

ULWQS

Science Panel Update

December 11, 2018



Technical Consultant Proposal Review

- Two consultants submitted proposals
 - Tetra Tech and Limno Tech
- Both firms were qualified
- From the Science Panel's perspective
 - Tetra Tech:
 - Knowledgeable staff
 - Significant applicable experience
 - Familiar with Utah's surface waters



Development of Technical Consultant Scope of Work

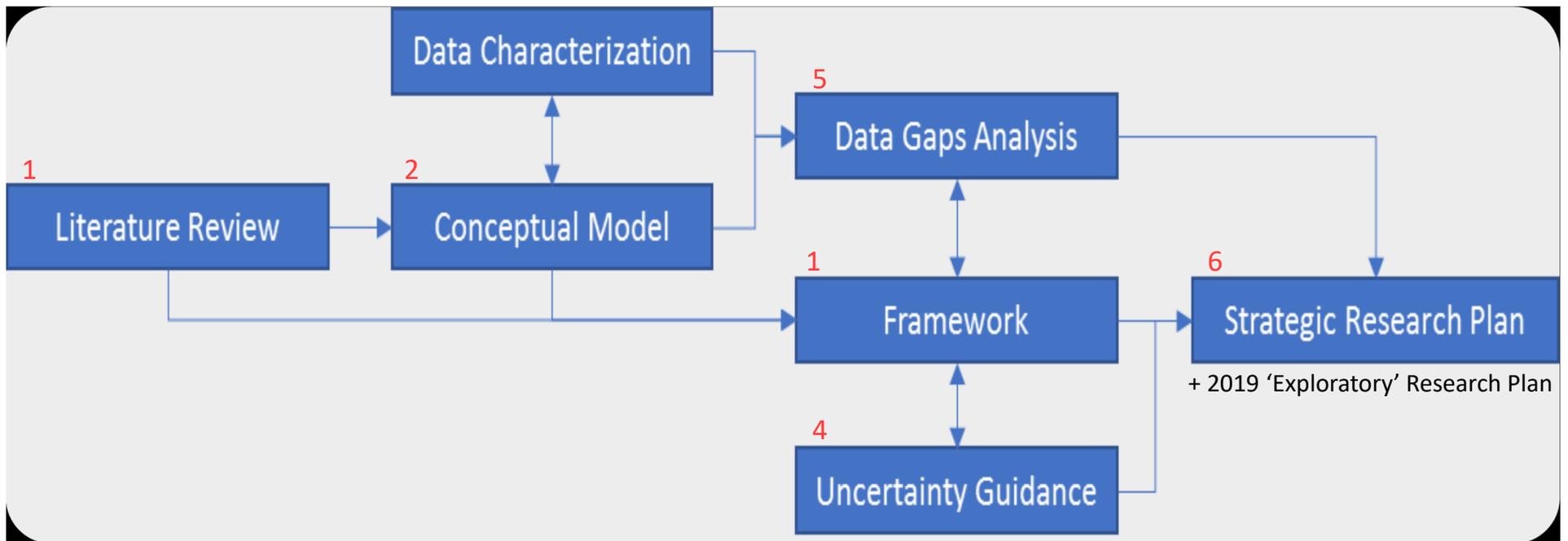
TASKS:

1. Nutrient Criteria Development Framework
2. Conceptual Model/Linkage Diagram
3. Phase 2 Data Characterization
4. Uncertainty Guidance Development
5. Data Gaps Analysis
6. ULWQS Strategic Research Plan
 - 2019 'Exploratory Research Plan'
7. Ongoing Science Panel Technical Support
8. Science Panel Meetings and Travel



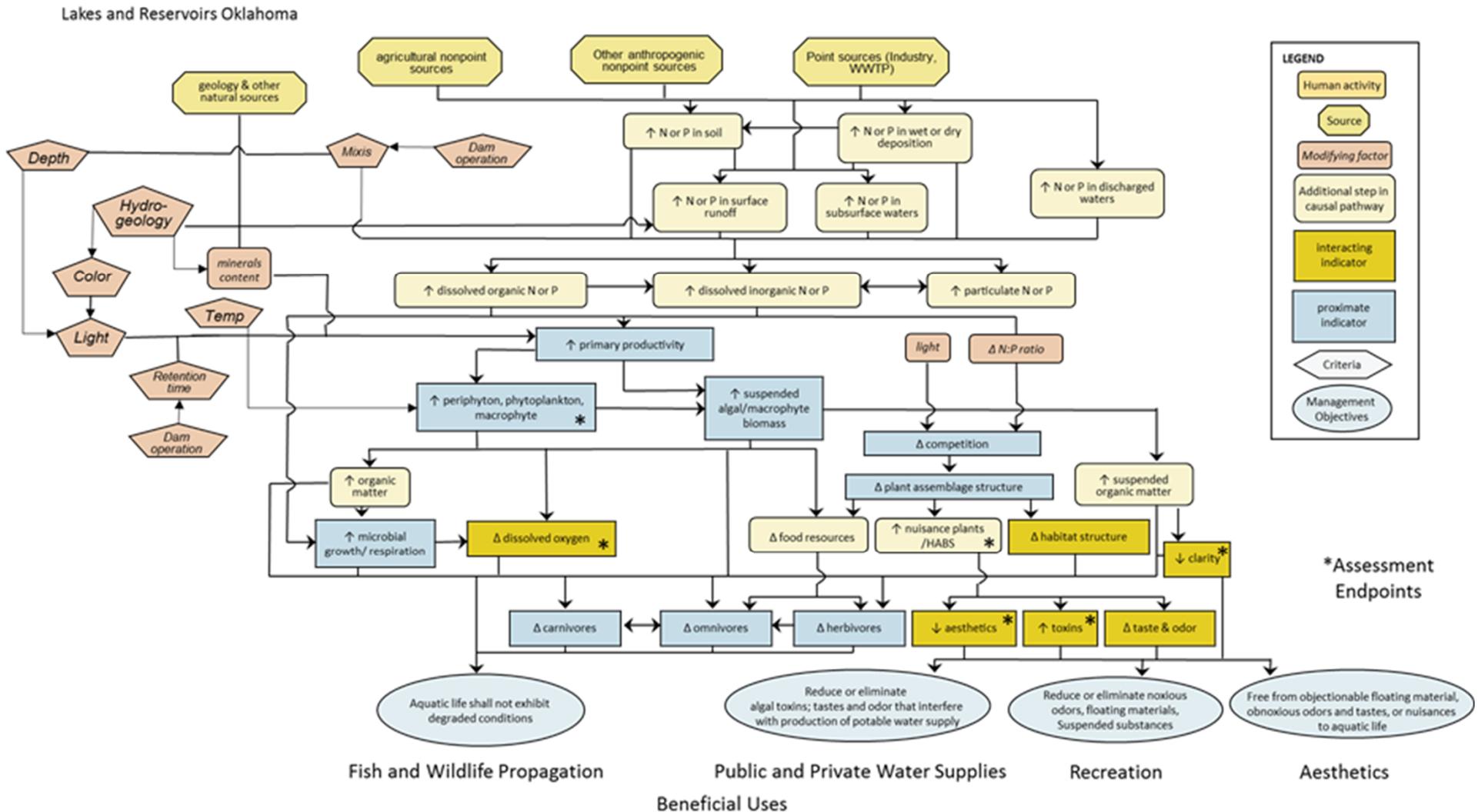
Development of Technical Consultant Scope of Work

Task Linkages



Development of Technical Consultant Scope of Work

Conceptual Model/Linkage Diagram (Example)



Development of Technical Consultant Scope of Work

Task Schedule (Preliminary)

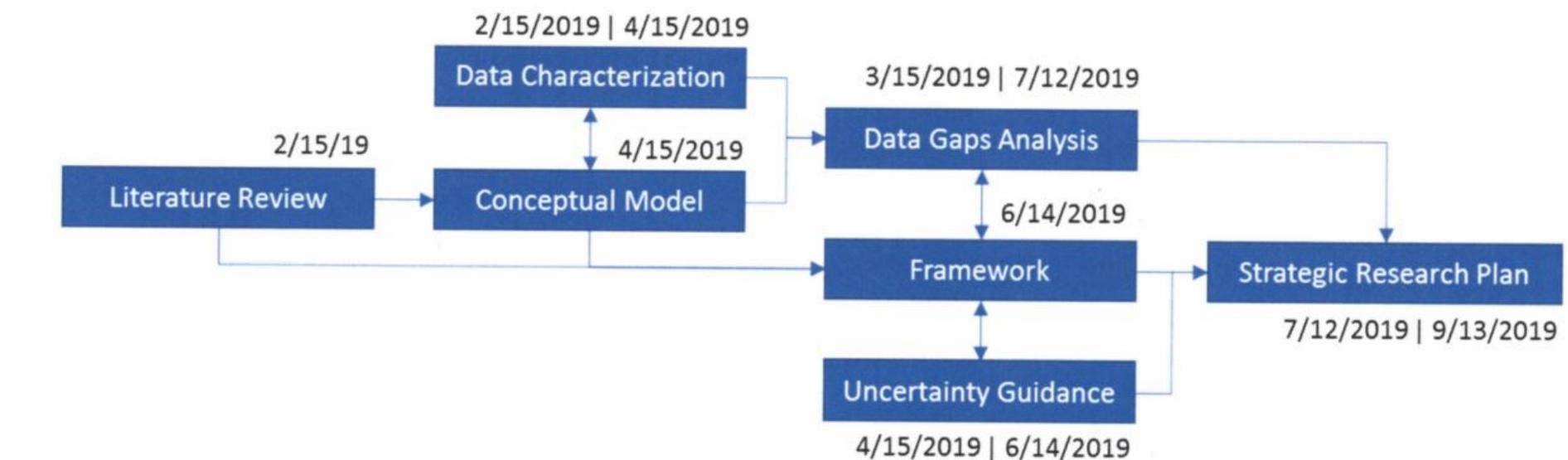


Figure 1. Task relationship with due dates shown above each (assuming 12/15/18 start date).



Development of Technical Consultant Scope of Work

Task Schedule (Preliminary)

Table 1. Proposed Milestones and Deliverables Schedule

Task(s)	Proposed Milestones and Deliverables	Date
1	Literature Review Technical Memo	2/15/19
	Nutrient Criteria Development Technical Framework	6/14/19
2	Utah Lake Conceptual Model/Linkage Diagram	4/15/19
3	Electronic Data Deliverable	2/15/19
	Electronic Data Analysis Framework	4/15/19
4	Technical Memo Summarizing Review Approaches	4/15/19
	ULWQS Uncertainty Guidance Document	6/14/19
5	Technical Memo of Data Gaps Analysis	3/15/19
	Data Gaps Document	7/12/19
6	Exploratory ULWQG Strategic Research Plan Document	3/31/19
	ULWQG Strategic Research Plan Document	9/13/19
7	As needed technical support	Ongoing and as needed through 12/31/20
8	Science Panel Meeting Attendance	Ongoing and as needed through 12/31/20



Development of ‘Working Content’ Associated with Initial Charge

Serves as a road map for data gaps analysis and future research

1. What was the historical condition of Utah Lake with respect to nutrients and ecology pre-settlement and along the historical timeline with consideration of trophic state shifts and significant transitions since settlement?
 - Dr. Rushforth’s data and historical grey literature may provide valuable information
 - Sediment cores required



Development of ‘Working Content’ Associated with Initial Charge

Serves as a road map for data gaps analysis and future research

2. What is the current state of the lake with respect to nutrients and ecology?
 - 2.1, Carp
 - 2.2, Macrophytes
 - 2.3, HABS*, nutrients*, lake elevation, calcite-P interactions, and light extinction
 - 2.4, Sediments*
 - 2.5, Fauna*



Development of ‘Working Content’ Associated with Initial Charge

Serves as a road map for data gaps analysis and future research

3. What additional information is needed to define nutrient criteria that support existing beneficial uses?



Development of 'Working Content' Associated with Initial Charge

Answers to Initial Charge questions:

- 2.3.i. Where do HABs most frequently start/occur? Are there hotspots and do they tend to occur major nutrient sources?
 - See Ben Holcomb HAB presentation (Utah DWQ)
 - See Utah DWQ ShinyApps
- 2.3.ii. Which nutrients are actually controlling primary production and HABs and when?
 - See Utah DWQ ShinyApps, Water Quality Map, N:P ratio (molar), dissolved
 - N:P = 30+:1 in Utah Lake
 - Redfield ratio = 16:1
- 2.4.ii. What is the sediment oxygen demand of, and nutrient releases from, sediments in Utah Lake under current conditions?
 - See Hogsett & Goel
- 2.5.i. Where and when in Utah Lake are early life stages of fish present?
 - See June Sucker research
- 2.5.ii. Which species are most sensitive and need protection from nutrient-related impacts?
 - See June Sucker research



Development of a Modeling Memo for University of Utah

- Goal was to address known and potential important water quality parameters
 - Inputs and In-lake processes
- 1. Model calibration and sensitivity report
 - To confirm water quality modeling addresses goals of ULWQS
- 2. In-lake processes
 - Bioturbation
 - More complex sediment diagenesis
 - Orthophosphate binding with calcite
 - Biological export of P
 - Food chain mechanisms
- 3. Inputs
 - Groundwater
 - Stormwater
 - Atmospheric deposition
 - POTWs



Questions and Comments

Thank you and have a great holiday season!

