RECLAMATION

Managing Water in the West

Central Valley Program Improvement Act Section 3408 (h) Land Retirement Program U.S. Dept. of the Interior

U.S. Department of the Interior
Bureau of Reclamation

CVPIA Land Retirement
An Interagency Team

Robert H. May USBR Program Manager
Stephen Lee, USBR Hydrologist
Bea Olsen, FWS Wildlife Biologist
Steve Laymon, BLM Site Coordinator

Land Retirement Program Goals

- Reduce agricultural drainage
- Restore upland wildlife habitat
- Acquire CVP water when feasible

Retired lands are those taken out of irrigated agricultural production as one means to reduce drainage problems.

Five Year Land Retirement Demonstration Project

Demonstration Project clearly shows that retiring land from irrigated agriculture results in numerous physical and biological benefits.

Acquisitions Accomplished for the CVPIA Land Retirement Demonstration Project

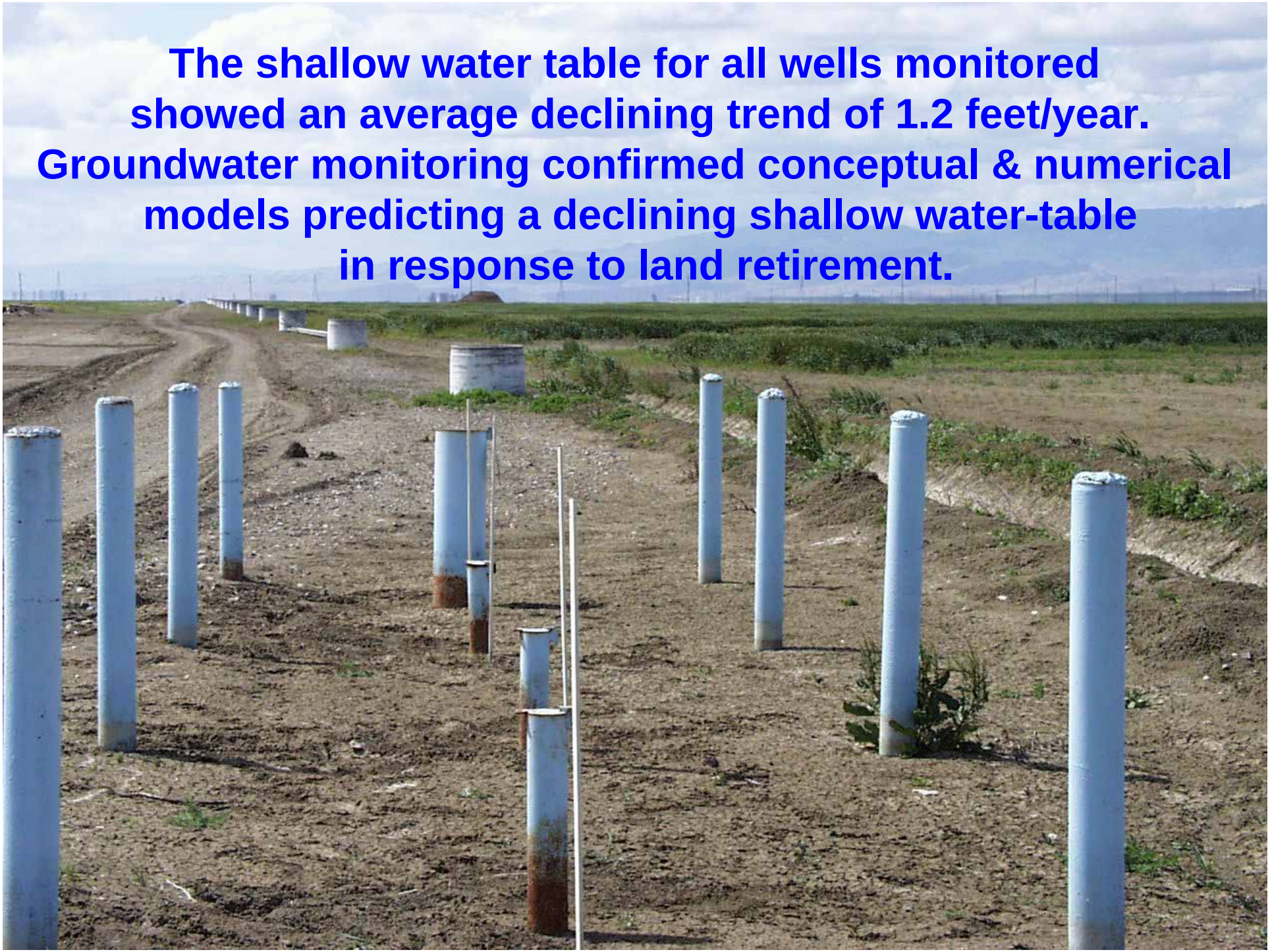
Tranquillity Site =

2090 acres

Atwell Island Site =

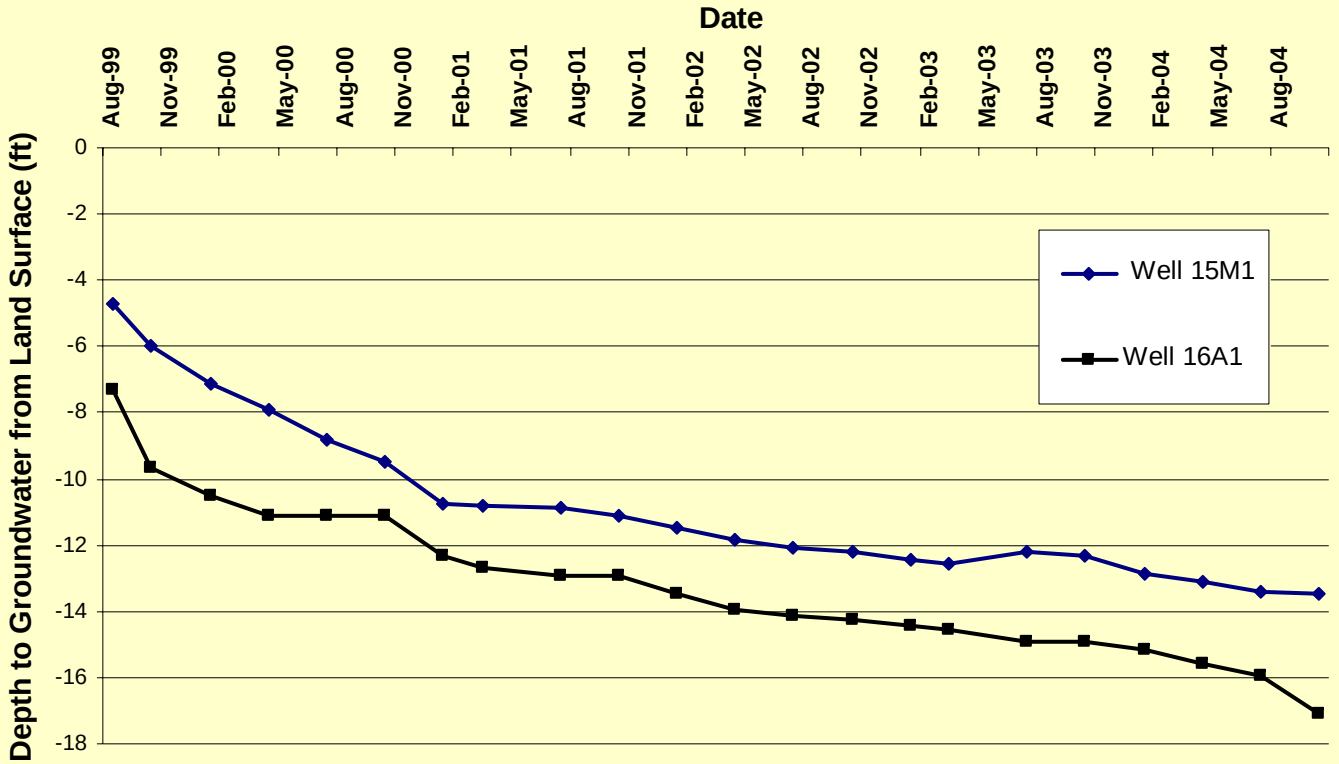
6200 acres

The shallow water table for all wells monitored showed an average declining trend of 1.2 feet/year. Groundwater monitoring confirmed conceptual & numerical models predicting a declining shallow water-table in response to land retirement.



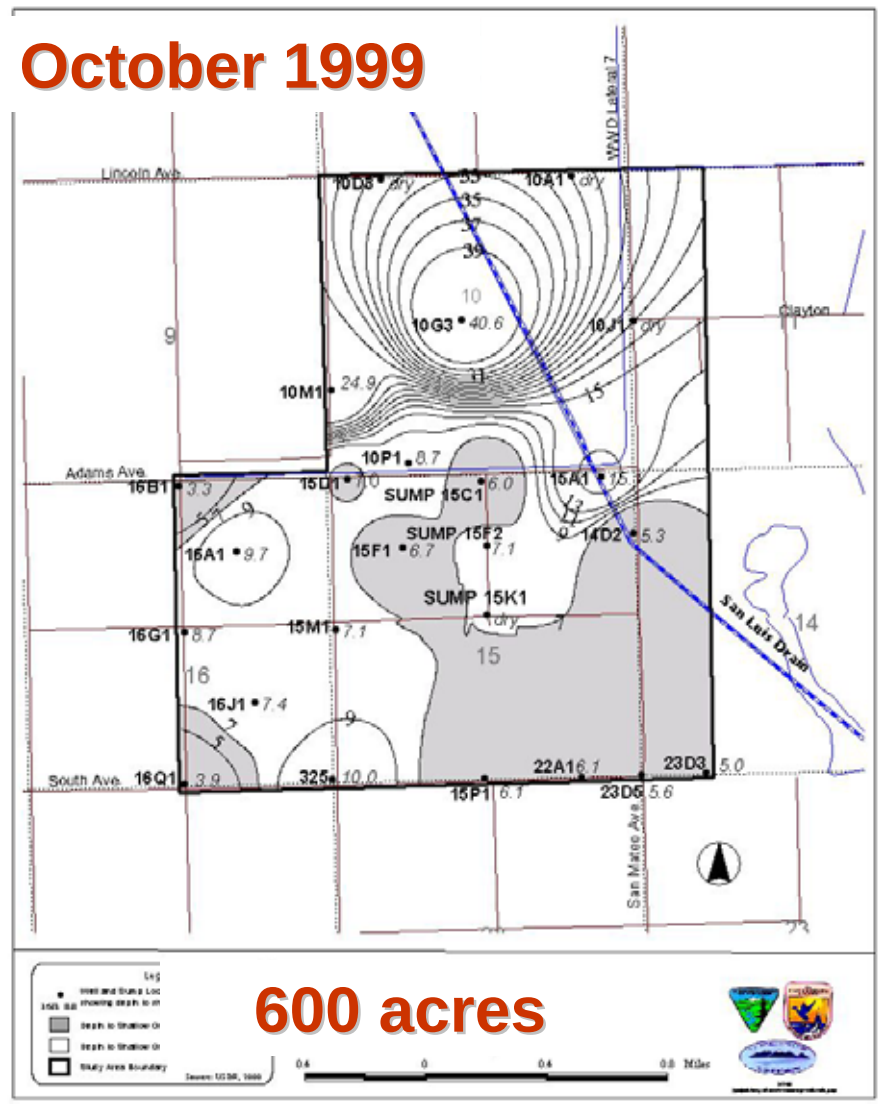
Declining Shallow Groundwater Trend

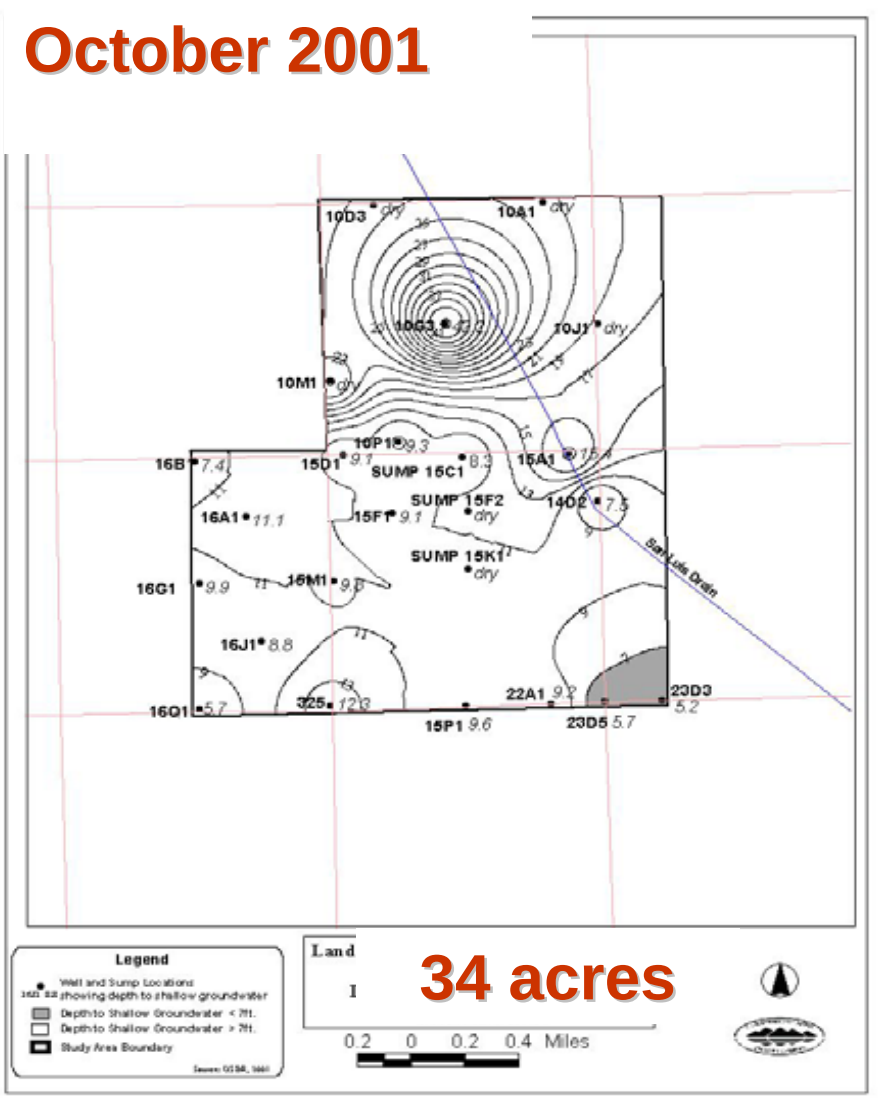
Traquillity Site Hydrographs: Wells 15A1, 16M1



Depth to Shallow Groundwater

Number of acres within 7 feet of land surface





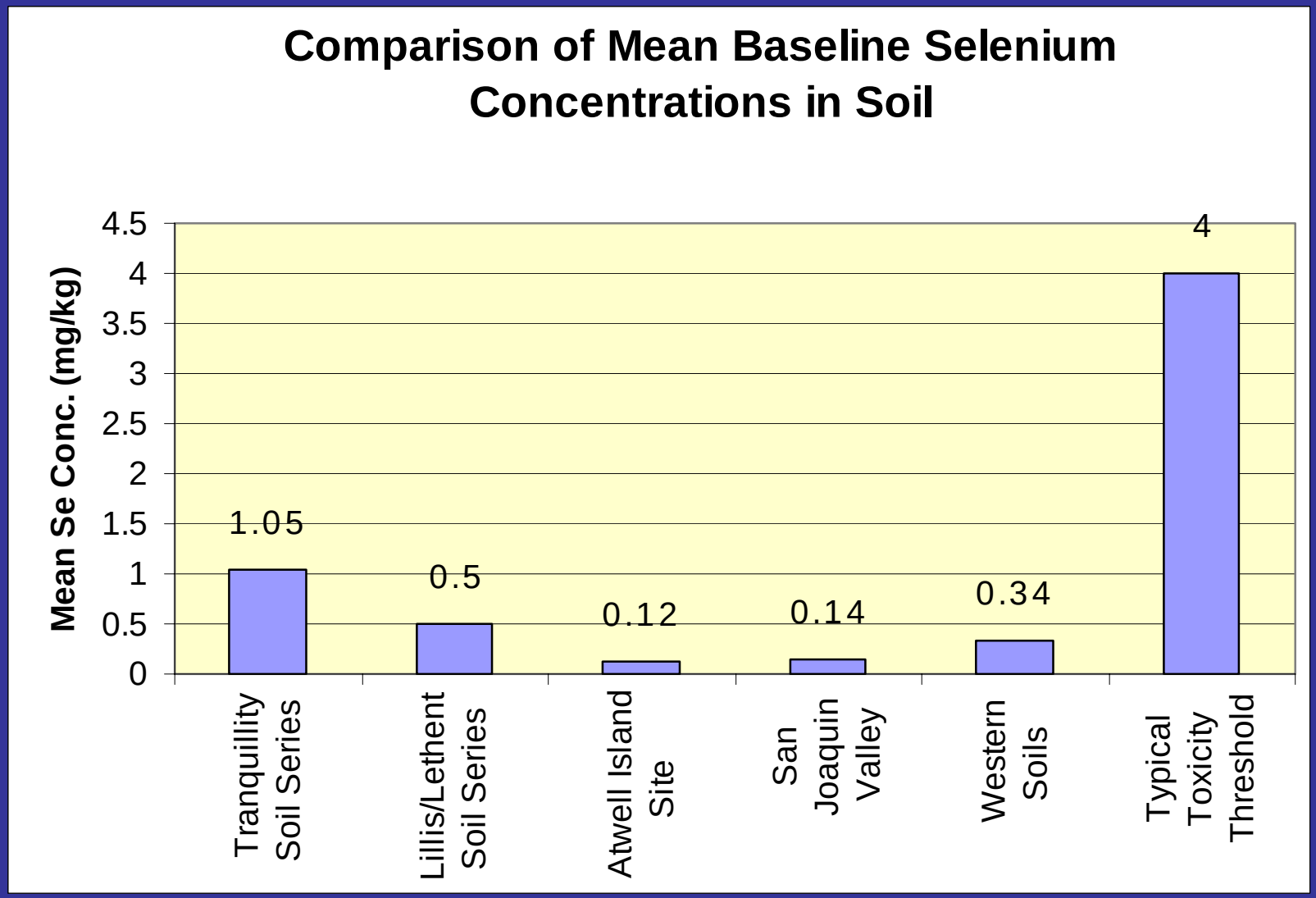
Groundwater Quality

- Dominant ions are Sodium Sulfate.
- Highly saline shallow groundwater ranges of 11,000 – 76,000 uS/cm.
- High Se Concentrations 5 – 5300 ug/l, mean 2100 ug/l. (EPA surface water criteria 5 ug/l).

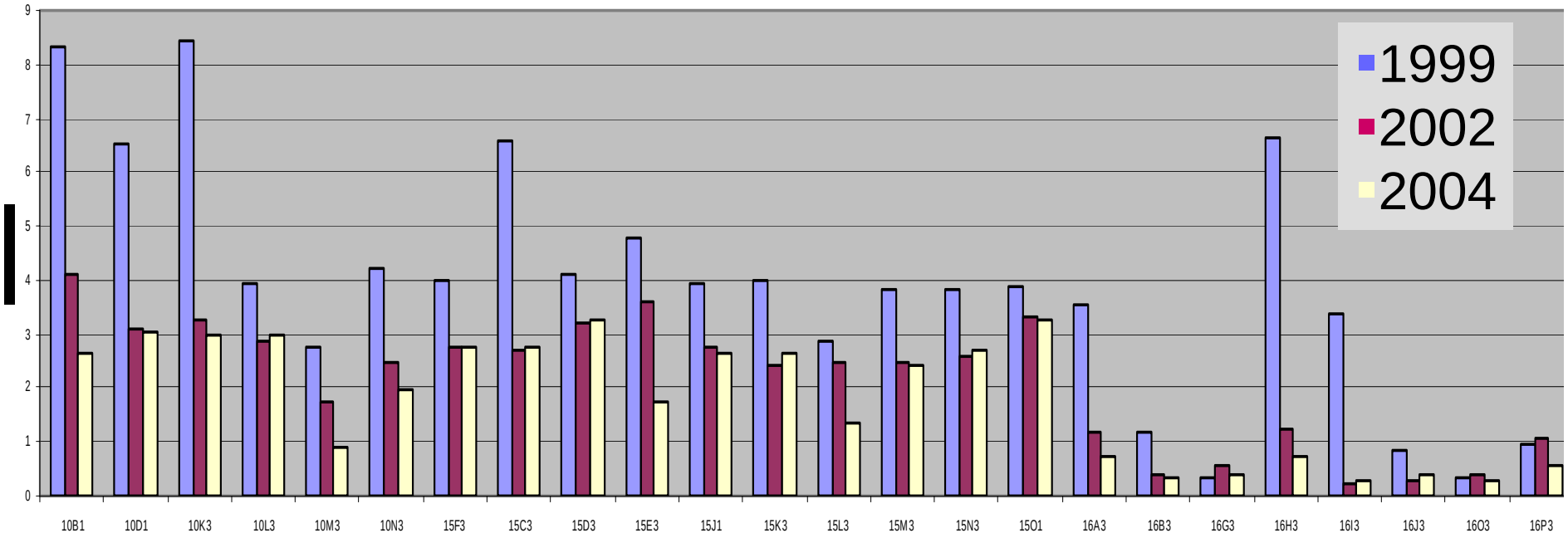
- High Salinity and trace element concentrations in shallow groundwater results of evaporation from shallow water-table.

Soil selenium moderately elevated, but w/in range of western clay & silty-clay soils.

- Tranquillity Clay Predominant soil type
- Slow permeability
- High shrink-swell potential
- Selenium in top foot decreased over 5 yrs
- Soluble Se increase in substrata due to oxidation associated with declining water-table


Comparison of Mean Baseline Selenium Concentrations in Soil
Mean Se Conc. (mg/kg)
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
1.05
0.5
0.12
0.14
0.34
4
Tranquillity Soil Series
Lillis/Lethent Soil Series
Atwell Island Site
San Joaquin Valley
Western Soils
Typical Toxicity Threshold

Salinity (EC5) Trends in Top Foot of Soil

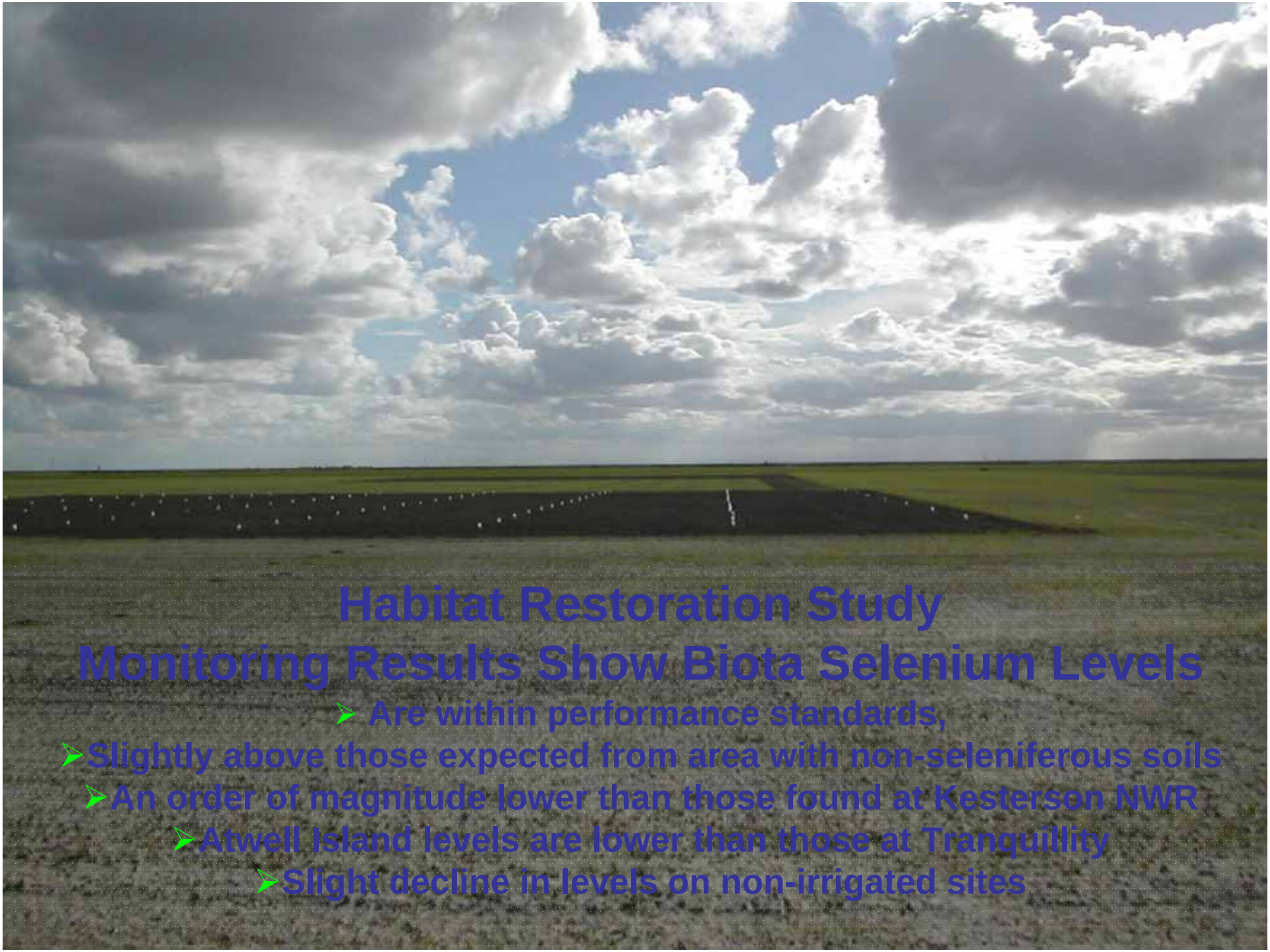


Soil Sampling Site

- No evidence of upward movement of water or salt into surface soils.
- Over 50% of salts leached from the 0-1 ft zone (most leaching from 0-8 in.).

Surface Ponding

- No surface water ponding due to extensive network of dessication cracks in clay soils
- Soils cracked to depth of 3-5 ft. Cracks not swell shut during study
- Depth to moisture did not exceed 12” during 1999-2004
- Depth to moisture averaged 25” March 2005
- No groundwater recharge from rainfall
- Site vegetation mostly shallow rooted annual grasses

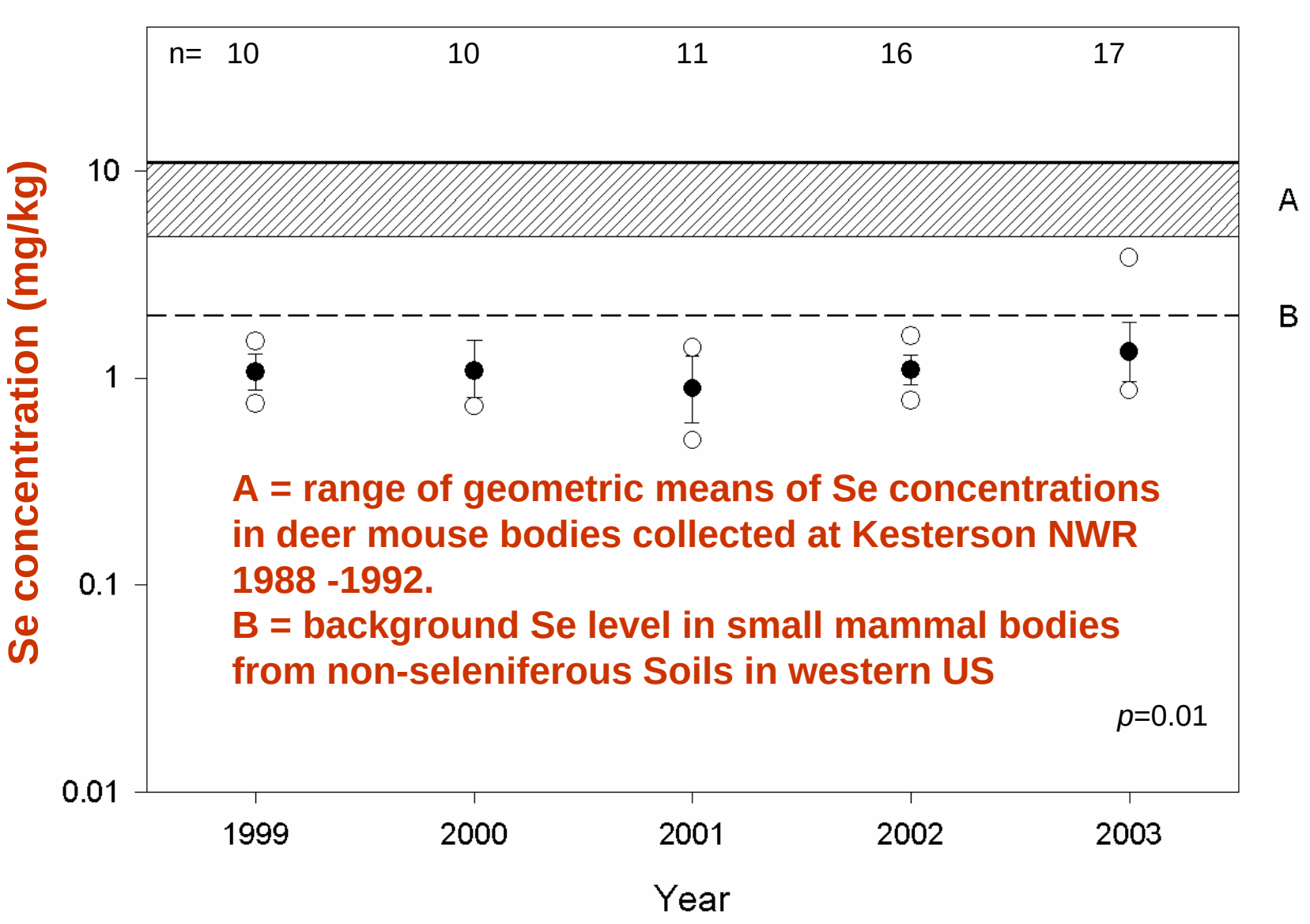


Habitat Restoration Study

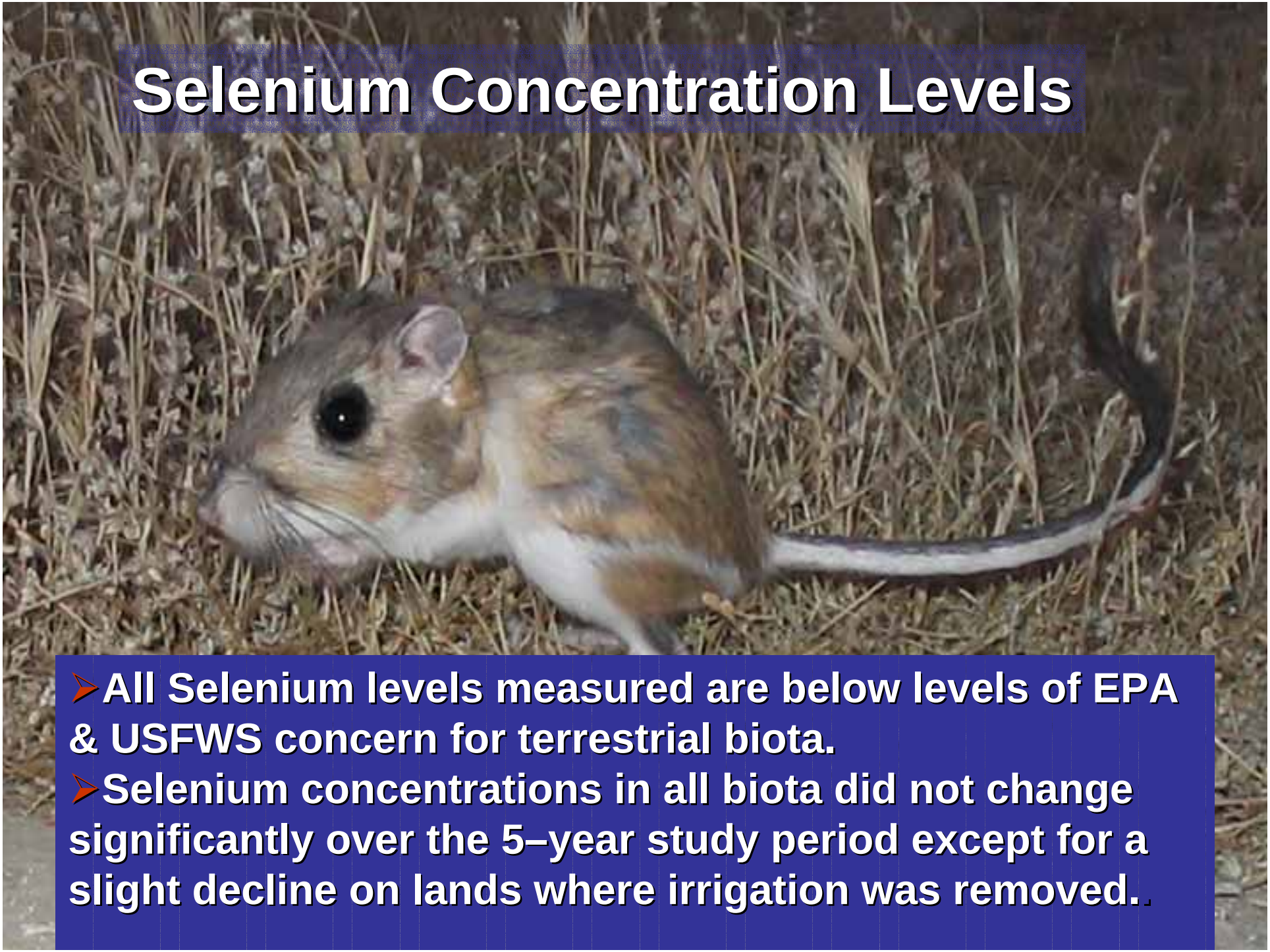
Monitoring Results Show Biota Selenium Levels

- Are within performance standards,
- Slightly above those expected from area with non-seleniferous soils
- An order of magnitude lower than those found at Kesterson NWR
- Atwell Island levels are lower than those at Tranquillity
- Slight decline in levels on non-irrigated sites

Se Levels in Deer Mouse (*Peromyscus maniculatus*)



Selenium Concentration Levels



- All Selenium levels measured are below levels of EPA & USFWS concern for terrestrial biota.
- Selenium concentrations in all biota did not change significantly over the 5–year study period except for a slight decline on lands where irrigation was removed.

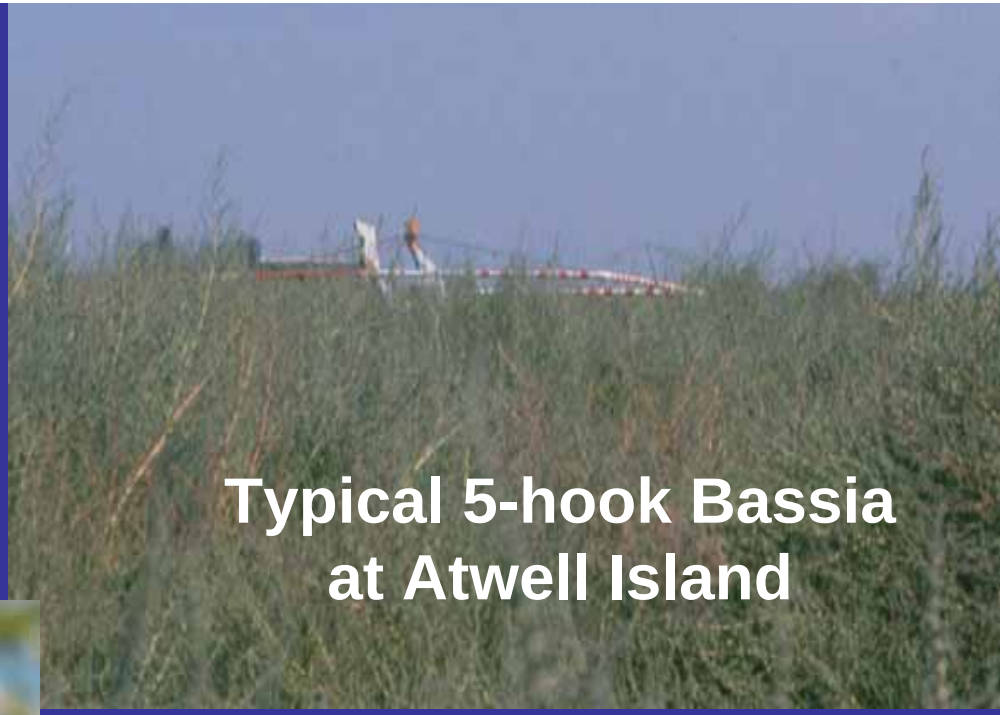
Increased wildlife diversity & abundance on retired agricultural lands.

Restoration Results

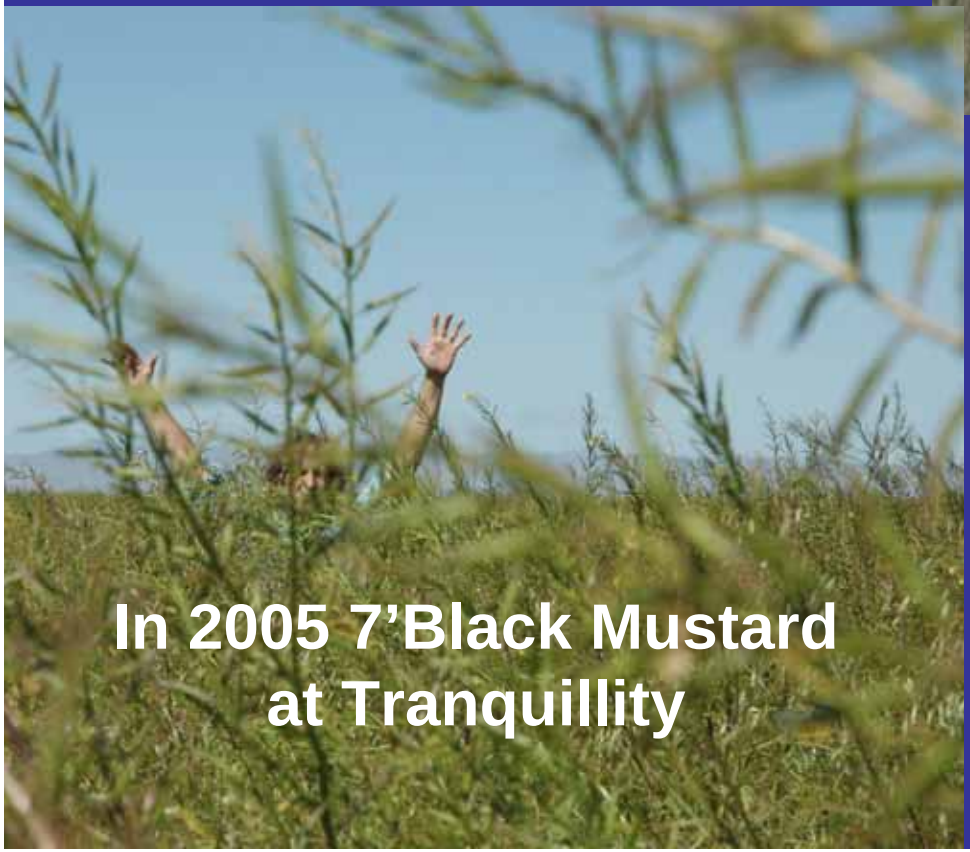
Non-native species dominate.
Relatively few non-imprinted natives become established.
Successful establishment of perennials but with low diversity.

At Tranquillity 8 native species were observed in the restored areas.

Restoration Challenges to Native Vegetation Establishment



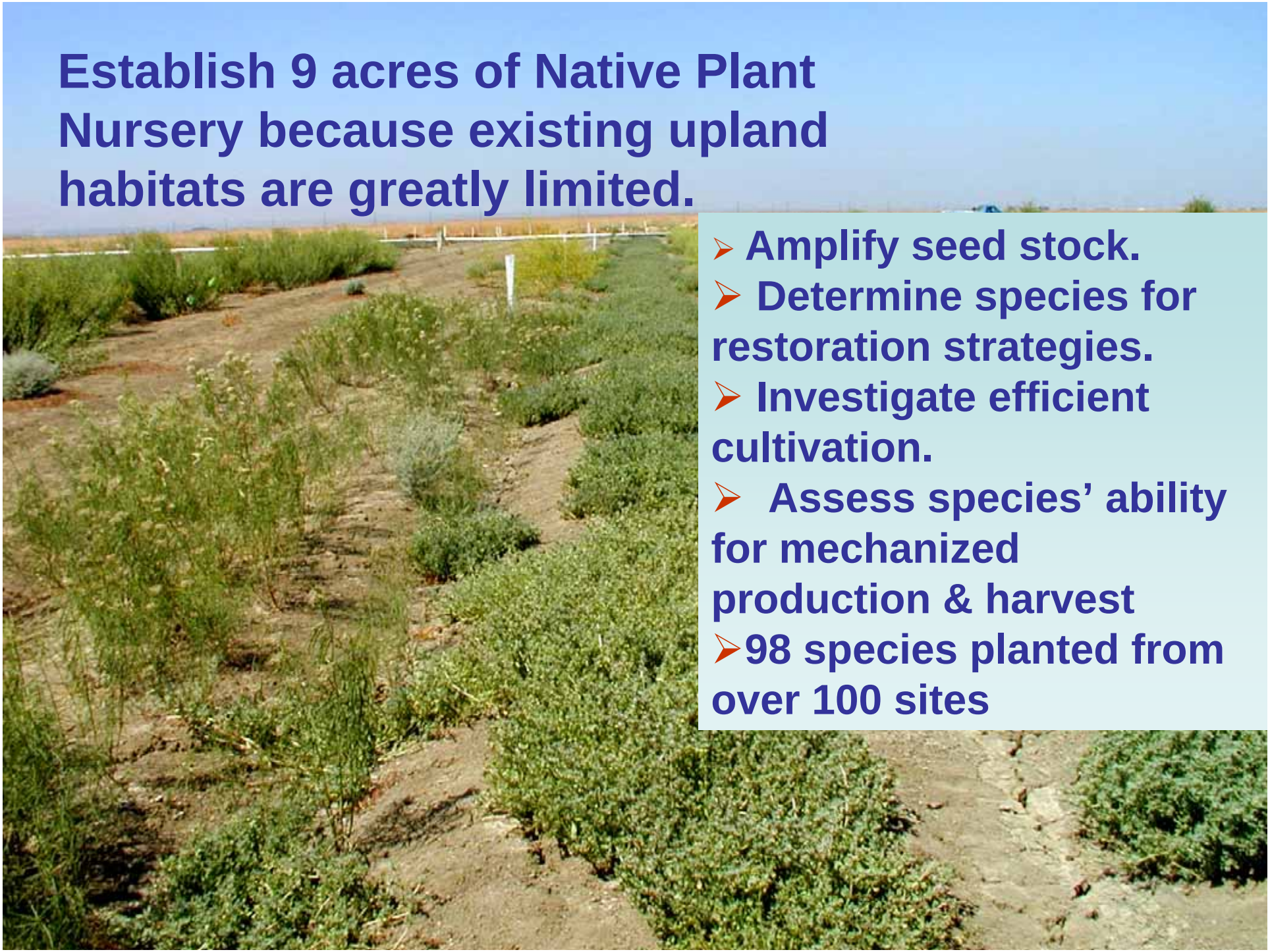
Typical 5-hook Bassia at Atwell Island



In 2005 7'Black Mustard at Tranquillity

- Large amount of weed seed in seed bank & adjacent fields
- Low amounts of native seed in seed bank
- Low rainfall years & changed hydrology
- Effects of soil types & recent agricultural activities

Establish 9 acres of Native Plant Nursery because existing upland habitats are greatly limited.



- Amplify seed stock.
- Determine species for restoration strategies.
- Investigate efficient cultivation.
- Assess species' ability for mechanized production & harvest
- 98 species planted from over 100 sites

Seed Augmentation by USDA – NRCS Plant Material Center Lockeford, CA

Why Restoration of Native Vegetation?

- Self sustaining
- Low water requirement
- Low maintenance cost once established
- Provides wildlife habitat

Restoration of retired lands can assist the recovery of local species and enhance existing upland wildlife habitat by providing structure & composition.

Two year hedgerow with nesting Loggerhead Shrikes & other resident & migratory species

Knowing listed species life requirements helps in planning restoration work

Existing native upland habitat.

Four-year old hedgerow creates similar low density shrubland.

Some Restoration Lessons Learned

Drip irrigation is too labor intensive. Perennial shrubs grow in hedgerows on either side of a furrow created wide enough to plant both sides with range land drill. Furrow irrigated twice in year of planting only.

Management Benefits

Habitat Demonstration Units for Wildlife

Hedgerow trapping tumbleweeds

Increased numbers of agricultural beneficial insects.

Utilize TSC Expertise

In Growth-form & Herbicide Trials like this Late Season Species Trial.

For Testing Planting Techniques of Strips of Natives in Retired Alfalfa Fields.

Other Restoration Trials & Lessons

Best use of fire

Recreating topography

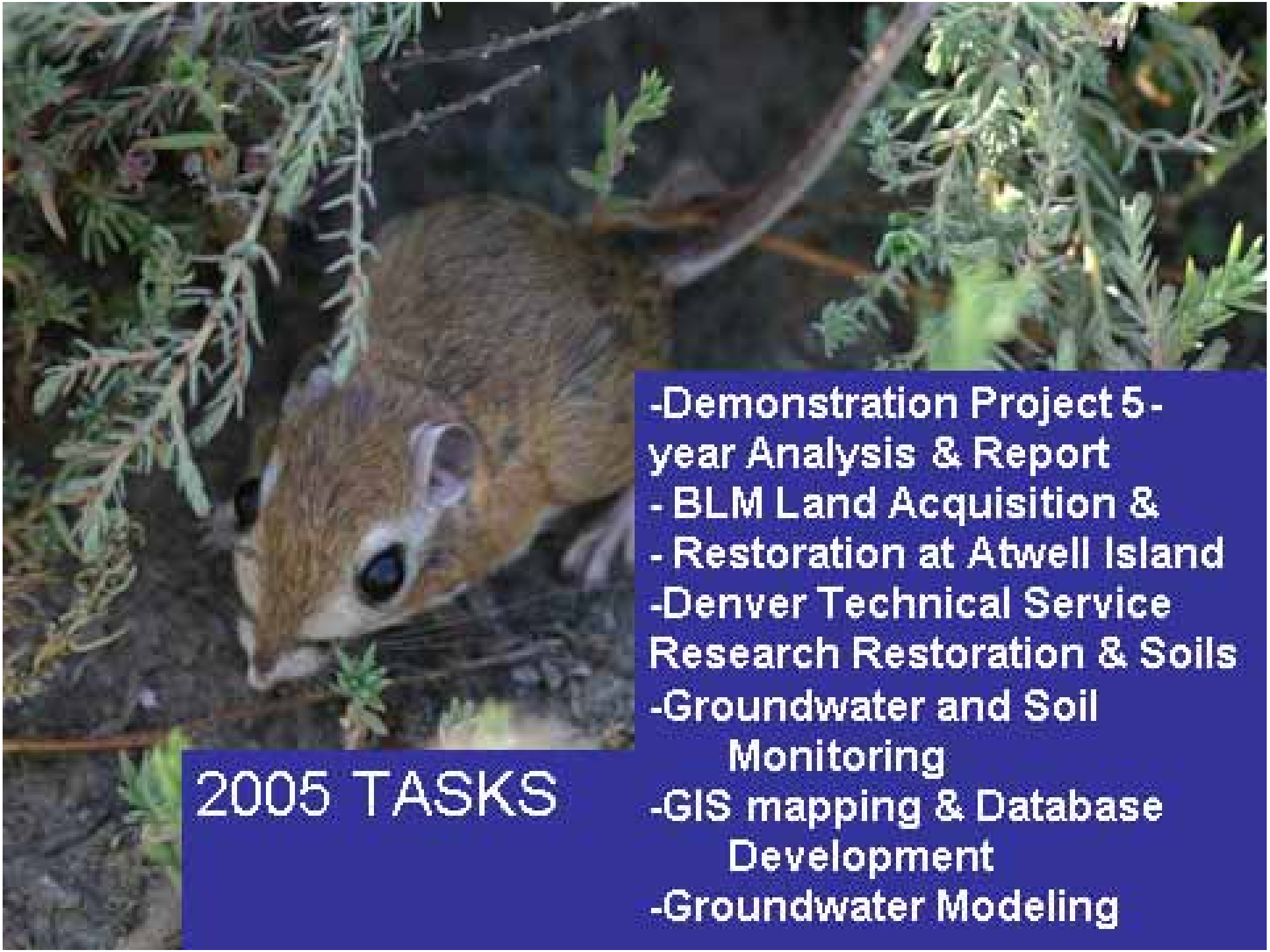
Seeding Rates & Methods

Water Management on site and for other CVPIA purposes

Partners/Cooperators

USBR, BLM, FWS
CSU Stanislaus
Endangered Species Recovery Program
USGS, DWR, DFG
UC Davis
CSU Bakersfield
CSU Fresno
Trust for Public Lands
USBR Technical Services Center
USDA-NRCS-Plant Materials Center

USDA-NRCS Visalia
Roger Sanders, Organic Farmer
Atwell Island farmers: Jack Mitchell, Ron Nichols, & Don Jackson
AmeriCorps NCCC
CART and other schools
Tulare Lake Basin Working Group
Westside RCD
California Dept. of Corrections
Clovis Botanical Garden
Trails Unlimited
US Forest Service



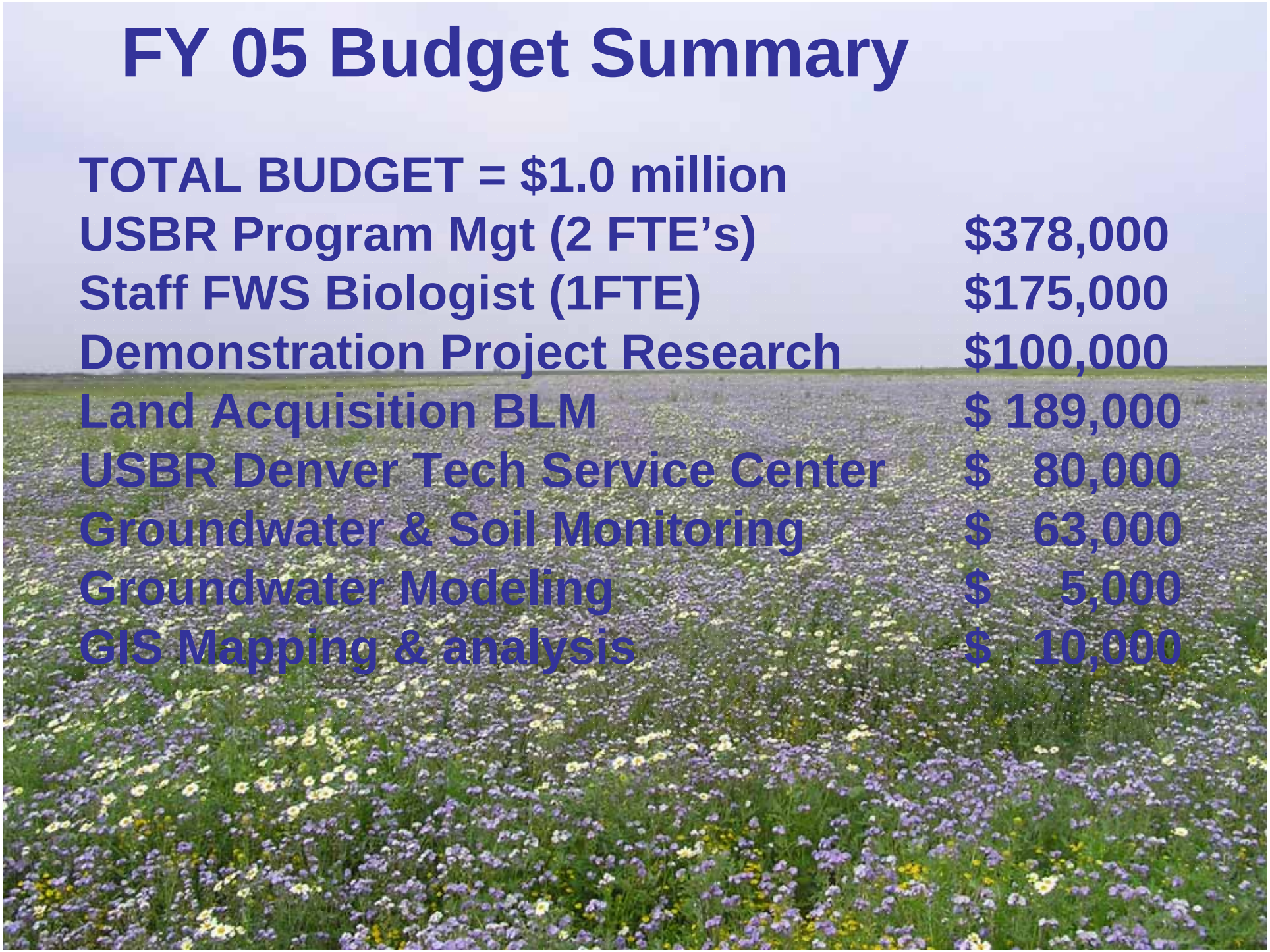
2005 TASKS

-Demonstration Project 5-year Analysis & Report
- BLM Land Acquisition &
- Restoration at Atwell Island
-Denver Technical Service Research Restoration & Soils
-Groundwater and Soil Monitoring
-GIS mapping & Database Development
-Groundwater Modeling

2005 BLM Tasks at Atwell Island

- Planted 6000 lbs. seed of 17 native species on 175 acres
- Planted 2 40-ac habitat demo units
- Created 16 new 0.5 mi hedgerows
- Continued native seed collection
- Received 120 lbs. alkali sacaton seed yield from organic cooperator
- Utilized 10-person AmeriCorp NCCC Team to plant 1.5 mi of canal banks w/ > 300 trees, shrubs & grasses
- Constructed 0.5 mile nature trail w. AmeriCorps & Trails Unlimited
- Conducted physical & biological monitoring

FY 05 Budget Summary



TOTAL BUDGET = $1.0 million

USBR Program Mgt (2 FTE's)	$378,000
Staff FWS Biologist (1FTE)	$175,000
Demonstration Project Research	$100,000
Land Acquisition BLM	$ 189,000
USBR Denver Tech Service Center	$ 80,000
Groundwater & Soil Monitoring	$ 63,000
Groundwater Modeling	$ 5,000
GIS Mapping & analysis	$ 10,000

Future CVPIA Land Retirement Priorities

- **Assess retired lands for species recovery & apply restoration technology on retired lands in SJV.**
- **Complete land acquisitions at Atwell Island WD.**
- **Continue habitat restoration & monitoring at Atwell Island.**
- **Perform long term monitoring at reduced frequency and scope.**
- **Maintain & augment native nursery at Tranquillity.**
- **Expand outreach.**

For more information contact:
Robert May USBR at SCCAO
rmay@mp.usbr.gov
Bea Olsen FWS in Fresno at the SCCAO
bolsen@mp.usbr.gov

RECLAMATION