



UTAH DEPARTMENT *of*  
ENVIRONMENTAL QUALITY

**WATER  
QUALITY**

Utah Lake Science Panel

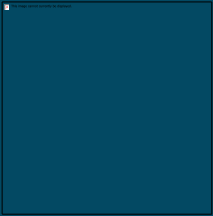
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# Utah Lake Modeling Effort

**Review Science Panel comments and identification of other modeling efforts**



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# Science Panel Comments

- **Model calibration performance**
  - Develop calibration goals
  - Evaluate performance of sensitive processes
  
- **Identification of important parameters**
  - Back of the envelope calculations
  - Employ stand alone modeling studies: WASP, Lake2K, fetch modeling
  - U of U sensitivity analysis
  - Simplification of insensitive parameters



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# Science Panel Comments

- Potential model challenges
  - Nutrient load delivery to the lake
    - Groundwater inputs
    - Stormwater
    - POTW inputs and spiraling in tributaries
  - Complexity of sediment diagenesis
  - Atmospheric deposition
  - Phosphorus calcite chemistry
  - Biological P export (carp, chironomids, etc.)
  - Bioturbation and carp influenced P recycling
  - Food web mechanism
  - Timing of divergence with the U of U project



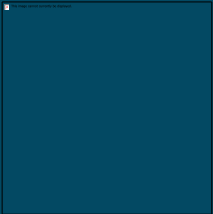
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# Supplemental Modeling Efforts

- Lake2K
- Stand alone sediment diagenesis model
- Bioturbation and carp influenced P recycling
- Stand alone food web model

# Technical Consultant

Share preliminary ideas roles and responsibilities



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# Potential Scope of Work

- Approach for developing nutrient criteria
  - Literature review
- Uncertainty and data quality guidance
- Conceptual map/linkage diagram
- Develop and manage project database
- Phase 2 Data Characterization
  - To supplement Phase 1
  - To answer key questions
- Data gaps analysis
  - With consideration of key questions, conceptual map, and criteria development approach
  - Develop and integrate working Charge document
  - Review of primary literature
- Inform research objectives
- Interpret and integrate study results
  - To answer key questions
  - To develop nutrient criteria document
- Ongoing Science Panel technical support
  
- Potential future tasks (not included)
  - Modeling support
  - Phase 3 metadata analysis



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# Milestones

- September 14, 2018 – Scope of work
- October 5, 2018 – Proposals due
- October 12, 2018 – Contract award





# Confirming Specific Science Panel Tasks

Next steps for further discussion on uncertainty, assessing proposed work plans, and evaluating studies



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# Assessing Data Quality

- Data Quality Objectives (DQOs)
  - EPA QA/G-4
- Data Availability
- Data Credibility



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# Data Quality Objectives (DQO's)

- Ensure studies meet objectives
- Determine the type, quantity, and quality of data needed to reach defensible decisions or make credible estimates

# EPA Guidance on Systematic Planning

**Table 1. Elements of Systematic Planning**

Elements
<b>Organization:</b> Identification and involvement of the project manager, sponsoring organization and responsible official, project personnel, stakeholders, scientific experts, etc. (e.g., all customers and suppliers).
<b>Project Goal:</b> Description of the project goal, objectives, and study questions and issues.
<b>Schedule:</b> Identification of project schedule, resources (including budget), milestones, and any applicable requirements (e.g., regulatory requirements, contractual requirements).
<b>Data Needs:</b> Identification of the type of data needed and how the data will be used to support the project's objectives.
<b>Criteria:</b> Determination of the quantity of data needed and specification of performance criteria for measuring quality.
<b>Data Collection:</b> Description of how and where the data will be obtained (including existing data) and identification of any constraints on data collection.
<b>Quality Assurance (QA):</b> Specification of needed QA and quality control (QC) activities to assess the quality performance criteria (e.g., QC samples for both field and laboratory, audits, technical assessments, performance evaluations, etc.).
<b>Analysis:</b> Description of how the acquired data will be analyzed (either in the field or the laboratory), evaluated (i.e., QA review/verification/validation), and assessed against its intended use and the quality performance criteria.



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# Data Availability

- **Readily available** – maintained in a database that directly interfaces with processing and analysis tools
  - Seamless integration
- **Partially available** – not publically available or known and in electronic format
  - Integration requires additional compilation, interpretation, and translation
- **Unavailable** – not accessible, not stored in electronic format, or missing essential metadata
  - Not integrated

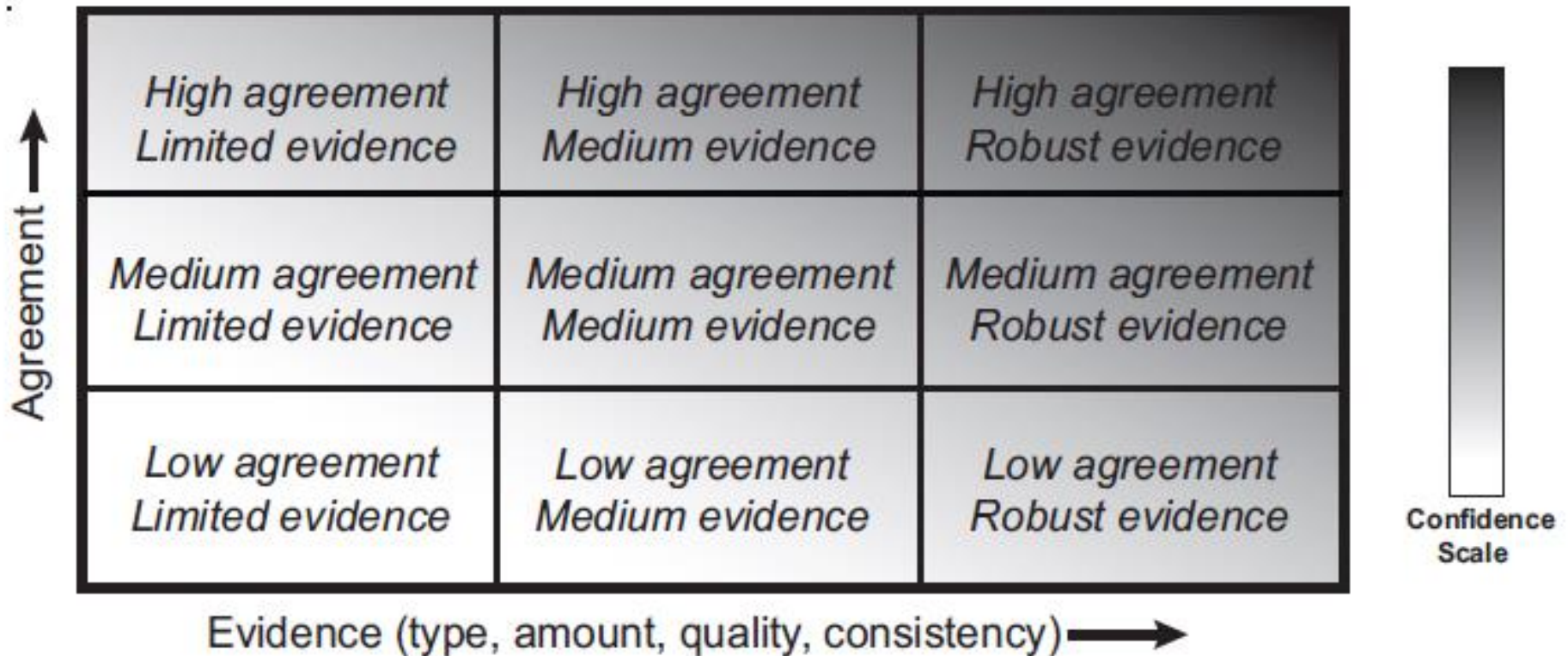
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# Data Credibility

- **Quality Assurance Project Plan (QAPP)**
  - A project specific blueprint for obtaining quality data
  - Minimum requirements for QA and QC
- **Sampling Analysis Plan**
- **Standard Operating Procedures**
- **Monitoring location information**



# Uncertainty



# Uncertainty

<b>Table 1. Likelihood Scale</b>	
<b>Term*</b>	<b>Likelihood of the Outcome</b>
<i>Virtually certain</i>	99-100% probability
<i>Very likely</i>	90-100% probability
<i>Likely</i>	66-100% probability
<i>About as likely as not</i>	33 to 66% probability
<i>Unlikely</i>	0-33% probability
<i>Very unlikely</i>	0-10% probability
<i>Exceptionally unlikely</i>	0-1% probability



# Questions

