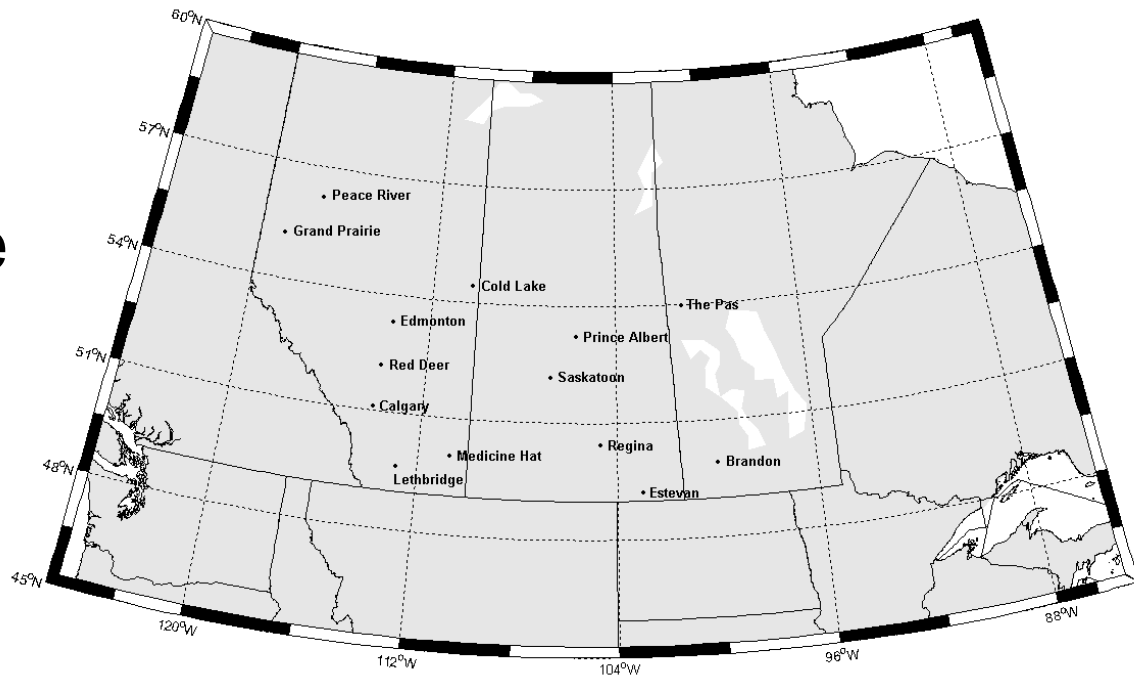


Drought Characterization

Examination of Extreme
Precipitation Events

Extreme Precipitation Events During the Drought

- For the drought years (1999-2005) daily precipitation data was analyzed to find extreme precipitation events
- **An event was considered extreme if the daily precipitation recorded was greater than the average monthly precipitation**
- 14 Stations over the Prairies were examined



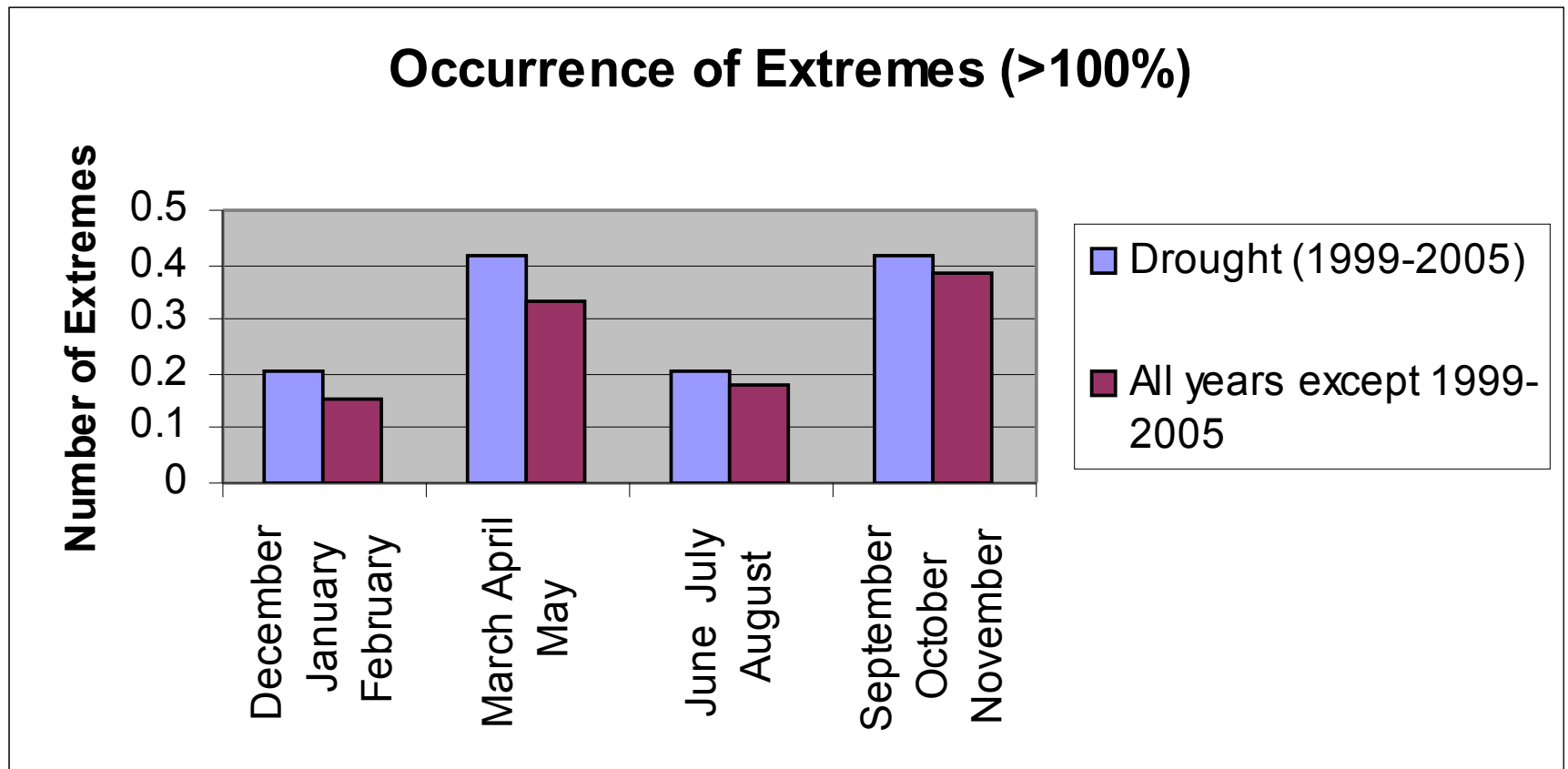
Single-day Extreme Precipitation Events

- 36 extreme precipitation events were found ranging from 101% - 291% of the monthly average
- The maximum extreme event was in Cold Lake on April 24th 2003
- Some of the stations seem to be more prone to extreme events.
 - The maximum occurrence of extremes at a station was five events (Cold Lake, Estevan and Lethbridge)
 - There were no extreme events in Edmonton or Grande Prairie

Comparison of Occurrence by Station

- 6 of 14 stations recorded more extreme events on average during the recent drought than the background climatology (Calgary, Cold Lake, Estevan, Peace River, Lethbridge and The Pas)
 - Cold Lake had 5 extremes (ave of 0.7 extremes/yr) during the drought, compared to 12 in 38 years (ave of 0.3 extremes/yr) in background climatology
 - Cold Lake was also the location of 3 of the 5 most extreme events (daily precipitation >200% of monthly average precipitation)
- However the overall occurrence of extremes at all stations, while slightly higher than non-drought years, is not significantly different.

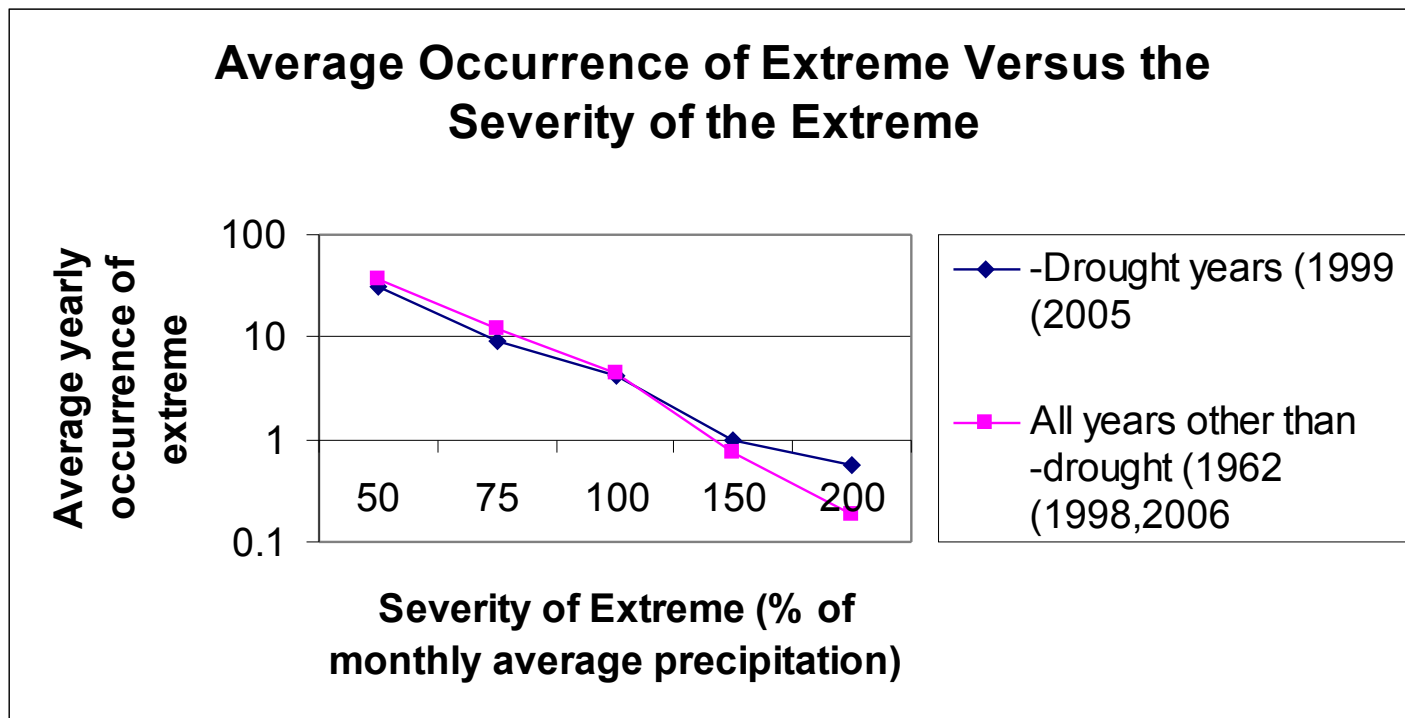
Seasonal Variability of Extremes



- Extremes are more prone to occur in the shoulder seasons (Fall and Spring) both during drought and in the climatology.
- There are slightly more extremes (average per year) during the recent drought than in the climatology.

Severity of Extremes

- The incidence of a given extreme decreases as the severity of the extreme increases.
- The incidence of extremes for drought vs. climatology is similar for moderately severe storms, but for very severe events (>200% of monthly average) their incidence is greater during the drought.



Multi-day Extreme Precipitation Events

- Multi-day extreme events were found during the drought as well.
- **An event was considered extreme if the accumulated precipitation for the event was greater than 200% of the monthly average.**
- There were 13 events found.
- The maximum, in Cold Lake, produced 428% of the monthly average precipitation.

Severity	Station	Length	Start Date	End Date
201	Regina	7	06-Aug-08	12-Aug
207	Red Deer	5	24-Apr-03	28-Apr
207	Peace River	3	01-Apr-03	03-Apr
215	Calgary	4	19-Apr-99	22-Apr
231	Cold Lake	2	09-Sep-03	10-Sep
235	Peace River	6	03-May-00	08-May
257	Brandon	6	28-Oct-02	2-Nov
258	Cold Lake	2	01-Oct-05	02-Oct
277	Lethbridge	3	08-Jun-02	10-Jun
284	Lethbridge	4	09-Sep-05	12-Sep
308	Lethbridge	10	01-Jun-05	10-Jun
367	Estevan	5	29-Oct-00	02-Nov
428	Cold Lake	3	24-Apr-03	26-Apr

Conclusions

- Though drought is characterized by a general lack of precipitation, extreme precipitation events do still occur.
- Certain areas are more prone to extremes during the drought, while others are less prone, overall giving an average occurrence that is similar to the climatology.
- Investigation into the large-scale and small scale features that produce these extreme events need to be continued as well as determination of the characteristics of their occurrence.
- During the drought there were not significantly more extremes ($>100\%$), but there were on average a higher occurrence of very severe extremes ($>200\%$) per year.

Severity (% of monthly ave)	Date	Location	Precipitation (mm)	Ave Monthly precipitation
101	5/5/1999	The Pas	36.6	36.3
102	25/4/2003	Calgary	24.3	23.9
104	8/7/2002	Medicine Hat	42.4	40.6
106	26/4/2003	Red Deer	24.0	22.6
106	29/10/2003	Medicine Hat	19.6	18.5
106	24/8/2005	Lethbridge	48.5	45.8
108	8/8/2002	Estevan	53.4	49.5
108	18/12/2002	Estevan	18.6	17.2
109	1/4/2003	Peace River	17.5	16.1
110	2/11/2000	Estevan	19.6	17.8
111	27/3/2004	Peace River	14.8	13.3
112	23/2/2002	Lethbridge	13	11.6
113*	10/9/2005	The Pas	62.8	55.4
114	9/2/2000	Calgary	10	8.8
114	6/3/2005	Saskatoon	18.5	16.2
115	26/4/2003	Cold Lake	28.5	24.9
116	7/11/2000	Estevan	20.6	17.8
117	2/11/2005	Saskatoon	16.0	13.7
118	16/7/2001	Regina	76	64.4

Severity (% of monthly ave)	Date	Location	Precipitation (mm)	Ave Monthly precipitation
122*	30/12/2004	Regina	20	16.4
124*	8/6/2002	Lethbridge	78.2	63.0
125	20/4/1999	Calgary	29.8	23.9
135*	18/5/1999	Saskatoon	59.0	43.6
142*	1/11/2000	Brandon	25.2	17.7
142	10/9/2005	Calgary	64.8	45.7
144	4/2/2005	Red Deer	15.6	10.8
150*	4/5/2000	Peace River	53.0	35.4
150*	5/2/2005	Prince Albert	17.4	11.6
151	14/10/2004	Lethbridge	28.5	18.9
152*	23/3/2003	Cold Lake	23	15.1
161	25/8/2004	Medicine Hat	53.5	33.3
201*	10/9/2005	Lethbridge	79.5	39.6
207	1/10/2005	Cold Lake	36.2	17.5
208*	1/11/2000	Estevan	37	17.8
225*	9/9/2003	Cold Lake	89.8	39.9
291*	24/4/2003	Cold Lake	72.4	24.9