

On-Farm Water Management Survey and Tile Drainage Decisions

Portage Workshop
Portage la Prairie
March 14 & 15, 2006

Acknowledgements

- Keystone Vegetable Producers Association
- Prairie Farm Rehabilitation Administration
- Participating Producers

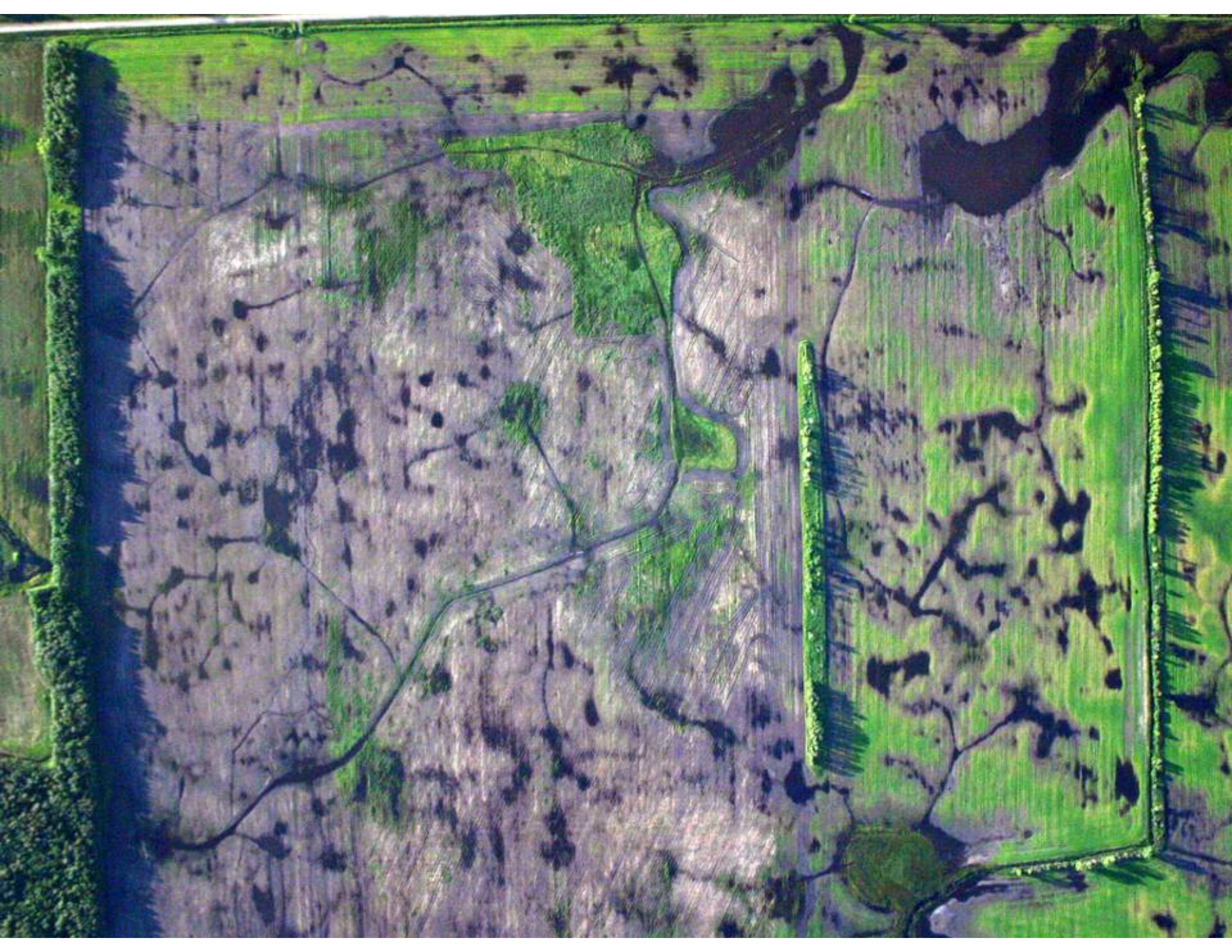
Why a Water Management Survey?

- Summer of 2005 an extreme event
- Water table extremes - never seen before
- Back Flooding of large areas
- Keystone Vegetable Producers Association fly Infrared photos
- Large destruction of specialty crops
- Start discussion of risk management
- View the performance of existing tile drainage systems
- Look at future limitations to tile development









Survey Goals and Objectives

- Objectives
 1. Provide an overview of the decision making process for improving on-farm drainage
 2. Examine the payback period
 3. Review the major issues of future development for on-farm tile

On Farm Water Management

- The Questionnaire
 - Water Management Decision Process
 - Soil Landscape Features
 - Drainage Design
 - Effectiveness of Tile Drainage
 - Comments

Tile Decision Answers

- Producer answers vary across the Province
- Select producer profiles look at different regions

Producer - Carman Area

- Tiles installed in the 90's
- Tile spacings
 - 6@75'
 - 4@100'
 - 2@200'
 - 3@66'
- Area drained – 123 acres
- Soil Series - Graysville, Reinland, Rosebank
- Outlet – reservoir, pumped to ditch (ditch improvement by owner for 1 mile)
- Drains start running in April until drained
- 2005 tile drains ran until after December 10th

Soil Series Drained

- Graysville
 - Top 60-90 cm loamy (VFSL,L, SiL, SiCL)
 - Hydraulic conductivity 0.6-2.0 in/hr
 - Over C to SiC
 - <0.06 in/hr. in clay
- Reinland
 - Deep Coarse Loamy (LVFS, VFS, FSL, SL)
 - Hydraulic Conductivity 2.5-3.0 in/hr
- Rosebank
 - Thin (25-100cm) coarse loamy (LVFS, VFS, FSL) over clayey lacustrine (SiC, C)
 - Hydraulic Conductivity 2.0-4.0 in/hr in surface and <0.06 in/hr in clay

Survey Analysis

- Surface drainage a must to start
- Payback period on rotation of wheat and corn can be long but benefits are there every year for yield and quality
 - did it as money was available
- DC ¼", 1 meter depth. Variable spacing 66' to 200'. The 200' was too wide. 50' seemed too tight.
- Tiles installed to solve drought induced by shallow root system
- Municipal drainage is inadequate, deepened 1 mile of ditch at own expense

2005 Performance

- Pump unable to keep up for close to a week (100gpm)
- Yield maps indicate 15 bu difference on tile vs non tile and harvestability is not an issue
- Acreage lost to drown out in 2005
 - In tiled fields 3 acres, some reduced yield areas
 - In non tiled fields, close to a write off
- Limitations to further developments
 - Outlets (underground to creek, needs caveat)

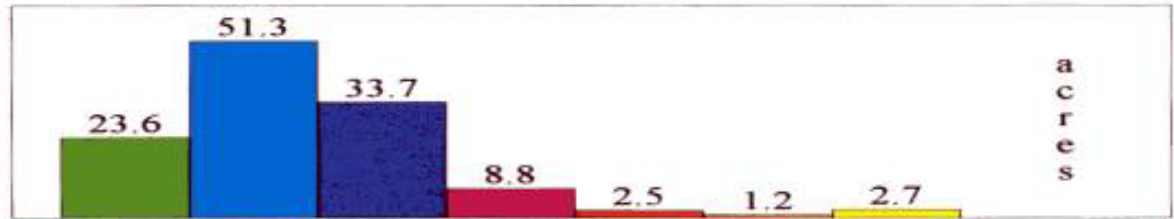
Field: FIELD 11

Harvested Acres: 123.73
Date: 12/10/2002-29/10/2002
Yield: 121.56 bpa
Moisture: 23.91%
Harvest Hours: 15.73

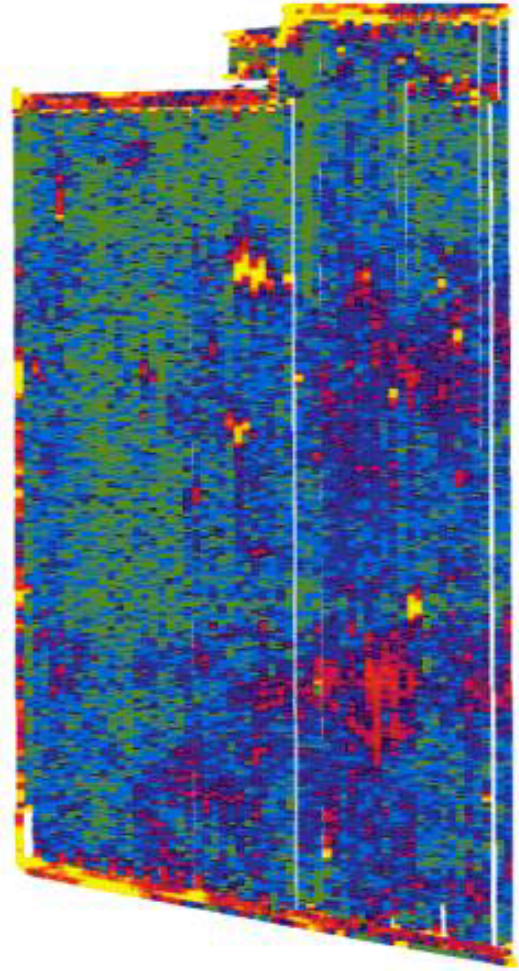
GREENSTAR™
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110.00 - 119.99
100.00 - 109.99

less than 80.00



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300 feet

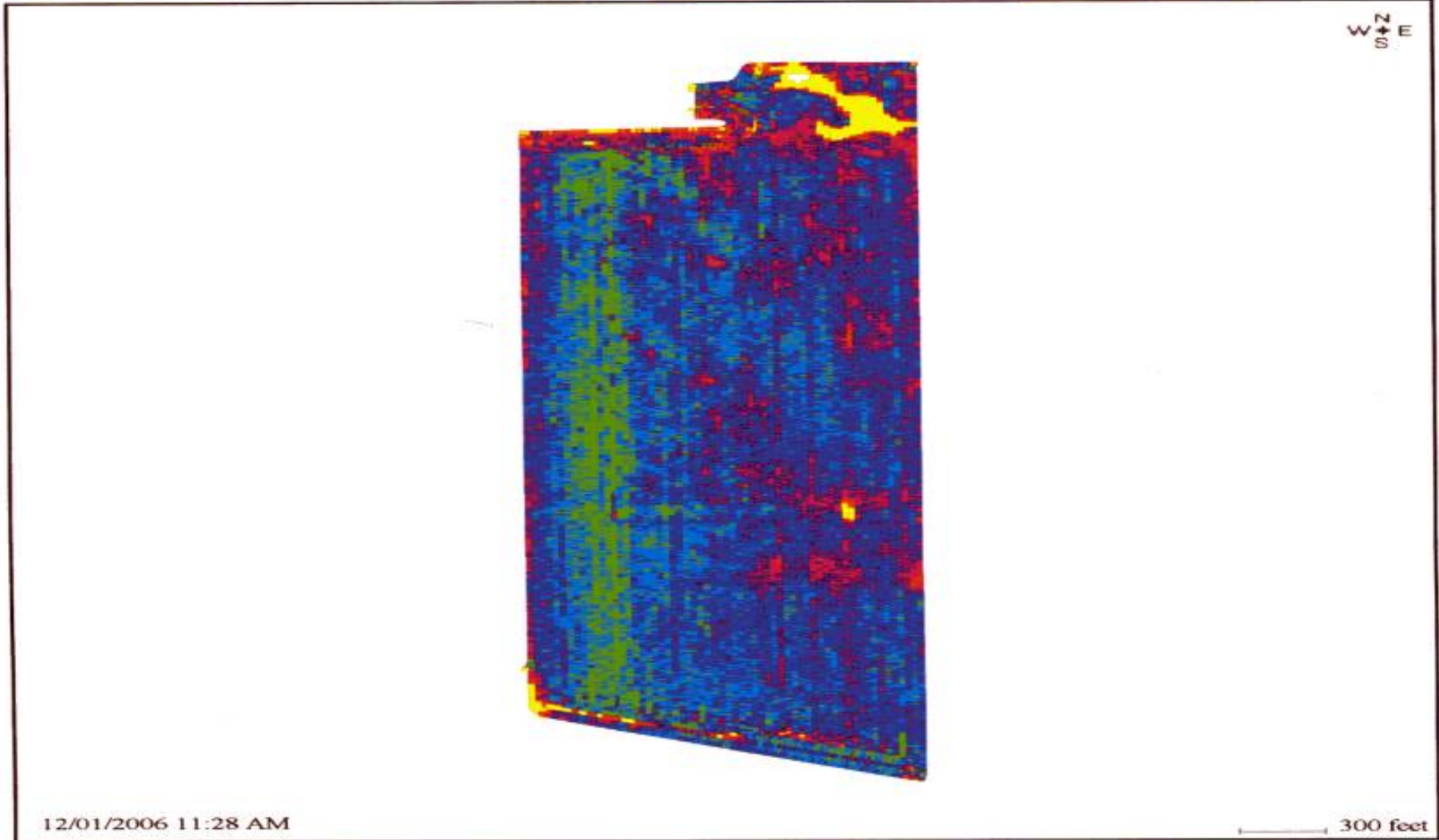
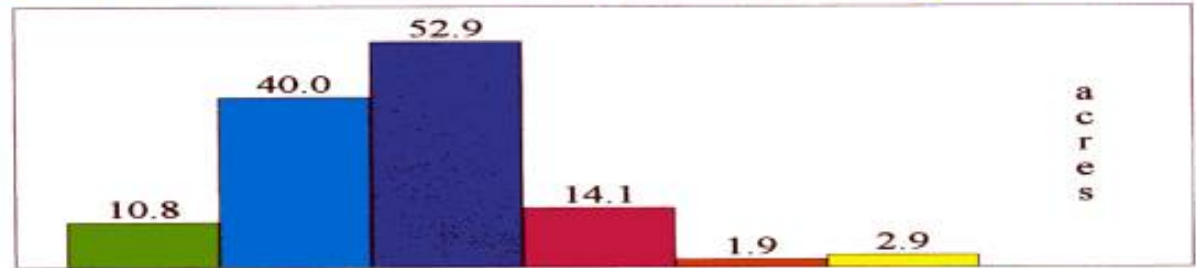
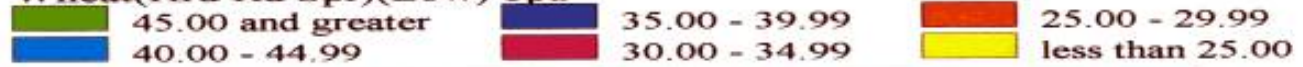
Yield Map (2005)

Client:
Farm: BOB'S
Field: FIELD 11

Harvested Acres: 122.58
Date: 16/08/2005-20/08/2005
Yield: 39.09 bpa
Moisture: 16.91%
Harvest Hours: 13.51



Wheat(Hrd Rd Spr)(Low) bpa



Producer - Winkler Area

- Systematic Spacings @ 50'
- Soil Series Drained (multiple, over large areas of land and many fields)
- Outlets are a combination of reservoirs with pumps and gravity
- 90% of tile fields are irrigated
- Typical Rotation
 - Wheat/corn
 - Beans/canola
 - Potatoes

Survey Analysis

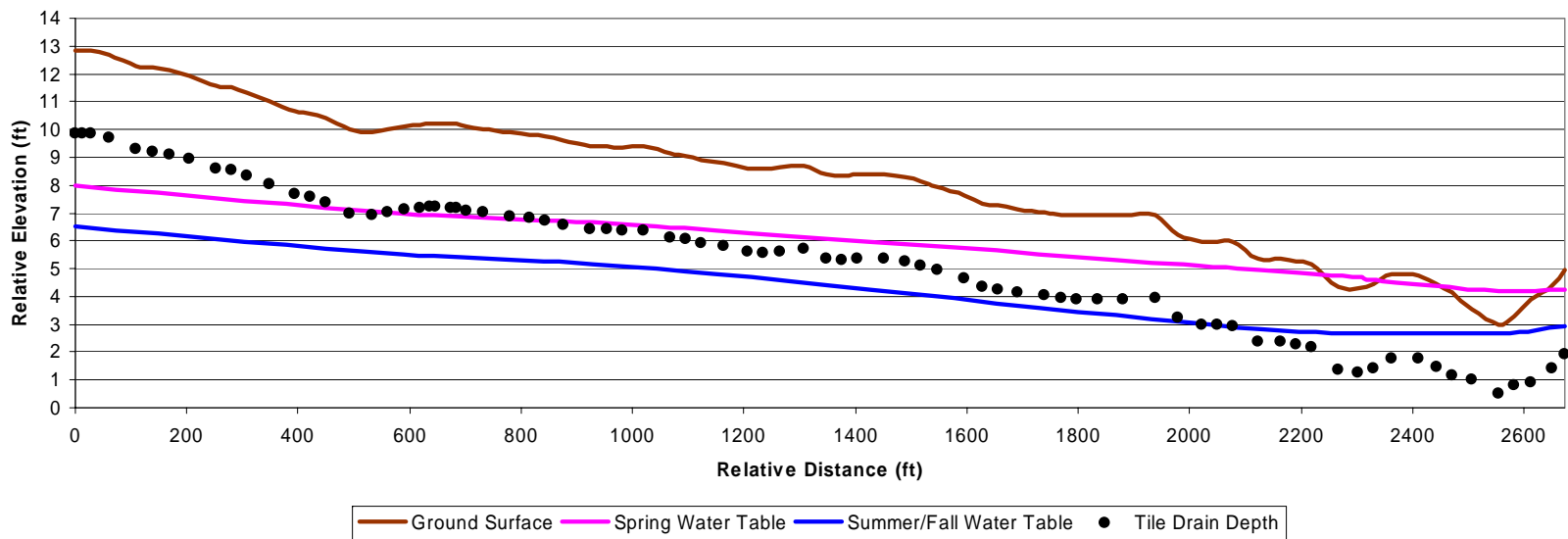
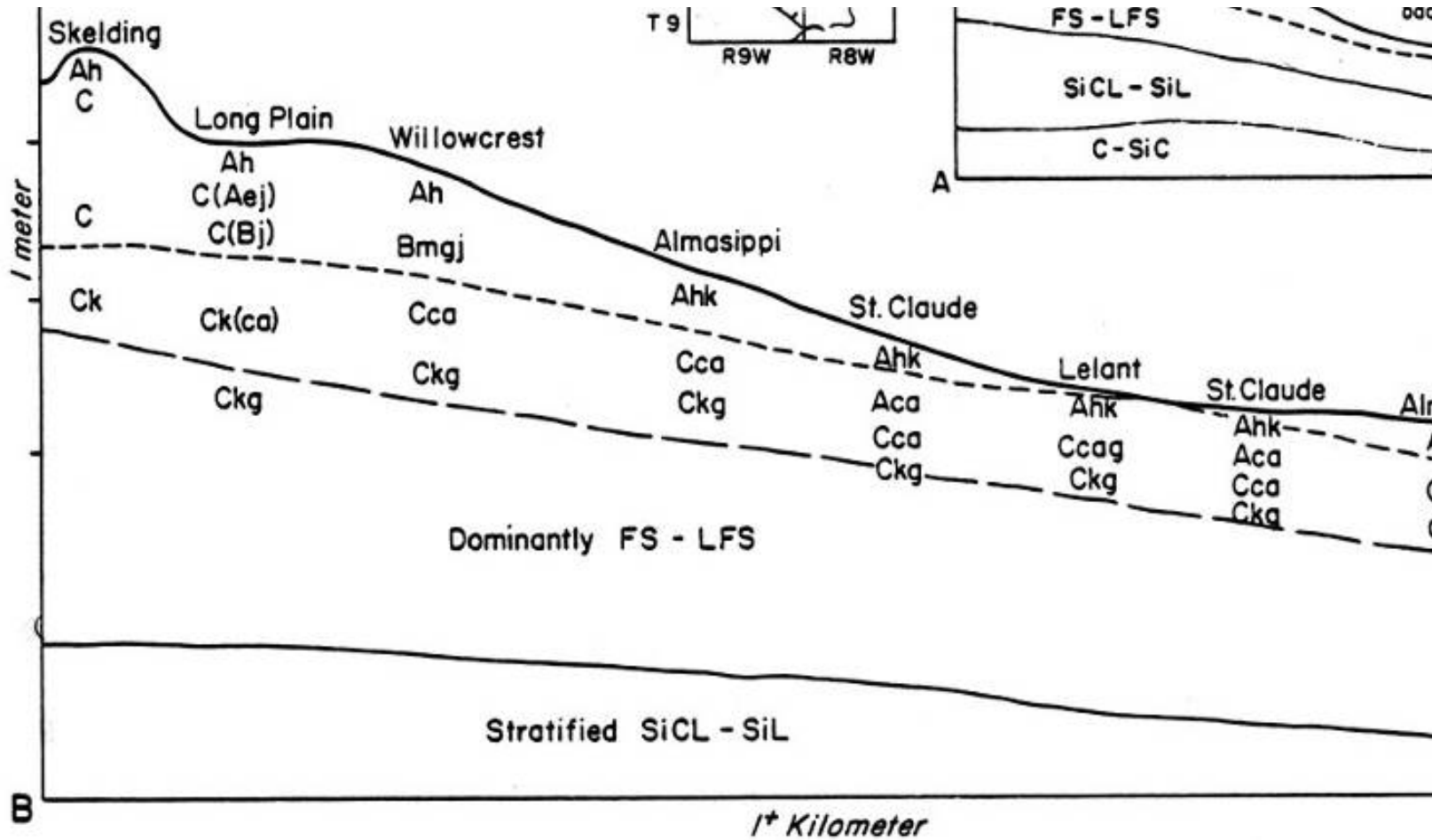
- Surface drainage improved in all cases prior to tile
- Prior to drainage 0-50% loss of crop/year
- Payback period
 - Payback on a 50% specialty crop loss year is 1 year
- DC ¼", 24-48" in depth on 50' spacings
- Tiles installed to address all-season drown-out, quality issues and harvestability

2005 Performance

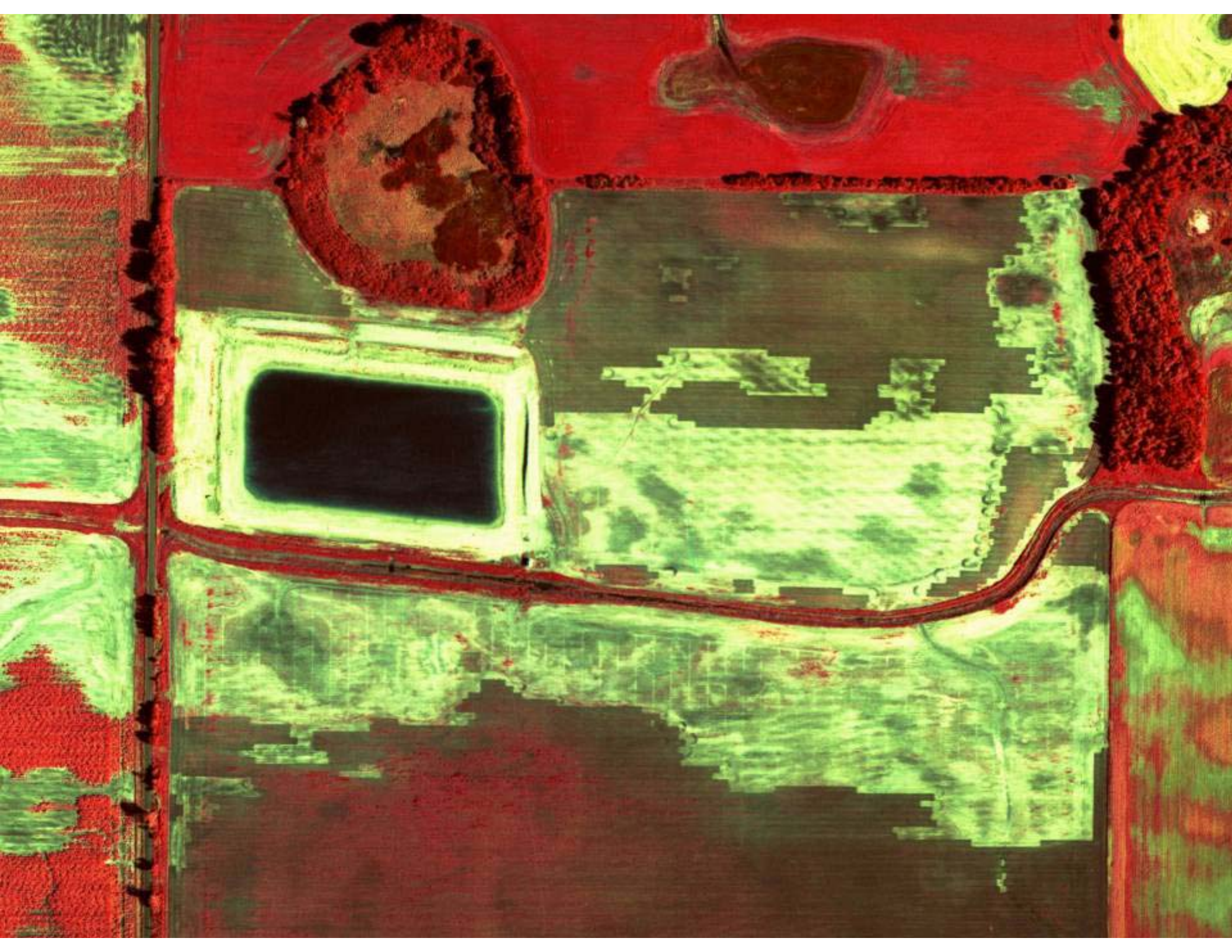
- Non tiled fields in 2005 - 80% crop loss
- Tiled fields in 2005 – 10% loss
- Back flooding
 - Half of the systems slowed by high water in ditches
- Drainage to Design?
 - Yes, and quite often above design.
- Yield Increase Tile vs Non-Tile
 - 75-80 cwt/ac every year
 - 2005 120 cwt/ac

Comments

- “Quality issues on tilled land are always undervalued, especially on potatoes”
- “Certain soil series drain better than others, like Willowcrest.”
- “Everything that was tilled by 2004 was paid for in 2005”









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Producer - Portage Area

- Site Specific Tiles @ 50' spacings
- Tiles used to drain specific areas of fields to allow for potato production
- Soil Series Drained
 - Gnadenthal,
 - Neuhorst,
 - Plum Coulee
- Outlet - creek

Soil Series Drained

- Gnadenthal
 - Loam
 - Thin sandy layers beneath the solum adjacent to stream channels
 - Hydraulic conductivity 1.7-3.5 in/hr
- Neuhorst
 - Clay loam
 - Hydraulic conductivity 0.16-0.95 in/hr
- Plum Coulee
 - Clay to clay loam
 - Hydraulic conductivity 0.05-0.60 in/hr

Survey Analysis

- Objective to have a rotation of beans, canola, potatoes (not currently)
- Land is not irrigated
- Years of surface drainage improvement were ineffective
- Payback period
 - Immediate at today's interest rates
 - At \$700 per acre (tax deductible) x 6% = \$42/acre yearly cost
- % of crop lost prior to tile drainage
 - 15% of land 100% loss
 - 40% of land 50% loss
 - 45% of land 0% loss
- Tile decisions were for
 - All season drown out
 - Trafficability
 - Salt control due to salt encroachment

Comments

- “There are not sufficient resources to support the tile decision, it is like unchartered territory”
- “So many reasons for tiling, issues like late seeding, retarded crop growth, salinity encroachment, compaction”

