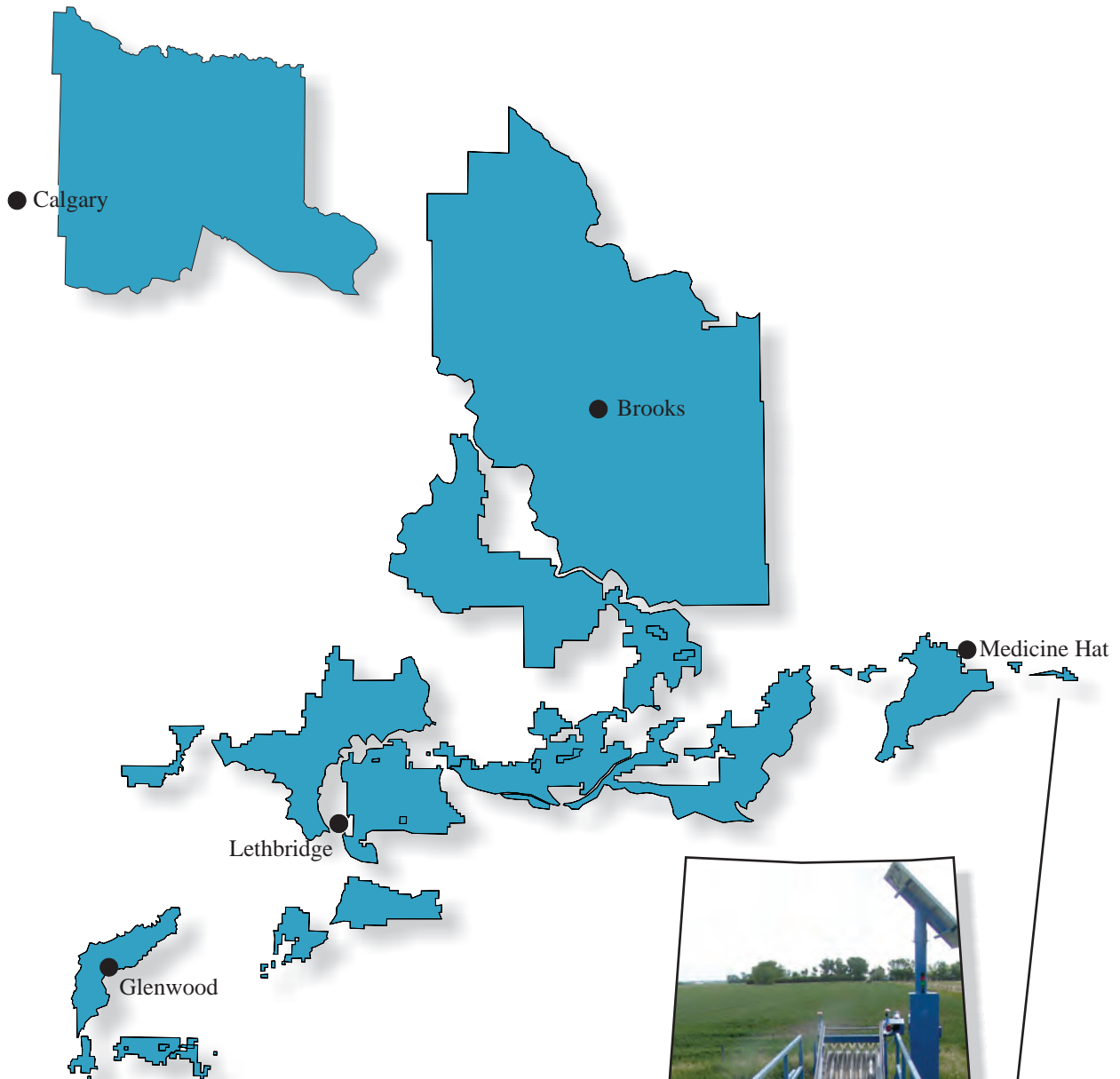


Alberta Irrigation Information 2011



ALBERTA IRRIGATION INFORMATION

FACTS AND FIGURES FOR THE YEAR 2011

BASIN WATER MANAGEMENT BRANCH
IRRIGATION AND FARM WATER DIVISION

JUNE 2012

This report is prepared by Alberta Agriculture and Rural Development. The purpose of this booklet is to provide a statistical overview of irrigation information and data relating primarily to the thirteen irrigation districts situated in southern Alberta, but also includes irrigation water use across the whole province.

For more information, please contact:
Bob Winter, Alberta Agriculture and Rural Development
100, 5401- 1st Avenue South
Agriculture Centre
Lethbridge, Alberta T1J 4V6
Telephone (403) 382-4424
bob.winter@gov.ab.ca

For an electronic version of this report or additional information visit:

Website: www.agric.gov.ab.ca

Select: Information ⇒ Soil/Water/Air ⇒ Irrigation

LIST OF FIGURES

Figure 1. Irrigated Crops within the 13 Irrigation Districts in Southern Alberta (2002 - 2011)	3
Figure 2. Acres of Five Major Irrigated Specialty Crops – Canola Seed, Alfalfa Seed, Dry Beans, Potatoes, and Sugar Beets	3
Figure 3. Crops Grown within the 13 Irrigation Districts in 2011	4
Figure 4. On-farm Irrigation Methods within the 13 Irrigation Districts in 2011	4
Figure 5. Irrigation Method Summary within the 13 Irrigation Districts (2002 - 2011)	6
Figure 6. Growth in Irrigation in Alberta (1970 - 2011)	11
Figure 7. Irrigation Districts Gross Annual Diversions (1976 - 2011).....	11
Figure 8. Irrigation Districts Gross Diversion Equivalent Depth (1980 - 2011).....	12
Figure 9. Irrigation Districts Water Use Productivity (1980 - 2011)	12
Figure 10. Private Irrigation in Alberta.....	20
Figure 11. Lethbridge Optimum Crop Water and Net Irrigation Requirements	21
Figure 12. Lethbridge Corn Heat Units (2002 - 2011).....	21
Figure 13. Bow Island Optimum Crop Water and Net Irrigation Requirements	22
Figure 14. Bow Island Corn Heat Units (2002 - 2011)	22
Figure 15. Brooks Optimum Crop Water and Net Irrigation Requirements.....	23
Figure 16. Brooks Corn Heat Units (2002 - 2011).....	23
Figure 17. Historical Irrigation Energy Prices.....	25
Figure 18. Alberta's Irrigation Districts	26

LIST OF TABLES

Table 1. Details of Crops Grown within the 13 Irrigation Districts in 2011.....	1
Table 2. Summary of Crops Grown within the 13 Irrigation Districts in 2011	2
Table 3. On-farm Irrigation Method Summary within the 13 Irrigation Districts.....	5
Table 4. Assessment Roll Acres within the 13 Irrigation Districts.....	7
Table 5. Acres Actually Irrigated within the 13 Irrigation Districts.....	8
Table 6. Irrigation Districts Annual Water Rates.....	9
Table 7. Gross Annual Diversions to Alberta Irrigation Districts	10
Table 8. Irrigation Districts Water Balance	13
Table 9. Conveyance Infrastructure by Type of Works in 2011	14
Table 10. Irrigation District Infrastructure by Length and Replacement Cost in 2011	15
Table 11. Summary of Irrigation District Water Licence Allocations	16
Table 12. Summary of Condition Assessments.....	16
Table 13. Irrigation District Reservoirs	17
Table 14. Provincially Owned and Operated Reservoirs.....	18
Table 15. Hydroelectric Plants Associated with Water Distribution Works	18
Table 16. Private Water Licences for Irrigation in Alberta	19
Table 17. Historical Rainfall in Southern Alberta	24
Table 18. Historical Corn Heat Units in Southern Alberta	24
Table 19. Frost Free Period (0° C) in Southern Alberta	24
Table 20. Frost Free Period (-2° C) in Southern Alberta	24
Table 21. Energy Type Used in the Irrigation Districts	25

Table 2. Summary of Crops Grown within the 13 Irrigation Districts in 2011

CROPS	IRRIGATION DISTRICTS													TOTAL ASSESSMENT ROLL ACRES
	AID	BRID	EID	LID	LNID	MID	MVID	RCID	RID	SMRID	TID	UID	WID	
Cereals	1,727	91,563	75,365	265	36,272	5,850	474	157	16,944	138,137	27,891	12,697	22,463	429,805
	39.3%	39.1%	25.6%	5.5%	20.6%	32.0%	13.1%	14.3%	36.6%	36.9%	33.7%	36.9%	23.5%	31.4%
Forages	2,408	40,615	131,664	4,583	106,691	8,580	3,136	637	19,083	90,824	19,475	14,304	31,073	473,073
	54.8%	17.4%	44.7%	94.5%	60.6%	46.9%	86.7%	57.9%	41.2%	24.3%	23.5%	41.6%	32.5%	34.5%
Oil Seeds	135	26,457	44,859	0	23,902	3,277	0	116	9,425	59,893	3,521	5,895	13,674	191,153
	3.1%	11.3%	15.2%	0.0%	13.6%	17.9%	0.0%	10.5%	20.4%	16.0%	4.3%	17.1%	14.3%	13.9%
Specialty Crops	118	56,291	35,517	0	6,108	377	0	0	305	80,477	27,684	1,075	5,197	213,150
	2.7%	24.1%	12.1%	0.0%	3.5%	2.1%	0.0%	0.0%	0.7%	21.5%	33.4%	3.1%	5.4%	15.6%
Other*	2	19,088	6,968	0	3,214	217	7	191	545	5,076	4,202	411	23,347	63,268
	0.0%	8.2%	2.4%	0.0%	1.8%	1.2%	0.2%	17.3%	1.2%	1.4%	5.1%	1.2%	24.4%	4.6%
TOTAL ASSESSMENT ROLL ACRES	4,390	237,014	294,373	4,848	176,187	18,300	3,617	1,101	46,302	374,408	82,773	34,382	95,754	1,370,449

Note: Assessment roll acres include "irrigation", "terminable" and "annual" acres

*Other includes unknown or not reported crops

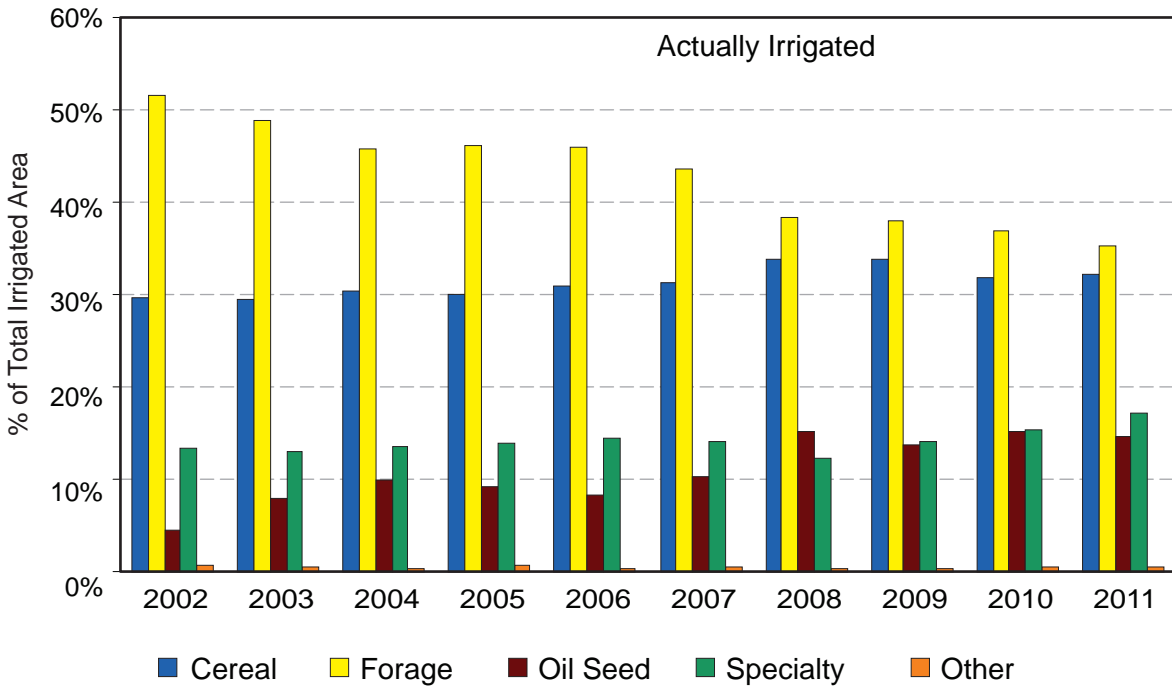


Figure 1. Irrigated Crops within the 13 Irrigation Districts in Southern Alberta (2002 - 2011)

Note: Starting in 2011, acreage data for canola seed (canola grown for seed production) was collected. It is included in the specialty crop category.

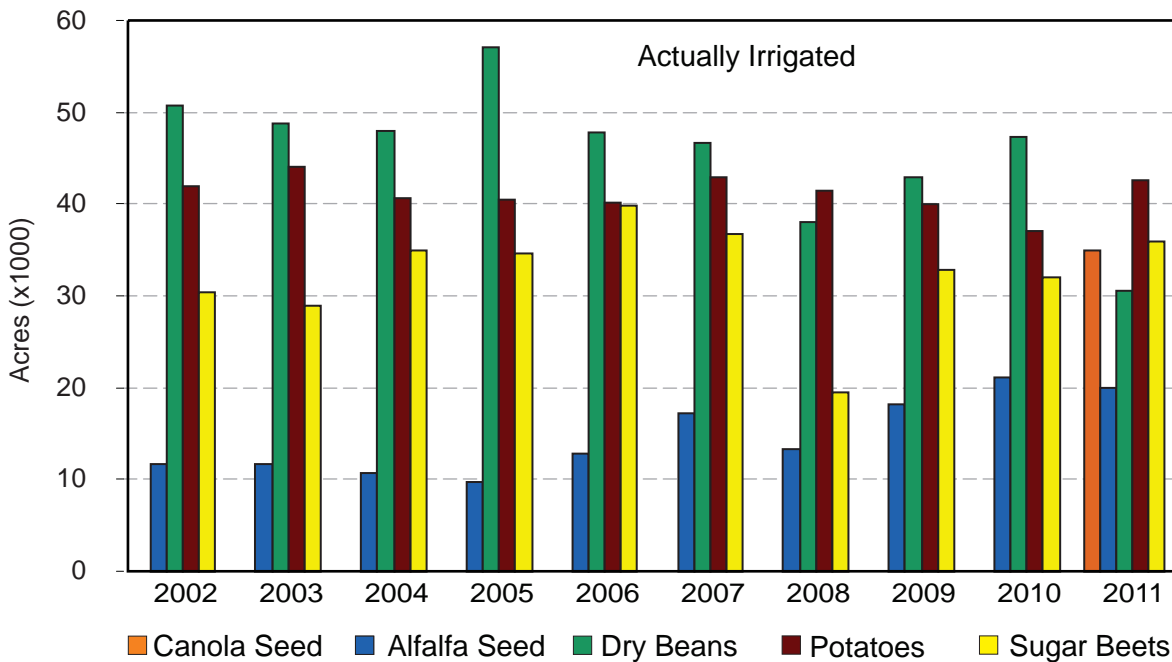


Figure 2. Acres of Five Major Irrigated Specialty Crops – Canola Seed, Alfalfa Seed, Dry Beans, Potatoes and Sugar Beets within the 13 Irrigation Districts in Southern Alberta (2002 - 2011)

Note: Starting in 2011, acreage data for canola seed (canola grown for seed production) was collected. It is included in the specialty crop category.

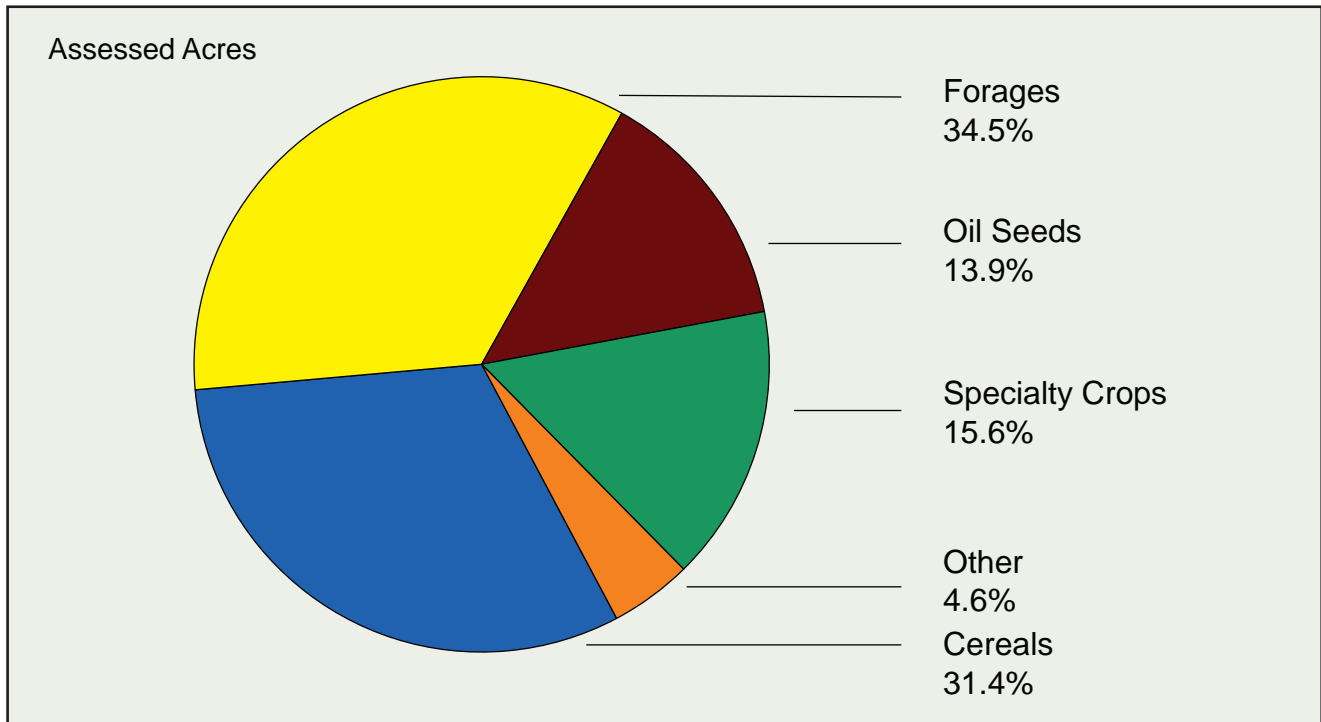


Figure 3. Crops Grown within the 13 Irrigation Districts in Southern Alberta in 2011

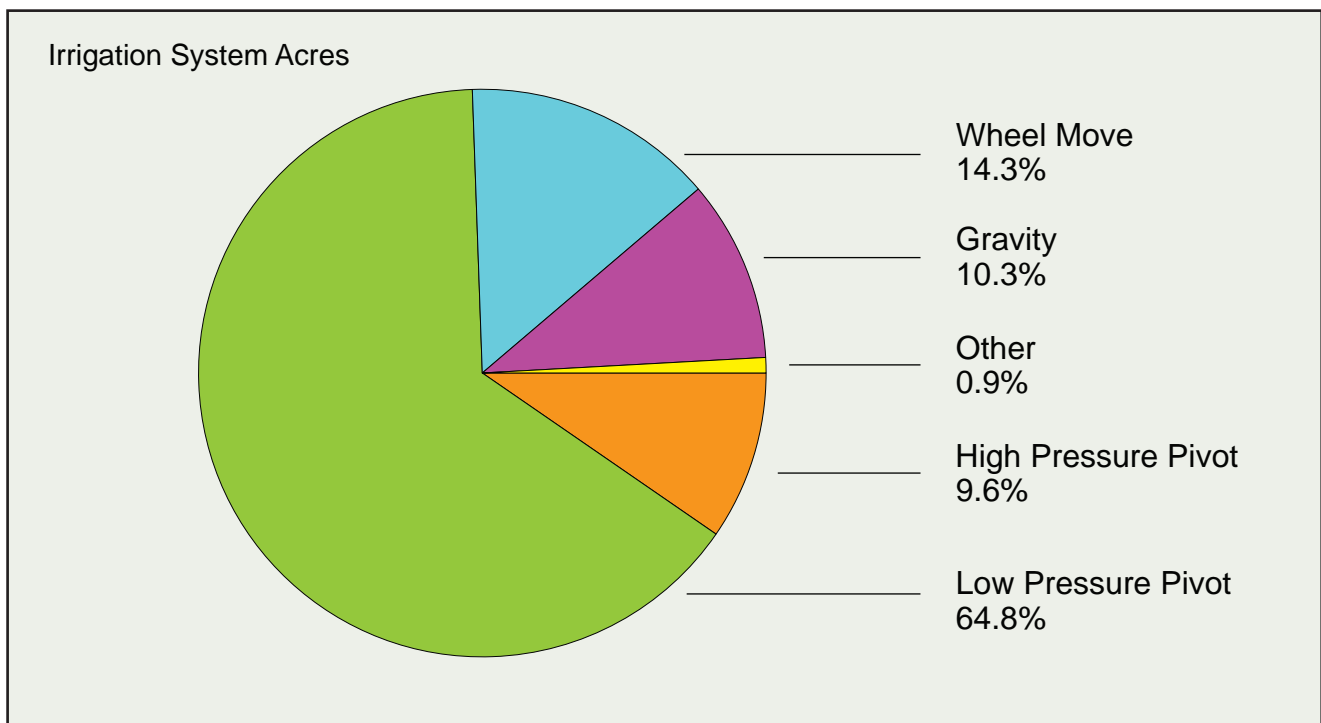
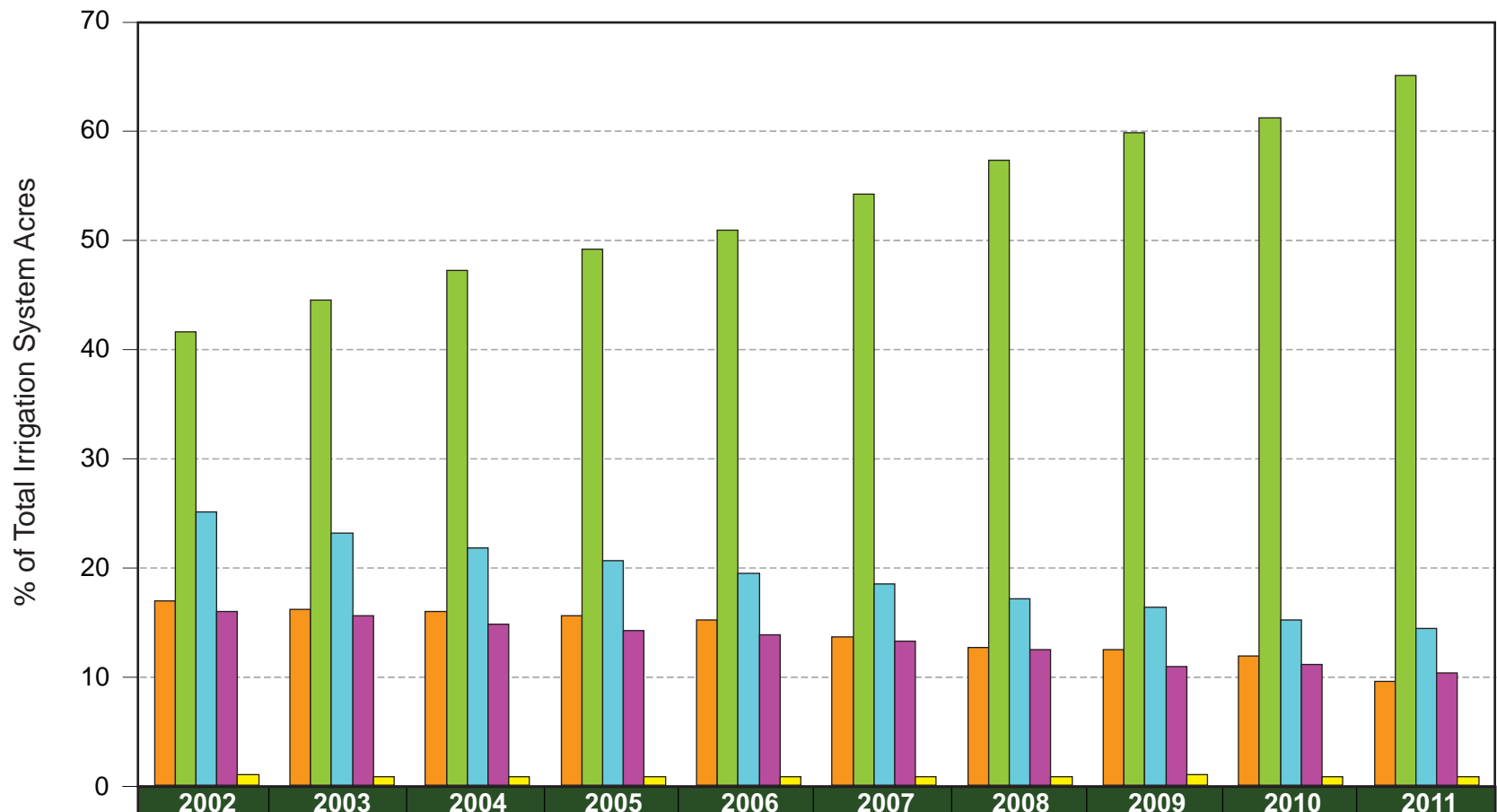


Figure 4. On-farm Irrigation Methods within the 13 Irrigation Districts in Southern Alberta in 2011

Table 3. On-farm Irrigation Method Summary within the 13 Irrigation Districts in Southern Alberta in 2011

IRRIGATION METHOD		AID	BRID	EID	LID	LNID	MID	MVID	RCID	RID	SMRID	TID	UID	WID	Individual Method Total	Total Acres Covered
HIGH PRESSURE PIVOT SPRINKLER	Pivot High Pressure		22,365	28,809	839	8,287	2,186		237		9,871	12,229	4,367	24,564	113,753	126,864
	Pivot High Pressure - Corner arm		1,574	3,246		4,351					1,408	1,016			11,595	
	Linear - High Pressure			217		875						109		314	1,515	
	percent of district -----	0.0%	11.1%	11.0%	17.8%	7.7%	11.9%	0.0%	22.0%	0.0%	3.1%	16.7%	12.8%	30.2%	9.6%	
LOW PRESSURE PIVOT SPRINKLER	Pivot Medium Pressure		2,697	3,985		641					3,026				10,349	856,708
	Pivot Medium Pressure - Corner Arm		280	248							288				816	
	Pivot Low Pressure	1,227	131,149	142,779	241	46,344	7,268		477	27,206	251,242	37,917	12,116	31,589	689,556	
	Pivot Low Pressure - Corner Arm		24,565	9,266		60,564				1,824	42,423	12,305	792	1,316	153,055	
	Linear - Low Pressure			1,256		336					931	249	80	80	2,932	
percent of district -----	31.0%	73.3%	53.6%	5.1%	61.5%	39.7%	0.0%	44.4%	62.7%	82.5%	63.0%	38.2%	40.0%	64.8%		
WHEEL MOVE	Wheel Move -Two Laterals	1,942	9,341	22,721	1,314	21,805	5,338	507	254	11,532	36,904	12,661	2,023	11,699	138,040	189,410
	Wheel Move - Four Laterals		5,900	8,601	358	26,195	140			1,688	5,098	853	224	2,312	51,369	
	percent of district -----	49.1%	7.0%	10.7%	35.5%	27.3%	29.9%	13.9%	23.6%	28.6%	11.6%	16.9%	6.6%	17.0%	14.3%	
GRAVITY	Gravity - Developed - No Control	11	14,774	57,954		1,245	3,174			2,944	1,526	1,450	1,148		84,226	136,711
	Gravity - Undeveloped - Flood	208	3,614	13,747	1,535	884		3,143	107	1,055	6,557	1,105	13,125	7,403	52,485	
	percent of district -----	5.5%	8.5%	24.4%	32.6%	1.2%	17.3%	86.1%	10.0%	8.6%	2.2%	3.2%	41.9%	9.0%	10.3%	
OTHER	Volume Gun - Stationary										151	10		65	226	11,630
	Volume Gun - Traveller		40	285		144					49	46		686	1,250	
	Solid Set (underground sprinkler)	47		8		532					254			202	1,044	
	Hand Move (sprinkler above ground)	522	75	576	426	952	174			47	1,267	113	149	729	5,021	
	Micro - Spray - Sprinkler					41					39	15	15	116	226	
	Micro - Drip - Trickle							20			6	121		1,282	1,429	
	Other Application Use					2,365					6			64	2,435	
percent of district -----	14.4%	0.1%	0.3%	9.0%	2.3%	1.1%	0.0%	0.0%	0.1%	0.5%	0.2%	0.5%	3.8%	0.9%		
Total System Acres		3,957	216,374	293,689	4,713	175,561	18,300	3,650	1,075	46,302	361,162	80,078	34,041	82,421		1,321,322



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
High Pressure Pivot	214,009	206,746	204,342	201,601	198,011	176,421	164,072	160,664	156,907	126,864
Low Pressure Pivot	525,727	567,742	607,014	635,880	660,168	705,260	747,187	774,537	802,049	856,708
Wheelmove	316,689	295,310	279,183	265,897	252,831	239,140	222,247	210,606	198,043	189,410
Gravity	202,586	197,799	189,033	183,811	178,411	171,487	162,063	141,884	145,882	136,711
Other	11,773	11,006	9,347	10,600	10,579	10,380	9,870	11,935	11,826	11,630

Figure 5. Irrigation Method Summary within the 13 Irrigation Districts in Southern Alberta (2002 - 2011)

Table 6. Irrigation Districts Annual Water Rates (\$ per assessed acre per year)

YEAR	AID	BRID	EID	LID	LNID	MID	MVID	RCID	RID	SMRID	TID	UID	WID
1982	\$2.50	\$6.50	\$6.50	\$5.00	\$12.00	\$6.00	\$3.00	\$3.00	\$6.25	\$12.00	\$10.75	\$3.25	\$6.30
83	\$5.00	\$9.00	\$6.75	\$8.00	\$12.50	\$6.00	\$5.20	\$3.00	\$6.50	\$12.00	\$11.00	\$3.25	\$6.50
84	\$6.00	\$10.00	\$7.00	\$8.00	\$12.50	\$6.00	\$5.20	\$3.00	\$6.50	\$12.00	\$11.00	\$3.25	\$6.75
1985	\$6.00	\$10.00	\$7.00	\$7.50	\$12.50	\$6.00	\$5.20	\$4.00	\$6.50	\$12.00	\$11.00	\$3.25	\$7.25
86	\$6.00	\$10.00	\$7.25	\$7.50	\$12.50	\$6.00	\$5.20	\$6.00	\$6.50	\$13.00	\$11.00	\$3.25	\$7.47
87	\$6.00	\$10.00	\$7.50	\$7.50*	\$12.50*	\$6.00	\$5.20	\$6.00	\$6.50	\$13.00	\$11.00	\$3.25	\$7.47
88	\$7.00*	\$10.00	\$7.50	\$8.00*	\$12.50*	\$6.00	\$5.20	\$6.00	\$6.50	\$13.00	\$12.00	\$3.25	\$7.70
89	\$7.00*	\$10.00	\$8.00	\$8.00*	\$13.50*	\$6.00	\$6.20	\$6.00	\$6.50	\$13.25	\$12.00	\$3.50	\$8.00
1990	\$8.00*	\$10.00	\$8.50	\$8.00*	\$13.50*	\$6.00	\$6.20	\$6.00	\$6.50	\$14.00	\$12.00	\$3.75	\$11.00
91	\$8.00*	\$10.00	\$8.50	\$7.00*	\$13.50*	\$6.00*	\$6.20	\$6.00	\$6.50	\$14.00	\$12.00	\$4.00	\$13.00
92	\$8.00*	\$11.00	\$8.50	\$7.00*	\$14.00*	\$6.00*	\$6.20	\$6.00	\$6.50	\$14.00	\$12.00	\$4.25	\$13.50
93	\$8.00*	\$11.00	\$8.50	\$7.00*	\$14.00*	\$6.00*	\$6.20	\$6.00	\$6.50	\$14.25	\$12.00	\$4.50	\$13.50*
94	\$8.00*	\$12.00	\$8.50	\$7.00*	\$14.00*	\$6.50*	\$6.20	\$6.00	\$7.00	\$15.25	\$12.00	\$4.50	\$14.75*
1995	\$8.00*	\$13.00	\$8.50	\$8.00*	\$14.00*	\$7.00*	\$8.00	\$8.50	\$7.00	\$16.15	\$12.00	\$4.50	\$14.75*
96	\$8.00*	\$13.00	\$8.50	\$8.00*	\$14.00*	\$7.00*	\$8.00	\$8.50	\$7.50	\$16.15	\$12.00	\$6.50	\$15.25*
97	\$8.00*	\$13.00	\$7.50	\$8.00*	\$14.00*	\$7.00*	\$8.00	\$8.50	\$7.50	\$16.15	\$12.00	\$6.75	\$15.25*
98	\$8.00*	\$13.50	\$7.50	\$8.00*	\$14.00*	\$7.50*	\$8.00	\$8.50	\$8.50	\$16.65	\$12.00	\$7.00	\$16.25*
99	\$8.00*	\$14.50	\$7.50	\$8.00*	\$14.00*	\$7.50*	\$8.00	\$8.50	\$8.50	\$17.00	\$12.00	\$7.25	\$16.25*
2000	\$8.00*	\$14.50	\$7.50	\$8.00*	\$14.00*	\$7.50*	\$8.00	\$8.50	\$8.50	\$17.50	\$12.00	\$7.50	\$16.25*
01	\$8.00*	\$14.50	\$7.50	\$8.00*	\$14.00*	\$7.50*	\$8.00	\$8.50	\$8.50	\$17.90	\$11.00	\$7.50	\$16.25*
02	\$8.00*	\$14.50	\$7.50	\$8.00*	\$14.00*	\$7.50*	\$8.00	\$6.00	\$8.50	\$16.90	\$11.00	\$7.75	\$16.25*
03	\$9.00*	\$15.00	\$0.00	\$10.00*	\$14.00*	\$8.00*	\$8.00	\$13.58	\$8.50	\$17.90	\$11.00	\$8.25	\$16.25*
04	\$9.00*	\$14.50	\$0.00	\$11.00*	\$14.00*	\$8.00*	\$8.00	\$13.58	\$9.50	\$17.90	\$11.00	\$8.25	\$16.25*
2005	\$9.00*	\$14.50	\$0.00	\$11.00*	\$14.00*	\$8.50*	\$10.00	\$13.58	\$9.50	\$17.90	\$11.00	\$8.25	\$16.25*
06	\$9.00*	\$14.50*	\$0.00	\$11.00*	\$14.00*	\$8.50*	\$10.00	\$15.00	\$9.50*	\$18.50	\$11.00	\$8.25	\$16.25*
07	\$9.00*	\$14.50*	\$0.00	\$11.00*	\$14.00*	\$9.00*	\$10.00	\$18.00	\$9.50*	\$18.75*	\$8.00	\$8.25	\$16.25*
08	\$10.00*	\$14.50*	\$0.00	\$11.50*	\$14.00*	\$9.00*	\$12.00	\$21.00	\$9.50*	\$18.75*	\$8.00	\$8.50	\$16.25*
09	\$10.00*	\$15.00*	\$0.00	\$11.50*	\$14.00*	\$9.00*	\$12.00	\$22.50	\$9.50*	\$19.00*	\$8.00*	\$8.50	\$16.25*
2010	\$10.00*	\$15.00*	\$0.00	\$11.50*	\$14.00*	\$9.50*	\$12.00	\$21.50	\$9.50*	\$20.00*	\$8.00*	\$8.50	\$16.25*
11	\$10.00*	\$15.00*	\$0.00*	\$11.50*	\$14.00*	\$9.50*	\$12.00	\$20.50	\$9.50*	\$20.00*	\$8.00*	\$8.50	\$16.25*

Note: * Some districts levy additional surcharges. The 2011 rates were:

- AID – \$12.00 per acre for pipeline delivery in township 2
– \$13.00 per acre for pipeline delivery in township 3
- BRID – \$0.60 per acre inch for volumes used on flood parcels over the annual water allocation
- EID – \$3.50 per acre if served from H Cowoki, 03 East Branch, or Springhill pressure systems
- LID – \$3.00 per acre for pipeline delivery
- LNID – \$0.25 per psi for pressure pipeline
– \$5.00 per acre inch for volumes over the annual allocation
- MID – \$1.00 per 10 psi for pressure pipeline

- RID – charges vary for pipeline and pressure delivery
– \$100 per acre inch for volumes over the annual allocation
- SMRID – \$100 per acre inch for volumes over the annual allocation
- TID – \$50 per acre inch for volumes over the annual allocation
- WID – \$0.31 per psi per acre; \$0.50 per acre for automated screen cleaning

Some districts have centralized pump stations delivering pressurized water to individual farm turnouts.

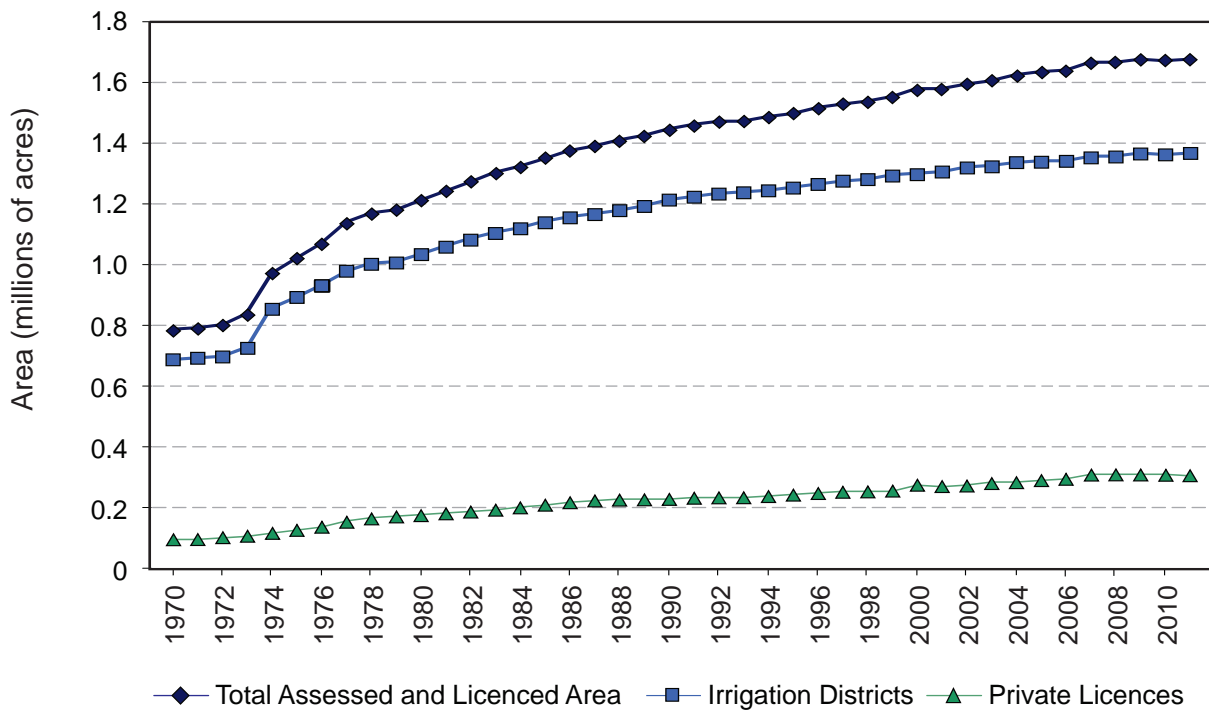


Figure 6. Growth in Irrigation in Alberta (1970 - 2011)

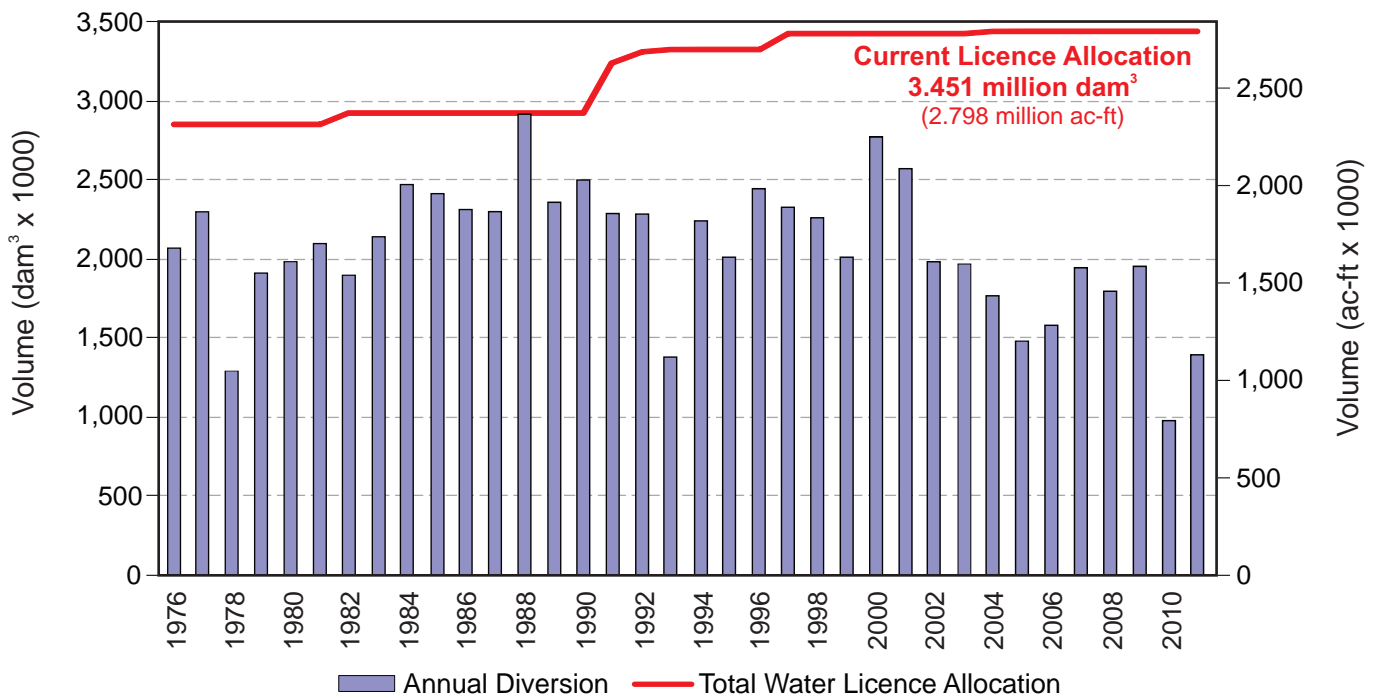


Figure 7. Irrigation Districts Gross Annual Diversions (1976 - 2011)

Note: Diversion data represent the gross diversion into and through the works of the irrigation districts and include volumes used directly for irrigation purposes, reservoir filling and the water supplied or licensed to municipal, domestic, other agricultural, industrial, environmental uses and water delivered to private licence holders through a conveyance agreement with the private licence holder.

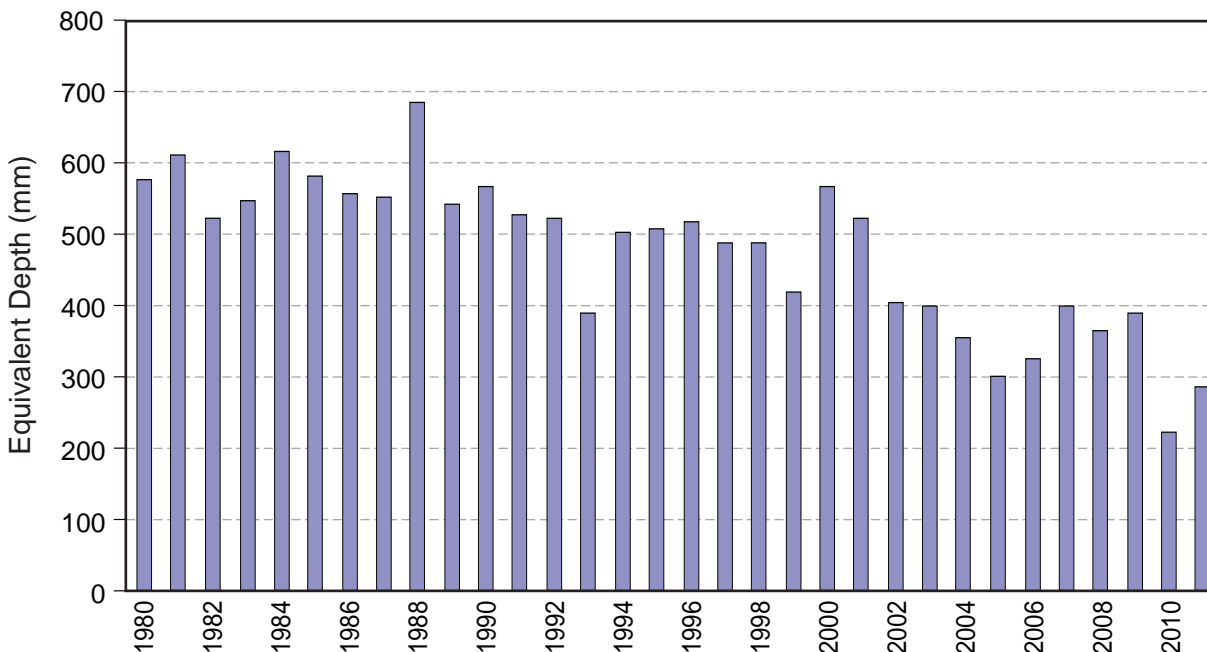


Figure 8. Irrigation Districts Gross Diversion Equivalent Depth (1980 - 2011)

Note: Irrigation district equivalent depth is the annual gross diversion of water (into the works of all 13 irrigation districts), divided by the area actually irrigated. However, this “depth” also includes water which may have accounted as net gains in reservoir storage, water diverted for other uses such as domestic, municipal, other agricultural, industrial, recreational and habitat enhancement purposes.

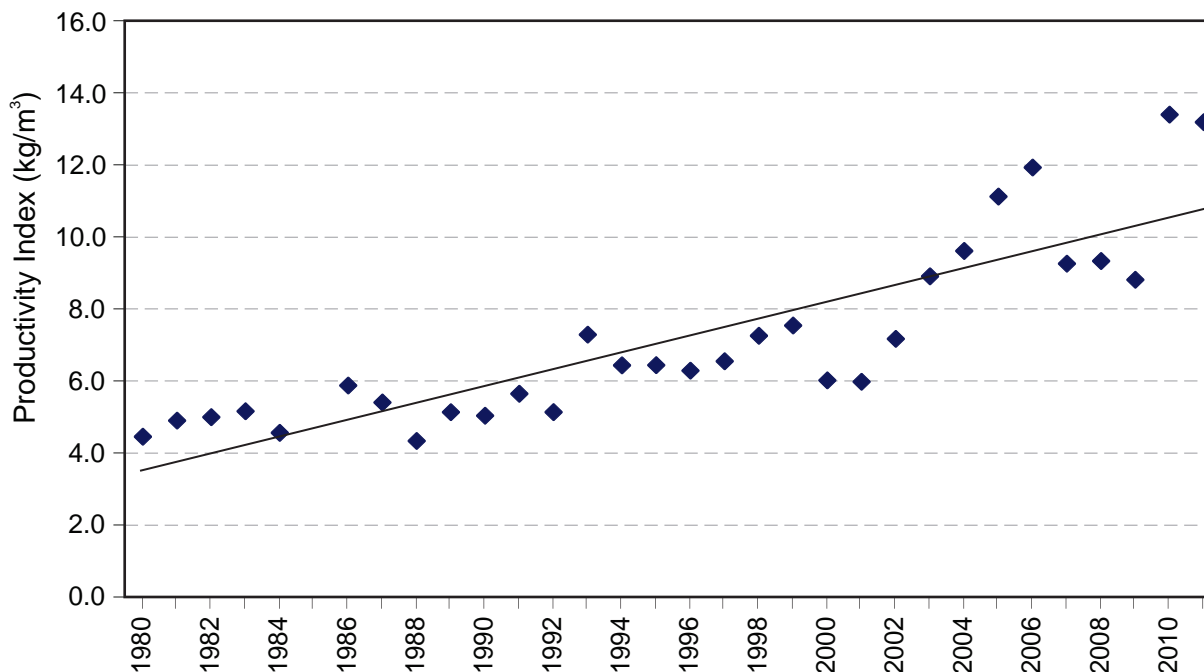
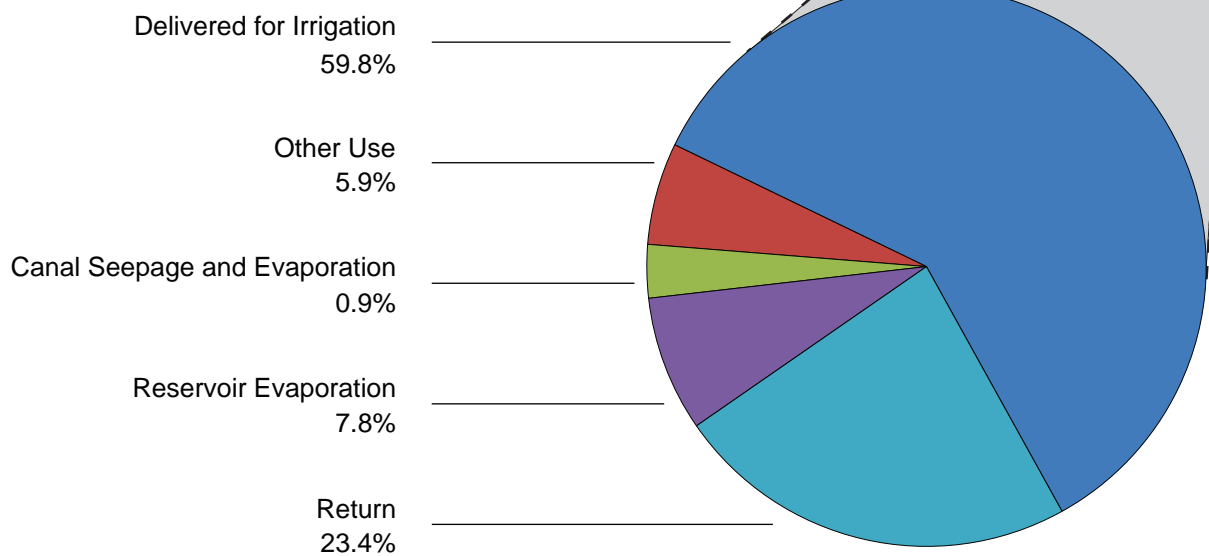


Figure 9. Irrigation Districts Water Use Productivity (1980 - 2011)

Note: Commodity yield per unit area divided by the volume of irrigation water diverted per unit area provides a measure of productive output per unit of irrigation water used. The historical yields of sugar beets (as reported by the Alberta Sugar Beet Growers), the historical yields of potatoes (as compiled by the Potato Growers of Alberta) and the historical yields of soft white spring wheat (as provided by the Alberta Soft Wheat Growers) are tallied and then divided by the respective annual gross water diversions to the 13 irrigation districts to derive a “Productivity Index”.

Table 8. Irrigation Districts Water Balance

Water Balance Category	OLDMAN RIVER BASIN	BOW RIVER BASIN	IRRIGATION DISTRICTS
Gross Diversion	583,990	610,751	1,194,741
Storage	(40,200)	(17,365)	(57,565)
TOTAL DISTRICT USE	624,190	628,116	1,252,306
Delivered for Irrigation	401,467	347,011	748,478
Other Use	22,286	51,623	73,909
Canal Seepage & Evaporation	18,724	19,868	38,592
Reservoir Evaporation	36,526	61,514	98,040
Return	145,187	148,100	293,287
TOTAL DISTRICT OPERATIONS	624,190	628,116	1,252,306



Note: 1. Irrigation district reported values were used
 2. Where district reporting was incomplete, Alberta Agriculture calculated an estimate
 3. All volumes are in acre-feet

Glossary

Gross Diversion - Volume of water diverted from a lake or the river system by irrigation districts

Storage - Volume of water removed from irrigation district reservoirs for use

Total District Use - Total volume of water from diversion and storage used

Delivered for Irrigation - Volume of water supplied for irrigation purposes

Other Use - Volume of water supplied for other uses including municipal and industrial

Canal Seepage & Evaporation - Water lost through delivery system from seepage and surface evaporation

Reservoir Evaporation - Water lost from evaporation from the surface of irrigation district reservoirs

Return - Volume of water returned to the river system

Total District Operations - Total volume of water used for irrigation districts operations comprised of water delivered for irrigation, other use, seepage and evaporation, and water returned

Table 9. Conveyance Infrastructure by Type of Works within the 13 Irrigation Districts in 2011

Irrigation District	REHABILITATED										UN-REHABILITATED		Total Conveyance Works (km)
	Membrane-Lined Canals		Pipelines - Closed		Pipelines - Open		Concrete - Lined Canals		Earth Canals		Un-Rehabilitated Canals		
	Length (km)	% of District Works	Length (km)	% of District Works	Length (km)	% of District Works	Length (km)	% of District Works	Length (km)	% of District Works	Length (km)	% of District Works	
AID	4.5	12.1%	22.1	59.4%	0.2	0.5%	0.0	0.0%	1.0	2.7%	9.4	25.3%	37
BRID	166.6	16.6%	438.1	43.6%	12.8	1.3%	16.6	1.7%	205.8	20.5%	165.5	16.5%	1,005
EID	341.3	17.8%	1004.8	52.3%	38.4	2.0%	0.0	0.0%	185.7	9.7%	350.2	18.2%	1,920
LID	2.0	3.7%	28.7	53.6%	0.3	0.6%	0.0	0.0%	11.7	21.9%	10.8	20.2%	54
LNID	56.8	7.6%	413.0	55.5%	12.6	1.7%	45.2	6.1%	68.1	9.1%	148.7	20.0%	744
MID	1.2	1.2%	59.2	58.9%	1.5	1.5%	0.3	0.3%	33.5	33.3%	4.8	4.8%	101
MVID	0.0	0.0%	15.1	37.9%	1.8	4.5%	0.0	0.0%	17.0	42.7%	5.9	14.8%	40
RCID	1.3	4.9%	12.2	46.4%	1.3	4.9%	0.0	0.0%	6.9	26.2%	4.6	17.5%	26
RID	0.0	0.0%	126.7	55.0%	7.0	3.0%	0.0	0.0%	80.2	34.8%	16.3	7.1%	230
SMRID	68.8	3.8%	875.9	48.0%	19.0	1.0%	74.7	4.1%	454.6	24.9%	330.3	18.1%	1,823
TID	58.1	17.2%	168.7	50.0%	13.4	4.0%	6.9	2.0%	67.9	20.1%	22.6	6.7%	338
UID	15.8	6.7%	74.5	31.5%	28.7	12.1%	0.3	0.1%	60.0	25.3%	57.5	24.3%	237
WID	32.7	3.1%	153.5	14.4%	41.3	3.9%	5.3	0.5%	171.7	16.1%	660.1	62.0%	1,065
Total	749	9.8%	3,393	44.5%	178	2.3%	149	2.0%	1,364	17.9%	1,787	23.4%	7,620
Headworks Owned by Alberta Environment												339	
Total Length of Conveyance System in Southern Alberta (km)												7,959	

NOTE: Rehabilitated infrastructure includes those works re-constructed through:

- the Irrigation Rehabilitation Program (IRP) 1969 - 2011
- Alberta Environment's headworks improvement program
- individual district operations & maintenance program

Totals only include irrigation conveyance works, ie. does not include domestic water supply

Table 10. Irrigation District Infrastructure by Length and Replacement Cost in 2011

IRRIGATION DISTRICTS	CONVEYANCE WORKS		MAJOR STRUCTURES		DRAINAGE WORKS CONSTRUCTED		DRAINAGE WORKS NATURAL		TOTAL of ALL WORKS	
	length (km)	replacement cost	number of units	replacement cost	length (km)	replacement cost	length (km)	replacement cost	length (km) / structures	replacement cost
AID	37	\$11,118,000	0	\$0	0	\$0	19	\$305,000	56 / 0	\$11,424,000
BRID	1,005	\$367,061,000	22	\$97,753,000	236	\$10,773,000	447	\$5,094,000	1,668 / 22	\$480,681,000
EID	1,920	\$658,394,000	61	\$349,421,000	205	\$9,471,000	1,686	\$15,405,000	3,811 / 61	\$1,032,691,000
LID	54	\$12,801,000	0	\$0	1	\$54,000	3	\$30,000	58 / 0	\$12,885,000
LNID	744	\$250,940,000	2	\$2,880,000	20	\$899,000	229	\$2,803,000	993 / 2	\$257,522,000
MID	101	\$28,797,000	0	\$0	12	\$601,000	149	\$2,119,000	262 / 0	\$31,517,000
MVID	40	\$14,807,000	0	\$0	1	\$33,000	0	\$0	41 / 0	\$14,840,000
RCID	26	\$3,973,000	1	\$135,000	3	\$105,000	5	\$20,000	34 / 1	\$4,233,000
RID	230	\$57,199,000	0	\$0	20	\$1,012,000	188	\$3,516,000	438 / 0	\$61,727,000
SMRID	1,823	\$612,777,000	48	\$335,617,000	49	\$3,325,000	345	\$4,977,000	2,217 / 48	\$956,696,000
TID	338	\$122,449,000	12	\$14,168,000	45	\$3,801,000	18	\$191,000	401 / 12	\$140,609,000
UID	237	\$76,500,000	11	\$16,206,000	4	\$308,000	54	\$649,000	295 / 11	\$93,664,000
WID	1,065	\$328,236,000	13	\$18,180,000	11	\$927,000	868	\$15,735,000	1,944 / 13	\$363,078,000
DISTRICT TOTALS	7,620	\$2,545,051,000	170	\$834,360,000	607	\$31,309,000	4,011	\$50,845,000	12,238 / 170	\$3,461,565,000

NOTE: – Constructed drainage works include both open channels and pipelines.
 – Natural drains are those channels that exist as natural watercourses and provide a means to drain unused tailwater away from irrigated works.
 – Total of All Works length values include the summation of conveyance and drainage works only.

Table 11. Summary of Irrigation District Water Licence Allocations

Irrigation District	Other Purposes* (ac-ft)	Total Licenced Volume (ac-ft)
AID	700	9,000
BRID	2,380	450,000
EID	5,000	762,000
LID	1,000	12,000
LNID	39,068	334,450
MID	740	34,000
MVID	n/a	8,000
RCID	n/a	3,000
RID	4,500	81,000
SMRID	12,000	722,000
TID	8,000	158,000
UID	1,000	66,210
WID	3,500	158,400
Total	77,888	2,798,060

Note: Other purpose uses of water volumes licenced to irrigation districts include non-irrigation uses such as municipal, rural water supply, agricultural, commercial, industrial, rural residential, management of fish/wildlife, habitat enhancement and recreation.

* Water volumes allocated to other purposes are included in the total licensed volumes.

Table 12. Summary of Condition Assessments (All Works by Replacement Cost)

Works Category	Good	Fair	Poor	TOTAL
Conveyance	\$1,647,466,000	\$778,749,000	\$118,837,000	\$2,545,051,000
Drainage	\$10,684,000	\$48,040,000	\$14,458,000	\$73,182,000
Major Structures	\$535,333,000	\$291,816,000	\$7,212,000	\$834,361,000
TOTAL	\$2,193,483,000	\$1,118,604,000	\$140,506,000	\$3,452,594,000
Proportion	63.5%	32.4%	4.1%	100%

Note: Condition assessments ratings are determined based on criteria in the Irrigation Works Condition Evaluation Guidelines. Construction and material costs are updated approximately every five years. The last valuation was completed in 2006.

Table 13. Irrigation District Reservoirs

Location	Reservoir	Approximate Date of Impoundment	Live Storage (dam ³)	Live Storage (acre-feet)
Bow River Irrigation District	Badger	1985	53,650	43,494
	'D' Reservoir	2005	395	320
	'H' Reservoir	1953	2,220	1,800
	Lost Lake	1973/1987*	5,050	4,094
	'PFRID' Reservoir	2005	586	475
	Scope	1953	19,740	16,003
	Total storage	-	81,641	66,186
Eastern Irrigation District	Bantry # 1	1968	617	500
	Bantry # 2	1967	5,550	4,500
	Cowoki Lake	1937	19,735	16,000
	Crawling Valley	1984	130,500	105,797
	'J' Reservoir	1949/1966*	615	500
	Kitsim	1980	26,520	21,500
	Lake Newell	1914	320,215	259,600
	One Tree	1935	2,345	1,901
	Rock Lake	1956	9,250	7,500
	Rolling Hills	1940/2003*	46,000	37,292
	Snake Lake	1997	18,230	14,779
	Tilley "A"	1972	33,300	26,996
	Tilley "B"	1973/1979*	38,235	30,997
Total storage	-	651,112	527,862	
Lethbridge Northern Irrigation District	Park Lake	1928	740	600
	Picture Butte	1936	1,600	1,297
	Vandenburg	1992	114	93
	Total storage	-	2,454	1,990
Raymond Irrigation District	Corner Lake	1925	495	400
	Craddock	1925	615	500
	Factory Lake	1925	370	300
	Total storage	-	1,480	1,200
St. Mary River Irrigation District	Bullshead	1954	125	101
	Chin	1954	190,330	154,300
	Cross Coulee	1954	2,590	2,100
	Forty Mile	1987	86,345	70,000
	Murray	1954	30,590	24,800
	North East	1954	2,095	1,698
	Raymond	1954	1,600	1,297
	Sauder	1953/1982*	37,745	30,600
	Seven Persons	1953	1,355	1,099
	Sherburne	1952	10,625	8,614
	Stafford	1954/1982*	23,315	18,900
	Yellow Lake	1952	18,130	14,690
Total storage	-	404,845	328,199	
Taber Irrigation District	Fincastle	1952	3,085	2,501
	Horsefly	1950	9,250	7,499
	Taber Lake	1955	6,415	5,200
	Total storage	-	18,750	15,200
United Irrigation District	Cochrane Lake	1923	3,100	2,513
Western Irrigation District	Chestermere	1944	5,180	4,200
	Langdon	1979	7,895	6,400
	Total storage	-	13,075	10,600
Grand Total	-	-	1,176,457	953,751

Note: all reservoirs are off-stream storage sites

* denotes year of reservoir enlargement

Table 14. Provincially Owned and Operated Reservoirs

Source Supply for:	Reservoir	Approximate Date of Impoundment	Live storage (dam ³)	Live storage (acre-feet)
Bow River Irrigation District	Little Bow	1920	21,078	17,088
	McGregor	1914	351,059	284,604
	Travers *	1954	104,638	84,830
	Total Storage	-	476,775	386,522
Lethbridge Northern Irrigation District	Keho	1920	95,635	77,531
	Oldman River *	1991	490,180	397,390
	Total Storage	-	585,815	474,921
Ross Creek Irrigation District	Cavan	1950	4,625	3,750
Mountain View, Leavitt, Aetna	Payne	1942	8,690	7,045
St. Mary Project (SMRID, MID, TID, RID)	Jensen	1948	19,000	15,403
	Milk River Ridge	1957	127,297	103,200
	St. Mary *	1951	369,310	299,400
	Waterton *	1965	111,196	90,147
	Total Storage	-	626,803	508,150
Other Multi-purpose	Chain Lakes *	1966	14,679	11,900
	Twin Valley Dam *	2003	62,700	50,831
	Pine Coulee	1998	51,000	41,346
	Women's Coulee	1949	362	293
	Total Storage	-	128,741	104,370
Grand Total	-	-	1,831,449	1,484,759

Note: * denotes on-stream storage reservoir

Table 15. Hydroelectric Plants Associated with Water Distribution Works

Location	Owner	Capacity (megawatts)
Oldman Reservoir	ATCO Electric	32
Waterton Reservoir	TransAlta	3
Belly River Chute	TransAlta	3
St. Mary Reservoir	TransAlta	2
Taylor Coulee Chute (Jensen Reservoir)	TransAlta	13
Raymond Reservoir	Irrican	21
Chin Chute (Chin Reservoir)	Irrican	13
SMRID - Main Canal Drops #4, #5 and #6	Irrican	7
Total		94

Table 16. Private Water Licences for Irrigation in Alberta

There are 2,904 individual irrigation projects, outside of the 13 irrigation districts, irrigating approximately 308,435 acres in Alberta. These projects vary in size from 1 acre to over several thousand acres of agricultural or horticultural production. Each of these projects is licensed to an individual, a group of producers or to private or public lands (ie. golf courses or parks). The agricultural feasibility of these projects is reviewed by Alberta Agriculture and Rural Development and the licencing is regulated by Alberta Environment.

RIVER BASIN	Total Acres Irrigated	No. of Licences 1 to 100 ac.	No. of Licences 101 to 300 ac.	No. of Licences over 300 ac.	Total No. of Licences
ATHABASCA RIVER	1,985	43	6	0	49
MILK RIVER	18,801	97	43	14	154
NORTH SASKATCHEWAN RIVER	27,391	317	56	15	388
PEACE RIVER	3,364	67	9	0	76
SOUTH SASKATCHEWAN RIVER					
- Bow River	27,298	151	59	19	229
- Little Bow River	30,087	127	68	24	219
- Lower Oldman River	16,426	22	24	13	59
- Red Deer River	45,796	422	89	19	530
- South Saskatchewan River	47,609	533	79	25	637
- Upper Oldman River	7,550	64	22	3	89
- Waterton / Belly / St. Mary Rivers	52,019	136	70	19	225
- Willow Creek	30,109	156	77	16	249
South Saskatchewan River Total	256,894	1,611	488	138	2,237
2011	308,435	2,135	602	167	2,904
2010	309,778	2,153	605	166	2,924
2009	310,821	2,158	607	165	2,930
2008	310,272	2,161	602	166	2,929
2007	310,733	2,157	601	166	2,924
2006	296,964	2,150	579	159	2,888
2005	293,055	2,138	572	154	2,864
2004	285,276	2,113	575	152	2,840
2003	283,254	2,108	571	149	2,828
2002	275,599	2,100	567	141	2,808
2001	272,353	2,085	558	143	2,786
2000	277,826	2,076	555	140	2,771
1999	257,258	1,863	509	137	2,509
1998	255,192	1,884	501	138	2,523
1997	253,868	1,893	486	129	2,508

Notes: – upper Oldman reach is defined as upstream of the Belly River confluence
– lower Oldman reach is defined as downstream of the Belly River confluence
– 25,000 acres from the Waterton / Belly / St. Mary Rivers category is for the Blood Tribe Agricultural Project
– does not include irrigation licences issued to irrigation districts in southern Alberta
– data are obtained from Alberta Environment
– licence authorization as of January 2011

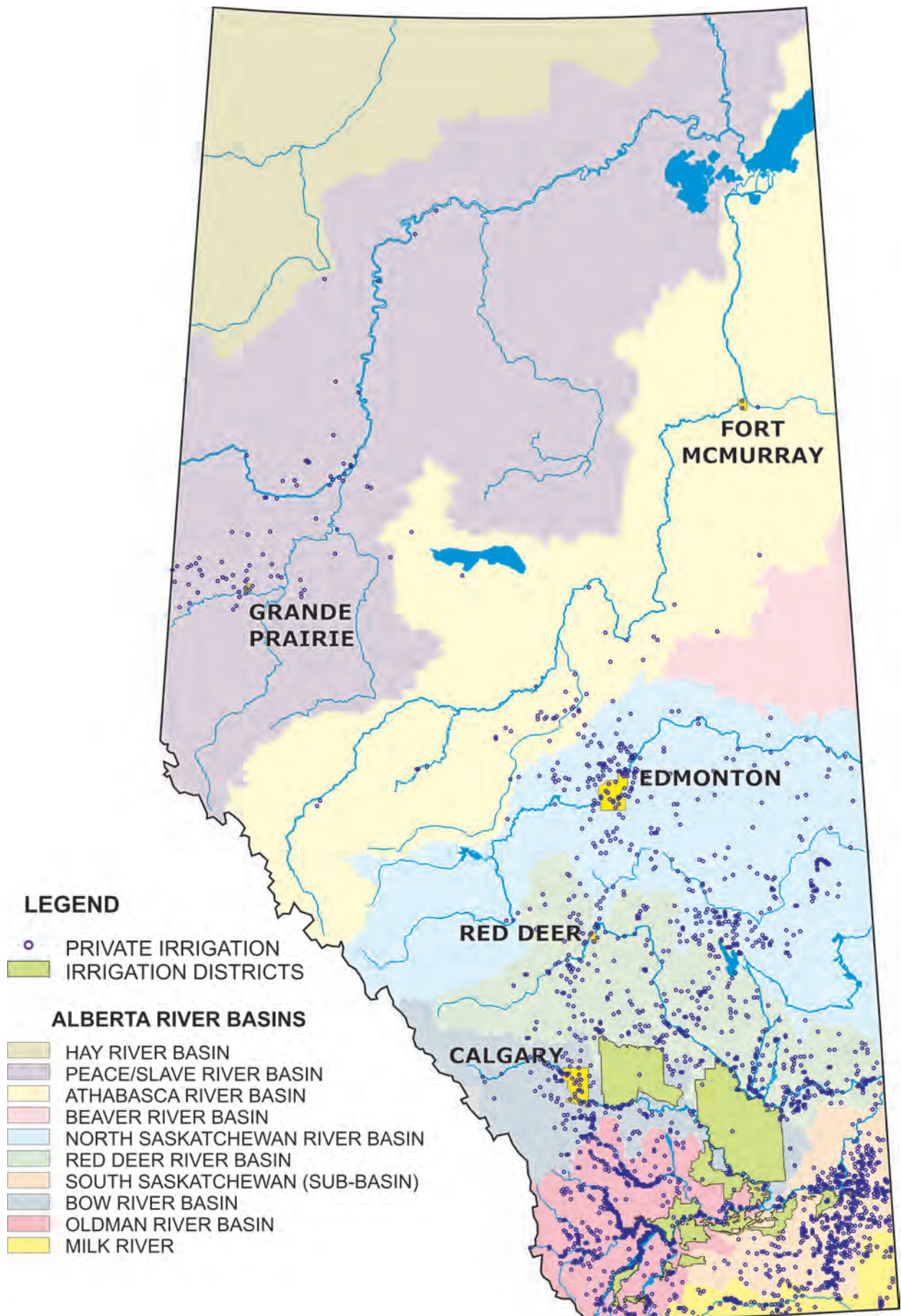


Figure 10. Private Irrigation in Alberta

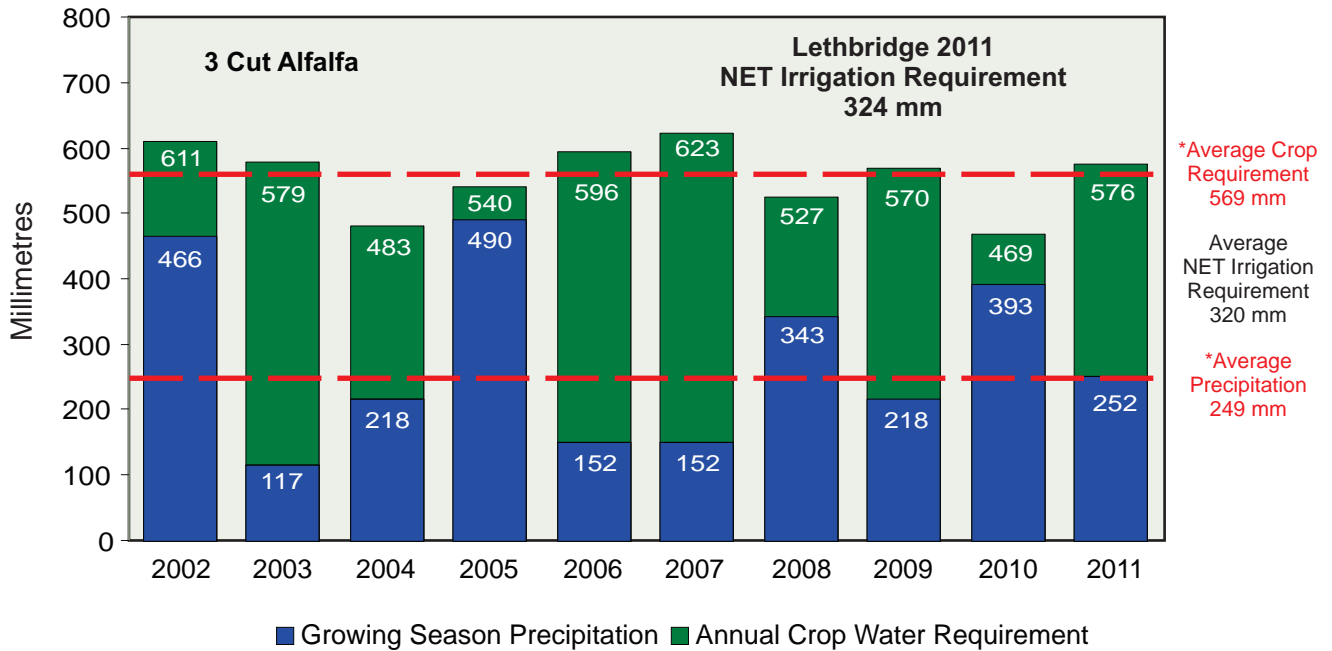
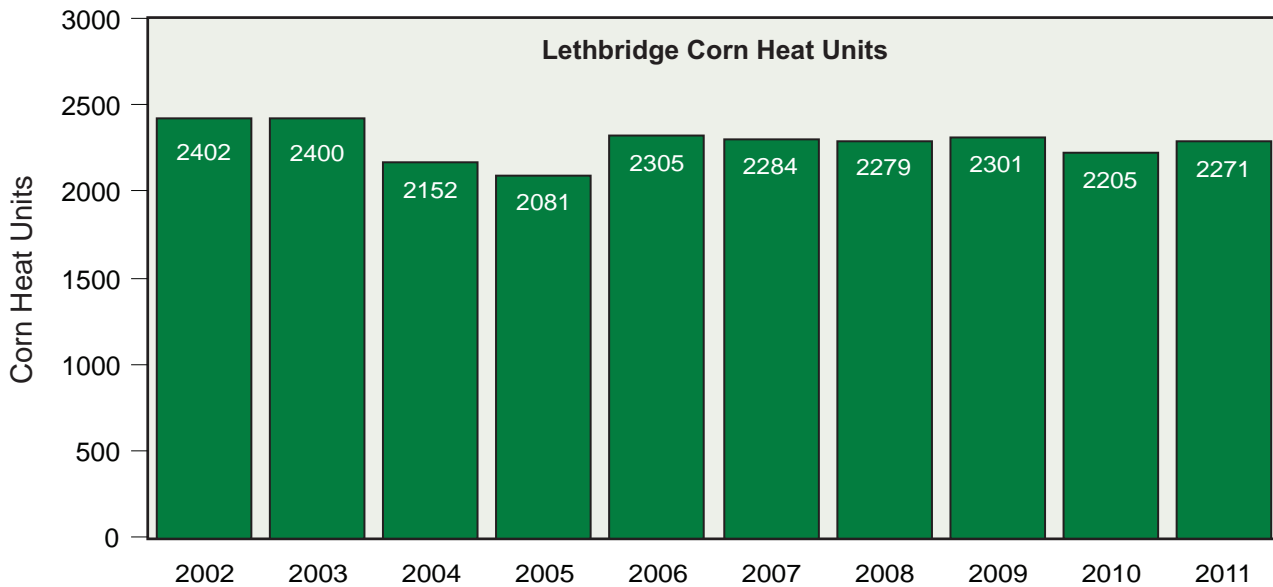


Figure 11. Lethbridge Optimum Crop Water and Net Irrigation Requirements (2002 - 2011)

Note: The high water use, 3 cut alfalfa is used in these examples because this crop's annual growing season closely coincides with the annual irrigation season.

The difference between the total crop water requirement and total precipitation is the NET irrigation requirement.

*The average crop requirement and average precipitation are from the period 1997 to 2011. Seasonal precipitation from May 1 to September 30.



Note: Total Corn Heat Units (CHU) starting May 15 until 1st killing frost (-2°C)

Figure 12. Lethbridge Corn Heat Units (2002 - 2011)

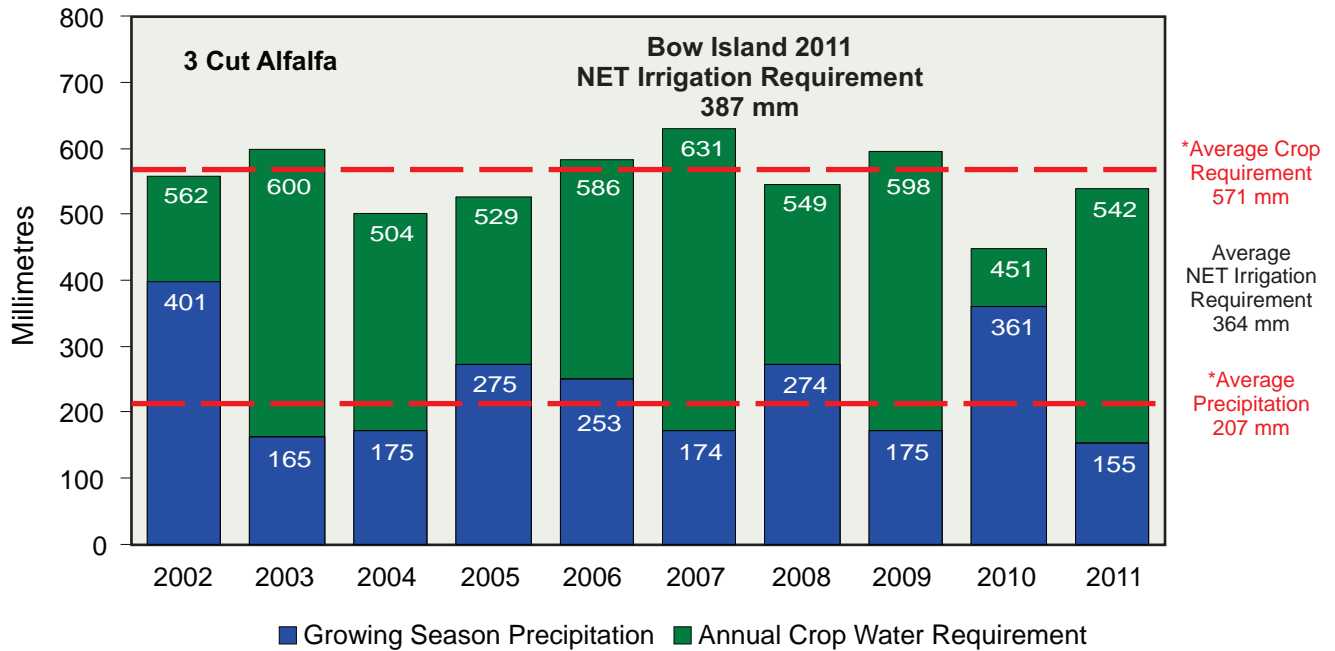
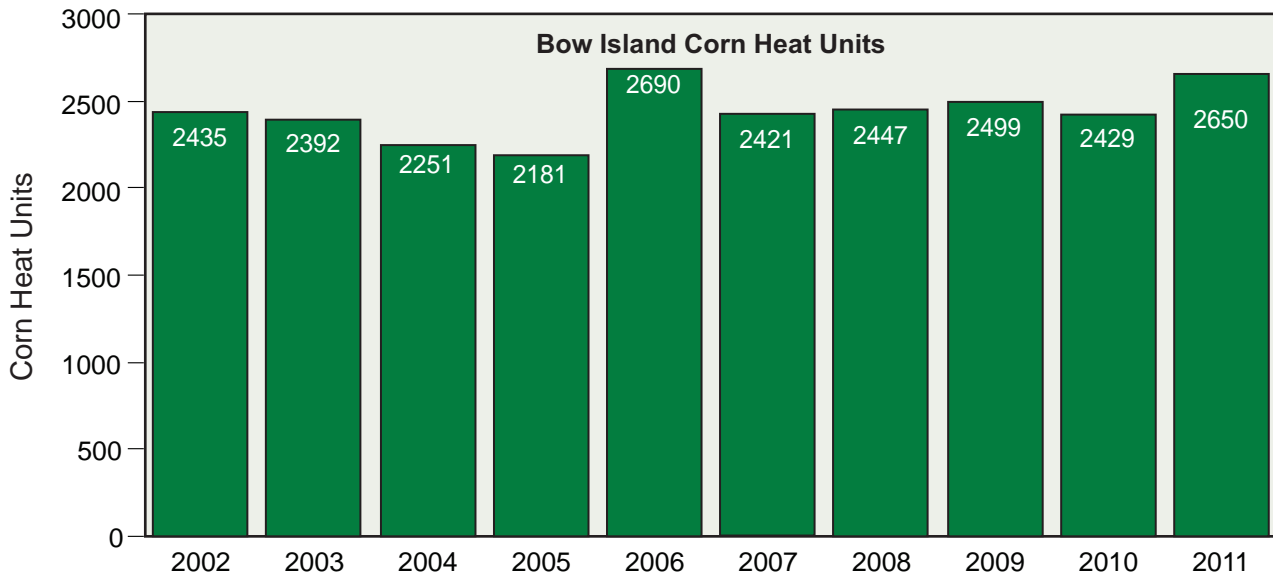


Figure 13. Bow Island Optimum Crop Water and Net Irrigation Requirements (2002 - 2011)

Note: The high water use, 3 cut alfalfa is used in these examples because this crop's annual growing season closely coincides with the annual irrigation season.

The difference between the total crop water requirement and total precipitation is the NET irrigation requirement.

*The average crop requirement and average precipitation are from the period 1997 to 2011. Seasonal precipitation from May 1 to September 30.



Note: Total Corn Heat Units (CHU) starting May 15 until 1st killing frost (-2°C)

Figure 14. Bow Island Corn Heat Units (2002 - 2011)

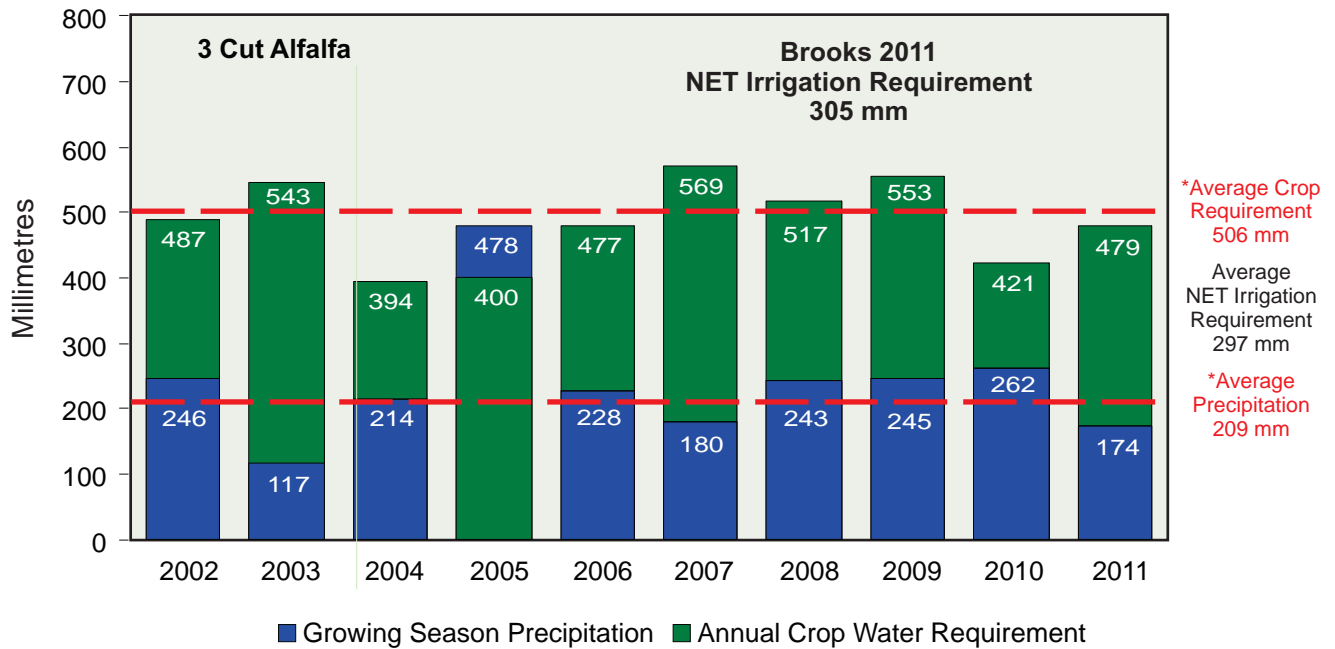
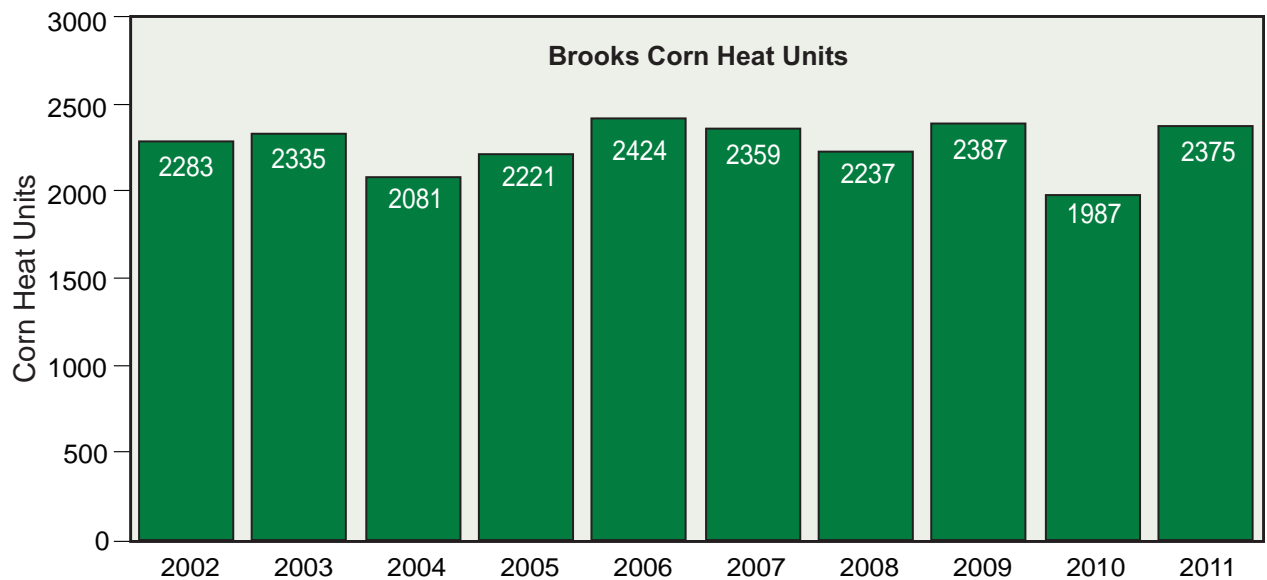


Figure 15. Brooks Optimum Crop Water and Net Irrigation Requirements (2002 - 2011)

Note: The high water use, 3 cut alfalfa is used in these examples because this crop's annual growing season closely coincides with the annual irrigation season.

The difference between the total crop water requirement and total precipitation is the NET irrigation requirement.

*The average crop requirement and average precipitation are from the period 1997 to 2011. Seasonal precipitation from May 1 to September 30.



Note: Total Corn Heat Units (CHU) starting May 15 until 1st killing frost (-2°C)

Figure 16. Brooks Corn Heat Units (2002 - 2011)

Table 17. Historical Rainfall in Southern Alberta (April 15 to October 15)

AREA	MAXIMUM RAINFALL (mm)	MINIMUM RAINFALL (mm)	NORMAL RAINFALL* (mm)	2011 RAINFALL (mm)	2011 % OF NORMAL
Lethbridge	534 (1978)	71 (2001)	275	338	123%
Bow Island	439 (1993)	112 (2001)	256	190	74%
Brooks	484 (2005)	87 (2001)	241	193	80%

Note: * Normal rainfall 1970 - 2011

Table 18. Historical Corn Heat Units in Southern Alberta (May 15 to 1st Killing Frost)

AREA	MAXIMUM CHU (2002-2011)	MINIMUM CHU (2002-2011)	LAST TEN YEAR AVERAGE*	2011 CHU	2011 % OF LAST TEN YEAR AVERAGE
Lethbridge	2402 (2002)	2081 (2005)	2268	2271	100%
Bow Island	2690 (2006)	2181 (2005)	2439	2650	109%
Brooks	2424 (2006)	1987 (2010)	2269	2375	105%

Note: * Last ten year average 2002 - 2011

Table 19. Frost Free Period (0° C) in Southern Alberta

AREA	AVERAGE LAST FROST	AVERAGE FIRST FROST	AVERAGE FROST FREE DAYS*	2011 LAST FROST	2011 FIRST FROST	2011 FROST FREE DAYS	2011 % OF NORMAL
Lethbridge	May 18	Sept 19	124	May 18	Sept 29	134	108%
Bow Island	May 12	Sept 23	134	May 10	Sept 20	133	99%
Brooks	May 20	Sept 13	116	May 18	Sept 18	123	106%

Note: * Average frost free days 1971 - 2000

Table 20. Frost Free Period (-2° C) in Southern Alberta

AREA	AVERAGE LAST FROST	AVERAGE FIRST FROST	AVERAGE FROST FREE DAYS*	2011 LAST FROST	2011 FIRST FROST	2011 FROST FREE DAYS	2011 % OF NORMAL
Lethbridge	May 2	Sept 29	150	May 2	Sept 29	162	108%
Bow Island	Apr 30	Oct 1	154	April 30	Oct 1	167	108%
Brooks	May 5	Sept 28	146	May 5	Sept 28	152	104%

Note: Average frost free days 1971 - 2000

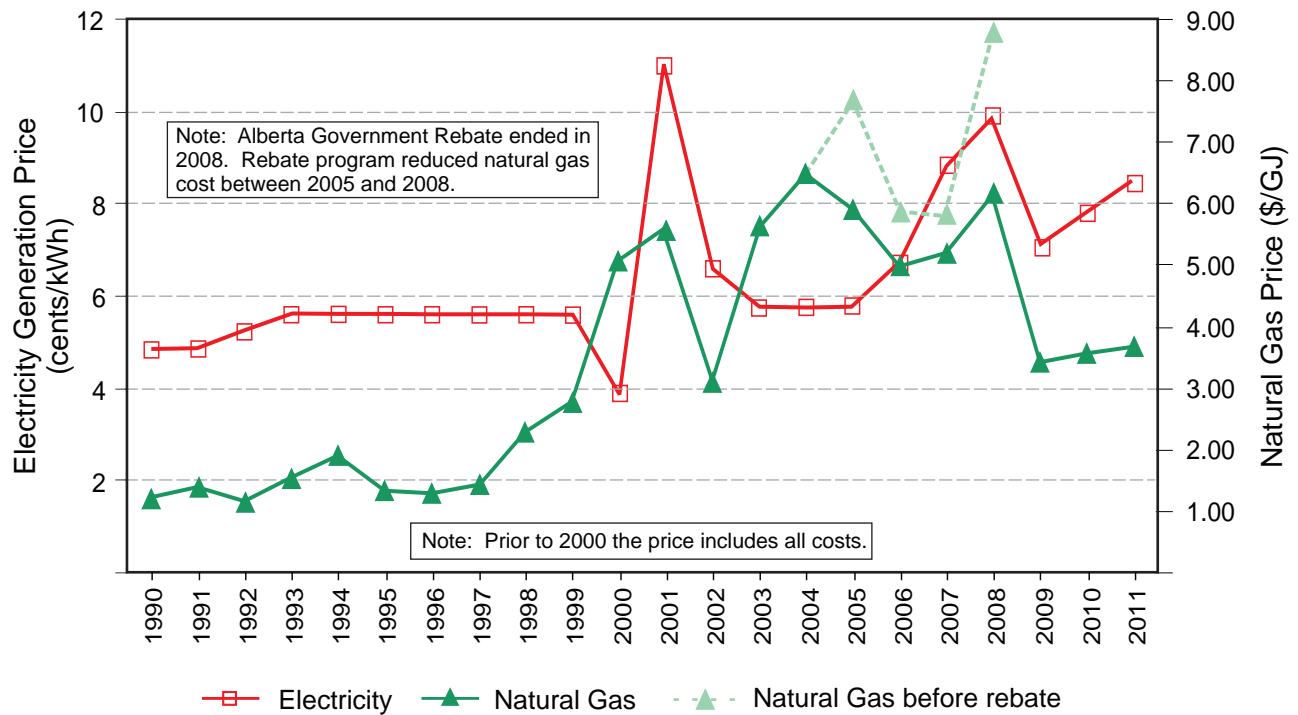
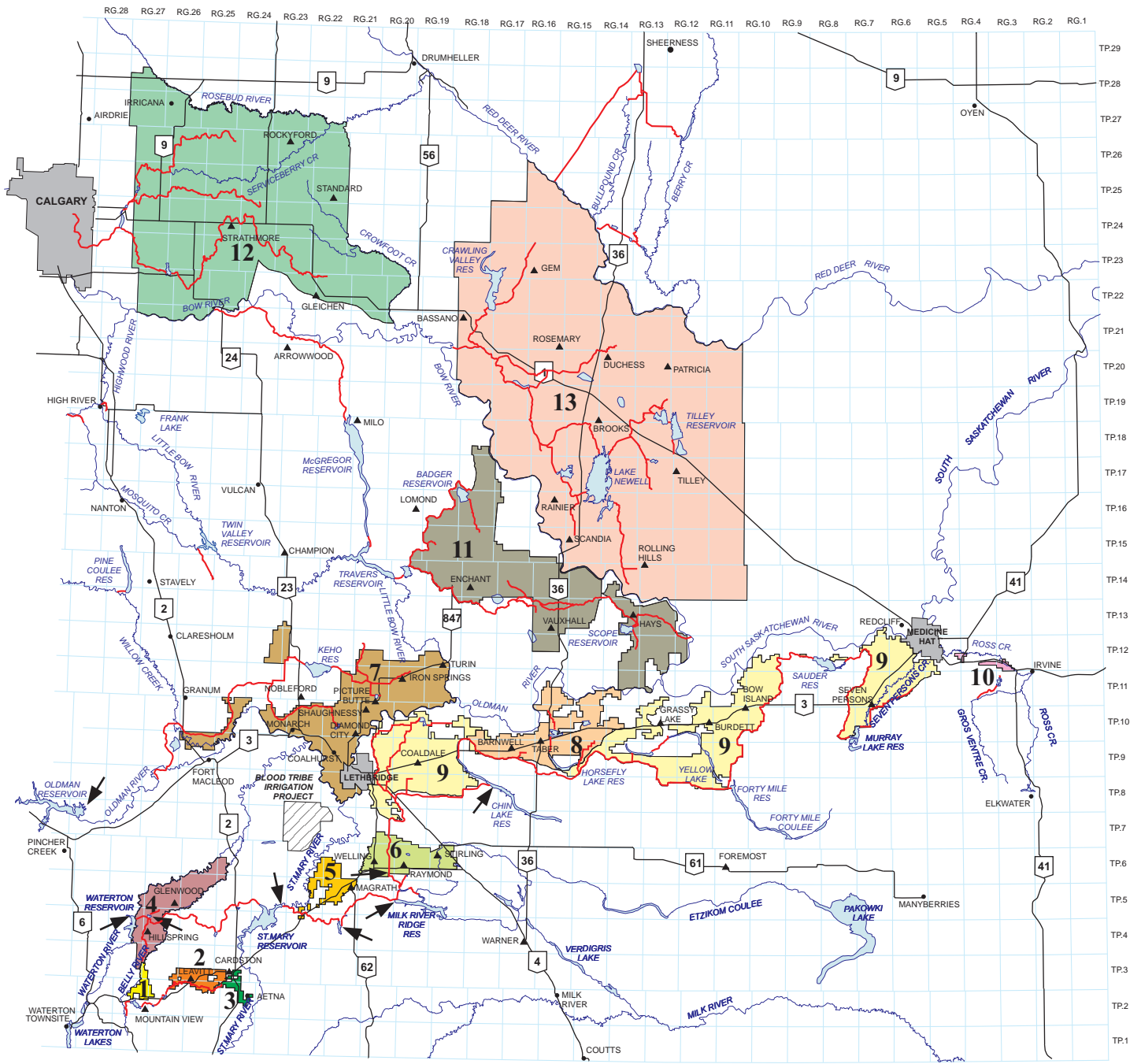


Figure 17. Historical Irrigation Energy Prices (average prices from May to September)

Table 21. Energy Type Used in the Irrigation Districts (acres irrigated by energy type)

Energy Type	BRID	EID	LNID	MID	SMRID	TID	UID	WID	Average Energy Type
Electricity	71.1%	40.4%	47.0%	9.0%	57.3%	58.8%	31.6%	31.7%	51.3%
Natural Gas	13.2%	24.9%	39.4%	57.1%	37.3%	36.4%	3.2%	32.6%	29.5%
Diesel	3.5%	5.2%	0.8%	0.0%	0.9%	0.8%	0.2%	9.3%	2.8%
Gravity	7.3%	24.1%	1.5%	17.2%	1.9%	3.3%	39.8%	9.7%	9.8%
Gravity Pressure Pipeline	3.9%	2.2%	9.1%	16.5%	2.4%	0.8%	7.6%	8.5%	4.2%
Pump Pressure Pipeline	0.4%	1.6%	0.1%	0.0%	0.0%	0.0%	1.7%	0.2%	0.5%
Other*	0.5%	1.1%	0.7%	0.2%	0.4%	0.2%	0.1%	8.0%	1.1%
Unknown	0.1%	0.5%	1.3%	0.0%	0.0%	0.0%	15.9%	0.0%	0.7%
Total Acres	216,375	293,689	172,326	18,300	361,161	80,078	34,044	82,149	1,258,122

Notes: – * other includes gasoline, propane or butane
 – AID, LID, MVID, RCID, and RID did not report any data



- 1 Mountain View Irrigation District
- 2 Leavitt Irrigation District
- 3 Aetna Irrigation District
- 4 United Irrigation District
- 5 Magrath Irrigation District
- 6 Raymond Irrigation District
- 7 Lethbridge Northern Irrigation District
- 8 Taber Irrigation District
- 9 St. Mary River Irrigation District
- 10 Ross Creek Irrigation District
- 11 Bow River Irrigation District
- 12 Western Irrigation District
- 13 Eastern Irrigation District

- ▲ Communities receiving irrigation water
- Communities not receiving irrigation water
- ↙ Hydroelectric plants associated with water distribution works
- Main canals

There are 13 irrigation districts in southern Alberta providing water to 1,370,449 assessed acres of farmland. The infrastructure within these irrigation districts is comprised of approximately 7,959 kilometres of conveyance system, of which 339 kilometres are owned and operated by Alberta Environment.

Figure 18. Alberta's Irrigation Districts