Utah's Water Quality Program

GSL Advisory Council

Walt Baker, Division of Water Quality

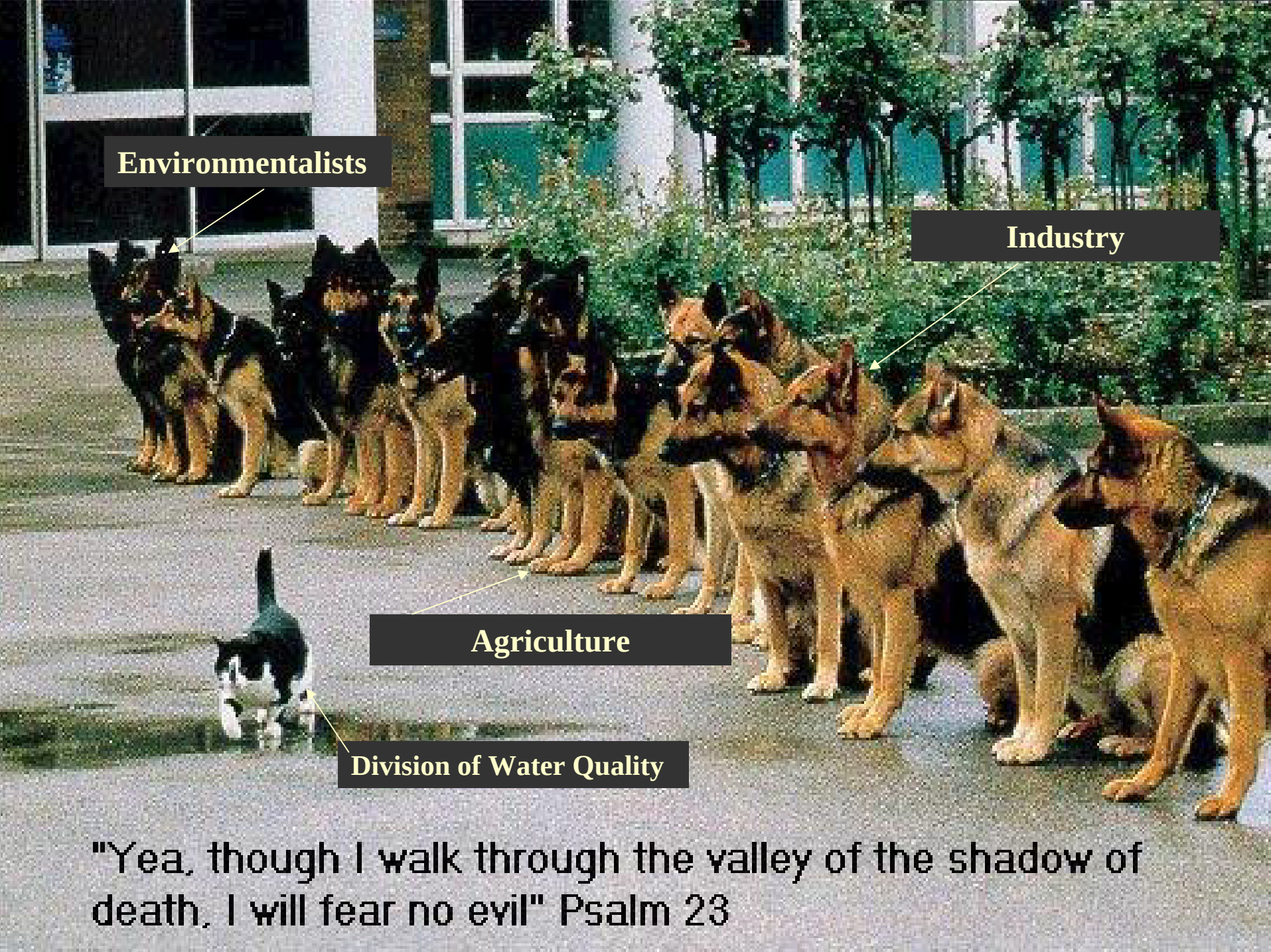
July 29, 2010

12-Member Utah Water Quality Board

- DEQ Exec. Director
- Minerals Industry
- Food Processing
- Manufacturing
- Municipal Government (2)
- Agricultural and Livestock Interests
- Fish, Wildlife and Recreation
- Improvement Districts
- Local Health Dept.
- At-large (2, one of which must represent environmental interests)

Board Responsibilities:

- Prevent, control and abate water pollution
- Encourage studies
- Develop water quality standards
- Develop rules
- Fund projects
- Issue orders
- Oversee onsite systems
- Issue const. permits
- Discharge permits
- Meet federal law
- Develop TMDLs
- Regulate UICs
- Regulate sewage sludge
- Govern wastewater operator certification
- Regulate wastewater reuse
- Operating permits


Environmentalists
Industry
Agriculture
Division of Water Quality
"Yea, though I walk through the valley of the shadow of death, I will fear no evil" Psalm 23

Develop Water Quality Standards

Clean Water Act (1972)

"Restore and Maintain the Chemical, Physical, and Biological Integrity of the Nation's Waters"

Water Quality Standards: The Foundation of Protection

- **Antidegradation Policy – Requires Minimal Decreases in Water Quality**
  - Category 1 [No Discharge Allowed]
  - Category 2 [Discharge only at Background]
  - Category 3 [Discharge permitted based on WLA]
  - Level I and Level II Evaluations

- **Beneficial Use – Classifications of Levels of Protection**
  - 1C Domestic Purposes
    - Protected for use as a raw water source for domestic water systems.
  - 3A Cold Water Fishery

- **Numeric Criteria – Numbers that Define the Beneficial Uses**
  - 50 ug/l Selenium – 1C
  - 4.6 ug/l Selenium Chronic – 3A

- **Narrative Criteria - Narrative that Defines the Beneficial Uses**
  - "become offensive"
  - "undesirable physiological responses"

Beneficial Use Classifications

All waters of the state are classified for their beneficial uses:

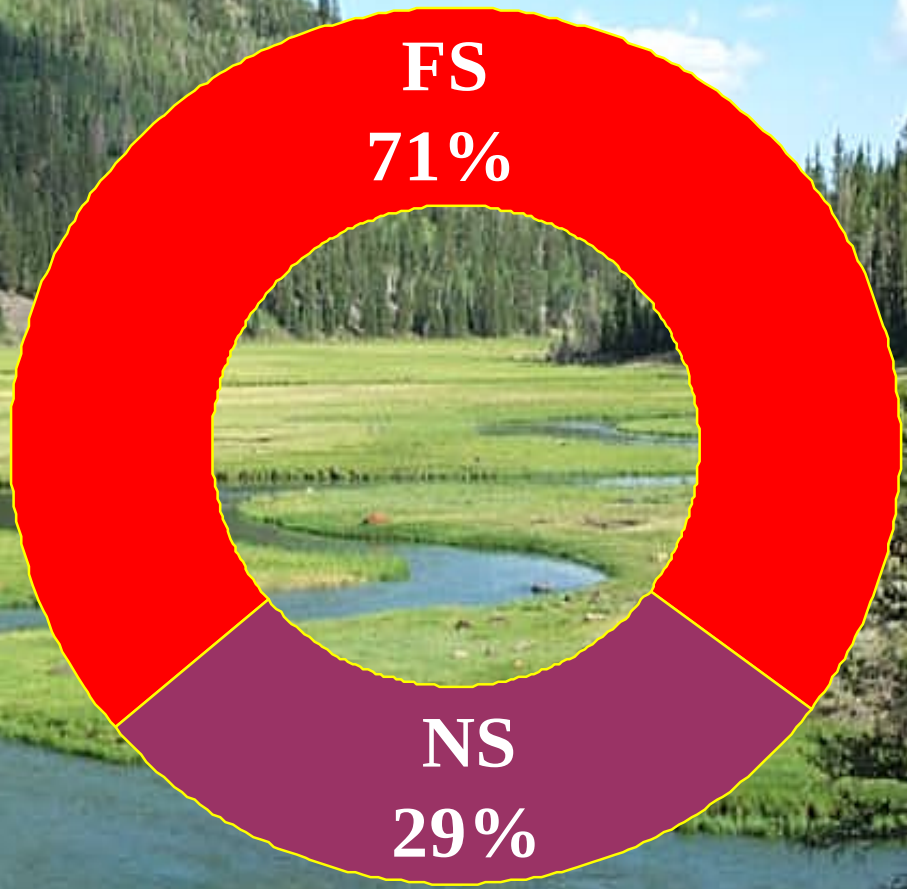
- ✓ Class 1 - protected as a drinking water source
- ✓ Class 2 - protected for recreational uses
- ✓ Class 3 - protected for use by aquatic life
- ✓ Class 4 – protected for agricultural uses
- ✓ Class 5 – (GSL) protected for mineral extraction; primary & secondary contact recreation; and wildlife

Utah's 2004 303(d) List of Impaired Waters

Castle Valley Utah

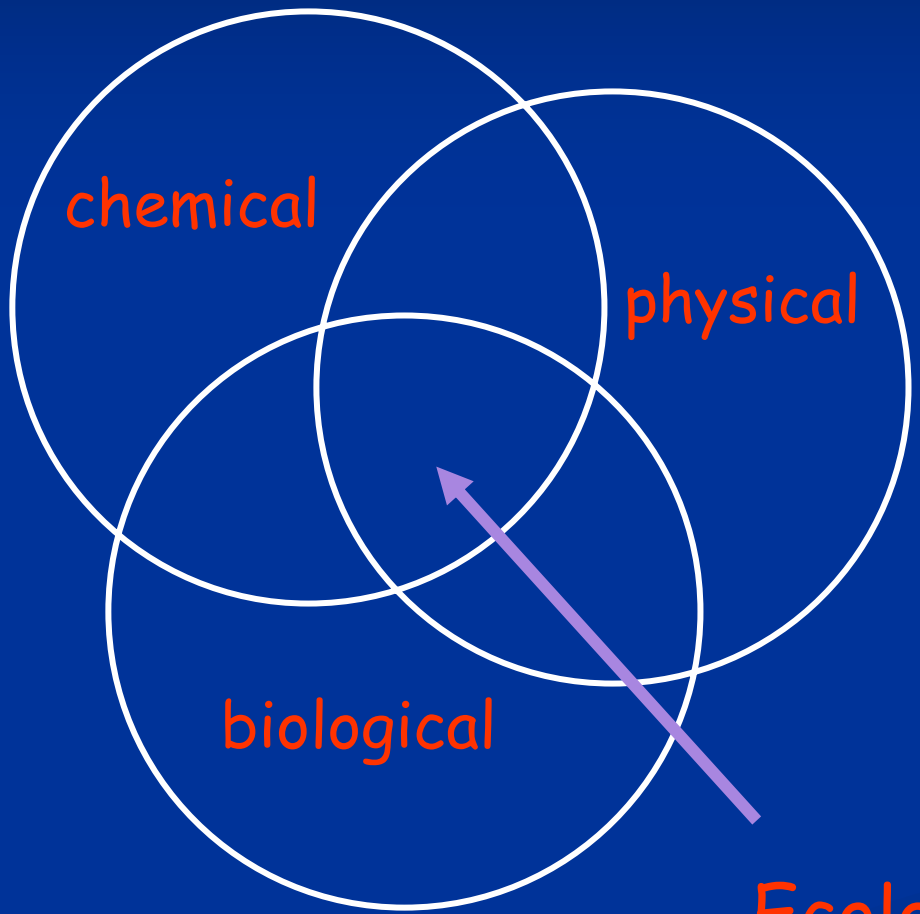
Department of Environmental Quality
Division of Water Quality

Utah Rivers/Streams Water Quality Status - 2008



Total miles = 10,795 miles

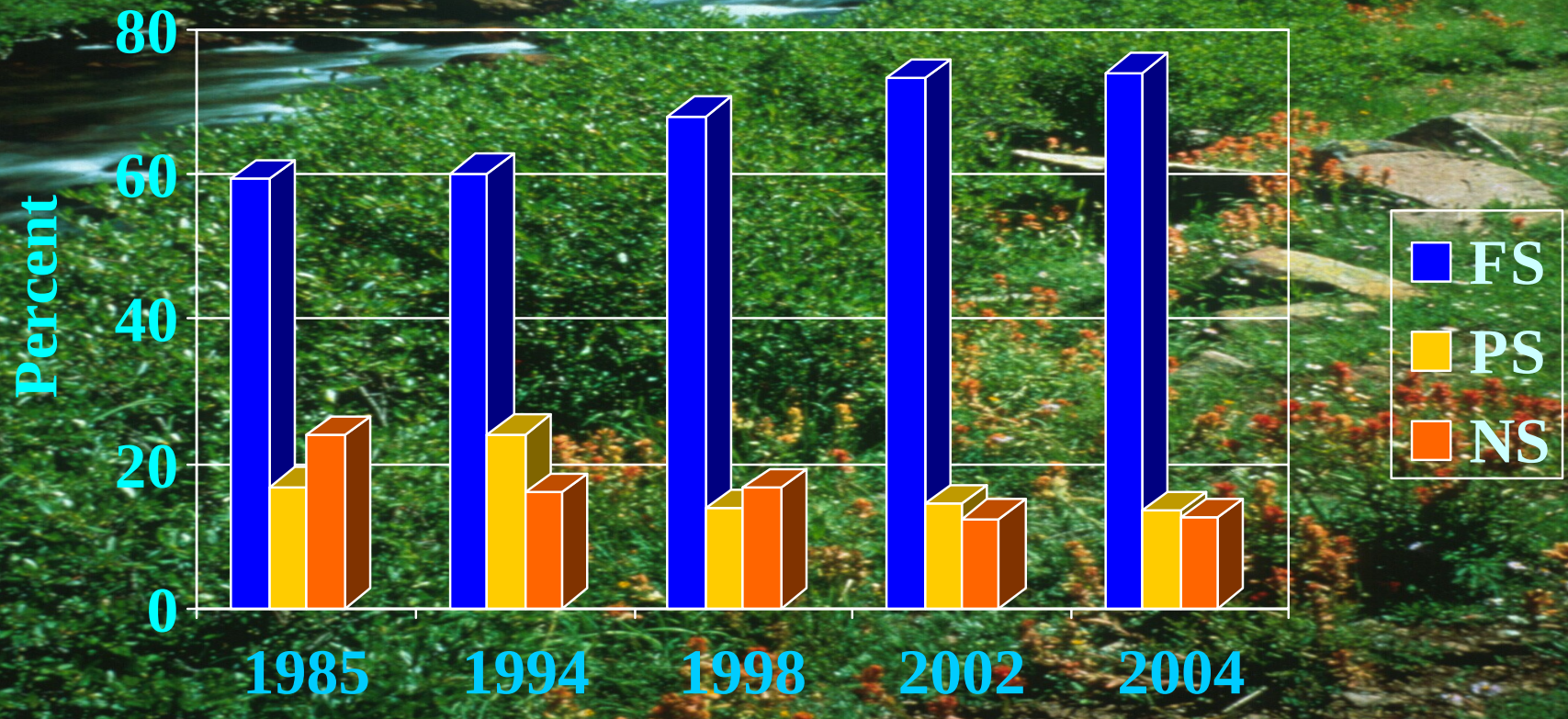
Biological Matrices



- Healthy waters have high chemical, physical and biological integrity
- Many water bodies are healthy in one component, but impaired in others.

Ecological Integrity

Historical Stream Water Quality Assessment



Great Salt Lake Issues

Beneficial Uses

- Class 1 – Drinking Water
- Class 2 – Recreational Use and Aesthetics
- Class 3 – Aquatic Wildlife
- Class 4 – Agricultural Use
- Class 5 (5A-5E) – The Great Salt Lake

Class 5 (5A-5E): The Great Salt Lake

- Based on Narrative Standard: no numeric standards except for selenium
- Beneficial Use: Protected for primary and/or secondary contact recreation, waterfowl, shore birds and other water-oriented wildlife including their necessary aquatic organisms in their food chain

Activists say Utah should test its waters for mercury

Government , industry need to do more to resolve mercury issue

Toxic mercury lurking in Great Salt Lake

Salt Lake Tribune

Mercury too high in Utah test fish

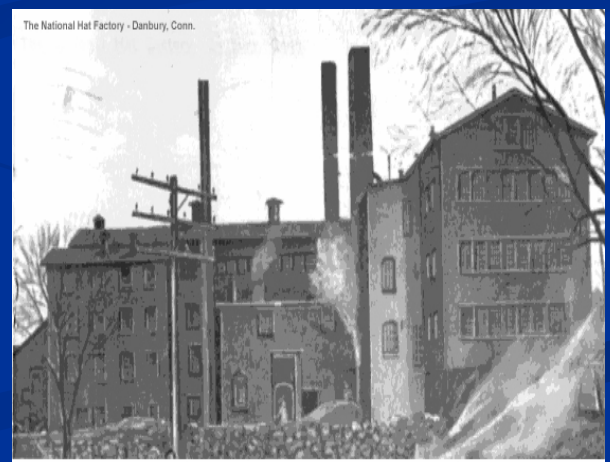
It's raining mercury

Mercury a worry for duck hunters

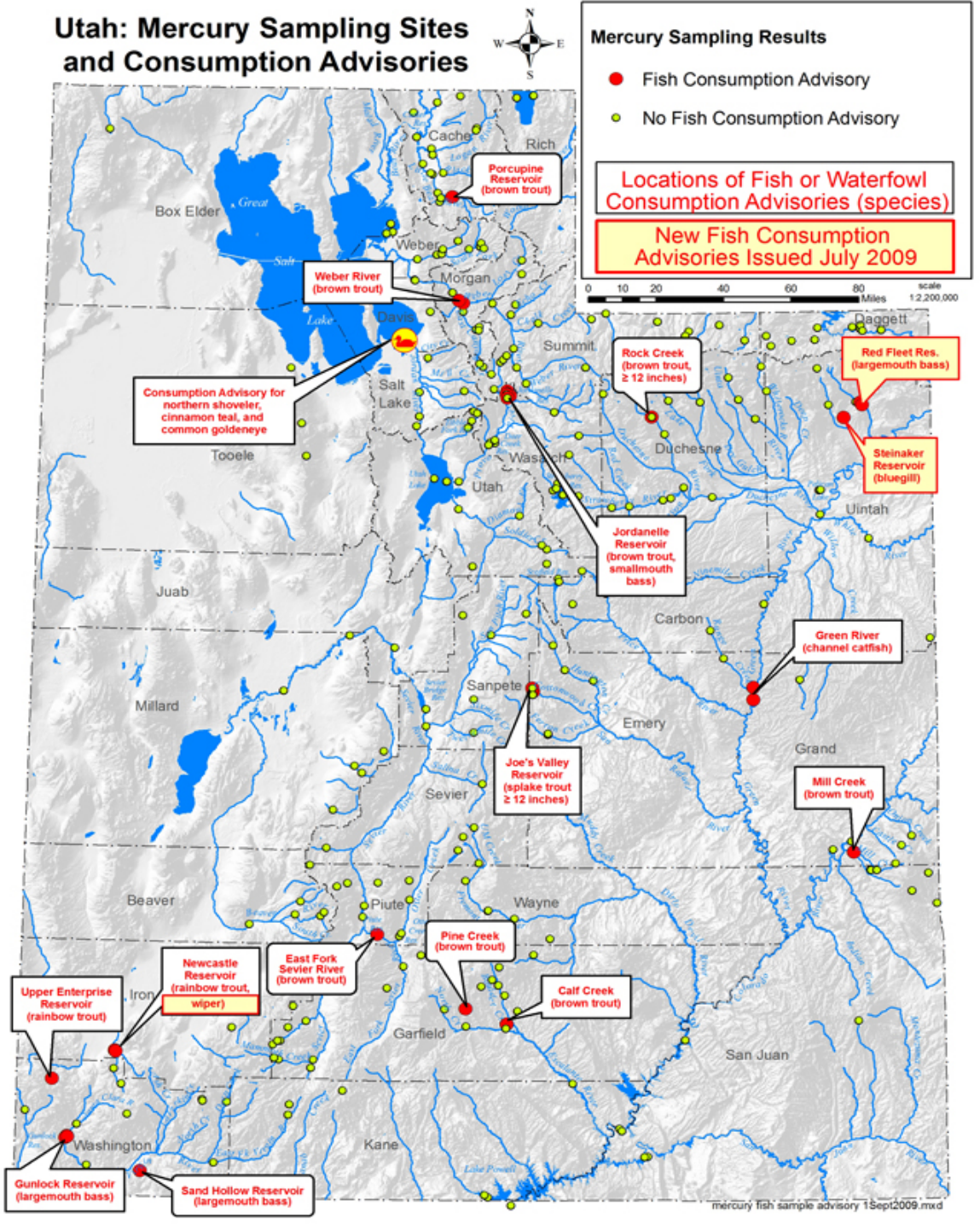
A poison wind: Toxic mercury blows into Utah from Nevada

What Are the Sources of Human-caused Mercury Emissions?

- Medical waste incinerators (10%)
- Smelting, equipment manufacturing (12%)
- Municipal incinerators (19%)
- Coal-fired power plants (33%)
- Industrial boilers (18%)
- Other

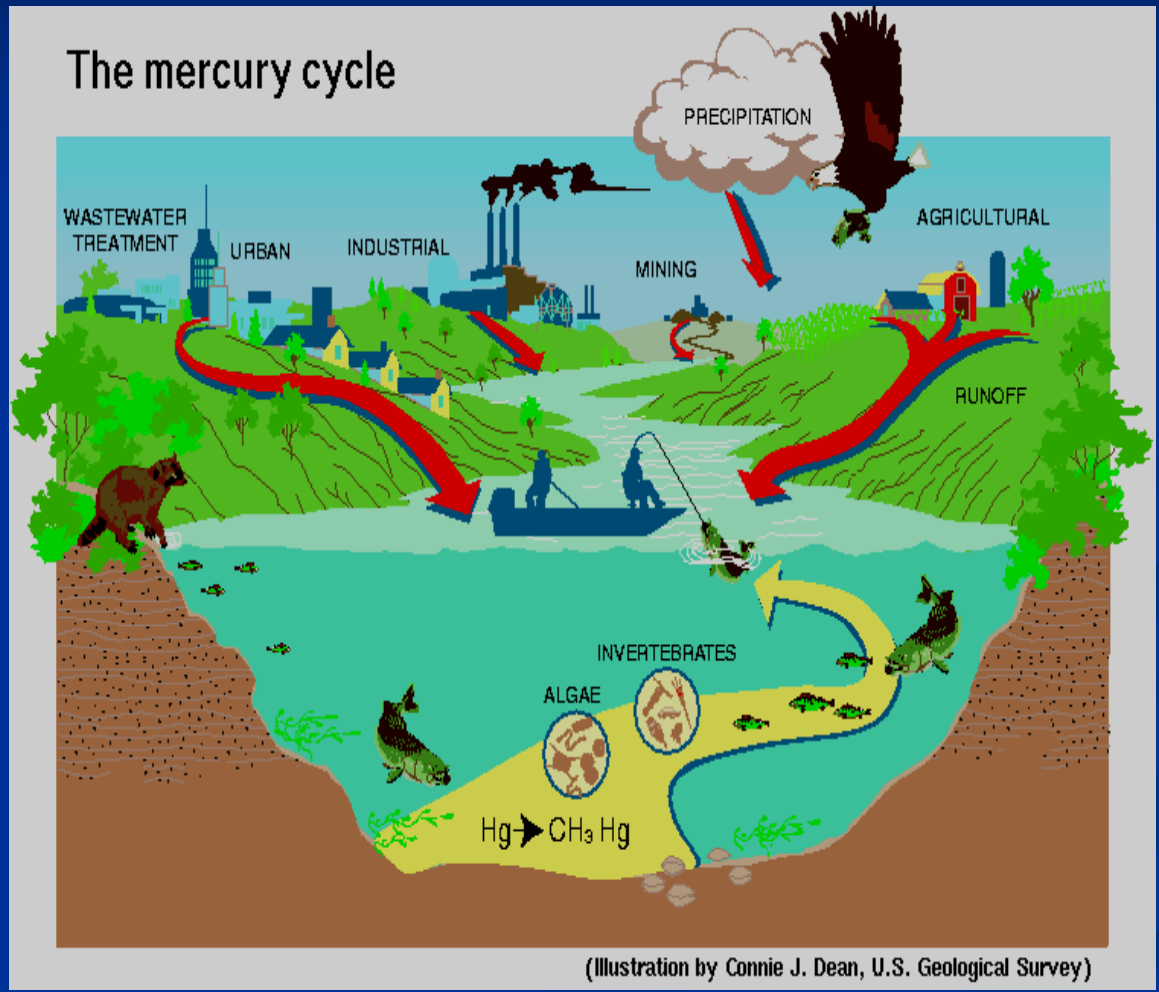


Hat Factory Along The Still River. Air and water discharges contaminated The River with mercury and other pollutants.

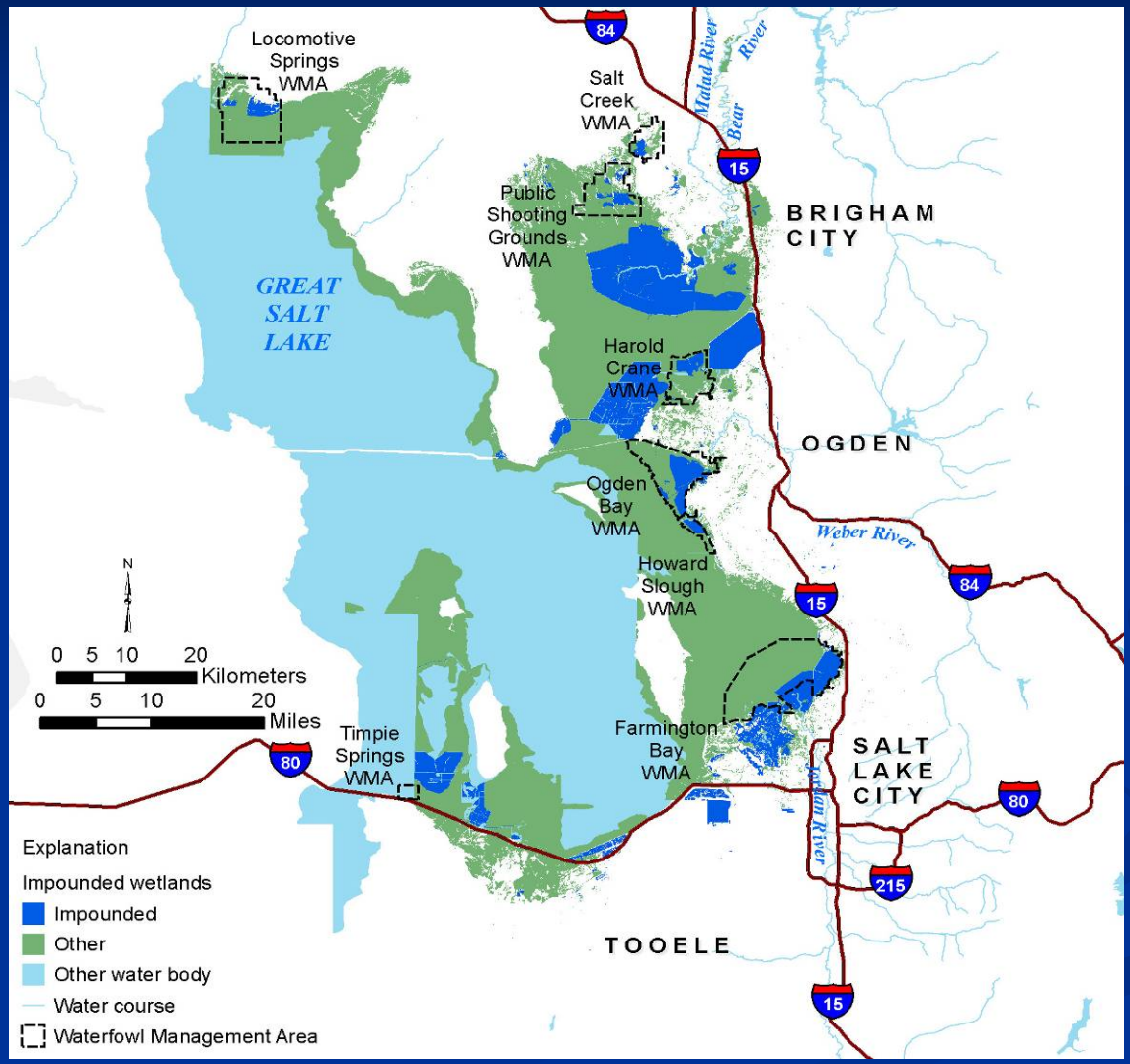

Utah: Mercury Sampling Sites and Consumption Advisories
N
W
E
S
Mercury Sampling Results
Fish Consumption Advisory
No Fish Consumption Advisory
Locations of Fish or Waterfowl Consumption Advisories (species)
New Fish Consumption Advisories Issued July 2009
0 10 20 40 60 80 Miles
scale 1:2,200,000
Porcupine Reservoir (brown trout)
Weber River (brown trout)
Consumption Advisory for northern shoveler, cinnamon teal, and common goldeneye
Rock Creek (brown trout, ≥ 12 inches)
Red Fleet Res. (largemouth bass)
Steinaker Reservoir (bluegill)
Jordanelle Reservoir (brown trout, smallmouth bass)
Green River (channel catfish)
Joe's Valley Reservoir (splake trout ≥ 12 inches)
Mill Creek (brown trout)
Pine Creek (brown trout)
East Fork Sevier River (brown trout)
Newcastle Reservoir (rainbow trout, wiper)
Upper Enterprise Reservoir (rainbow trout)
Calf Creek (brown trout)
Gunlock Reservoir (largemouth bass)
Sand Hollow Reservoir (largemouth bass)
Cache
Rich
Box Elder
Weber
Morgan
Davis
Summit
Daggett
Duchesne
Uintah
Salt Lake
Tooele
Utah
Wasatch
Juab
Carbon
Millard
Sanpete
Emery
Grand
Sevier
Beaver
Piute
Wayne
Iron
Garfield
San Juan
Washington
Kane
mercury fish sample advisory 1Sept2009.mxd


CAUTION
FISH CONSUMPTION ADVISORY
The Cheyenne River Sioux Tribe is advising that children (6 years and younger), women of childbearing age, women who are pregnant, women who are breast-feeding and the elderly(65 years and older) should not consume fish from the Cheyenne River, Moreau River, Lake Oahe and all surface waters of the Cheyenne River Sioux Reservation until further notice (including but not limited to stock ponds, dams, lakes, resevoirs, rivers, creeks, etc.).
People not in the above categories should minimize consumption of fish to no more than 16 ounces per month.
If you have any questions, please call the CRST Environmental Protection Department at (605) 964-6568 or the CRST Game, Fish and Parks Program at (605) 964-7812.
July15, 2002

The Mercury Cycle

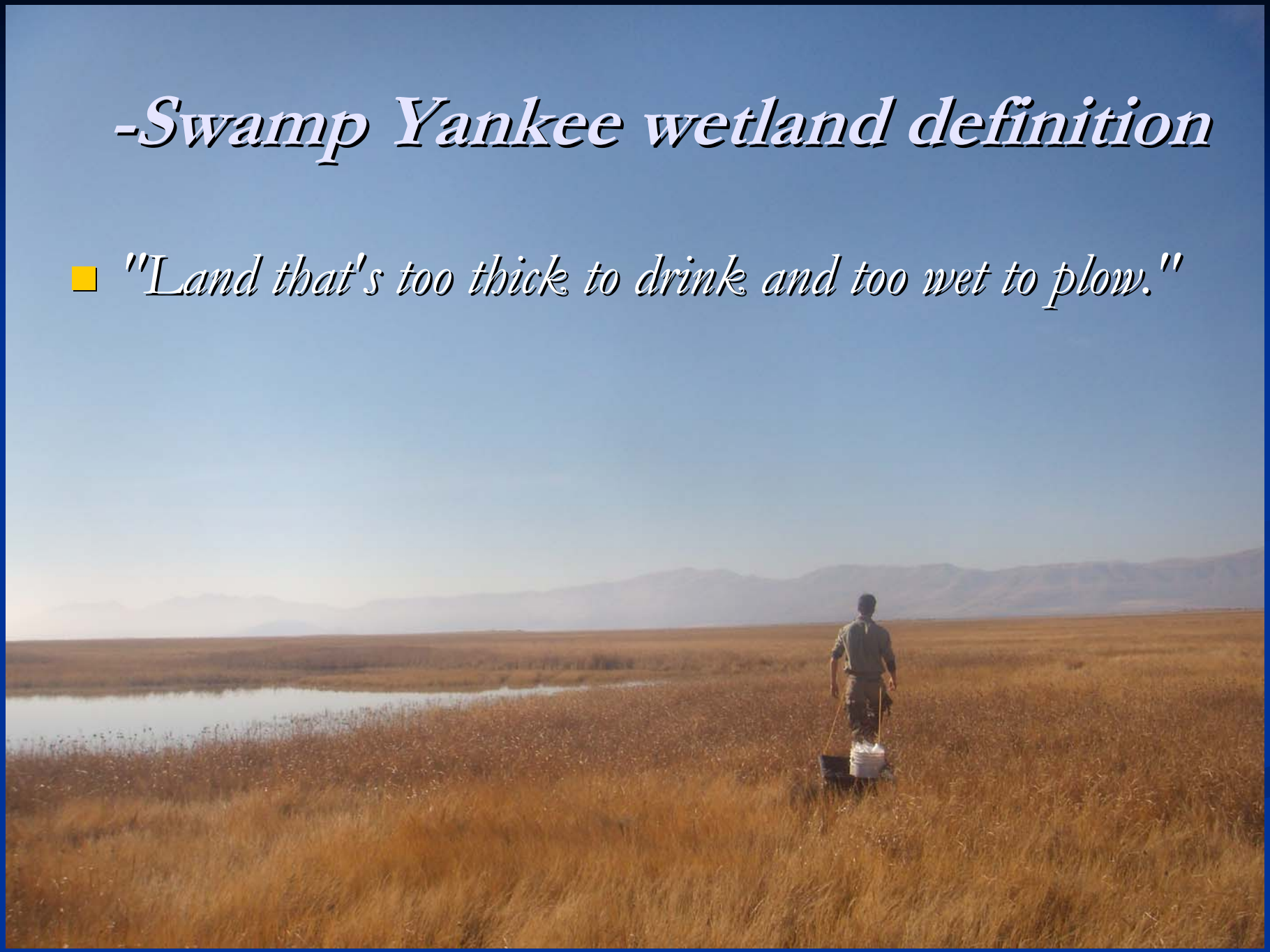


GSL Wetlands



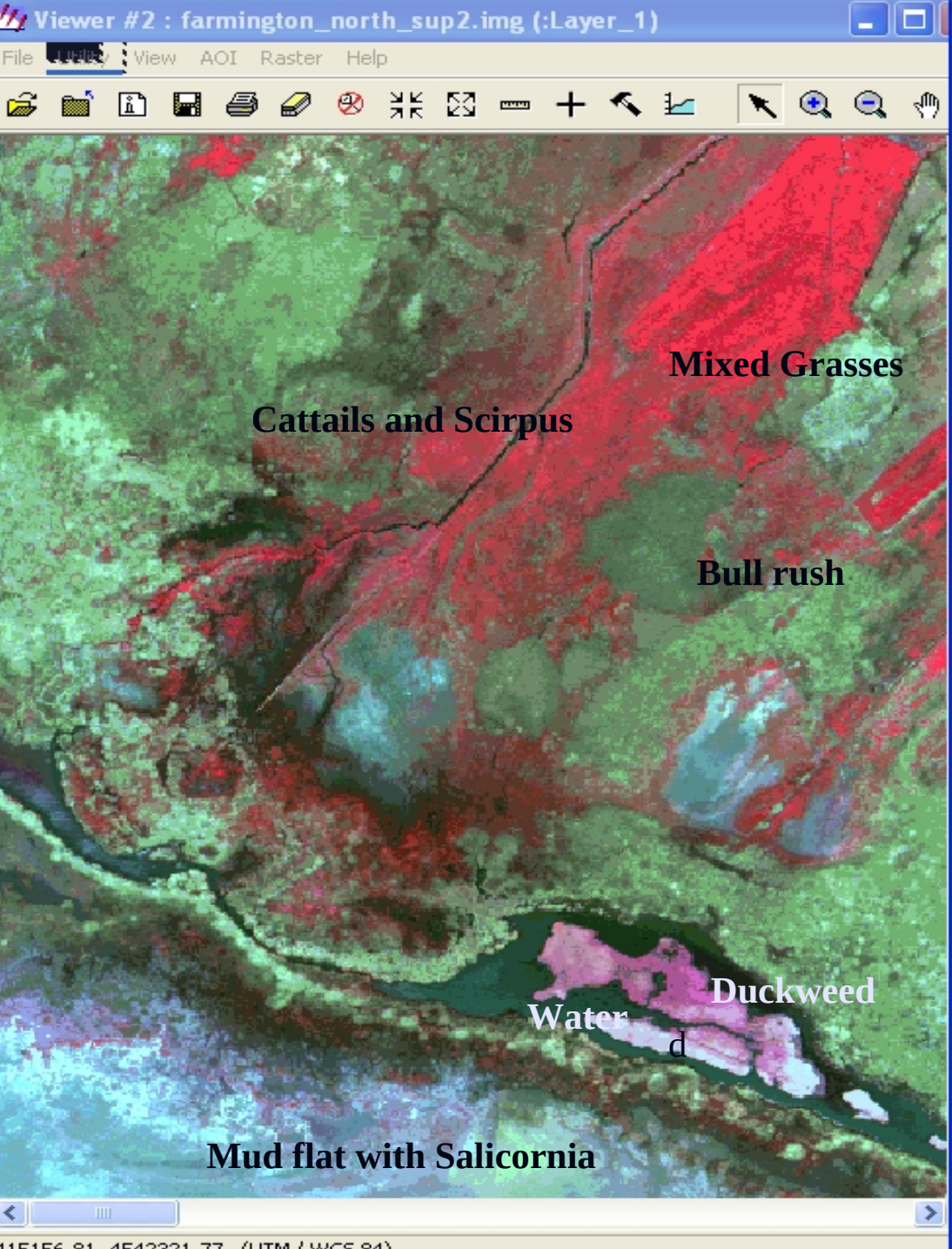
-Swamp Yankee wetland definition

- *"Land that's too thick to drink and too wet to plow."*



Goals of the Wetlands and Open Water Beneficial Use Assessment

- Develop appropriate methodology for assessment and site-specific criteria
- Understand “How the Ecosystem Works”
- Identify sensitive habitat, season and food chain links
- Identify tolerance thresholds (if they exist)



Raster Attribute Editor - farmington_nor...

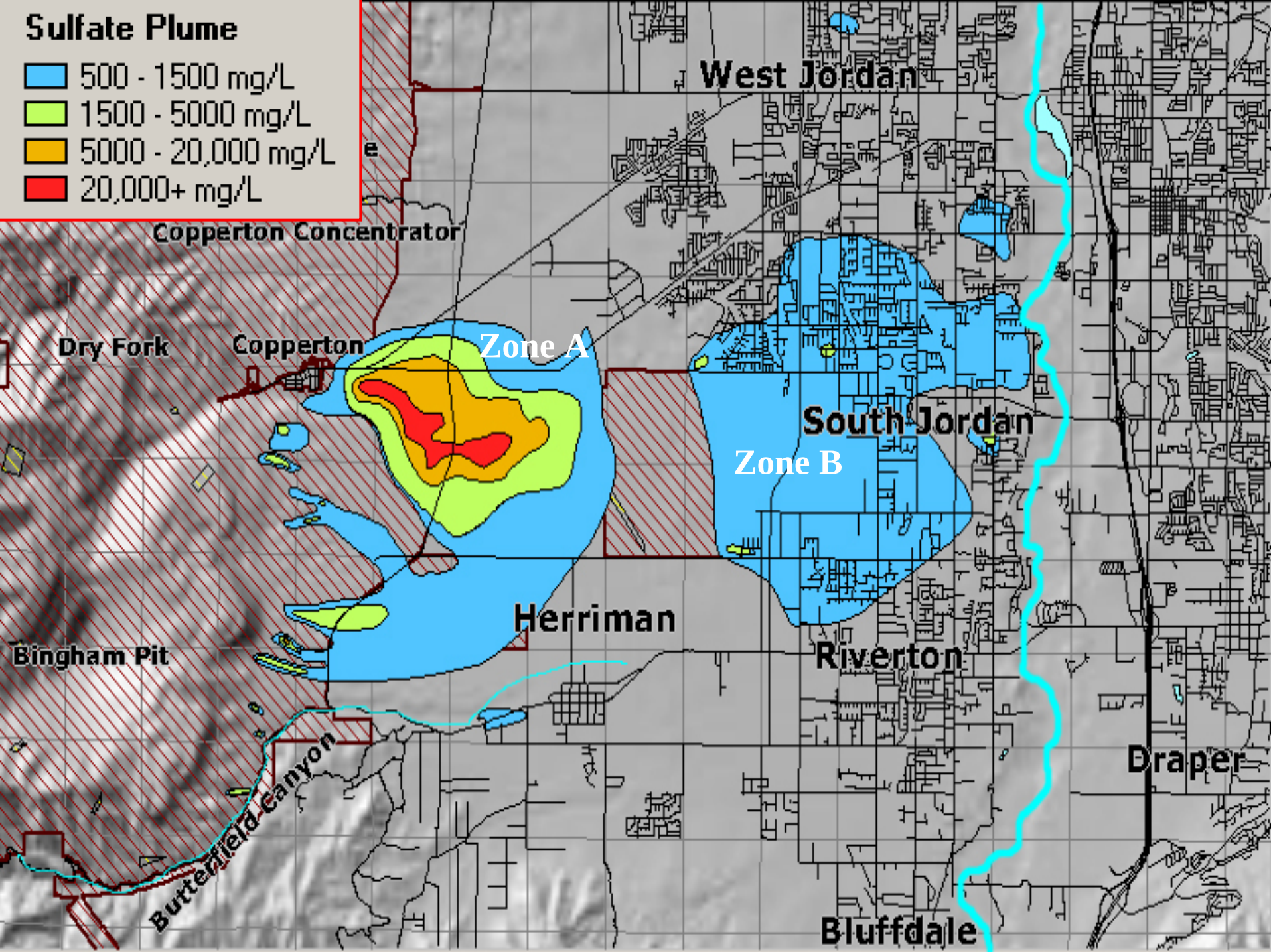
File Edit Help

Layer Number: 1

Row	Class Names	Value	Color
0	Unclassified	0	
1	Phragmites 1	1	
2	Phragmites 2	2	
3	Phragmities 3	3	
4	Scirpus /Cattail / Phrag Poss	4	
5	Bullrush 1b	5	
6	Cattails 2	6	
7	Cattails 3	7	
8	Phragmites Growing	8	
9	Duck weed 3	9	
10	Clover/Cheatgrass Mix	10	
11	Wheatgrass 1	11	
12	Phragmites / Cattails 7	12	
13	Sedge 1 / Cattails Growing Early	13	
14	Bullrush / Phragmites	14	
15	Salt Grass 1	15	
16	Scirpus	16	
17	Bullrush 3	17	
18	Cattails / Phragmites	18	
19	Scirpus 1	19	
20	Duckweed 1	20	
21	Duckweed 2	21	
22	Playa with Salicornia 1	22	
23	Playa 1	23	
24	Playa 2	24	
25	Playa moist 1	25	
26	Playa with Salicornia Sparse	26	
27	Phragmites Growing 3	27	
28	Playa with growing salicornia	28	
29	Playa with growing Salicornia 2	29	
30	Scirpus 3	30	
31	Wet Playa 2	31	
32	Scirpus 1 / Pepperweed	32	
33	Salt Grass / Foxtail 3	33	
34	Phragmites/ Playa with Salicorni.	34	
35	Scirpus / Cattail 1	35	
36	Bullrush 2	36	

Nutrient Determination Projects

- Macrophyte community analysis
- Plant and soil nutrient ratios
- Algal community analysis
- Macroinvertebrate community analysis
- Aerial survey for vegetation classification
- Shorebird nesting habitat assessment
- Water quality sampling
- Data analysis & statistical verification
- Farmington Bay open water:
  nutrient/plankton dynamics
- Data and report preparation


Sulfate Plume
500 - 1500 mg/L
1500 - 5000 mg/L
5000 - 20,000 mg/L
20,000+ mg/L
West Jordan
Copperton Concentrator
Dry Fork
Copperton
Zone A
South Jordan
Zone B
Herriman
Riverton
Bingham Pit
Draper
Butterfield Canyon
Bluffdale

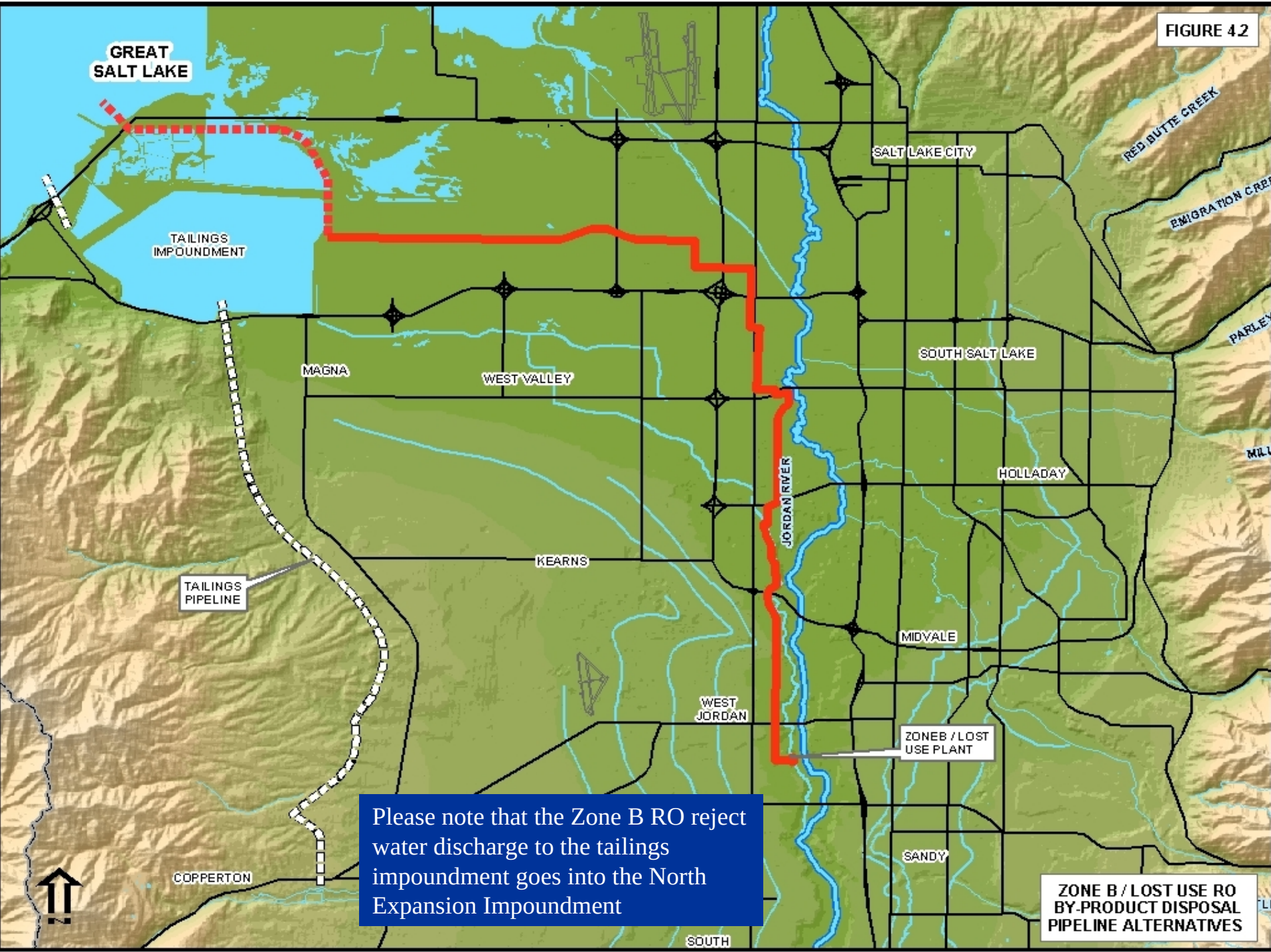
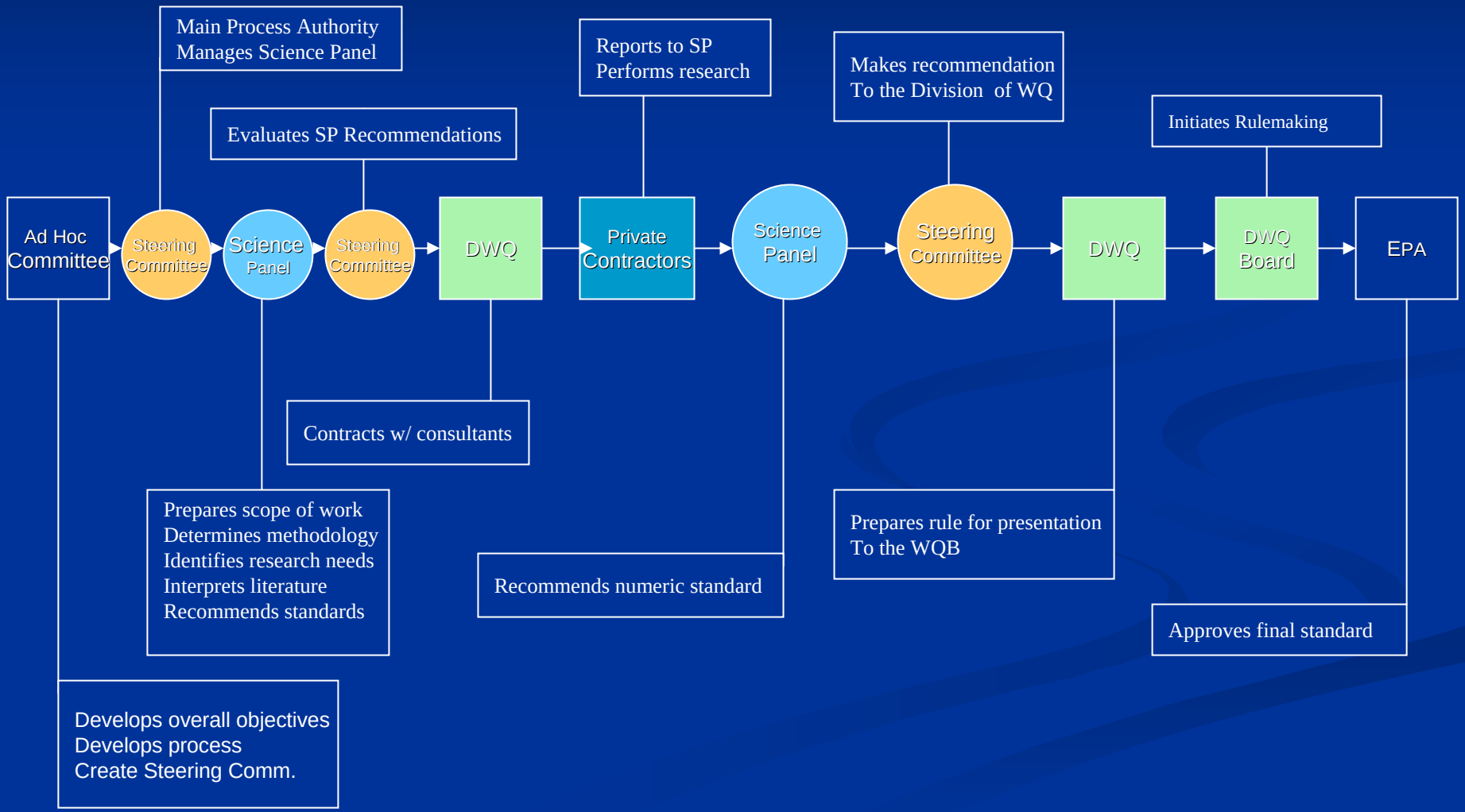


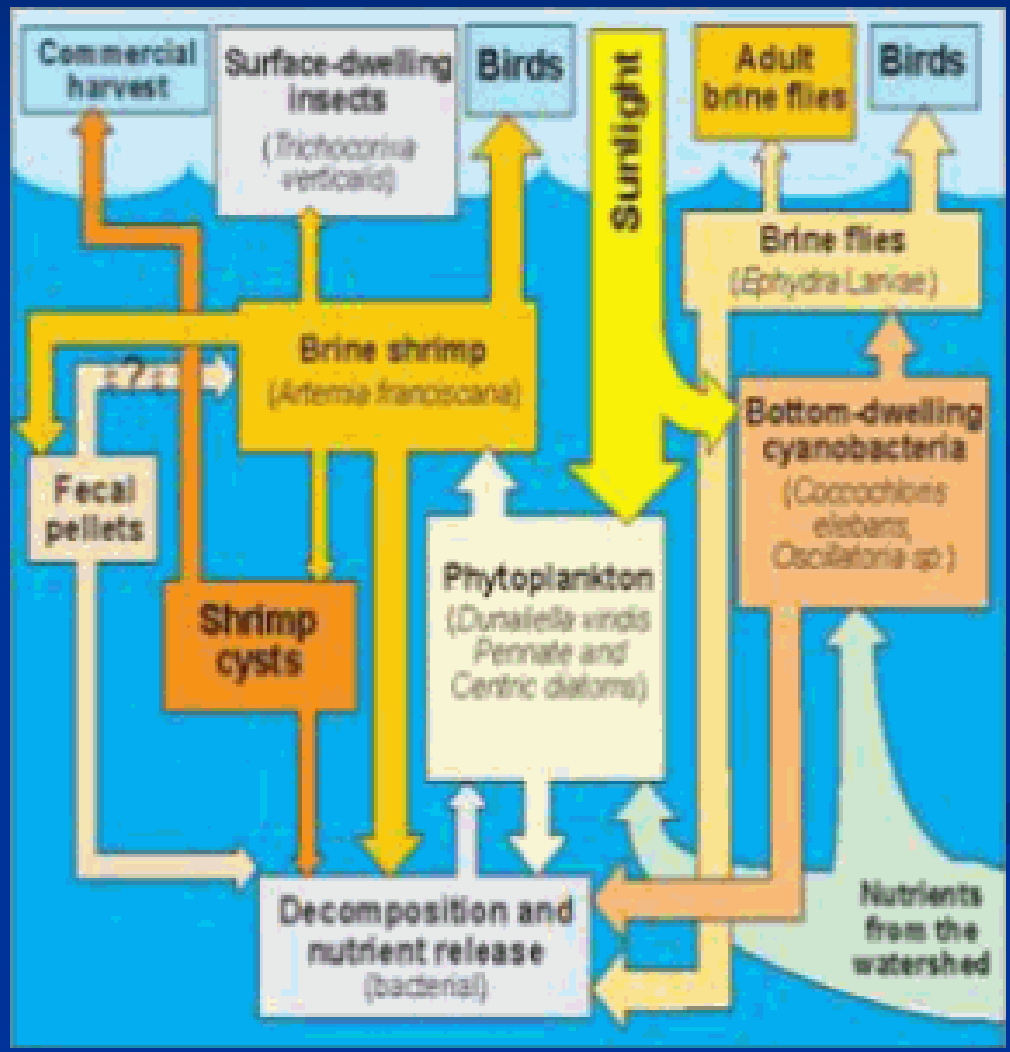
FIGURE 4.2
GREAT SALT LAKE
TAILINGS IMPOUNDMENT
SALT LAKE CITY
RED BUTTE CREEK
EMIGRATION CREEK
MAGNA
WEST VALLEY
SOUTH SALT LAKE
JORDAN RIVER
HOLLADAY
KEARNS
TAILINGS PIPELINE
MIDVALE
WEST JORDAN
ZONE B / LOST USE PLANT
SANDY
COPPERTON
SOUTH
Please note that the Zone B RO reject water discharge to the tailings impoundment goes into the North Expansion Impoundment
ZONE B / LOST USE RO BY-PRODUCT DISPOSAL PIPELINE ALTERNATIVES

Standard Setting Process



Understanding the Life Cycle

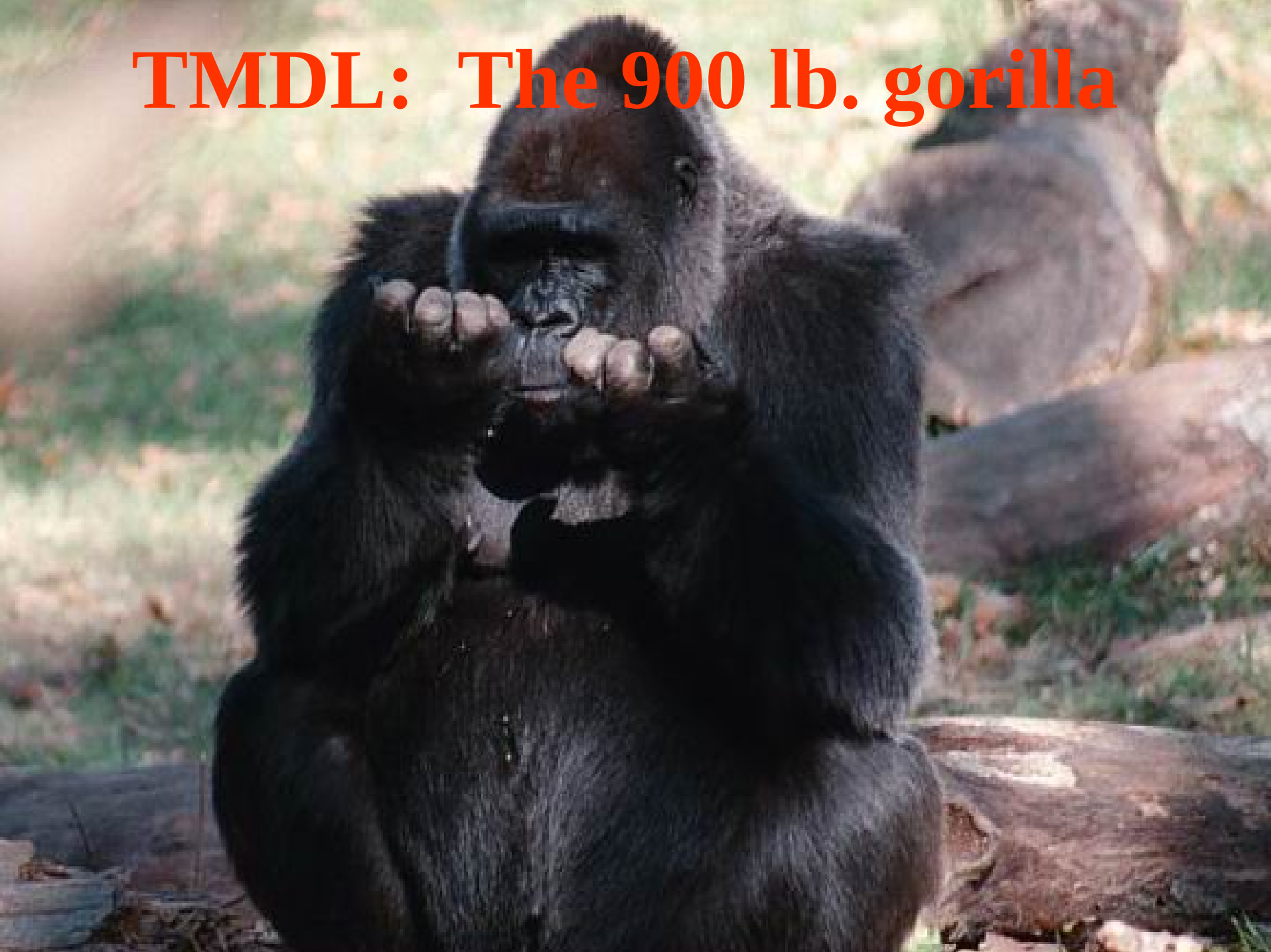
- Determine
  - Movement of Selenium into the Sediments
  - From Sediments into algae, brine flies, and brine shrimp
  - Effect on birds of eating brine flies & shrimp



Assessment Approach

SAMPLING		EGG CONCENTRATION	DWQ RESPONSE
Water Column and Brine Shrimp	Eggs (geometric mean of 5 eggs)		
4 locations/annually	1 location/1 species	5.0 mg/kg and below	Routine monitoring with sufficient intensity to evaluate whether selenium concentrations within the Great Salt Lake ecosystem are increasing
4 locations/quarterly	2 locations/1 species	5.0 mg/kg	Increased monitoring to address data gaps and areas of uncertainty identified from initial Great Salt Lake selenium studies
8 locations/quarterly	2 locations/2 species	6.4 mg/kg	Initiation of Level II Antidegradation reviews for all permit renewals or new permits to Great Salt Lake
8 locations/monthly	3 locations/2 species Perform hatchability study on 2 species	9.8 mg/kg	Initiation of preliminary TMDL studies to evaluate all selenium loading sources
		12.5 mg/kg and above	Declare impairment; formalize and implement the TMDL

TMDL: The 900 lb. gorilla



Total Maximum Daily Load

The sum of the nonpoint sources, (including natural background concentrations), point sources, and a margin of safety, so as to attain or maintain the water quality standards of a water body.

UTAH's TMDL STRATEGY

- *Local Watershed Planning*
- *Collaborative Process*
- *Contractual Strategy*
- *Public Involvement/Review*
- *2010 Completion Schedule*
  - *144 Listed Waterbodies in 1998; 171 by 2004*
  - *94 (65%) TMDLs completed, de-listed, or Water Quality Standards changed*
  - *All new TMDL listings after 1998 have a 12-year limit for completion*

HIGH PRIORITY TMDLs

- **JORDAN RIVER**
  - ✓ **Dissolved Oxygen, Bacteriologic, Selenium, TDS**
- **UTAH LAKE**
  - ✓ **Total Phosphorus, TDS**
- **CUTLER RESERVOIR/MIDDLE BEAR RIVER**
  - ✓ **Total Phosphorus, Dissolved Oxygen**

Develop Administrative Rules

DWQ Administrative Rules

- R317-2, WQ Standards
- R317-3, Design Req.
- R317-4, Onsite Systems
- R317-5, Large Underground Systems
- R317-6, Ground Water
- R317-7, UIC
- R317-8, UPDES
- R317-9, Administrative Procedures
- R317-10, Operator Certification
- R317-11, Onsite Cert.
- R317-100, -101, -102, -103, Loan & Grant Pgm.

Fund Projects

Utah Wastewater Financial Assistance Program

Total Assistance: $551.74 million

Issue Orders

Red Butte Creek Oil Spill

Issue Permits

Industrial SW:	521
Construction Storm Water:	1,267
Municipal Storm Water:	78
Municipal WWTP:	57
Biosolids:	30
Industrial WWTPs:	66
Animal Feeding Operations:	57
General Permits:	66


Questions?