

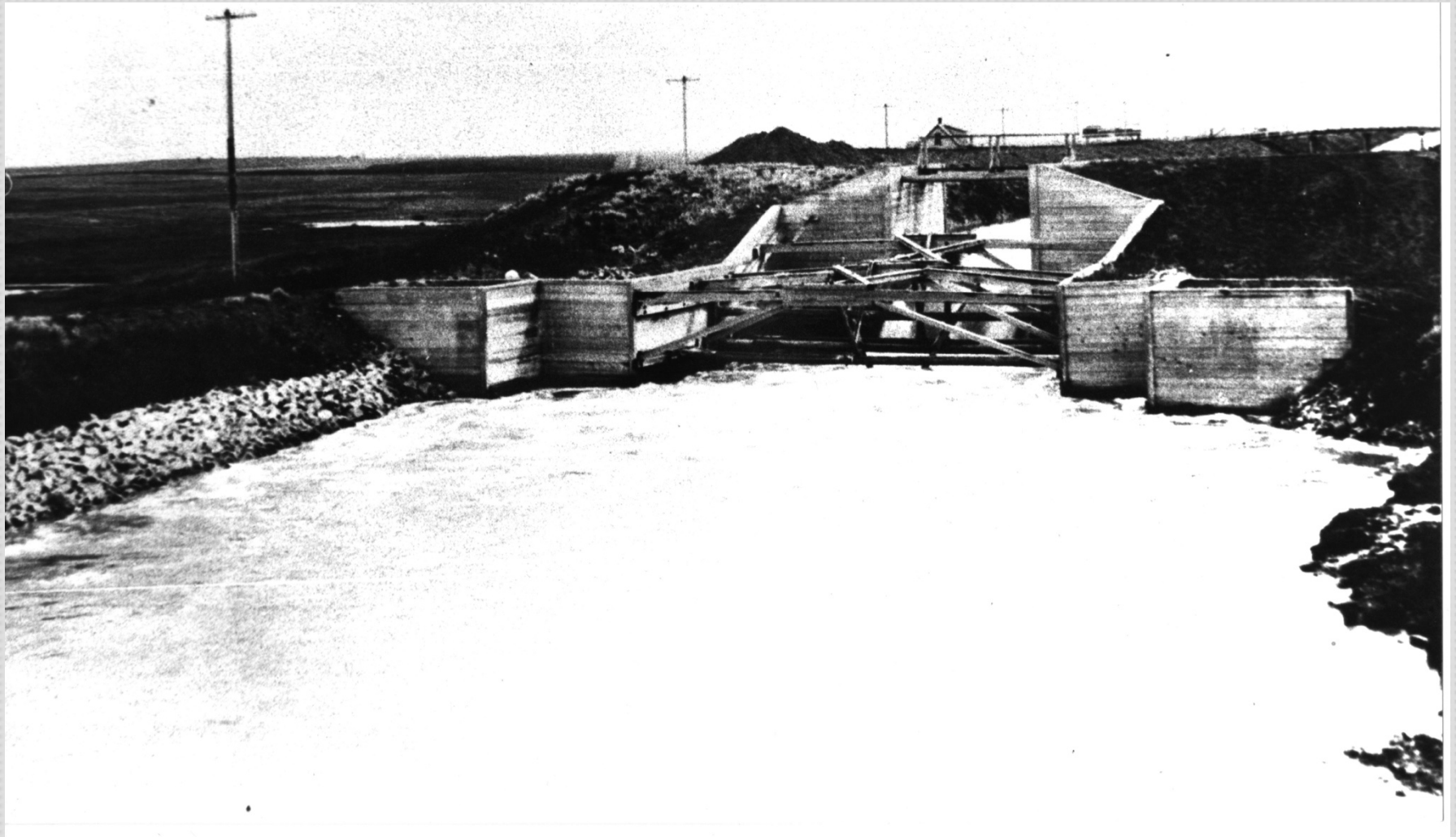
The Story of Chestermere Lake

Urban Lakes and Wetlands Workshop
Alberta Lake Management Society
Chestermere Alberta Sept 30-Oct 1, 2011

STORY

- History CPR started in 1906
1944 Farmers took over
- Change Urbanization, Technology
- Challenges Stormwater
- Opportunities Municipal Partners
- Future

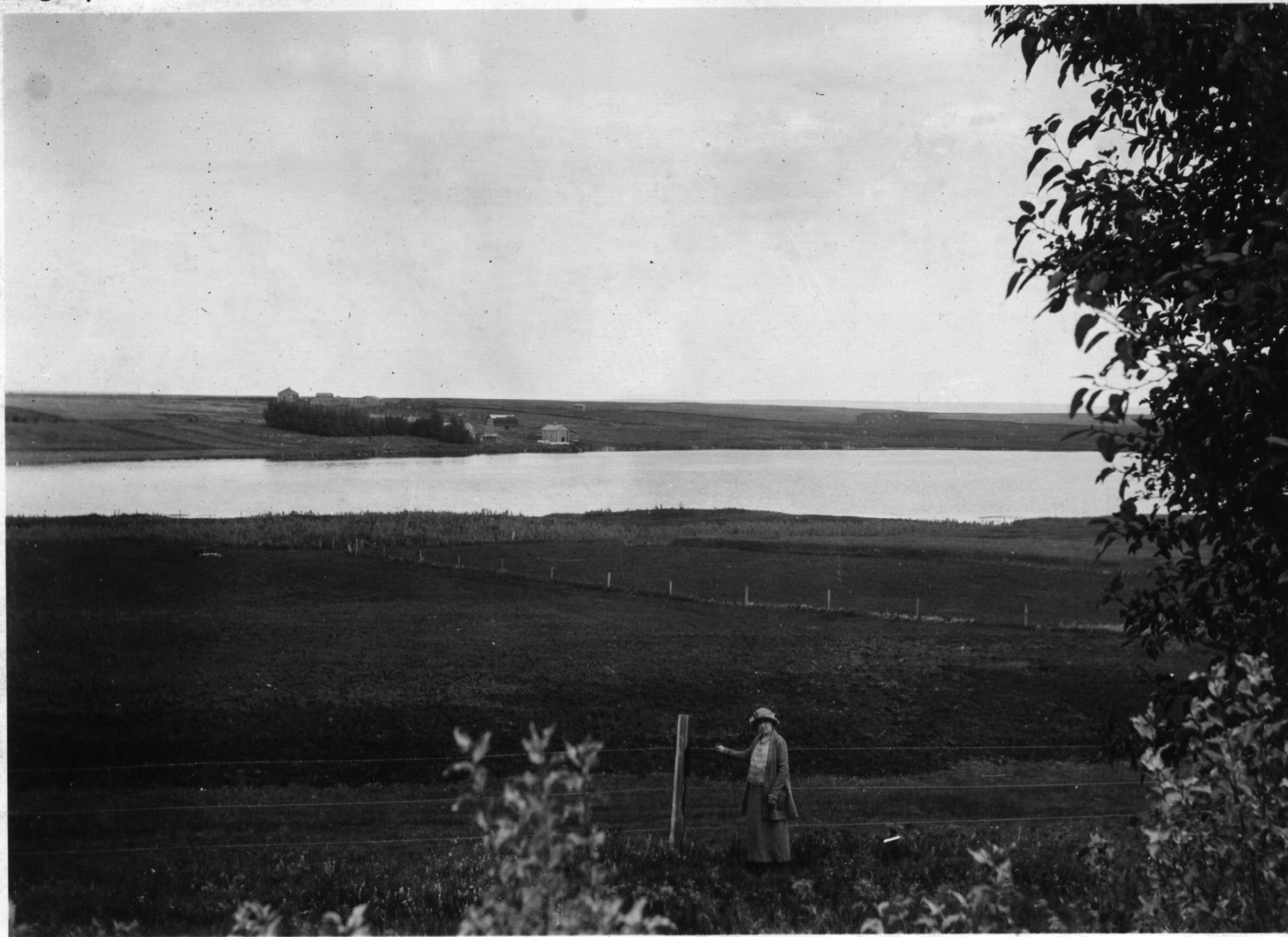
History:



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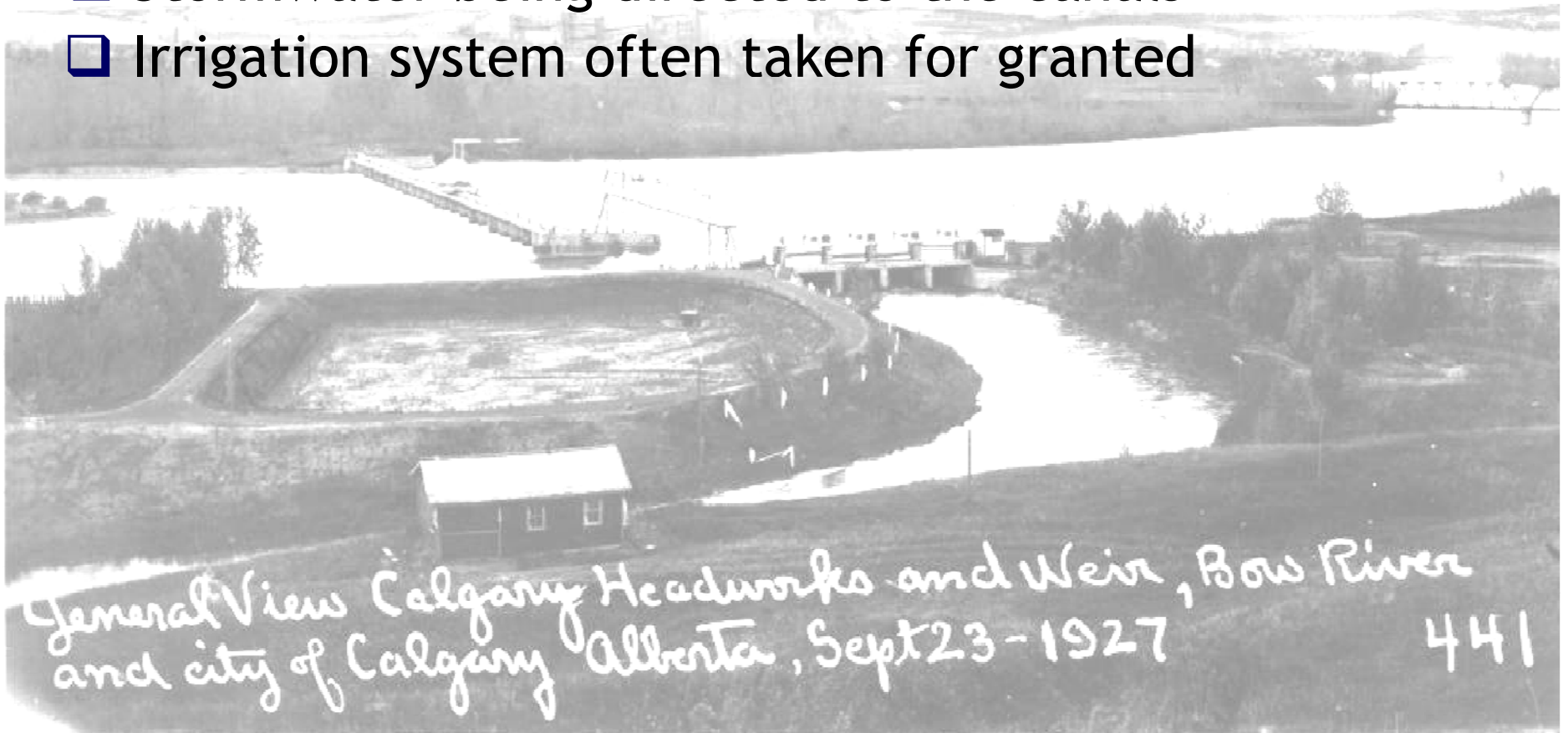


Chestermere Lake

➤ The CPR started its irrigation system in 1906

➤ 100+ Years Later:

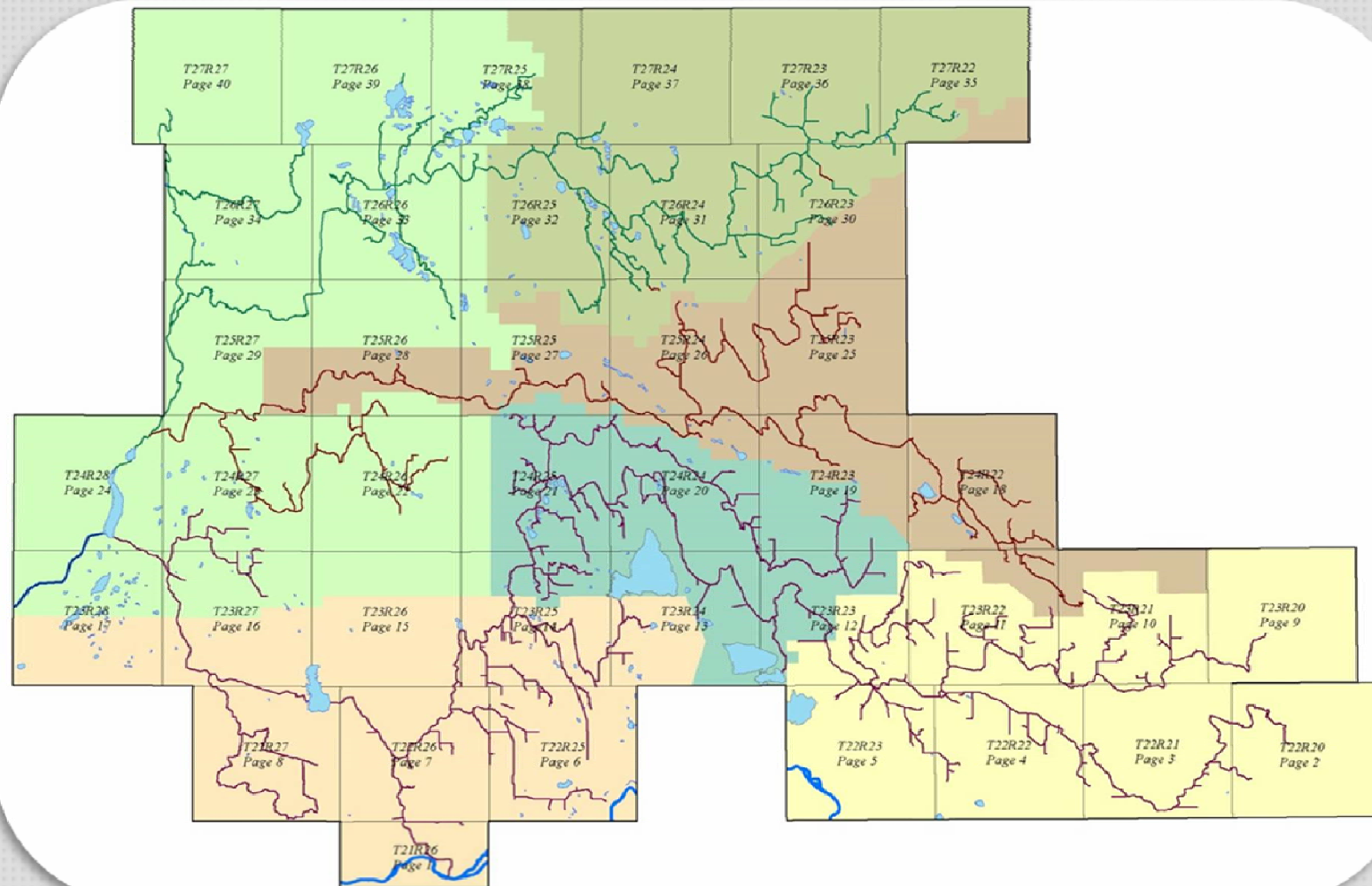
- ❑ Tremendous growth in Calgary region
- ❑ WID under pressure from urbanization
- ❑ Stormwater being directed to the canals
- ❑ Irrigation system often taken for granted



What we do

- WID holds a water license of 158,000 acre/feet from the Bow River.
- We service a maximum of 95,000 irrigation acres producing a variety of crops from traditional grains and forages to trees and sod, potatoes and organic vegetables.
- Municipal water is supplied to Rocky View County (Balzac), Wheatland County in addition to the villages of Rockyford, Standard and Gleichen.
- WID conveys water to a number of private license holders varying from Ducks Unlimited to golf courses, campgrounds and livestock operations.
- Provide a range of recreational activities for all seasons from boating to hunting and fishing, walking, cycling and cross country skiing.

The WID system has 3 main canals with smaller lateral ditches and pipelines divided into 6 service areas using gravity flow on contour designed in the early 1900's.



Rehabilitation of main supply canals reduce seepage losses and increase freeboard during peak usage.

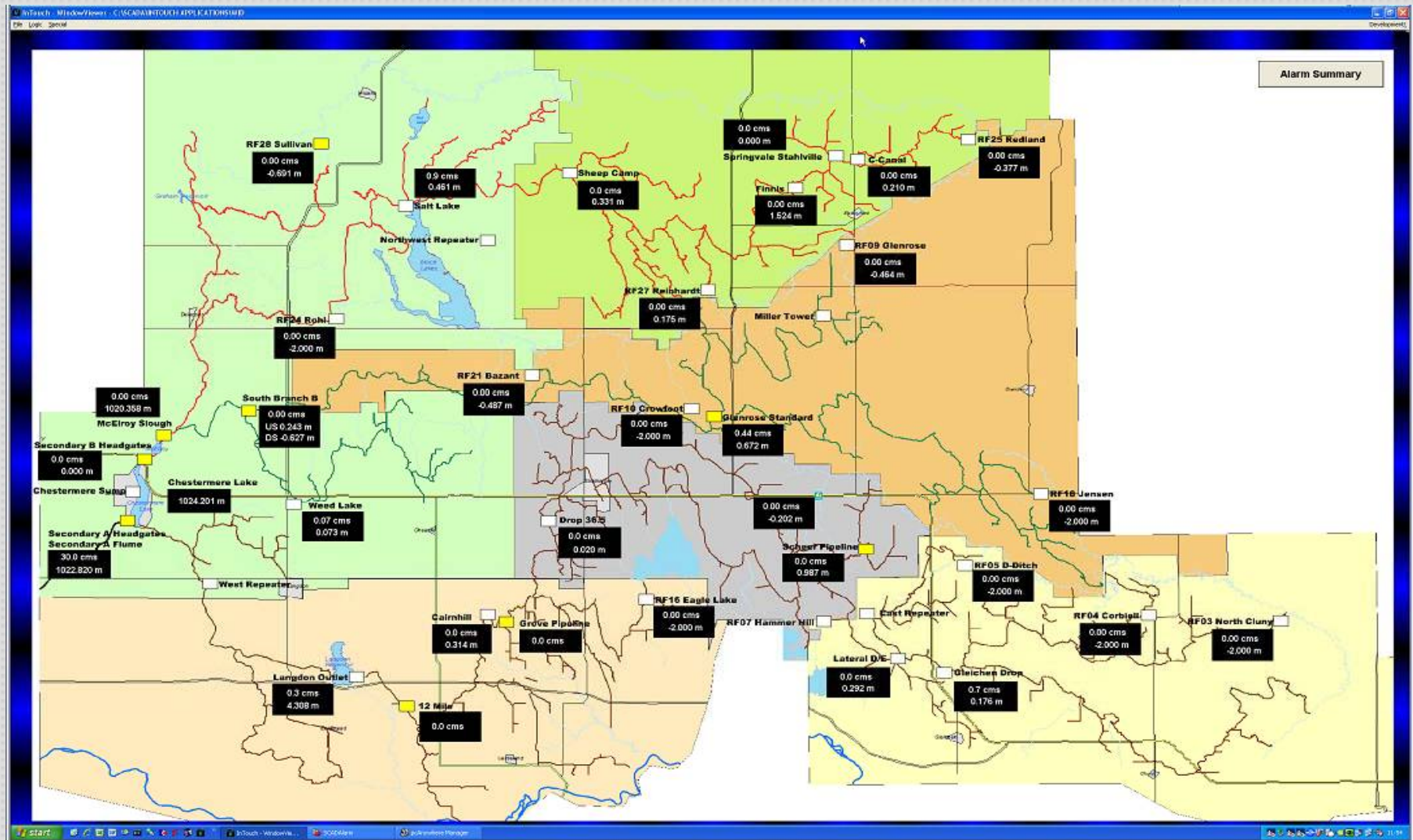


Lateral delivery canals converted to closed pressure pipelines eliminates conveyance losses.





SCADA information is accessible on office computers and in area supervisor truck mounted laptops.



Examples of data collection sites

Diversion Gates



Pipeline Inlets



Control Structures and Spillways



Return Flow Channels

- WID infrastructure starts at Chestermere Lake, one of two internal storage reservoirs in the district.

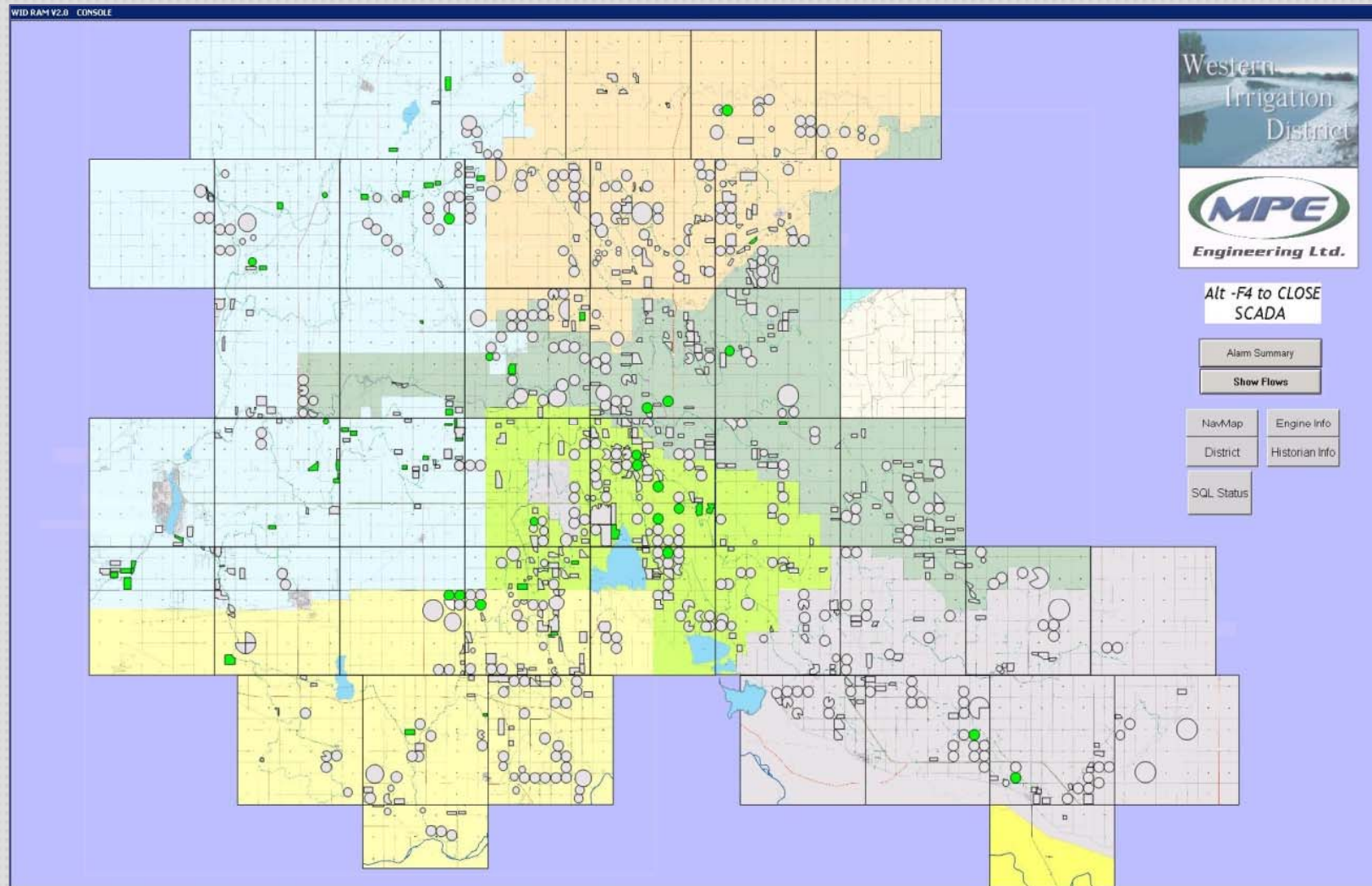
- It has lost its functionality as a live storage reservoir due to development and now acts primarily as a recreational water body.



Management

- SCADA offers real time trending used to track changing water levels in canals, increasing the supervisor's ability to deliver water more accurately.
- Alarm software notifies area supervisors if pre-determined alarm set points (e.g. flow rate, canal level or site functionality) are reached.
- Staff is automatically called and can react to a situation sooner, before it causes service interruptions or damage to infrastructure.

In 2010 WID implemented design of a software program (RAM) to compliment SCADA which records irrigation system status throughout the district.





- New rehabilitation projects and existing structures are fitted with measurement and monitoring.

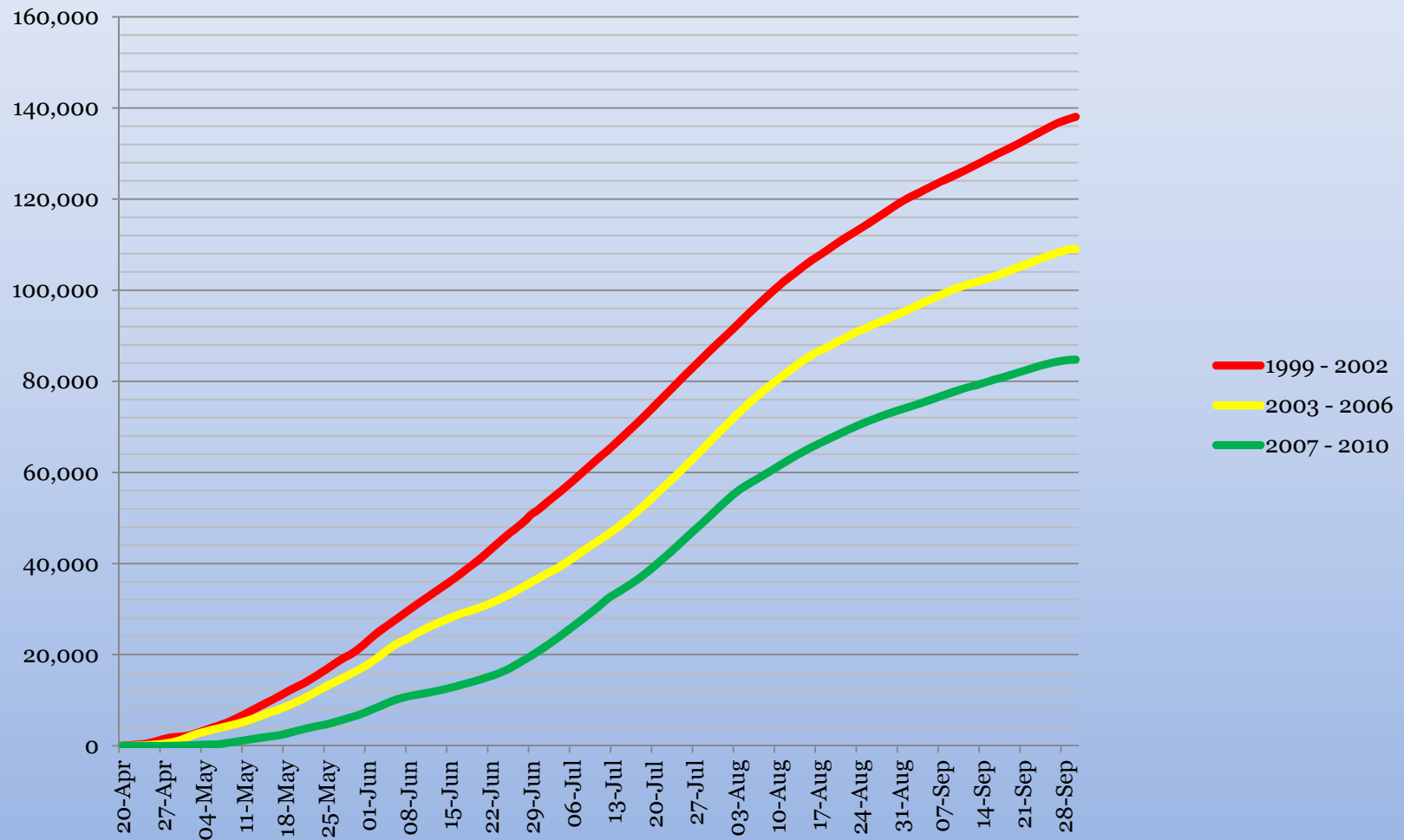
- Flows rates in monitored canals are measured for accuracy and in non-monitored canals for management using Acoustic Doppler technology.



Monitoring

- Since 2005, investment in automation and flow monitoring (SCADA) has surpassed 1.27 million dollars in the WID.
- 33 sites comprised of diversion gates, inflow control structures, pipeline inlets and return flow channels are monitored in real time on the SCADA network.
- Data is transmitted over a WID owned radio system, chosen for low operating costs and reliability.

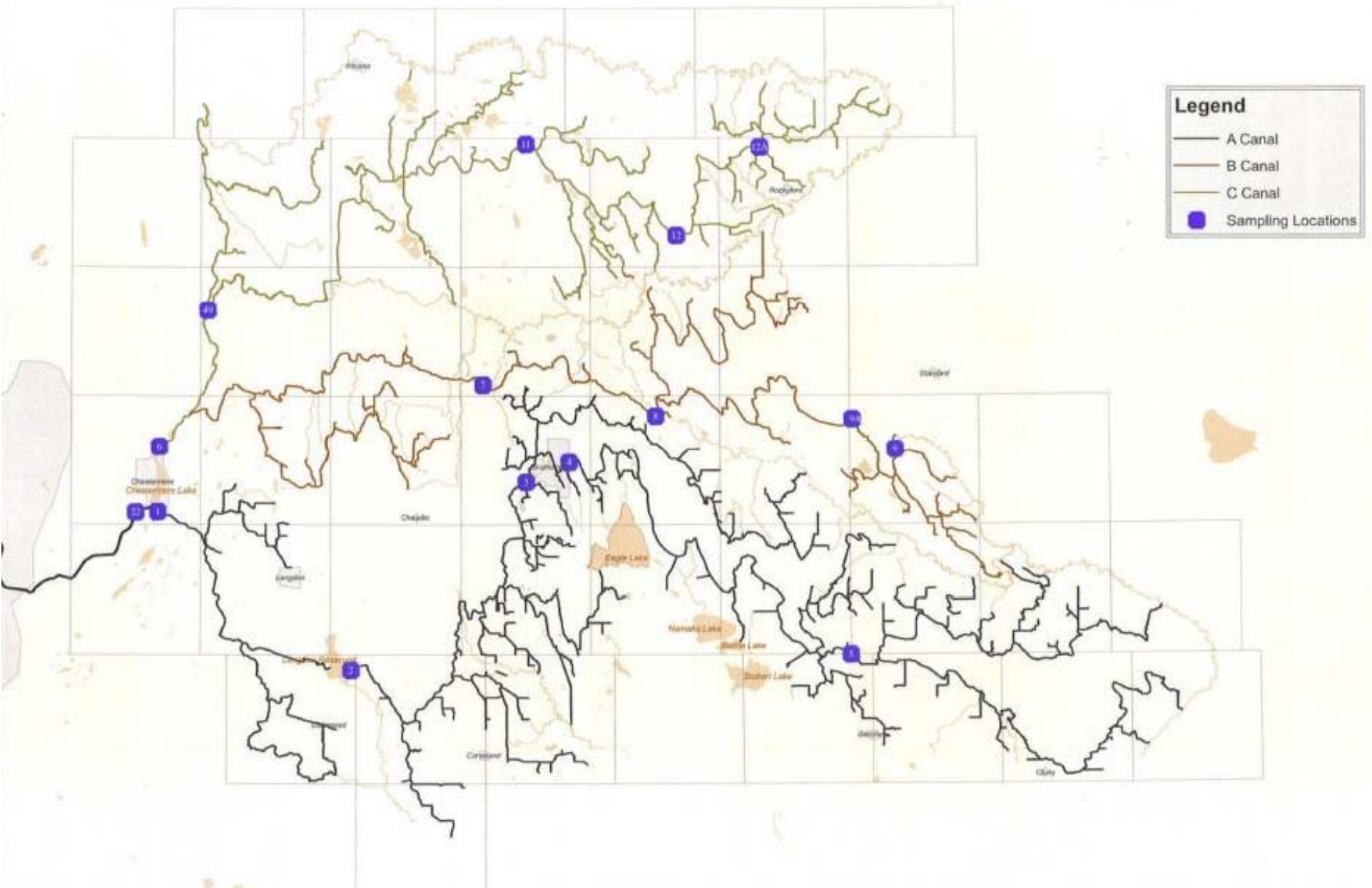
With 12 years of flow data available to be analyzed, average diversions are dropping as a result of water savings through rehabilitation, improved management, and automation.





Water Quality

Water Quality Monitoring

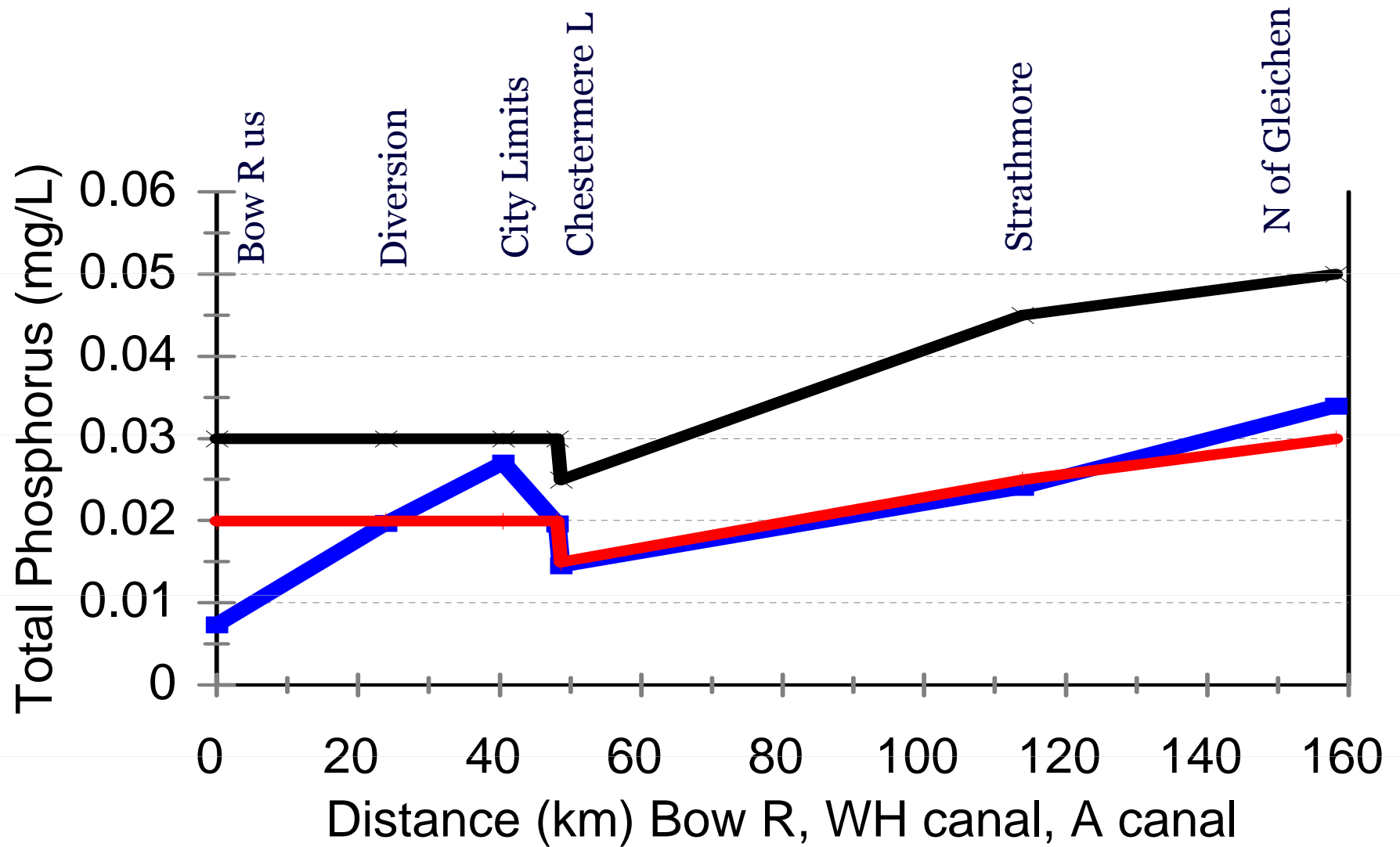




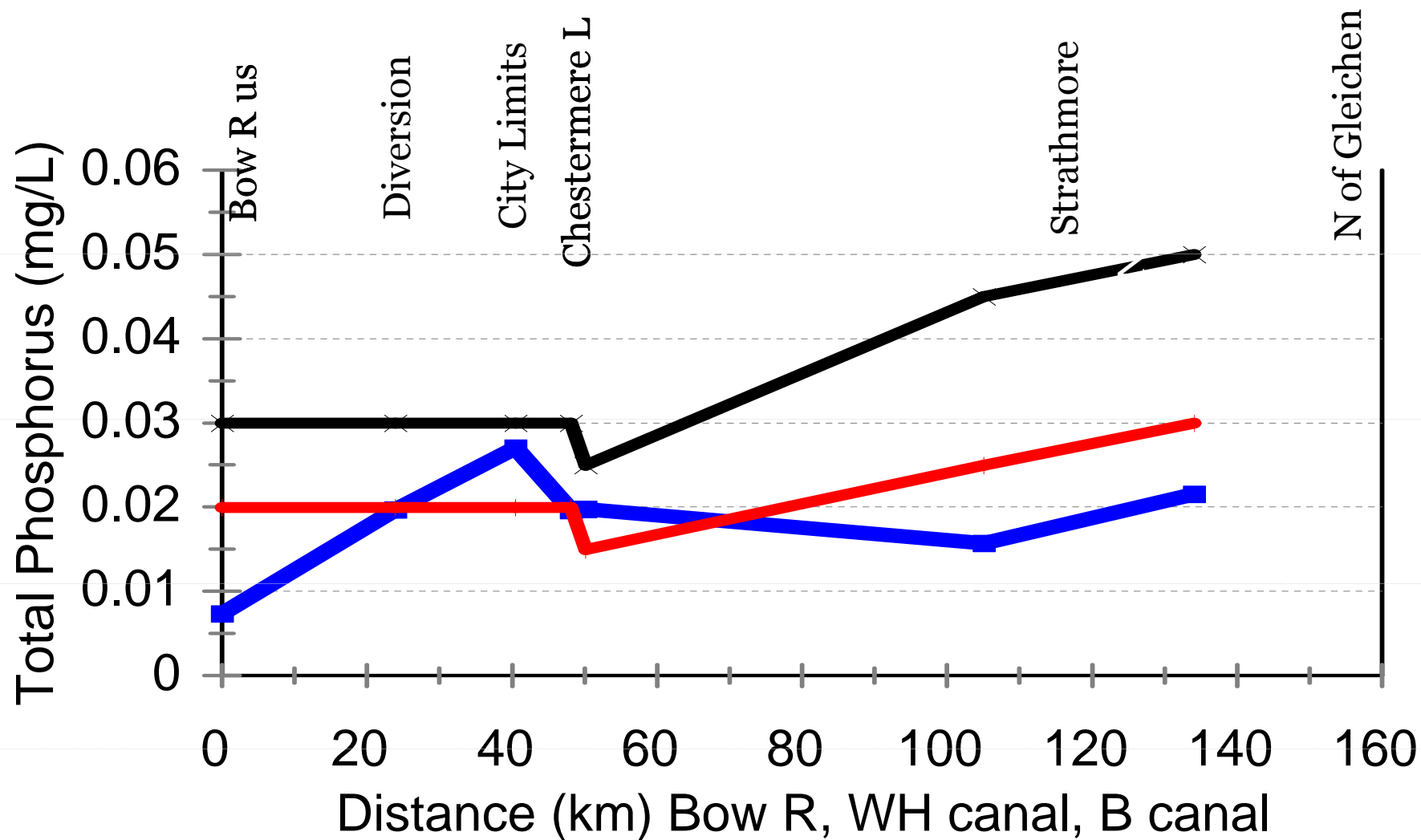
-Results of phosphorus loading is the increase of aquatic weed growth in the delivery system.

-Aquatic weeds restrict the ability to efficiently move water through the canals.

-WID must ensure irrigation quality water to all users regardless of where they are located in the district.

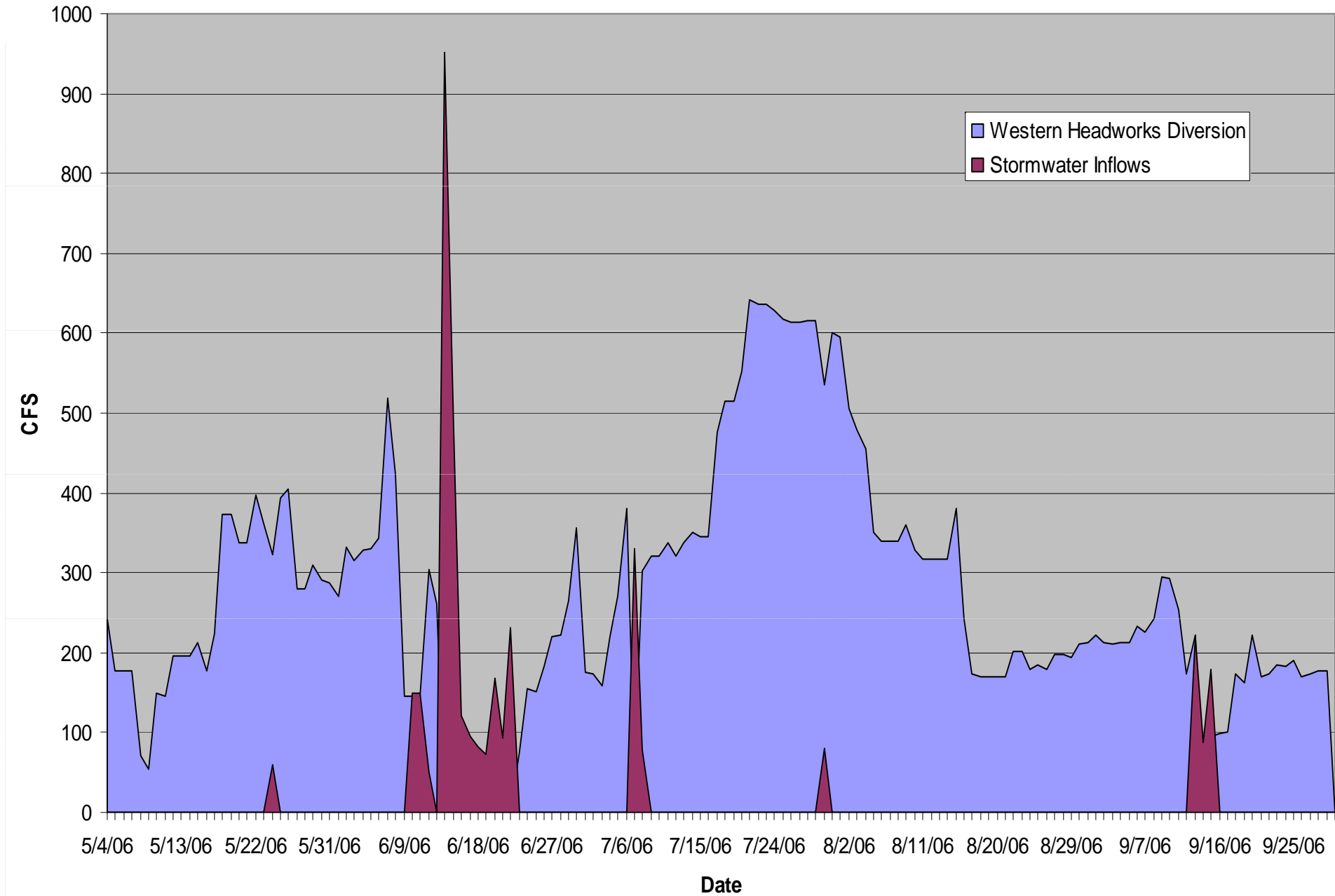


—■— Avg 99-05 —+— Target (avg) —×— Limit (1 sample)



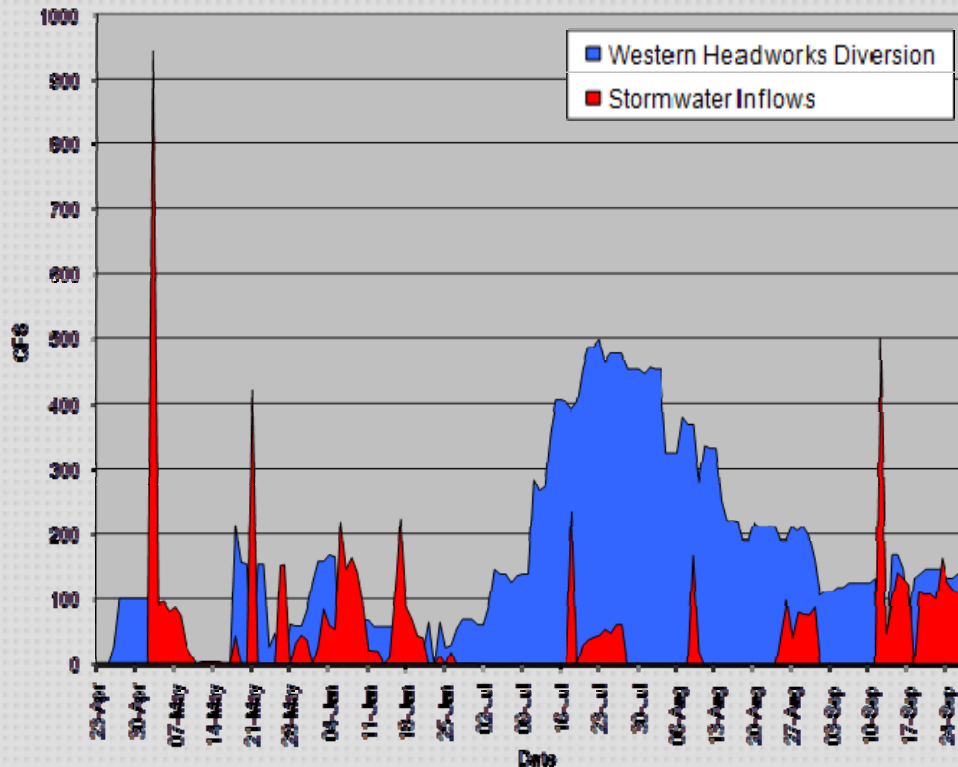
—■— Avg 99-05 —+— Target (avg) —×— Limit (1 sample)

WID Diversion vs. Stormwater Inflows



Shepard Stormwater Project removes Calgary stormwater from the WHC upstream of Chestermere Lake.

2007 WID Diversion vs. Stormwater Inflow



Urbanization Impacts Runoff

- Volume of runoff can increase over 10 times
 - ❑ Depressions filled
 - ❑ Increased roofs, pavement
- Water quality reduced
 - ❑ TSS ~ 300 to 400 mg/L
 - ❑ TP ~ 0.4 mg/L
 - ❑ Others (Bacteria, EC, etc.)
- Peak flows increase



Little to No Capacity Remains

- TP already exceeding system-wide targets
- Hydraulic capacity of 2 to 3 L/s/ha in most rehabilitated canals, but not as high in existing
- City of Calgary Shepard Stormwater Diversion Project on-line helps but not entire answer

STORMWATER APPROVING AUTHORITY

1. WID Only (Into Canals)

- A, B, C Canals
- Areas Upstream of Chestermere Lake and Langdon Reservoir require Mechanical Treatment
- Strathmead, Cairn Hill

2. WID & AENV (Shared Streams)

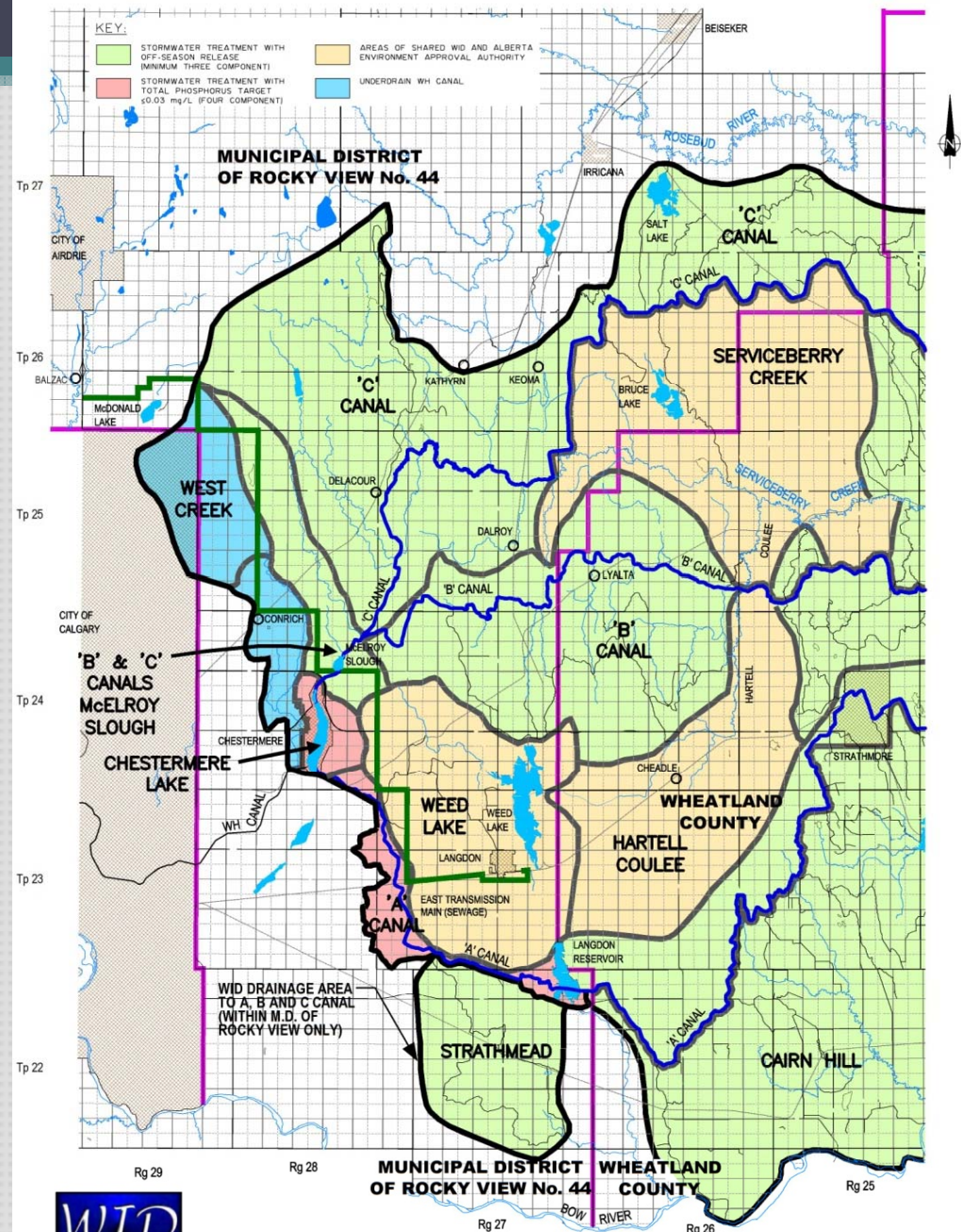
- Serviceberry Creek
- Weed Lake / Hartell Coulee

3. WID Pre-Existing Agreements

- Strathmore, Chestermere 2004
- Weed Lake / Langdon

4. WID Access Prohibited

- West Creek (Underdrain WH Canal)



**WID DRAINAGE AREAS
WEST OF STRATHMORE**

Storm Pond Quality Not Good Enough

- Quality from typical AENV regulated ponds less than WID irrigation targets
- Only TSS removal (85% of particles > 75 μm)
- WID also targeting Total Phosphorous, Fecal Coliform Bacteria, Salinity
- Irreducible Phosphorous concentrations can be > 0.10 mg/L versus irrigation target of 0.03 mg/L

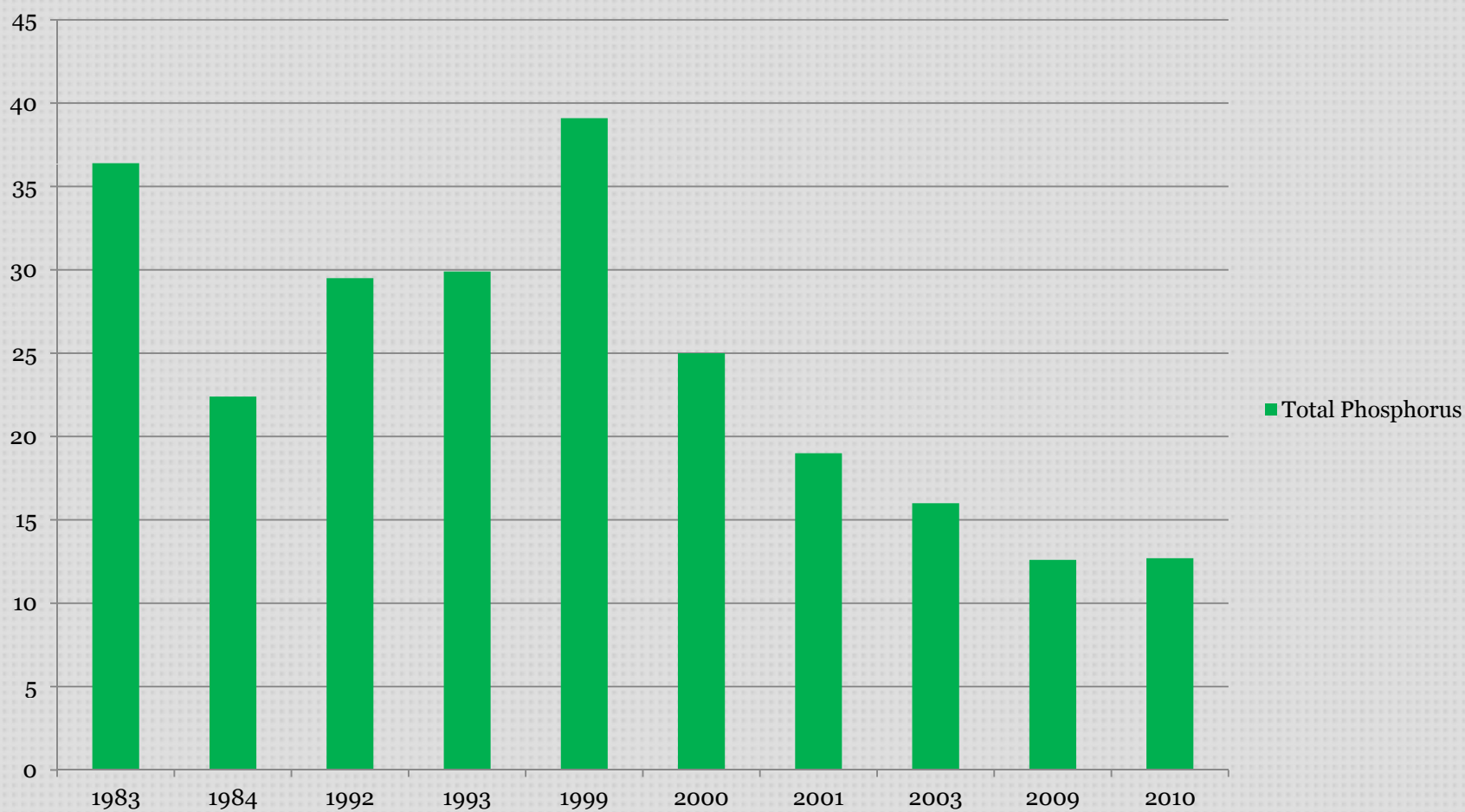
Actions for improvement:

- Continued annual testing of water quality throughout the WID is showing positive trends.
- Water quality guidelines for releases into WID canals, erosion control measures and the Shepard Stormwater Project contribute to improved results.



Mean historical total phosphorus levels in Chestermere Lake (units per 1000)

Total Phosphorus



City of Calgary

- Western Headworks Stormwater Settlement
 - Limits on Peak flows
 - Committed to Shepard Stormwater Diversion
 - Reduction in total loadings
 - Collaborating with AE and WID

More is Coming

- **Strathmore Annexation**
 - 50,000 people in 50 years
- **Chestermere Annexation**
- **Rocky View County - Growth Mgmt Strategy**
 - Conrich & Langdon 10,000 each
 - Kathryn & Delacour 5,000 each
 - Hwy 1 & Glenmore Trail Business Corridors
- **Wheatland County**
 - Regional Growth Management Strategy Coming
 - Hwy 1, Muirfield & More

Town of Chestermere

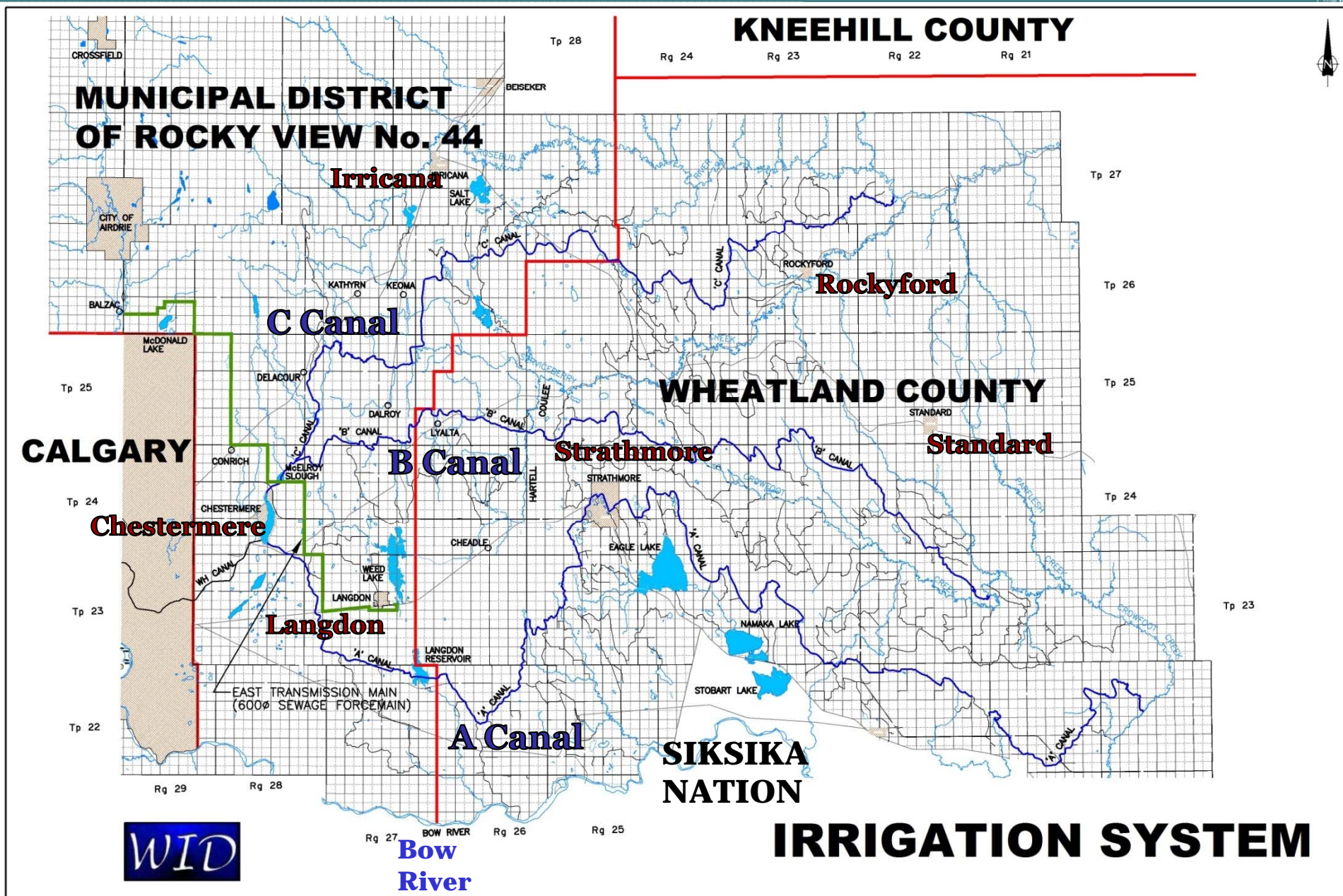
- **USE OF WORKS Agreement**
 - Limit Storm Water Contribution
 - Agreement on Lake Management
 - Contribution to Infrastructure
- **LAND DEAL**
 - Lake Front Owners
 - Town Jurisdiction
 - Parks

Other Municipalities

- Regional Storm Water Plan
 - Underdrains
- WID Storm Water Strategy
 - System Based
 - Wetlands
 - Multi use

Future

- Continued Growth
- Regional Storm Water Plans
- Partnerships/Opportunities
- Offstream Storage
 - Langdon Reservoir Expansion
 - Bruce Lake





Happy Endings