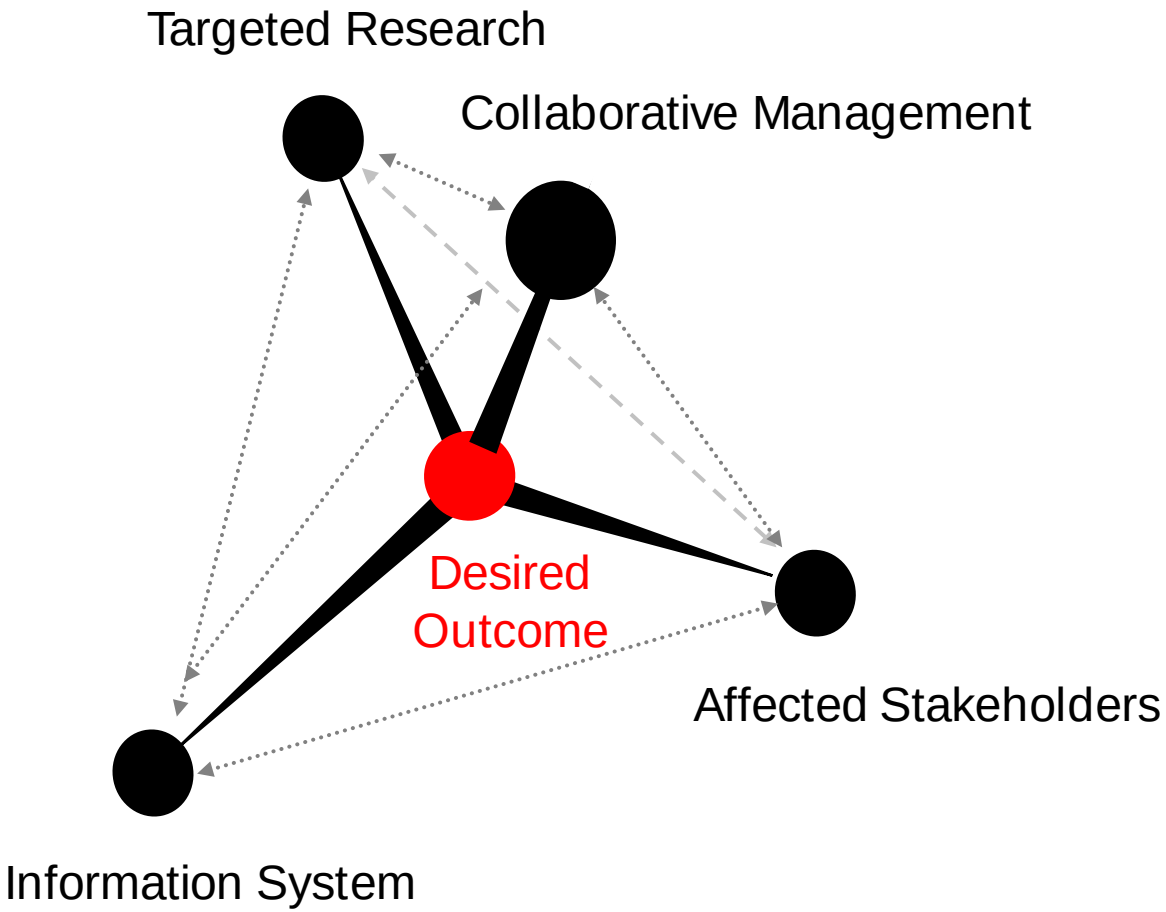
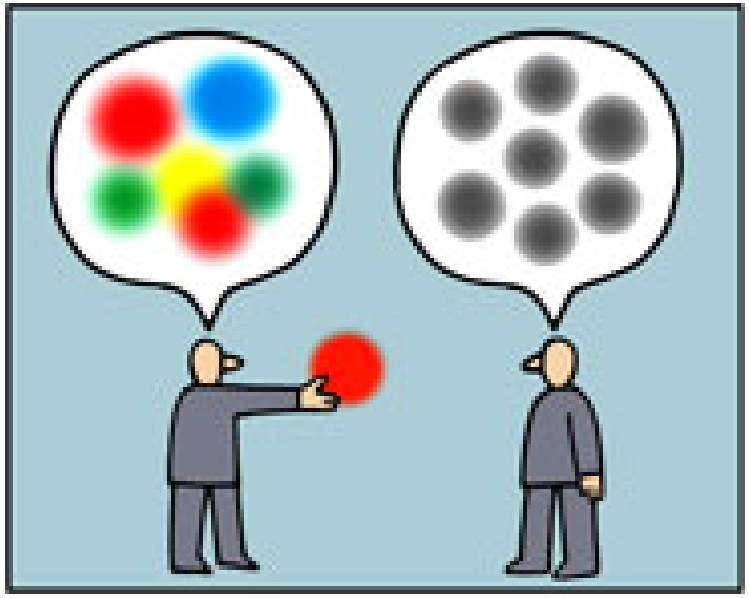
Building Consensus as You Go

- One-on-one meetings
  - to collect data, information, & local knowledge
  - to get to know key stakeholders "*eyeball to eyeball*"
  - to build trust & support
  - going slow to go fast
- Briefings
  - to test working hypotheses
- Workshops (including field reconn.)
  - to work through issues
  - to identify restoration alternatives
  - to gain buy-in

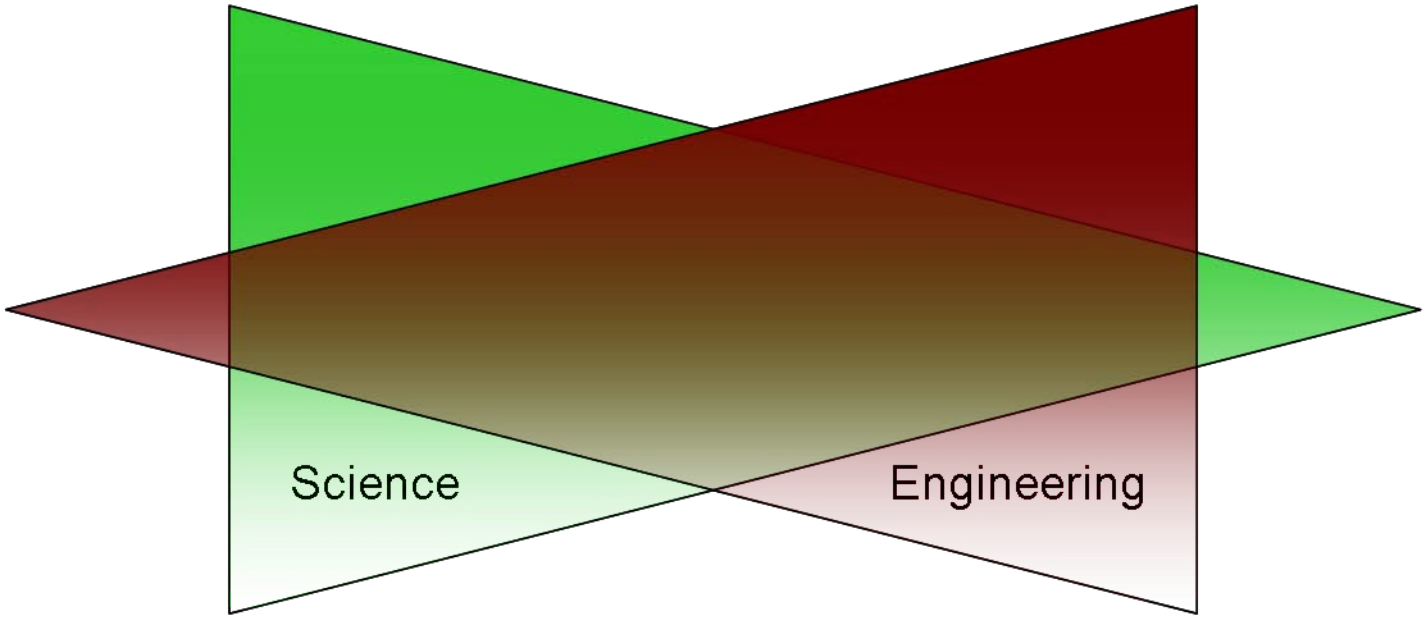
Model for Achieving a Desired Outcome



Overcoming Obstacles to the Synthesis of Data & Information



Science & Engineering

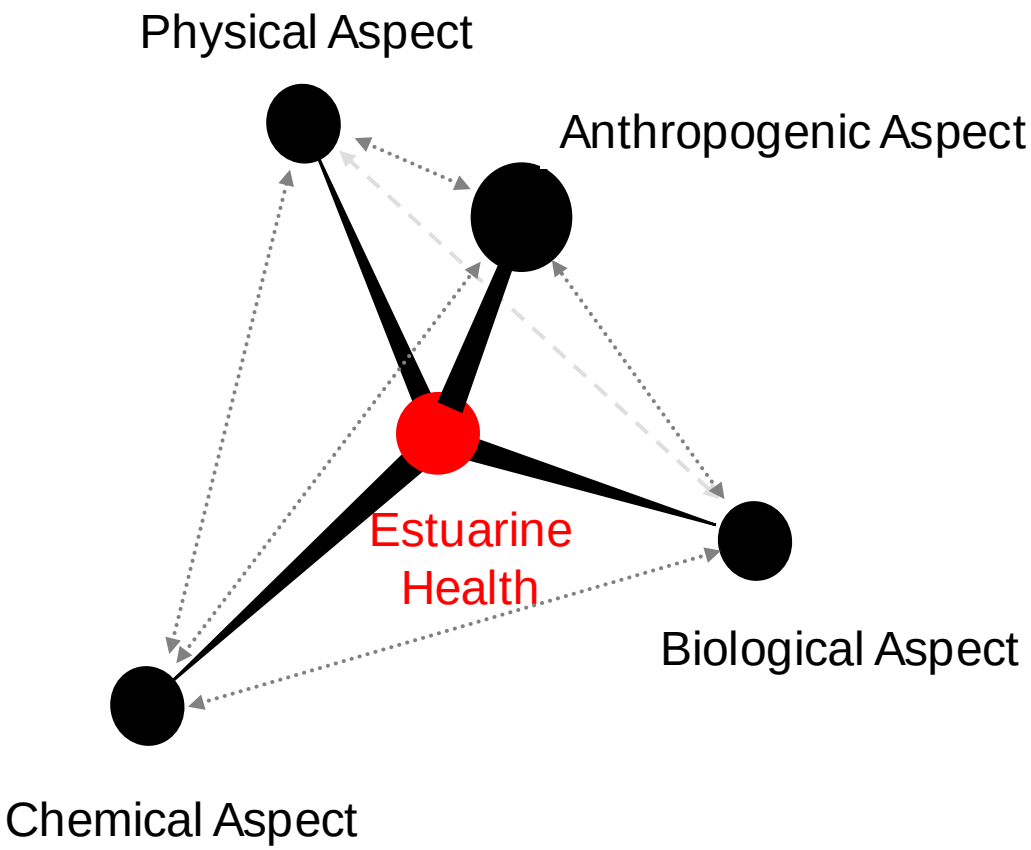


Observe → Analyze → Design → Construct

Need sound science to have sound engineering

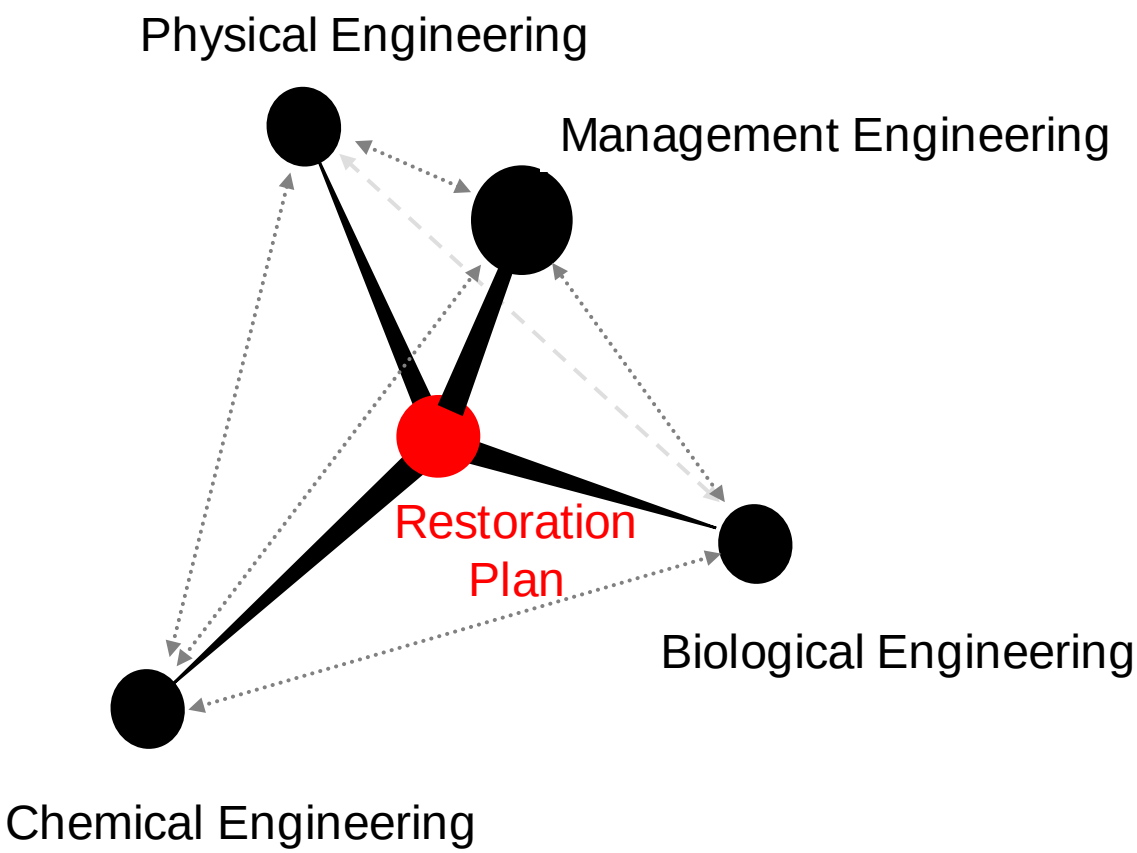
Science: *understanding reality*

What is controlling the watershed?

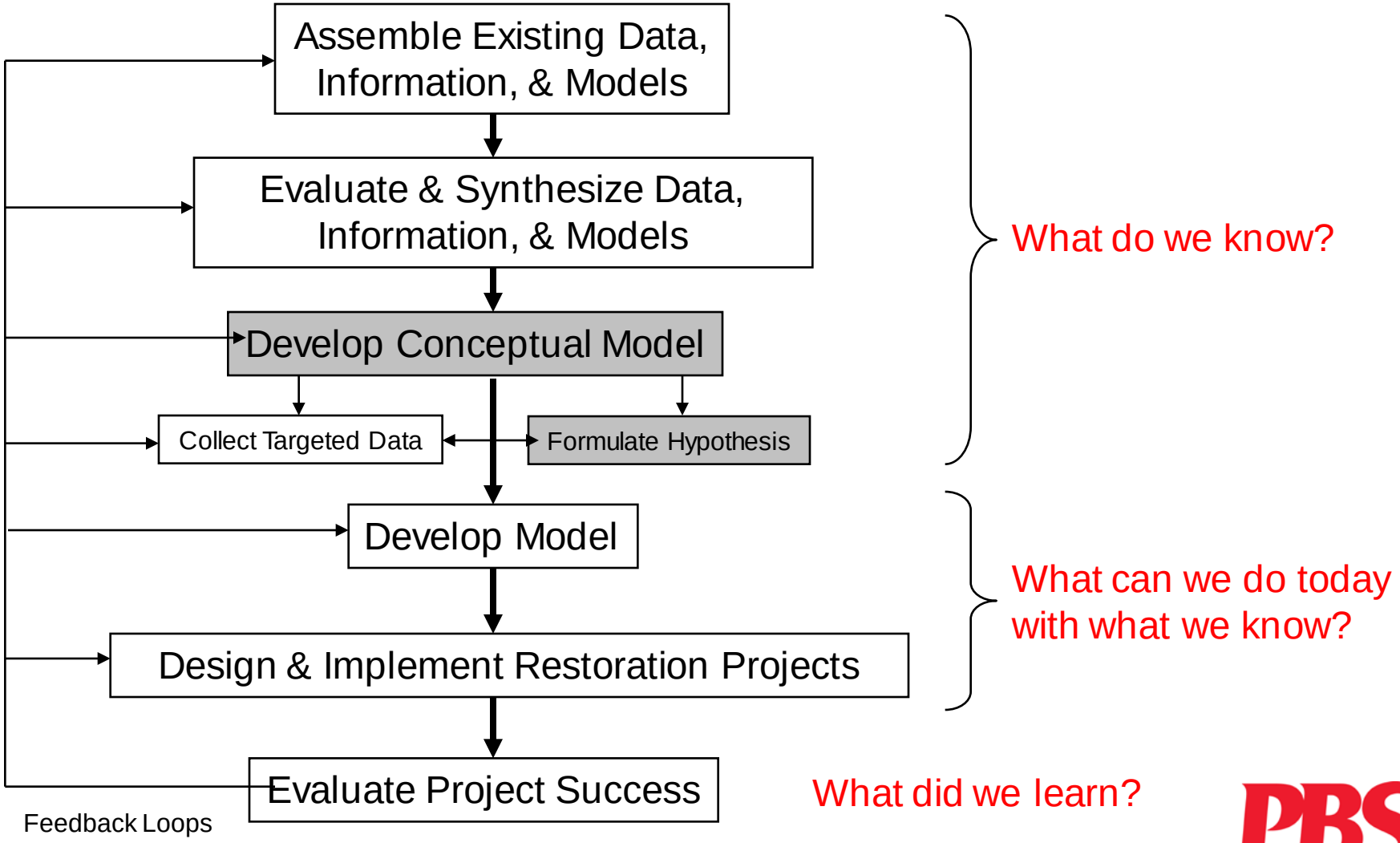


Engineering: *changing reality*

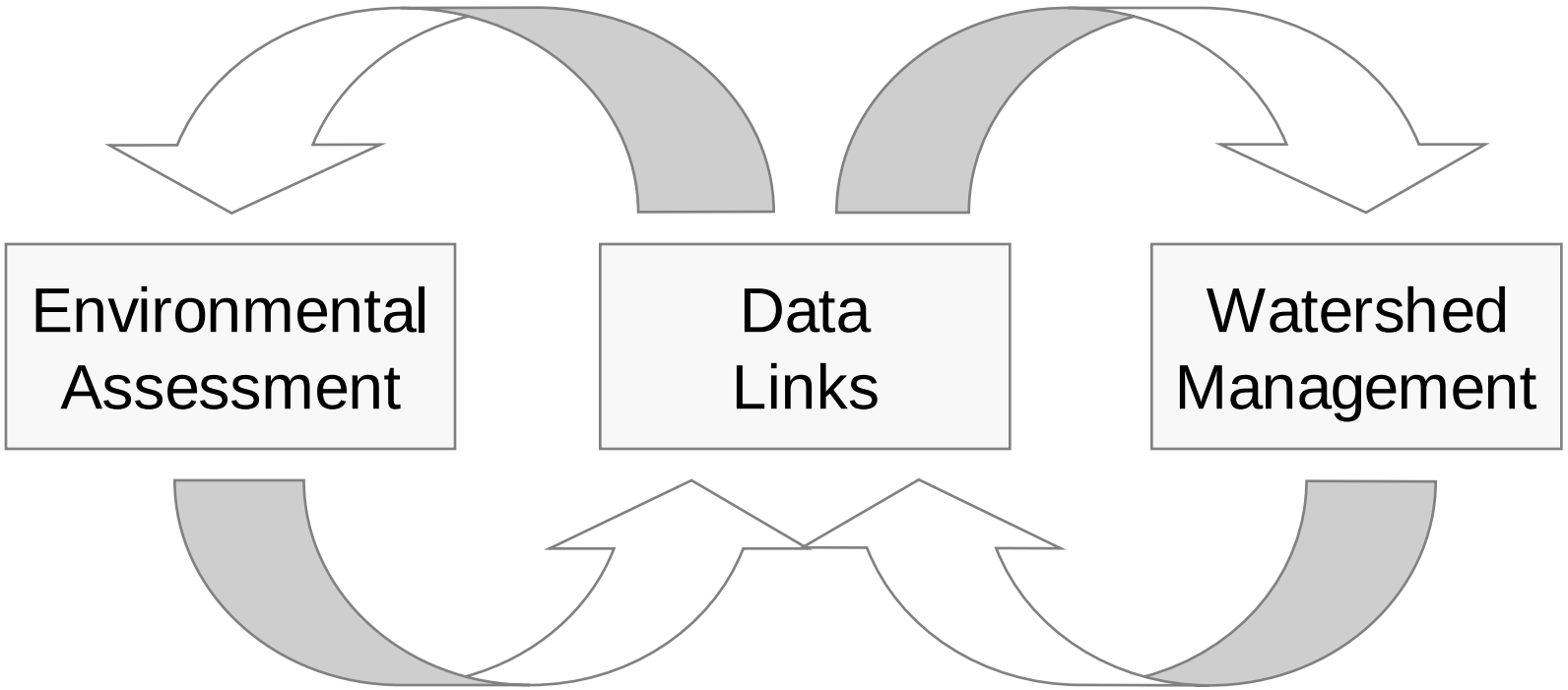
How do you improve conditions?



Scientific Method: *aka Planning & Management*



Data & Information Synthesis

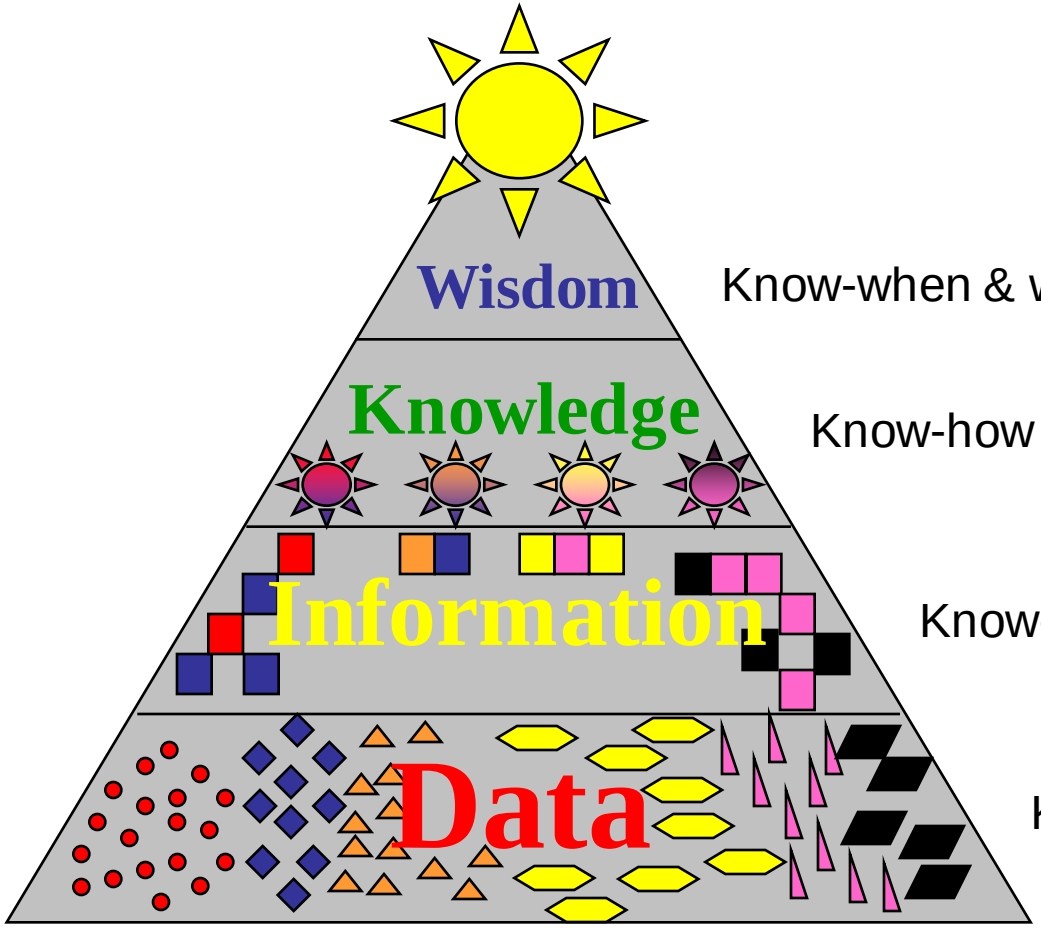


It really doesn’t matter where you begin.

The synthesis of data & information is continuous.

Data & Information Synthesis

So what?



Know-when & why (principles)

Know-how (patterns)

Know-what (associations)

Know-nothing

We know a lot more than we think we know.

We just don't know how to connect all the pieces.

Overcoming the Obstacles to the Synthesis of Data & Information

- Obstacle 1: "expert" work mode
  - Solution: *"collaborative" work mode*
- Obstacle 2: "specialized knowledge"
  - Solution: *"integrated knowledge"*
- Obstacle 3: reliance on past experience & success
  - Solution: *question expertise & accepted knowledge though imagination & innovation*

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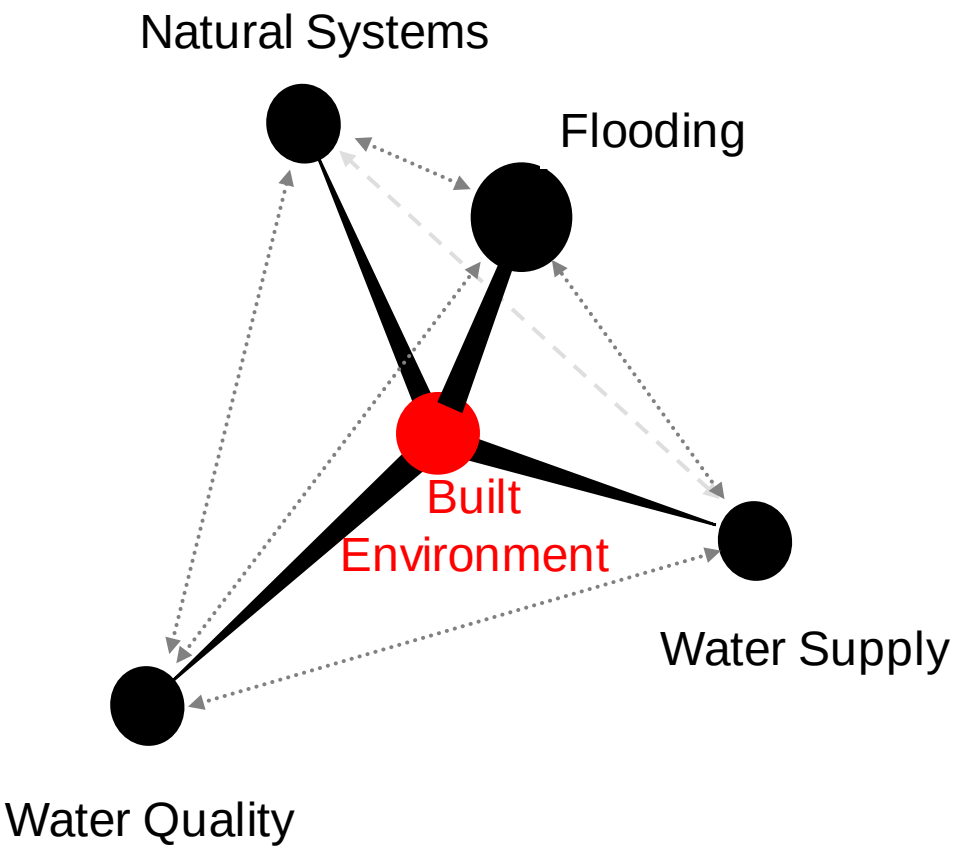
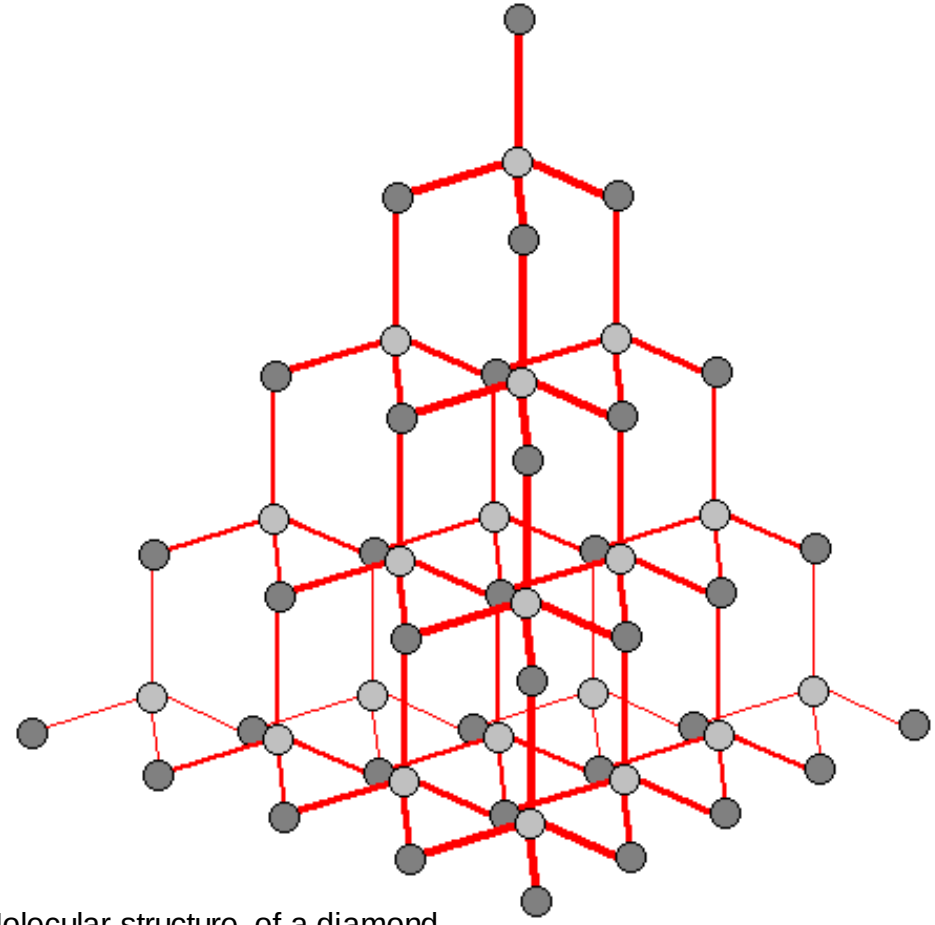
Integrated Water Resource Management



Comprehensively managing the highly complex relationships between communities & the land & water resources that sustain them.

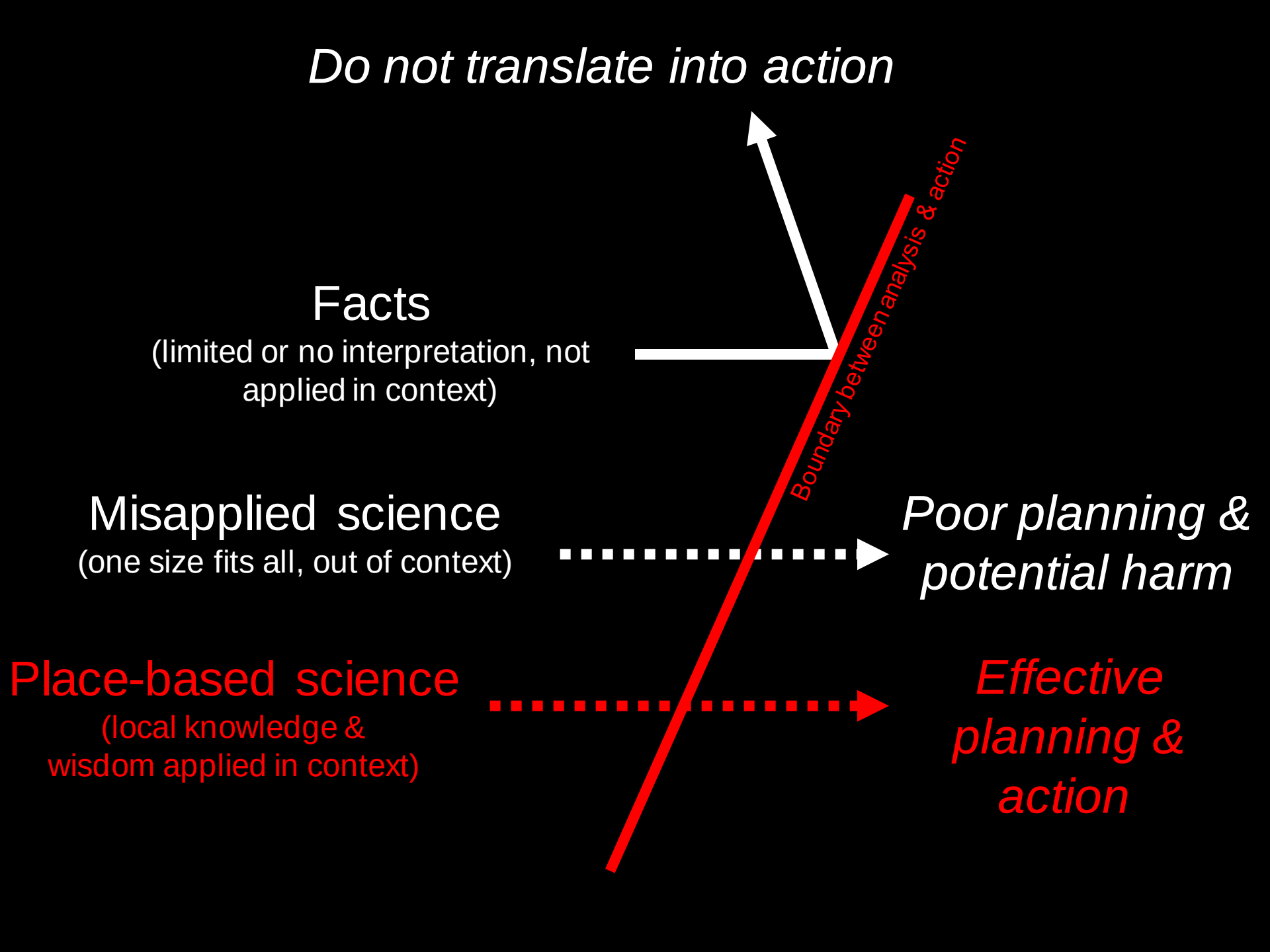
Integrated Water Resource Management



Molecular structure of a diamond

Comprehensively managing water resources across diverse watersheds:

- All places are unique.


Do not translate into action
Facts
(limited or no interpretation, not applied in context)
Boundary between analysis & action
Misapplied science
(one size fits all, out of context)
Poor planning & potential harm
Place-based science
(local knowledge & wisdom applied in context)
Effective planning & action

3 Case Studies

- DOE Grant – North Slope DSS
  - Support the construction of ice roads & ice pads for oil & gas exploration with minimal environmental impact
- Proposed DOE Grant – National Geothermal Database
  - Support geothermal exploration & research
- Proposed NOAA Grant – National Coastal Estuarine Research & Technology Program (NCERT) DSS
  - Stimulate research & scientific collaboration between the 27 National Estuarine Research Reserves (NERRs)

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More Information

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