

Tres Rios



**Tres Rios
Hiding In Plain Sight**

Tres Rios Location, History and Flood Potential





91st Ave WWTP



A. ~~Start of a path~~ **A path with a lot of twists and turns**



Tres Rios

- Water conveyance to downstream users.
- Water quality.
- Reduce flooding potential and damage to surrounding areas.
- Flow attenuation from treatment plant discharge.
- Serve as a platform for environmental education in water quality and ecosystem restoration.
- Habitat restoration.
- Passive recreational opportunity for community.
- Settle “quality of life” dispute with Holley Acres Group.
- Impact vector control issues within the project area.
- Revitalize character of community.
- Restore habitat conditions prior to occupation of WWTP.



Restoration Process



Ecosynthesis

Carbon sequestration and other advantages

Producer	Biomass productivity (gC/m²/yr)
swamps and marshes	2,500
tropical rain forests	2,000
coral reefs	2,000
algal beds	2,000
river estuaries	1,800
temperate forests	1,250
cultivated lands	650
tundras 140	140
open ocean	125
deserts	3

Wetlands generate 2500 g/m²/yr of biomass via photosynthesis which is greater than the amount of biomass produced in the tropical rainforests, 2000 g/m²/yr

Wetlands can have noticeable impacts on residual toxicants: Herbicides, pesticides, organic wastewater compounds
Removal range: 40% to 99%

Non-ionic surfactants (endocrine disruptors) nonylphenol and its analogs
Removal range: 16% to 57%

Safe Harbor Agreements

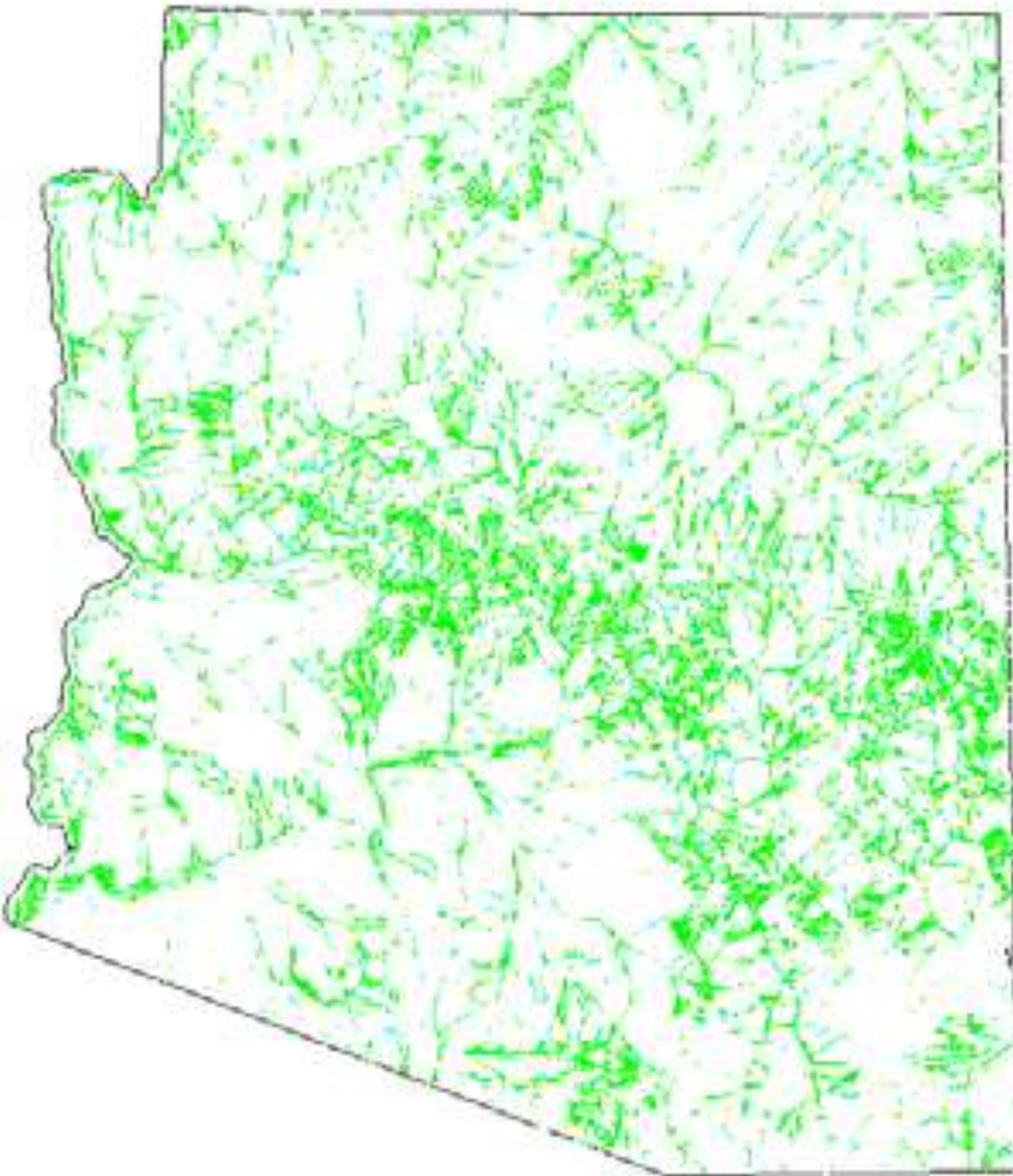


Under the policy, the Services will provide participating property owners with technical assistance to develop Safe Harbor Agreements that manage habitat for listed species, and provide assurances that additional land, water, and/or natural resource use restrictions will not be imposed as a result of their voluntary conservation actions to benefit covered species

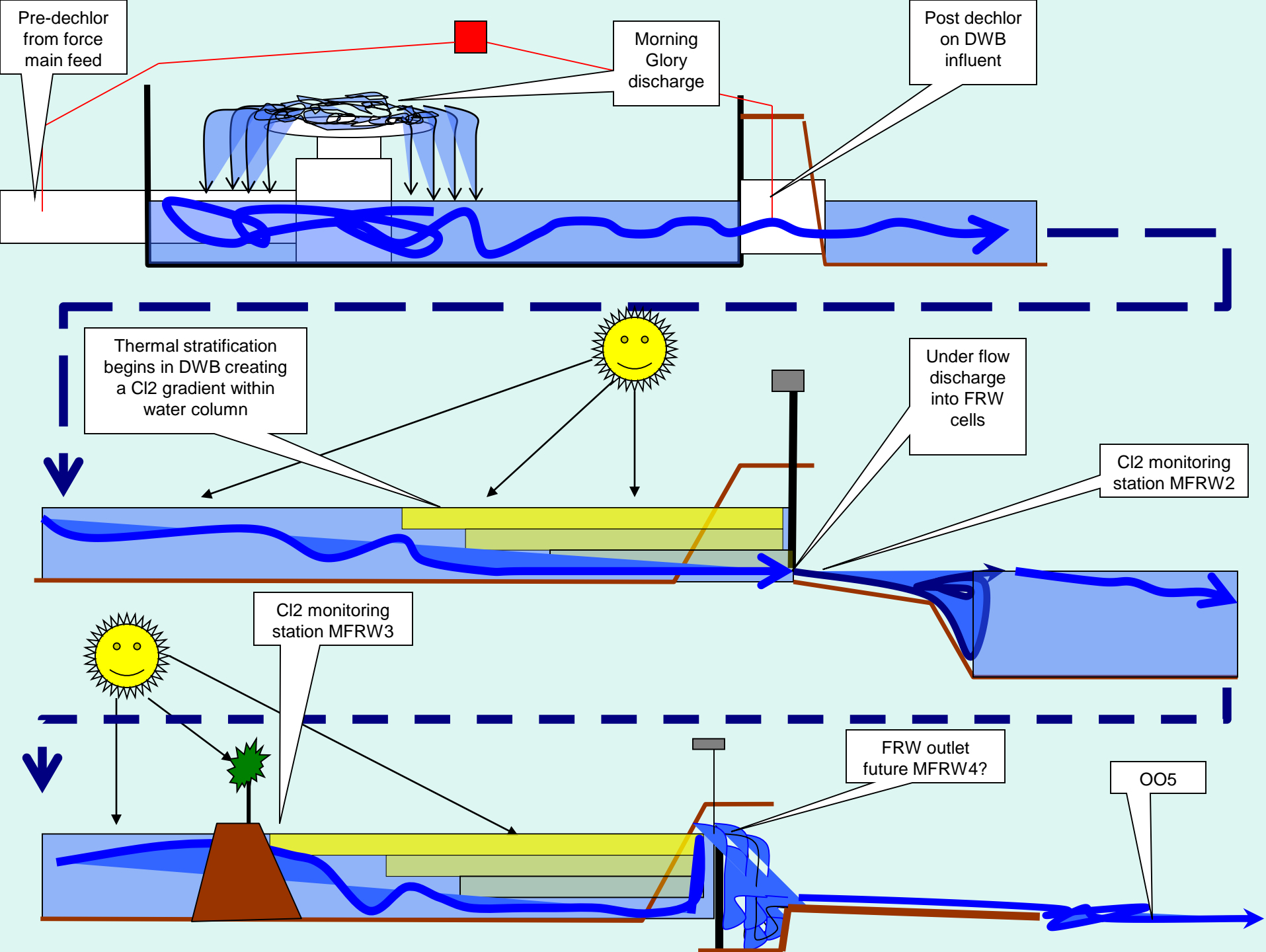
Conduct operation and maintenance activities associated with the Tres Rios Project, including, but not limited to, management of vegetation, roads, trails, water delivery systems, flood control capacity, and storm water facilities. Through the PCA the City of Phoenix signed with Corps in 2004, the Corps committed 6.2 million dollars towards project construction (which include riparian habitat and stream improvements), while the City of Phoenix committed to the long-term management of these habitats, including supplying treated wastewater at a cost of 1.3 million dollars annually. The SHA between the Service and the City of Phoenix establishes maintenance and management of these habitats for the conservation benefit of the covered species, without penalty under the Act.

• **II. LIST OF COVERED SPECIES**

- Common name Scientific name Status
- Yuma clapper rail *Rallus longirostris yumanensis* Endangered
- Southwestern willow flycatcher *Empidonax traillii extimus* Endangered
- Bald eagle *Haliaeetus leucocephalus* Threatened
- Brown pelican *Pelecanus occidentalis* Endangered
- Gila topminnow *Poeciliopsis occidentalis occidentalis* Endangered
- Desert pupfish *Cyprinodon macularius* Endangered



- 1850
- 1940
- 2000



Why do we need highly trained and qualified Operators?

- Must have Pesticide applicator license to apply pesticides on COP property.
- Must have aquatics license to apply to water bodies of COP.
- Must have intimate knowledge of PGP/IPM to meet requirements of AZPDES.
- Must Have CDL w/HZMT to transport pesticides on public right of way .
- Must have certified pilot for operation of airboat.
- Must have certified backhoe operator.
- Must have Grade III to take compliance samples and set up equipment for process sampling.

O & M Tech Sampling at Tres Rios

745.55 (005 Final) 745.HDW-1 (hayfield)

Daily

CBOD, TSS – auto sampler composite
E.Coli – grab (separate chain of custody)
Field Reads: Temp, pH, Chlorine (micrograms at 745.55)

Once per week (every Wednesday)

Ammonia – grab
Dissolved Oxygen Reading (DO) – separate chain of custody

Once Per Month (date to be determined by ESD)

WET – done on Mon, Wed, Fri – same sample number different dates (3 COC's) (2 samples at Hayfield)
****Additional Hayfield Sample Location (**745.28**) for monthly WET Test for 12 months (Oct 2010)

740.55 (morn glori)

Daily

CBOD, TSS – auto sampler composite
Coliform MPN & Colilert MPN– grab (separate chain of custody)
Field Reads: Temp, pH, Chlorine

Once per week (every Wednesday)

Ammonia – grab
Dissolved Oxygen Reading (DO) – separate chain of custody

Once Per Month (date to be determined by ESD)

WET – done on Mon, Wed, Fri – same sample number different dates (3 COC's)(2 samples)

745.FRW-2

745.FRW-3

Daily

Nothing

Once per week (every Wednesday)

TSS – auto sampler composite
Ammonia – grab
Field Reads: Temp, pH, Chlorine

Once Per Month (first Wednesday of the Month)

CBOD – auto sampler composite
E. Coli – grab
(ECOLI, CBOD, TSS, Ammonia, & Dissolved Oxygen (DO) on one Chain of Custody)

Once Per Month (date to be determined by ESD)

WET – done on Mon, Wed, Fri – same sample number different dates (3 COC's) for 12 months (Oct 2010)

QUARTERLY VOC'S – 624, 624 AC/AC, 524 (2 vials each method)

Normally done the 2nd month of the quarter during WET



Monitoring and Surveillance

Water balance = water quality

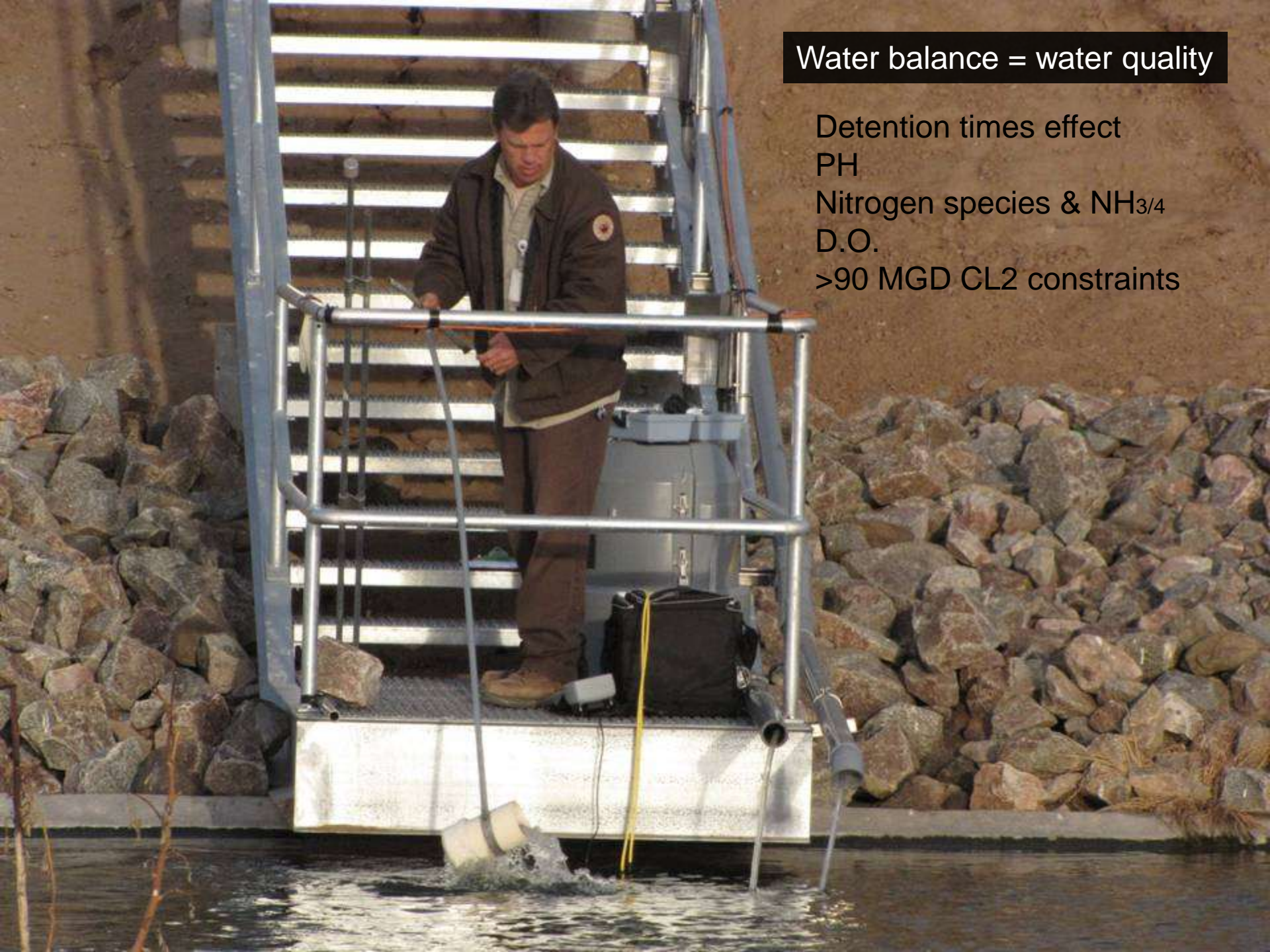
Detention times effect

PH

Nitrogen species & $\text{NH}_3/4$

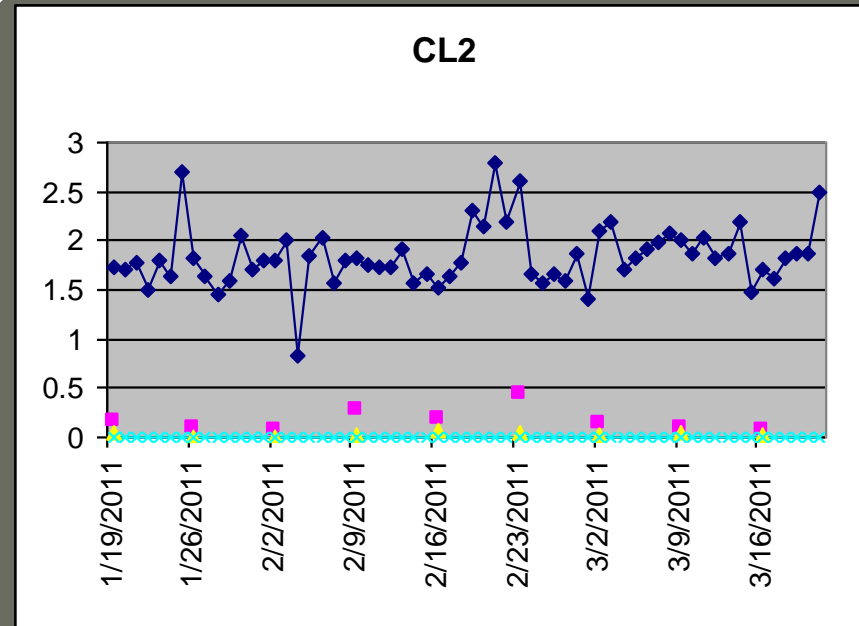
D.O.

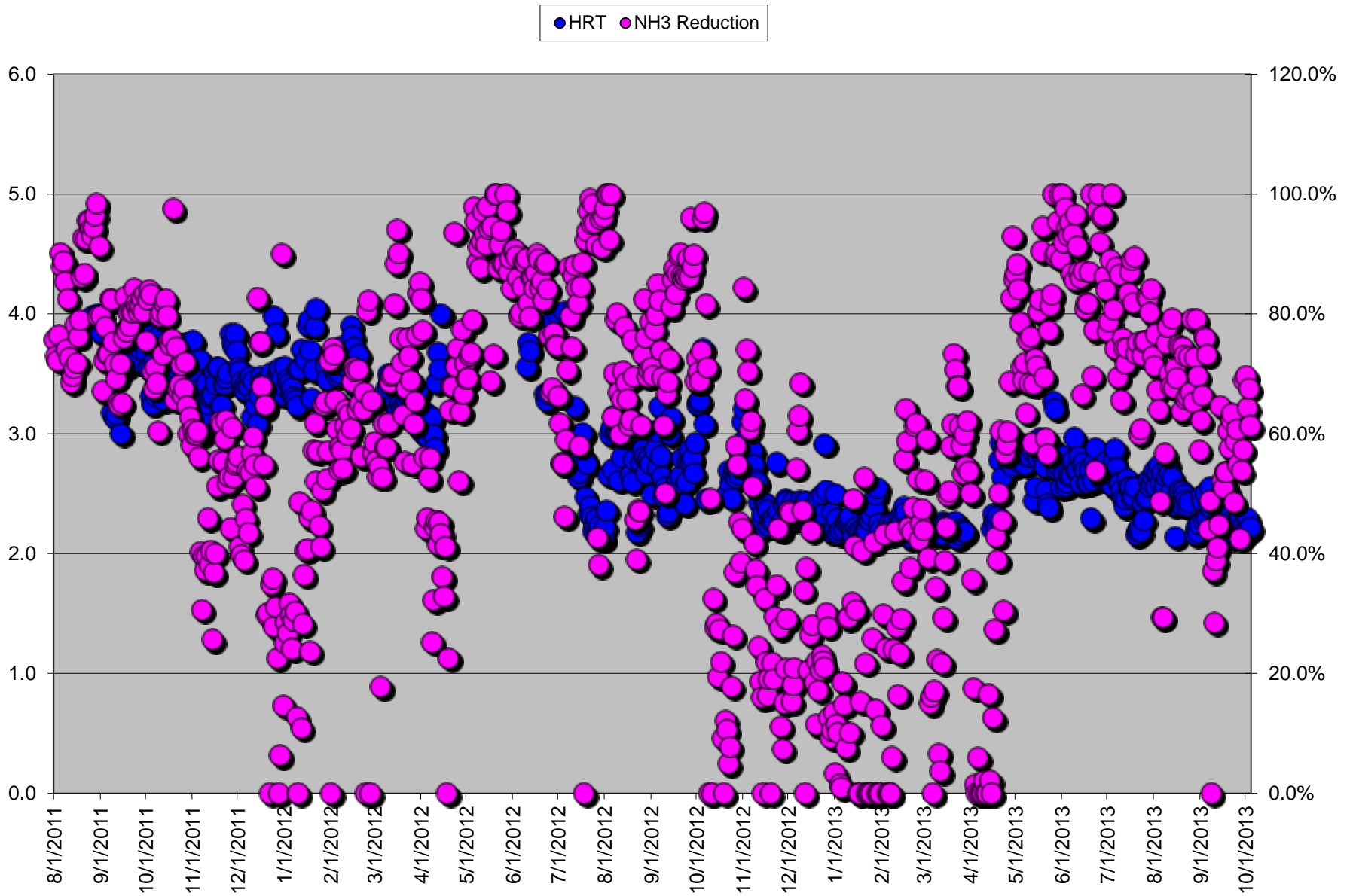
>90 MGD CL2 constraints



CL2 and Peroxides

Future FRW Outfall CL2 Monitoring Station MFRW3 CL2 Monitoring Station MFRW2 CL2 Monitoring Station







Enhanced Reductions

- Ammonia > 50%
- NO₂ - up to 60%
- NO₃ - up to 60%
- Tot-N up to 40%


Chemical Savings

- Minimized disinfection chemical rates
- No chemical de-chlorination during normal flow patterns

Compliance

- Effluent meets and exceeds permit parameters

- **Microbial interaction**
- **Sedimentation**
- **Chemical adsorption**
- **Plant uptake**
- **UV degradation**

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- A photograph of a snake, likely a rattlesnake, coiled on a sandy surface. The snake's body is thick and covered in a pattern of dark and light brown scales. Its head is raised and turned towards the left. The background is a flat, sandy ground with some small pebbles and shadows.
1. Design
 2. System cultivation
 3. Accessibility
 4. Proper staffing/training
 5. Equipment
 6. IPM's
 7. Budget
 8. Experience
 9. Anticipation of organisms adaptive nature

The pitfalls

The Fine Line





Integrated Pest Management

Trophic cascade development



Hydraulics

Hydraulic Engineer









ANPP



Project Benefits; Projected and Realized



Realized:

- Flow attenuation
- Water quality
- Habitat restoration
- Conveyance for agricultural use and industrial re-use
- Nuisance control
- Ecological and community stability
- Flood mitigation and asset protection

Projected:

- Passive recreation
- Environmental education
- Carbon sequestration
- Heat signature reduction
- Aquifer recharge
- Increased valuation of adjacent properties
- Positive appearance for public interests

Lessons Learned



Success is measured proportionally
Qualitative = Quantitative



Questions?

