Utah Water Quality Task Force Meeting
Minutes

May 19, 2014 9:00am-12:00am
Utah Division of Water Quality
195 N. 1950 W.
Salt Lake City, Utah

Attendance

Name	Representing
Jim Bowcutt	DEQ/DWQ
Gertrudys Adkins	Utah Division of Water Rights
Gordon Younker	UACD
Marian Hubbard	Salt Lake County
Daniel Gunnell	UACD
Brian Green	USU Extension
Carl Adams	DWQ
Rhonda Miller	USU Extension
LuAnn Adams	UDAF
Bill Zanotti	UDFFSL
Walt Baker	DEQ/DWQ
Erica Gaddis	DEQ/DWQ
John Whitehead	DEQ/DWQ
Melissa Ure	UDAF
Thayne Mickelson	UDAF
Jay Olsen	UDAF
Jake Powell	UACD
Norm Evenstad	NRCS
Jim Harris	DEQ/DWQ
Jeff Ostermiller	DEQ/DWQ

Walt Baker- Welcome and Introductions

Jake Powell- CRMP- South Fork of Chalk Creek Watershed (See attached presentation)

- Interest in Water Quality began to increase throughout the watershed over the past few years, so the Kamas Conservation District submitted an application for funding to UDAF to develop a CRMP.

- Even if an agency has the money to implement a plan you need to gain the support of the landowners to implement it.

- The Coordinated Resource Management process can be used when there is a high level of conflict anticipated.

- Helping all the partners and landowners to get to know each other is the most critical process of all.

- Most land owners highly value protecting and restoring the land. Often times they just need a little information to help guide them in management practices that are the best fit for them.

- In the South Fork of Chalk Creek USU students were used to help gather the initial data that will be used to develop the plan.

- The landowners are the ones that are "driving the ship"

- To help determine success, current conditions will be documented, and annual workplans developed at the end of the process.

- In order to address the concerns of the state and local agencies there is a certain amount of education that needs to take place to bridge the gap between the desired outcomes of the landowners and the agency partners.

Dan Gunnell- CRMP Development in the Wallsburg Watershed (See attached Presentation)

- The Wallsburg Watershed CRMP got its start from the Deer Creek TMDL, as well as other listings on Main Creek.

- The local Conservation District was able to secure $150,000 in funding from the NRCS to develop the plan.

- The development and mailing out of agendas and newsletters helped sustain continued support of the plan within the watershed.

- Having a good facilitator is an important part of the CRM process. In this case the facilitator was the RC&D.

- Early implementers have been critical for project implementation.

- Conservation Districts are also a key element in the development of these plans.

- This process has made match more available for implementation

- Currently CRM plans have been, or are being, developed in the San Pitch Watershed, Spanish Fork River, Kane County, and West Box Elder.

Jim Harris- Assessment of Waters of the State (See Presentation)

- Observed : For biological assessment, a ratio of observed over expected macroinvertebrate species (O:E) below .70 would be considered impaired but will look at multiple samples.

- Total Suspended Solids (sediment) is a common driver for a low O:E ratio.

- The new 303(d) list will have better resolution and will be able to show people where waters are meeting Water Quality Standards.

- Partners should work with DWQ to determine where samples should be taken.

- The Integrated Report (IR) must be submitted every 2 years.

- Several additional waterbodies will be listed in the next IR because the State has begun to look at more parameters than they have in the past.

- There will be a 30 day comment period prior to finalizing the report.

- We need to be able to monitor and tell our stories about how watersheds are doing.

- Continuous monitoring sensors can be very useful in capturing the entire picture of what is going on in the watershed DWQ is looking at installing several more of these.

Jeff Ostermiller- Nutrient Standards and the Recovery Potential Tool (See Presentation)

- Technology based nutrient limits would be developed for treatment plants. January1, 2015-2020 these plants will need to have the required reductions met for their facilities. This will require increased monitoring for these facilities.

- There are 6 meetings scheduled around the state to discuss this. Beginning on May 15th there will be a public comment period about this.

- It was determined that the headwaters did not need to be subdivided.

- To evaluate phosphorus they are looking at models to determine what the natural nutrient loading is for each waterbody.

- The recovery potential tool is used to identify low hanging fruit and determine if implementation goals are actually obtainable.

- The tool was able to match a collective 100 years' worth of on the ground knowledge fairly closely.

- The State of Utah is currently in the process of developing a tool specific to Utah. Eventually the Utah Recovery Potential tool will be posted on the DEQ website.

- Selenium has lots of natural background sources. This standard will be tissue based. Will mostly be found in the Colorado River Watershed as it's associated with Mancos and other saline geologic formations.

Jim Bowcutt- Utah NPS Annual Report and FY-2015 Funding (See Presentation and Handout)

- Utah actually received a small increase in Section 319 funding in FY-2014.

- The selected project areas for FY-2014 were the Wallsburg Watershed and the Jordan River.

- The Colorado River Watershed will be the targeted basin in FY-15.

- 64 Proposals totaling $4,565,771 were submitted to DWQ for funding with NPS grants.

- Applications will be ranked internally using the ranking criteria developed by the Water Quality Task Force.

- A subcommittee of the Water Quality Task Force will discuss the ranking on June 2nd.

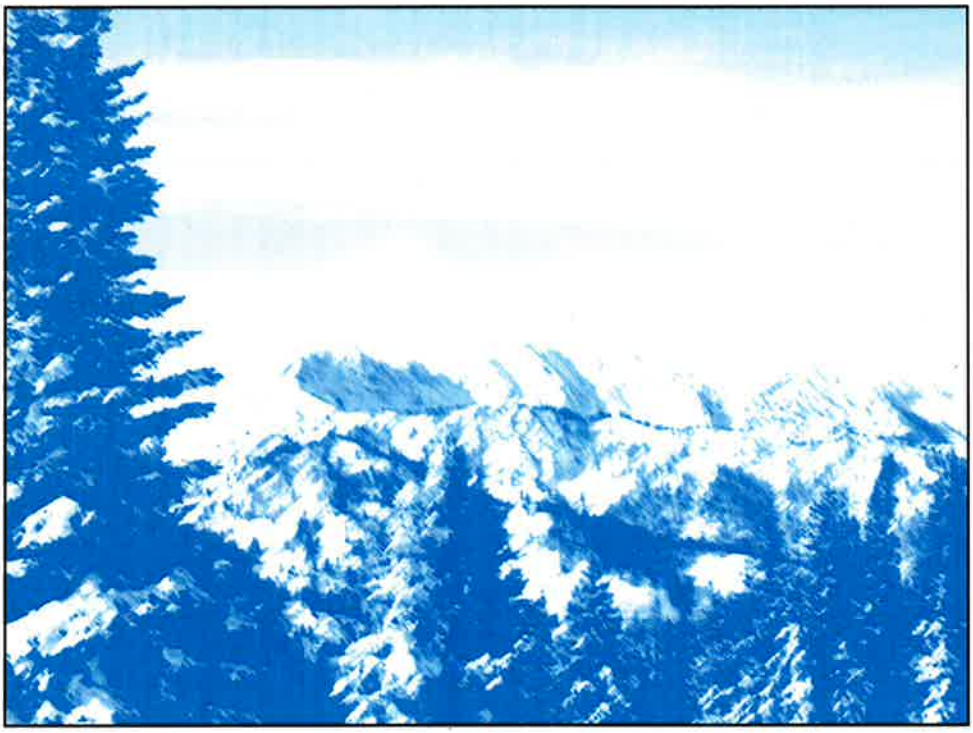
- Grants selected for funding will be presented to the Water Quality Board during the June Board meeting

Additional Discussion

Topics for Future Water Quality Task Force Meetings:

- More CRMP presentations
- Pharmaceuticals (Snyderville Basin)
- Effects of Catastrophic Fires
- USU Extension's AFO Education Program
- Envision Utah- Quality/Quantity Nexus
- Update on the Waters of the State
- Water History- Professor at University of Utah, Red Butte Creek
- I Utah Project- Michelle Baker

- Next meeting will be held on August 25th, 2014



$1.5 Million is available from the "Siglin Foundation" to spend on watershed wide, natural resource focused improvements where would you put it and what exactly would you do with it?

How many landowners would you be able to have agree with your plan and allow work on their properties?

How would you convince the Foundation's board of trustees that the stakeholders are in support of your plan?

What basis is your idea for spending this money predicated on?

Why Plan?

Planning is about understanding the constraints, benchmarks, and all the "moving Parts" that must be addressed.

Poor planning results in poor implementation....

poor implementation....

Can leave you hanging...

Poor planning results in poor implementation....

poor implementation....

Can be uncomfortable...

Poor planning results in poor implementation....
poor implementation....

Can become an obstacle for others...

Poor planning results in poor implementation....
poor implementation....

Can become an obstacle for others...

Poor planning results in poor implementation....
poor implementation....

Can negate the usefulness of a project...

Poor planning results in poor implementation....
poor implementation....

Can make things awkward with your neighbor...

Poor planning results in poor implementation....
poor implementation....

Can be dangerous...

Poor planning results in poor implementation....
poor implementation....

Can lead us to make unwanted compromises...

Poor planning results in poor implementation....
poor implementation....

Can limit us on taking our vision as far as it needs to go...

Planning formalizes a common vision

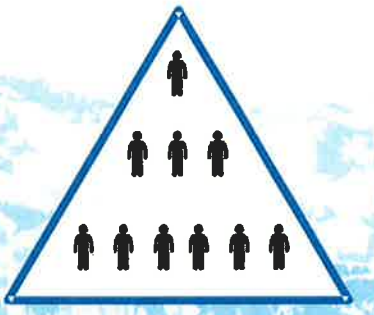
"The future is for keeps. Once you get there you cannot go back. Unlike a location from which you are able to leave, we often arrive in the future without liking it. Planning and training are the keys to the maps of our future."

"CRMP"

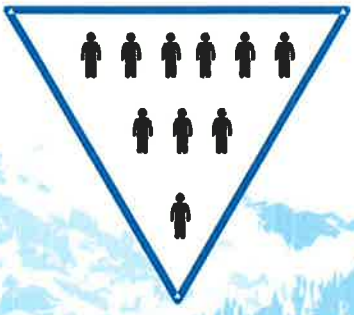
Coordinated Resource Management Plan

How do we plan?

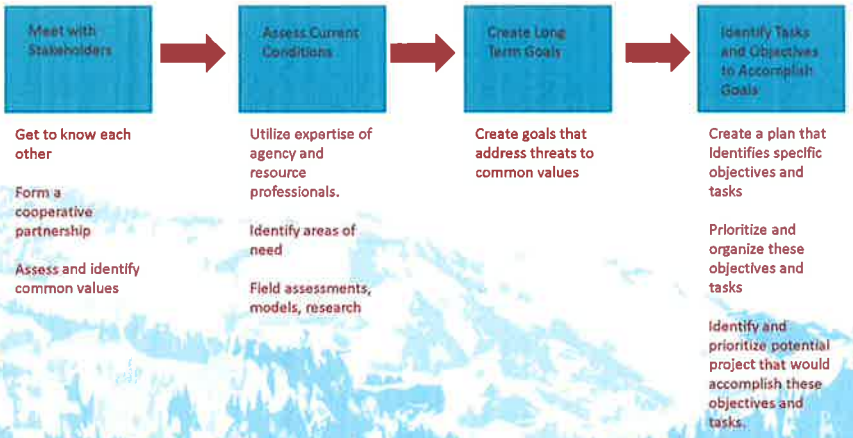
Authoritative



Locally Lead



The CRMP Process



Get to know each other

Form a cooperative partnership

Assess and identify common values

Utilize expertise of agency and resource professionals.

Identify areas of need

Field assessments, models, research

Create goals that address threats to common values

Create a plan that Identifies specific objectives and tasks

Prioritize and organize these objectives and tasks

Identify and prioritize potential project that would accomplish these objectives and tasks.

Meeting #1

What things are important to you, your family, or operation in the watershed?

What things do you see as threatening or stressing these items?

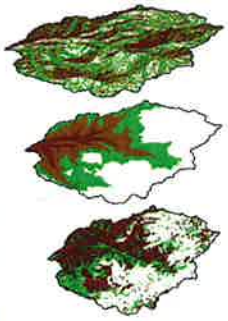
"Values"

- Irrigation Water
- Streambanks
- Fish – Cutthroat Trout
- Roads and Rights of Way
- Wildlife
- Water Diversions
- Big Game Hunting
- Economic Sustainability
- Productivity
- Livestock Production and Management
- Spring Protection and Development
- Aspen Stands

"Stressors"

- Beetle Kill
- Wildfire
- Upland and Stream Erosion
- Oil Field roads and maintenance
- Weeds
- Predators
- Lack of Differing tree age class
- Loss of sage brush
- Stream Access
- Public Access to private lands
- Sage Grouse listed as an Endangered Species
- Winter Range Habitat
- Lowered Capacity

Meeting #2

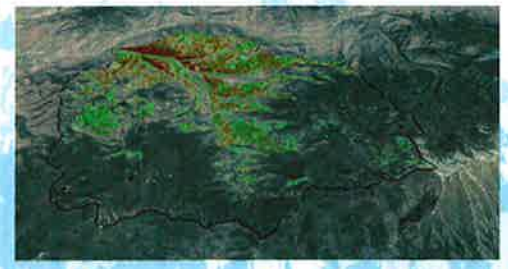


MATRIX OF VALUES & THREATS

		Value Summary	Threats: Stream Access	Public Access	Predators	Lack of Winter Range	Oil Fields	Sage Grouse ESA Listing	Beetle Kill	Weeds	Lowered Capacity	Erosion	Wildfire	Drought
Threat Summary →										13	10	21			
Values	Agave														
	Stream Banks	11									3				
	Irrigation	15										2		3	
	Road Maintenance	13					3	3						2	
	Water Diversions	14									3				
	Spring Protection	8									2				
	Hunting	9									2				2
	Livestock	7			2						2		2		
	Productivity	7				2					2				
Wildlife	Moose	9											2		3
	Cutthroat Trout	10										2			3
	Riparian Birds	11								3	3				2
	Sage Grouse	13				3					3			3	3
	Elk	14			2								2		3
	Deer	12											2		3

Effect

Medium



Meeting #2

What information do we need to make informed decisions about these items?

"Values"

- Diversions – Passage and Irrigaiton
- Creek/Riparian Conditions
- Weeds – Where they are, threats, how to manage
- Water Supply
- Pond Suitability
- Spring Map/Development Suitability
- Beaver Suitability
- Winter Range location and Status
- Range Health
- Predators
- High Erosion Areas

Social structure beginning to form.

Currently

Technical Tasks

- Summer Field work
- Provide answers
- 2 Summer Meetings
- Begin Writing

+

Social Tasks

- Summer Tours
- BBQ

Coordinated Resource Management Planning

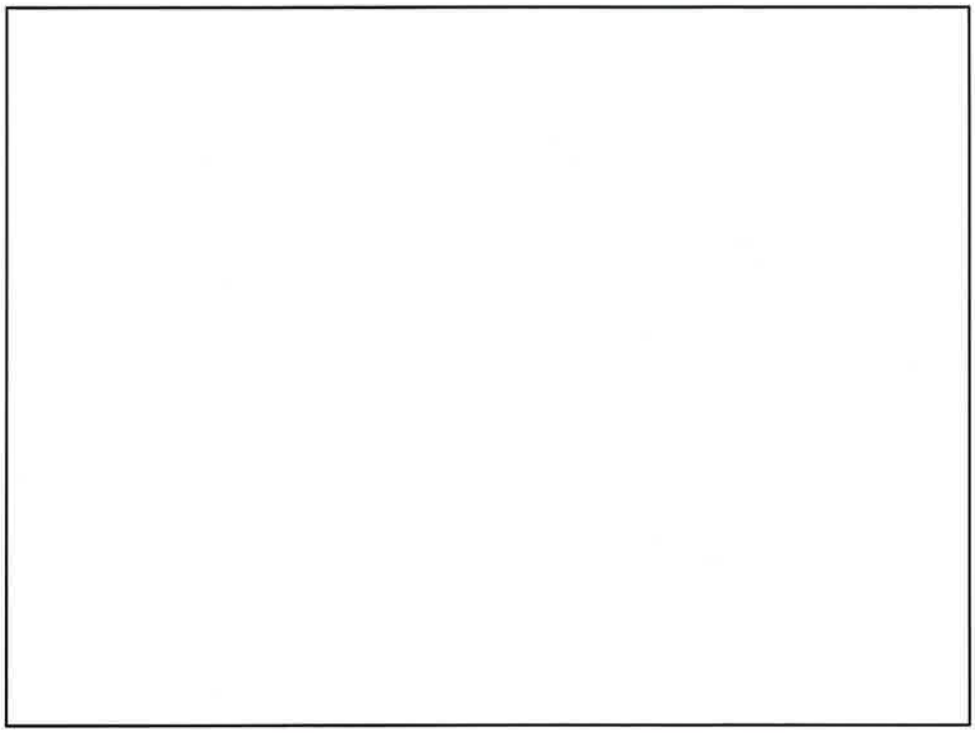
Wallsburg Watershed

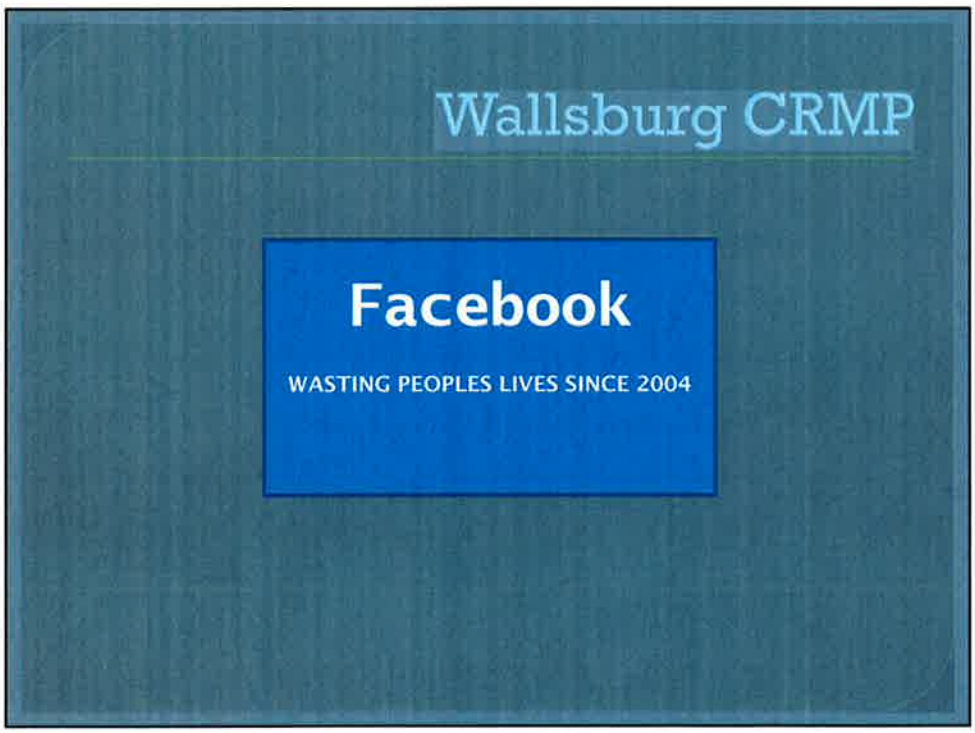
Wallsburg Watershed Location

Main Creek Restoration

Background

- In 2002 DEQ assessed Deer Creek Reservoir.
- Due to low dissolved oxygen, it was not meeting its cold water fishery beneficial use.
- TMDL identified that Main Creek is a significant source of phosphorous in the reservoir.
- Main Creek was also listed due to exceedances in E. coli and water temperature.




Wallsburg CRMP
Facebook
WASTING PEOPLES LIVES SINCE 2004

Wallsburg CRMP

- NRCS had federal appropriations to do CRMP's for vital watersheds in Utah.
- Wallsburg was designated.
- NRCS appropriation went through the Wasatch Conservation District.
- Wasatch CD lead agency.

Wallsburg Watershed Council

- Coordinated management was needed to resolve the resource concerns.
- The first Wallsburg Watershed Council public meeting was held on March 29, 2007.
- Composed of Wasatch Conservation District, local landowners and conservation agencies.

Wallsburg Watershed Council

Wallsburg Coordinating Council

- The Wallsburg Watershed Coordinating council was formed as the planning group of the CRMP.
  - Wasatch Conservation District
  - NRCS
  - Central Utah Water Conservancy District
  - Utah Association of Conservation Districts
  - Landowners

Three Rules of CRMP process

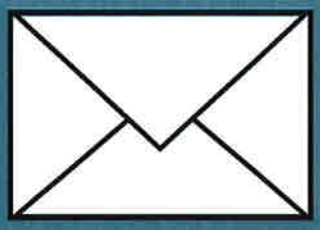
- Management by Consensus
- Commitment
- Broad Involvement

Mangement by Consensus

- Participation in CRMP is voluntary and consensus promoted involvement. Everyone must agree on conclusions before they can be accepted by the group.

Commitment

- All participants must feel committed to the success of the program.
- The agenda was distributed before the meetings.
- Detailed letters were mailed out after the meetings.



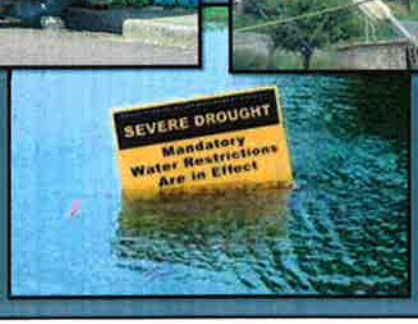
Broad Involvement

- CUWCD
- DFFSL
- DWRi
- DWQ
- DNR
  - DWR
  - Parks and Rec
- HDR Engineering
- Irrigation Companies
- Local Landowners
- NRCS
- Mountainland AoG
- UACD
- USFS
- Uinta Headwaters RC&D
- Wasatch CD
- Wasatch County
  - Health Department
  - Public Lands
  - Weed Supervisor
- Wasatch CWMA
- Wallsburg Town

Resources of Concern

- Water conservation
- Riparian management
- Water quality
- Animal waste
- Noxious and invasive weeds
- Soil erosion
- Water rights
- Predator control
- Irrigation water management
- Threatened/endangered species
- Wildlife habitat
- Recreation impacts
- Forest health
- Pest management
- Septic tank management
- Well head protection
- Air quality
- Grazing management
- Wetland protection
- Agricultural land converted to other uses

Identify Concerns



Resources of Concern

Resources of Concern

Resources of Concern

Resources of Concern

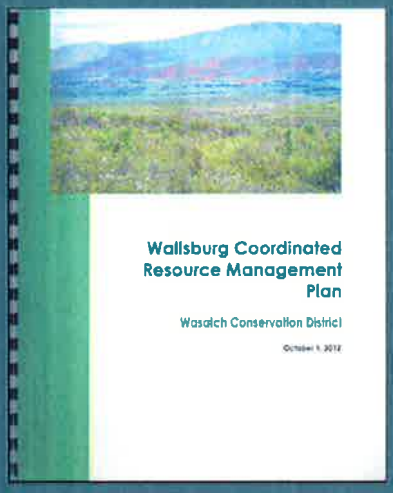
Resources of Concern

CRMP Elements

- Watershed Characteristics
  - Watershed Area
  - Authorities and Jurisdictions
  - Population and Land Use
  - Social Environment and Recreation
  - Water Resources
  - Wildlife and Habitat
- Watershed Planning Elements
  - Economic Overview
  - Riparian Assessment and Inventory (SVAP)
  - Range Assessment and Inventory
  - Water Quality Assessment
  - Wildlife Management
  - Forestry Assessment and Inventory
  - Water Rights Inventory
  - Septic Tank Functionality
  - Hydrology
  - Pastureland Assessment
- Recommendations
- Implementation Plan

The Final CRMP

The Conservation District contracted with a consultant (HDR) to compile the data and coordinate with the Wasatch Conservation District and Wallsburg Watershed Committee to make recommendations and prepare the implementation plan.



For a full copy of the Wallsburg CRMP and other related documents please visit our website at:

wasatchconservationdistrict.org

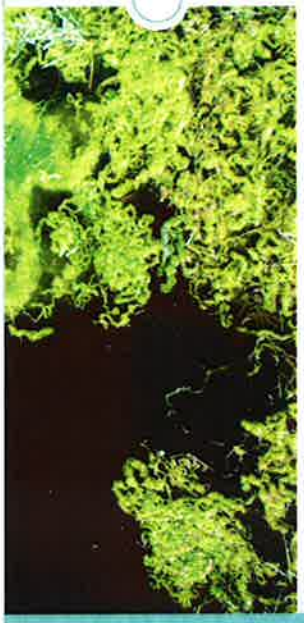
Wasatch Conservation District

Daniel Gunnell
District Resource Coordinator

Utah's Integrated Report

JIM HARRIS — May, 19th, 2014

UTAH DWQ, MONITORING SECTION



CLEAN WATER ACT REQUIREMENTS

- **Water Quality Standards**
  - Utah Administrative Code R317.2
- **Integrated Reporting**
  - 305(b) and 303(d) reports
- **Total Maximum Daily Loads**
  - Watershed Planning and Protection
- **Water Pollution Controls**
  - Permitting and Compliance
  - NPS Program (319)

Utah's WQ standards can be found at waterquality.utah.gov or

http://www.rules.utah.gov/publicat/code/r317/r317-002.htm

COMPONENTS OF WQ STANDARDS

- **Designated Uses**
  - **Drinking Water**
  - **Recreation**
  - **Aquatic Life**
  - **Agriculture**
- **Waterbody Descriptions**
- **Numeric Criteria**

UTAH'S STATE WATERS

Perennial Rivers / Streams

14,250 **miles**

Lakes / Reservoirs / Ponds
(2,085 Total)

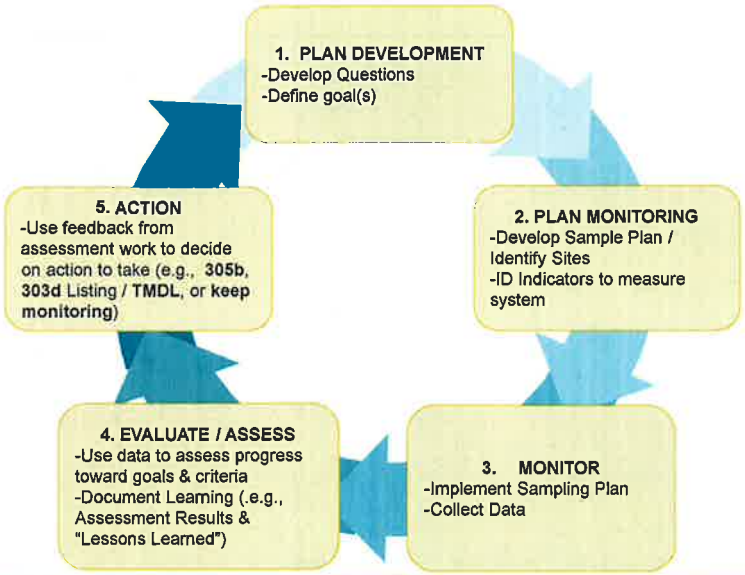
461,717 **acres**

Freshwater Wetlands

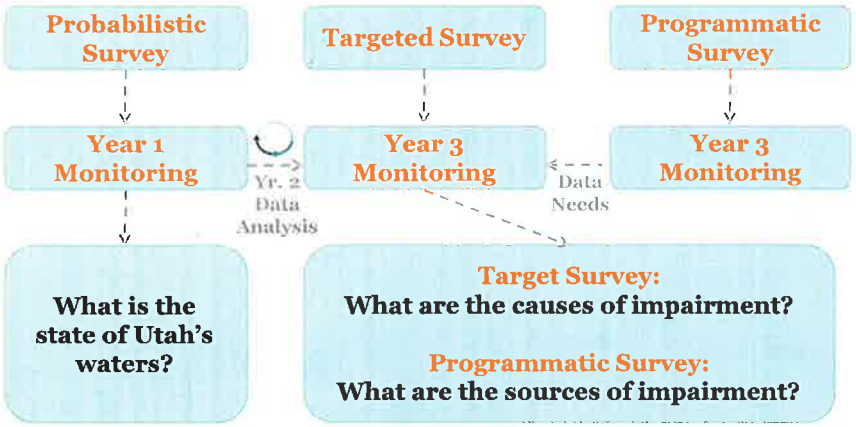
510, 359 **acres**

HOW CAN WE ASSESS ALL WATERS OF THE STATE?

DWQ'S APPROACH: AN ADAPTIVE DESIGN



WATER QUALITY QUESTIONS



MULTI-SPATIAL SCALE ASSESSMENT

Probabilistic Survey

50 Random Sites
(Jordan River Watershed)

Targeted Survey

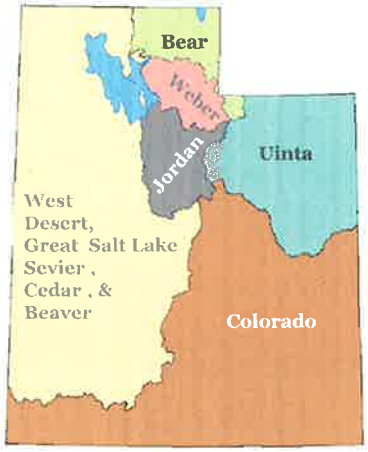
248 Sites*
(DWQ + Cooperators)

*Not all sites are depicted in map

Programmatic Survey

Site Specific
(Based on DWQ Program Needs)

ROTATING BASIN SCHEDULE: 6-YR. STATEWIDE ASSESSMENT



Watershed Management Unit (WMU)	Probabilistic Survey	Targeted & Programmatic Survey
Uinta Basin	2008	2010
Jordan – Utah Lake	2009	(2009) & 2010
Colorado	2010	2012
Sevier – Cedar – Beaver – West Desert – Great Salt Lake	2011	2013
Bear River	2012	2014
Weber River	2013	2015

PROBABILISTIC ASSESSMENTS: JORDAN RIVER WMU (2009/2010)

50 Random Sites
(Jordan River WMU)

50 RANDOM SITE SELECTION

- **Probabilistic Survey Design**
- **Streams ordered & weighted on 3 attributes**
  1. Stream Size
  2. Stream Length
  3. Stream Location
- **Each site assigned a probability of being selected based on attributes**

PROBABILISTIC ASSESSMENTS: JORDAN RIVER WMU (2009/2010)

50 Random Sites
(Jordan River WMU)

50 RANDOM SITES

Reference

- **Sites absent of human-caused disturbances**

Non-Reference

- **Sites impacted by humans**
  - e.g., land use changes, point source pollution, etc.

TYPES OF DATA COLLECTED

ALONG SPECIFIC TRANSECTS ON A STREAM REACH, DWQ COLLECTED:

Biological: Macroinvertebrates and Fish

Chemical: e.g., DIN, TP, Chloride, TSS

Physical: Sedimentation, In-Stream Channel & Riparian Vegetation Complexity, & Human Disturbance

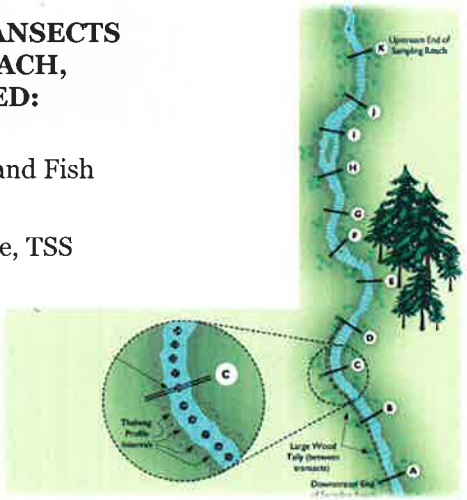


Figure from EPA WSA Report: 841-B-06-002

ASSESSMENT METHODOLOGY

Indicators of Biological Stress

Aquatic Measures of Stress

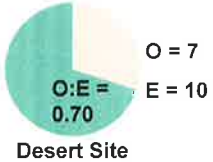
Ranking of Stressors

1. Macroinvertebrate Observed / Expected ratio of Taxa Loss (O:E)

2. Fish IBI

RIVPACS Model → O:E ratio

Quantifies loss of biodiversity or extent to which taxa have become locally extinct because of human activities



Desert Site

Multimetric Index

Quantifies extent to which a sampled population represents a least disturbed population

ASSESSMENT METHODOLOGY:

Indicators of Biological Stress

Aquatic Measures of Stress

Ranking of Stressors

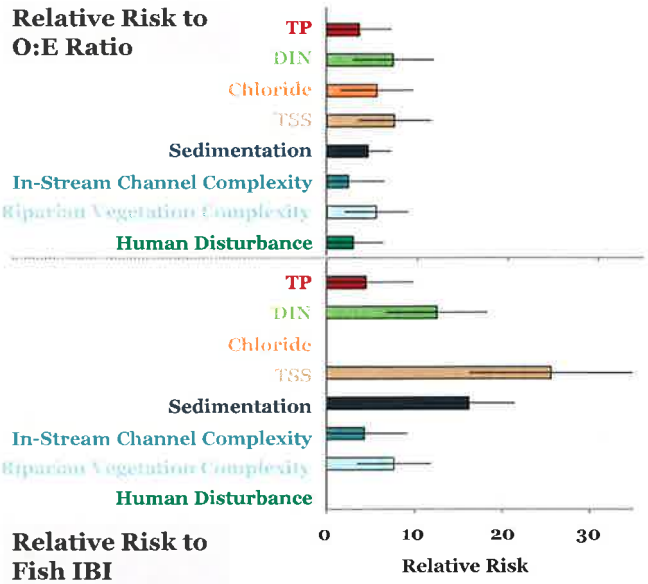
Extent of Stressor

- **Determines the prevalence (in stream miles) of each stressor**
- **Examines how each stressor compares to other stressors**

Relative Risk of each Stressor

- **Determines how much influence a stressor has on biological condition**
- **Determines a stressor's influence on other stressors** (e.g., is it greater or smaller than the influence of others)

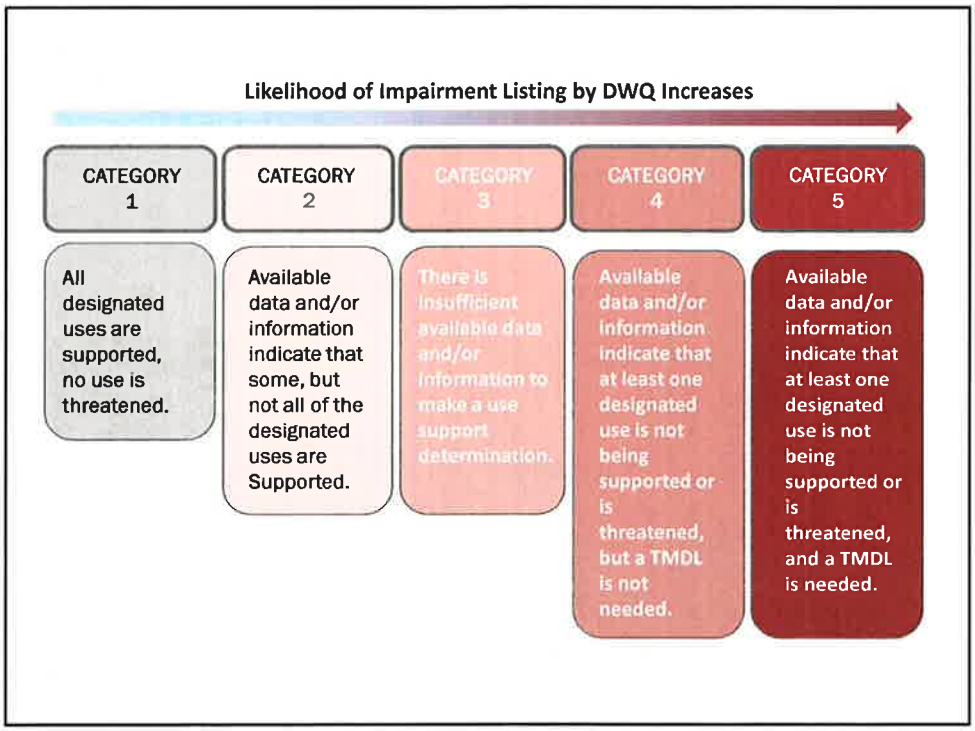
RELATIVE RISK OF STRESSORS



303(D) LISTING PROCESS

Probabilistic Survey | Targeted Survey | Programmatic Survey

- Data mining, evaluation, standardization
  - Public sources
  - Other agencies
  - Cooperative monitoring
- Compare river, stream, lake data to WQ criteria
- Summarize sites not meeting WQ standards
- Compile 303(d) list
  - Waterbodies requiring development of TMDL



NEXT STEPS: ONGOING MONITORING AND ASSESSMENT

Probabilistic Survey

Track trends in water quality and evaluate year to year variability

Targeted Survey

Refine Targeted Sites & focus Parameters of Concern

Programmatic Survey

- Special Studies
- TMDLs
- Standards development
- New Criteria and methods

Update assessments and evaluate water quality improvements with the goal of de-listing (restoring uses and meeting water quality standards).

2016 IR FUTURE IMPROVEMENTS

- Link Stream Assessment to NHD
  - Better Resolution
  - More Accurate Listings
- 2-yr Assessments
- Integrate USGS Data

THANK YOU

jamesharris@utah.gov

801-536-4360

QUESTIONS ?

Utah's Nutrient Reduction Program: Status Report

Jeff Ostermiler
Utah DWQ
NPS Task Force
5-18-2014

Presentation Outline

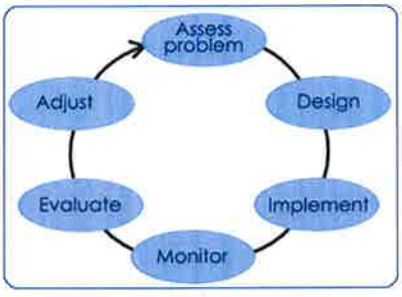
- A brief overview of nutrient reduction program elements
- Current Status
  - Technology-based limits rule (in public comment)
  - Numeric Criteria for Headwaters
- Prioritization: Recovery Potential screening tool

Eutrophication: A Wicked Problem

- Difficult to clearly define
- Many interdependencies and multi-causal aspects
- Proposed measures have unforeseen effects
- Problems may be unstable or continue evolving
- No clear or correct solution
- Problems are socially complex, many stakeholders
- Responsibility stretch across multiple organizations
- Solutions may require behavior changes

"You don't so much "solve" a wicked problem as you help stakeholders negotiate shared understanding and meaning of the problems and its possible solutions" **Conklin**

Adaptive Management



- "Learn by Doing"
- Identify areas of relative uncertainty In both problem elicitation and program implementation
- Resource prioritization

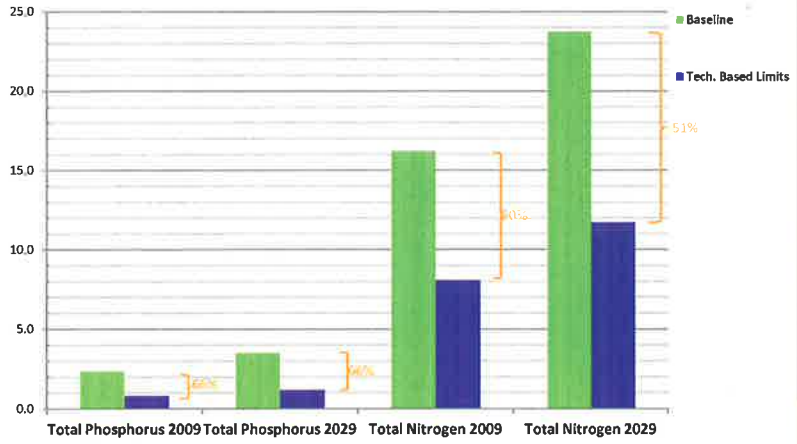
Implementation Elements: Briefly

- Identify Sites with Nutrient-Related Problems
- Prioritize Sites (Recovery Potential)
- Fix what is fixable
  - Continue to develop numeric endpoints
  - Consider TMDL Alternatives—Adaptive Management
- Shared Responsibility
- Collaborative Management

Shared Responsibility:

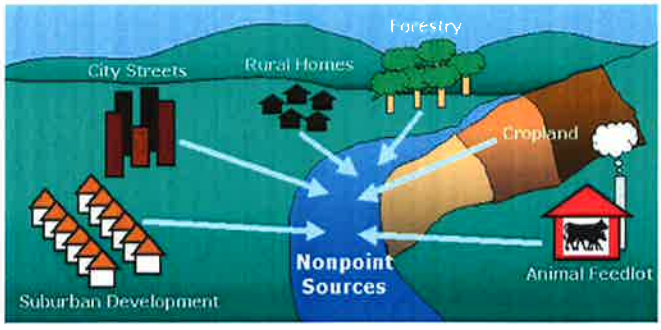
Wastewater Treatment Plants
Technology-Based Limits

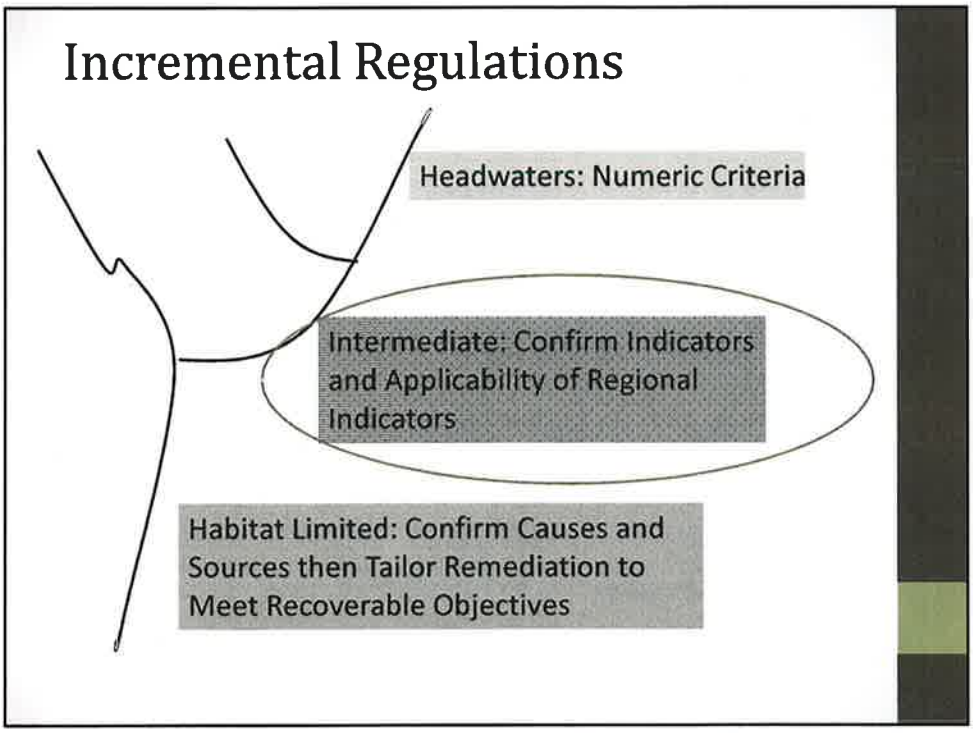
Interim Tech-Based Limits

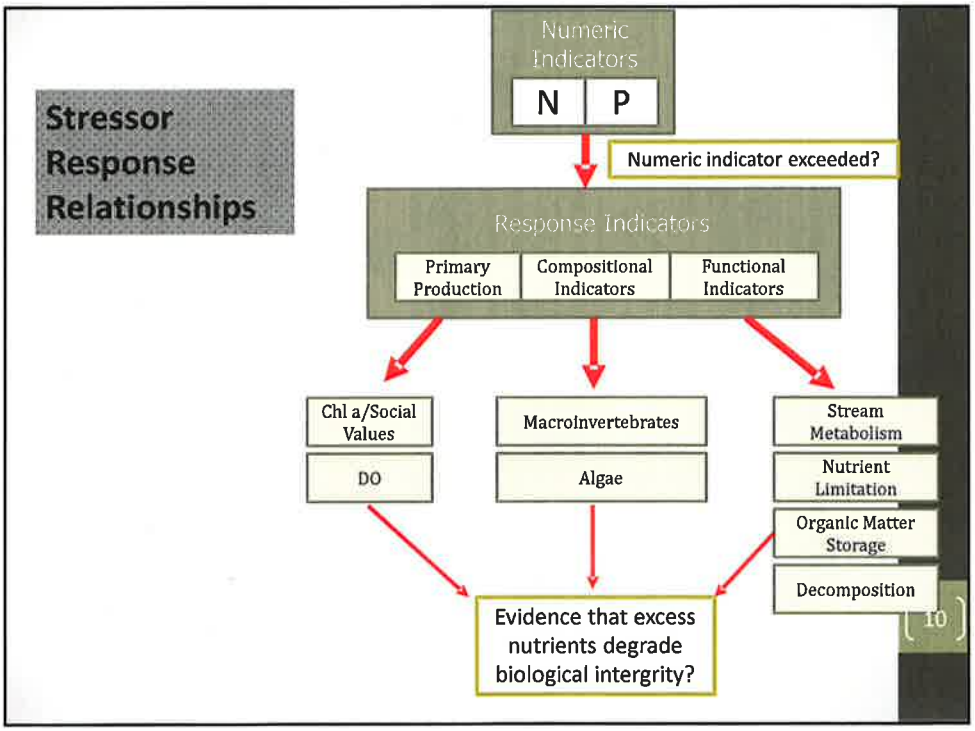


Shared Responsibility: Nonpoint Sources

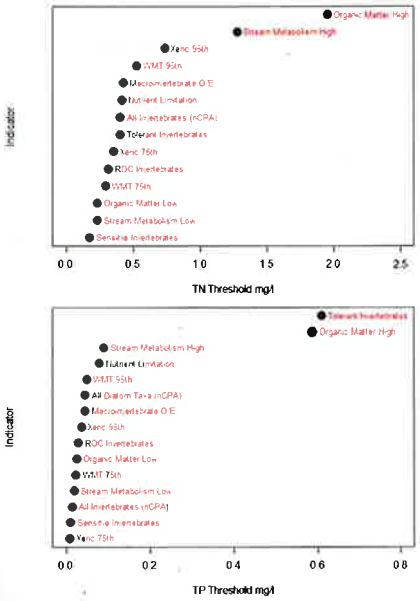
Incentive-Based, Agricultural Certification of Environmental Stewardship (ACES)




Incremental Regulations
Headwaters: Numeric Criteria
Intermediate: Confirm Indicators and Applicability of Regional Indicators
Habitat Limited: Confirm Causes and Sources then Tailor Remediation to Meet Recoverable Objectives

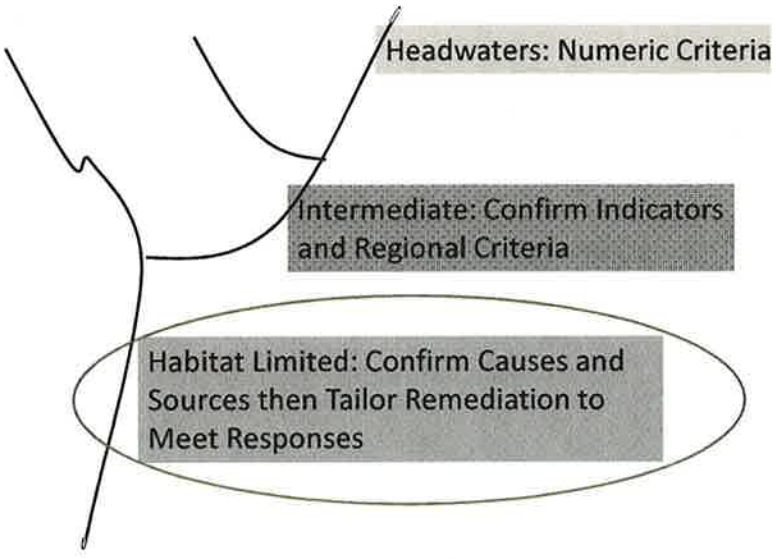

Stressor Response Relationships
Numeric Indicators
N
P
Numeric indicator exceeded?
Response Indicators
Primary Production
Compositional Indicators
Functional Indicators
Chl a/Social Values
DO
Macroinvertebrates
Algae
Stream Metabolism
Nutrient Limitation
Organic Matter Storage
Decomposition
Evidence that excess nutrients degrade biological intergrity?
10

Multiple Thresholds



- ❖ Statistical thresholds were established for numerous indicators of biological integrity
- ❖ Two Perspectives:
  - Ecological Relevance
  - Designated Use Protection
- ❖ Values span a relatively narrow range of [TN] and [TP]

Incremental Regulations

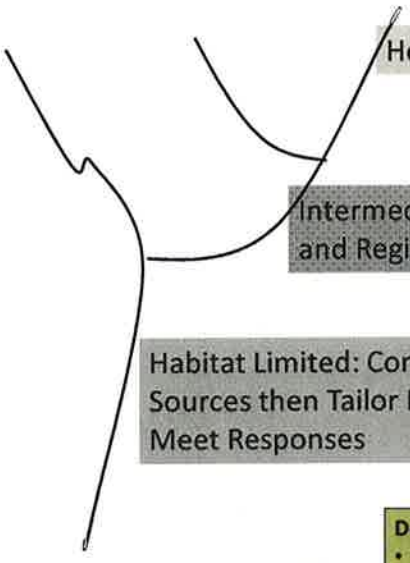


Watershed-Specific Reductions

TMDL-Alternatives

- Collaborative Management
- Incremental Reductions
- Monitor Progress
  - Accountability
- Ongoing Science
  - Establish Standards
  - Modify Response Goals
  - Recommend Incremental BMPs

Incremental Regulations



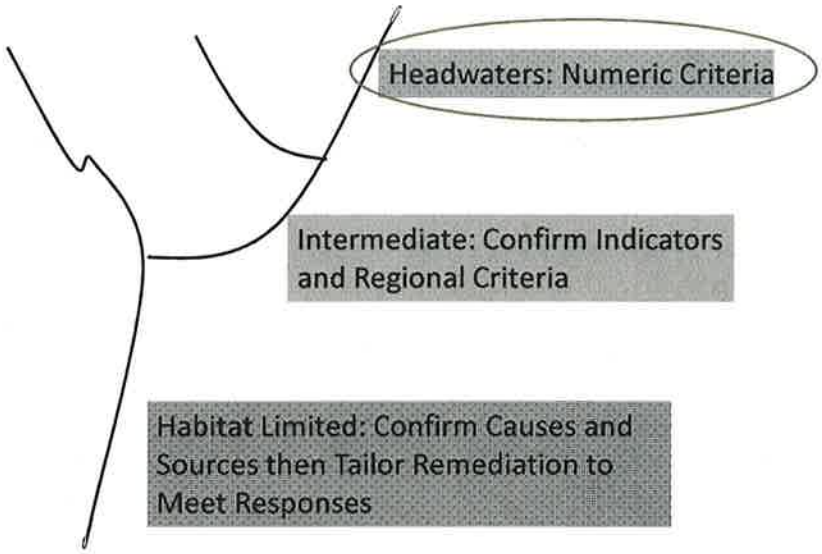
Headwaters: Numeric Criteria

Intermediate: Confirm Indicators and Regional Criteria

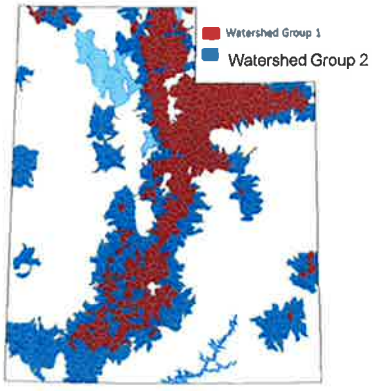
Habitat Limited: Confirm Causes and Sources then Tailor Remediation to Meet Responses

Downstream Protection
- **Continue with TSI is reservoirs**
- **GSL and Wetland Program**

Incremental Regulations

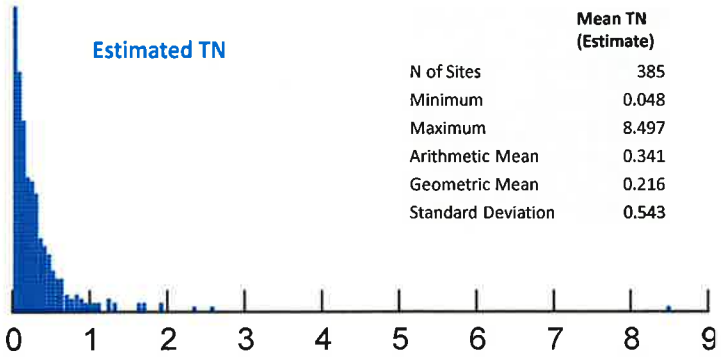


Classification



- K-Means Clustering
- Numerous environmental gradients
  - Weather
  - Soils
  - Predicted N & P
  - Slope
- No significant differences in TIN or TP

Headwater Streams: Total Nitrogen

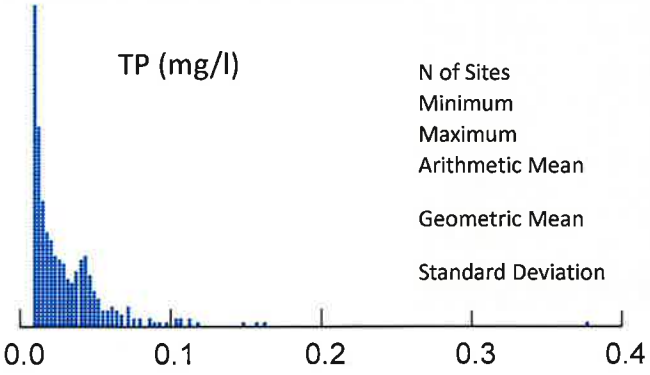


	Mean TN (Estimate)
N of Sites	385
Minimum	0.048
Maximum	8.497
Arithmetic Mean	0.341
Geometric Mean	0.216
Standard Deviation	0.543

How many problems?

Threshold	Pct Above
0.7	8%
0.8	8%
0.9	7%
1	5%
1.1	4%
1.2	4%
1.3	3%

Headwater Streams: Total Phosphorous



	Average TP
N of Sites	408
Minimum	0.01
Maximum	0.377
Arithmetic Mean	0.03
Geometric Mean	0.022
Standard Deviation	0.03

How many problems?

Threshold	Pct Above
0.03	46%
0.04	31%
0.05	11%
0.06	7%
0.07	5%

Recovery Potential

EPA
- Doug Norton
- Katherine Dowell
- Katie Flahive
- Tina Laidlaw

DWQ
- Ben Holcomb
- Mike Shupryt
- Mark Stanger
- Carl Adams

Tetra Tech
- Mike Paul
- Aileen Molloy
- Ehren Hill

- ❖ Ongoing science will allow us to find and characterize problems, but…
- ❖ Where do we start looking for solutions?

What is Recovery Potential Screening?

A method to help states and restoration planners compare restorability across all watersheds

- Systematic <u>but</u> very flexible approach
- Science-based, indicator-driven (GIS and field monitoring data)

ecological capacity,
exposure to stressors, *and*
social context *affecting restoration efforts*

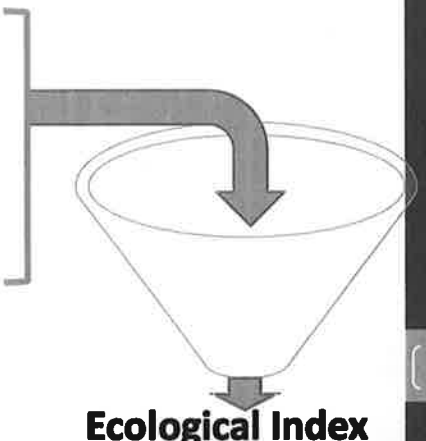
How does recovery potential work?

21

RPS Ecological indicator subcategories

• describe condition (physical structure, key processes) and implications for capacity to regain function:

1. **watershed natural structure**
2. **corridor condition**
3. **flow and channel dynamics**
4. **biotic community integrity**
5. **aquatic connectivity**
6. **ecological history**

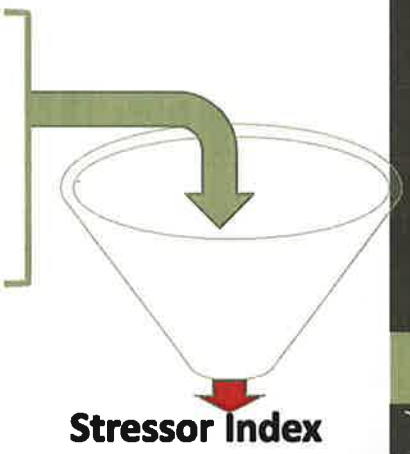


22

RPS Stressor indicator subcategories

• describe condition (sources and stressors) and the magnitude of risk they represent:

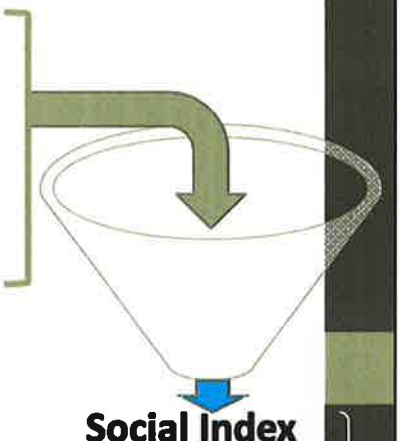
1. watershed disturbance
2. corridor/shoreland disturbance
3. flow or channel alteration
4. biological stressors
5. severity, complexity of pollution
6. land use legacies

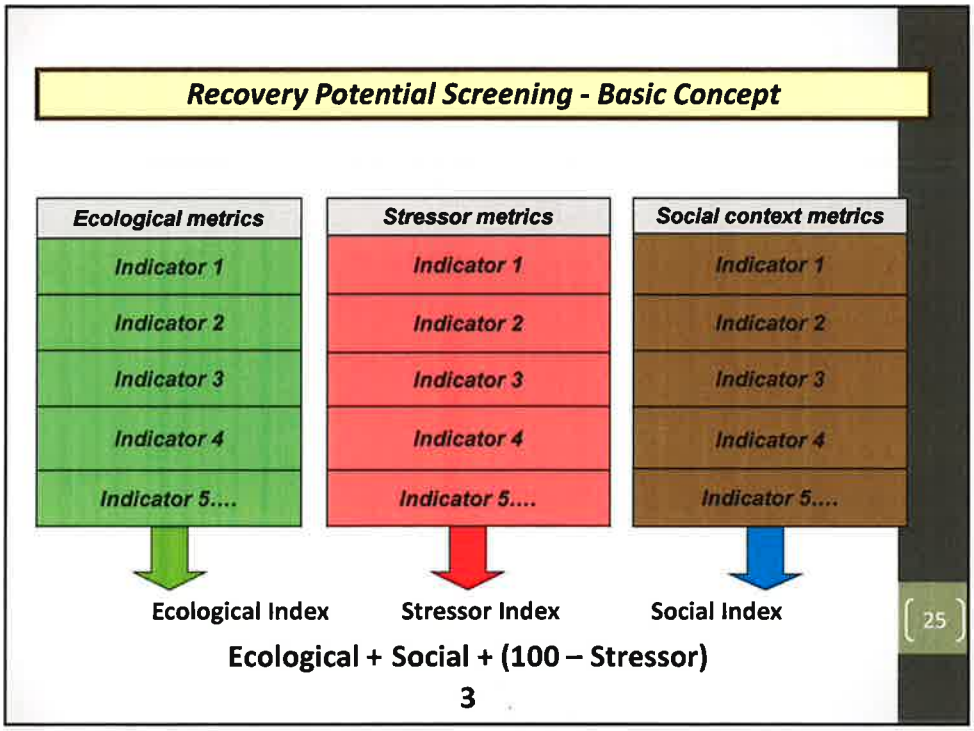


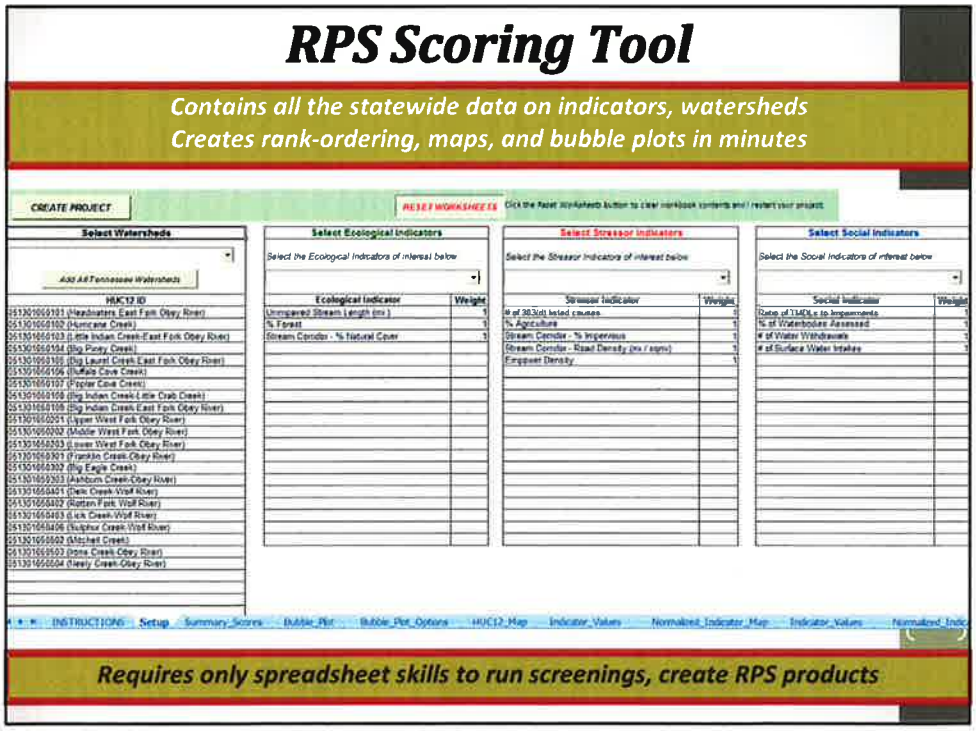
RPS Social indicator subcategories

• these do not address ecological condition – they are societal factors that influence restoration success:

1. leadership, organization, engagement
2. protective ownership or regulation
3. level of information, planning, certainty
4. cost, complexity
5. socio-economic factors
6. human health, uses, incentives




Recovery Potential Screening - Basic Concept
Ecological metrics
Indicator 1
Indicator 2
Indicator 3
Indicator 4
Indicator 5....
Stressor metrics
Indicator 1
Indicator 2
Indicator 3
Indicator 4
Indicator 5....
Social context metrics
Indicator 1
Indicator 2
Indicator 3
Indicator 4
Indicator 5....
Ecological Index
Stressor Index
Social Index
25
Ecological + Social + (100 – Stressor)
3


RPS Scoring Tool
Contains all the statewide data on indicators, watersheds
Creates rank-ordering, maps, and bubble plots in minutes
CREATE PROJECT
RESET WORKSHEETS
Select Watersheds
Select Ecological Indicators
Select Stressor Indicators
Select Social Indicators
Requires only spreadsheet skills to run screenings, create RPS products

Using Recovery Potential Screening Products

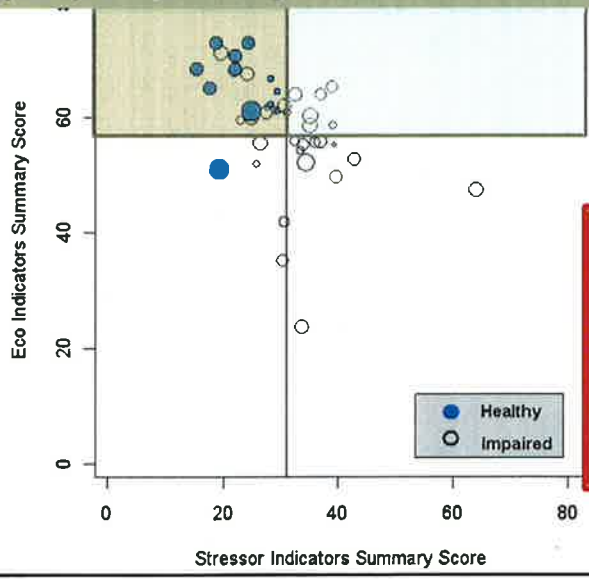
Comparison by Rank Ordering RPS Indices

1st (top) quartile | 2nd quartile | 3rd quartile | 4th quartile

HUC ID	HUC12 NAME	TYPE	AGRICULTURE				MINING				POPULATION GROWTH				MEAN RPI RANK
			ECO	STR	SOC	RPI	ECO	STR	SOC	RPI	ECO	STR	SOC	RPI	
51100011301	Echo River-Green River	REFW	547	117	2	10	290	270	3	4	203	14	3	4	3
51001010508	Scott Creek-Licking River	REFW	17	194	5	1	9	833	4	8	7	105	4	3	5
51100010307	White Oak Creek-Green River	REFW	80	350	28	13	7	754	20	18	13	217	16	5	17
51301050303	Ashburn Creek-Obey River	REFW	477	80	57	61	1	1	34	1	1	39	41	1	20
50600021605	Carroll Run-Scioto River	REFW	837	233	53	192	29	5	31	2	17	491	31	10	22
51100011106	Conoloway Creek-Nolin River	REFW	153	70	85	34	26	13	69	5	38	13	74	6	12
51100010205	Wilson Creek-Robinson Creek	REFW	129	375	58	36	22	784	43	48	47	301	42	14	40
51100020207	Walnut Creek-Barren River	REFW	329	285	64	68	293	32	60	11	334	112	61	50	42
51302050703	Long Creek-Cumberland River	REFW	208	61	121	47	14	124	102	6	34	28	99	8	45
51301040701	Wolf Creek-Big South Fork Cumberland River	REFW	345	12	96	60	69	412	82	28	71	46	73	11	46
51002040503	Rose Creek-Kentucky River	REFW	87	67	96	26	157	377	88	41	123	41	91	19	52
51002040207	Upper Middle Fork Red River	REFW	76	67	68	12	163	514	55	39	179	454	57	55	54
51100020102	Trace Creek-Line Creek	REFW	308	513	71	98	318	165	54	20	368	315	56	79	57
51100010306	Lower Casey Creek-Green River	REFW	184	333	82	51	46	773	67	83	94	148	66	20	62
51002030103	Martins Creek-Goose Creek	REFW	503	149	46	69	335	668	27	76	240	682	29	81	68
51001010404	Leatherwood Creek-Beaver Creek	REFW	24	181	93	19	13	846	74	104	14	306	77	15	71
51301040505	Williams Creek-Big South Fork Cumberland River	REFW	5	14	200	28	36	379	153	47	35	8	162	16	88
51100020505	Lower Trammel Creek	PHW	351	390	116	124	449	173	100	62	423	168	97	100	98
60400051005	Bear Creek-Kentucky Lake	REFW	325	288	211	170	24	21	219	13	63	116	216	56	98
60102060103	Indian Creek	REFW	482	60	216	181	171	59	172	42	21	163	176	30	96
51100020905	Cliffy Creek-Barren River	PHW	311	309	132	111	364	215	156	96	360	87	157	107	112
51002040501	Bailey Fork	REFW	166	83	160	62	327	337	140	110	256	88	143	71	114

Recovery Potential Screening:

RPS tools reveal impaired watersheds with good recovery prospects, healthy watershed risks



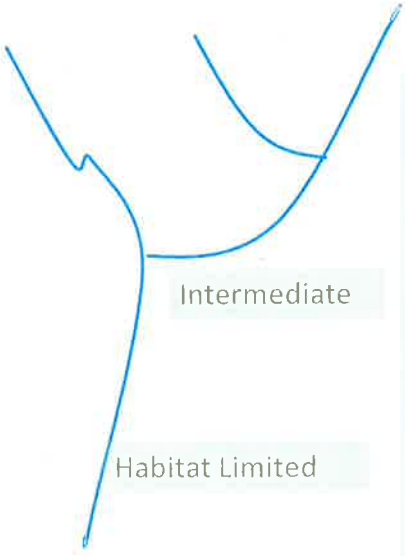
Bubble Plotting Tool

simultaneously compares differences in eco, stressor, social RPS scores

- *upper left impaired watersheds are most like health*
- *smaller healthy watershed dot - poorer social score may imply risk*

Development of a RPS for Utah

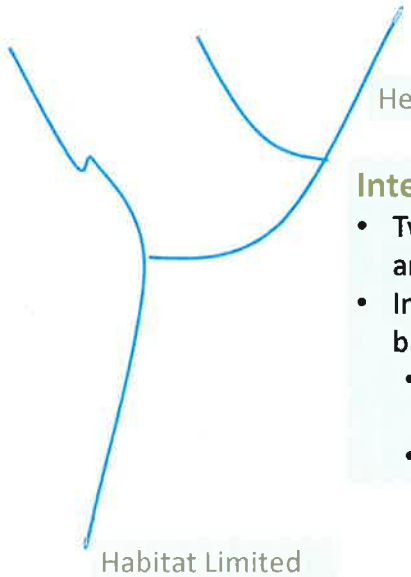
Revisiting our phased approach…



Headwaters

- Address problems broadly (i.e., grazing management plans)
- Incorporate habitat degradation
- RPS primarily used for multiagency collaborative management
  - Coordinate NPS funds
  - Share geospatial data

Revisiting our phased approach…



Intermediate

- Two Scenarios: NPS (Rural) and Multiple (Suburban)
- Incorporate into rotating basin approach
  - NPS funding prioritization
  - Monitoring

Revisiting our phased approach…

Habitat Limited

- Expand on water quality objectives to include broad, locally-derived objectives
- Incorporate into watershed plans
  - Agency coordination
  - Funding prioritization

Utah's RPS Rollout: Case Studies

- Two Scenarios Related to our Nutrient Reduction Program
  - NPS/Rural Watersheds
  - NPS&PS, Urban Watershed
- Expert Elicitation
  - With and without RP Screening Tool
  - Selected Urban Scenario
    - Broad environmental gradient
    - Important and engaged stakeholders
    - Numerous, technical savvy experts
  - Developed case study for RP rollout
- Stakeholder Workshop
  - Well attended by stakeholders with diverse perspectives
  - Provided hands on experience

Urban and rural RP Scenarios

- **Ecological Metrics:**
  - Why these and why different among settings?

Indicators				Scenarios					
Indicator Name	Urban	Rural	Correlated with (r>0.7)	Urban1	Urban2	Urban3	Rural1	Rural2	Rural3
Percent_Forest	X	X	%forest corridor	X		X		X	
Percent_ForestCorridor		X					X		X
Percent_NaturalCover	X	X		X	X	X		X	
Percent_NaturalCoverCorridor		X					X		X
HYDR_AVE (Avg Flow)	X			X	X				
MEANP_AVE (Avg Precip)*	X	X			X	X			
OMH_AVE (Soil Org Matter)		X					X	X	X
PERMH_AVE (Soil Permeab.)		X						X	X
WTDPH_AVE (Water Table)		X					X		X

*Weighted higher in urban weighted scenario; black weighted higher in rural weighted scenario

Urban and rural RP Scenarios

- **Stressor Metrics**:
  - Why these and why different among settings?

Indicators				Scenarios					
Indicator Name	Urban	Rural	Correlated with (r>0.7)	Urban1	Urban2	Urban3	Rural1	Rural2	Rural3
#UPDES (Permit Qs)	X		%Impervious	X					
POTW	X	X		X			X		
#Returns	X	X		X	X	X	X	X	X
Mean TSS		X	Max TSS				X		X
Max TSS		X						X	
Mean TN	X	X	Max TN; TN%Mean		X			X	
Mean TP	X	X	MaxTP; TP%Mean		X			X	
TN%Mean (Obs/Pred Summer TN)*	X	X		X		X	X		X
TP%Mean (Obs/Pred Summer TP)*	X	X		X		X	X		X

*Weighted higher in urban weighted scenario; black weighted higher in rural weighted scenario

Urban and rural RP Scenarios

- **Stressor Metrics** continued:

Indicators				Scenarios					
Indicator Name	Urban	Rural	Correlated with (r>0.7)	Urban1	Urban2	Urban3	Rural1	Rural2	Rural3
ErosionPotential_KFFACT		X	KFFACT				X		X
ErosionPotential_KWFACT		X						X	
PercentUnstable (20m)	X	X	%Cropland; %CropCorridor	X			X		
percentPasture		X					X	X	X
percentCropland		X	%CropCorridor					X	
Percent_PastureCorridor		X					X	X	X
Percent_CropCorridor		X							X
PercentImpervious	X		UPDES; RoadDensityAll		X				
RoadDensityAll	X		UPDES			X			
PercentIncreaseUrban	X			X	X	X			

Black weighted higher in rural weighted scenario

Urban and rural RP Scenarios

- **Social Metrics:**
  - Why these and why different among settings?

Indicators				Scenarios					
Indicator Name	Urban	Rural	Correlated with (r>0.7)	Urban1	Urban2	Urban3	Rural1	Rural2	Rural3
# T&E spp	X	X		X	X	X			
# BoatRamps	X	X	MajorFishing River Private; RECUSEVAL				X		
MajorFishing River Private (Km)	X	X	RECUSEVAL		X			X	
Major Fish Public Access (Km)	X	X		X	X		X	X	
REC USE VALUE*	X	X				X			X
USFS		X					X	X	X
# Jurisdictions.1Inv	X			X	X	X			
TMDLRatio	X	X					X	X	X
Income*	X		EducationPercent	X		X	X		X
EducationPercent	X				X			X	

*Weighted higher in urban weighted scenario; black weighted higher in rural weighted scenario

Rural scenarios

- RPI Scores/Ranks and Individual metric Scores/Ranks
  - Best and Worst

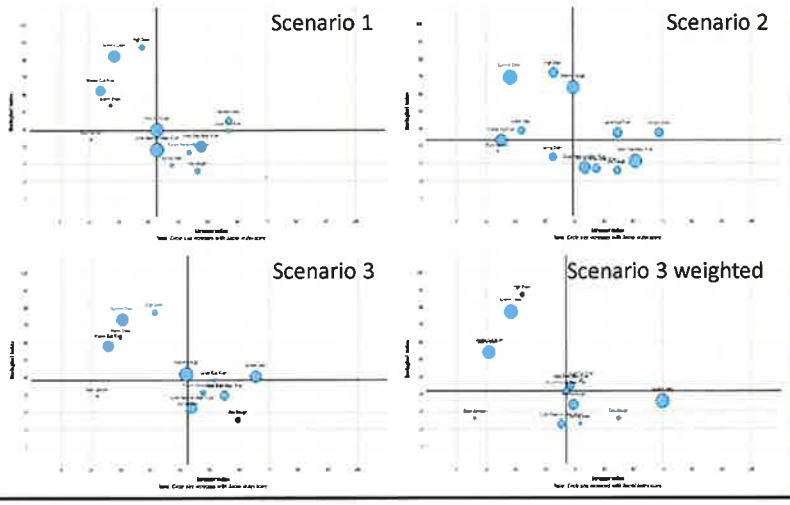
	Rural1		Rural2		Rural3		Rural3Weighted	
Watershed ID	RPI Score	RPI Rank	RPI Score	RPI Rank	RPI Score	RPI Rank	RPI Score	RPI Rank
Summit Creek	64.26	1	65.16	1	60.64	1	65.80	1
Middle Cub River	56.84	2	49.93	4	54.76	2	59.34	2
Spring Creek	28.36	11	34.79	9	27.21	12	24.54	12
Clay Slough	25.11	13	25.05	13	20.59	13	21.63	13

- Six varied > 30% in rank among scenarios

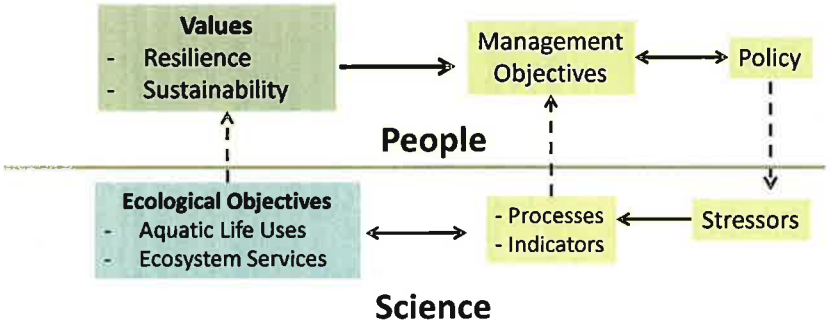
	Rural1		Rural2		Rural3		Rural3Weighted	
Watershed ID	RPI Score	RPI Rank	RPI Score	RPI Rank	RPI Score	RPI Rank	RPI Score	RPI Rank
Hopkins Slough	48.96	4	54.84	2	46.58	5	35.65	7
Cutler Reservoir-Bear River	46.09	6	34.98	7	33.8	8	30.2	11
Nebo Creek-Bear River	36.4	8	33.66	10	30.38	9	36.82	5
Newton Creek	32.64	9	29.18	11	34.94	7	31.7	10
Pullum Hollow-Bear River	29.67	10	28.7	12	29.65	11	34.45	8
Lower Cub River	28.34	12	34.88	8	29.83	10	32.52	9

Rural scenarios

- Once again, good separation among sites

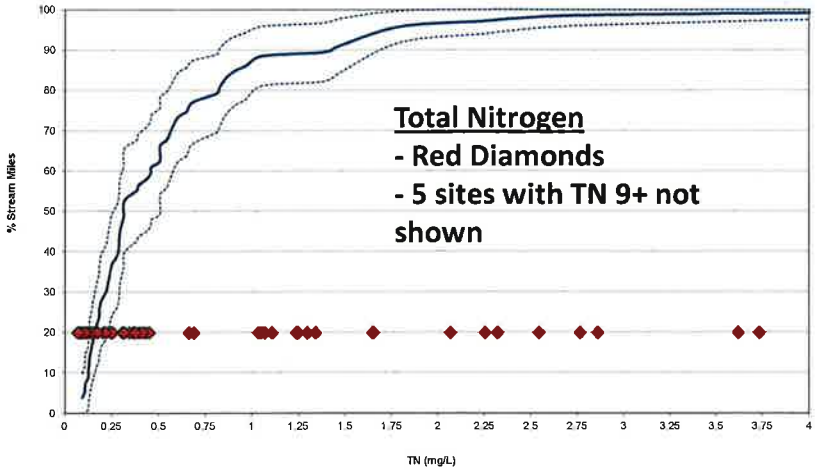


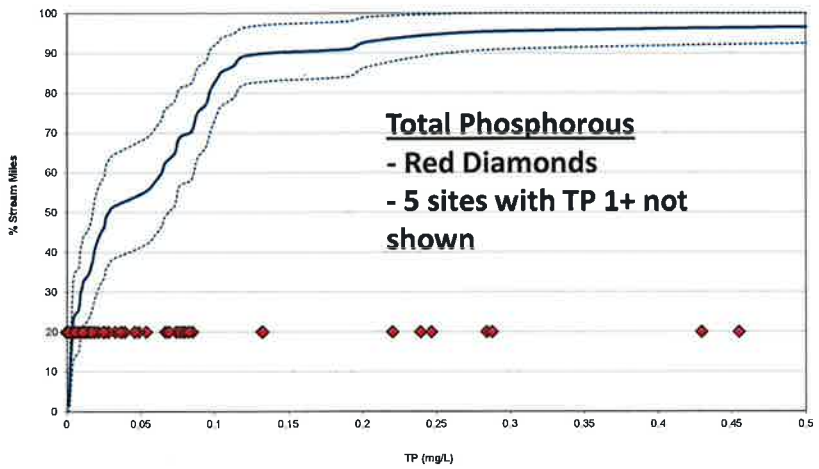
The "Random Walk"



Science is necessary, but not sufficient. Implementation considerations are always important!

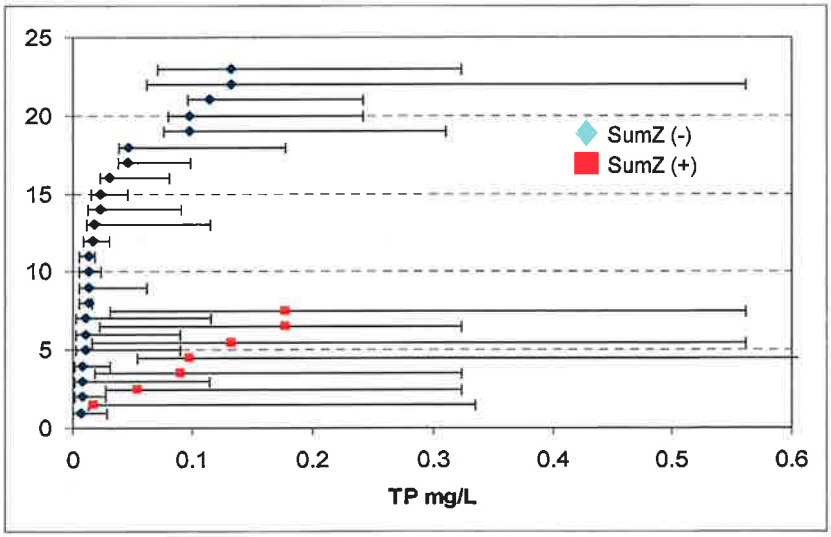
A targeted study to develop nutrient responses thresholds for both structural and functional indicators.





Side Note: Out really hosed sites are just as rare as our reference sites (if not more so). What does this mean in the context of probabilistic designs?

Structural Indicators: TITAN



TITAN Results

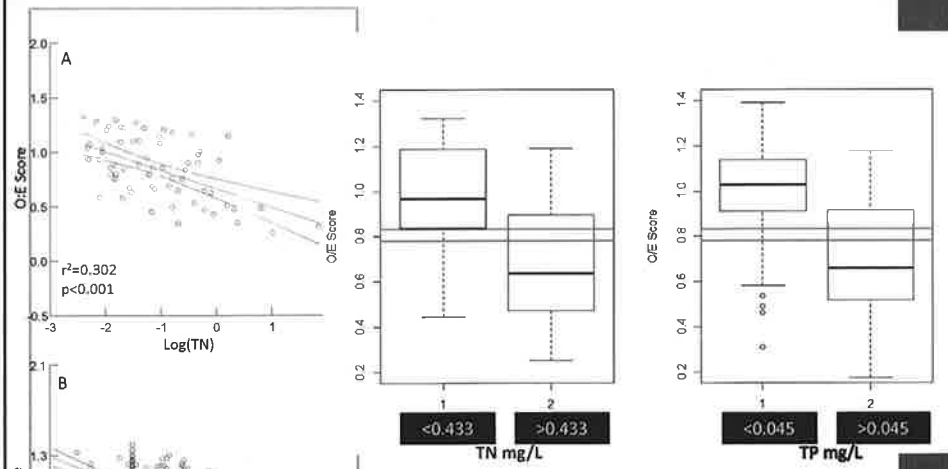
Macroinvertebrates

Macroinvertebrates		Total Nitrogen(mg/L)			Total Phosphorus(mg/L)		
Community	Method	Threshold	5th Percentile	95th Percentile	Threshold	5th Percentile	95th Percentile
Sensitive	TITAN	0.18	0.14	0.40	0.011	0.003	0.043
Tolerant	TITAN	0.41	0.36	5.10	0.612	0.042	1.81
All	nCPA	0.41	0.40	0.11	0.015	0.004	0.113

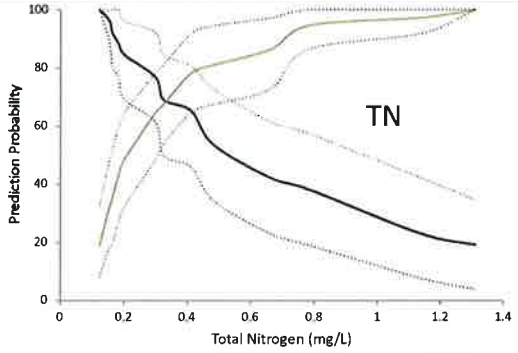
Diatoms

Diatoms		Total Phosphorus (mg/L)		
Community	Method	Threshold	5th Percentile	95th Percentile
Sensitive	TITAN	0.016	0.010	0.022
Tolerant	TITAN	0.042	0.027	0.051
All	nCPA	0.022	0.010	0.047

An interim indicator for these critters.



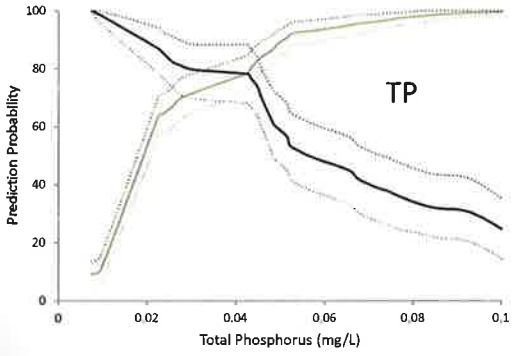
Thresholds determined by nonparametric deviance reduction among binary response data of O:E impairment indicator



Threshold Diagnostics

TN-0.5	TN-OE	5th CI	95th CI
AUC	72.6	60.21	82.9
RR	2.09	1.57	2.95

True Positives (impaired)
True Negatives (not impaired)

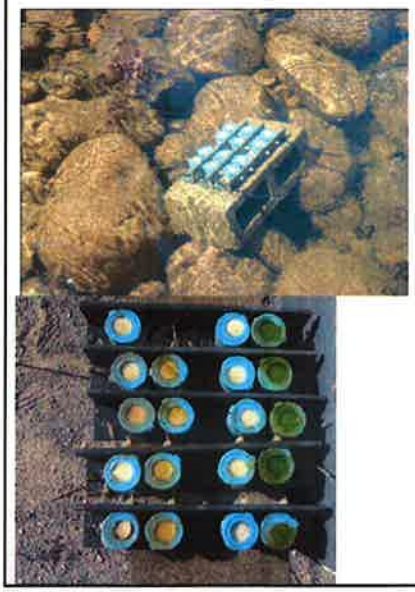


Threshold Diagnostics

TP-0.045	TP-OE	5th CI	95th CI
AUC	79.6	72.7	85.6
RR	3.66	2.66	5.01

Receiver Operating Characteristics

Functional Indicators: NDS



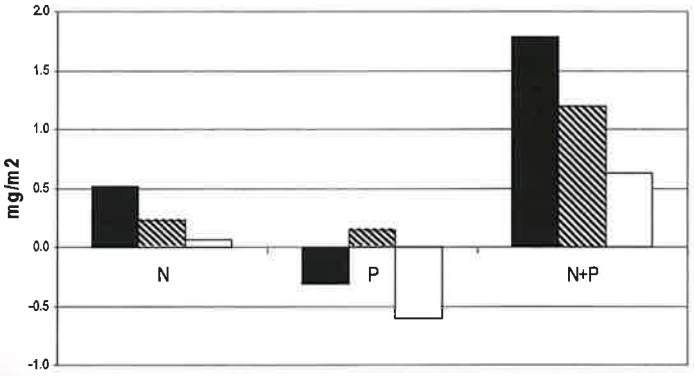
- 3 Replicates, 3 Treatments (P, N, N&P) and Controls
- Saturation Thresholds
  - TN = 0.042 (95%: 0.33-1.41)
  - TP = 0.078 (95%: 0.017-1.33)
- Confirmed accuracy of classifications with ROC:
  - TN = 82% (AUC)
  - TP = 72%

Limiting Nutrients

Data Relative to Controls

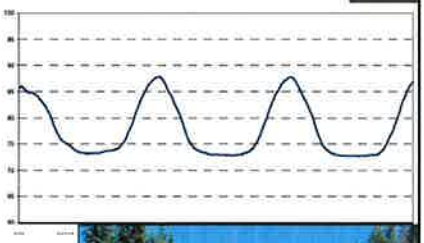
High Variation! Site-Specific (time-specific?) factors seem important.

Reference Sites
Moderate Nutrients
High Nutrients



Whole Stream Metabolism

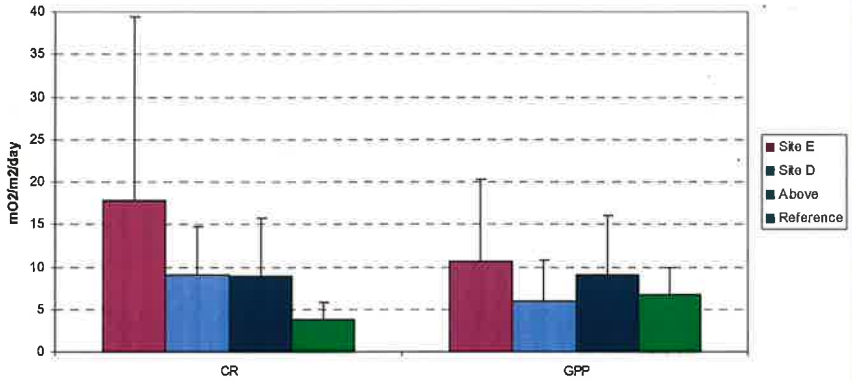
$\Delta DO = GPP - CR \pm E$



- Measures daily production & consumption of oxygen
- Promising initial results
- Continuing analysis on low productivity streams

Probes are now ~$1K!

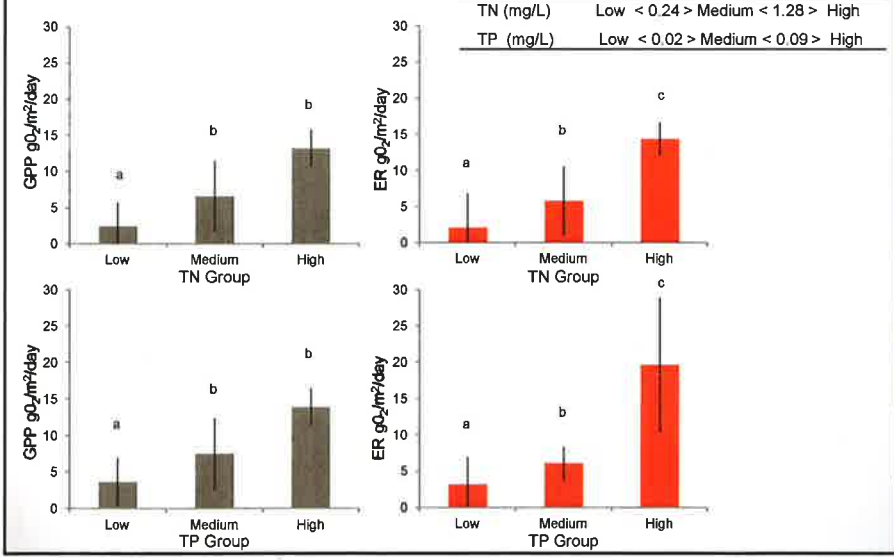
Stream Metabolism



Take Home: Look for metabolism responses considerably downstream from point sources.

Relative Sensitivity of GPP and ER

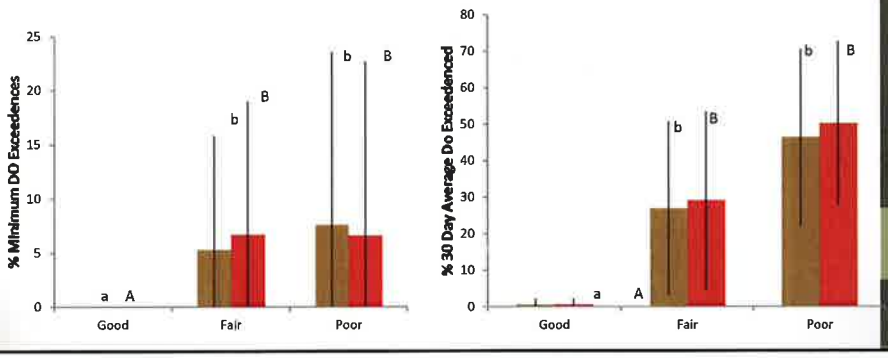
Nutrient	Nutrient Group Thresholds
TN (mg/L)	Low < 0.24 > Medium < 1.28 > High
TP (mg/L)	Low < 0.02 > Medium < 0.09 > High



Relationship to DO Criteria

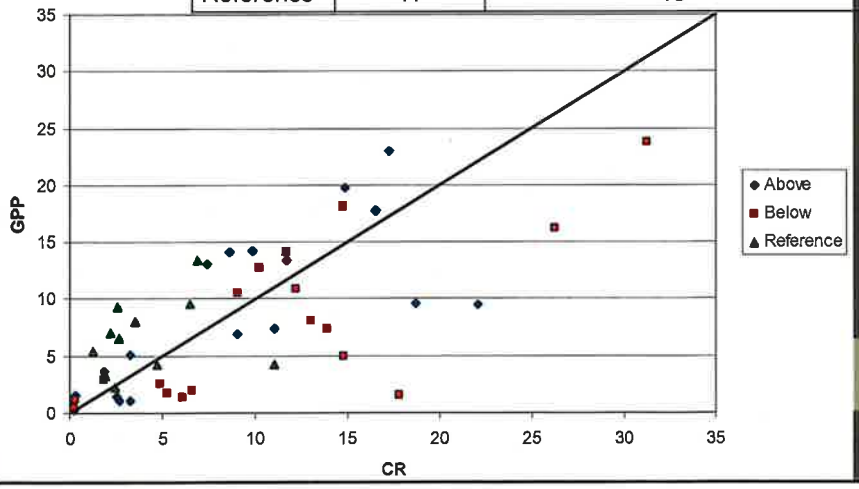
Functional Indicator	Indicator Group Thresholds
GPP ($gO_2/m^2/day$)	Good < 6.0 > Fair < 10.0 > Poor
ER ($gO_2/m^2/day$)	Good < 5.0 > Fair < 9.0 > Poor

- Nutrients -> Metabolism -> Aquatic Life

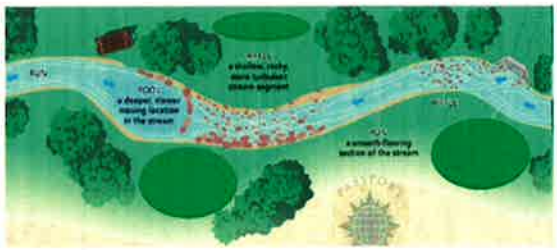


Caveats

	Number of Stations	
	Completed	Bad Regression
Treatment	38	3
Reference	11	19

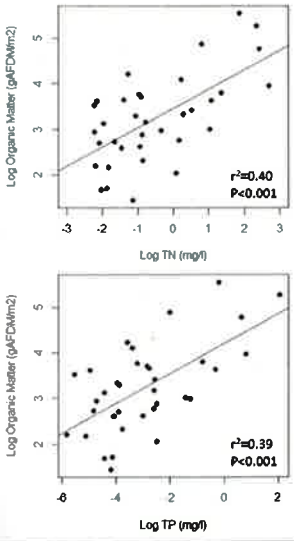


Organic Matter Standing Stocks



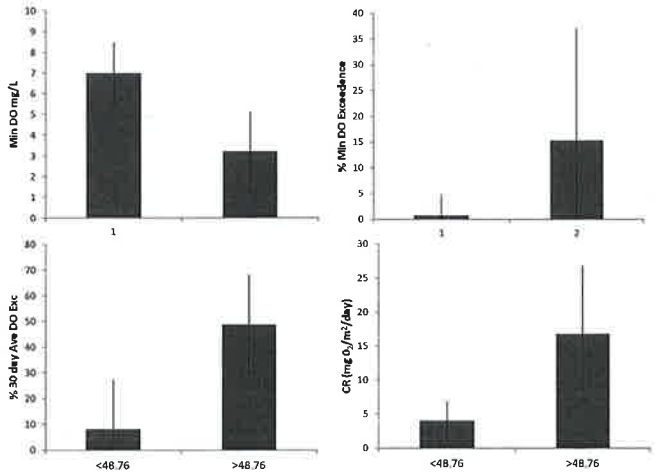
- Depending on the ecological response of interest, carbon may be as important, or more important than N or P.
- Consider DO: what is the covariate? C or N/P?

The Carbon Picture

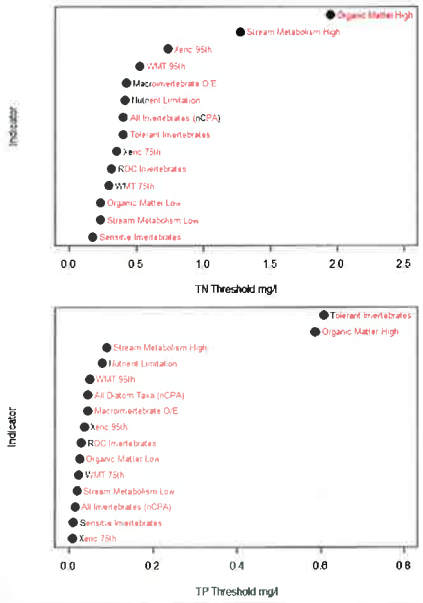


- Methods: Distinguish between autochthonous and allochthonous carbon standing stocks
- Focus on sources associated with GPP

OM Standing Stocks & DO Criteria

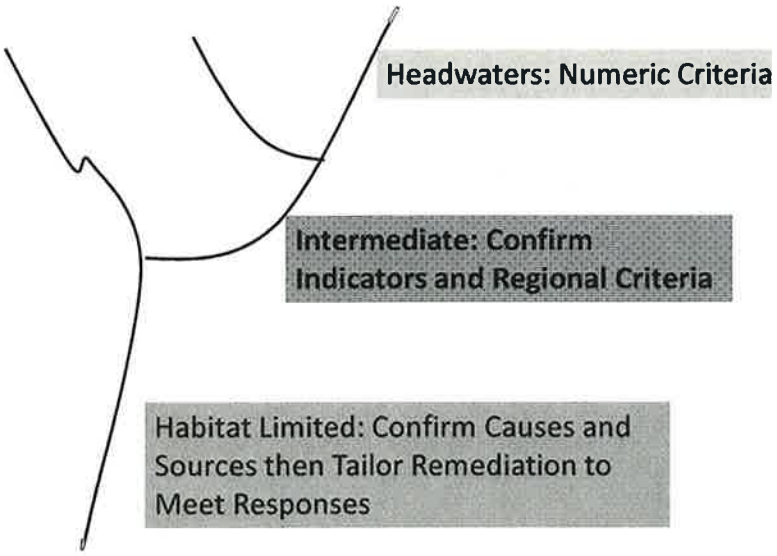


Multiple Thresholds



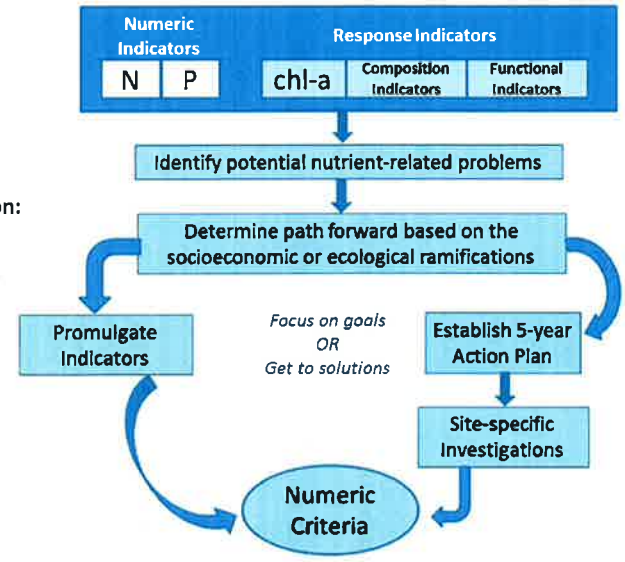
- ❖ Statistical thresholds were established for numerous indicators of biological integrity
- ❖ Two Perspectives:
  - Ecological Relevance
  - Designated Use Protection
- ❖ Values span a relatively narrow range of [TN] and [TP]

Incremental Regulations

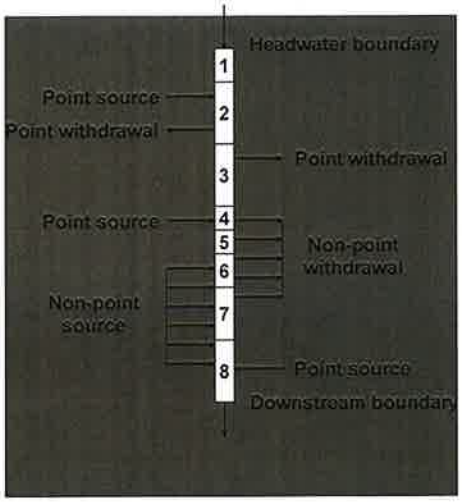


Intermediate Waters

Prioritization: RPS Tool (tomorrow)



Mechanistic Models: Site-Specific Standards



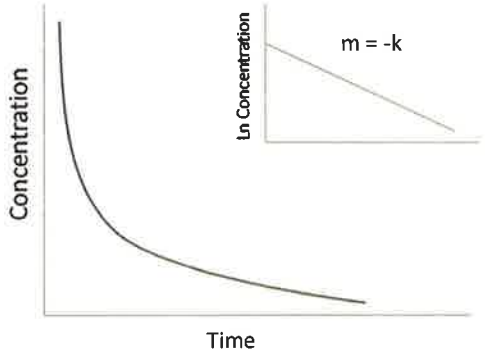
- **Already developed for each POTW**
- Allows predictions of future scenarios
- Evaluates interaction among nutrient-related water quality parameters
- A start at site-specific numeric criteria

Collaboration with B. Neilson and A. Hobson, USU

Experimental Support

- Addition of nitrate and phosphorous
- Treatments
  - SAV removal (clear phase)
  - With and without mats (green phase)
- 6 hours in duration
  - 15 minute sample interval (first 2 hours)
  - 30 minute interval (last 4 hours)
- Sondes for several days (DO, pH, temperature and cond)

Theoretical Underpinning



$$N_t = N_0 e^{-kt}$$

Results: Mean Rates [(mg [Nut] up/mg [nut])/min]

Control

SRP Rate
0.14
k = -0.12 to -0.16

NO3 Rate
0.72
k = -0.60 to -0.92

N Rate: P Rate
5.4

Treatment

SRP Rate
0.05
k = -0.04 to -0.07

NO3 Rate
0.26
k = -0.13 to -0.36

N Rate: P Rate
5.6

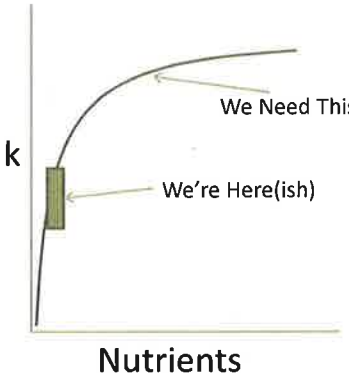
Scaling of Rate Constants...And comparing Rates to External Loads

NO_3 Turnover (Load / Uptake Rate)

		N Load (lbs N / day)						
Trip	TRT	25	50	75	250	500	1000	4000
1	+SAV	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	<0.01 <0.01	0.02 <0.01	0.03 0.01	0.13 0.04
1	-SAV	<0.01 <0.01	<0.01 0.01	<0.01 0.01	0.04 0.01	0.07 0.02	0.15 0.04	0.60 0.17
2 – Day	+SAV	0.13 0.04	0.26 0.07	0.39 0.11	**1.30** 0.37	**2.59** 0.75	**5.19** **1.50**	**20.8** **6.0**
2 – Day	-SAV	0.09 0.03	0.18 0.05	0.26 0.08	0.88 0.25	**1.77** 0.51	**3.53** **1.02**	**14.1** **4.1**
3 – Night	+SAV	0.03 0.01	0.06 0.02	0.10 0.03	0.32 0.09	0.64 0.18	**1.28** 0.37	**5.12** **1.48**
3 – Night	-SAV	0.04 0.01	0.08 0.02	0.12 0.04	0.41 0.12	0.82 0.24	**1.64** 0.47	**6.57** **1.90**
4 - Tailrace	-SAV	0.03	0.06	0.09	0.29	0.58	**1.17**	**4.67**

Values are Estimate of Nutrient Load divided by Uptake Rate, by Trip and Vegetation Type. Upper values are for Low Water conditions, Lower values for High Water Conditions. Trip 4 shown only for Tailrace area

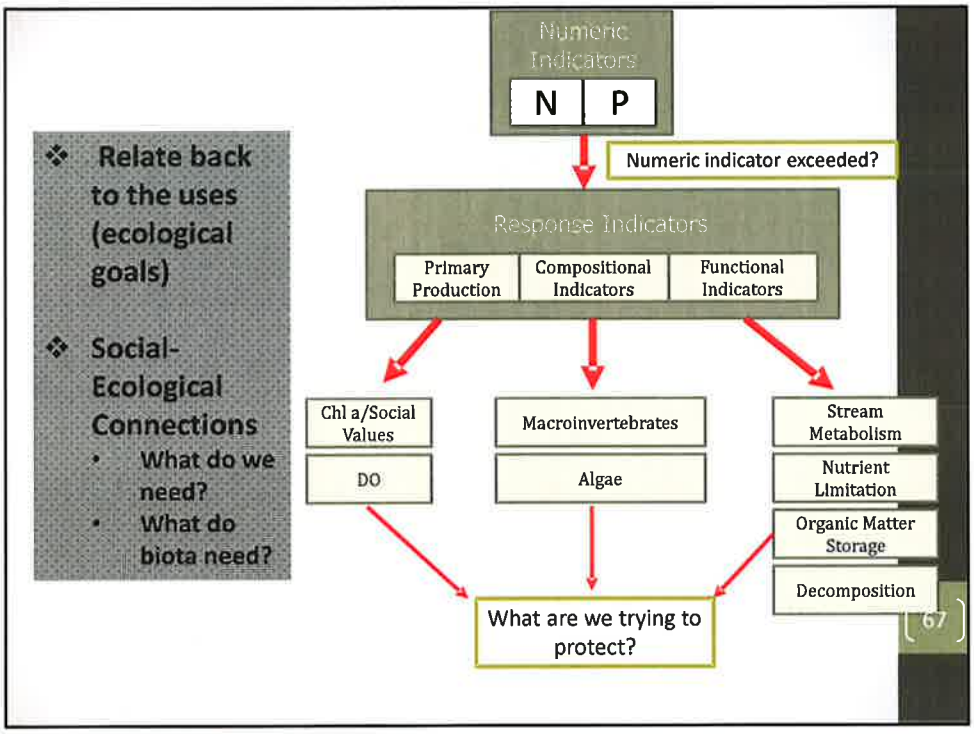
General Applicability?



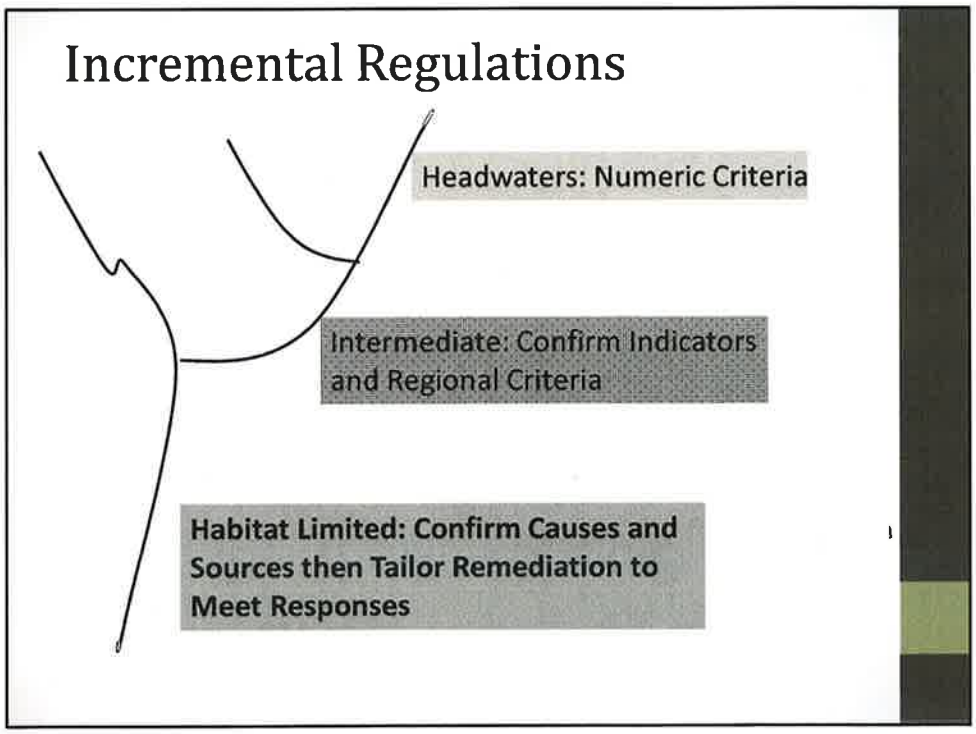
- A fundamental ecosystem process (ecosystem service)
- In streams spiraling concepts could be used to provide similar data
- Directly addresses: How much is too much?

But...

- **K estimates vary**
  - constants are not constant
- **Biological retention is temporary**
  - The type of organism is an important consideration



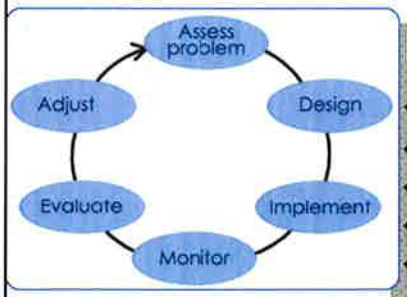
- Relate back to the uses (ecological goals)
- Social-Ecological Connections
  - What do we need?
  - What do biota need?



Key Considerations

- **What is the relative role of nutrients vs. other stressors?**
  - Can these be decoupled?
- **To what extent can the stressors be addressed?**
  - What is reversible?
- **What are appropriate (attainable) ecological goals?**
  - Is reference the appropriate benchmark?
  - Are there other societal goals? How can we incorporate these?
- **Can we do better?**
  - Is there a trajectory that we can follow to meet collective goals and objectives?

Watershed-Specific Reductions



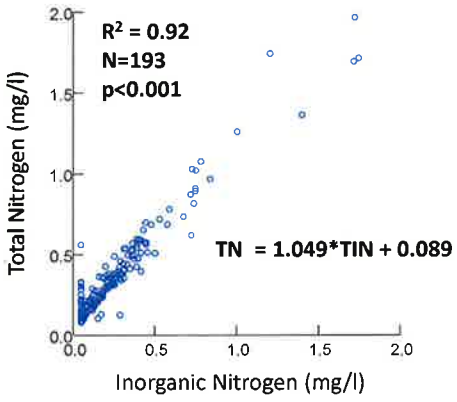
TMDL-Alternatives

- Collaborative Management
- From values **define shared goals**
- Seek **incremental progress**
- **Monitor** to ensure accountability
- **Ongoing Science**
  - **Establish Standards**
  - **Modify Response Goals**
  - **Adjust recommend BMPs**

Next Steps

- **Headwater Numeric Criteria**
  - this summer
- **Technology-based Limits**
  - Explore optimization for N
- **Variance Policy**
- **Ammonia**
  - eDNA
  - Modeling
- **Monitoring and Assessment**
  - Institutionalize phased monitoring approaches
  - Develop Assessment Methods

TN vs. TIN: Category 1 & 2 Waters



Among headwater stream, TIN varies predictably with TIN.

Annual Utah Nonpoint Source Program Report

FY-2013

Water Quality Task Force
May 19, 2013
Jim Bowcutt
Utah NPS Program Coordinator

Notable Accomplishments in 2013

- The Statewide NPS Pollution Management Plan was updated and approved by EPA.

NPS Projects of 2013

San Pitch River

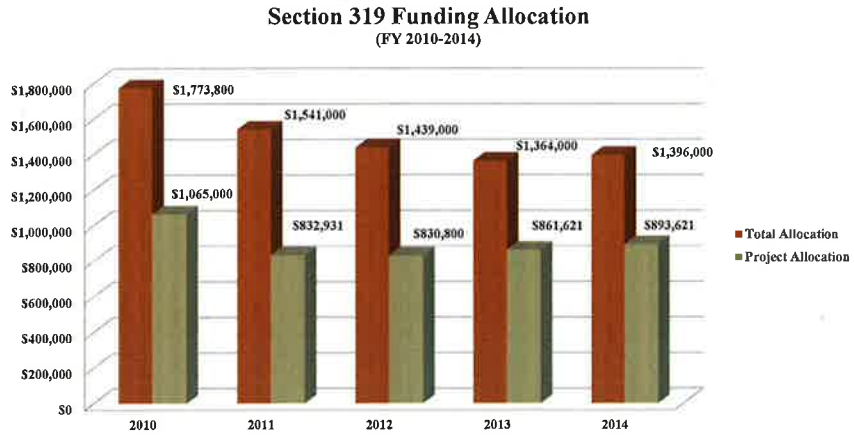
NPS Projects of 2013

Main Creek (Wallsburg) Watershed

NPS Projects of 2013

Strawberry River

The Funding Pendulum's Upward Swing?



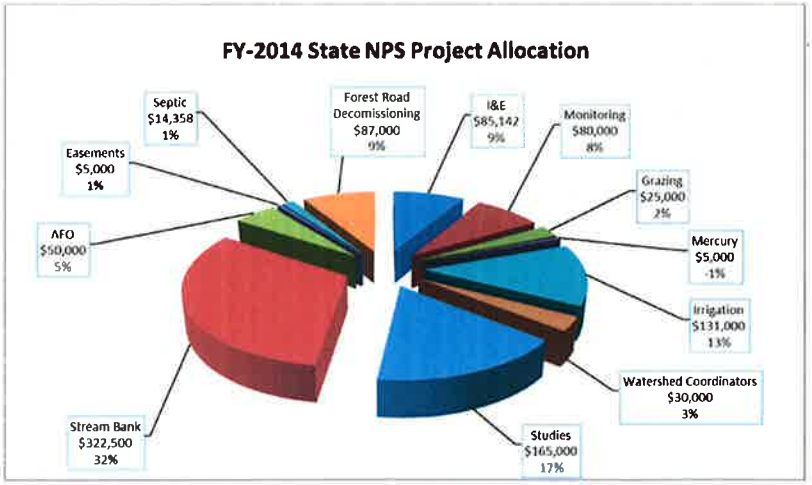
FY-14 Section 319 Projects Selected

Location	Project Sponsor	Project Description	Funding Requests
Statewide	DWQ	Local Watershed Coordinators	$340,000
Statewide	USU Extension	Volunteer Monitoring and I&E	$84,525
Main Creek (Wallsburg)	Wasatch CD	Wallsburg Watershed Restoration	$150,000
Jordan River	Salt Lake County	Jordan River Restoration	$319,096
		Total	**$893,621**

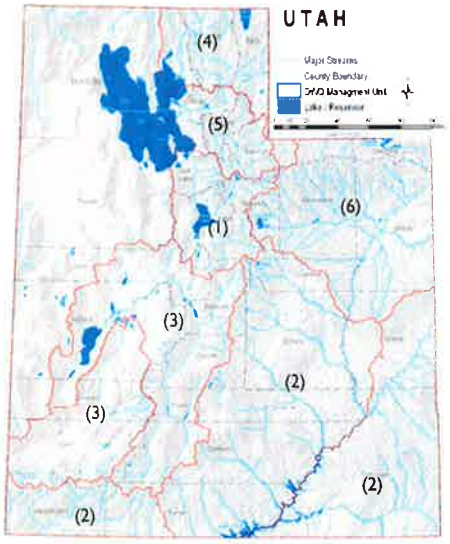
2014 Section 319 Projects
Main Creek (Wallsburg) Watershed

2014 Section 319 Projects
Jordan River

FY-2014 State Nonpoint Source Projects Funded



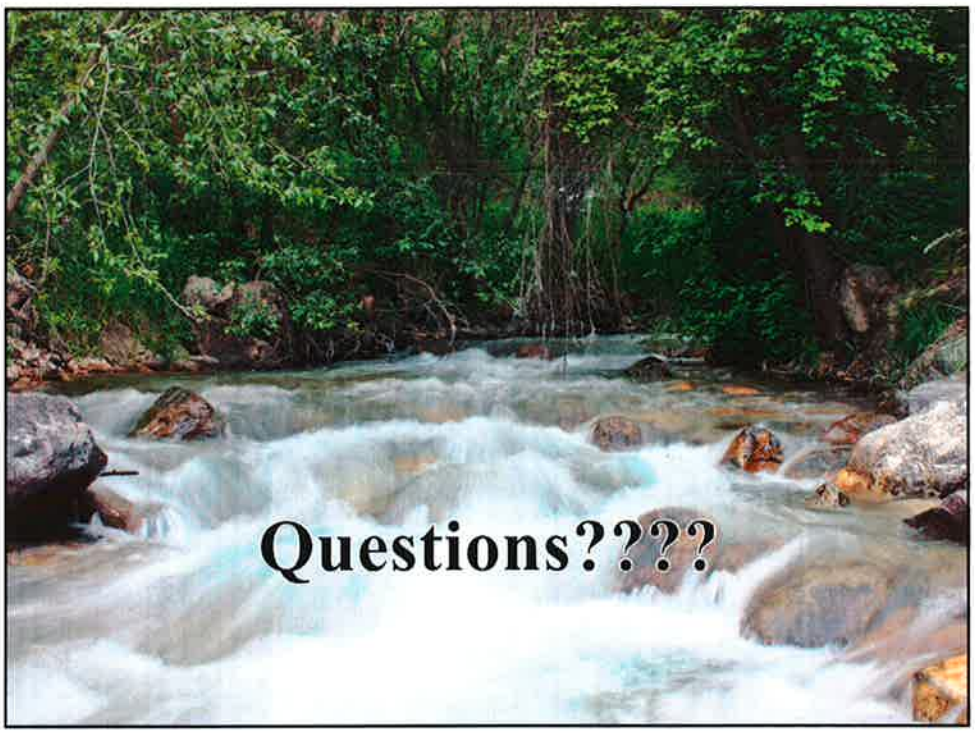
The Watershed Funding Cycle



Basin Priority Funding Schedule							
Watershed	2013	2014	2015	2016	2017	2018	2019
(1) Jordan/ Utah lake							
(2) Colorado River							
(3) Sevier, Cedar-Beaver							
(4) Bear River							
(5) Weber River							
(6) Uinta Basin							

FY-2015 Application Period

- Application deadline was May 16th.
  - 64 proposals Received
  - $4,565,771
- Applications will be ranked internally using the ranking criteria developed by the Water Quality Task Force.
- A subcommittee of the Water Quality Task Force will discuss the ranking on June 2nd.
- Grants selected for funding will be presented to the Water Quality Board during the June Board meeting.


Questions????

FY-2015 NPS Proposals Received

Project Title	Watershed	Sponsor	Contact	Project Type	Amount Requested
Water Management Planning	Bear River	Cache County	Bob Fotheringham	Planning	$30,000.00
Kunzler AFO	Bear River	Private Landowner	Nathan Daugs	AFO	$20,000.00
D&S Dairy Manure Management	Bear River	Private Landowner	Stephen Griffin	AFO	$50,000.00
Maple Creek Stream Bank Project	Bear River	Private Landowner	Justin Elsner	Stream Bank	$15,000.00
Rick Hafen Stream Bank	Cedar/Beaver	Dixie Conservation District	David Dodds	Streambank	$14,729.00
Hafen Pinto Creek Stream Bank	Cedar/Beaver	Private Landowner	David Dodds	Streambank	$19,783.00
Cedar Beaver I&E Request	Cedar/Beaver	Enterprise and Iron CD	David Dodds	I&E	$9,300.00
Fish Lake Parking Lot Project	Colorado	USFS	Peter Hareden	road maintenance	$25,000.00
Upper Valley Creek Stream Bank	Colorado	Private Landowner	Alysia Angus	Stream Bank	$114,000.00
Helper City Revitalization Project	Colorado	Helper City	Crystal Young	Stream Bank	$150,000.00
Shivwits Streambank	Colorado	Private Landowner	David Dodds	Streambank	$79,492.00
North Fork (Lower) Irrigation Project	Colorado	BLM	David Dodds	Irrigation	$174,555.00
North Fork (Upper) Irrigation Project	Colorado	Enterprise and Iron CD	David Dodds	Irrigation	$56,693.00
Mud Creek Stream Bank Restoration	Colorado	Price River Water Conservancy District	Roger Barton	Streambank	$168,136.00
San Rafael River Restoration Monitoring	Colorado	BLM	Justin Jimenz	monitoring	$99,211.00
Removal of Selenium and TDS from Storm Water	Colorado	University of Utah	Ramesh Goel	Study	$112,046.00
St. George Detention Basin	Colorado	Dixie Conservation District	David Dodds	Storm Water	$313,841.00
Richard Jensen Stream Bank	Colorado (Fremont)	Private Landowner	Monte Turner	Streambank	$80,000.00
Farmington Bay Student Research Project	GSL	USU	Wayne Wurtsbaugh	Study	$2,192.00
Remote sensing to detect Algal Mat Cover	GSL	UDEQ	Toby Hooker	Study	$183,601.00
Bio retention Demonstration Project	Jordan River	University of Utah	Michael Barber	Storm Water	$177,605.00
Blaine Nature Preserve Riparian Demonstration Project	Jordan River	Salt Lake City Corporation	Lewis Kogan	Streambank	$10,460.00
Provo River I&E	Jordan River/Utah Lake	Wasatch County Planning Dept.	dsmith@co.wasatch.ut.us	I&E	$15,000.00
Wallsburg Septic Study	Jordan River/Utah Lake	Wasatch CD	Dan Gunnell	Study	$16,100.00
Wallsburg Streambank Restoration	Jordan River/Utah Lake	Wasatch CD	Dan Gunnell	Stream Bank	$85,000.00
Anderson Stream Bank	Middle Sevier	Private Landowner	Lynn Koyle	Stream Bank	$50,000.00
Bench River Project	San Pitch	Private Landowner	Alan Saltzman	Streambank	$150,000.00
Turpin River Project	San Pitch	Private Landowner	Alan Saltzman	Streambank	$150,000.00
Parry Stream Bank Project	San Pitch	Private Landowner	Alan Saltzman	Stream Bank	$15,000.00
Mill and Pack Creek Active Revegetation	SE Colorado	Rim to Rim Restoration	(Kara)Rim to Rim Restoration	Invasive Revegetation	$57,200.00
La Sal Spring/Wetland Protection	SE Colorado	USFS	Tina Marian	Grazing Management	$31,500.00
Castle Creek Bank Stabilization	SE Colorado	Town of Castle Valley	Dave Erley	Stream Bank	$12,530.00
Mill Creek Riparian Restoration	SE Colorado	BLM	An Marie Aubry	road closures and restorati	$40,000.00
Porcupine Fire Restoration	SE Colorado	Town of Castle Valley	Dave Erley	Fire Restoration	$16,157.00
Pack Creek Stream Bank Restoration	SE Colorado	City of Moab	Stan Holland	Stream Bank	$36,709.00
Moab Technical Assistance	SE Colorado	UDEQ	Mike Allred	Technical Assistance	$35,000.00
Onion Creek road Feasibility Study	SE Colorado	Grand County	Arne Hultquist	Study	$15,898.00
Montezuma Creek Watershed Plan Development	SE Colorado	San Juan CD	Arne Hultquist	Planning	$25,000.00
Mustang Mesa Vegetation Treatment Project	SE Colorado	Private Landowner	Arne Hultquist	Upland	$49,056.00
Utah Envirothon	Statewide	UACD	Loralie Cox	I&E	$3,500.00
Local Watershed Coordinators	Statewide	UDEQ	Carl Adams	Technical Assistance	$370,000.00
Riparian Grazing Management Workshop	Statewide	UDAF	Troy Forest	I&E	$20,000.00
Water Week	Statewide	AWWA	Alane@ims-awwa.org	I&E	$8,000.00
Mercury Take Back	Statewide	UDWQ	Amy dickey	Mercury	$6,000.00
Development of Sensor Based WQ Program	Statewide	UDEQ	Jeff Ostermiller	Study	$262,215.00
Producers Education Through Workshops and the Producers Website	Statewide	USU	Rhonda Miller	I&E	$20,125.00
Watershed Management Short Course	Statewide	WyoHydro	Greg Bevenger	I&E	$15,807.00
Volunteer Monitoring Program and Statewide I&E	Statewide	USU Extension	Nancy Mesner	I&E	$83,250.00
Onsite BMP Manual	Statewide	USU	Judy Simms	I&E	$46,275.00
Strawberry River Restoration	Uinta Basin	UDWR	Justin Robinson	Stream Bank	$150,000.00
White River Enhancement Project	Uinta Basin	BLM	Evan Guymon	Invasive Plants	$23,300.00
Stuart Lake Selenium Monitoring	Uinta Basin	Upper Colorado River Fish Recovery Program	Kevin McAbee	Study	$5,500.00
Sediment Loading and BMP Effectiveness Oil and Gas Sites	Uinta Basin	University of Utah	Christine Pomeroy	Study	$152,503.00
Spirit Lake Road Site Restoration	Uinta Basin	National Forest Service	Chris Plunkett	Road Decommissioning	$10,279.00

West Panguitch Pipeline	Upper Sevier	West Panquitch Irrigation Company	Wally Dodds	Irrigation	$150,000.00
Assessment of PCB and Nutrients in Utah Lake	Utah Lake	UVU	Weihong Wang	Study	$111,933.00
Tie Fork Road Stream Crossing #1	Utah Lake	USFS	George Garcia	Road Improvements	$36,290.00
Siddoway Ranch Conservation Easement	Weber	Summit Land conservancy	Robyn@wesameland.org	conservation Easement	$5,000.00
Burningham Stream Bank	Weber	Private Landowner	Jake Powell	Stream Bank	$23,000.00
Sutherland Stream Bank	Weber	Private Landowner	Jake Powell	Stream Bank	$30,000.00
Clinton City Detention Basin	Weber	Clinton City Corporation	Lynn Vinzant	Storm Water	$125,000.00
Clinton City Storm Drain Project	Weber	Clinton City Corporation	Lynn Vinzant	Storm Water	$125,000.00
Mike Morgan AFO	Weber	Private Landowner	Buzz Nelson	AFO	$11,300.00
East Canyon Creek Dairy Manure Mitigation Project	Weber	Private Landowner	Buzz Nelson	AFO	$60,000.00
				Total	$4,570,071.00

Funding Available

State NPS		$1,000,000
Section 319 Project Funding		$893,621
	Total	$1,893,621

Water Quality Task Force Meeting 5/19/14

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