UTAH DEPARTMENT *of* ENVIRONMENTAL QUALITY

WATER QUALITY

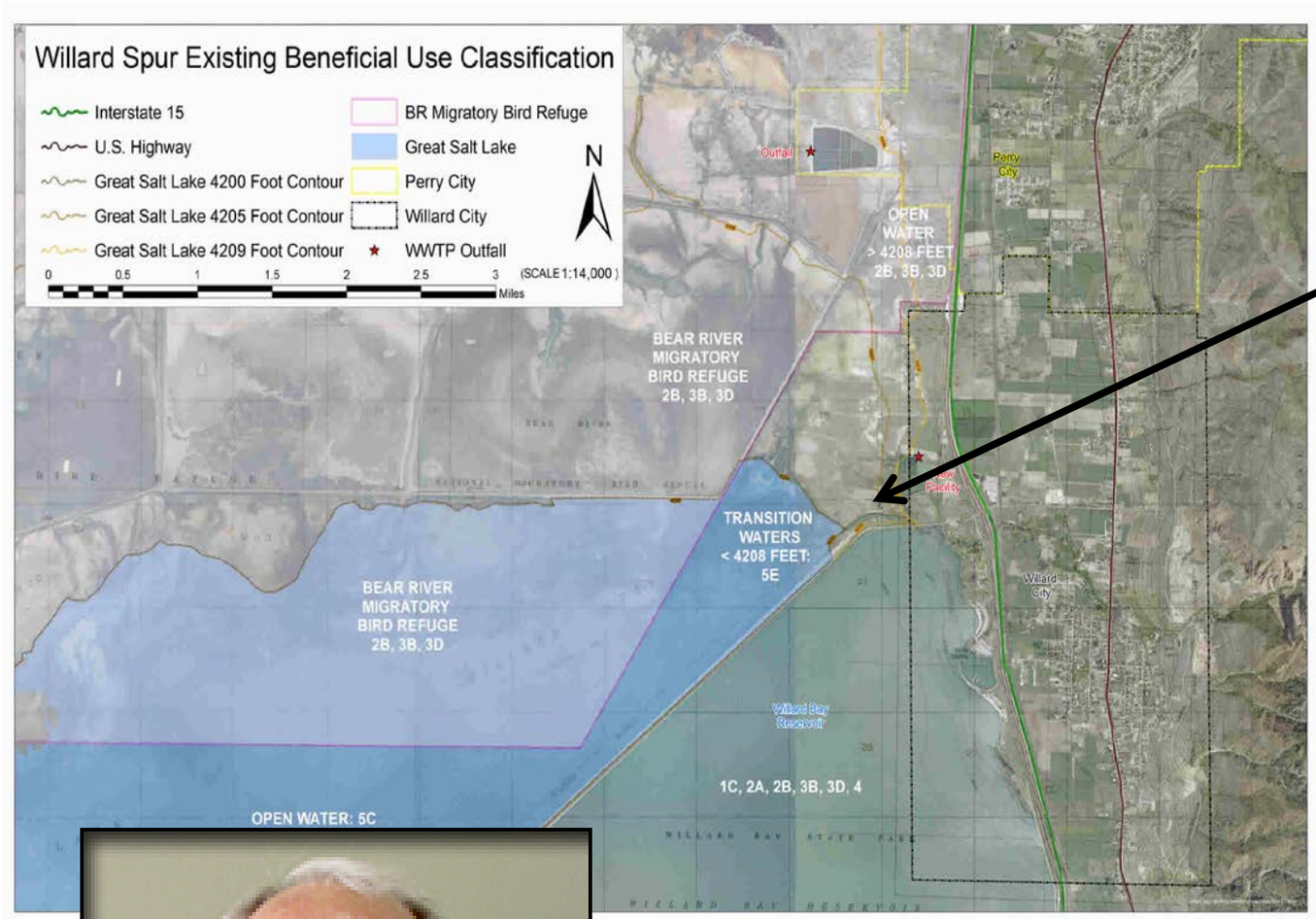
Willard Spur

A Case Study in Conflict Resolution

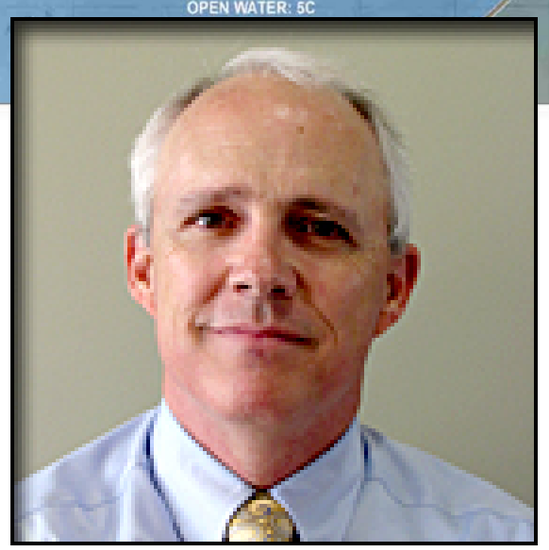
Water Quality Board, May 2016

Photo courtesy of Charles Uibel, greatsaltlakephotos.com

In the beginning…



Challenges to the Perry-Willard POTW permit



Walt asks,
"Is there a reason to be concerned?"

What did we find?

RISK EVALUTION FROM RECON DATA

Modeling to Estimate Impact from Loads

- Little known about receiving water volume
- Nothing known about year-to-year accumulation
- Created worse- to best-case scenarios

Risk to Willard Spur Uses?

- Compare scenarios against previously derived indicators of condition

Conclusion:

- Immediate threat unlikely, but
- long-term threats uncertain

PRELIMINARY CONCLUSIONS:

Ambient Nutrients were Low/Moderate

- Limited to a handful of challenges collected <u>after</u> the initial challenge

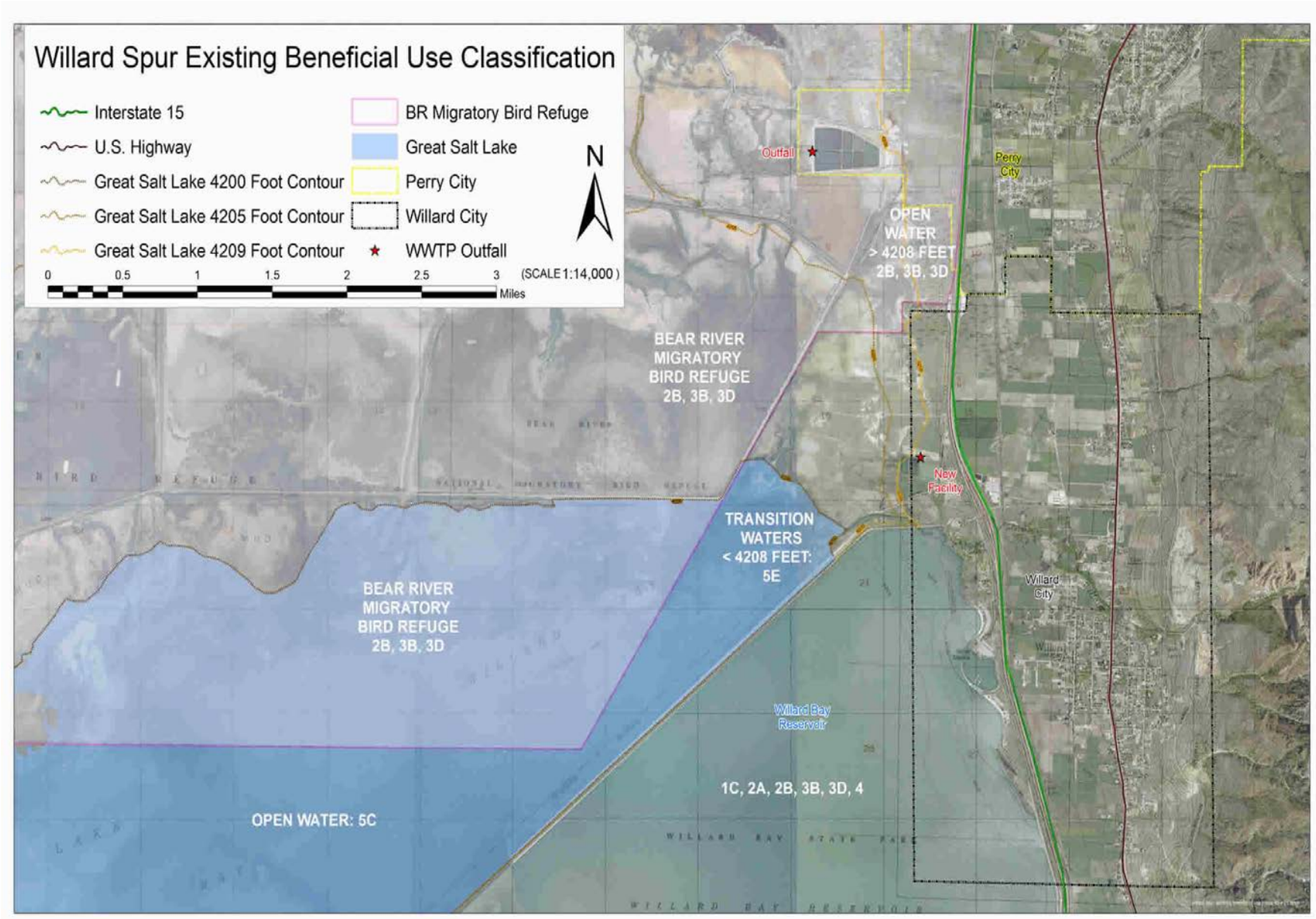
Bird Use is High

- The ecosystem is ecologically important

Stakeholder Contention is High

- Unclear how legal challenges would play out
- Delays associated with potential federal challenge a concern

SCIENCE AND LAW



Real concerns, outcomes… uncertain.

Is there a discharge to the refuge?

THE COMPROMISE

Steering Committee ⟷ Science Panel

- Engaged stakeholders
- Review science
- Make Board Recommendations

- Technical Experts
- Identify and prioritize areas of uncertainty
- Discuss options with SC

STEERING COMMITTEE

Walter Baker & Leah Ann Lamb, Utah Division of Water
Laura Ault & Laura Vernon, Sovereign Lands
Pam Kramer & Kent Sorenson, Utah Division of Wildlife Resources
Bob Barrett & John Isanhart, U.S. Fish and Wildlife Service
Karen Hamilton & Lareina Guenzel, U.S. Environmental Protection Agency
Jerry Nelson & Bruce Howard, Perry & Willard Municipalities
Dick West & Bruce Wadell, Duck Clubs
Joan Degiorgio & Rob Dubuc, Environmental NGOs
R. Jeffery Hicks, Recreation Interests
Dal Wayment & Leland Myers, Wastewater Treatment
Will Snarr & Rod Smith, Compass Minerals
Don Leonard & Thomas Bosteels, Great Salt Lake Brine Shrimp Cooperative

Mediation and Coordination: **Jeff Denbleyker**, CH2MHill

SCIENCE PANEL

Nominated by the Steering Committee:

Jeff Ostermiller

Theron Miller

Chris Cline

Jim Hagy

John Luft

Dave Tarboton

The Charge:

- Identify gaps in scientific understanding of the Willard Spur ecosystem.
- Advise the Steering Committee on funding requirements.
- Prioritize issues of concern.
- Finalize and approve work plans for scientific studies.
- Recommend a process for independent peer review of scientific studies.
- Recommend science-based changes to water quality standards to the Steering Committee.

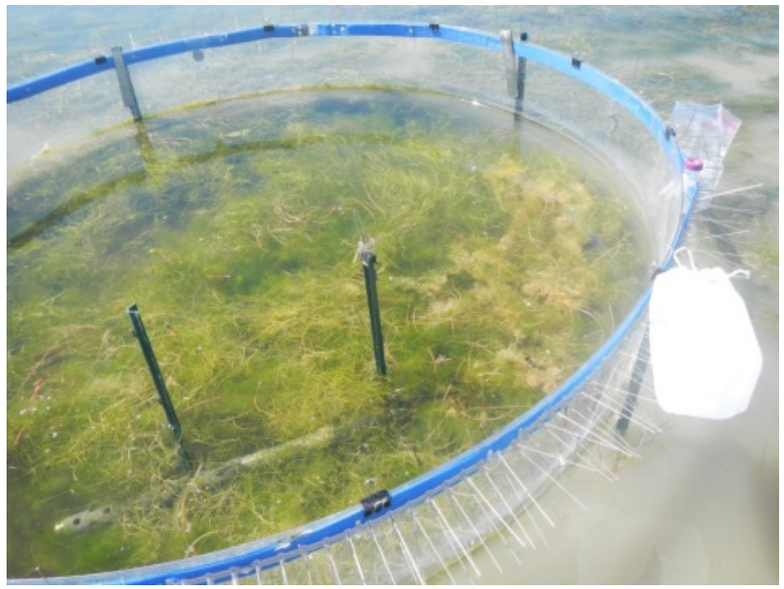
KEY QUESTIONS

What risk does the discharge pose to the Spur's beneficial uses?

What is needed to ensure the long-term protection of the Willard Spur ecosystem?

WHAT WAS DONE?

- Development of Conceptual Models
  - Linkages between nutrients and uses
  - Prioritized pathways and developed research plan
- Implemented Routine Monitoring
  - Purchased requisite equipment
  - Developed SAP, SOPs, etc.
- Conducted Literature Reviews
  - What is known about resident assemblages?
  - How can this information inform conceptual models?
- Experimental Nutrient Additions
  - Large scale “press” experiments to examine effects on structural measure of condition
  - Short-term (pulse), mesocosms experiments to measure nutrient uptake/processing



SCIENTISTS

A. Long
C. Penne
CH2MHill
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E. Flemmer
H. Hoven
H. Moore
J. Cavitt
J. Denbleyker
J. Hollingsworth
J. Luft
J. Ostermiller
K. Kettenring
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K. Simms
L. Gray
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M. Hogsett
M. Pierson
M. Shupryt
R. Barber
R. Downard
R. Goel
R. Nasrabadi
S. Rushforth
S. Rushforth
S. Tahir
T. Hooker
T. Miller
W. Johnson
W. Wurtsbaugh

Plus others I accidentally missed…Apologies!

From Here…

- Refuge (USFWS)
- Western Resource Advocates

- Perry-Willard Municipalities
- POTW Consortium

- Utah Division of Water Quality
- EPA

To Here…

Thanks to Jeff Denbleyker,
penultimate cat herder!

What did we find?

CLEAR WATER PHASE

KEY ATTRIBUTES

- Submerged Aquatic Vegetation (SAV): Keystone Assemblage
  - Habitat, Base of Food Web
- Piscivorous Avifauna
- Ecosystem Service: Nutrient Removal
  - Internal nutrient cycling
  - Low water column nutrients
  - Low sediment nutrients

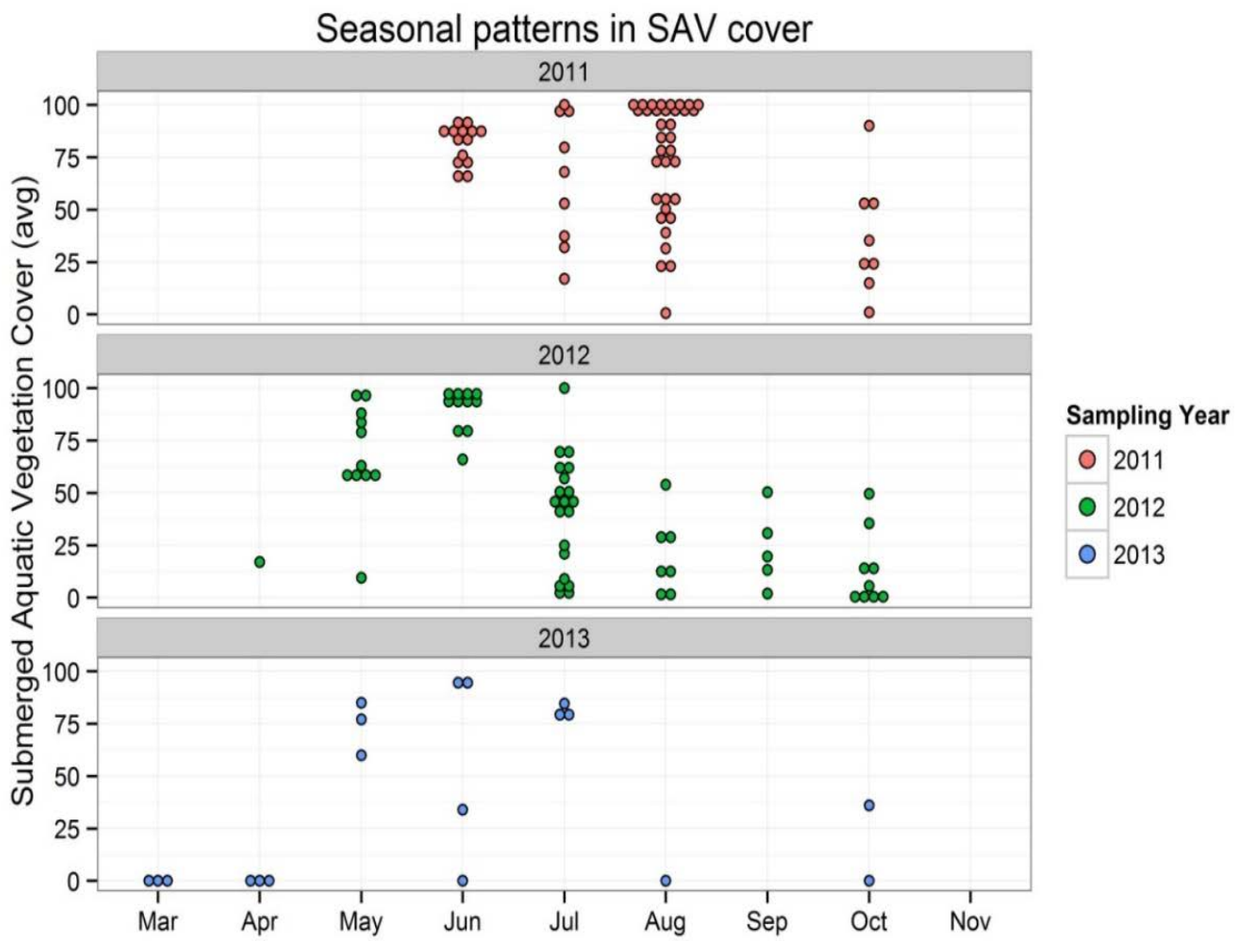
GREEN WATER PHASE

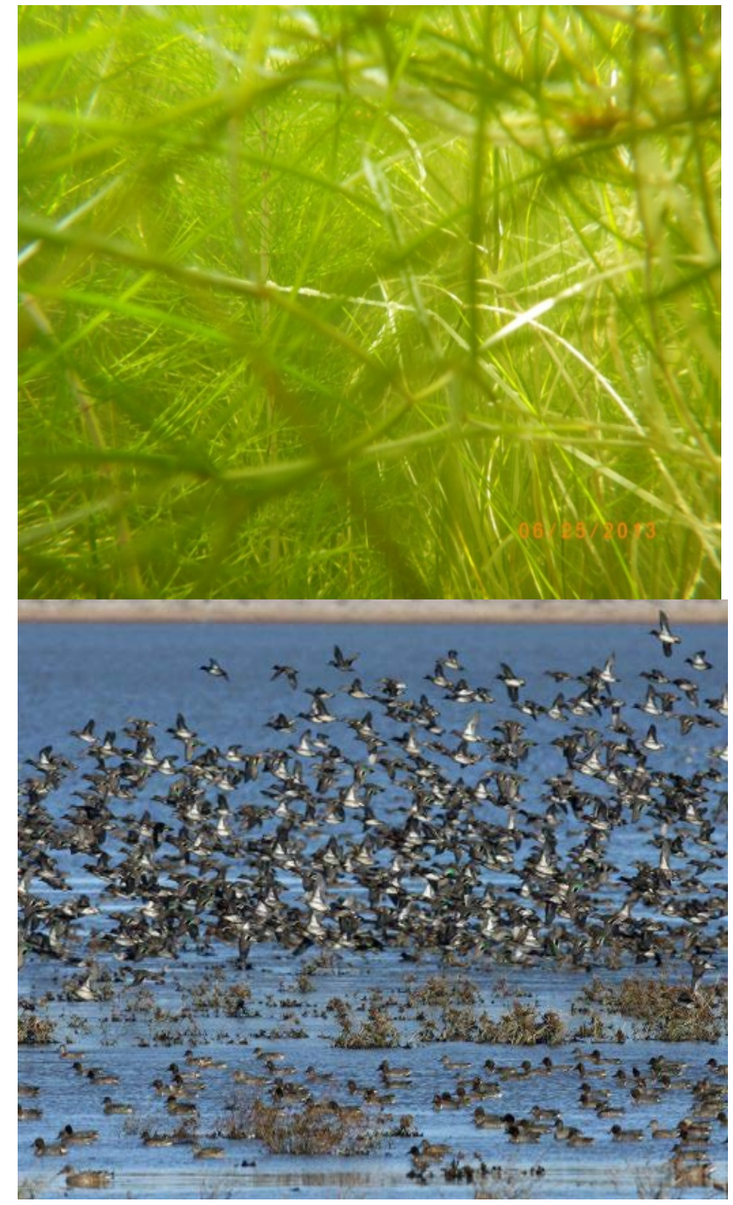
KEY ATTRIBUTES

- SAV Senescence
    - Nutrient Cycling back to Water Column and Reproductive Structures (tubers & drupelets)
    - Denitrification: N to Atmosphere
    - Shorebird Avifauna

Is the Spur Meeting its Uses?

Yes, both of them…





…at least under current conditions.

Some observations suggest risk is small

On one hand…

Little evidence of year-to-year accumulation of nutrients

- Flushing flows are protective

POTW sources are small relative to others

- Sometimes doesn't reach the open waters

Uptake >> Inputs

- Especially in early growing season

But risk cannot be entirely discounted

Observations of SAV Collapse

- Largely driven by hydrologic isolation and associated changes in habitat (increase in pH, temperature, salinity)
- Could nutrients exacerbate these conditions?

Experimental Evidence

- Early: moderate/high = depressed growth
- Later: high = decrease in SAV condition

Low Nutrient/High Production Condition is Unique

- Does it warrant explicit protection?

On the other hand…

KEY QUESTIONS: RESOLUTIONS?

What risk does the discharge pose to the Spur's beneficial uses?

PHASE 1

What is needed to ensure the long-term protection of the Willard Spur ecosystem?

PHASE 2

PHASE 1

How to reasonably manage risk?

A Permitting Approach

Waste Load Analysis

- Applied warm-water fish (3B) criteria
- No issues with current discharge

Use TBPEL to Address Phosphorus

- Seasonal variance to TBPEL requirements
- Limits compliance to period of greatest concern

BMPs

- Discharge to adjacent field where possible
- Chemical P removal not required when this occurs

PHASE 2

Phased Changes to Standards

Create New Use Class for the Spur

- Potentially at the next May WQB meeting

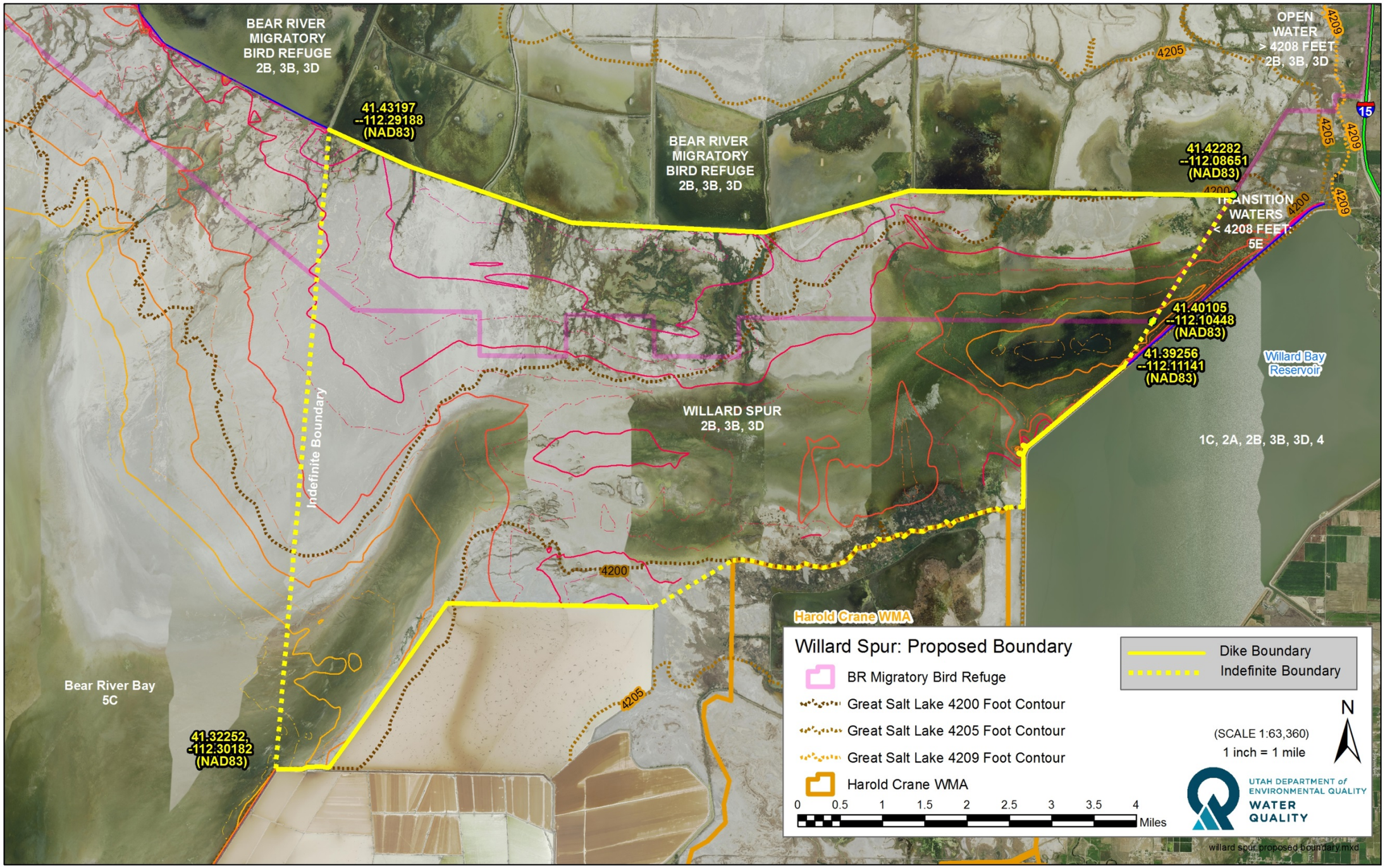
Remove Overlap with Refuge Boundary

- Generate future UAA
- Removal/modify criteria that violate because of natural conditions

Develop a Site-Specific Narrative

- Meet obligation to ensure long-term protection
- Capture results to facilitate protection from future threats
- A stakeholder-driven effort

PROPOSED BOUNDARY



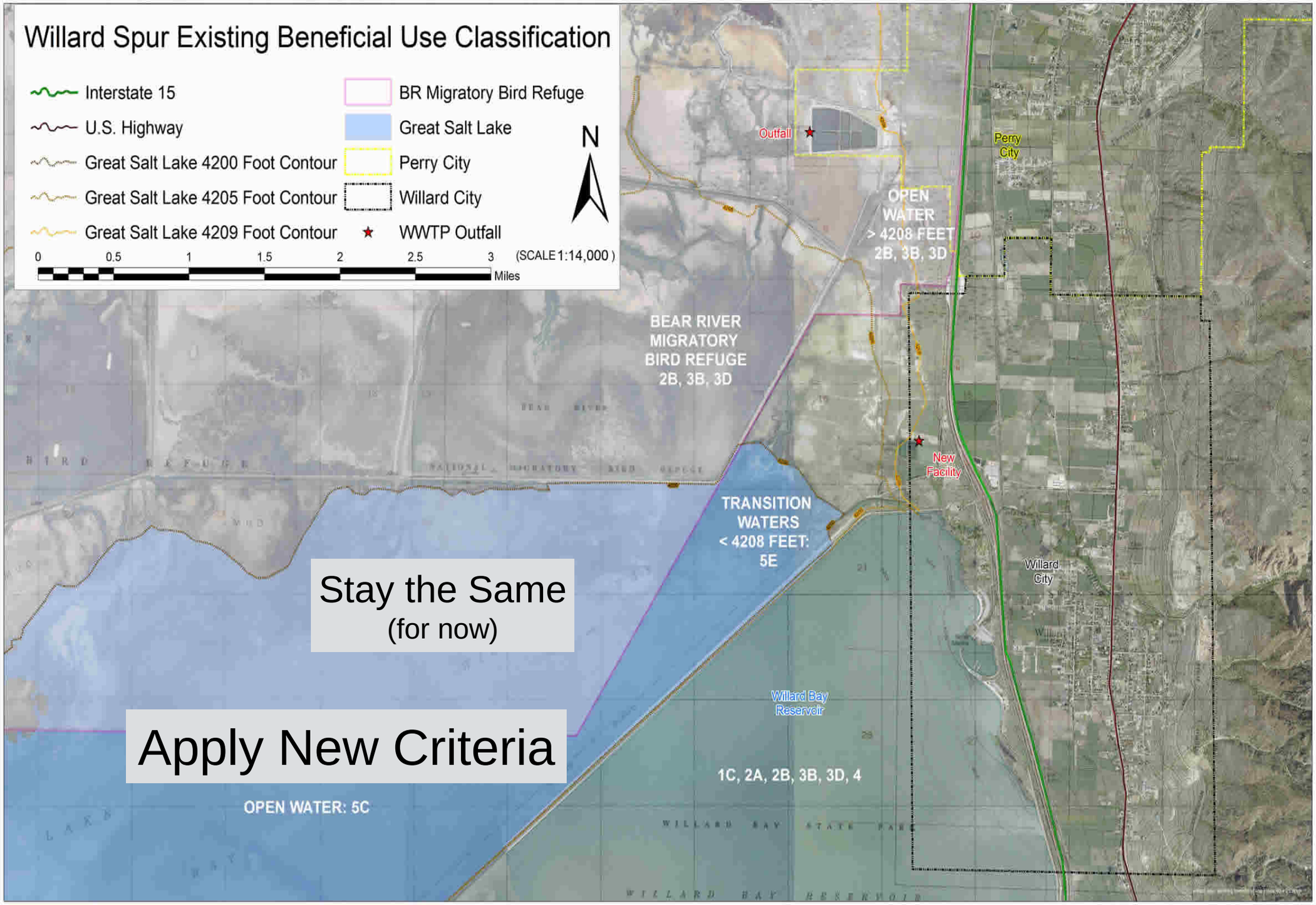
Proposed Numeric for New Uses

All 3B criteria, except:

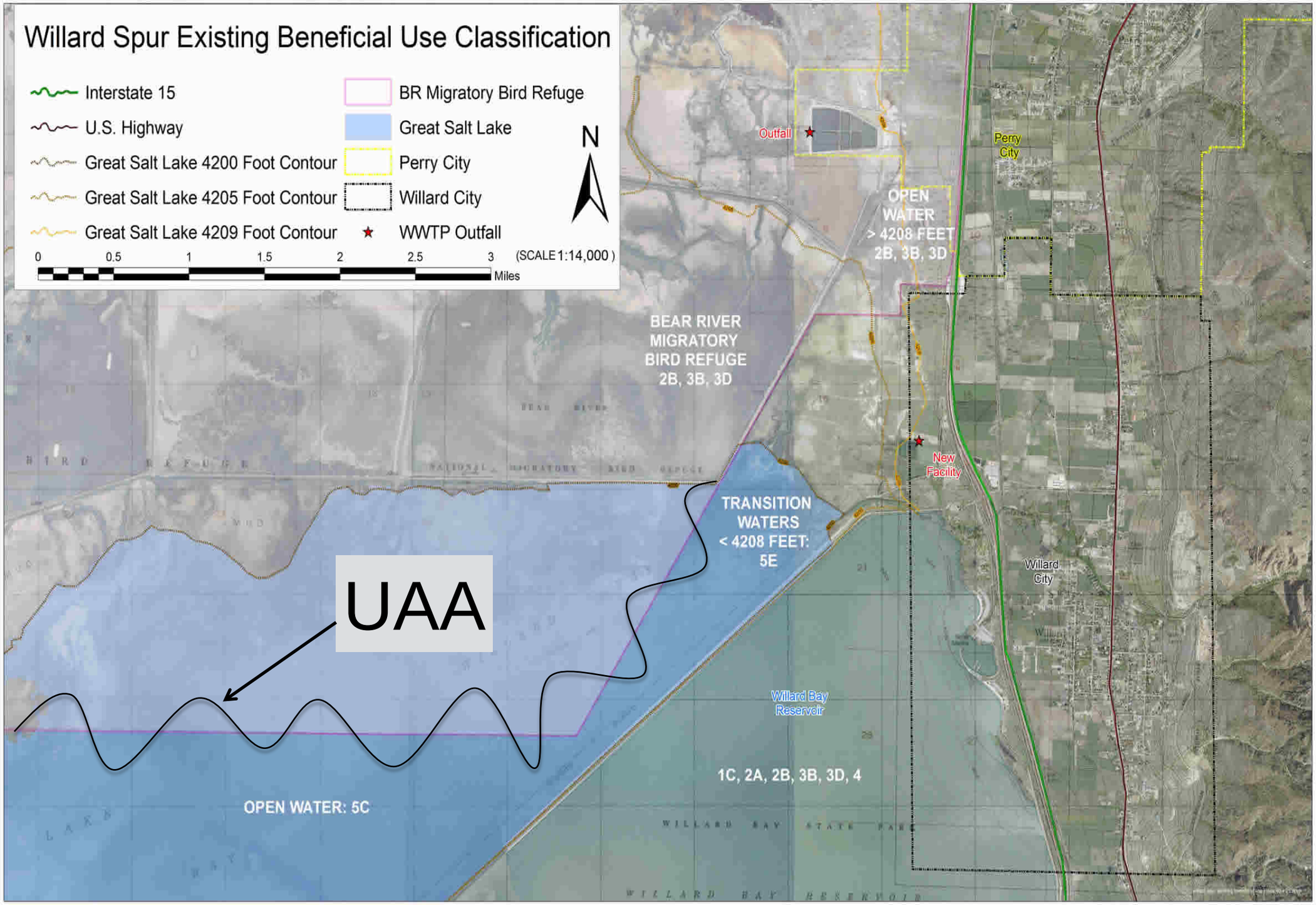
- pH
  - Naturally high during peak periods of SAV growth
- DO
  - Naturally low during plant senescence
- Temperature
  - Naturally as the Spur becomes isolated
- Ammonia ???
  - Naturally high (few observations, in limited locales) during SAV decomposition

Will determine how to best incorporate, if at all, with UAA

Proposed Numeric Criteria



NEXT STEPS


Willard Spur Existing Beneficial Use Classification
Interstate 15
U.S. Highway
Great Salt Lake 4200 Foot Contour
Great Salt Lake 4205 Foot Contour
Great Salt Lake 4209 Foot Contour
BR Migratory Bird Refuge
Great Salt Lake
Perry City
Willard City
WWTP Outfall
N
0 0.5 1 1.5 2 2.5 3
Miles
(SCALE 1:14,000)
Outfall
Perry City
OPEN WATER > 4208 FEET 2B, 3B, 3D
BEAR RIVER MIGRATORY BIRD REFUGE 2B, 3B, 3D
New Facility
TRANSITION WATERS < 4208 FEET: 5E
Willard City
UAA
Willard Bay Reservoir
1C, 2A, 2B, 3B, 3D, 4
OPEN WATER: 5C

SITE-SPECIFIC NARRATIVE

What conditions are require to ensure protection?

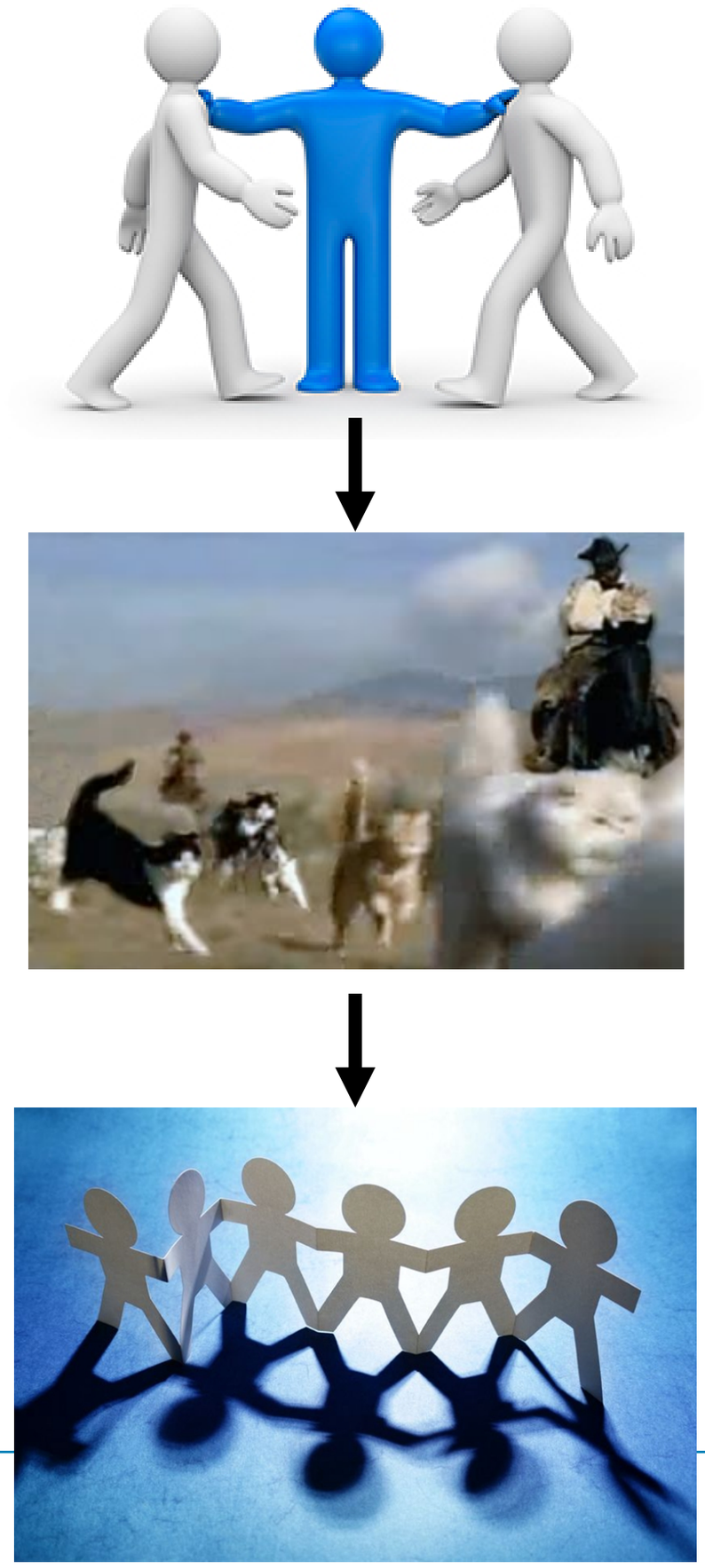
- Site-Specific numeric nutrient criteria are not possible
  - Uptake is too high
  - Effects occurred, but water column increases could not be measured
  - Alternative measures are needed

- Captures results of the investigations
  - Addresses unforeseen future changes
  - Identifies achievable management objectives

- Continued Stakeholder Engagement
  - Group has appreciation/respect for different perspectives
  - Potential to help facilitate collaborative resource management
  - Identifies achievable management objectives

Potential for addressing irreversible or atypical conditions elsewhere?

LESSONS LEARNED



WAS IT WORTH IT? $ PERSPECTIVE

- Savings for POTW
  - ~$400K over life of plant
- DWQ Capacity
  - ~150K in material goods that can be applied elsewhere (e.g., airboat, sodes)
- Dividends with Respect to Ongoing Research
  - To date ~$750K grants submitted
- Conflict Resolution
  - How much would have multi-year conflicts cost?

MOST IMPORTANTLY:

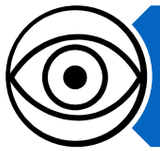
- We better understand the importance of this ecosystem
- We now know what is needed to protect the ecosystem
- We have the data necessary to incorporate what we've learned in rule
- We can potentially take lessons learned from this responsibly project to protect other wetlands in Utah

NOT WITHOUT CHALLENGES

Schedule

Continuity

Trust



Focus

Uncertainty

Frustration

Time = Money

QUESTIONS?