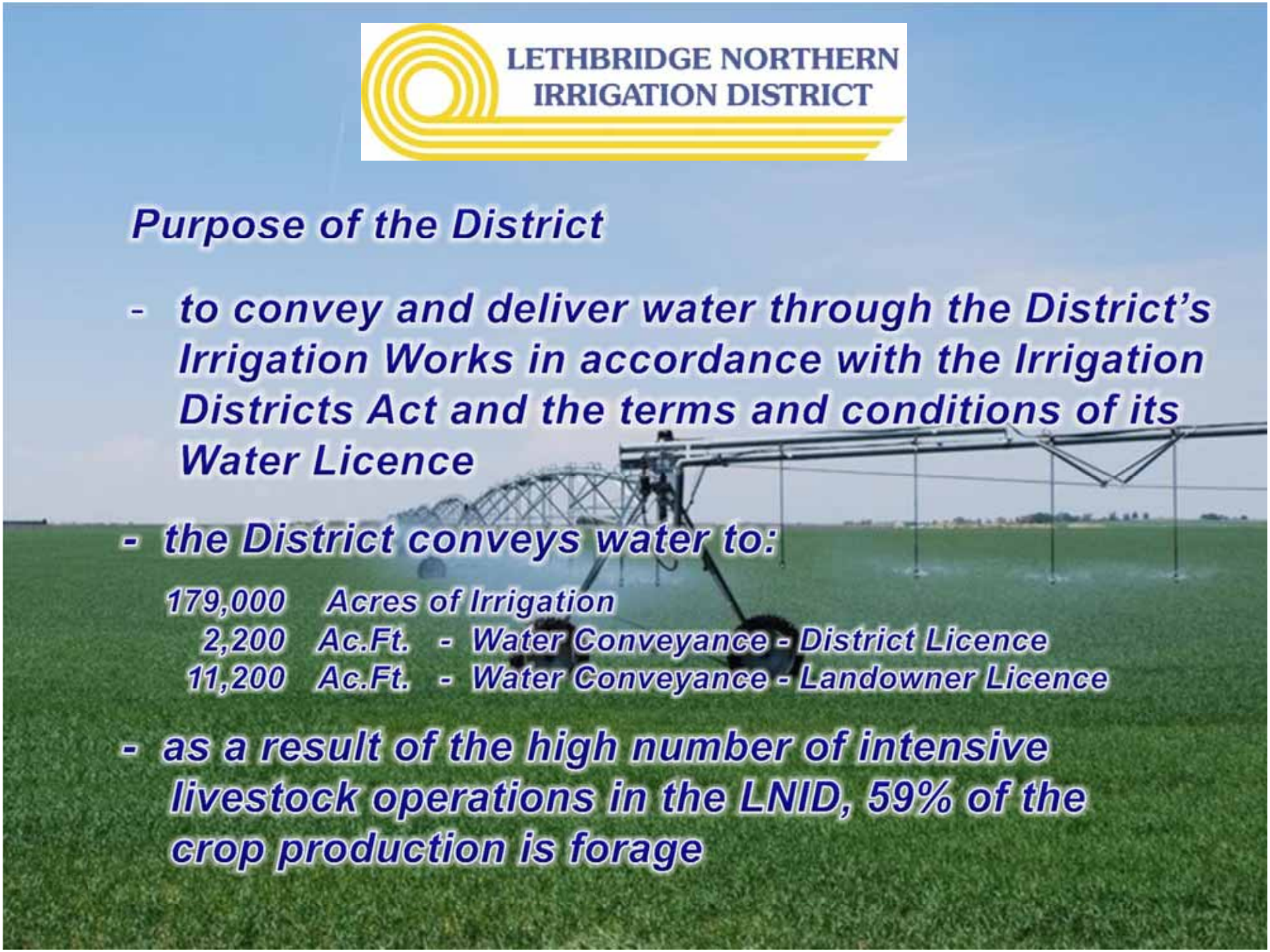
LETHBRIDGE NORTHERN
IRRIGATION DISTRICT

Water Measurement in the LNID


LETHBRIDGE NORTHERN
IRRIGATION DISTRICT
Purpose of the District
- to convey and deliver water through the District's Irrigation Works in accordance with the Irrigation Districts Act and the terms and conditions of its Water Licence
- the District conveys water to:
179,000 Acres of Irrigation
2,200 Ac.Ft. - Water Conveyance - District Licence
11,200 Ac.Ft. - Water Conveyance - Landowner Licence
- as a result of the high number of intensive livestock operations in the LNID, 59% of the crop production is forage


LETHBRIDGE NORTHERN
IRRIGATION DISTRICT
The LNID has 5 Water Licences totalling 334,450 Ac.Ft.
LNID Water Storage:
Oldman Dam 397,500 Ac.Ft.
Keho Lake 77,500 Ac.Ft.
Picture Butte Reservoir 1,300 Ac.Ft.
Park Lake 1,200 Ac.Ft.

Why Measure Water?

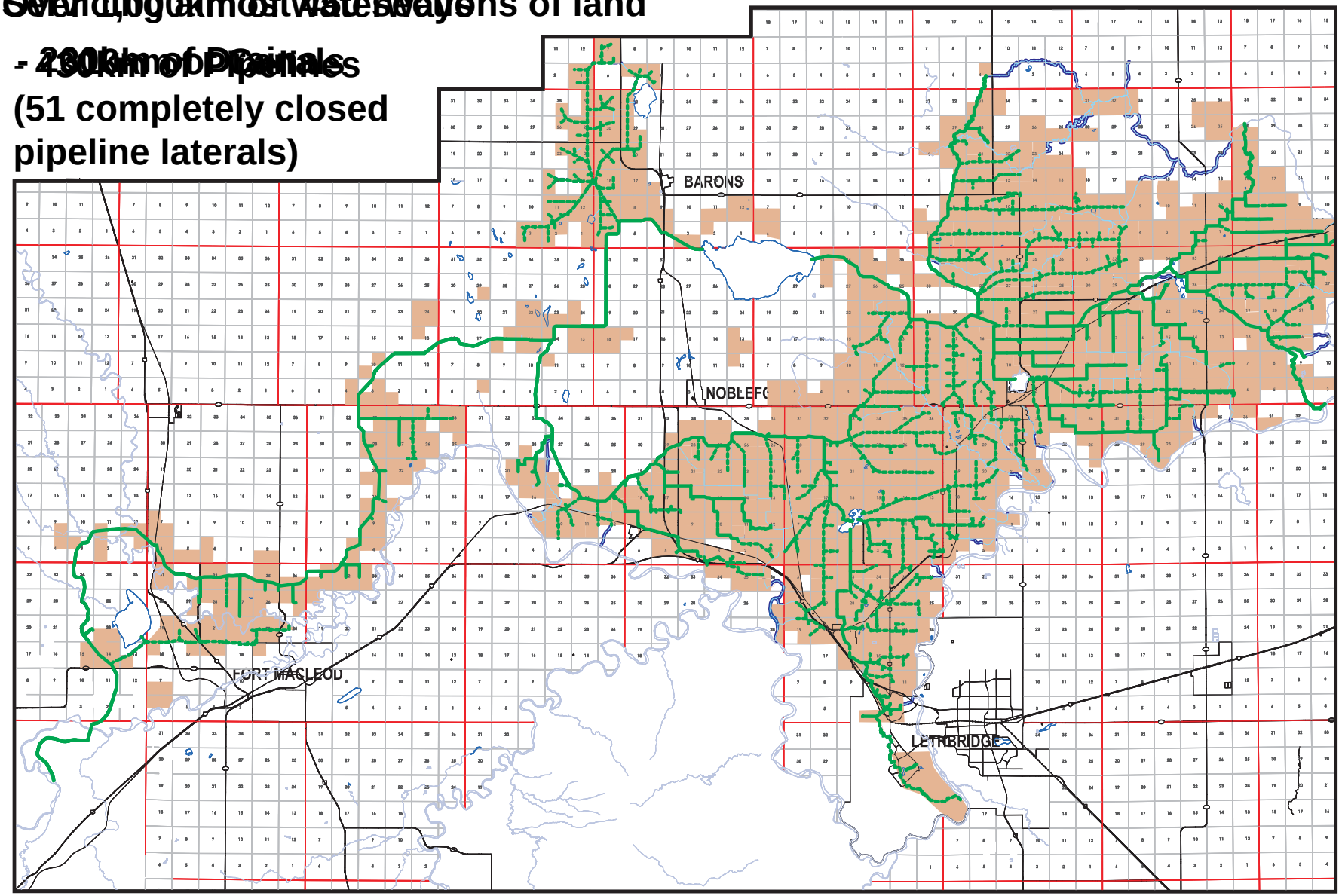
- Internal Operations
- Water Users
- Public Records
- Government


Water Metering
Real-Time Water Management
Pump Station Management
Flow Monitoring at the Turnout
Historical Efficiency & Growth Potential
LNID Vision for the Future

Real-Time Water Management

Serving 1,000 km of waterways and 450 sections of land

- 430km of Pipelines
(51 completely closed pipeline laterals)

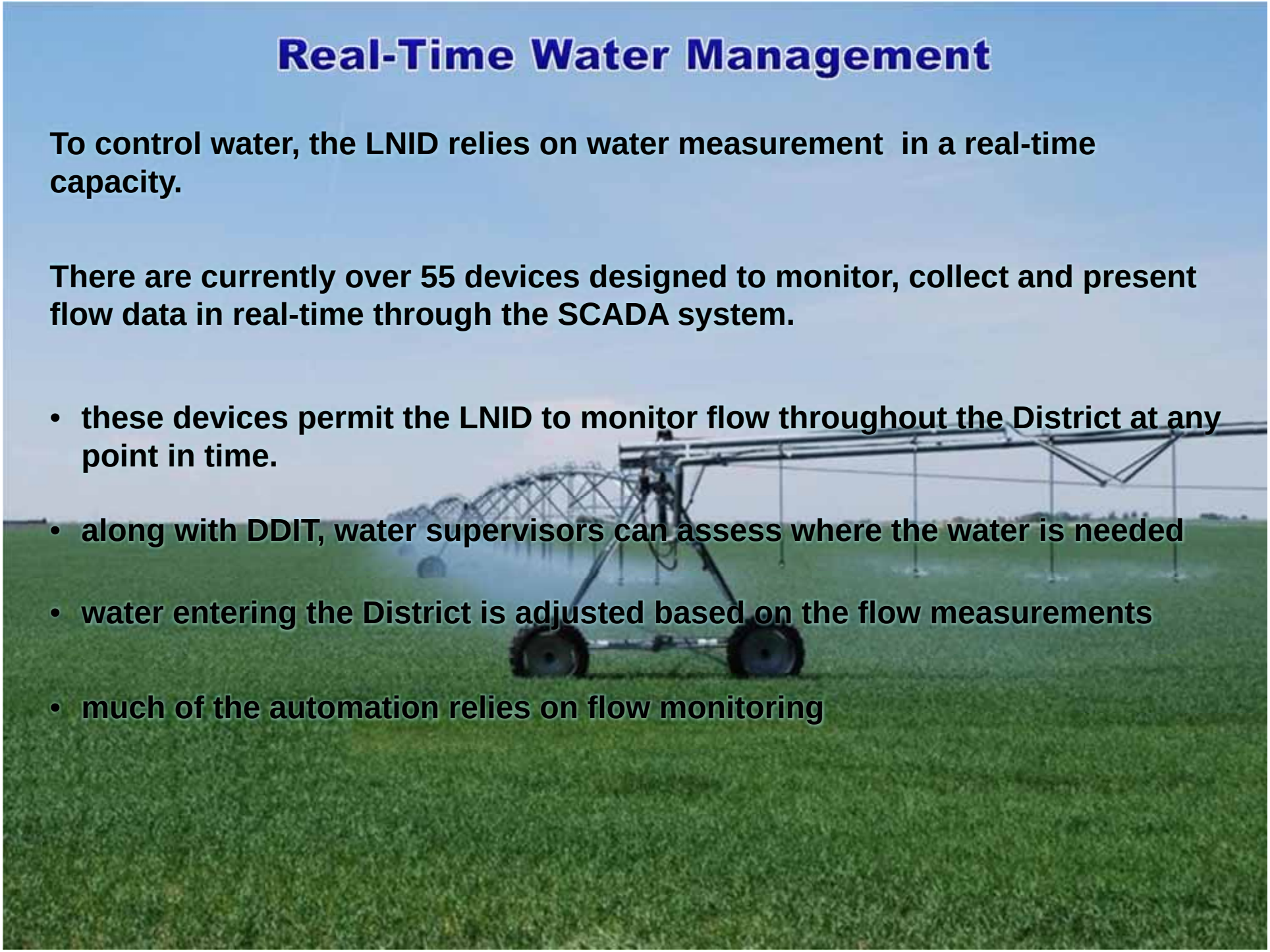


Real-Time Water Management

To control water, the LNID relies on water measurement in a real-time capacity.

There are currently over 55 devices designed to monitor, collect and present flow data in real-time through the SCADA system.

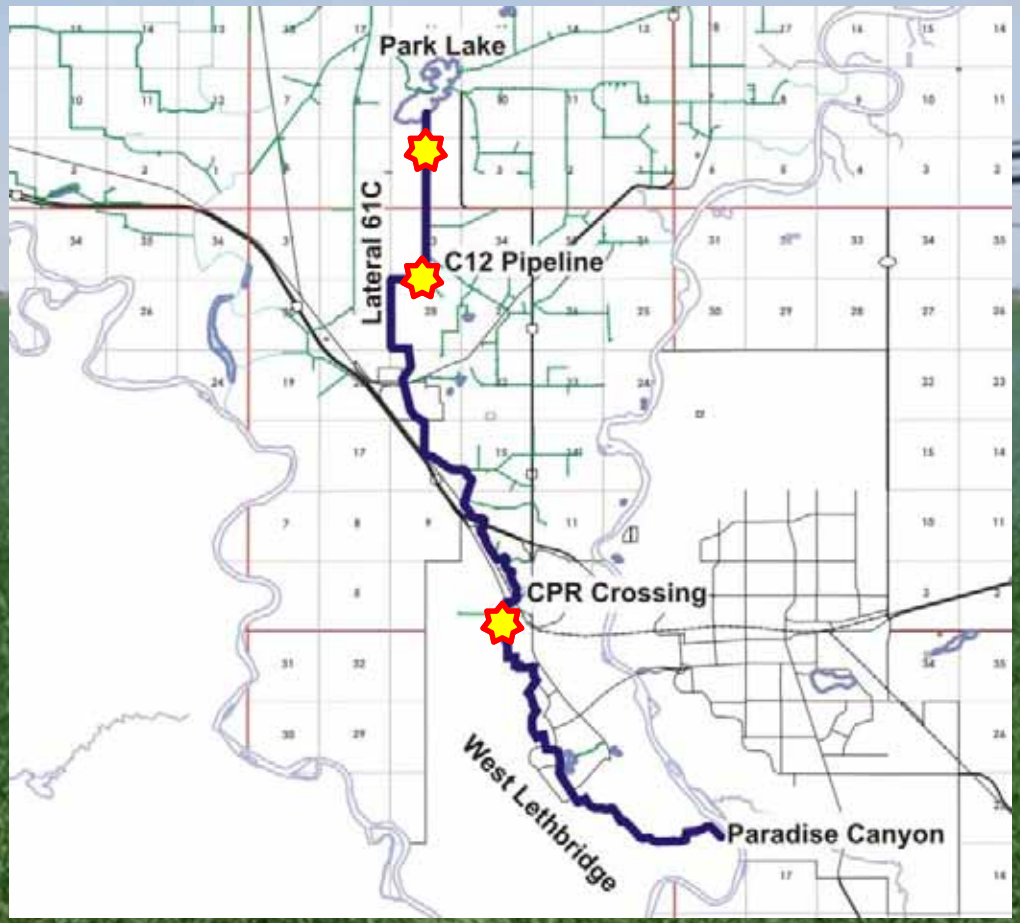
- **these devices permit the LNID to monitor flow throughout the District at any point in time.**
- **along with DDIT, water supervisors can assess where the water is needed**
- **water entering the District is adjusted based on the flow measurements**
- **much of the automation relies on flow monitoring**



Real-Time Water Management

- flow measuring devices have helped detect and minimize problems within the system

- Example - Communication between Park Lake, Lateral 61C and the Lateral C12 pipeline eliminates excess water flowing to West Lethbridge.



Real-Time Water Management

Several different technologies to obtain water measurements are used.

1. **Ultrasonic Level Indicating Transmitters**
   - **basic flow measurement**
   - **primarily used on automated gates and large weirs**
   - **low precision but only used in areas with large flow rates**
   - **also used in areas to show possible problems (differential level on screeners)**

Real-Time Water Management

2. **Float Potentiometers**
   - **basic flow measurement**
   - **primarily used on return flow sites and small automated gates**

Real-Time Water Management

3. **Single Point Insertion Magmeter**
   - **high accuracy flow measurement**
   - **primarily used at the start of closed pipelines**
   - **this measurement in real-time is crucial for determining water usage on a pipeline**
   - **assists in leak detection**

Pump Station Management

The LNID operates 3 pump stations.

Keho/Barons, Piyami, and B6

These pump stations all use flow monitoring equipment to:

- **provide data about usage of the entire system**
- **initiate pump sequencing**
- **warn of possible pipeline breaks**
- **water meters are installed on each turnout in the Keho/Barons and Piyami systems.**

Pump Station Management

The Keho/Barons Pump Station provides water for 10,680 irrigation acres on 75 parcels of land.

The cost of operating the pump station is allocated to the pipeline water users based on actual water usage of each parcel of land.

- **the McCrometer water flow meter was installed at each turnout to determine the actual water usage of each parcel**

Pump Station Management

The information gathered from water meters has provided more benefit than calculating the usage for billing purposes.

- help tighten calculations for DDIT
- water users have requested the information from water meters for their own use
- Alberta Agriculture & Rural Development used them for the Current Irrigation Management Practices (CIMP2) program .

Pump Station Management

The Piyami Pump Station provides water for 2,200 irrigation acres on 15 parcels of land.

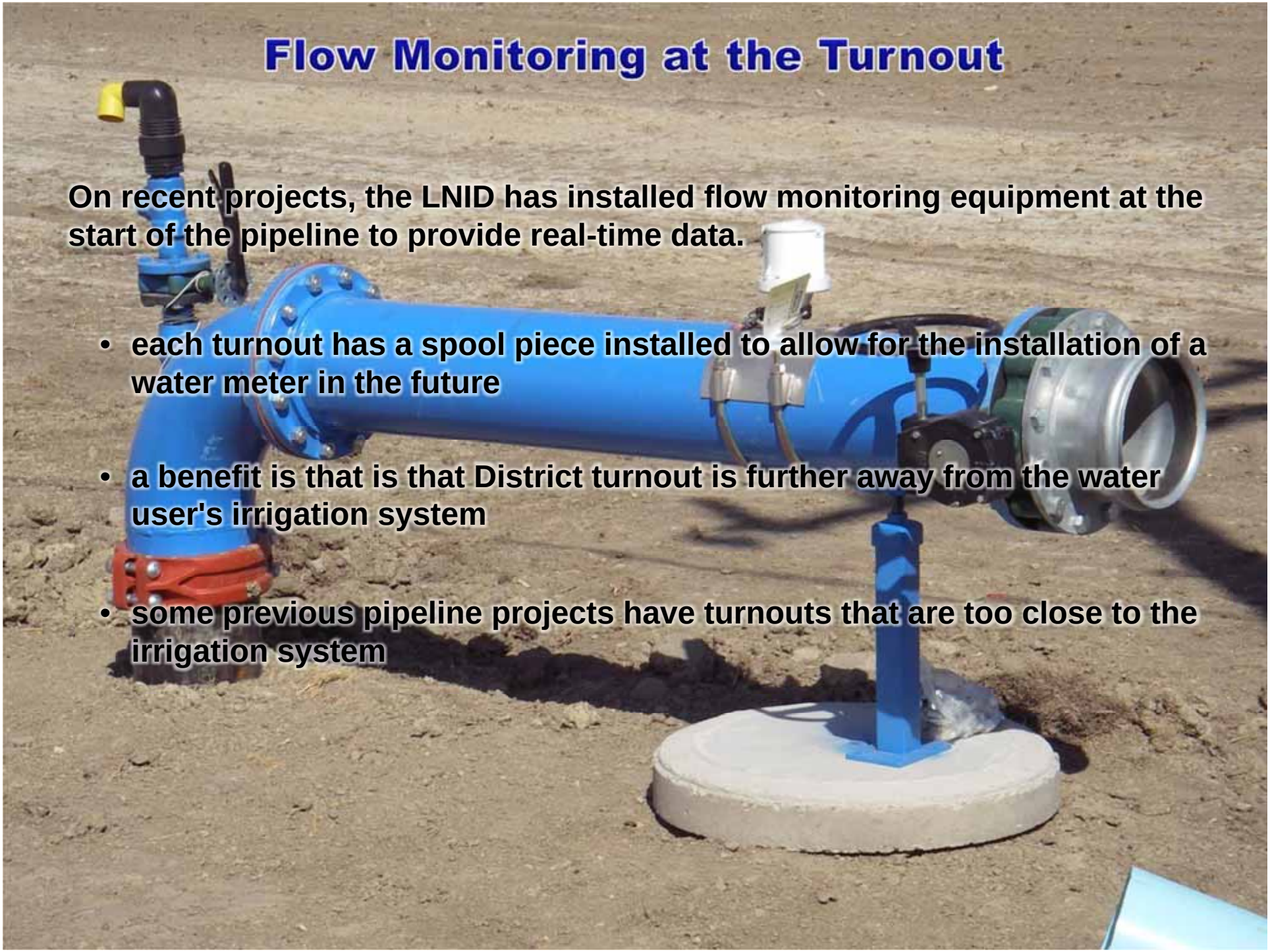
Flow meters were installed on turnouts.

Flow Monitoring at the Turnout

After Piyami, the LNID decided to install water meters on all turnouts of new pipeline projects.

- the information is used to validate DDIT and the flow meter at the start of the pipeline
- flow meters were installed on 4 gravity flow pipeline projects
- the information is not real-time

Flow Monitoring at the Turnout

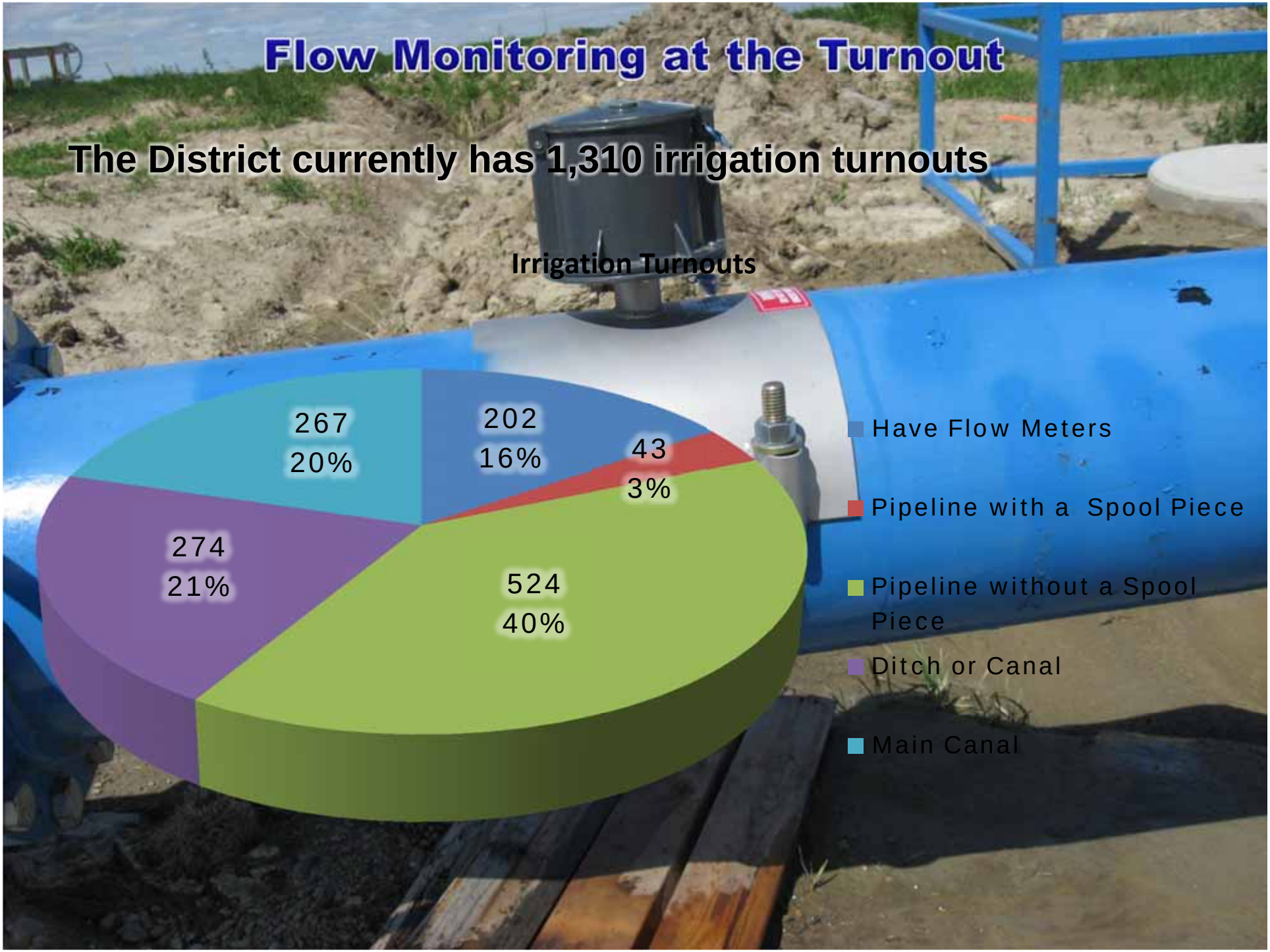


On recent projects, the LNID has installed flow monitoring equipment at the start of the pipeline to provide real-time data.

- each turnout has a spool piece installed to allow for the installation of a water meter in the future
- a benefit is that is that District turnout is further away from the water user's irrigation system
- some previous pipeline projects have turnouts that are too close to the irrigation system

Flow Monitoring at the Turnout

The District currently has 1,310 irrigation turnouts

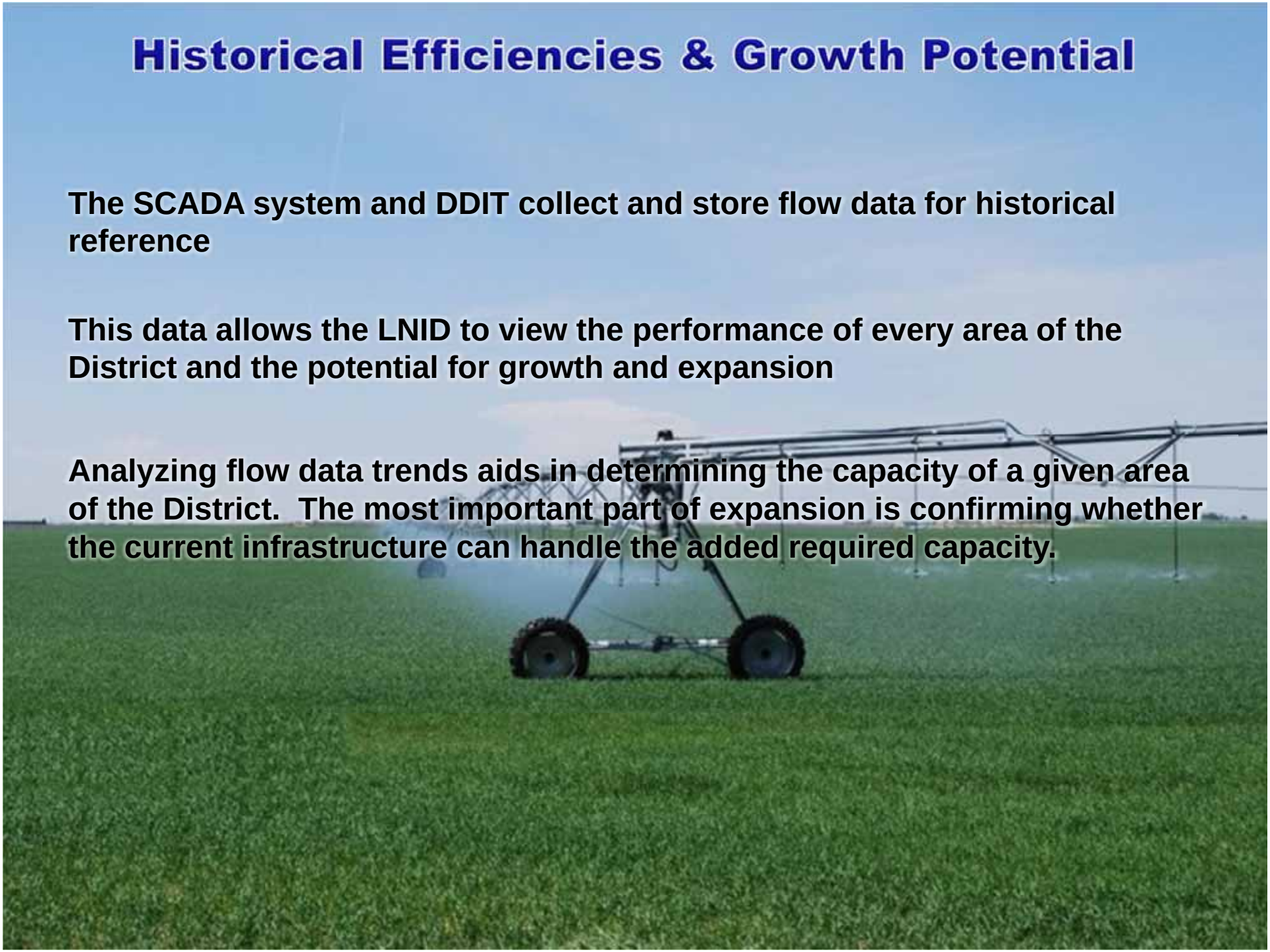


Historical Efficiencies & Growth Potential

The SCADA system and DDIT collect and store flow data for historical reference

This data allows the LNID to view the performance of every area of the District and the potential for growth and expansion

Analyzing flow data trends aids in determining the capacity of a given area of the District. The most important part of expansion is confirming whether the current infrastructure can handle the added required capacity.



Vision for the Future

The LNID considers that flow metering and monitoring is one of the most important areas fundamental to future growth and expansion.

- **increased efficiencies permits expansion and water availability for other use purposes as specified in the District's Amended Water Licence**
- **at the current time the District is not installing water meters on all turnouts, but is allowing for future installation on new pipelines**
- **the LNID is positioning itself in the future to assessing water rates based partially on a variable rate for actual consumption**

Efficient operation of the District depends heavily on flow monitoring from the time the water enters the District's system until the time it is delivered to the water user or returned to the river.

LETHBRIDGE NORTHERN IRRIGATION DISTRICT

Questions?

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