

Irrigation and Innovation

Alberta Land Institute
Land, Water, & Society
May 2018

Irrigation in Alberta

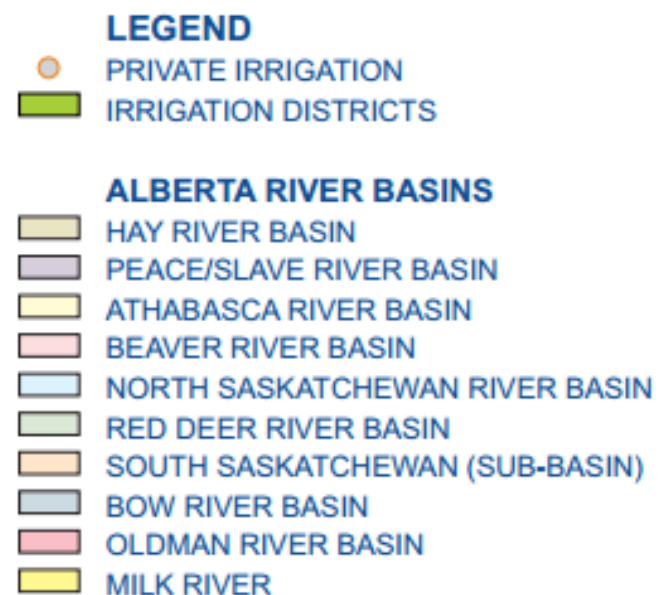
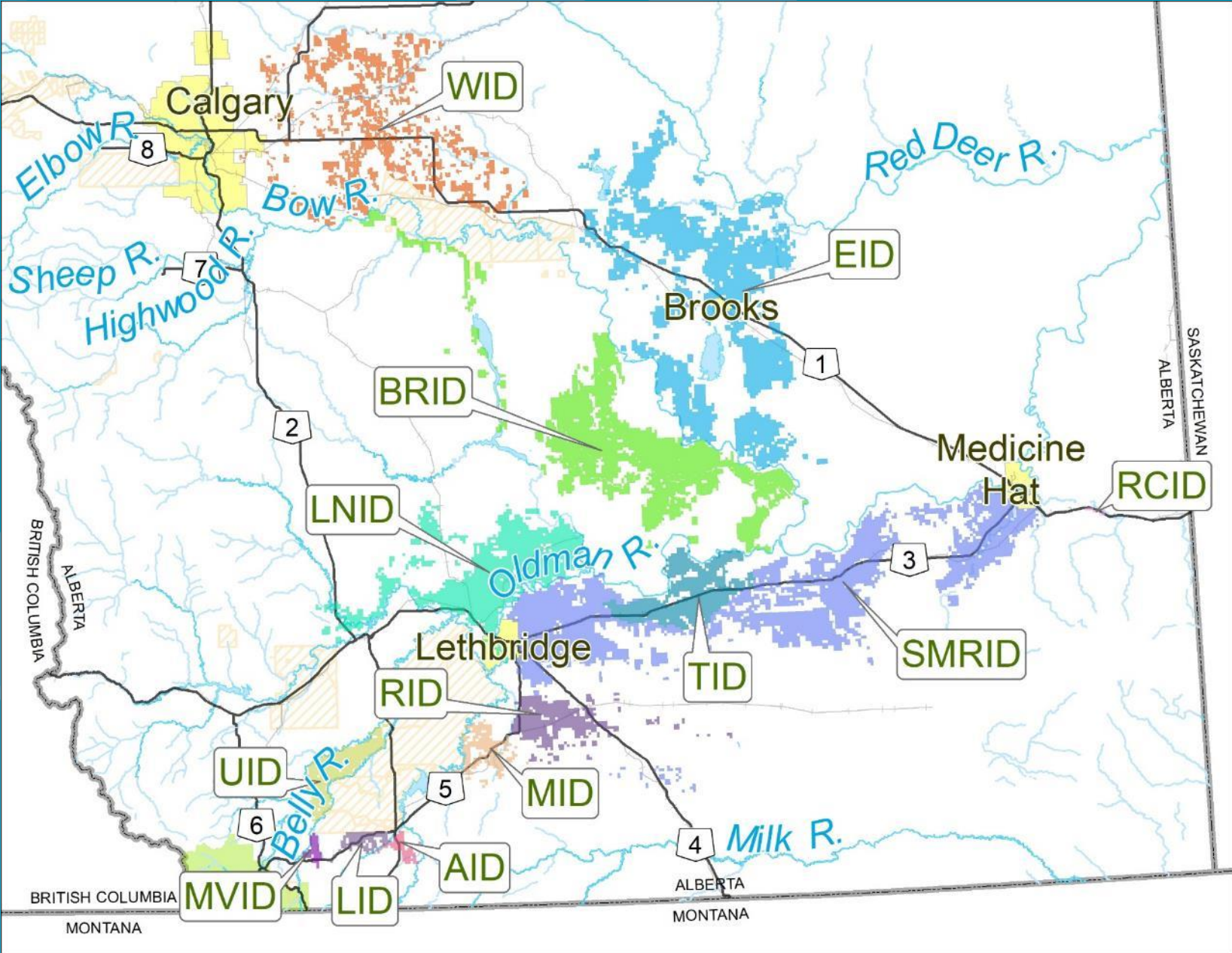
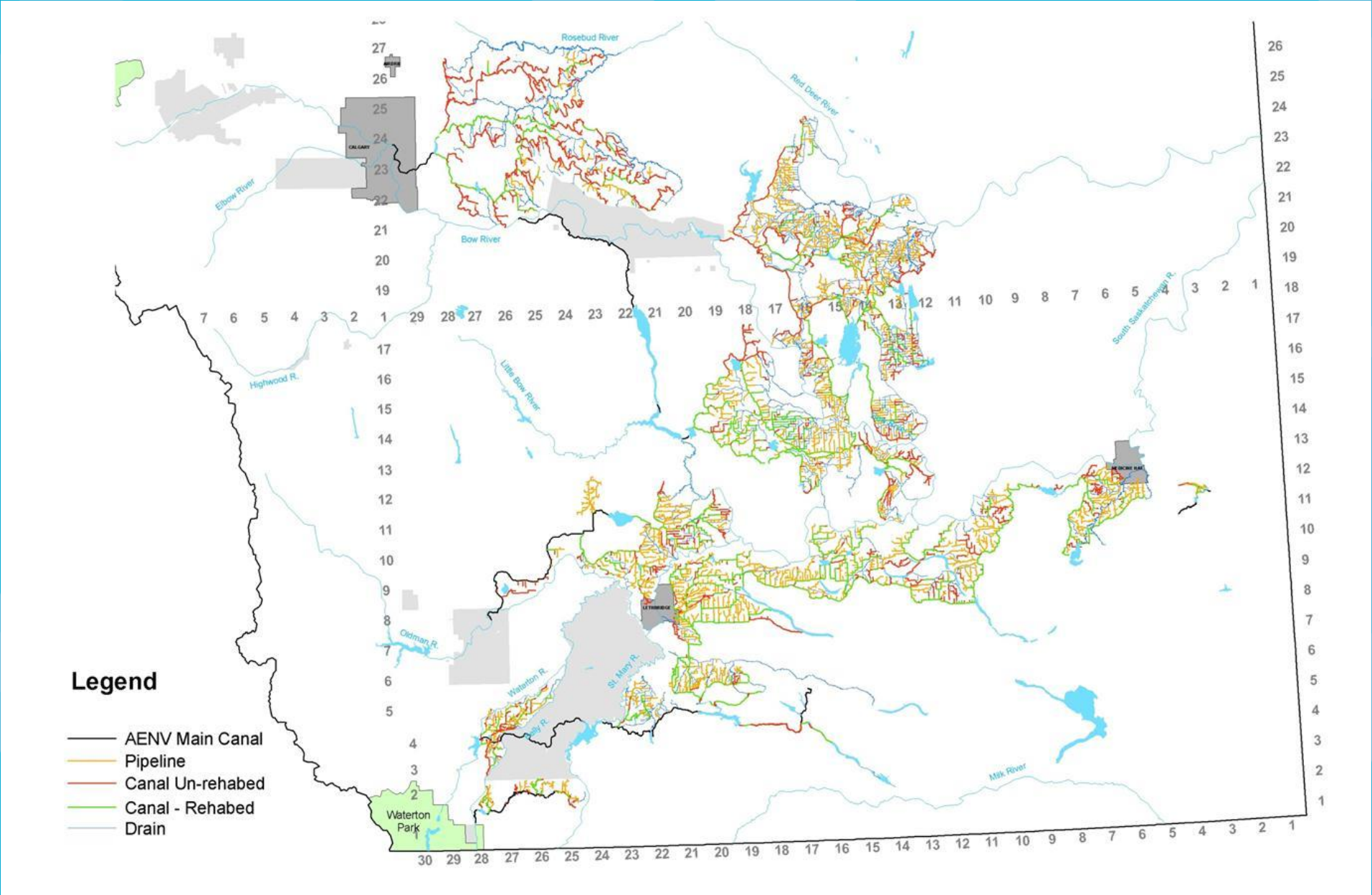


Figure 1. Location of irrigated areas in Alberta.

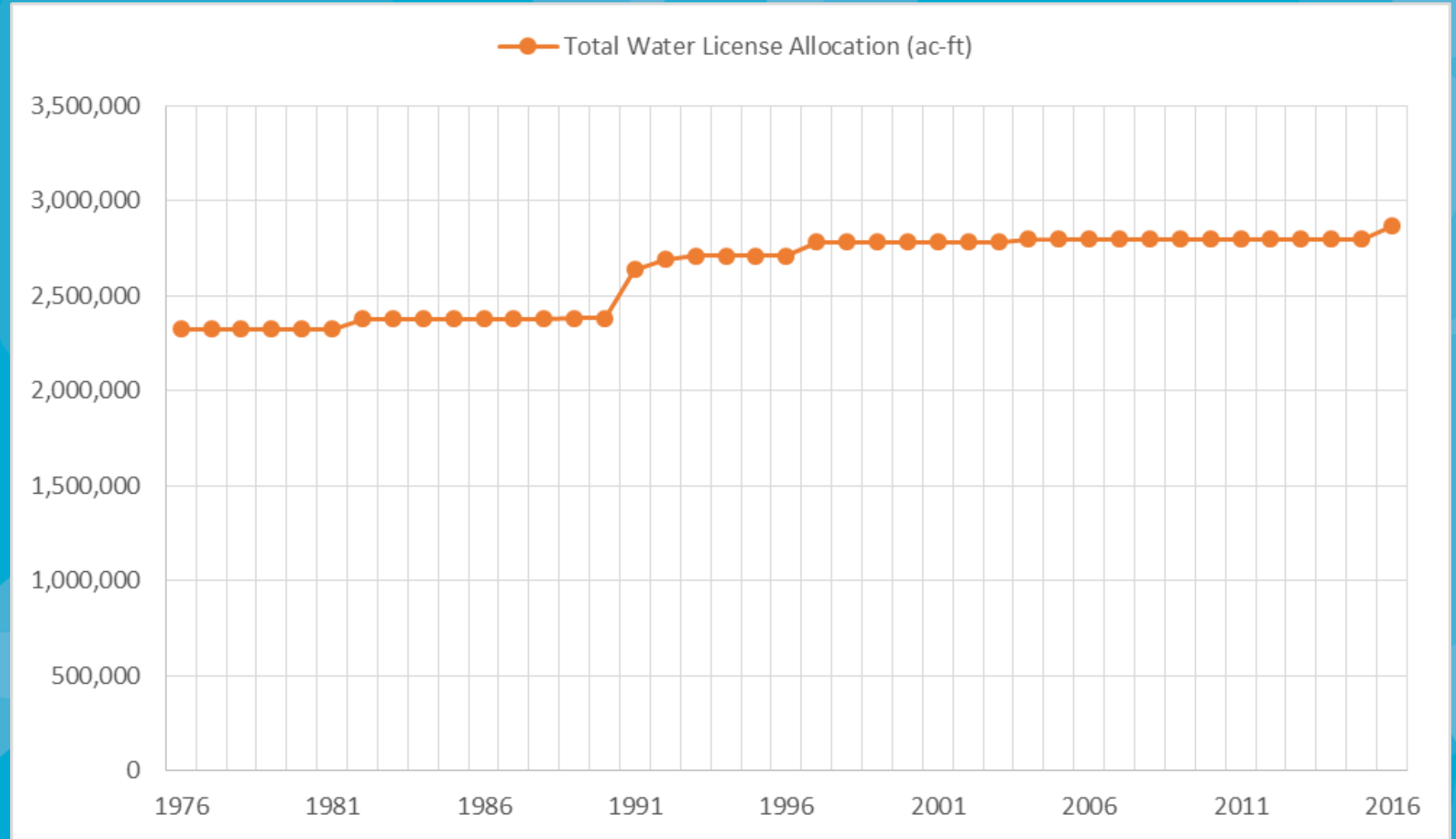
Irrigation in Alberta



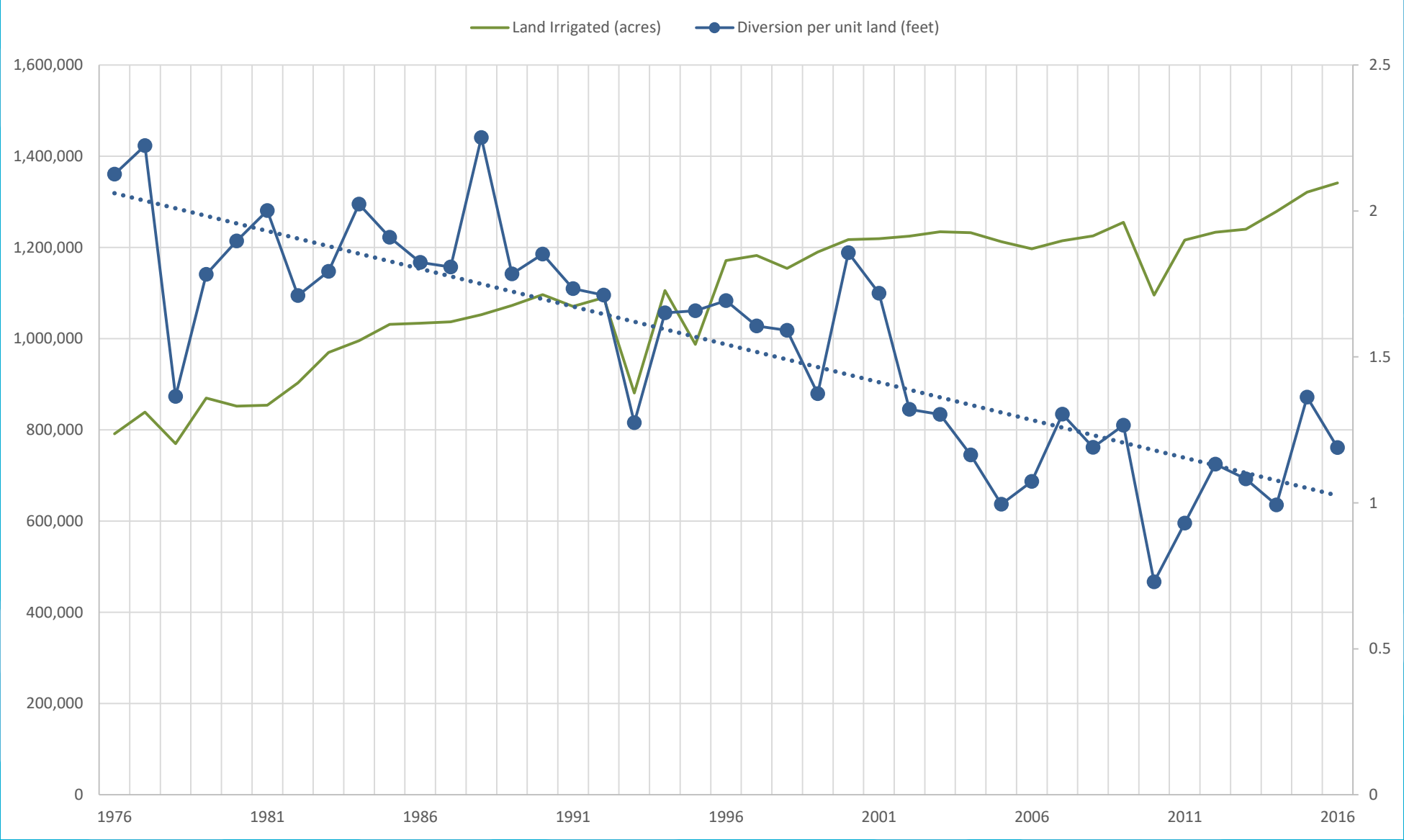
Irrigation in Alberta



The Challenge:



The response:



Efficiency through innovation

Three areas of efficiency gains:

- Conveyance efficiency
- Application efficiency
- Management (conveyance network and on-farm application)



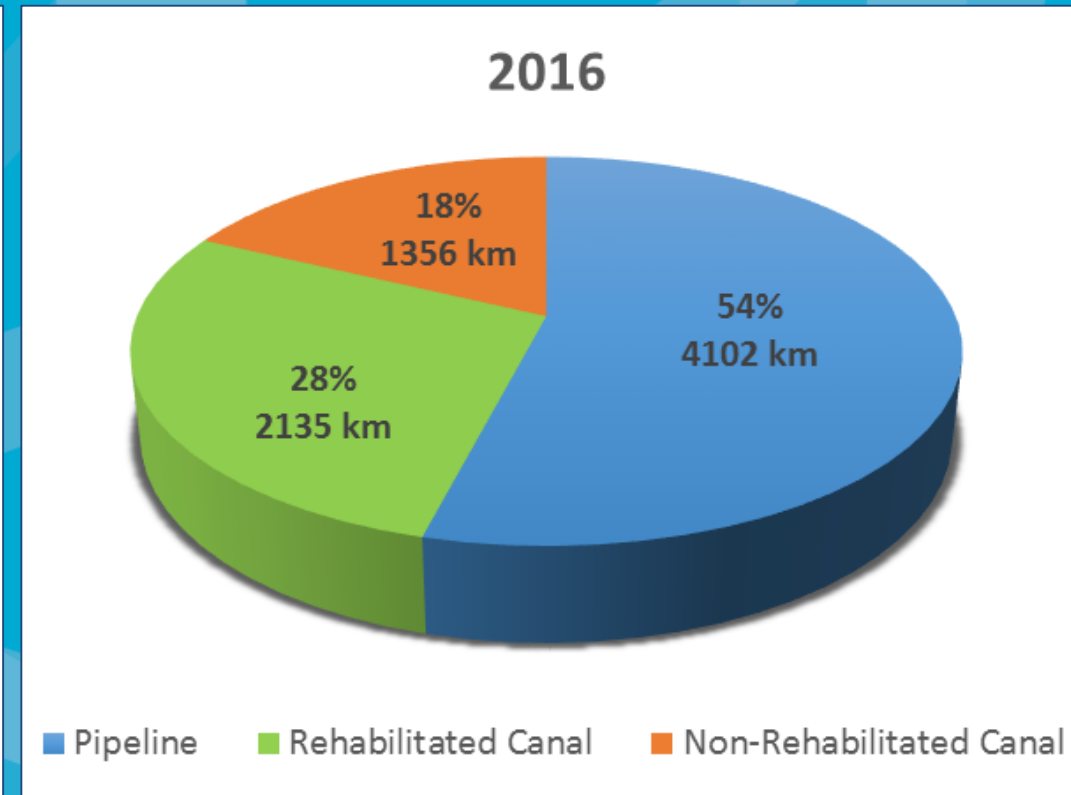
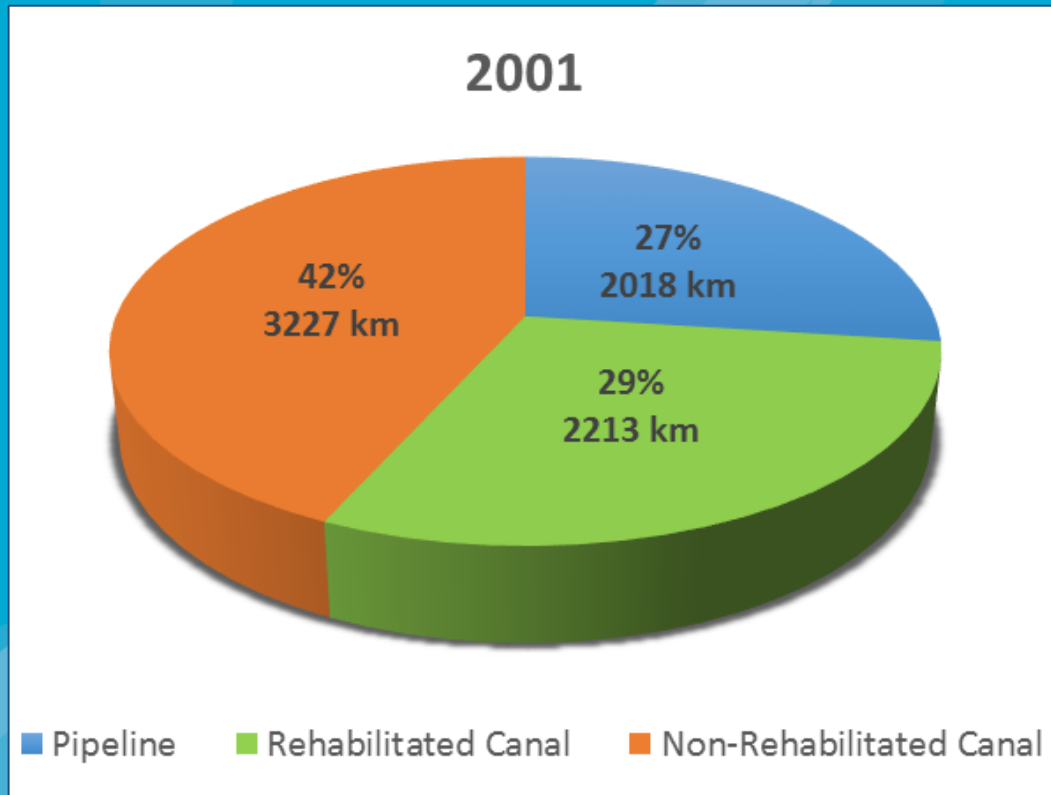
Efficiency through innovation:

Water Conveyance

Efficiency through innovation: Conveyance



Efficiency through innovation: Conveyance





Efficiency through innovation:

Water Application

Efficiency through innovation: Application



30-50%

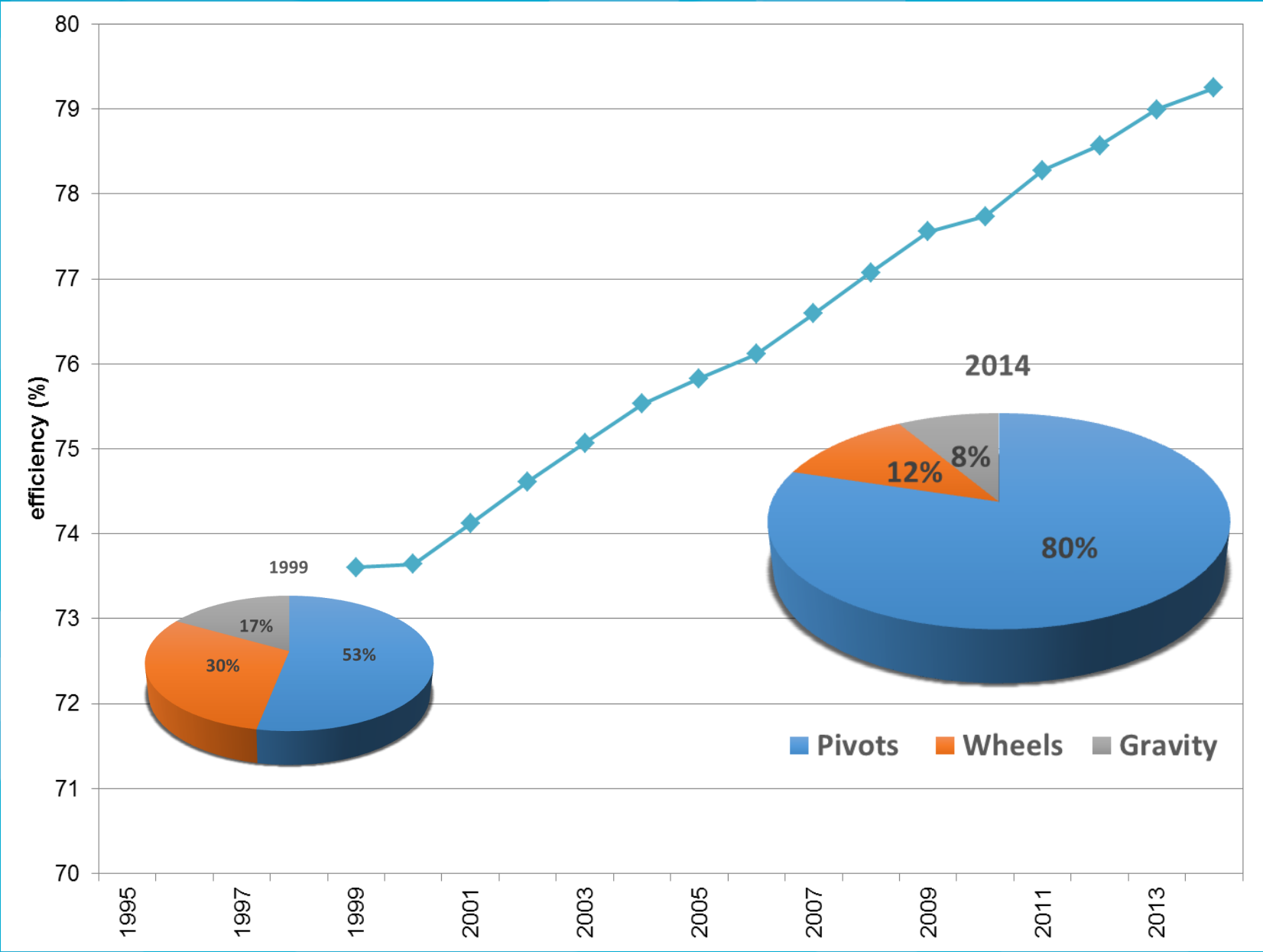


70%

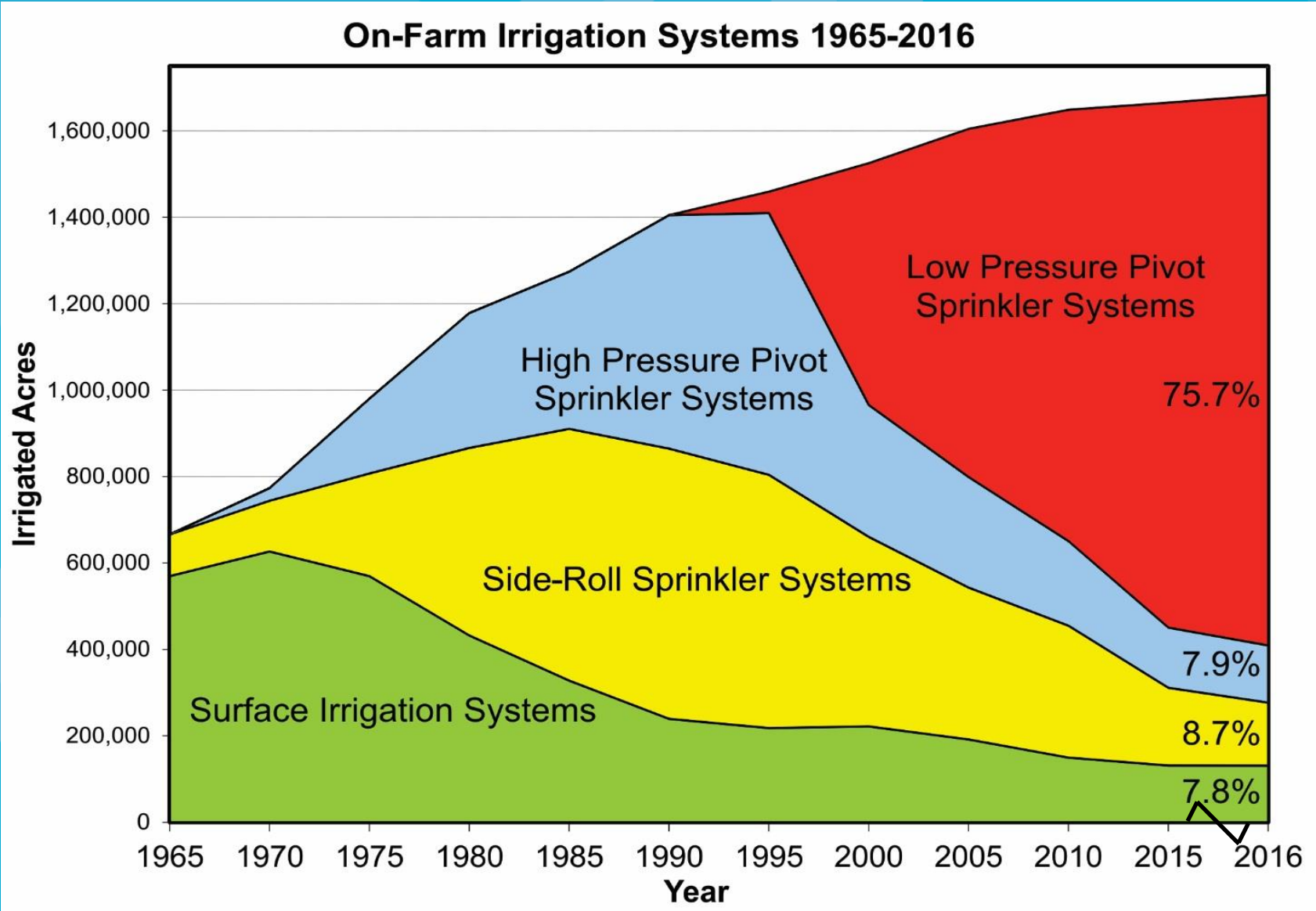


84%

Efficiency through innovation: Application



Efficiency through innovation: Application



Efficiency through innovation: Application

What's next?



Efficiency through innovation: Application

What's next?





Efficiency through innovation:

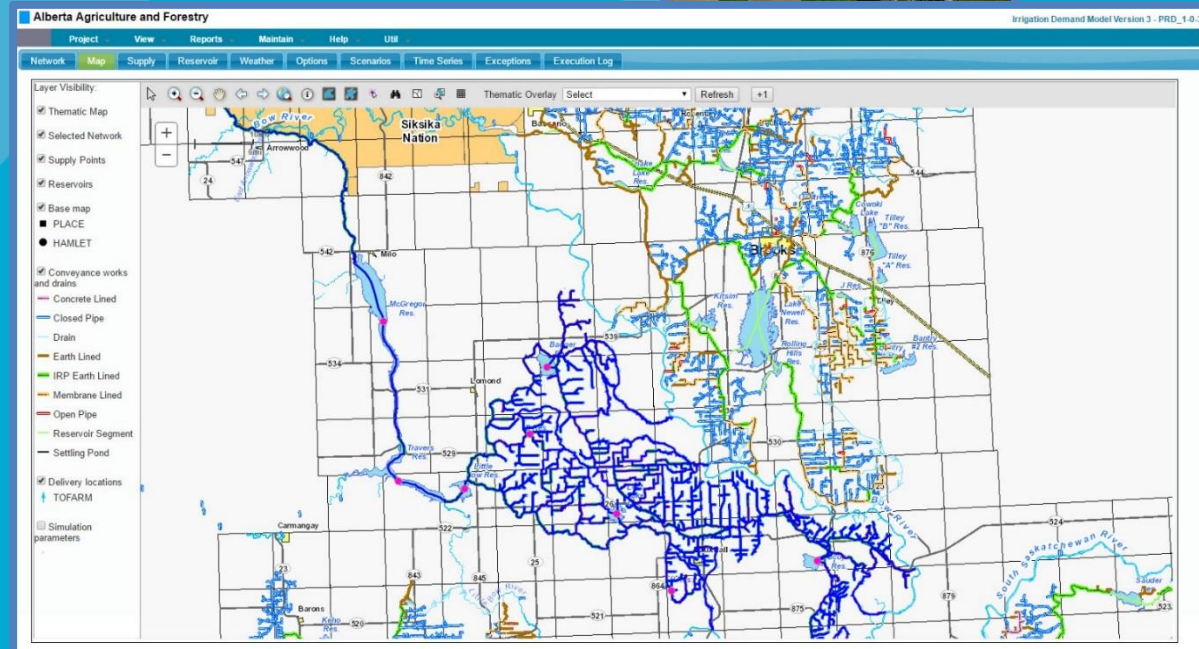
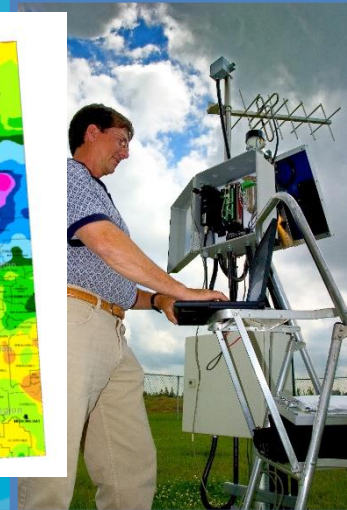
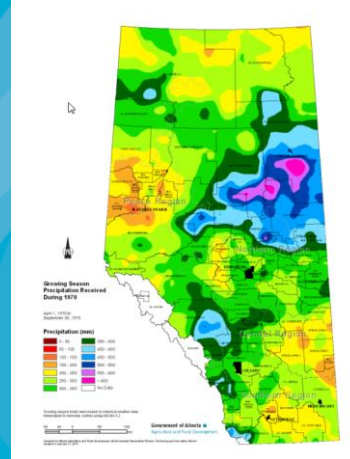
Water Management

Efficiency through innovation: Management -IDM-3

Irrigation Demand Model (v. 3) (IDM-3)

- Linear programming optimization solver
- Incorporates crop, irrigation application system, weather, and conveyance infrastructure data

Efficiency through innovation: Management -IDM-3



Efficiency through innovation: Management

-IDM-3

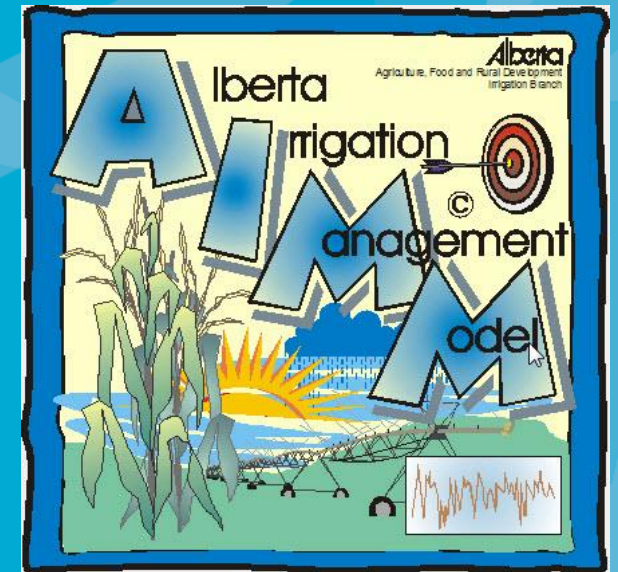
Uses:

- Districts: modelling risk of water shortage from changes to irrigated area, water 'savings' of conveyance improvements, conveyance limitations to meeting demand, etc.
- AEP: Management of provincial storage and conveyance infrastructure
- AF: modelling impacts of policy and programming decisions, modelling impacts of different climate change scenarios.

Efficiency through innovation: Management -AIMM

Alberta Irrigation Management Model (AIMM)

- Assists producers with irrigation scheduling.



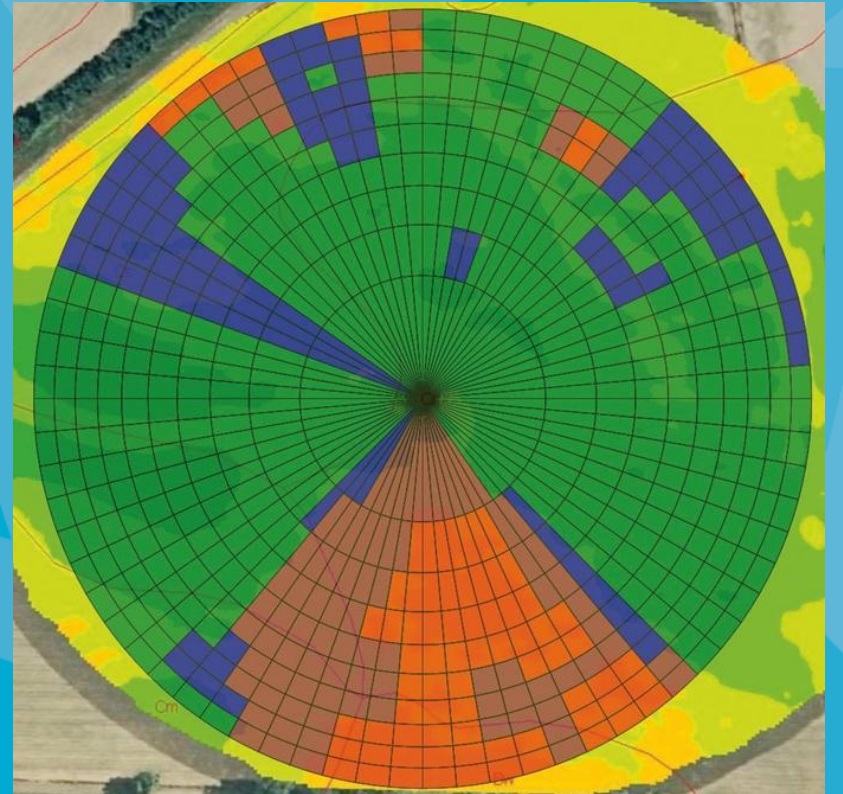
Efficiency through innovation: Management -AIMM

- Field-scale crop information (type, seeding date, fertility), soil data (texture by depth, initial moisture profile), and irrigation (systems, events)
- Near-real time weather data from the provincial weather station network (temp., wind, solar radiation, RH, precip.)
- Models crop demand through maturity
- Makes recommendations on when/how much to irrigate.

Efficiency through innovation: Management -VRI

Variable rate irrigation (VRI)

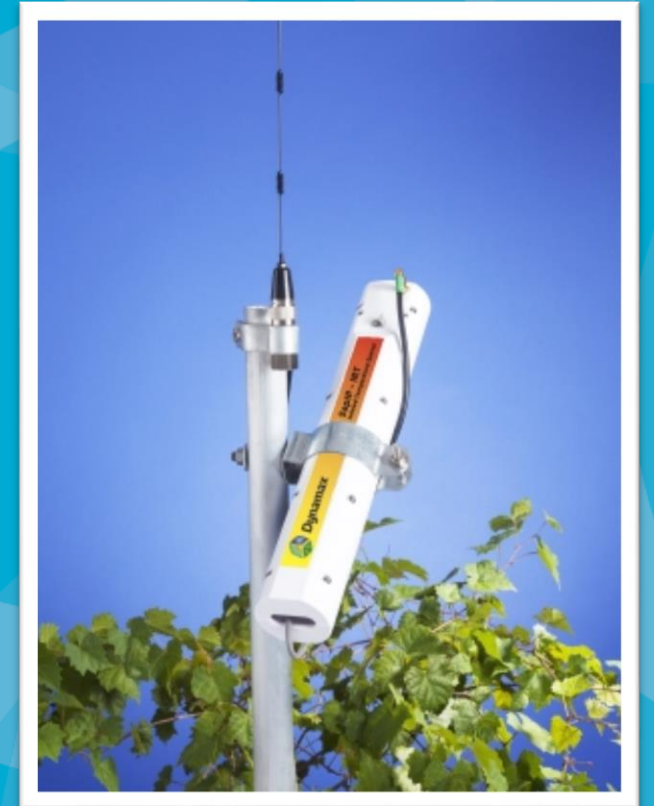
- Allows each nozzle on a pivot to be controlled independently



Efficiency through innovation: Management -VRI/IRT

Infrared thermometer (IRT)

- Mounted obliquely on pivot arm
- 2 IRTs for each VRI zone on the pivot
- Wireless connection to VRI control unit
- ... real-time water prescription maps.



In closing ... Efficiency through Innovation

