Joint RGBI Annual Conference 2010

Irrigation District Engineering and Assistance

Dr. Guy Fipps
Eric Leigh
Askar Karimov
Martin Barroso
Gabriele Bonaiti

Task 1 and 3 Extension Engineering

Task 1: Irrigation District Studies

- Provide technical assistance, applied research and educational programs to improve water management and promote water conservation and modernization.

Task 3: Institutional Incentives

- Evaluate irrigation district infrastructure needs and develop strategies to efficiently deliver water for agricultural use, and to facilitate the adoption of efficient irrigation technologies.

Highlights 2009-2010

- Newsletter
- Website Hosting
- Canal Lining Evaluations
- Automation/Telemetry Demonstrations
- Canal Riders Training Development
- Spill Loss Research Update
- WebGIS – Brownsville

GIS Classes

Scheduled

August 2010

- **Beginners GIS Course** – 1 day intro class using ArcGIS 9.x. Students will learn basic mapping skills.
- **Intermediate GIS Course** – 1 day advanced class learning spatial analysis operations, create personal geodatabases, and a demonstration on Online GIS applications.
- **GPS Course** – ½ day class will provide hands-on instruction using simple hand-held units to a more complex survey-grade unit.

GIS Classes

Scheduled

August 2010

- Contact **Eric Leigh** or **Martin Barroso** for more information
- **http://idea.tamu.edu**
- Classes in El Paso depending on interest

GIS Classes

Significance?

- To educate about software updates and functionality
- Improve knowledge and skills
- Provide awareness of technology
- Available to:
  - District Managers
  - Farmers
  - Board of Directors
  - Local & State Officials
  - Extension & Research Personnel

A NEW IDEA
News Letter

November 2009

- Projects: Ongoing, Updates, and Results
- Recent Publications
- Educational Opportunities

A NEW IDEA

Newsletter of the Irrigation District Engineering and Assistance Program

ISSUE 4, NOVEMBER 2009

INSIDE THIS ISSUE:

Urbanization of Irrigation Districts

Rapid urban growth in the southern border region of Texas is causing fragmentation of many irrigation districts, among other impacts to the region. The IDEA Team recently completed an analysis of the growth of urban areas over the ten-year period, 1996 to 2006, in border counties with irrigation districts. We found that the Lower Rio Grande Valley experienced an overall 31% increase in urban area. In El Paso, there was a 12% increase in urban area within the county and 8% within the irrigation district. However, in contrast, there was very little change in urbanized area in Maverick and Hudspeth Counties. Table 1 lists our estimates of the expansion of total urban area by county.

In the Lower Rio Grande Valley, the most urbanized district is Hidalgo County Municipal Utility District No.1 at 89.5% urbanization, while Valley Acres and Bayview Irrigation Districts are the least urbanized as a percentage of the district. Hidalgo County Irrigation District No.2 has the most urban area in terms of total acreage, while the largest increase in urban area as a percentage of the district was

Urban Expansion in El Paso County

[CONTINUED ON PAGE 5]

In Pursuit of the Perfect Liner

Since 1999, irrigation districts in the Lower Rio Grande Valley have been experimenting with various types of synthetic canal liners as an alternative to more costly canal lining and rehabilitation options. Since 2005, the IDEA Team has been evaluating the performance of these linings by conducting annual inspections in order to help answer the question: "*which liner is the best*?" The answer turns out to depend on several factors including where the liner is installed and whether or not the liner has a protective covering (or barrier).

As expected, synthetic liners with a protective covering performed better than those without. Synthetic liners significantly reduce water losses while the protective barrier (usually shotcrete) prevents damage. The higher initial costs for a liner with protective barrier may be off-set over the long run by reduced maintenance and repair costs, better performance, and less water loss. The two types of lining materials that were used with a

[CONTINUED ON PAGE 4]

AgriLIFE EXTENSION
Texas A&M System

Lining Evaluation Project

[CONTINUED FROM PAGE 1]

protective barrier were PVC and polyester.

Liners installed without a protective barrier are susceptible to damage from the sun (UV), animals, intentional and unintentional vandalism, and normal district operational activities. An example of unintentional vandalism is children swimming in the canals.

Four types of liners have been used without a protective barrier: polypropylene, PVC alloy, EPDM rubber, and polyurethane. Many of the rubber lined sections showed serious deterioration. The PVC alloy is the hardest of the liners and is more resistant to vandalism and animal damage. The other two liners did well in remote canals.

Proper installation of liners was found to be critical. For example, liners that were not stretched properly during installation left folds and loose material that seem to be a natural draw for damage. Folds and loose material are easily grabbed, pulled, and torn.

The IDEA Team recommends that districts institute a regular inspection and repair program. Once a tear or cut happens, it will tend to expand and be susceptible to further damage until it is repaired. When planning a lining project, a district should evaluate the location and consider the potential for damage. Liners in high traffic areas will experience more damage. A more durable liner such as the PVC or even better, a liner with a protective barrier should be considered.

Additional details and results of our analysis are provided in the report *"Evaluation of Canal Lining Projects in the Lower Rio Grande Valley of Texas,"* which maybe viewed or downloaded from the IDEA website (http://idea.tamu.edu).

Liner showing top-anchor cuts

Canal liner with a protective barrier is shown being installed

Liner has been torn and pulled off the canal sidewall

more easily
calibrated to
need for a
meters cost

onnect cable
and the dis-
and control
erNet-RTMC
ed upstream
rsonnel now
tream water
nges to gate

tablish flow
temporally
the informa-
ate was suc-

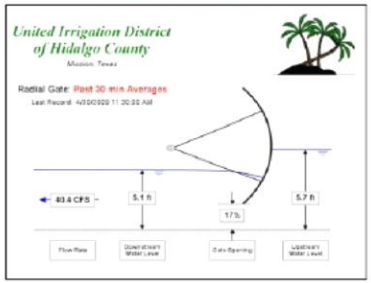
ng

irrigation
EA team
ject that
alculates
e data is
t's head-
, the Dis-
e weir and
called in the information to the district office twice a day.

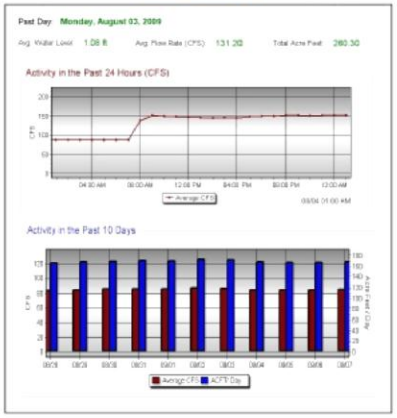
We set up a user interface on a computer at the district office to enable the district manager to view the flow in real time. In addition, we created a web page for the district which displays the flow data from the weir using hourly and daily graphs.

36 ft Weir. Weir blade is at 0 water level.

Office Computer Screen Display



Online Screen Display



Recent Publications

B-6218 Measuring Seepage Losses from Canals Using the Ponding Test

Measuring seepage loss rates is one of the best ways to prioritize canals for maintenance and rehabilitation and to
f canal improvements quan-
bilitation testing.
onsidered to be the most
ge losses from irrigation
standard of comparison
hod two ends of a canal
ually with earthen dams)
ter. The change in water
f 24 to 48 hours and used
to calculate the seepage
plete details for using this method. It includes sections on preparing for the test, constructing the dam, selecting and installing equipment, measuring canal shapes, and calculating seepage losses from data collected. There is a sample ponding test data form and equipment checklist. 20 pp., 14 color photos, 6 tables, 7 illustrations), $7.00.

Printed copies may be ordered from the Texas AgriLife Extension Bookstore http://agrilifebookstore.org.

blished by the Texas Water Resources Institute http://twri.tamu.edu and can be
http://idea.tamu.edu.

rea in Irrigation Districts of the Rio Grande River Basin, 1996–2006: A Map Series

counties: El Paso, Maverick, Cameron, Hidalgo, and Willacy, showing the expansion of urban
96 to 2006). Also shown on the maps are the service areas of 30 irrigation districts that de-
River Basin. Individual district maps are posted under the GIS/Maps link. Tables show esti-
n area in both county and irrigation district boundaries.

Irrigation Districts of the Rio Grande River Basin: A Map Series

showing the boundaries of legislative districts (state and federal) and 32 irrigation districts
tables include Texas Class A water rights for the irrigation districts of the Lower and Middle
tions for the Upper Rio Grande Basin irrigation districts according to the Rio Grande Com-
stricts by irrigation districts.

ing Projects in the Lower Rio Grande Valley of Texas

the Lower Rio Grande Valley of Texas have been experimenting with an assortment of canal
team initiated a program to track the long-term effectiveness and durability of these mate-
n and maintenance procedures which will help ensure good performance. This report pro-
om the first three years of this evaluation program.

News Letter
Provides

- To communicate, education, and make aware of program activities
  - District Managers
  - Board of Directors
  - Local & State Officials
  - Extension & Research Personnel
- Presents opportunities for involvement

A NEW IDEA

Newsletter of the Irrigation District Engineering and Assistance Program

ISSUE 4, NOVEMBER 2009

INSIDE THIS ISSUE:

Automation, Remote Monitoring and Control Demonstrations-Updates 2
- Full Automation
- Radial Gate: Remote Monitoring and Control
- Remote Wide Monitoring 3

Personnel News 6

Recent Publications: 7
- Measuring Seepage Loss Using the Ponding Test Method

and more...

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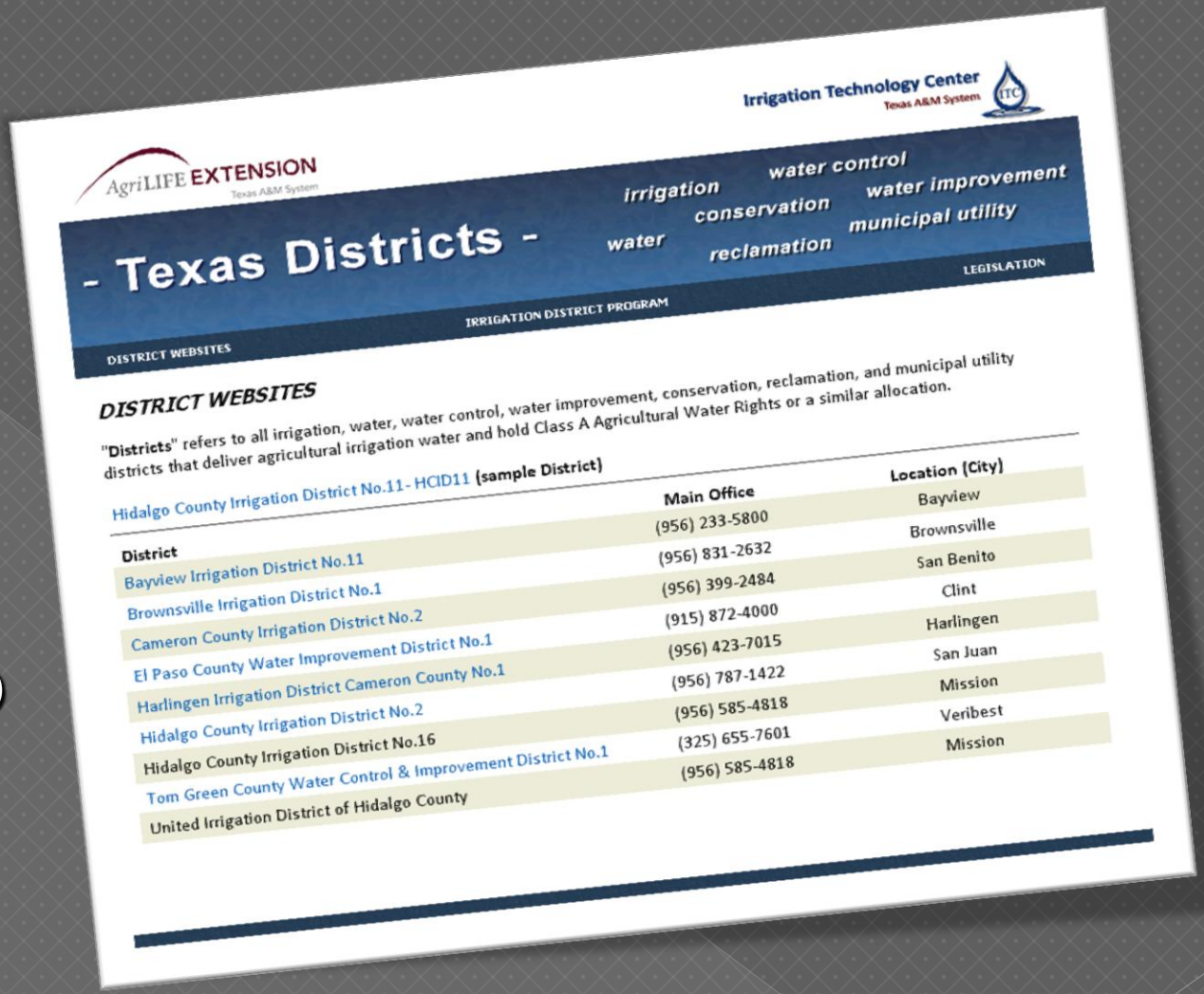
Texas A&M System

A NEW IDEA

Website Hosting

- Bayview ID
- Brownsville ID
- CCID2
- United
- HCID16



Irrigation Technology Center
Texas A&M System

AgriLIFE EXTENSION
Texas A&M System

- Texas Districts -

irrigation water control water improvement conservation water reclamation municipal utility

DISTRICT WEBSITES IRRIGATION DISTRICT PROGRAM LEGISLATION

DISTRICT WEBSITES

"**Districts**" refers to all irrigation, water, water control, water improvement, conservation, reclamation, and municipal utility districts that deliver agricultural irrigation water and hold Class A Agricultural Water Rights or a similar allocation.

Hidalgo County Irrigation District No.11- HCID11 **(sample District)**

District	Main Office	Location (City)
Bayview Irrigation District No.11	(956) 233-5800	Bayview
Brownsville Irrigation District No.1	(956) 831-2632	Brownsville
Cameron County Irrigation District No.2	(956) 399-2484	San Benito
El Paso County Water Improvement District No.1	(915) 872-4000	Clint
Harlingen Irrigation District Cameron County No.1	(956) 423-7015	Harlingen
Hidalgo County Irrigation District No.2	(956) 787-1422	San Juan
Hidalgo County Irrigation District No.16	(956) 585-4818	Mission
Tom Green County Water Control & Improvement District No.1	(325) 655-7601	Veribest
United Irrigation District of Hidalgo County	(956) 585-4818	Mission

http://districts.tamu.edu

Bayview
Irrigation District No.11

Bayview 11

110 S. SAN ROMAN RD BAYVIEW, TEXAS 78566 (956) 233-5800

May 12, 2010

Office Hours
Mon-Fri: 8:00-5:00

Home

About Us

District Directory

Board of Directors

Water Policies & Documents

Forms

Maps

Links

Welcome to the Bayview Irrigation District No.11 Website!

General Manager
Amy Gonzales

Office Location: Map
110 S. San Roman Rd.
Bayview, Texas 78566

Telephone Numbers:
(956) 233-5800 office
(956) 233-4343 fax

Hours of Operation:
Monday - Friday
8 am - 5 pm

Email Address: bayviewirrigation@yahoo.com

Bayview
Irrigation District No.11

Bayview 11

110 S. SAN ROMAN RD BAYVIEW, TEXAS 78566 (956) 233-5800

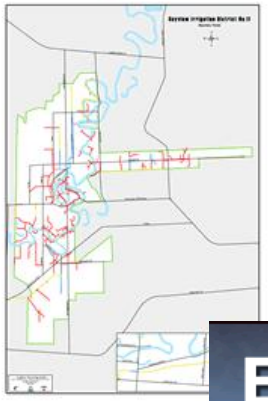
May 13, 2010

Office Hours
Mon-Fri: 8:00-5:00

- Home
- About Us
- District Directory
- Board of Directors
- Water Policies & Documents
- Forms
- Maps
- Links

Maps

District Maps



PDF JPG

Office Location Map

Done

Bayview
Irrigation District No.11

Bayview 11

110 S. SAN ROMAN RD BAYVIEW, TEXAS 78566 (956) 233-5800

May 13, 2010

Office Hours
Mon-Fri: 8:00-5:00

- Home
- About Us
- District Directory
- Board of Directors
- Water Policies & Documents
- Forms

Board of Directors

Name	Position	Phone	Email
Ernesto Martinez	President	(956) 330-0812	bayviewfive@sbcglobal.net
Sherman Lee	Vice President	(956) 433-1313	slee6343@aol.com
Roger Schultz	Secretary/Treasurer	(956) 233-9833	bayviewtwo@aol.com
Jearel Adams	Member	(956) 831-3642	jearel@aol.com
David Wilhite	Member	(956) 831-3304	dwilhite@stx-woodmill.com

Bayview
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May 13, 2010

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About Us

Our History

Cameron County Water Improvement District Number 11 was organized as a water control and improvement district in 1932 under the provisions of Chapter 51, Texas Water Code. The Cameron County Water Improvement District Number 11 was renamed Bayview Irrigation District No. 11 on November 29, 1982.

The District's primary operation is to provide irrigation water to an area approximately 6,850 acres but only about 4,506 are strictly under agricultural production. The District obtains water from the Rio Grande River unde
Grande River via ca
water reaches the
system and eventu

Bayview
Irrigation District No.11

Bayview 11

110 S. SAN ROMAN RD BAYVIEW, TEXAS 78566 (956) 233-5800

May 13, 2010

Office Hours
Mon-Fri: 8:00-5:00

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- Forms
- Maps

Water Policies & Documents

- District Operating Policy
- TCEQ Conservation Report Update
- Drought Contingency and Water Allocation Plan

Website Addresses

- Bayview Irrigation District No.11

  http://bayviewid11.tamu.edu

- Brownsville Irrigation District

  http://brownsvilleid.tamu.edu

- Cameron County Irrigation District No.2

  http://ccid2.tamu.edu

- Hidalgo County Irrigation District No.16

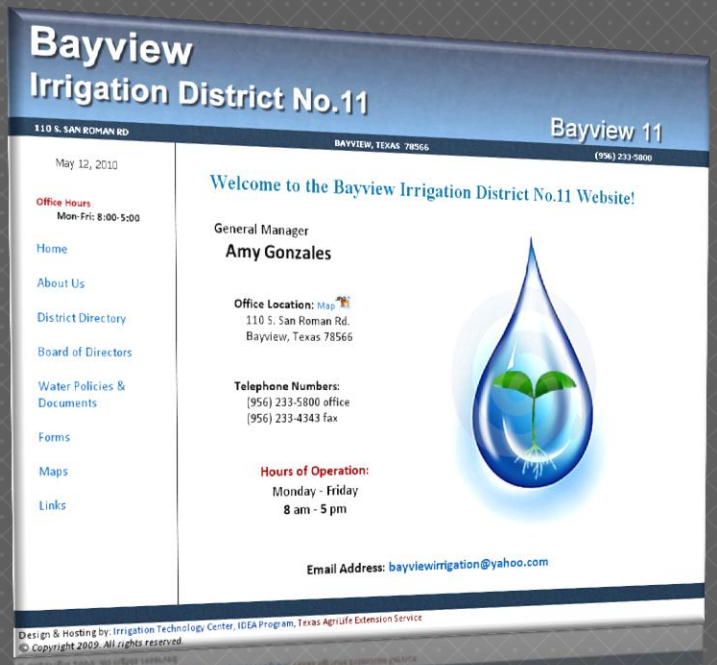
  http://hcid16.tamu.edu

- United Irrigation District

  http://united.tamu.edu

Significance?

- To help communication information via internet to farmers, water users, and communities.



- Publicizes the districts' involvement in the community, and provides a forum in which to interact with the district.

Website Hosting

TASK 1: Irrigation District Studies

Updates:

- Canal Lining Evaluations
- Automation/Telemetry Demonstrations

Canal Lining Evaluation Program

- Annual evaluations and ratings to determine durability and long-term viability of canal lining

Purpose of Lining Evaluations

- Ensure continued water savings
- Help districts select durable canal lining material
- Develop guidelines for maintaining performance
  - vandalism
  - material installation
  - maintenance/repair

Lining Materials

Table 1. Description of each lining material's composition.	
Material	**Description**
Polyester with protective barrier	A geocomposite consisting of two layers (top and bottom) of 8 oz/yd^2 nonwoven polyester bonded to an olefinic copolymer geomembrane, 20 mil thick. The protective barrier consists of 2-3 inches of shotcrete.
PVC with protective barrier	Non-reinforced Poly Vinyl Chloride (PVC). The protective barrier consists of a wire mesh with 2.5 inches of shotcrete.
Polypropylene	A reinforced polyester scrim 16 oz/yd^2 between polypropylene layers, 24 mil thick.
PVC Alloy	A polyvinylchloride blend, reinforced with a polyester scrim, 40 mil thick.
EPDM Rubber	A non-reinforced EPDM (ethylene propylene diene monomer), 45 mil thick.
Polyurethane	Two layers of 3-oz/yd^2, heat-bonded, non-woven geotextile saturated with liquid polyurethane, 40 mil thick.

Canal Lining Evaluation Report

June 29, 2009

AgriLIFE EXTENSION
Texas A&M System

TR 353

EVALUATION OF CANAL LINING PROJECTS
IN THE LOWER RIO GRANDE VALLEY OF TEXAS

Rio Grande Basin Initiative
Irrigation Technology Center
Texas AgriLife Extension Service

Significant Water Savings

- Water losses were reduced after lining by 94%

before

1.98 gal/ft2/day

227.14 ac-ft/mi/yr

after

1.17gal/ft2/day

11.20 ac-ft/mi/yr

Results

- EPDM and Polyurethane liners ranged from good performance to having serious problems
- The PVC alloy is the toughest of the 4 liners installed without a protective barrier
- Without question, the best lining system is a synthetic liner with a protective barrier of shotcrete.

Updates ?

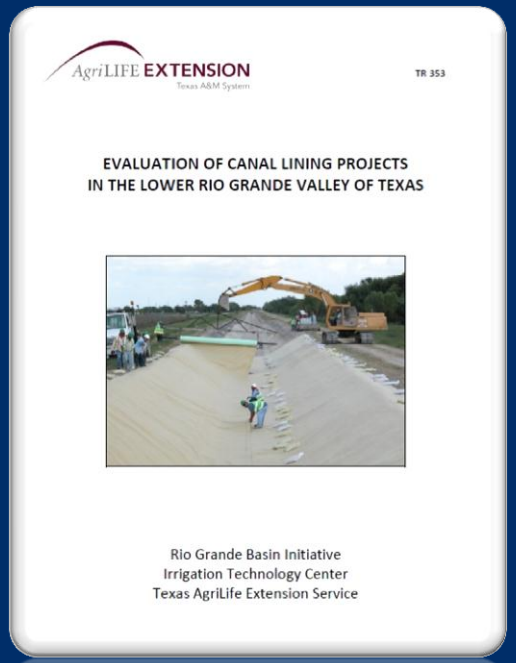
- Performed 2009-2010 inspections of old and new lining projects.
- 33 project sites, including 6 new projects
  - EPDM material in Maverick ID
  - 3 in overlaid shotcrete on existing lined section in HCID No.6

Impacts?

- 3 different EPDM materials in Adams Garden ID in collaboration with Firestone

Impacts ?

- United Irrigation District followed our recommendations and installed new project


AgriLIFE EXTENSION
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TR 353

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IN THE LOWER RIO GRANDE VALLEY OF TEXAS

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Automation and Telemetry Demonstrations

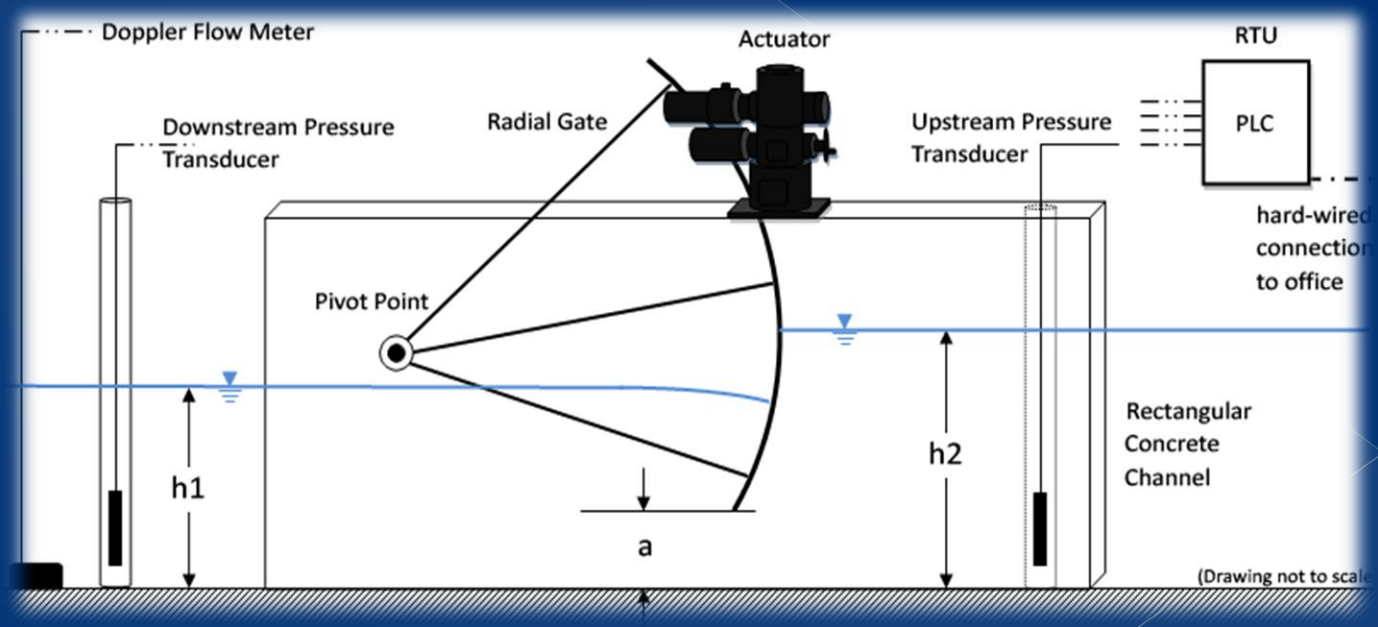
- Hidalgo County Irrigation District No.6 (HCID6)
- Cameron County Irrigation District No.6 (CCID6)
- United Irrigation District

Purpose?

- Create in-house capacity in canal operation and control concepts, and automation applications
- Demonstrate cost-effective and alternative technologies for SCADA

Purpose?

- Assist districts in designing and implementing projects which have a water conservation/management purpose
- Evaluate and advise districts on equipment/software options and other technical issues



Obstacles

- Implementation Process
  - Lack of knowledge about existing technology
  - Lack of willingness to learn/use technology based control system

Our Approach:

- Provided detailed explanations on equipment and design during the process
- Developed "easy to understand" manuals
- Provided training on control interface
- Constant reinforcement of project activities and goals


SMK

Activities

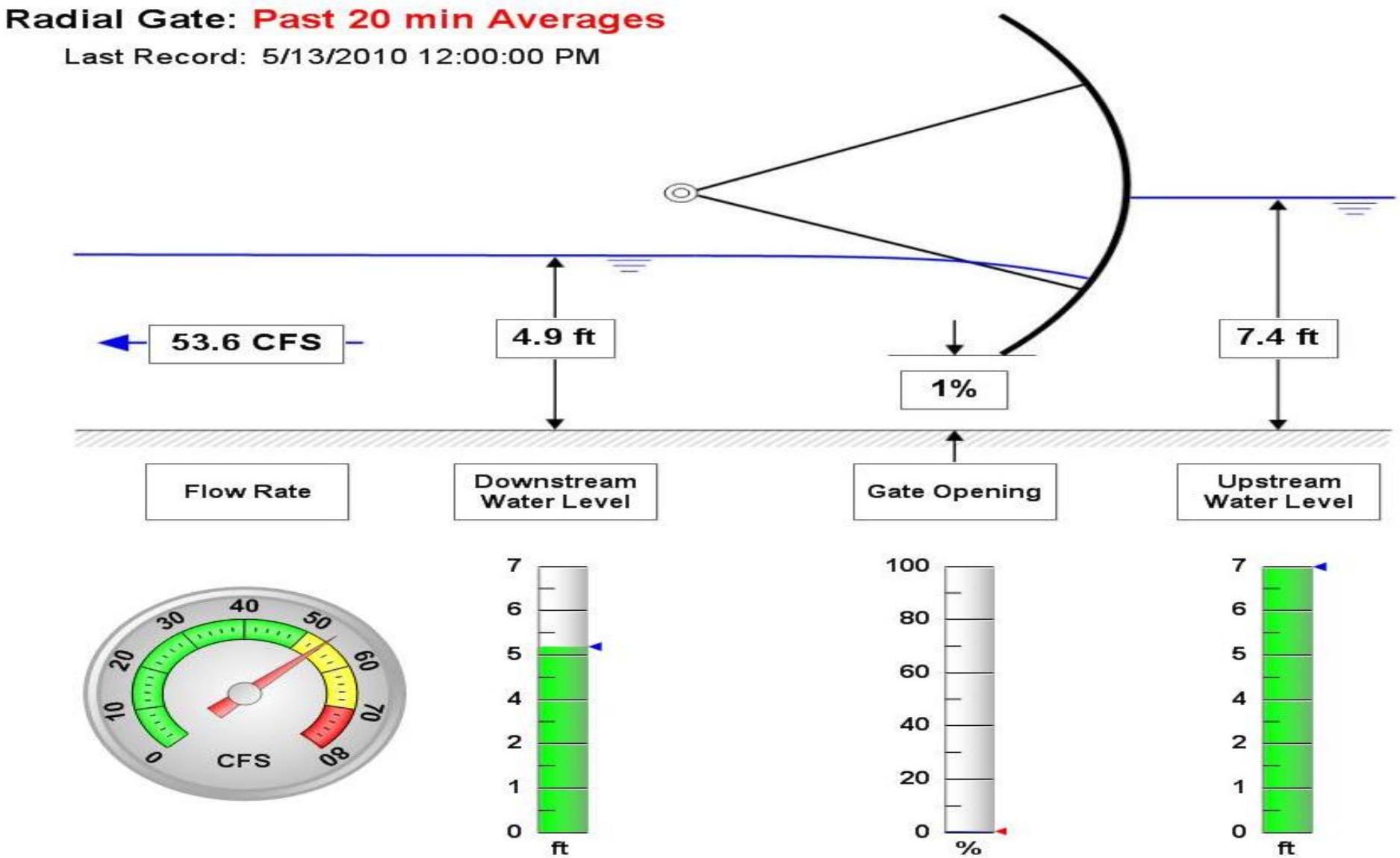
- Maintenance
- Hardware problems & replacement
- Programming changes
- Testing
- Communication systems
- Internet

United ID

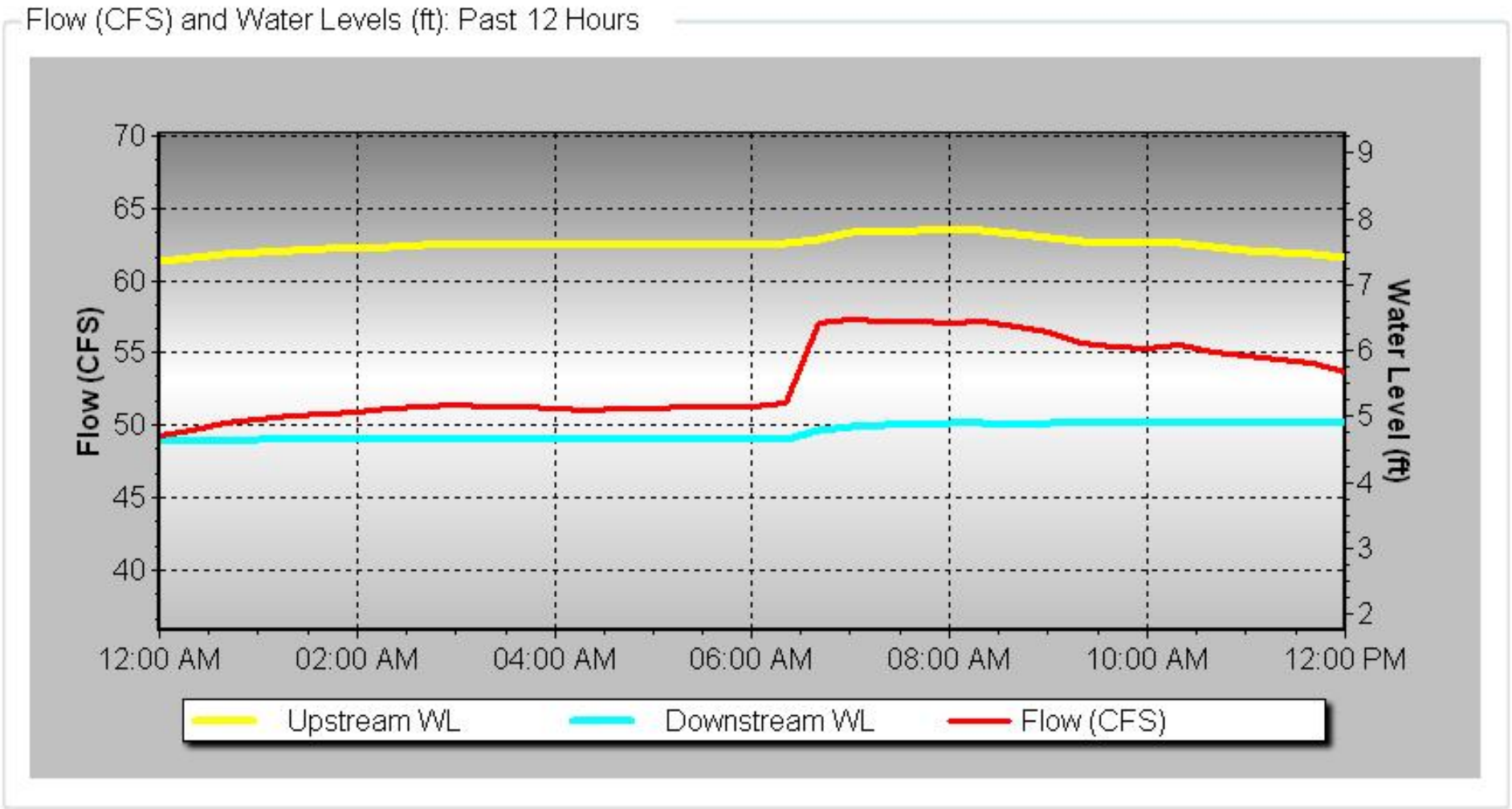
Examples:

- Continued testing due to hysteresis during radial gate operation at United
- Continued flow measurement for varying flow conditions at United
- Improvement on programming code to control the gate and monitor flow rates
- On-line access (password protected) to control and monitor SCADA projects.

District and Online Displays in United



District and Online Displays



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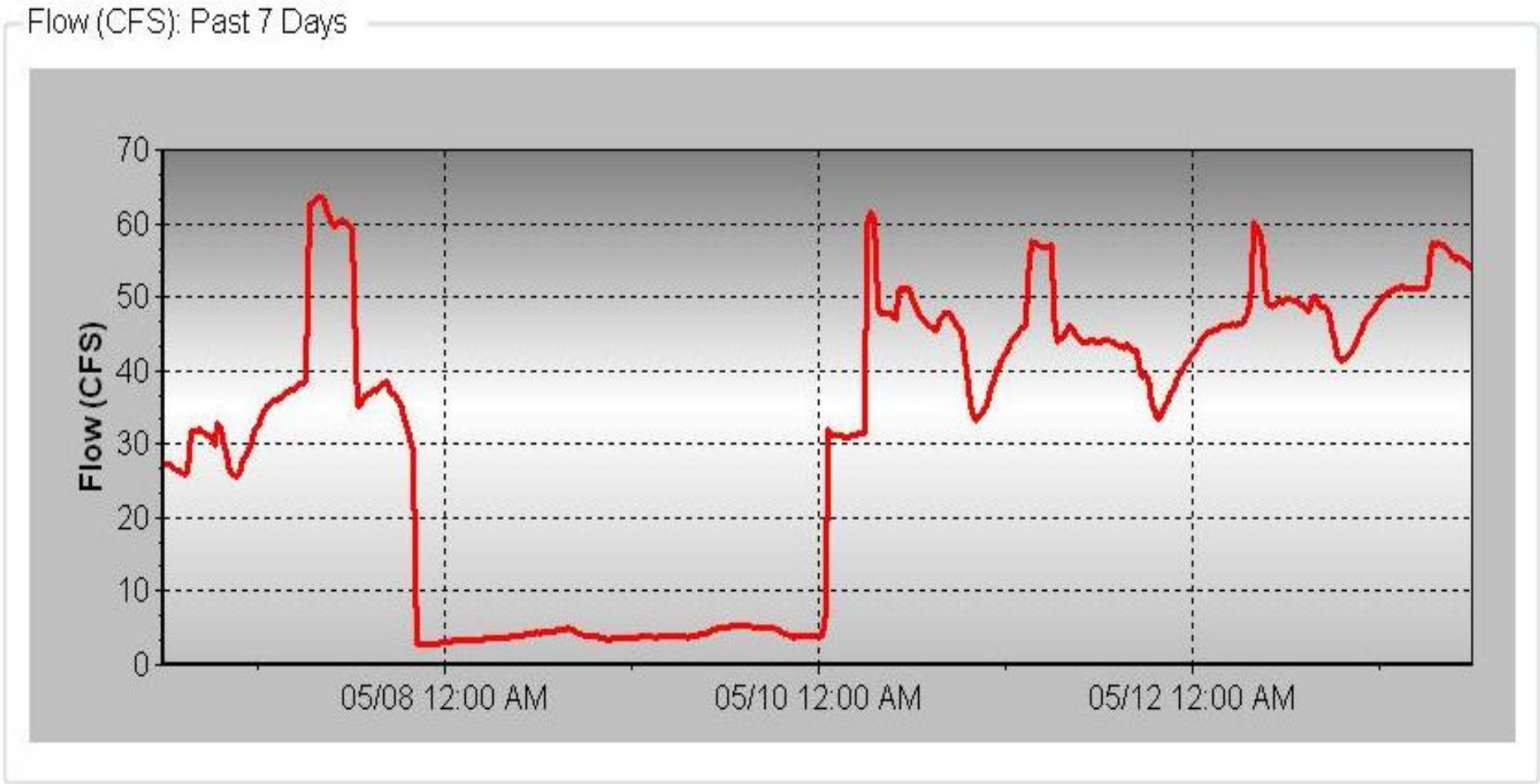


Significance?

- Accurate gate calibration is pivotal for flow calculations
- Gate is used for flow control and measurement purposes (United)
- Online & computer displays help the districts to control, operate, and make decisions

Mission 6

Examples:

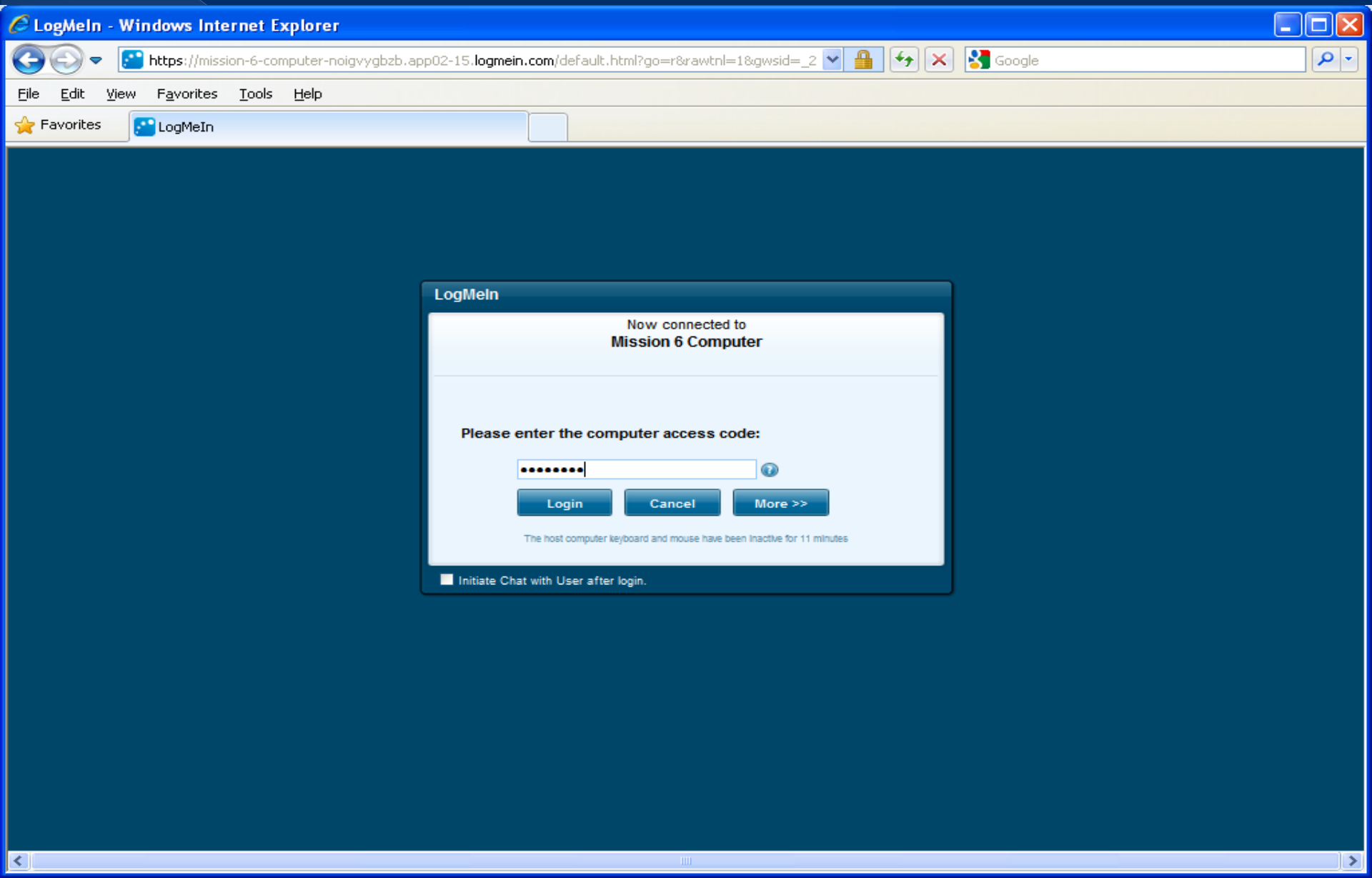
- Replacement of faulty parts in actuator
- Improvement on communication system; both radio and direct connection.
- Water level sensor and control (PLC) replacement due to lighting events in HCID No.6

Walker Lake

Significance?

- Performed operation and maintenance because district personnel lacks of knowledge and skill to do so
- Provided further guidance to HCID6 how to expand existing SCADA projects (Eagle Automation)

HCID6 Online Access



ViewX - District.Default

File Edit View Tools Insert Arrange Window Help

94%

District Lake

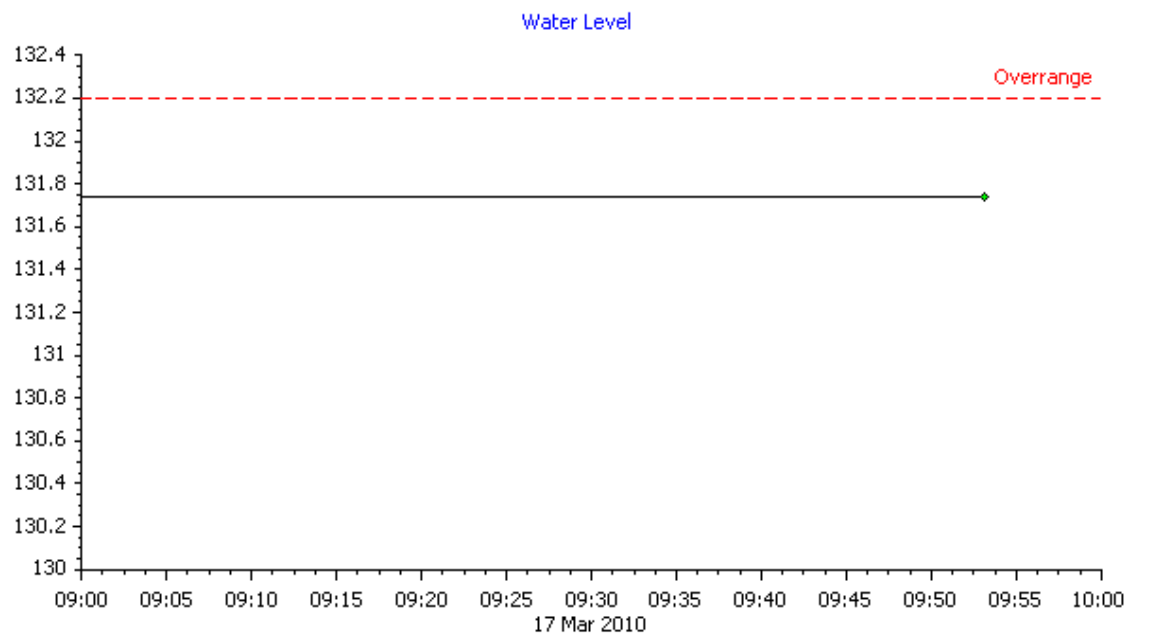
Control Type	Current Water Level	Remote Control	Communication Status
Manual	131.7 feet	0	Healthy, Multidrop

Emergency Level

132.20 feet

Gate Status

100



Trace	Type	Ruler Value
District.Current Water Level	Current	-

Main Menu

Ready mission6 Emergency.Communication Status, Refresh data request successful (3/17/2010 8:05:02

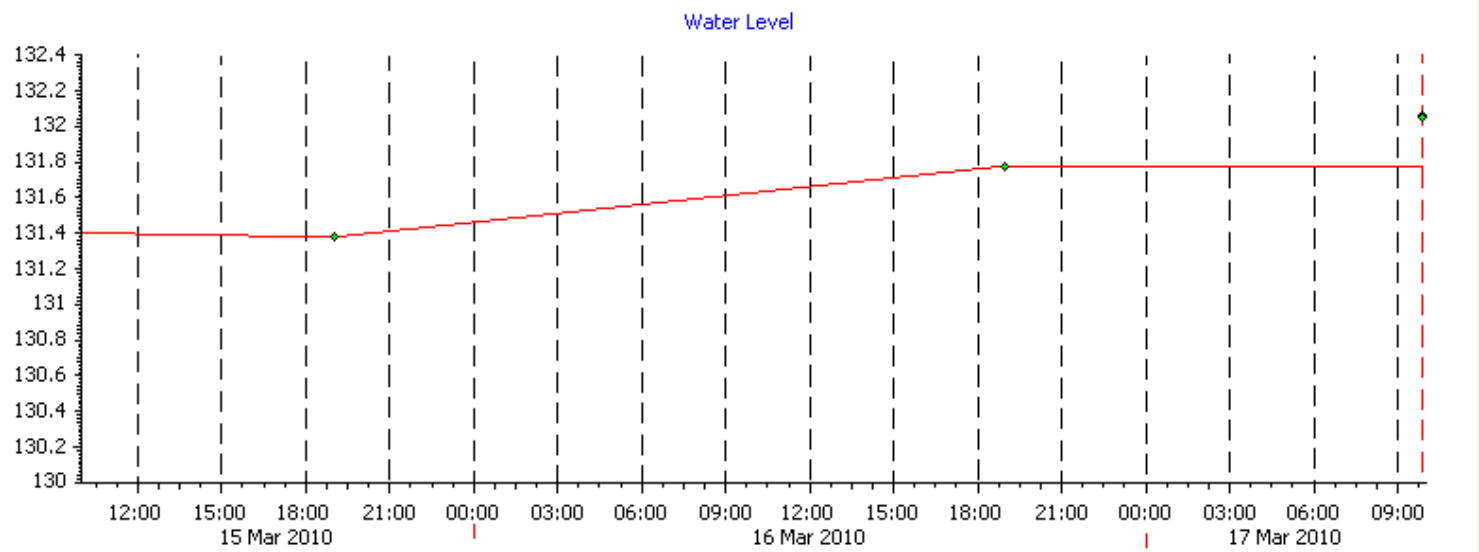
ViewX - Emergency.Default

File Edit View Tools Insert Arrange Window Help

94%

Emergency Gate

Control Type	Current Water Level	Emergency Level	Communication Status	Gate Status
Normal State	132.0 feet	132.40 feet	Healthy, Multidrop	Gate Closed



Trace	Type	Ruler Value
Emergency.Current Water Level	Current	-
Emergency.Current Water Level	Raw Historic	-

Main Menu

Ready mission6 Emergency.Communication Status, Refresh data request successful (3/17/2010 8:05:02

Weir at Los Fresnos

Significance of Automation?

- Reduces losses due to spillage
- Improves conveyance efficiency
- Improved water delivery to farm turnout which contributes to better on-farm efficiency
- Real time data at a central location for improved operation of system
- And the ability to quickly respond to changing situations

TASK 3: Institutional Incentives

- Canal Riders Training Development
- Spill Loss Research Update
- WebGIS – Brownsville

GIS as a real time decision support system in Brownsville Irrigation District

PURPOSE

- Improving pumps and water account data daily management
- Enabling growers/landowners to access personal data via Internet

ACTIVITIES

- Recommendations to improve pump flow and water sales data management
- Training and Demonstration Activity for district personnel and contractors
  - Meetings: database improvement and transfer set up
  - Demonstrations: ArcGIS Server, WebGIS pilot project
  - GIS classes to district personnel
- WebGIS Pilot Project
  - Output files format, elaboration, and transfer
  - Network communication
  - Web applications to access historic and real time data

WebGIS Pilot Project

Grower/Landowner

Brownsville Irrigation District - Grower/Landowner Map

ESRI | ESRI Support Center

Meter | Owner map | Print

Results

Map Contents

Layer
- Meter
- Unit
- Network
- Soil Survey

Background
- Owner Maps
- Annotation
- Boundaries < 22500
- Fields 2003 flat light
- Fields 2003 flat rate dark
- Fields 2003 flat rate
- Roads < 22500
- Roads > 22550
- Water Bodies
- NE_Mexico
- Aerial photograph

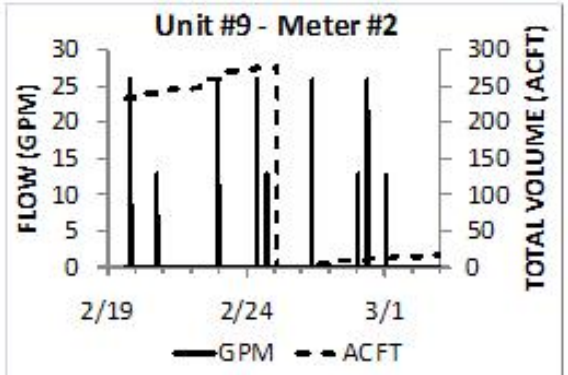
Meter: 1_Fehrenbach
- 1_Fehrenbach
- 2_Jones
- 3_Pavillon
- 4_Salado
- 5_Sandhill
- 6_Orchard_Block
- 7_North_Drive
- 8_Armstrong

PUB PUMP
Unit_1
Unit_4
Walker Gate
Unit_7
Unit_6
Booster Pump
Unit_8
Unit_11
Farmer meter
Pump Plant
TEXAS
MEXICO

The page at http://watergis.tamu.edu says:

Please enter your password:

OK | Cancel



Time	GPM	ACFT
Monday 3/8/2010 8:30	0	26

WebGIS Pilot Project

Management – Pumps Data

File Edit View History Bookmarks Tools Help

http://watergis.tamu.edu/IDB/Default.aspx

http://watergis.ta.../IDB/Default.aspx

Brownsville Irrigation District - Water Tickets Sales and Flow Meters

ESRI | ESRI Support Center | Help

Account | Owner Map | Grower Map | Unit | Print

Results

Map Contents

Unit

Unit Booster Pump

Booster Pump
PUB PUMP
Pump Plant
Unit_1
Unit_10
Unit_11
Unit_12
Unit_4
Unit_6
Unit_7
Unit_8
Unit_9
Walker Gate

- Untitled
  - pur
- Layers
  - Meters
  - Unit
  - Network
  - 2006 DEL
  - 2006 DEL
  - 2008 DEL
  - 2008 DEL
  - 2009 ORDERS (ACFT)
  - 2009 ORDERS (IN)
  - 2009 ORDERS (CROP)
  - Soil Survey
  - Urbanization
- Background
  - Owner Maps
  - Annotation
  - Fields 2003 flat rate
  - Roads < 22500
  - Roads > 22550
  - Boundaries < 22500
  - Water Bodies
  - Boundaries
  - NE_Mexico
  - Aerial photograph

PUB PUMP
0 + 28.058871 GPM
Unit_1
5694 + 28.245701 GPM
1040 + 28.245701 GPM
Walker Gate
0 + 5746 GPM
Unit_7
0 + 28.245701 GPM
Unit_6
TEXAS
0 + 28.245701 GPM
Booster Pump
5408 + 5746 GPM
Unit_8
0 + 0 GPM
Unit_11
67.638984 + 28.245701 GPM
Unit_12
Unit_10
Pump Plant
MEXICO

026 6052 9078 12104 Feet

Unit_08_Gra

Home Insert Page Layout Formulas Data Review View Developer Add-Ins

Paste Cut Copy Format Painter Clipboard

Arial 16 Font

Wrap Text Merge & Center Alignment

Custom Number

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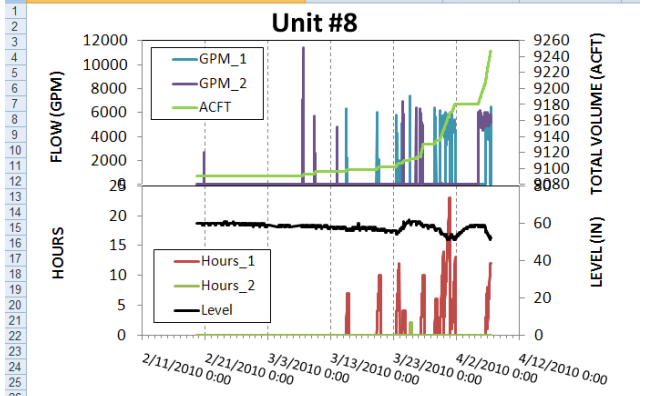


Wednesday 4/7/2010 12:15		
GPM_1	5408	Flow meter 1
GPM_2	5746	Flow meter 2
ACFT	9247	Total volume
Hours_1	12	Pump 1
Hours_2	0	Pump 2
LEVEL	52	Resaca Level

WebGIS Pilot Project

Management – Water Sales Data

Brownsville Irrigation District - Water Tickets Sales and Flow Meters

Account | Owner Map | Grower Map | Unit | Print

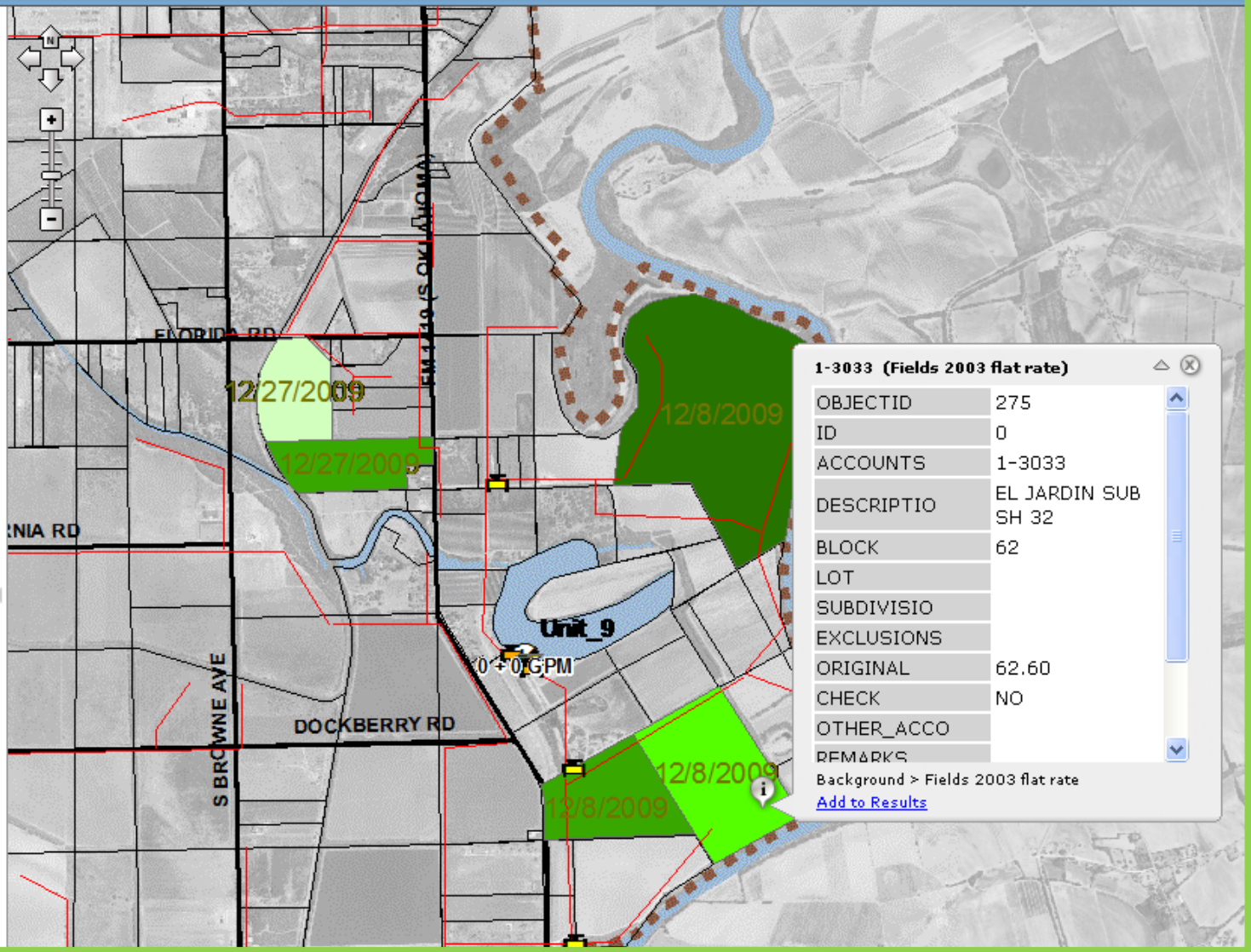
Results

Clear All

- Unit (1)
  - Unit (1)
    - Unit_8

Map Contents

- Untitled
  - pumps
- Layers
  - Meters
  - Unit
  - Network
  - 2006 DELIVERED (ACFT)
  - 2006 DELIVERED (IN)
  - 2008 DELIVERED (ACFT)
  - 2008 DELIVERED (IN)
  - 2009 ORDERS (ACFT)
    - 0 - 1
    - 1 - 5
    - 5 - 10
    - 10 - 15
    - 15 - 36
  - 2009 ORDERS (IN)
  - 2009 ORDERS (CROP)
  - Soil Survey
  - Urbanization



1-3033 (Fields 2003 flat rate)

OBJECTID	275
ID	0
ACCOUNTS	1-3033
DESCRIPTIO	EL JARDIN SUB SH 32
BLOCK	62
LOT	
SUBDIVISIO	
EXCLUSIONS	
ORIGINAL	62.60
CHECK	NO
OTHER_ACCO	
REMARKS	

Background > Fields 2003 flat rate

Add to Results

WebGIS Pilot Project

Management – Historic Data

Water GIS @ TAMU.EDU - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://watergis.tamu.edu/index_IDB_download.html

Water GIS @ TAMU.EDU

Water GIS - BROWNSVILLE IRRIGATION DISTRICT

DATABASE DOWNLOAD

Tickets:

2006
2008
2009

Pump Units:

2009: 1,2,4,5,6,7,8,9,10,11,12

Pump Units (Landowners Unit9):

2009: 1(Fehrenbach),2(Jones),3(Pavillon),4(Salad

water_2008_mod_WEB.xls [Read-Only] [Compatibility Mode] - Microsof

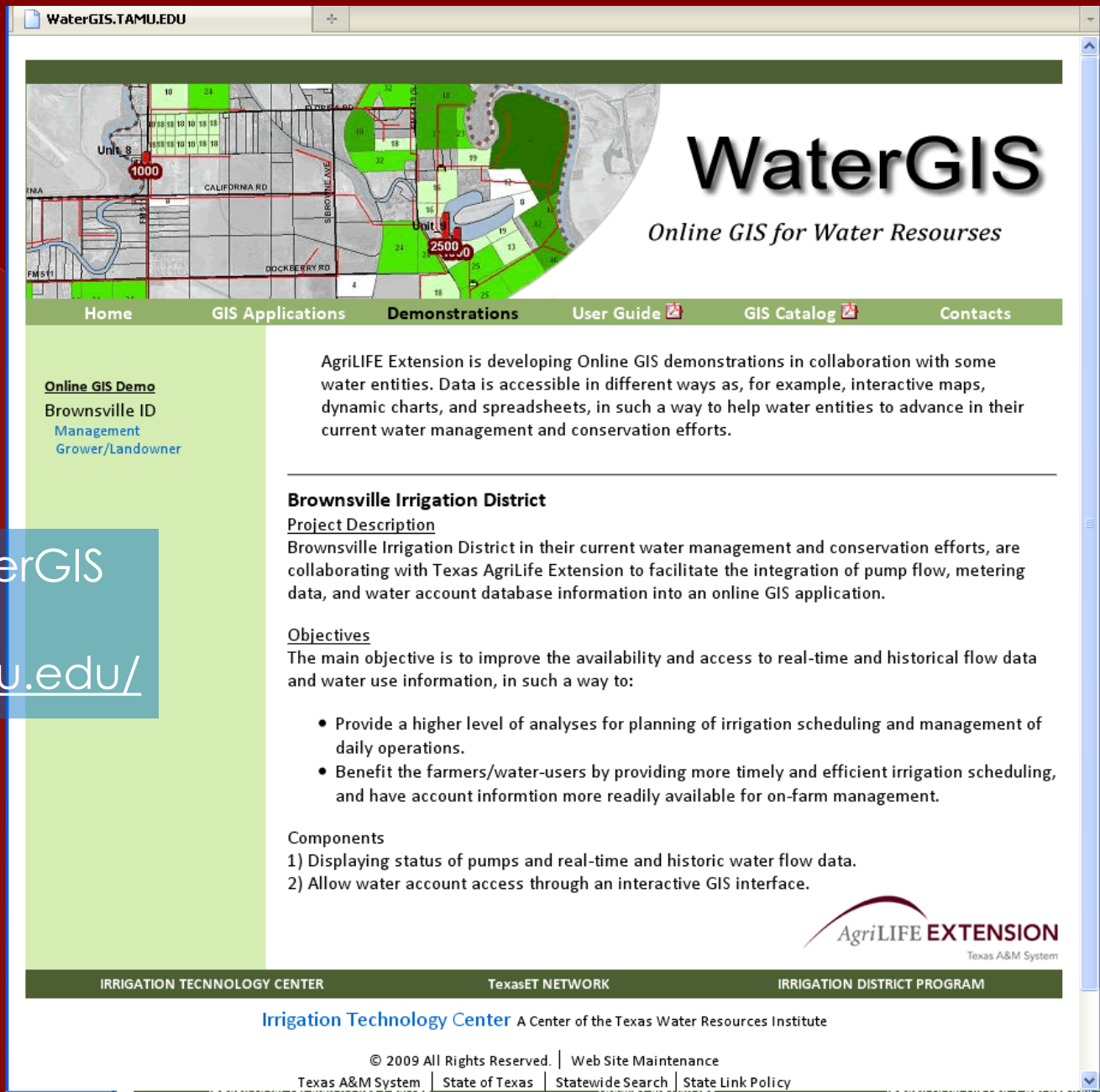
Home Insert Page Layout Formulas Data Review View Developer Add-Ins

R9

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	ACCOUNTS	GROWER1	GROWER	OWNER	SUB	BLK	LOT	NET_ACRES1	NET_ACRES	CROP1	CROP	INCHES	ACFT	DATE
2	1_404	3	*****	*****	DIX INDUSTRIES SUB	1	2	9.545	9	SB	SOY BEAN	6	4.49982	2/15/2008
3	1_404	3	*****	*****	DIX INDUSTRIES SUB	1	2	9.545	9	SB	SOY BEAN	6	4.49982	3/24/2008
4	1_404	3	*****	*****	DIX INDUSTRIES SUB	1	2	9.545	9	SB	SOY BEAN	5	3.74985	4/14/2008
5	1_404	3	*****	*****	DIX INDUSTRIES SUB	1	2	9.545	9	SB	SOY BEAN	5	3.74985	5/12/2008
6	1_566	3	*****	*****	LANE TRACT NO 1		1	5.365	3	SB	SOY BEAN	6	1.49994	2/15/2008
7	1_566	3	*****	*****	LANE TRACT NO 1		1	5.365	3	SB	SOY BEAN	6	1.49994	3/20/2008
8	1_566	3	*****	*****	LANE TRACT NO 1		1	5.365	3	SB	SOY BEAN	6	1.49994	4/11/2008
9	1_2033	3	*****	*****	PALM PARK-201	201	5	7.46	9	WH	WHEAT	8	5.99976	2/12/2008
10	1_2033	3	*****	*****	PALM PARK-201	201	5	7.46	9	SB	SOY BEAN	6	4.49982	6/16/2008
11	1_2033	3	*****	*****	PALM PARK-201	201	5	7.46	9	SB	SOY BEAN	6	4.49982	8/11/2008
12	1_2034	3	*****	*****	PALM PARK-201	201	6	12.49	9	WH	WHEAT	8	5.99976	2/12/2008
13	1_2034	3	*****	*****	PALM PARK-201	201	6	12.49	9	SB	SOY BEAN	6	4.49982	6/16/2008
14	1_2034	3	*****	*****	PALM PARK-201	201	6	12.49	9	SB	SOY BEAN	6	4.49982	8/11/2008
15	1_2046	3	*****	*****	PALM PARK-201	201	14	6.64	8	WH	WHEAT	8	5.33312	2/12/2008
16	1_2046	3	*****	*****	PALM PARK-201	201	14	6.64	2	WH	WHEAT	8	1.33328	2/20/2008
17	1_2046	3	*****	*****	PALM PARK-201	201	14	6.64	8	SB	SOY BEAN	6	3.99984	6/16/2008
18	1_2046	3	*****	*****	PALM PARK-201	201	14	6.64	2	SB	SOY BEAN	6	0.99996	6/16/2008
19	1_2046	3	*****	*****	PALM PARK-201	201	14	6.64	8	SB	SOY BEAN	6	3.99984	8/11/2008
20	1_2046	3	*****	*****	PALM PARK-201	201	14	6.64	2	SB	SOY BEAN	6	0.99996	8/11/2008
21	1_2047	3	*****	*****	PALM PARK-201	201	15	6.47	4	WH	WHEAT	8	2.66656	2/12/2008
22	1_2047	3	*****	*****	PALM PARK-201	201	15	6.47	5	WH	WHEAT	8	3.3332	2/20/2008
23	1_2047	3	*****	*****	PALM PARK-201	201	15	6.47	4	SB	SOY BEAN	6	1.99992	6/16/2008
24	1_2047	3	*****	*****	PALM PARK-201	201	15	6.47	5	SB	SOY BEAN	6	2.4999	6/16/2008
25	1_2047	3	*****	*****	PALM PARK-201	201	15	6.47	4	SB	SOY BEAN	6	1.99992	8/11/2008
26	1_2047	3	*****	*****	PALM PARK-201	201	15	6.47	5	SB	SOY BEAN	6	2.4999	8/11/2008
27	1_2304	3	*****	*****	PALM PARK-301	301	1	7.97	3	WH	WHEAT	8	1.99992	2/12/2008
28	1_2304	3	*****	*****	PALM PARK-301	301	1	7.97	10	WH	WHEAT	8	6.6664	2/20/2008
29	1_2304	3	*****	*****	PALM PARK-301	301	1	7.97	3	SB	SOY BEAN	6	1.49994	6/16/2008
30	1_2304	3	*****	*****	PALM PARK-301	301	1	7.97	10	SB	SOY BEAN	6	4.9998	6/16/2008

WebGIS Pilot Project

Authorized the WaterGIS website http://watergis.tamu.edu/



DISCUSSION

- Initial interest after demonstrations is promising, an evaluation from the Brownsville Irrigation District personnel is needed after a period of testing
- Design and maintenance of district databases should be done to allow easy updating of the system

Significance?

Saving water & time through:

- Improving pump and water account data daily management
  - Daily up-to-dated maps to improve water order planning and delivery
  - Provides better access for evaluation and analysis of historically data for improved efficiency
- Enabling growers/landowners to access personal data via Internet
  - Online irrigation (meter) readings
  - Updated water account information

Technical Assistance: GIS

PURPOSE

- Assist the District in their efforts in updating their GIS
- Interactions with consultants
- Create a standardized GIS database structure for irrigation districts

Hidalgo County Irrigation District #6 Database/GIS Integration

ACTIVITIES

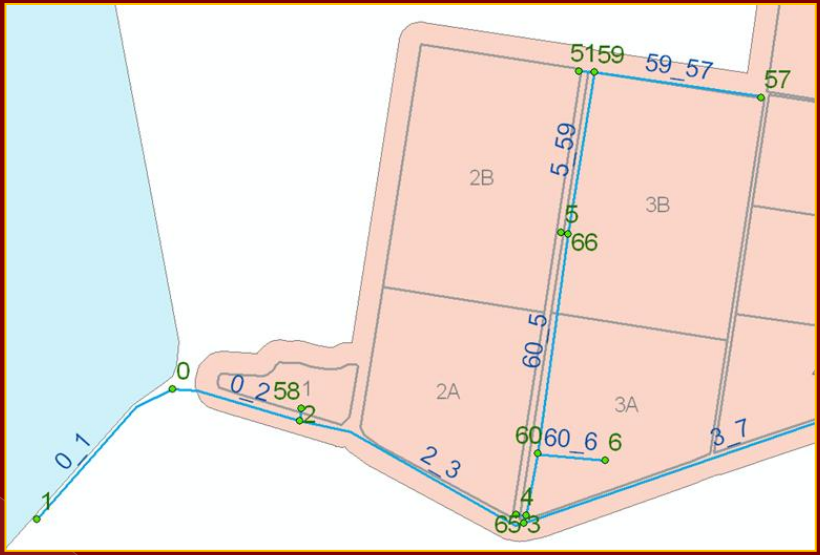
- Analysis of water account database
- Key missing data have been identified

legal parcels paying flat rate
recently irrigated parcels
25% of legal parcels have multiple and not identified water accounts

Delta Lake Irrigation District GIS Update Project Assistance

ACTIVITIES

- Provided recommendations
  - Categories of information
    - DISTRICT BOUNDARY
    - STORAGE AREA
    - IRRIGATION SUBAREA
    - IRRIGATION FIELD
    - SEGMENT OF CONVEYANCE SYSTEM
    - NODES OF CONVEYANCE SYSTEM
    - CROSS SECTION AND SURVEY POINT
    - OTHER NODE
  - Detailed information and organization into shapes and tables (e.g. Nodes):
    - PUMP/RE LIFT STATION
    - SIPHON
    - WEIR/FLUME
    - DIVERSION GATE
    - STANDPIPE
    - VALVE
    - BEGINNING OF SEGMENT
    - END OF SEGMENT



Canal Riders Training Development

PURPOSE

- Improve knowledge of district operation, understanding of basic concepts (maintenance, gates, priorities)
- Improvement in conserve water, timely irrigation, improve performances

Why?

- Low education levels and limited English skills
- High turnover rate due to limited to no in-district training

ACTIVITIES

- Set up of a Canal Rider Questionnaire
- Interviewed canal riders, supervisors and managers
- Training class set up
  - Overall goal: train the new canal rider and reinforce the knowledge of the experience canal rider
  - Outlines:
    - Section I. : General Description and Responsibilities of Canal Riders 1 Hour (lecture & Handouts)
    - Section II. : Basic Terminology
    - Section III. : Basic Hydrology (Visual Examples)
    - Section IV. : Basic Conveyance System and Structures
    - Section V. : Understanding the Importance of Canal Management
    - Section VI. : Common Practices and Issues
    - Section VII. : Basic Form Filling and Reporting Techniques

Spill Data Analysis in Hidalgo and Cameron County Irrigation District No.9 (In progress)

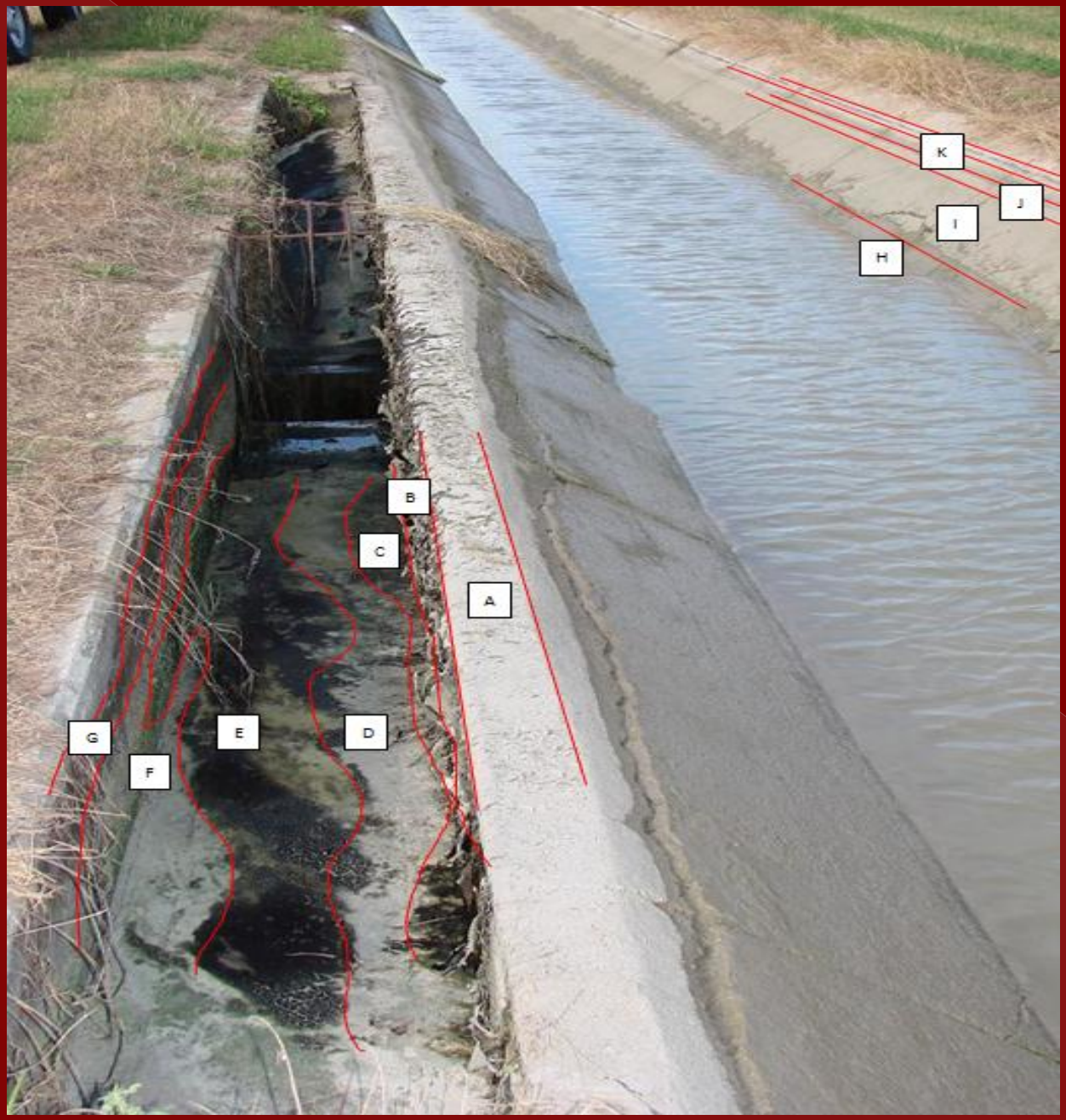
PURPOSE

- Development of a Rapid Assessment Tool (RAT) to identify major spill structures
- Development recommendations for operational parameters

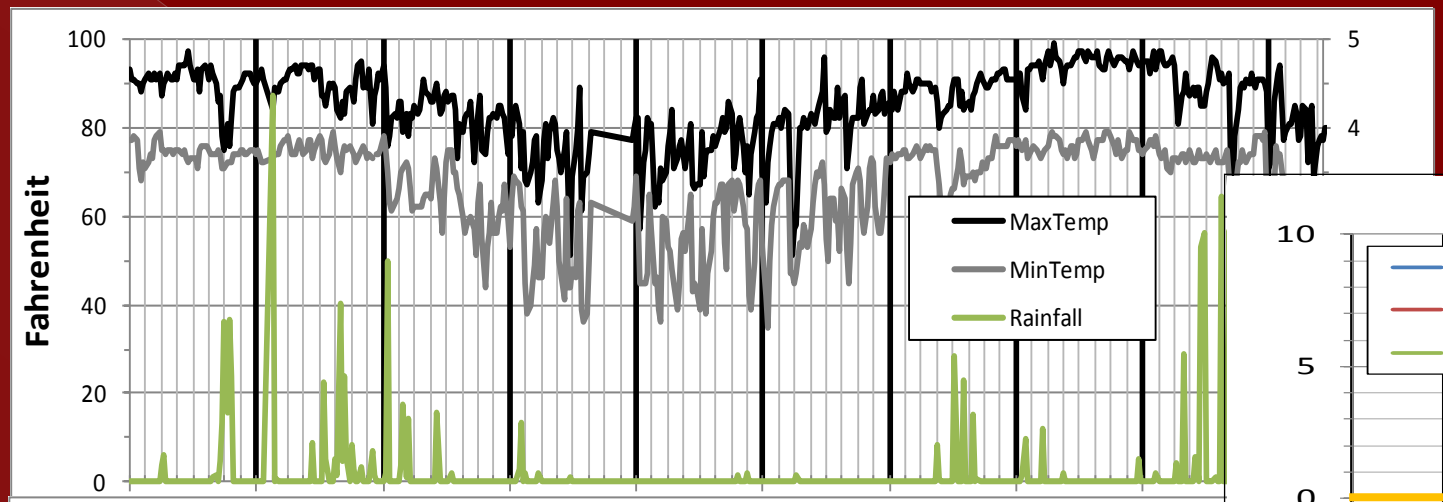
ACTIVITIES

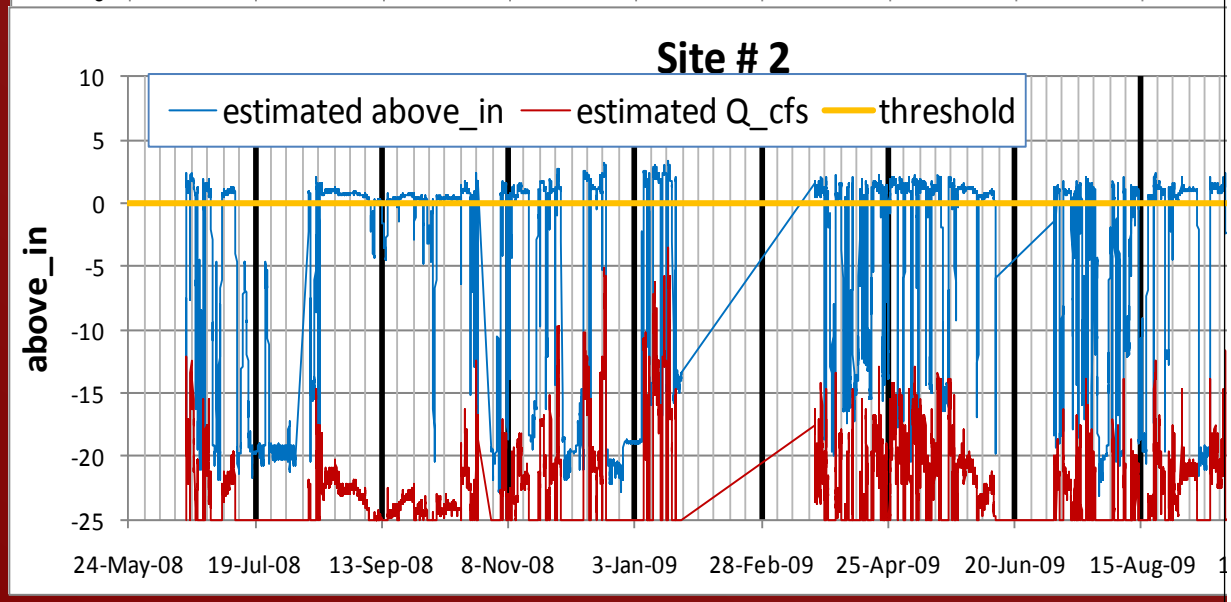
- Analysis of measured water level at 3 sites (6/2008 - 9/2009)
- Collection of new parameters as possible indicators of frequency and magnitude of water losses
  - Algae classification with University of Texas Pan American, Edinburg
  - Water sales

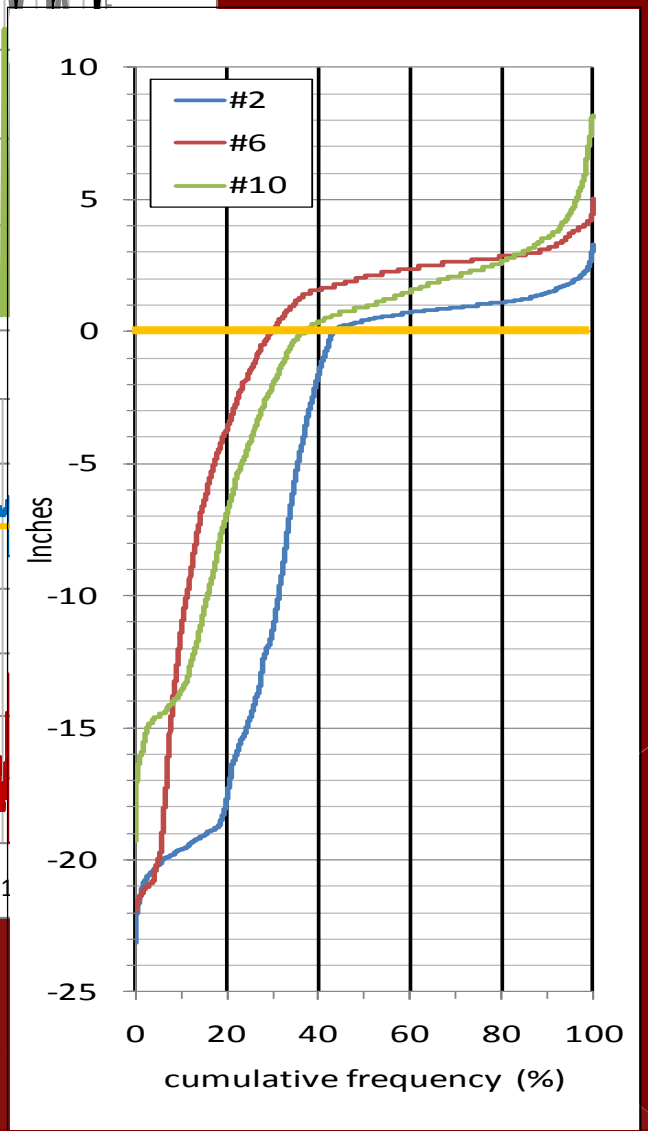
New possible indicators (water sales, algae classification):



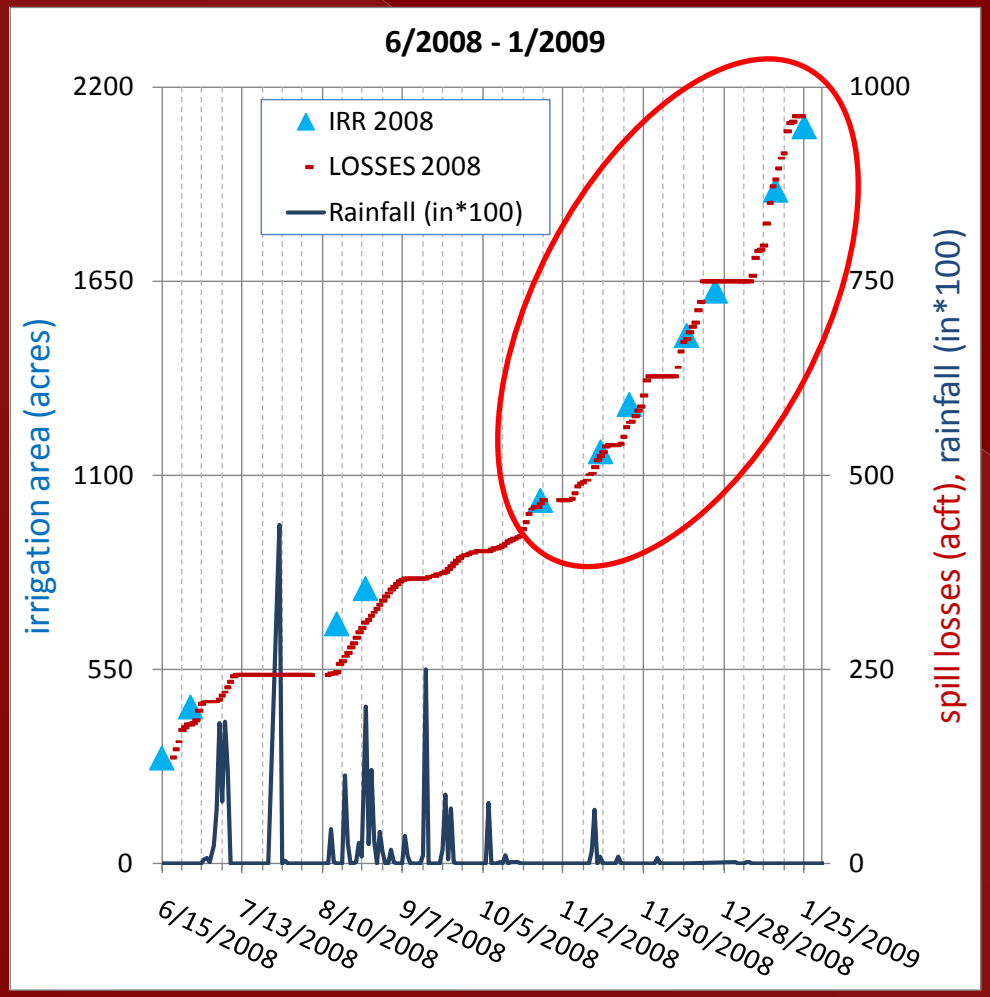
Results of water level analysis:

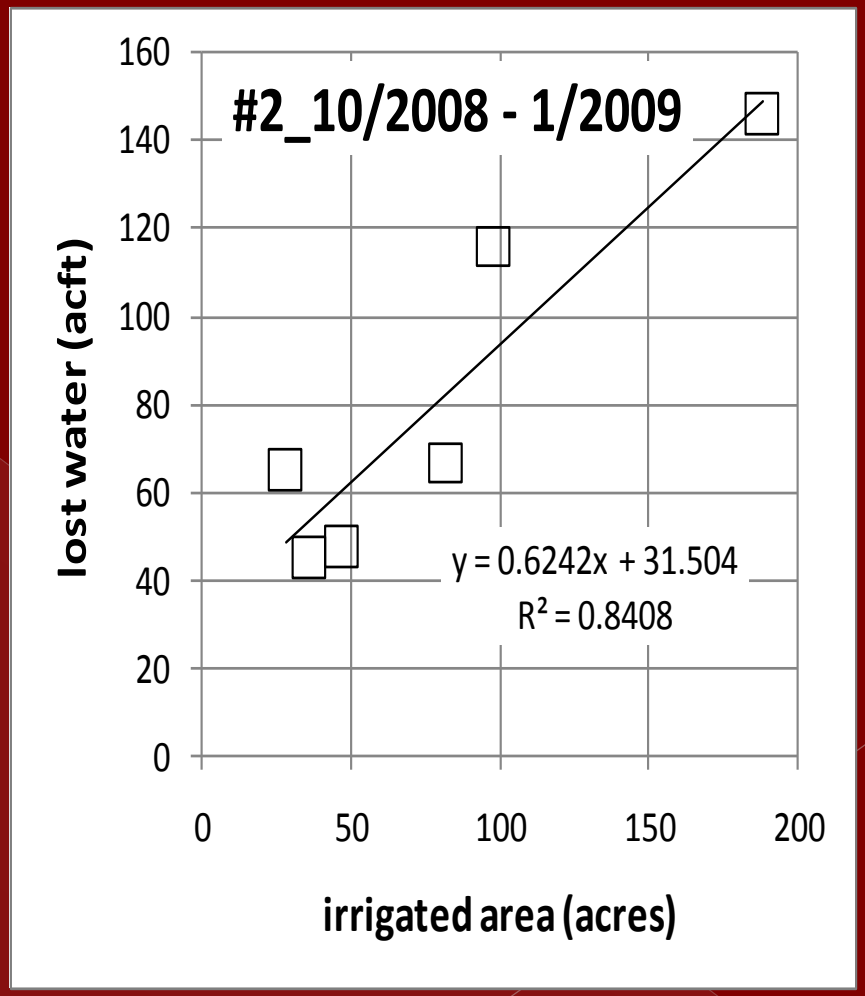




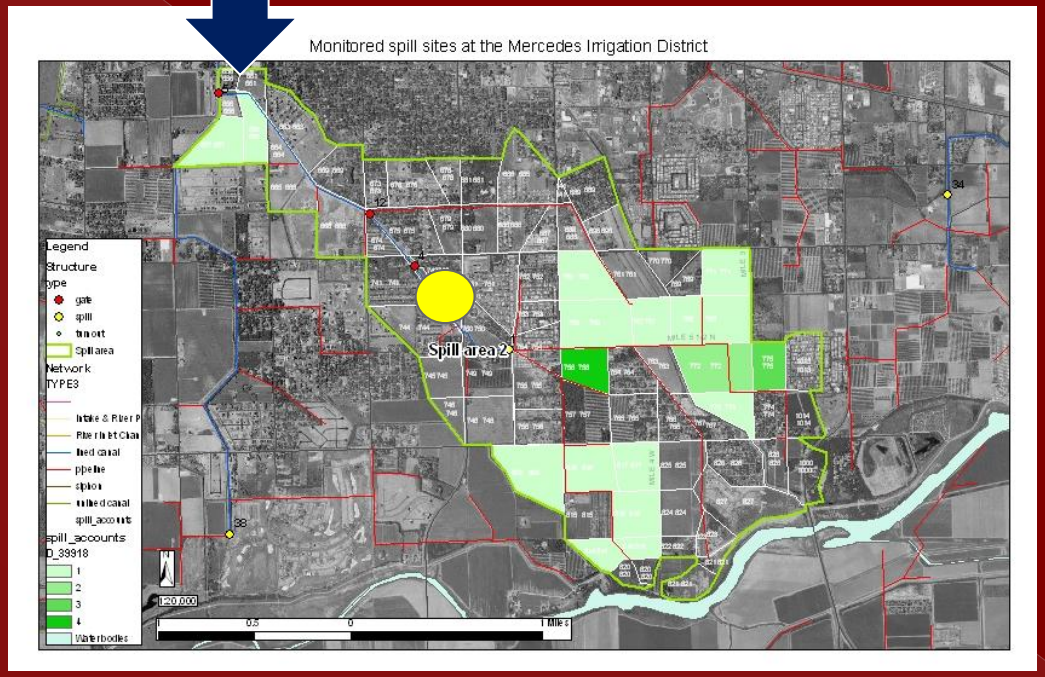


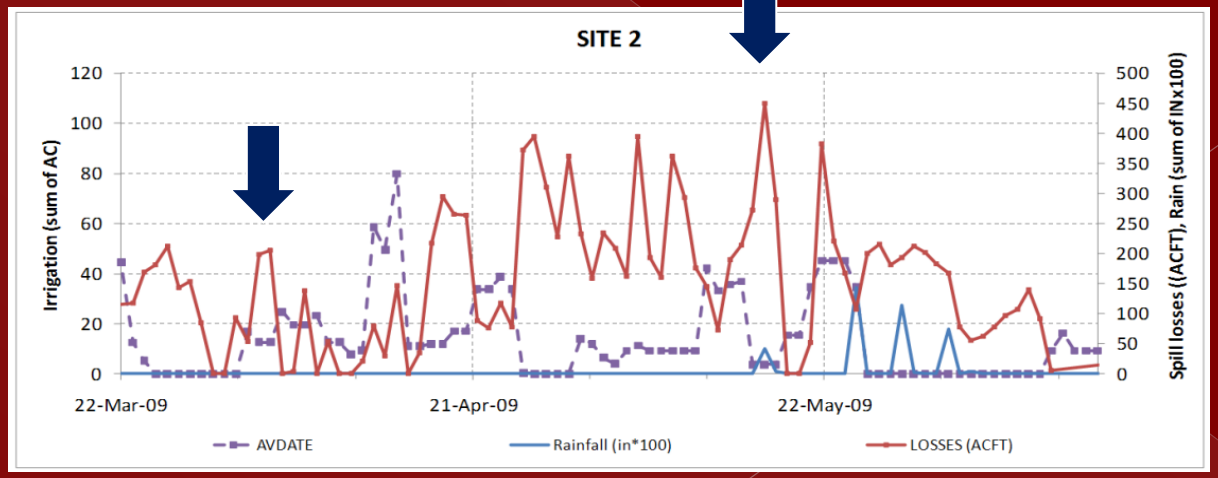
Correlation between water losses and irrigation:





Identification of key water sales:





CONCLUSIONS

- Promising correlation between observed parameters
- Estimate water losses that occur from spill losses

SIGNIFICANCE

- Allow Districts to quickly to identify and correct operational problems based on spill loss indictors to reduce water losses

On-farm/Distribution Network Management/Integration (In progress)

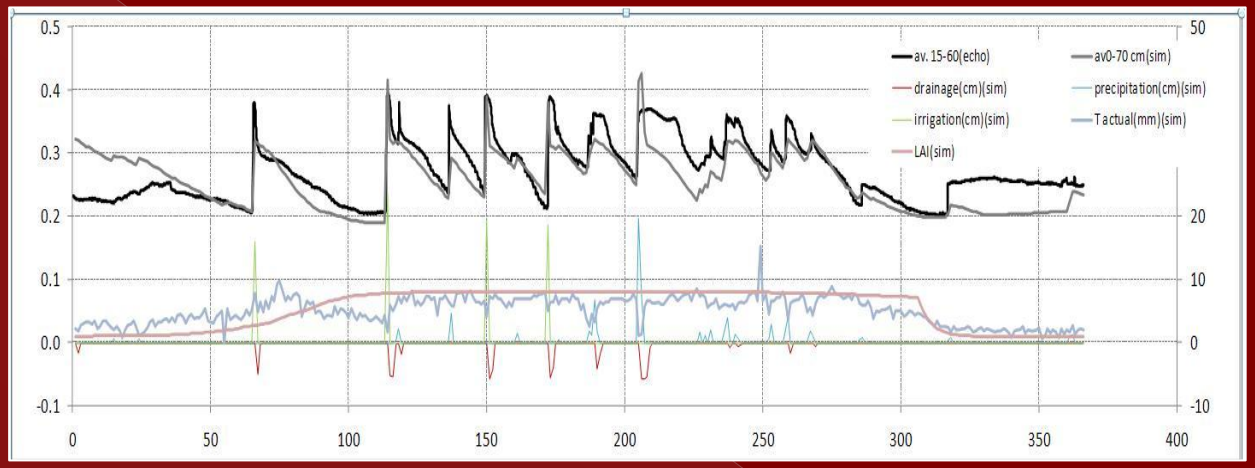
PURPOSE

- Evaluate the CRITERIA crop model for water balance simulation
- Create maps of predicted water needs to help the canal rider plan the water distribution operations

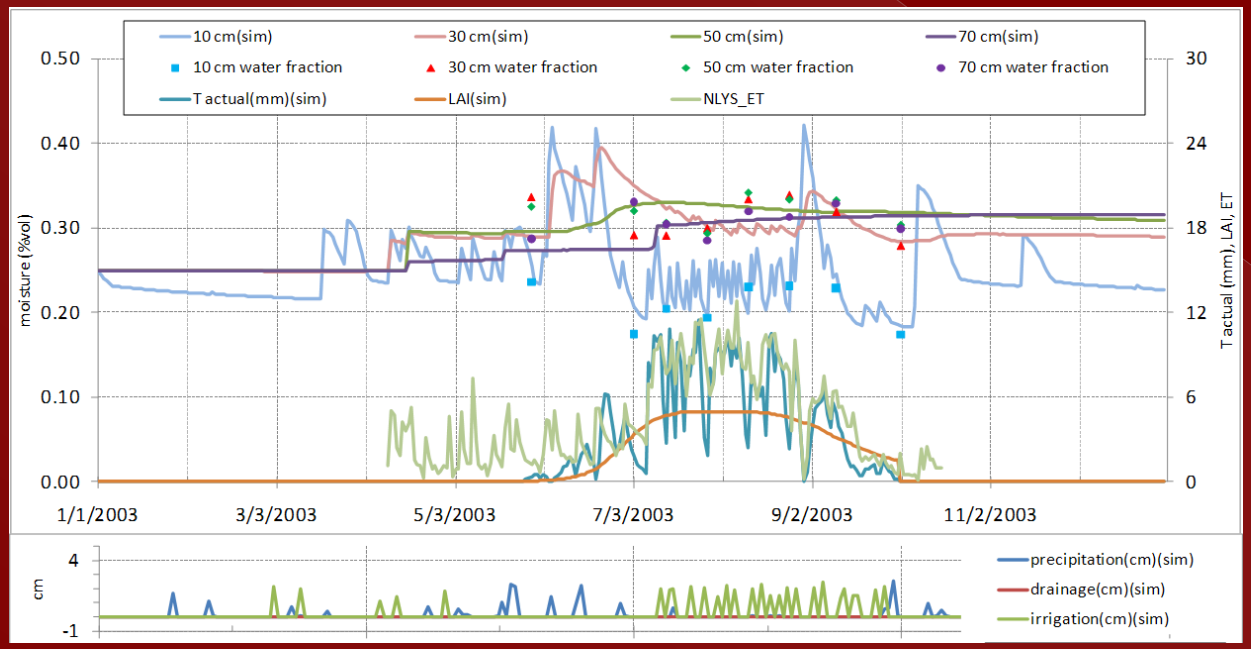
ACTIVITIES

- Testing of the CRITERIA crop model
  - Comparison of predicted and observed soil moisture for individual fields
  - Prediction of water needs at district level
- Collection of additional field data
  - Collection of core soil samples
  - Laboratory analysis of soil hydraulic properties (K sat, water content at saturation, FC, and WP)

AgriLife Research, Weslaco, TX, Delta Lake I.D.

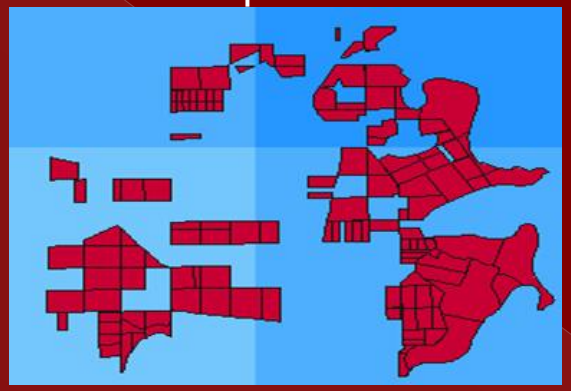


USDA-ARS laboratory, Bushland, TX

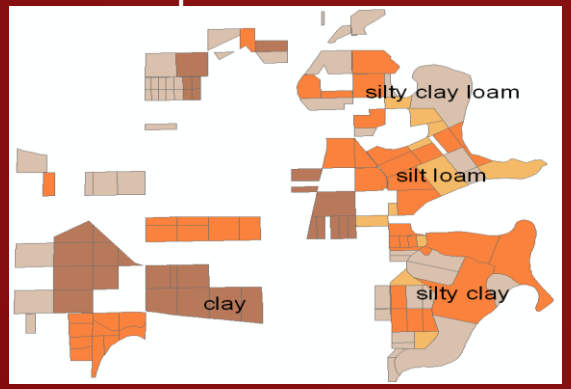


Brownsville I.D., TX

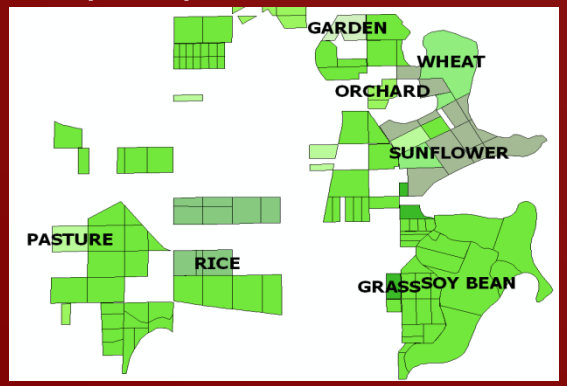
Rainfall map



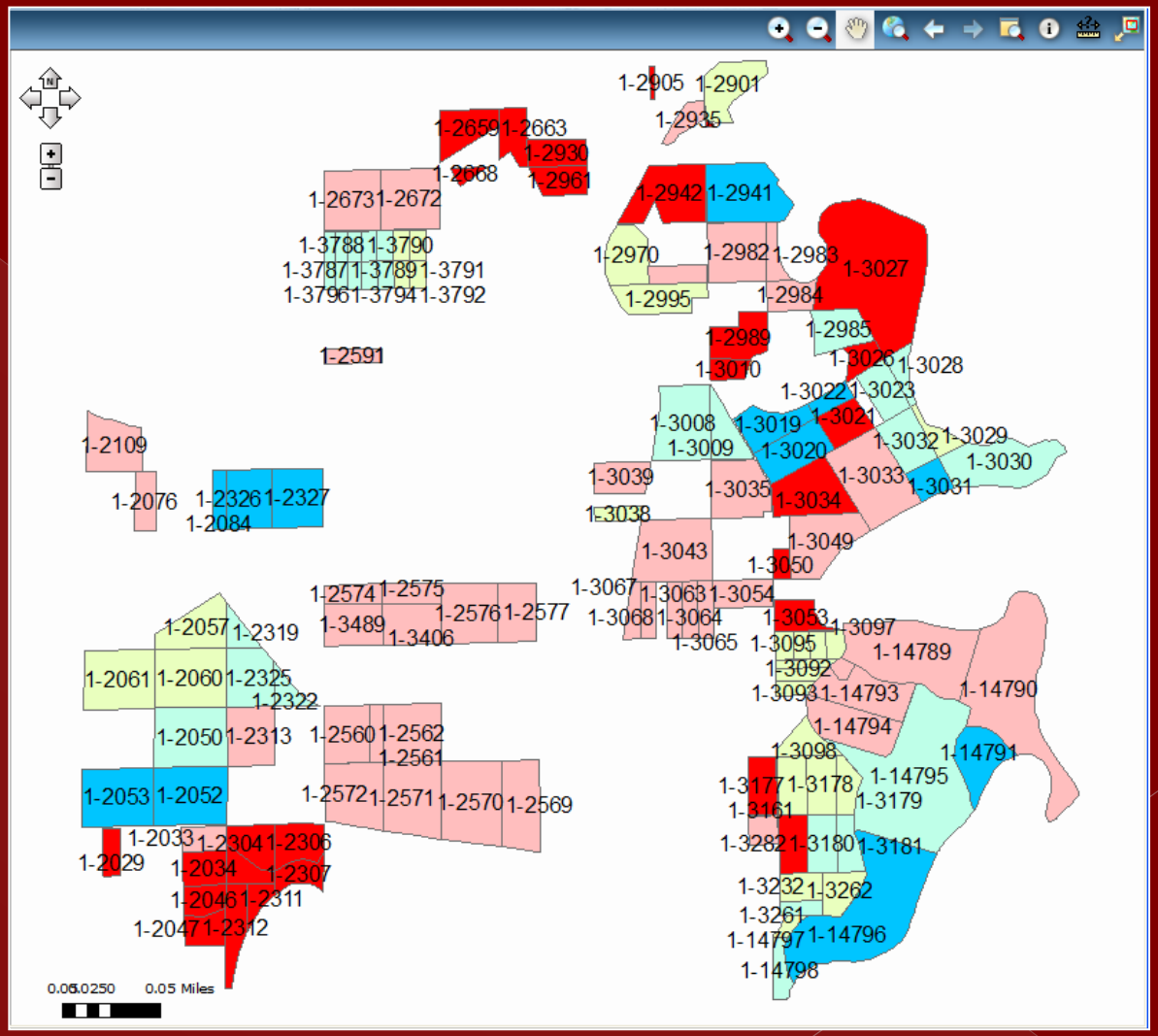
Soil map



Crop map



Estimated soil moisture April 24th



CONCLUSIONS

- Promising results for individual fields with detailed observed data
- District personnel expressed interest for soil moisture maps to help the daily water distribution operation, but there are some key data missing:
  - Local rainfall
  - Some crop management information (planting and harvesting date, exact irrigation timing)

SIGNIFICANCE

- Help Districts forecast on-farm irrigation needs and planning operational activities

Irrigation District Engineering and Assistance

http://idea.tamu.edu