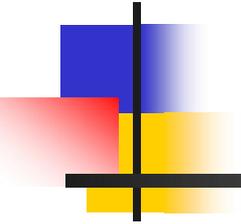


# **Developing a Selenium Standard for the Great Salt Lake**

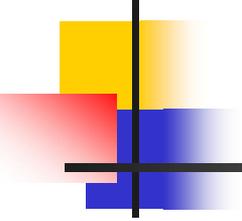
Southwest Jordan Valley Ground Water Cleanup

Project Stakeholder's Forum



Walt Baker  
Utah Division of Water Quality

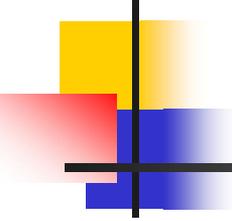
October 12, 2005



# Response to Selenium Concern

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- In response to the selenium concern, DWQ recognized the need to develop numerical standards to protect the beneficial uses of the GSL
- The proposing parties recognized the need to involve interested parties to address the questions about selenium fate and transport
- Establish the Great Salt Lake Water Quality Steering Committee to study the water quality of the Lake and make recommendations to the Division of Water Quality regarding a numeric water quality standard for Selenium for the open waters of the Lake

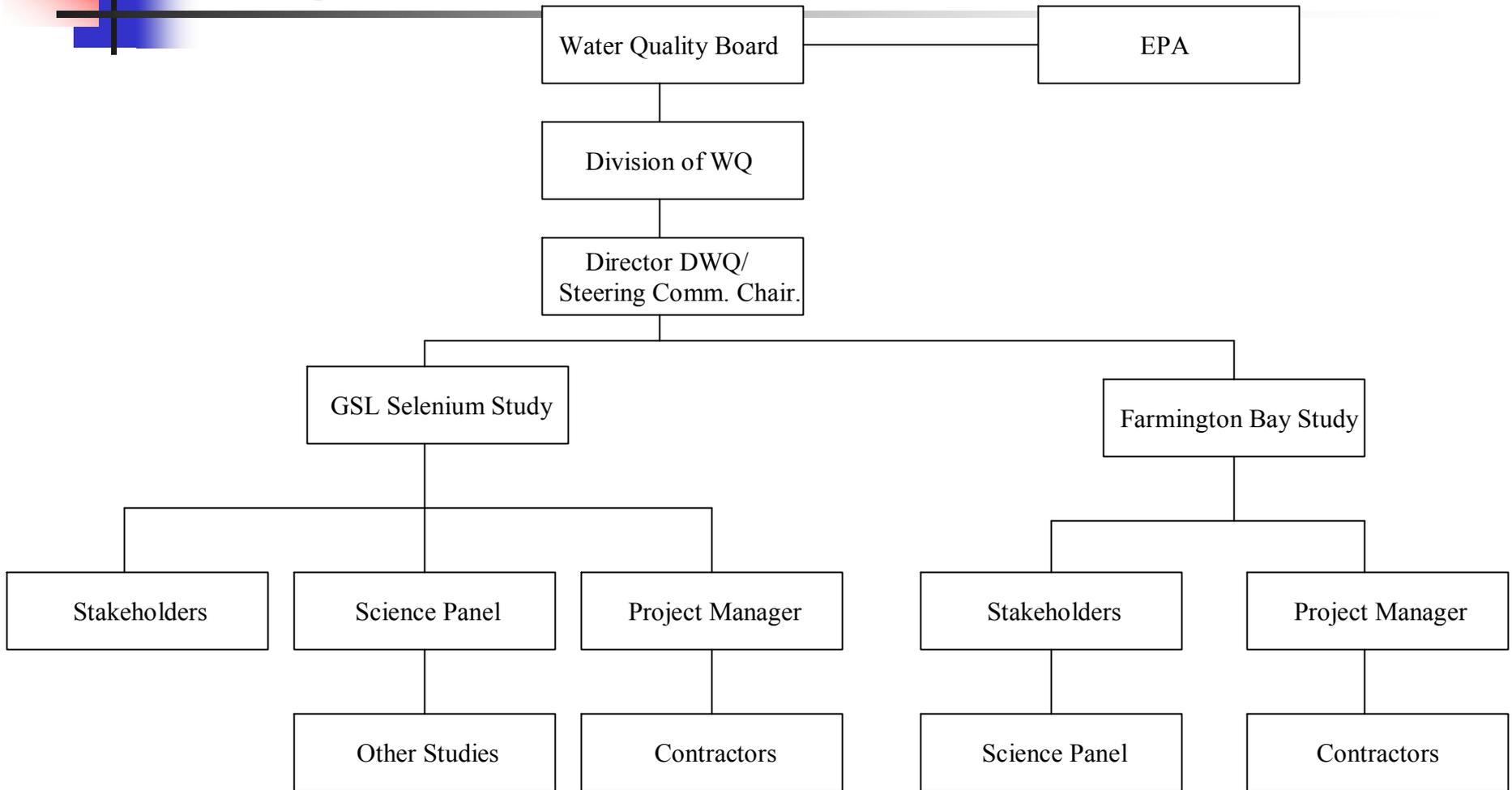


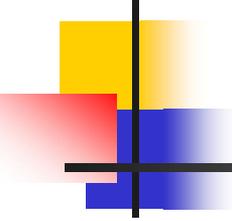
# The Road to Developing a Se Standard for the GSL

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- Preliminary discussions were held in March 2004 with the FGSL to define a process
- April – July 2004: Work Group recommends a Steering Committee be established and a Science Panel be selected
- August 2004: 1<sup>st</sup> meeting

# Organizational Chart

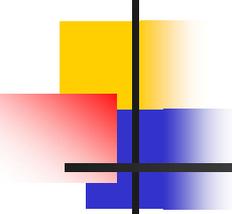




# Steering Committee Purpose

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- Create a partnership among stakeholders
- Conduct a transparent public process
- Establish a Science Panel
- Sponsor and guide scientific research
- Help secure funding
- Adhere to state & federal laws & regulations
- Make recommendations to the Division of WQ

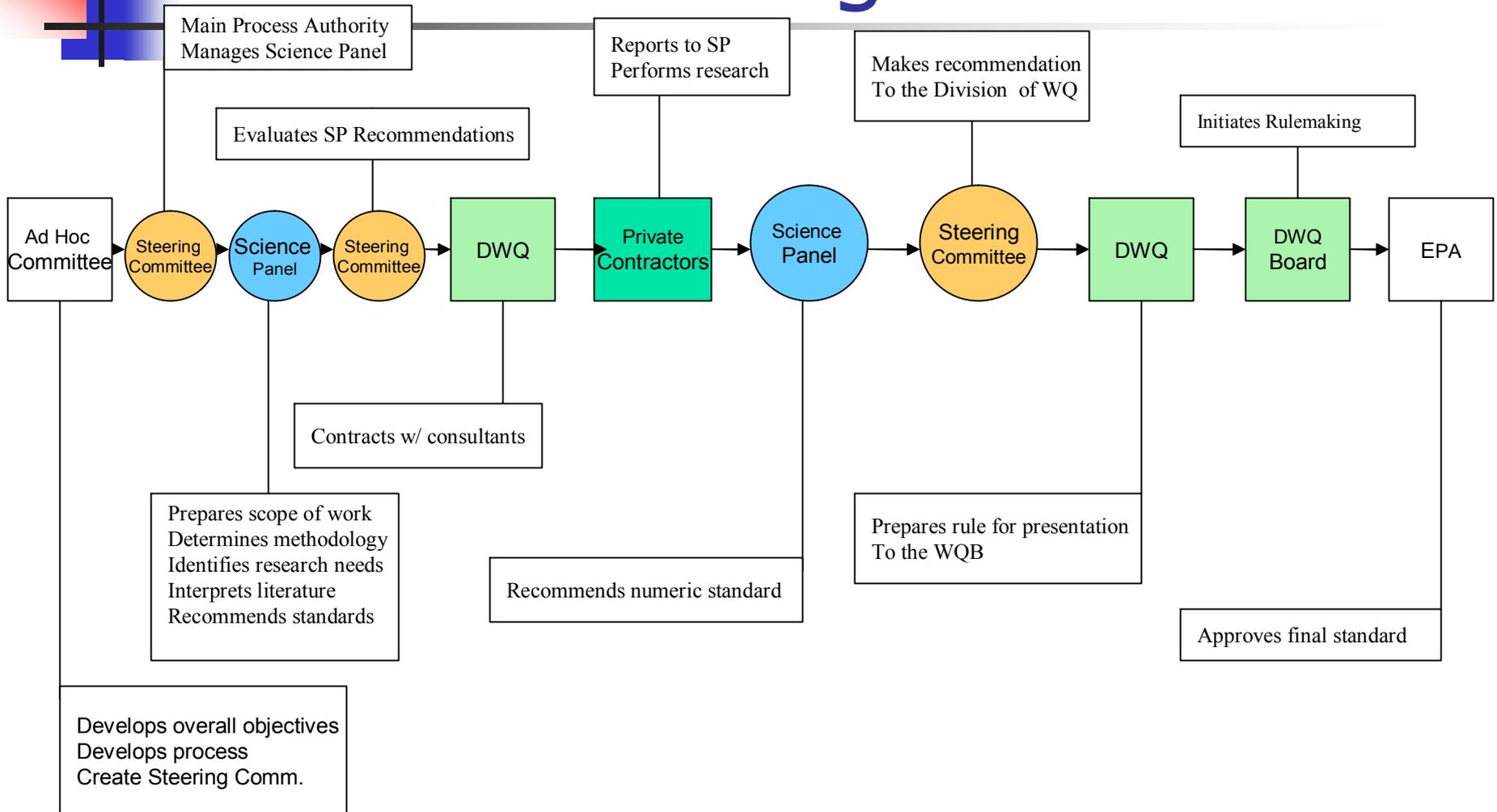


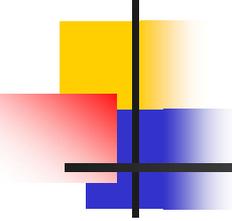
# Steering Committee Make-up

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1. Forestry & State Lands
2. Wildlife Resources
3. EPA Region VIII
4. US Fish & Wildlife
5. Brine Shrimp Industry
6. Mineral Extractors
7. US Geological Survey
8. Kennecott Utah Copper
9. Jordan Valley WCD
10. POTWs
11. GSL Alliance
12. GSL Alliance
13. Duck Clubs
14. Wasatch Front RC
15. DEQ
16. DWQ

# Standard Setting Process

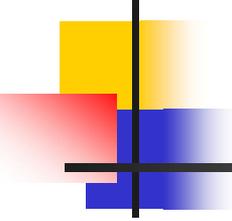




# Science Panel

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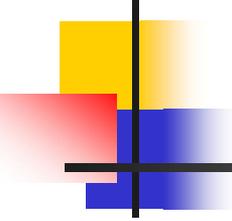
- Bill Adams,  
Rio Tinto
- Anne Fairbrother,  
EPA
- Don Hayes,  
University of Utah
- Theron Miller,  
DWQ
- Bill Moellmer,  
DWQ
- Clay Perschon,  
DNR
- Terresa Presser,  
US Geological Survey
- Joseph Skorupa,  
US Fish & Wildlife
- Bill Wuerthele,  
EPA



# Miscellaneous

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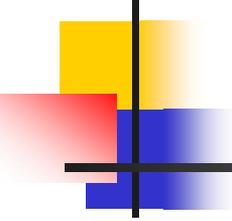
- The goal is to have the Steering Committee make a recommendation for a Selenium standard to DWQ by December 2007
- Local, state and federal funds are pledged to this effort
- The Steering Committee may be maintained to develop other standards for the GSL



# The Great Salt Lake: Biogeochemistry Biology 101- March 15, 2005

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- Background Presentations on the Hydrology and Biology of the Great Salt Lake
  - 10 Invited Scientists
    - Bathymetry & Geohydrology
    - Selenium in Sediments, Brine Shrimp, Birds
    - Brine Shrimp Studies and History of the Industry
    - Biology of the Salt Lake Eared Grebe
    - Current Bird Research on the Great Salt Lake

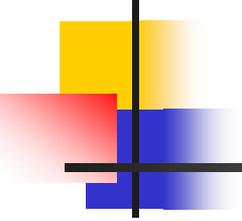


# Science Panel Meeting

## March 16, 2005

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- Motion: Develop a Conceptual Model of the “flow” of Selenium in the Ecosystem
  - Qualitative analysis of where the selenium moves
  - Graphical representation
  - Framework to determine what is needed for the future
  - Utilize funds (< \$20,000) to put together this model
  - Important considerations: Skills, Costs, Timing



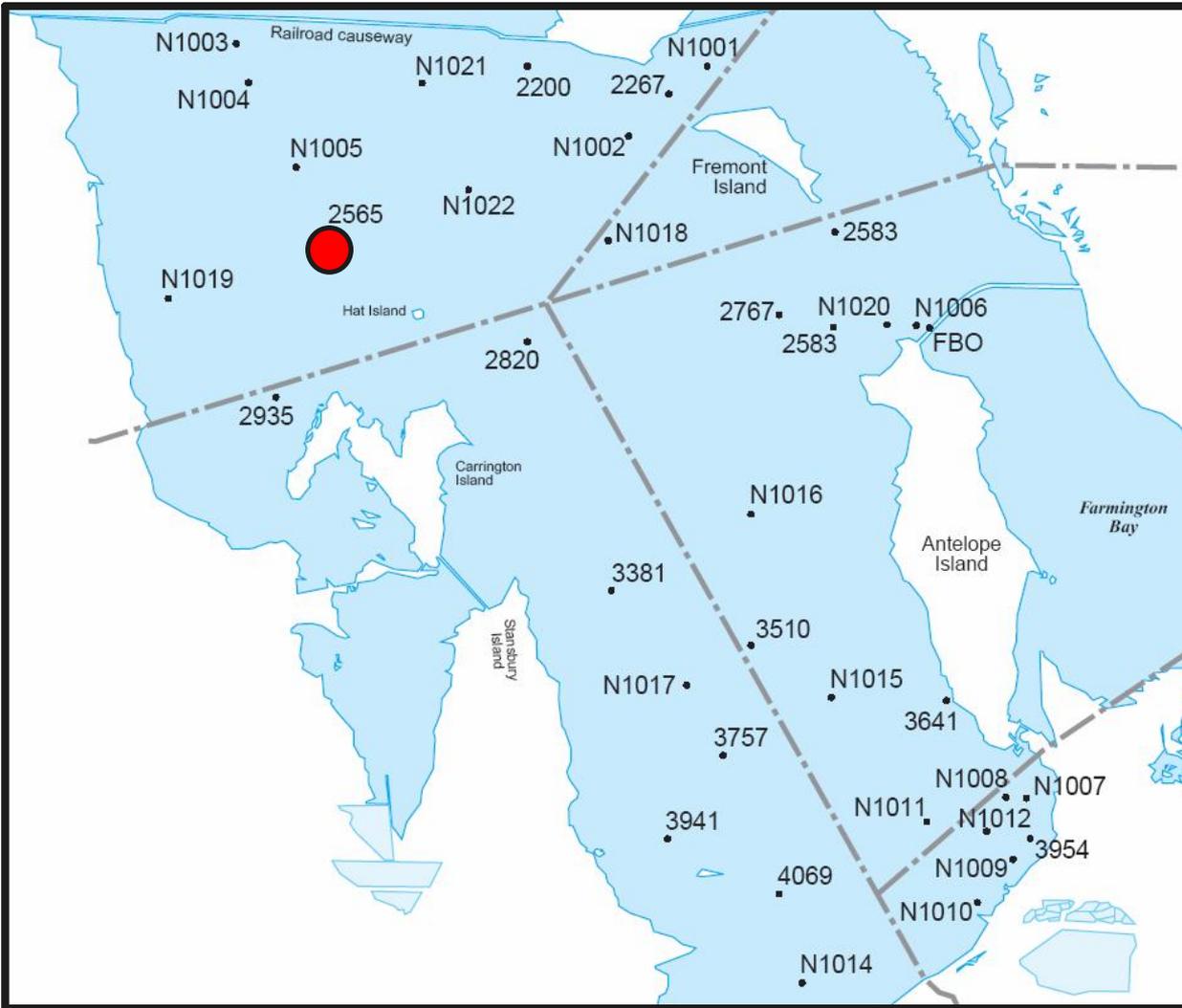
# Sampling Round Robin

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## Purposes:

- Determine the best analytical method for the GSL matrix
- Determine the best achievable detection limit
- Determine the variance between the laboratories participating
- Determine the best laboratory for future work

# SAMPLE LOCATION



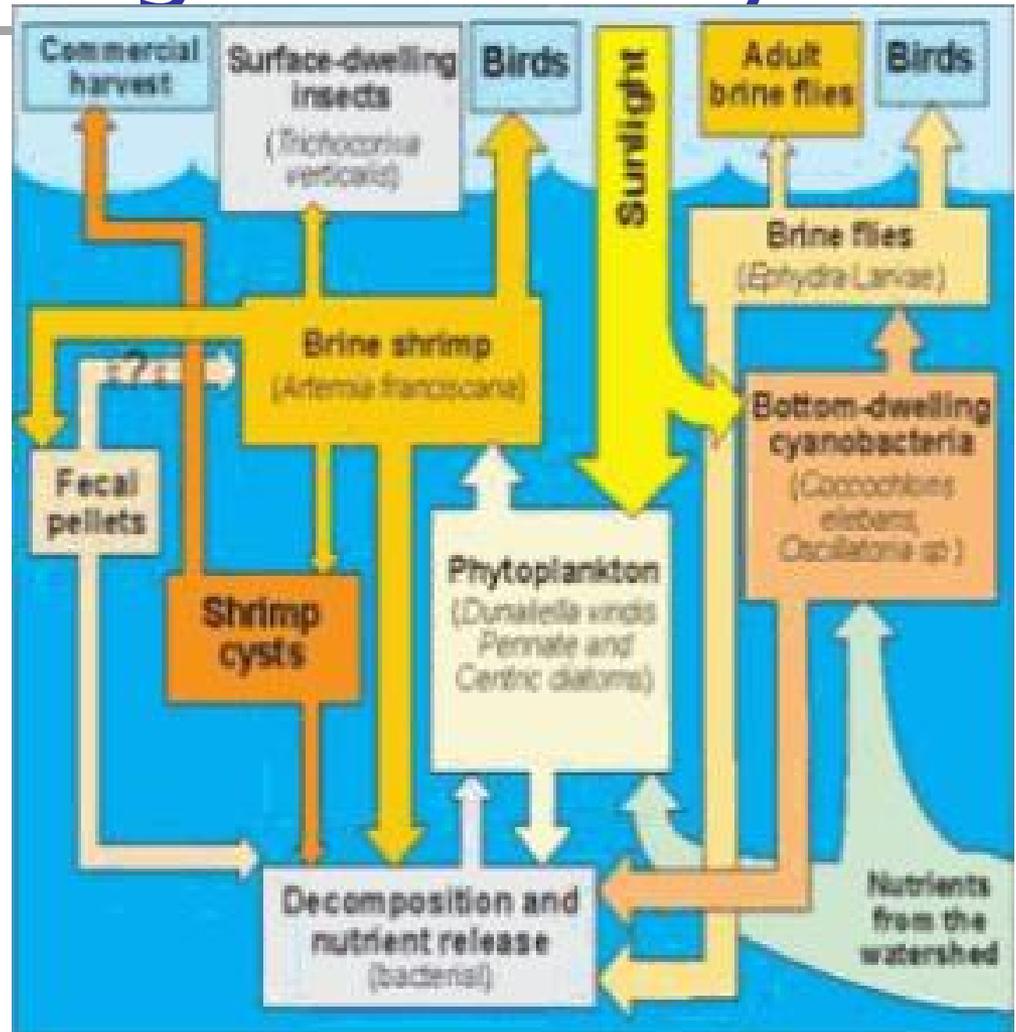
- Site 2565
- Total depth = 7.65 m
- Sample depths = 0.5 m and 7.0 m
- Sulfide (7.0 m) = 13 ppm

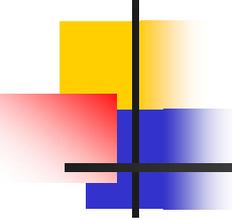
# Hydride Generation



# Understanding the Life Cycle

- Determine
  - Movement of Selenium into the Sediments
  - From Sediments into algae, brine flies, and brine shrimp
  - Effect on birds of eating brine flies & shrimp





# Financial Summary

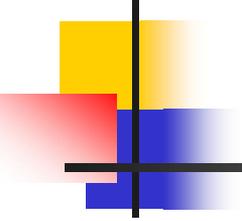
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## Receipts:

NC	\$20,000
JVWCD	\$20,000
EPA	\$15,000
NDSID	\$750,000
State Lands	<u>\$100,000*</u>
	\$905,000

## Expenditures:

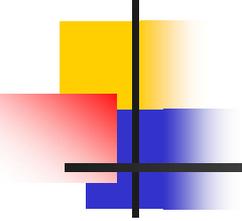
Round Robin	\$15,000
Science Panel	\$21,000
Facilitator	\$3,000
Misc.	\$1,000
Se Model	<u>\$20,000</u>
	\$60,000



# Beneficial Use Designations (Classifications)

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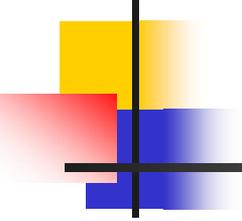
- Class 1C - Drinking Water
- Class 2A, 2B - Recreation ( e.g. swimming, boating etc.)
- Class 3A, 3B, 3C, 3D - Wildlife Uses
- Class 4 - Agricultural Uses
  
- **Example:** Jordan River - 2B, 3B, 3D, 4
  - North Temple to Farmington Bay



# Impaired Waters

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- Stream, River, Lake or Reservoir that is not meeting water quality standards.
- 303(d) List - All waterbodies that are impaired
- Utah's 303(d) list on DWQ Website:  
[www. waterquality.utah.gov](http://www.waterquality.utah.gov)
- Impaired waterbodies require a TMDL



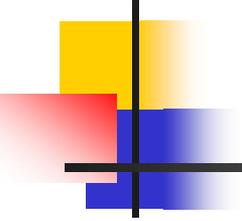
# Lower Jordan River Water Quality Impairment

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- Listed on Utah's 303(d) list in 2004
- Pollutants Listed
  - Total Dissolved Solids
  - Dissolved Oxygen
  - Temperature
- Likely Addition
  - Bacteria

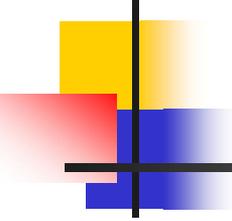
# Total Maximum Daily Loads

## The Process



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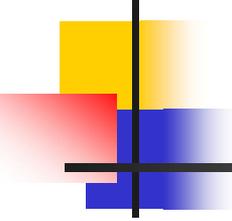
- Review existing water quality data
- Identify sources and causes of pollutants
- Identify water quality goals
- Establish the amount of pollutant that can be allowed in total
- Allocate allowable pollutant loads
- Identify and implement measures to achieve and maintain water quality standards
- Monitor to assure that goals are met



# Lower Jordan River TMDL Tentative Schedule Phase 1

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- **October 2005** –Water quality analysis and data review
- **October 2005** – Assess Sources and Loads causing impairments
- **March 2006** – Evaluate Modeling Capabilities to complete a TMDL



# Lower Jordan River TMDL Tentative Schedule Phase 2

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- **June 2006** – Proceed with TMDL Analysis
- **September 2006** – Sources and Loads compiled
- **January 2007** – Draft TMDL Allocation
- **May 2007** – Draft TMDL; Comment Period
- **September 2007** – TMDL Completed