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Use of SWAT by International Engineering Firms

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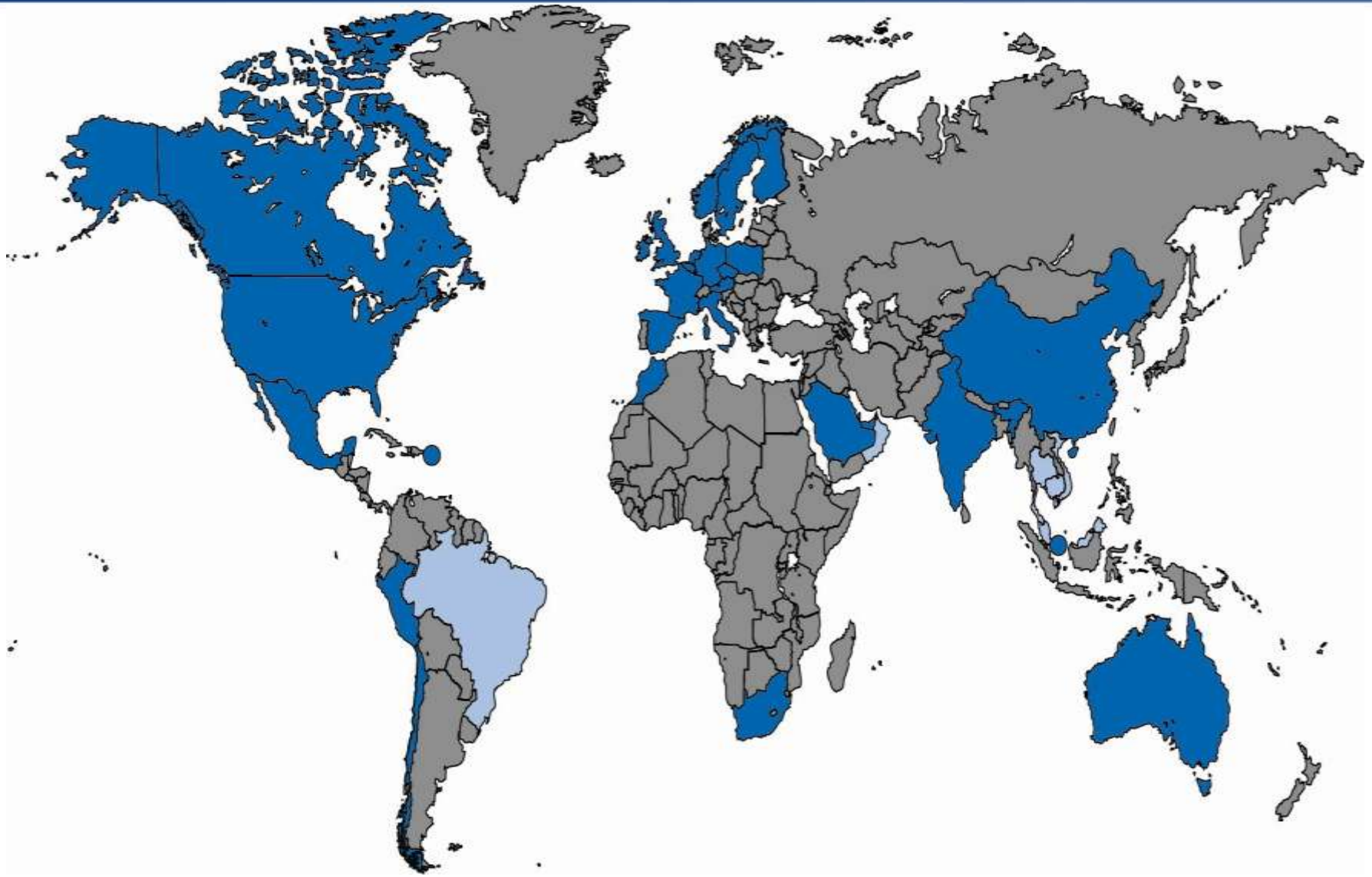

Global Presence

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Jacobs Infrastructure Group

- Involved in Multidisciplinary Engineering
  - Infrastructure – a major business line
    - Water Resources – SWAT Users
    - Water/Wastewater
    - Transportation
    - Structural
    - Aviation
    - Traffic
    - Building and Architecture
    - Land Development
    - Environmental

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Water Resources Engineering and Sciences

- **Flood Control Engineering and Flood Risk Management**
  - Modeling and Planning
  - Design
- **River Engineering**
  - Erosion and Sedimentation Control
  - Transit Crossings
- **Ecosystem Restoration**
  - Fluvial Geomorphology
  - Stream stabilization
- **Water Resources Planning**
  - Water Availability Modeling – Basin Scale Hydrology - Water Rights Analysis
  - Decision Support System
- **Water Resources Information System**
  - Spatial and Temporal Data Models and Database
  - Geographic Information System and Decision Support System Web Applications

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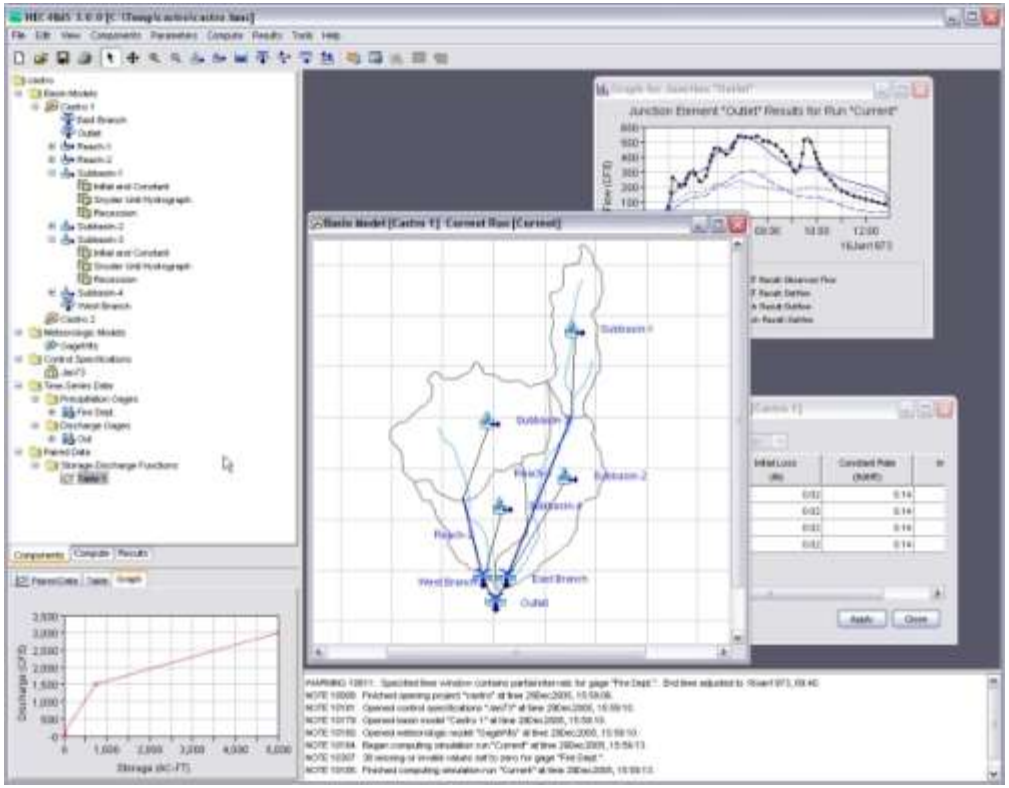
Engineering Applications for Flood Control

- Sub-hourly time scale for computations of hydrographs in response to design or historical rainfall
  - Typical modeling tool – Hydrologic Engineering Center's Hydrologic Modeling System (**HEC-HMS**)



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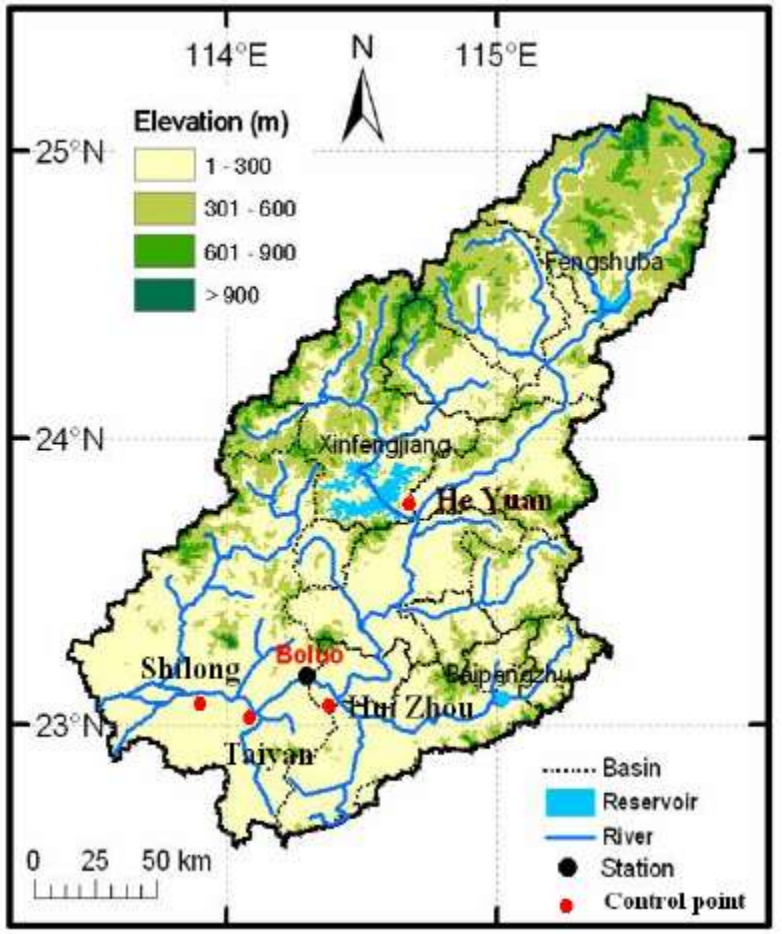
Water Resource Management Using SWAT

- Naturalized Stream Flows
  - Daily to monthly time scale
    - Water Availability Modeling
    - Applications to Water Rights Analyses and Water Resources Planning
- Water Quality
  - Daily to monthly time scale
    - In stream water quality
    - Total Maximum Daily Load (TMDL) calculations
    - Best Management Practices for pollutant loading

Water Availability Modeling

Naturalized Stream Flows using SWAT

- Routinely used in USA and other countries
- An Example – East River China (Chen and Chan, 2008)



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Mekong River Basin:

12th longest river of the world

A classic trans-boundary river basin

6 countries:

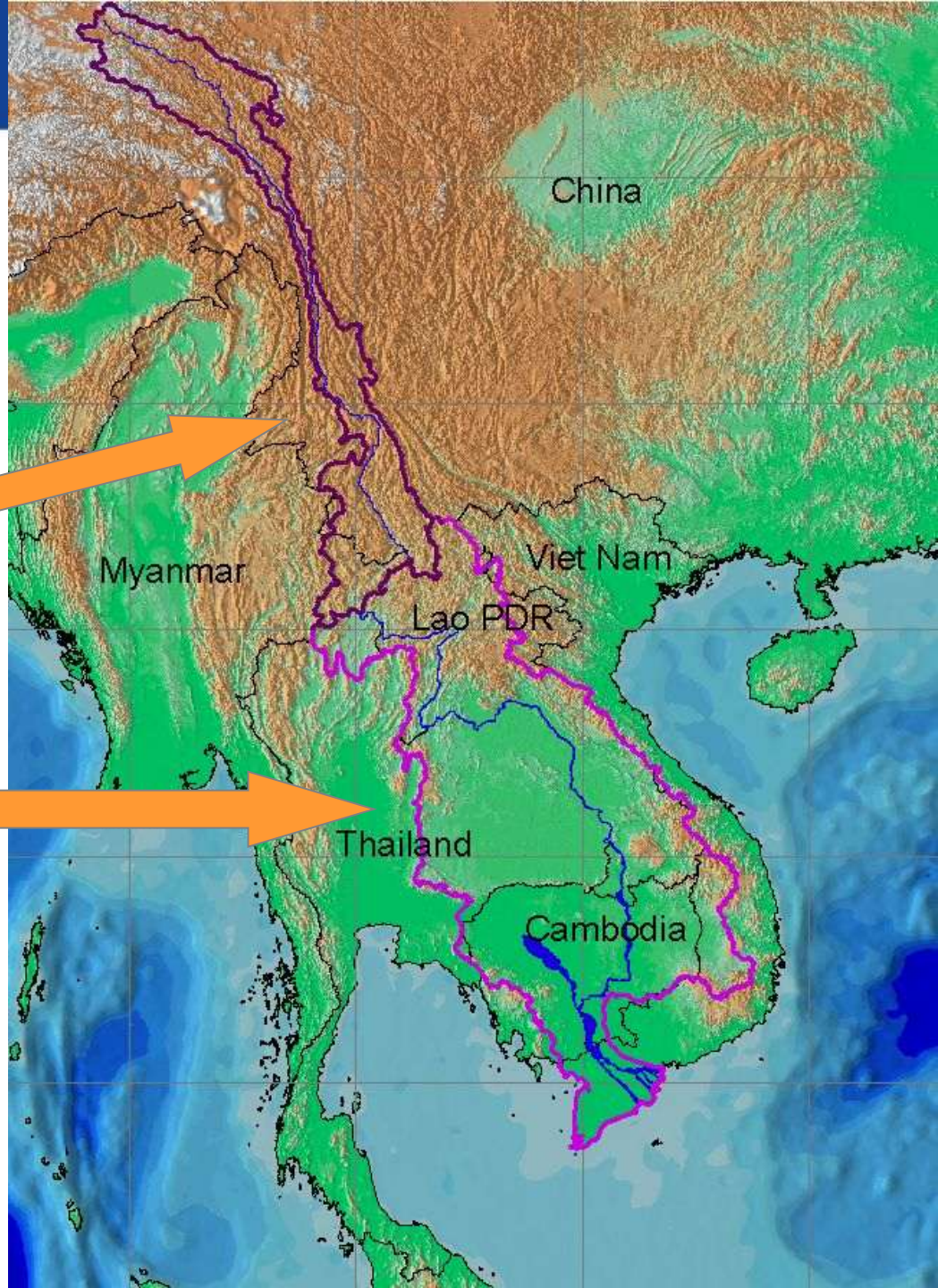
Upper Mekong

1. China – 16% of total flow
2. Myanmar – 2%

Lower Mekong Basin

Mekong River Commission:

3. Cambodia – 18%
4. Lao PDR– 35%
5. Thailand – 18%
6. Viet Nam – 11%



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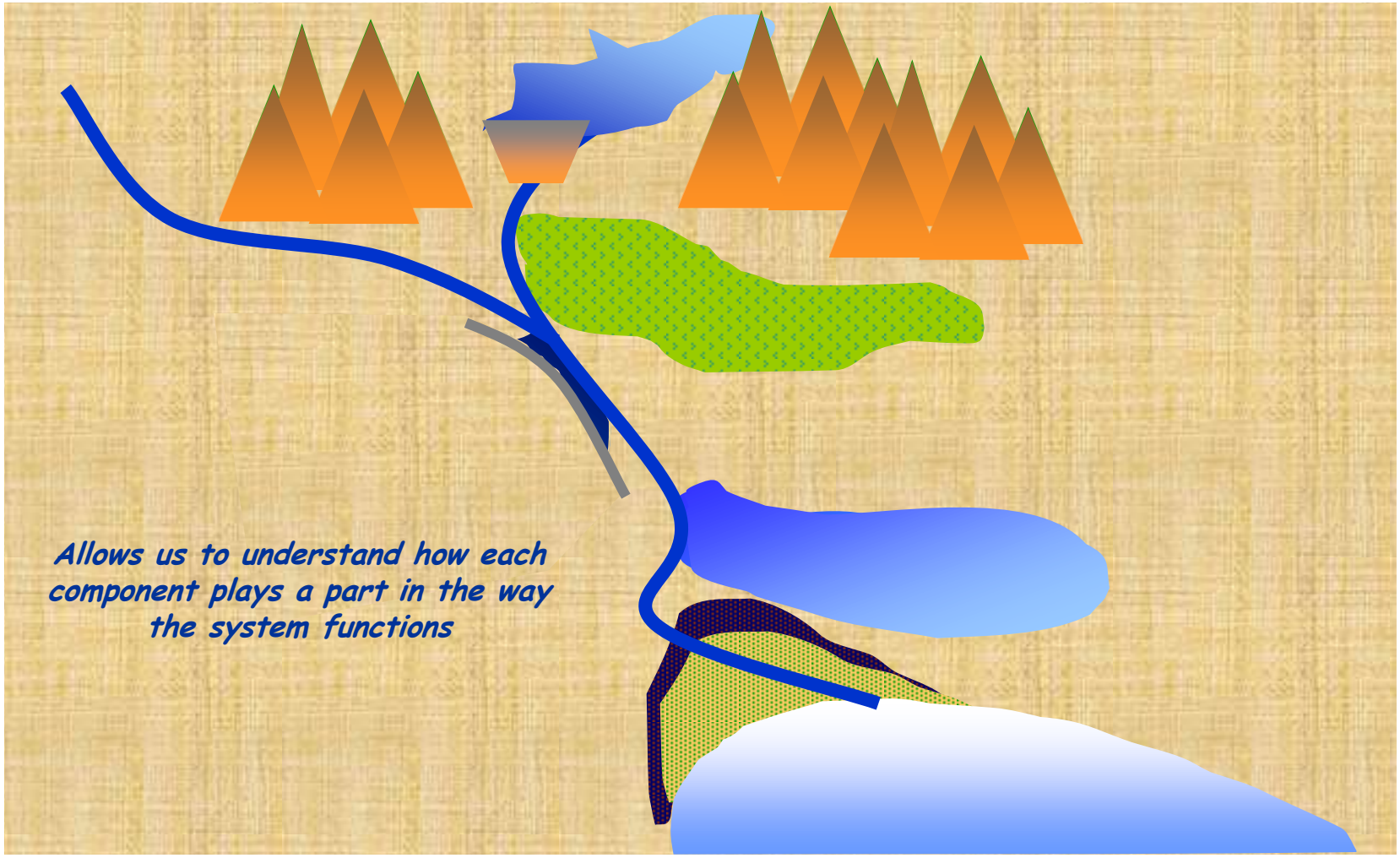
Mekong River Basin – Hydrologic Modeling with SWAT



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Deliverables and Findings

- **Developed a Decision Support Framework**
- **Water Utilization Program**
- **Policy Questions Answered**
  - water and food security
  - virtual water flow
  - landuse analysis
  - effects of climate change

Industry Challenges

- Large scale International Projects particularly in the developing parts of the world are sponsored or undertaken by multinational lending organizations such as the World Bank or the Asian Development Bank and donor agencies such as the US Aid

- Limited Opportunities for Research and Development

- Issues transitioning clients into new technology with a holistic focus

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Opportunities for Industry-Academia Partnerships

- Industry client issues can be addressed through academic research.
- Can act as the bridge between the sponsoring/funding agency and the consulting industry
- The consulting industry can undertake the "project delivery" through their vast experience and available resources
- Industry can translate academic ideas into a more client focused messsage.

Moving Forward

- Academia should educate/reeducate industry
- Industry should bring real world issues to academia for problem solving
- Academia should build policy tools that help translate scientific findings into a form that decision makers can easily understand.

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Questions?

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