Bear River - Cutler Reservoir TMDL

US EPA Nutrient TMDL Workshop
Feb 15-17, New Orleans

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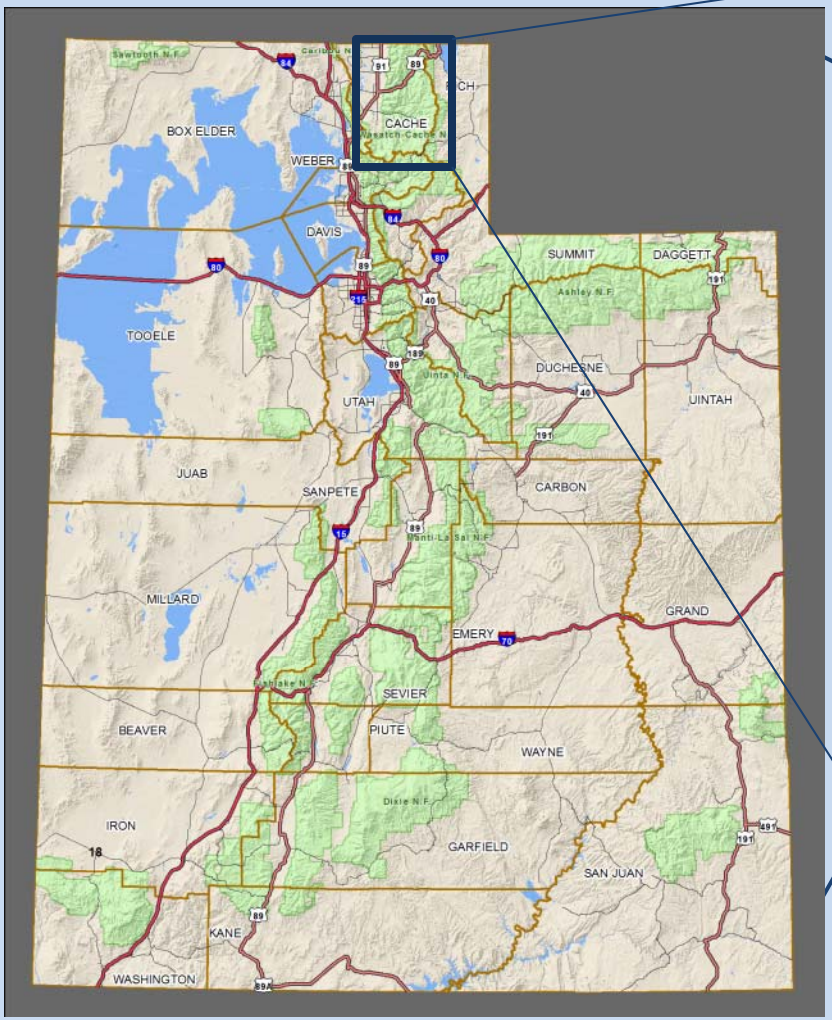
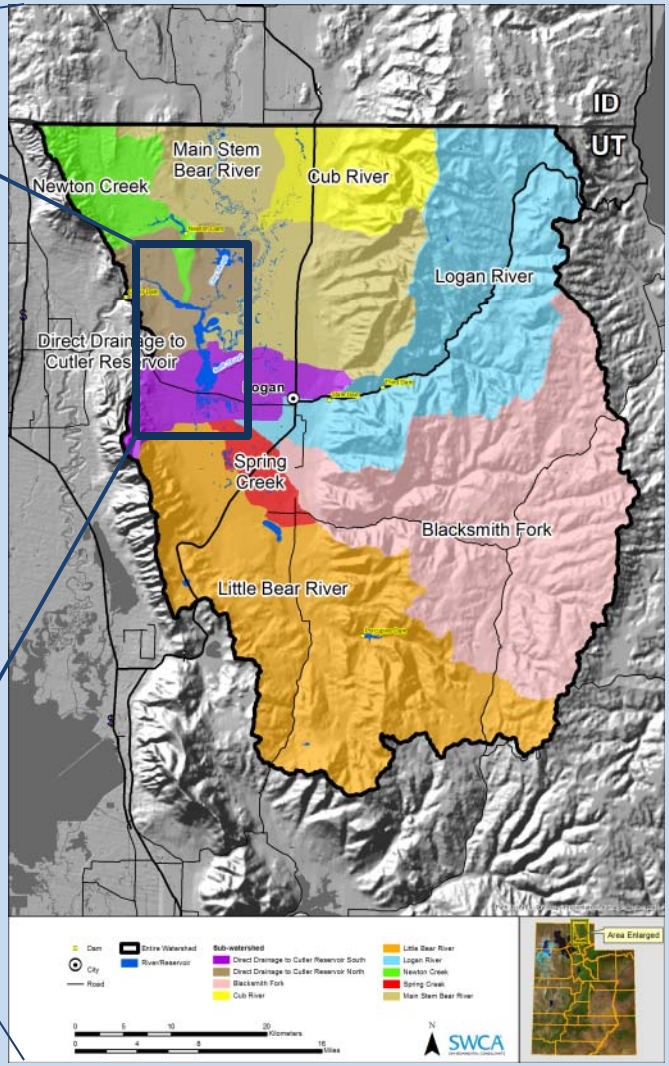
Cutler Reservoir and Bear River Study Area





History

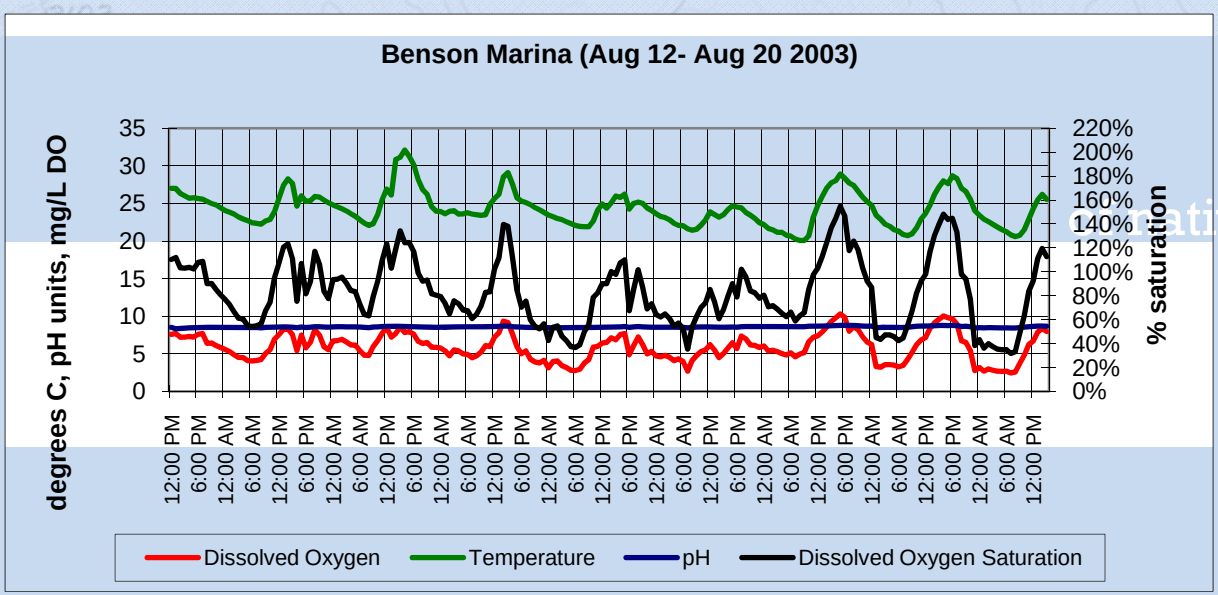
- Original Bear River TMDL approved in 1997 established phosphorus endpoint of 0.05 mg/l for Cutler
- Lower Bear River TMDL approved in 2002 identified phosphorus endpoint of 0.075 mg/l below Cutler
- Currently revised TMDL approved in 2010 with endpoint of 0.09 mg/l.
- Advisory committee formed in 2004

Process

- Representative and engaged technical committee
  - 69 advisory committee meetings over 5 years
  - Representation from diverse constituencies
- Comprehensive data collection
  - Supplemental data and studies completed at request of advisory committee
  - Data from Logan City, PacifiCorp and USU
    - 1,498 TP data points
    - 114 Chlorophyll *a* data points
    - 3,584 dissolved oxygen data points
    - 33 sites
- Thorough public review process
  - 21 comment letters (157 comments)
  - Substantive changes to analysis and TMDL as a result of public comments

Fishery Use is Impaired

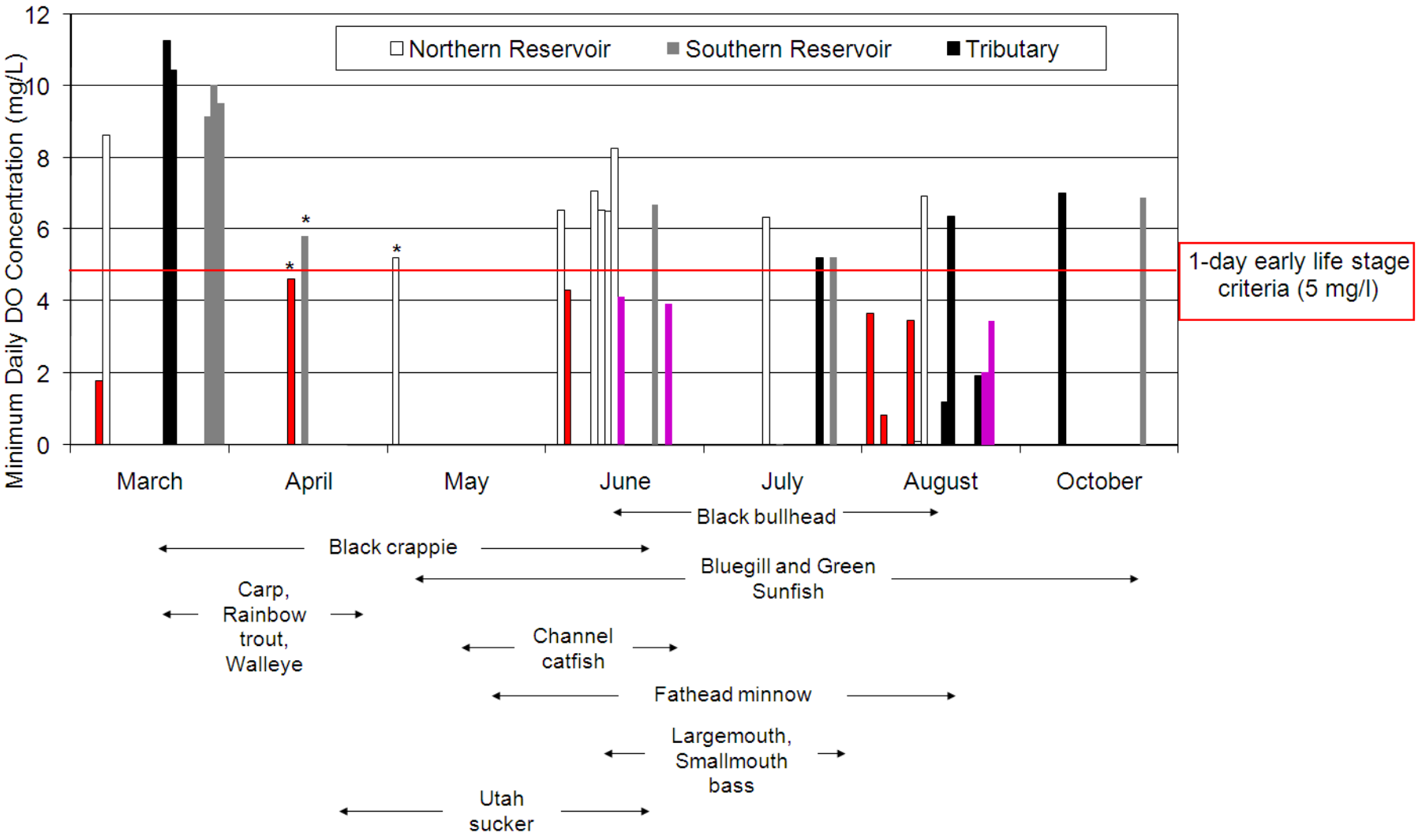
- Primary Evidence
  - Continuous data collected at 9 locations over 6 sampling periods (163 days)
  - 25% of samples violate early life-stage DO standard
  - 15% of samples violate all life-stage DO standard
  - Follows removal of disputed data



ative species

tolerant of

DO concentrations in Cutler Reservoir and Fish Spawning Periods



Recreational Use is Impaired

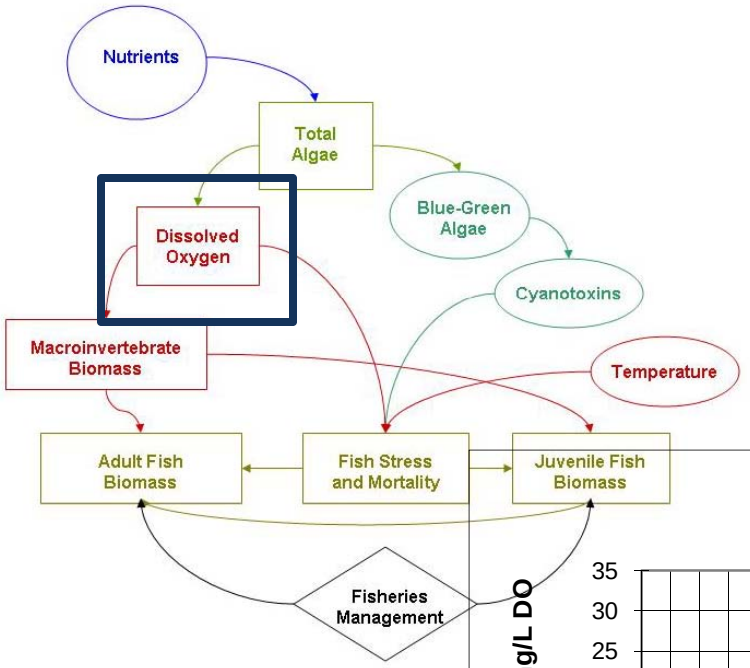
- Primary evidence
  - 26% of chlorophyll *a* data in Cutler Reservoir are >30 µg/L
  - Recreation user surveys: Half consider water quality in Cutler to be a moderate to big problem
- Additional concerns
  - Possibility of blue-green algae further threatens this use

East Canyon Reservoir Littoral Zone. Photo: Wayne Wurtsbaugh.

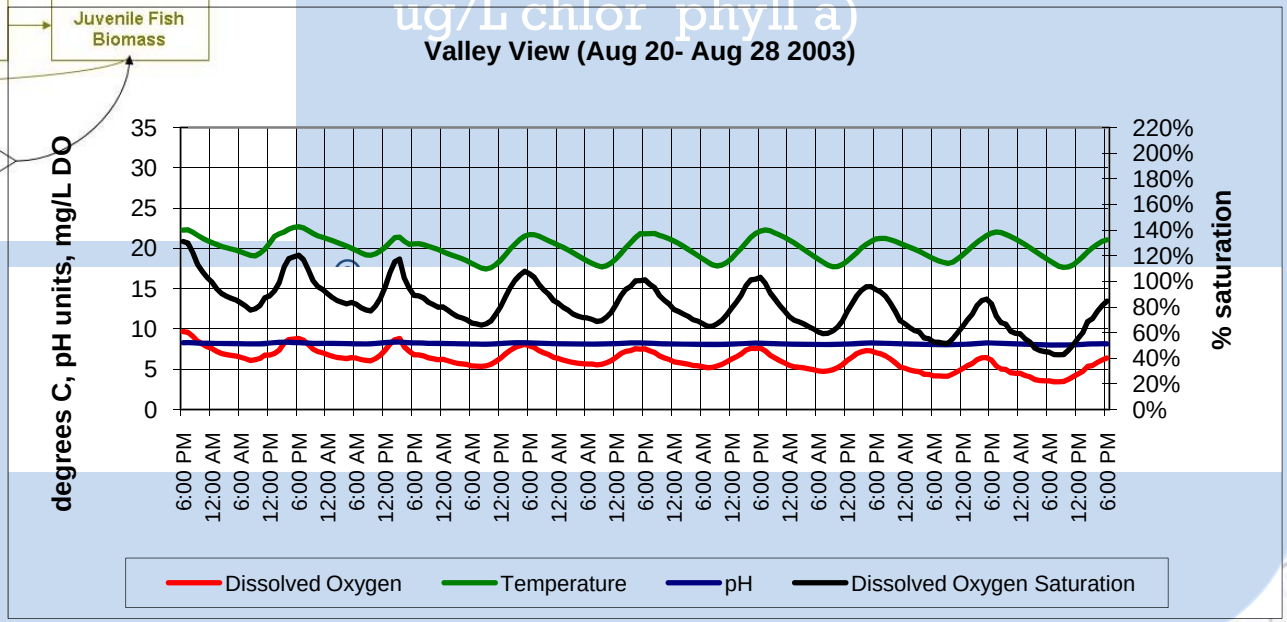
Water-oriented wildlife (3D)

- Primary evidence
  - 15% of samples exceed dissolved oxygen standard for aquatic life specific to 3D use
- Importance of Cutler wetlands
  - Wetlands around Cutler nominated by the Audubon Society as an Important Bird Area (IBA)
  - 25 bird species at Cutler feed on taxa that are NOT tolerant of hypereutrophic conditions
  - Cutler Reservoir is dominated by macroinvertebrate taxa tolerant of eutrophic conditions

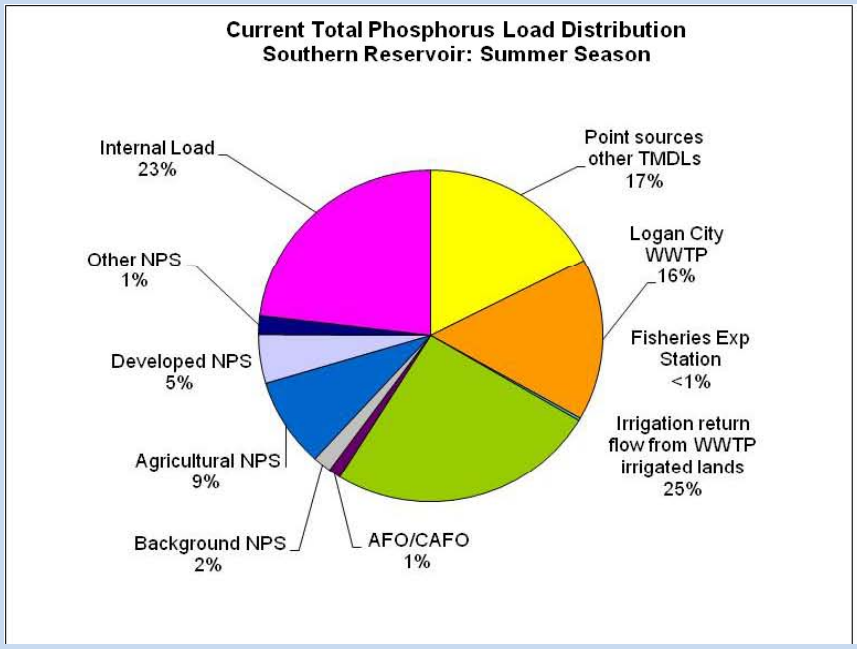
Linkages

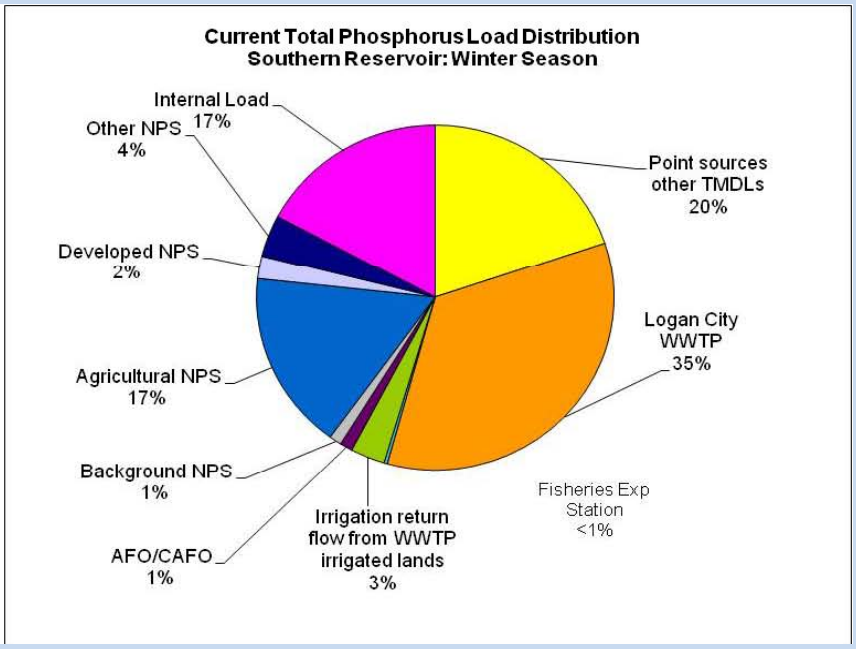


- Dissolved oxygen impairment (25% of data violate standard)
- Diurnal pattern of DO indicates nighttime algal respiration
- High algal concentrations in Cutler Reservoir (max over 1,000 ug/L chlor phyll a)

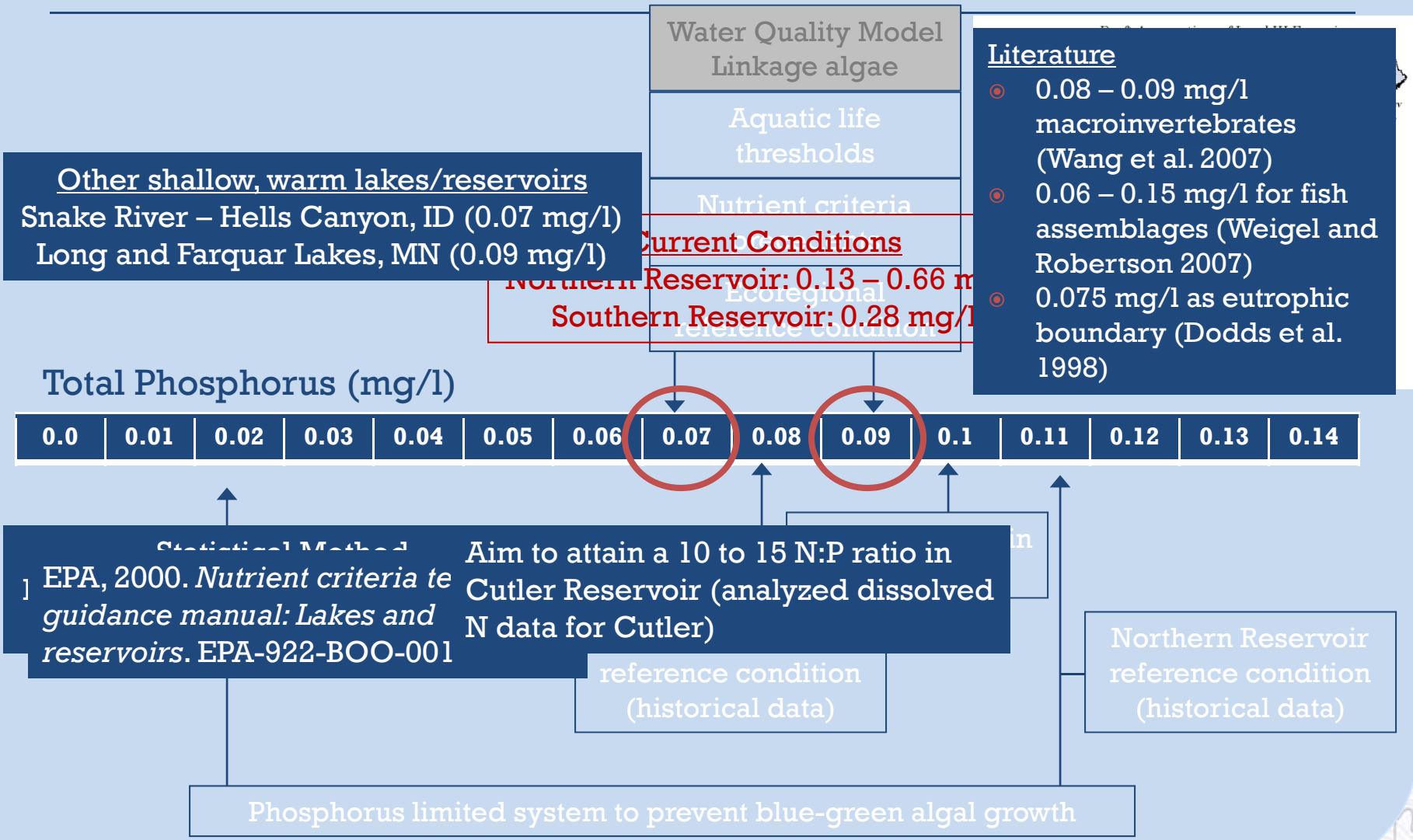


Current Sources





Evidence used to Select Phosphorus Endpoints (Summer Season)



Phosphorus Endpoints

	Winter	Summer
Middle Bear River	0.05 mg/l	0.05 mg/l
Southern Reservoir	None	0.09 mg/l
Northern Reservoir	0.075 mg/l	0.07 mg/l

- Middle Bear River TMDL set endpoint for Bear River above Cutler at 0.05 mg/l
- Lower Bear River TMDL set endpoint of 0.075 mg/l at Cutler Dam year round
- Summer endpoints derived from multiple lines of evidence

TMDL Conclusions and Current Status

- Cutler Reservoir's beneficial uses are impaired
- Linkage between DO and TP is well established, despite some uncertainty
- TMDL analysis was scientifically credible and rigorous
- Process included multiple stakeholders with extensive involvement
- Phased TMDL approach was selected to address uncertainty
- Monitoring plan has been developed to better define water quality endpoints
- Adaptive implementation efforts have begun to control pollutant sources

Uncertainty

- Uncertainty and TMDLs
  - All TMDLs and all scientific analyses have uncertainty
  - Good science acknowledges and discloses complexity and uncertainty
  - Water quality models are more 'precise' and quantitative but not necessarily more accurate
  - Margin of Safety (MOS) in TMDLs accounts for uncertainty
  - Cutler TMDL selected a Phased Approach to avoid 'over-regulating' during this iteration

Cutler Uncertainty

- Sources of uncertainty in Cutler Reservoir
  - Lack of paired TP-Chl a – DO datasets to quantify Cutler specific TP – DO linkage
  - Unique nature of Cutler Reservoir system:
  - Shallow depth and wetland habitat
  - Turbidity interference with algal growth
  - Tributary TMDL attainment (5 in watersheds)
- Phased Approach and Adaptive management
- Continue to monitor the system

TMDL Allocations

Cutler TMDL Load Analysis

All units Kg/Season	Current Load		TMDL Allocated Load		Load Reduction		Percent Reduction	
	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
Logan WWTP	11,236	21,597	4,405	11,831	6,831	9,766	61%	45%
Irrigation flow to Cutler from WWTP effluent	18,062	1,953	7,082	1,070	10,980	883	61%	45%
Total Southern Reservoir	71,201	62,622	25,539	28,986	45,662	33,636	64%	54%
Total Northern Reservoir	127,402	119,829	62,103	63,461	65,299	56,368	51%	47%

Logan City

- Largest discharger of TP in Bear River basin
  - Hyrum, Richmond, and Lewiston upgraded
  - Idaho municipalities are in compliance
  - TP loads at stateline are in compliance
- TMDL effluent limits
  - Effluent concentration of 1.3 to 1.9 mg/l (from 3.4 – 3.7 mg/l)
  - Water quality trading during the winter is permitted
  - Other WWTP in the state meet a 0.1 mg/l effluent target
- Costs of compliance
  - Tertiary treatment is NOT required to meet TMDL
  - Estimated cost to comply is $5 million (CH2MHill 2010)
  - Agriculture has spent more than $10 million since 1990
- Logan City is moving forward
  - Retained a design engineer to upgrade WWTP


COMPLAINT
DEPARTMENT
PLEASE TAKE A NUMBER
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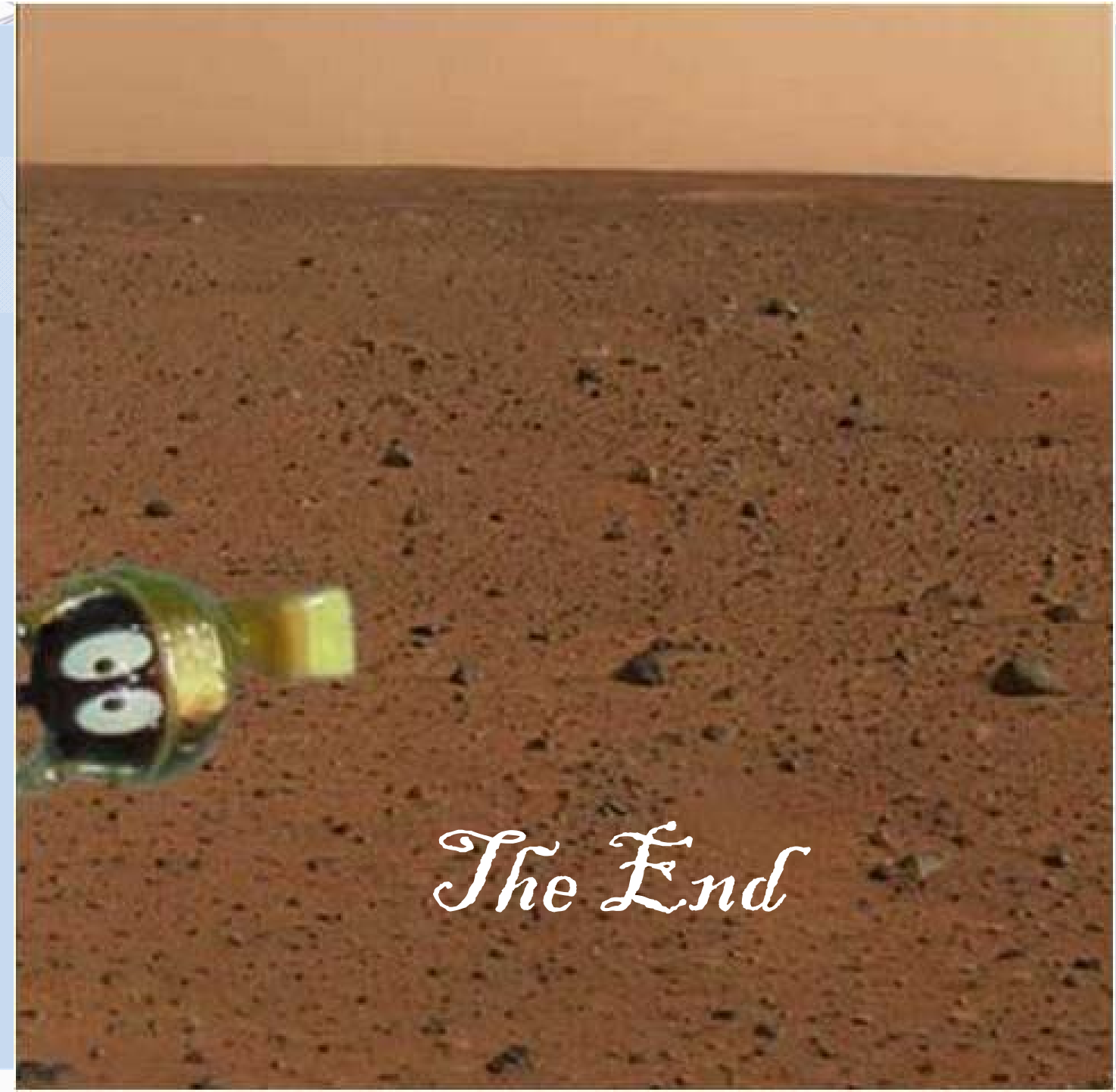
The End