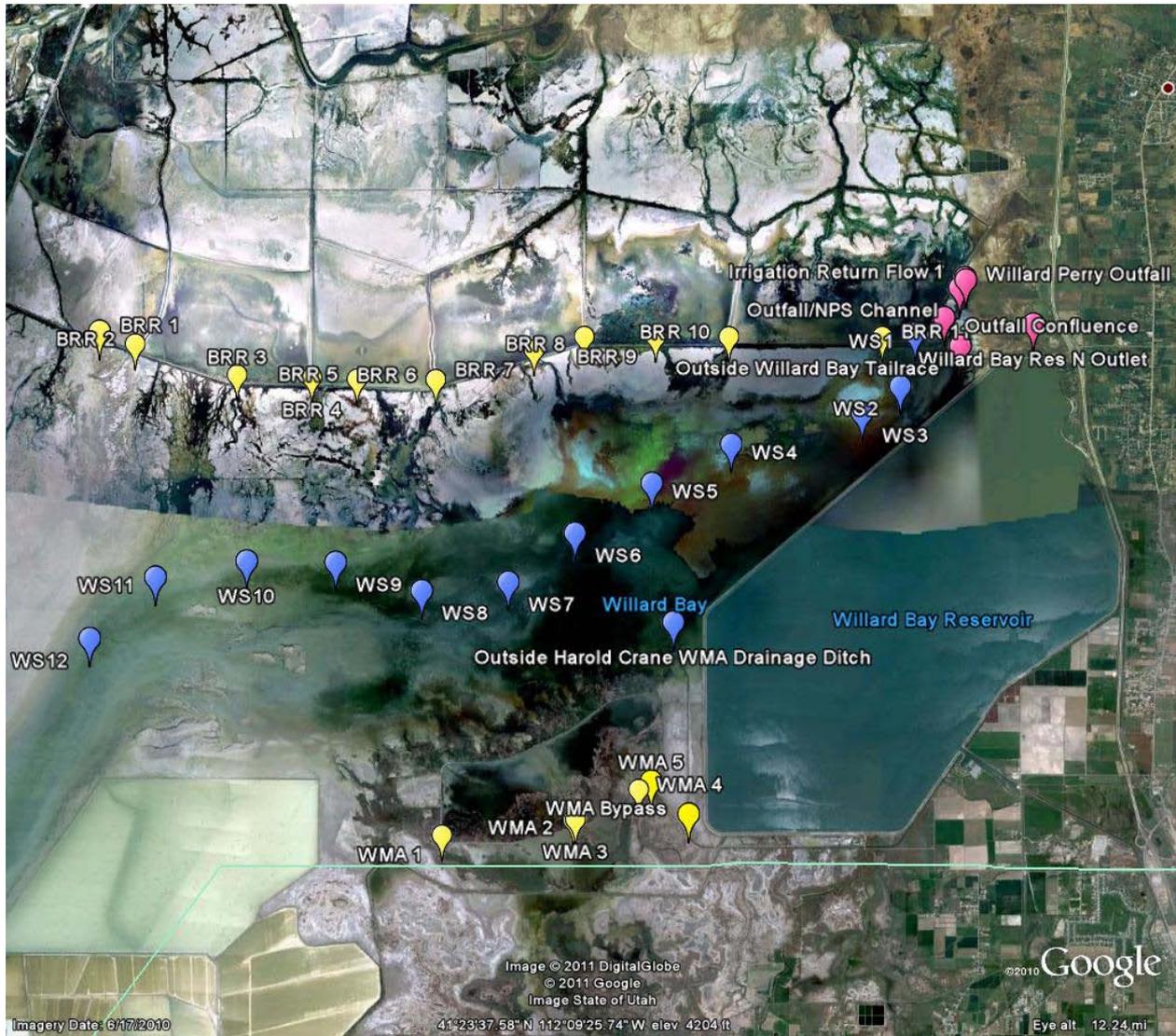


Willard Spur 2011: Sampling Program



Key Elements of Willard Spur Sampling Plan



- Routine Inflow Monitoring WMA and BRBR (~2 x per month)
- Open water sampling at 16 sites (monthly with LANDSAT 5)
- Open water transect monitoring (~40 sites)
- Discharge monitoring at BRBR (USGS and DWQ) and Harold Crane WMA

Harold Crane WMA Study Sites



Field Measurements:

- Water Chemistry
- Water Velocity
- Field Notes

East Side Drainage Study Sites



Field Measurements:

- Water Chemistry
- Flow
- Field Notes



Bear River Bird Refuge Study Sites



Field Measurements:

- Water Chemistry
- Flow and Water Level
- Field Notes



DWQ Pressure Transducers Installed



Bear River Bird Refuge (BRR 11)



Observations:

- 2 or 3 Different Plumages
- Take 2 or 3 reps.



Pre - Flood and Post Flood Conditions



Pre-Flood Conditions
(ex. Willard Perry Outfall)



Post-Flood Conditions
(ex. Willard Perry Outfall)

Post Flooding: East Side Drainage



a & b. Fields at Willard Perry Outfall & Irrigation Return Flow 1 flooded from Willard Spur
c. High Discharge from Willard Bay Res. N. Outlet

Post Flooding: Harold Crane WMA



- a. Boards removed, water flowing out of Willard Spur
- b. Boards in, water flowing into Willard Spur
- c. Water over banks at Harold Crane WMA Bypass Canal



Post Flooding: Bear River Bird Refuge

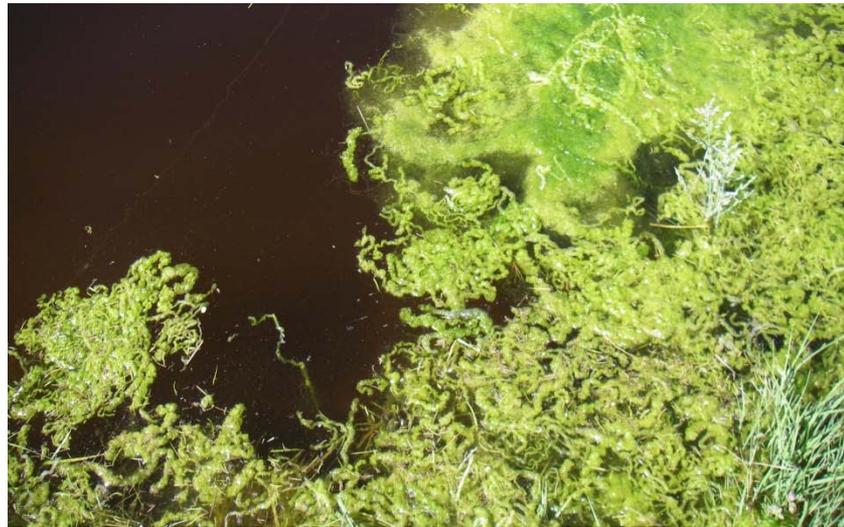


- a. Boards removed, water flowing out of Willard Spur (ex. BRR 9)
- b. Boards in, Algae Growth (ex. BRR 5)



East Side Drainage

(Vegetation Growth in Willard Perry Outfall)



Open Water Study Sites



- First data collection in March (hindered by ice cover)
- Sampling for Open Water Sites as per sampling plan began 06/08/2011
- Repeated week of 7/5/11

Open Water Study Sites

Field Notes

Willard Spur Run	
Trip Name: WS 10/02/04	<input type="checkbox"/> Discrete Site Visit (non-routine)
Sample Date: 6/8/11	Sample Collectors: <input checked="" type="checkbox"/> EF <input type="checkbox"/> #2 <input type="checkbox"/> EB <input type="checkbox"/> RB <input type="checkbox"/> KT
Sample Time: 13:10	<input checked="" type="checkbox"/> ST <input type="checkbox"/> #3 <input type="checkbox"/> BS <input type="checkbox"/> TJ <input type="checkbox"/> JH
Site STORET#: 5984645	Other: <input type="checkbox"/> #1 <input checked="" type="checkbox"/> AA <input type="checkbox"/> BB <input type="checkbox"/> DE <input type="checkbox"/> MS
Site Name: INSIDE WILLARD BAY TALK 3	
Field Observations	
Weather in past 48 hours:	
Current weather: Sunny, calm	
Flow direction: SW	Water Depth: 0.78
Secchi Depth: 0.6m	Water clarity: good
Algal mats: <input type="checkbox"/> Y <input checked="" type="checkbox"/> N	Describe:
Phragmites: N/S/E	



Bird Counts



Field Measurements

- Field Notes
- Bird Counts
- Water Chemistry
- Submerged Aquatic Vegetation
- Macroinvertebrates
- Zooplankton

Water Column analysis



Submerged Aquatic Vegetation



YSI Probe Deployment



- Installed YSI data sondes at 12 sites 7/21-7/27
 - DO pH
Temperature on all sondes
 - 6 with Chlorophyll a, Turbidity, Conductivity
- Next collection 10/2011

August 2011 Sampling

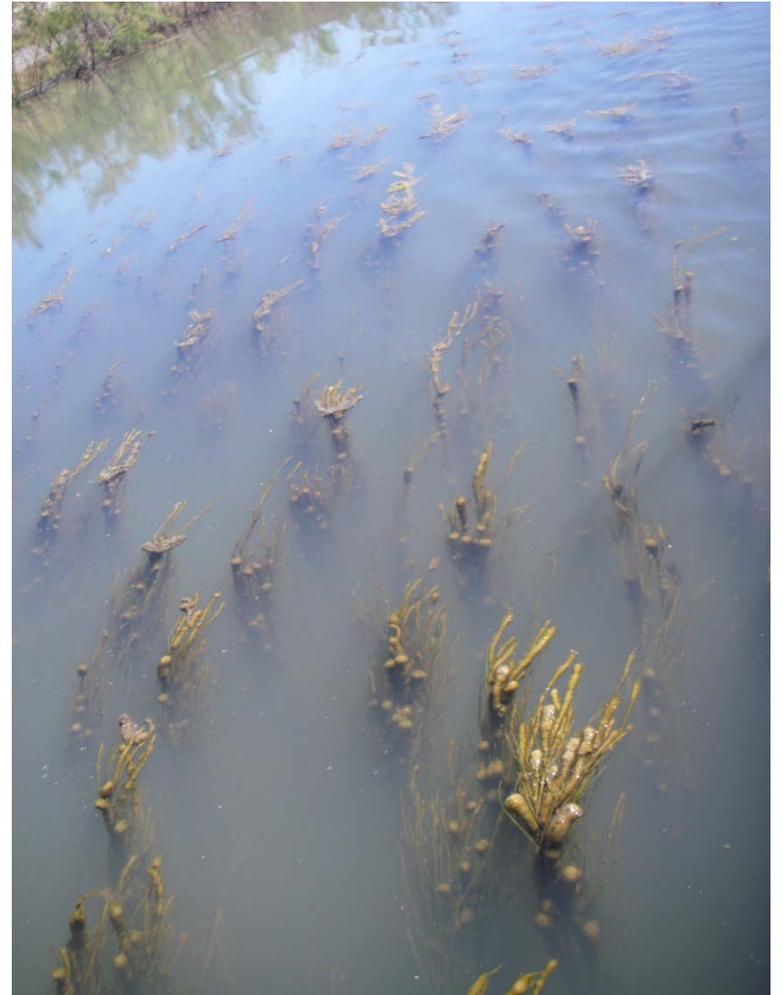


August 2011



- Water Chemistry
- Macro-invertebrates
- SAV Cover
- Zooplankton
- Phytoplankton
- Sediment Diatoms (8/16)
- Sediment Nutrients (8/16)

Open Water: Field Observations



QA/QC Activities



- QAPP and SOP documentation near completion
- Equipment, Duplicate and Trip Blanks
- YSI Probe checks for field parameters and chlorophyll a
- Sample tracking

Open Water: Sampling Challenges



- Flooding impaired inflow study on Harold Crane WMA
- SOPs under development and field training
- Bird sampling using airboat was challenging because of the noise
- Sampling for macroinvertebrates was difficult because of water depth (~120+ cm) during flooding.

Challenges...cont.

- Early sampling hindered by lack of airboat
- Monitoring open water time consuming (~3 staff hours per site)
- Sample tracking and lab services
- Access to Discharge (no July data)



Sampling Improvements



- Bird sampling with binoculars, expand study area to a 200 m radius
- Develop a SOP for measuring turbidity with a Turbidity Tube.
- DWQ acquired airboat in July
- Staff trained and efficient

Future Monitoring



- Sediment Metals
- Tracer Study
- Sedimentation Rates
- Fish Surveys
- WMA North Dike
- Estimating Flow at Site 12
- Other suggestions?

Questions?