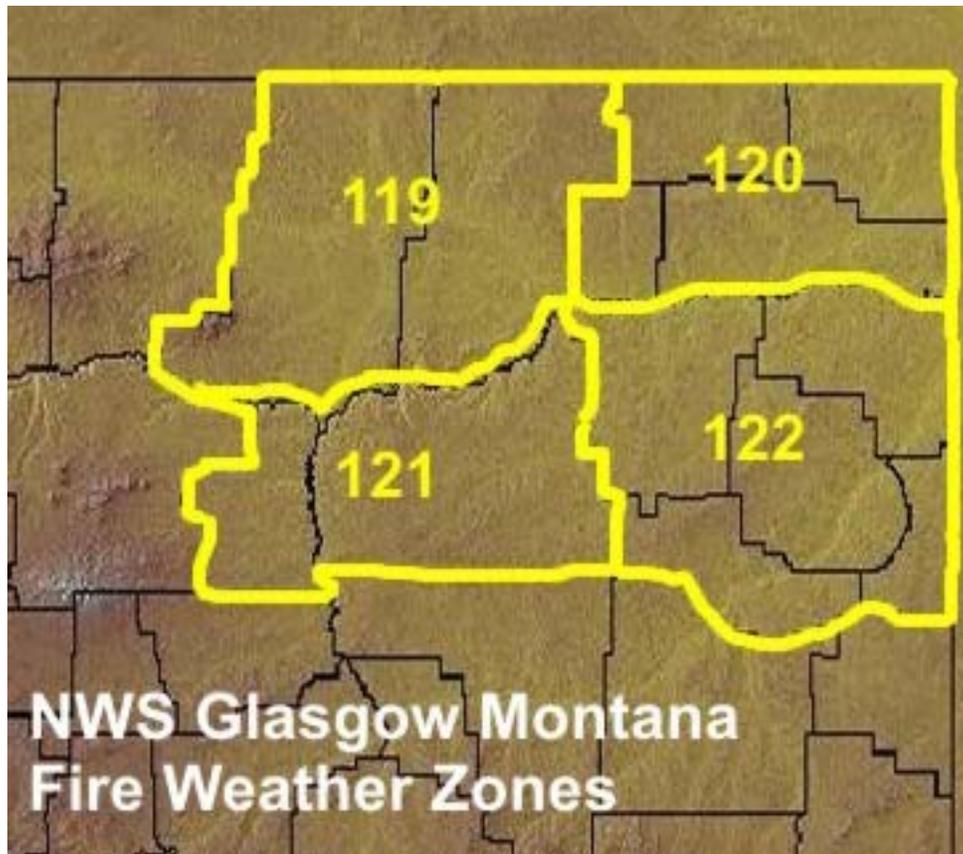


# National Weather Service – Glasgow 2006 Annual Fire Weather Report Northeast Montana

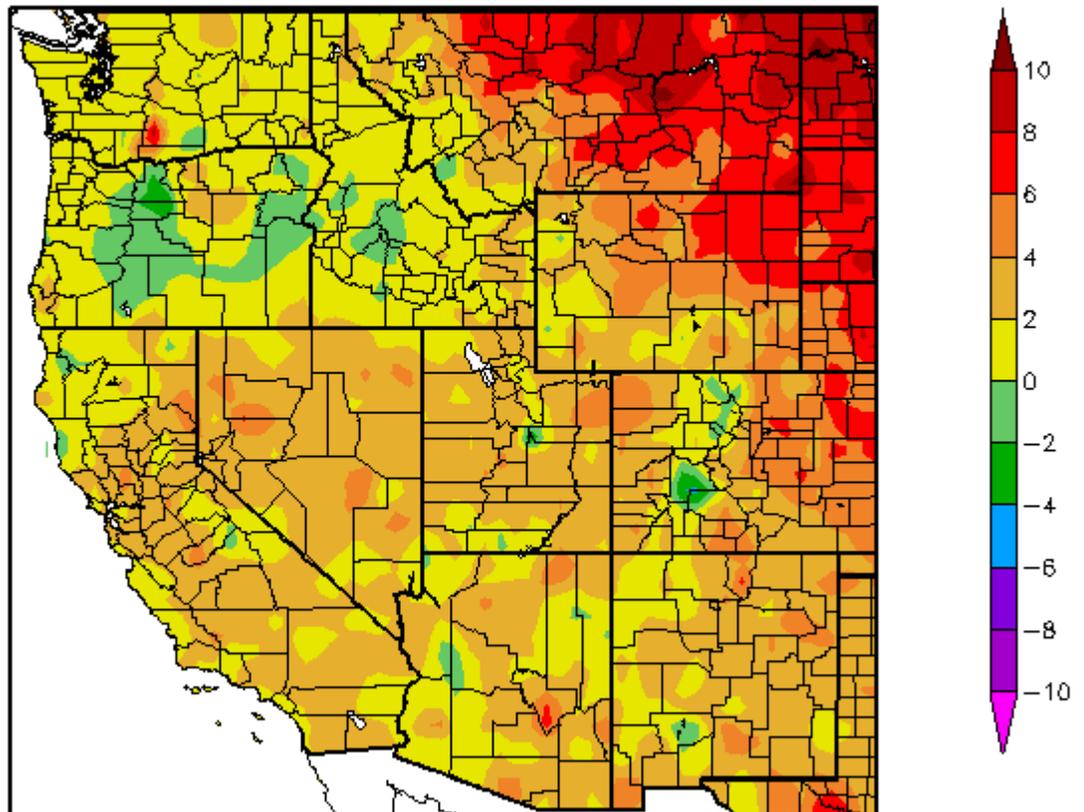


Black Pulaski Complex – Northern Garfield County July 2006

## 1. Overview

The year began on a warm note in January of 2006 with well above normal observed temperatures across northeast Montana. In fact, January 2006 was the warmest January on record at nearly all observation locations. High temperatures were above freezing on most days. Nearly all stations failed to even drop below zero the entire month, which was only the 3<sup>rd</sup> time this ever occurred in Glasgow since records began in 1893. In addition, numerous sites failed to even drop to freezing for overnight lows, quite an incredible feat for northeast Montana. Precipitation, on the other hand, averaged near normal across the region. Instead of falling in the form of all snow, there were periods of rain and some light freezing rain in addition to snow, quite rare for the month of January.

### Departure from Normal Temperature (F) 11/1/2005 – 1/31/2006



Generated 10/5/2006 at HPRCC using provisional data.

NOAA Regional Climate Centers

The observed warm weather in January spilled into the first half of February. Before finally cooling mid-month, temperatures continued to run well above normal. The cold blast that arrived mid-month finally provided below normal temperatures to the region with many readings in the teens to 20s below zero near the end of the month. Like January, February featured near normal precipitation.

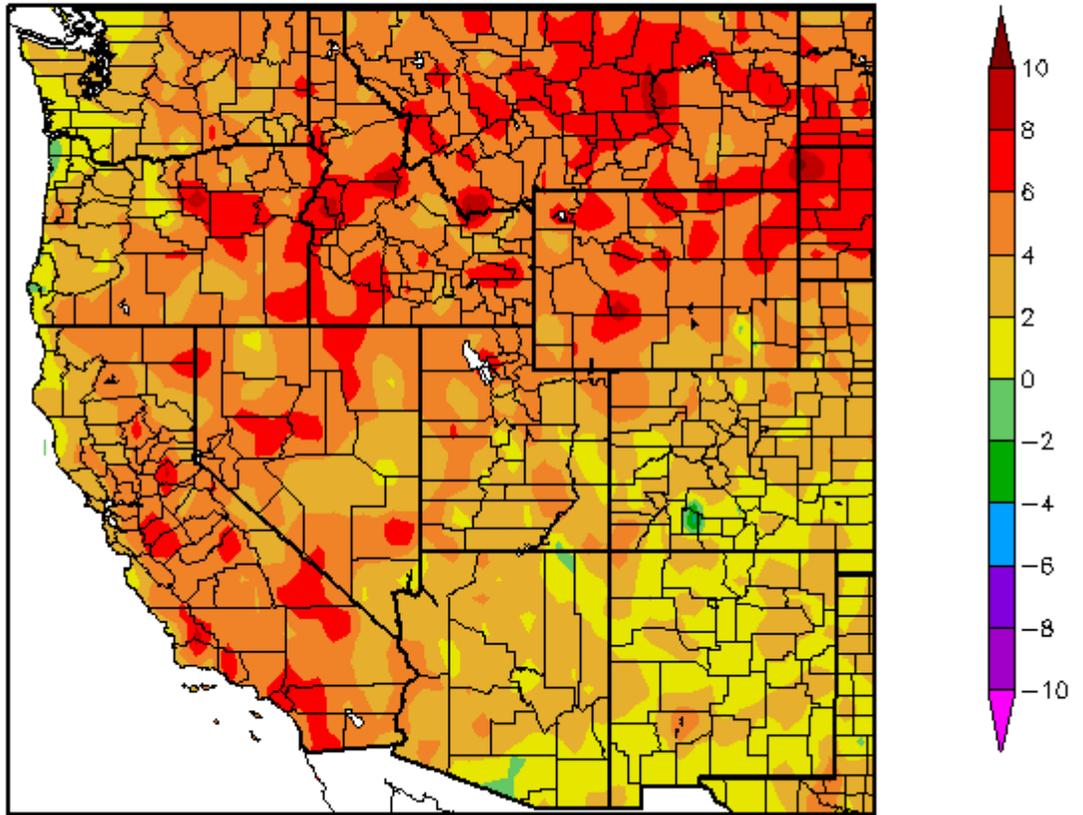
March of 2006 began on the cool side, but ended up with above normal temperatures toward the end of the month. Overall, March had near normal temperatures. The final zero degree reading of the winter was observed on the morning of the 15<sup>th</sup>. Precipitation was also near normal.

April featured both above normal temperatures and above normal precipitation across the area. By May, the warm trend continued with another month ending up with above normal temperatures. In fact, no below freezing temperatures were observed after May 15. The warm trend culminated with the majority of locations across northeast Montana seeing their first 90 degree day on the 18<sup>th</sup>. Precipitation was quite variable in May. The first part of the month was dry for the majority of the area, but by mid month, frequent showers and thunderstorms brought varied precipitation to northeast Montana with some sites seeing above normal precipitation while others were below normal.

June was overall warmer and drier than normal. No freezing temperatures were observed in June. The precipitation was the more critical factor this month though. June is climatologically the wettest month across northeast Montana with an average of 2.20 inches in Glasgow, and many spots ended up well below normal for total precipitation. The northeast corner of Montana did fare better than the rest of the region with some locations receiving above normal amounts. However, many spots were well below normal, including at least a dozen reporting stations that ended up with under an inch of precipitation. This shortage in what is supposed to be a wet month proved to be detrimental down the road.

The most critical month in the 2006 fire season was the month of July, which ended up much hotter than normal and drier than normal. The unusually hot temperatures brought 100 degree readings at least once in the month, and several locations had several consecutive days of 100 degree readings. Almost all high temperatures during the month of July were in the 80s and 90s or higher. All of this resulted in July being the 2<sup>nd</sup> hottest July ever on record in most locations, second only to 1936. Rainfall across most of the region for the month of July was less than one inch. July is climatologically the 2<sup>nd</sup> wettest month across northeast Montana with Glasgow's average at 1.78 inches. The cumulative precipitation deficits observed in June and July aided by above normal temperatures set the stage for a dangerously dry and efficient fuels situation. Isolated dry thunderstorms sparked numerous wildfires through the central part of the forecast area in mid July. Even though only a few lightning strikes were detected, a complex of 7 fires later named the Black Pulaski Complex started in the Charles M. Russell Wildlife Refuge. This would be the largest wildfire in northeast Montana for the 2006 season, burning approximately 125,000 acres when all was said and done. A Montana Type I team was called in to manage and control the fire, and this was the first time a Type I team was in the Glasgow forecast area. In addition to this large complex, a smaller complex named the Flat Tire Complex was established north of the Missouri River, managed by a Type II team. Both complexes were declared controlled by the end of July.

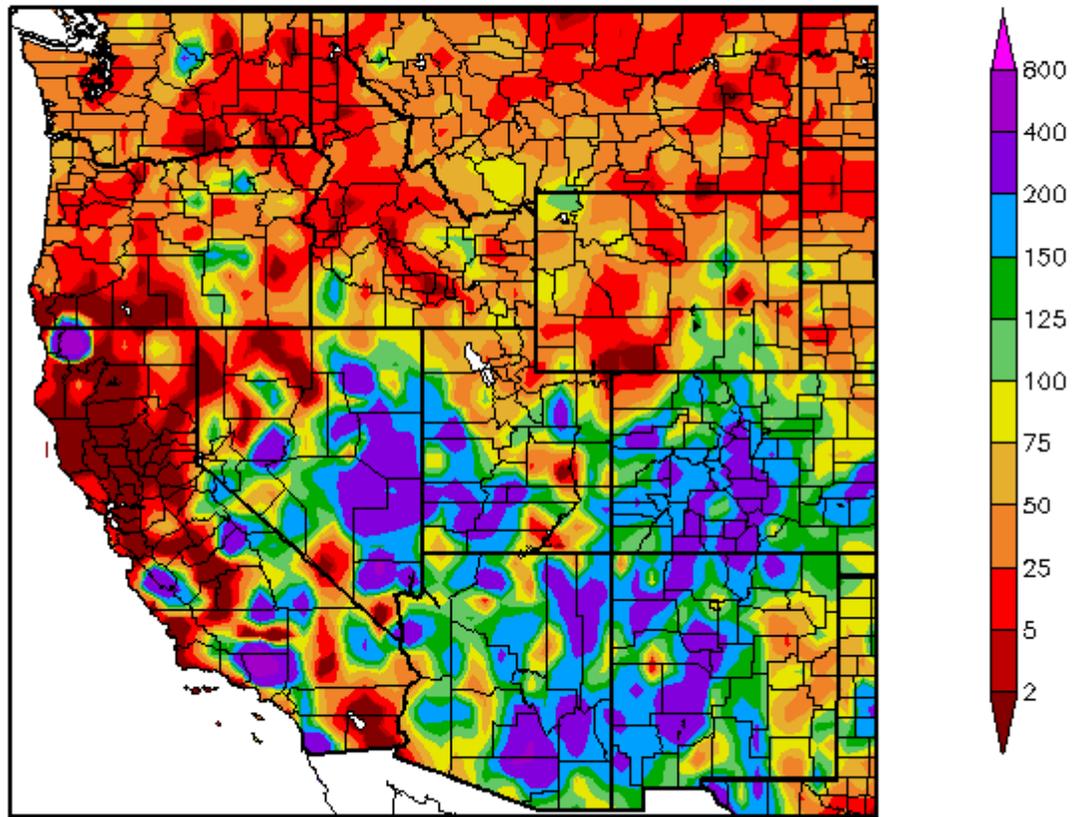
# Departure from Normal Temperature (F) 7/1/2006 - 7/31/2006



Generated 12/12/2006 at HPRCC using provisional data.

NOAA Regional Climate Centers

## Percent of Normal Precipitation (%) 7/1/2006 - 7/31/2006



Generated 12/12/2006 at HPRCC using provisional data.

NOAA Regional Climate Centers

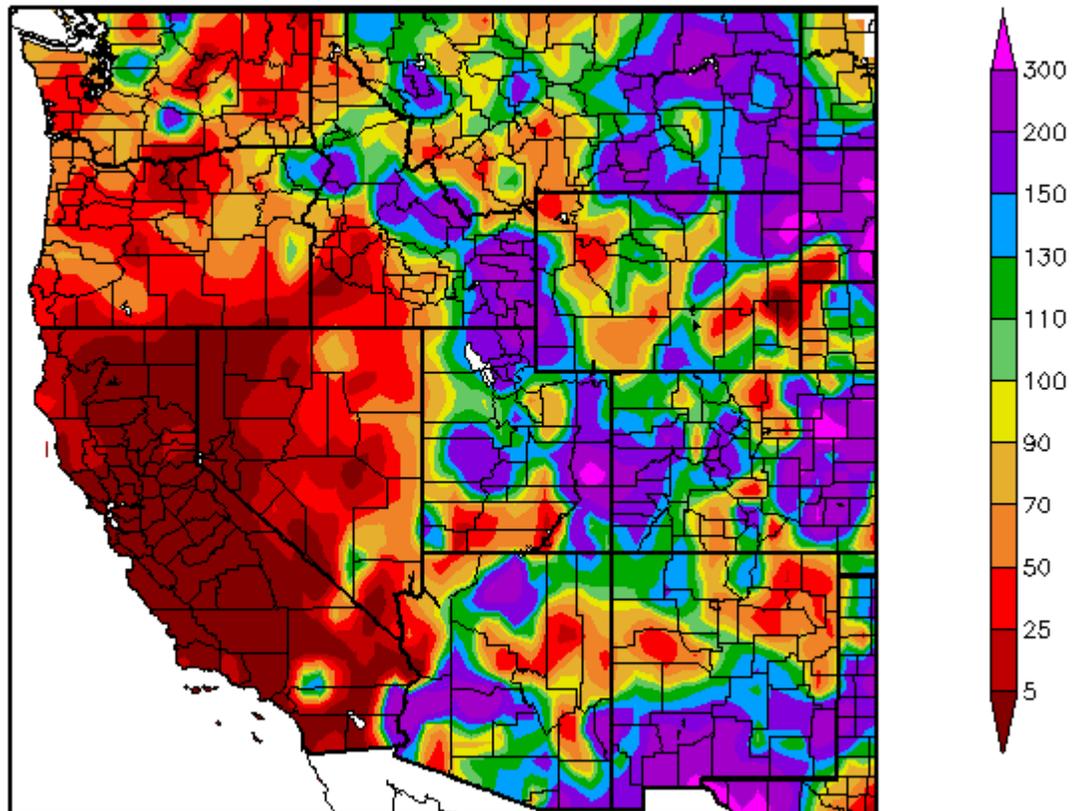
By August, the weather began to change a little. The month did end up hotter and drier than normal overall, but unlike the month of July, there were several brief cooler periods. When fires did begin in August, the cooler periods allowed agencies to get a handle on them more quickly than in July. There were numerous 100 degree high temperatures in the first half of the month, but many stations experienced a day or two in between with highs only in the 60s. Several lows dropped into the 30s as well, which also helped the fire weather situation with better relative humidity recovery than observed in July.

In summary for the entire summer of 2006, northeast Montana began the period with no drought conditions. The severe conditions of June, July and August quickly put the region back into severe drought conditions on the National Drought Monitor by the end of the summer. Glasgow had its driest summer on record with only 1.73 inches of rain observed the entire period. The previous record dry summer was in 1930 with 1.93 inches. It also ended up as the 5<sup>th</sup> warmest summer on record for Glasgow. That ranking would probably have been higher had it not been for the cooler spells that came in August.

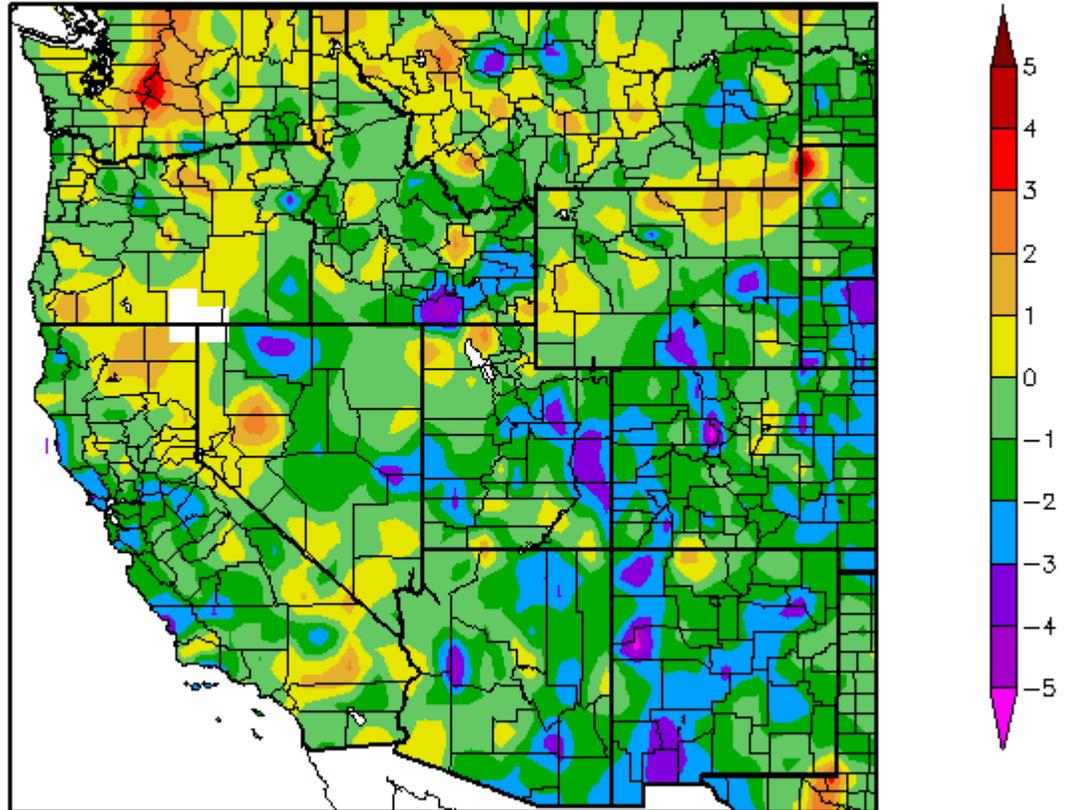
September finally brought a big change in the weather and some much-needed relief with near normal temperatures and well above normal precipitation. Although the hot and dry weather continued into the first part of September, a dramatic change then took place as the overall weather pattern finally shifted by mid-month. Unusually cold air finally filtered in along with much wetter conditions. In fact, the cold surge in the middle of September actually brought many locations their first observed snow of the season. All of northeast Montana observed above normal precipitation with most sites reporting between 2 and 3 inches of rain by the end of September. The normal amount of precipitation for Glasgow in September is 0.98 inches. The dramatic change to colder and wetter weather brought an abrupt end to the 2006 wildfire season.

The change in the weather went into October when much colder and wetter conditions than normal continued. In some spots, it was the first month in over a year with well below normal temperatures. The majority of northeast Montana ended up with well above normal precipitation, including above average snowfall.

### Percent of Normal Precipitation (%) 9/1/2006 - 9/30/2006



## Departure from Normal Temperature (F) 8/1/2006 – 10/31/2006



Generated 11/6/2006 at HPRCC using provisional data.

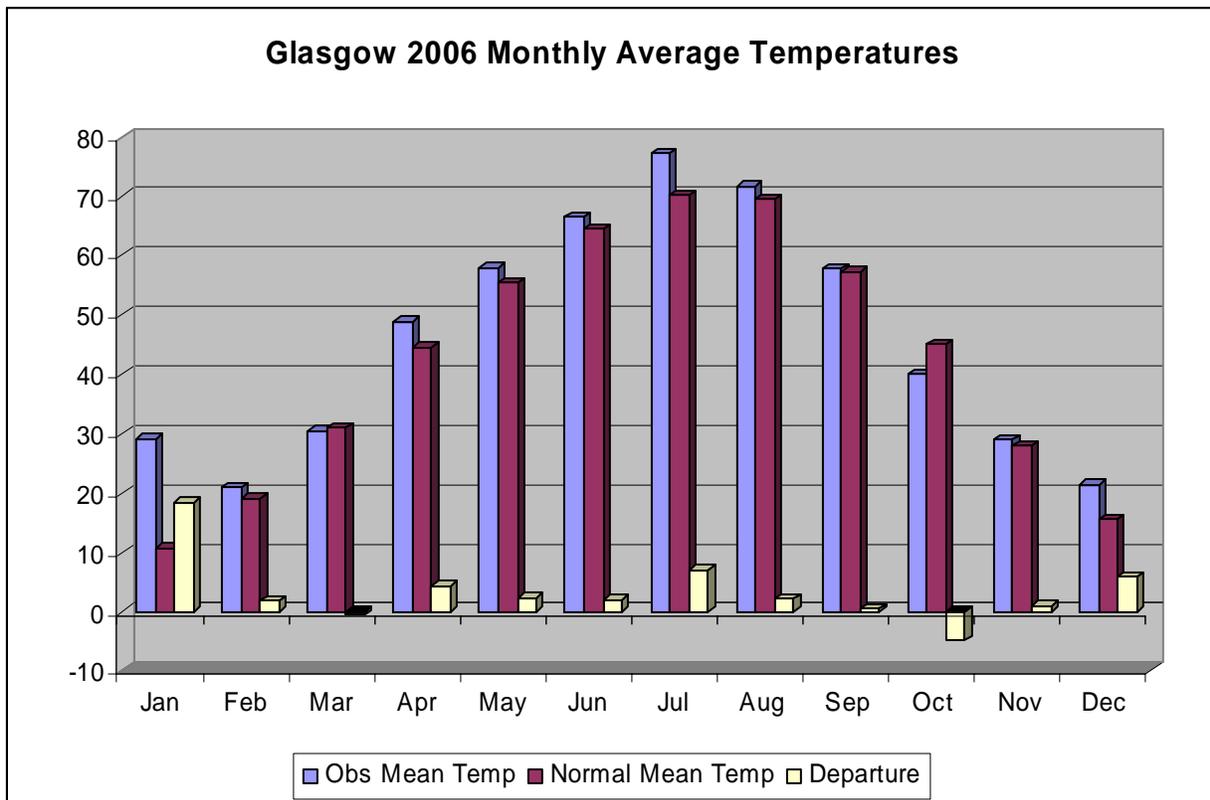
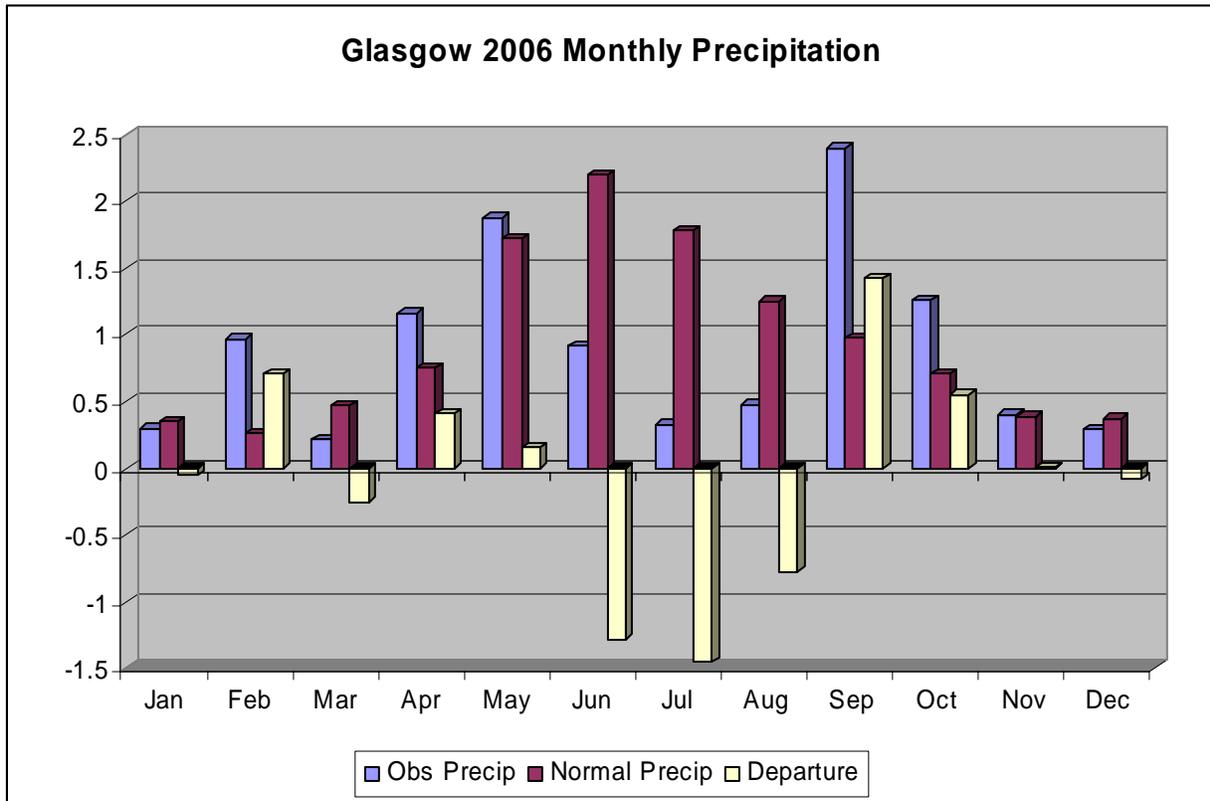
NOAA Regional Climate Centers

By November, a more normal weather pattern returned and both temperatures and precipitation returned to near normal. This included near or slightly above normal snowfall.

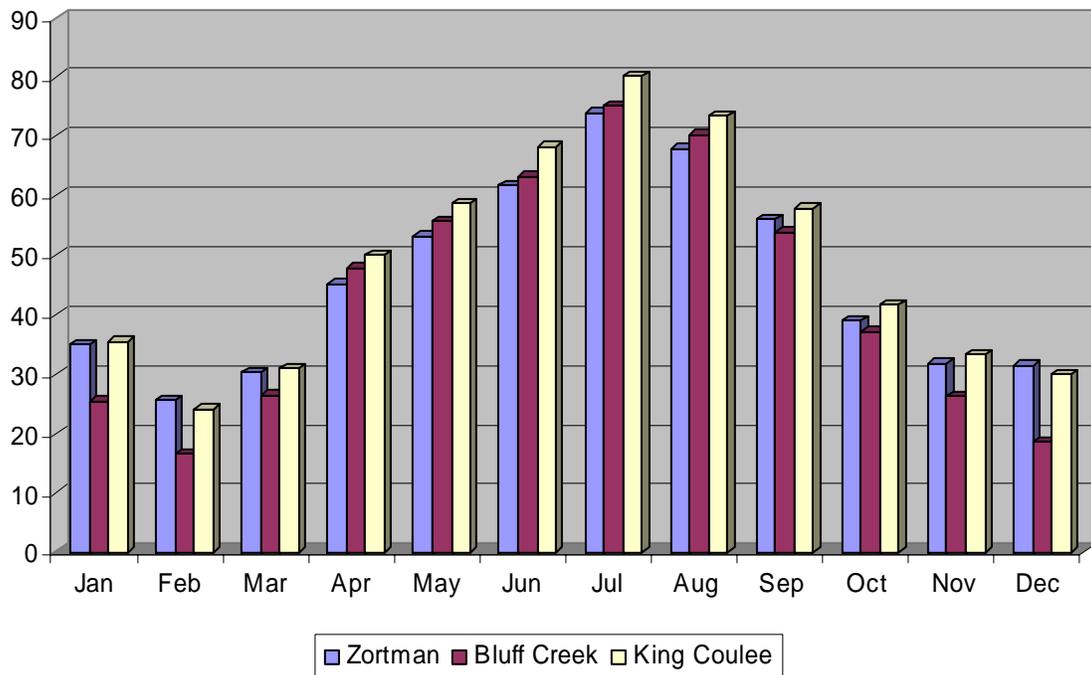
December ended up with well above normal temperatures and just slightly below normal precipitation. The month began and ended on a cold note, but temperatures were very warm in between that time. Snowfall ended up just slightly below normal for December despite the warm temperatures.

All of 2006 ended up being the 3<sup>rd</sup> warmest year on record at Glasgow since records began in 1893. Only 1981 and 1987 were warmer than 2006.

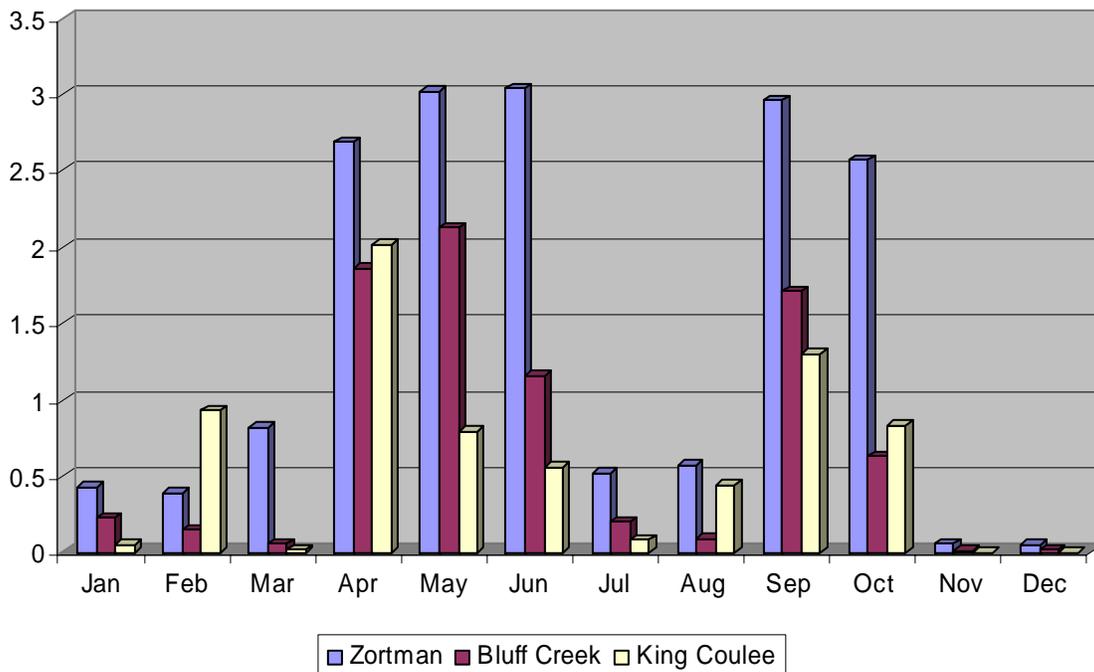
## Precipitation and Temperature Summaries



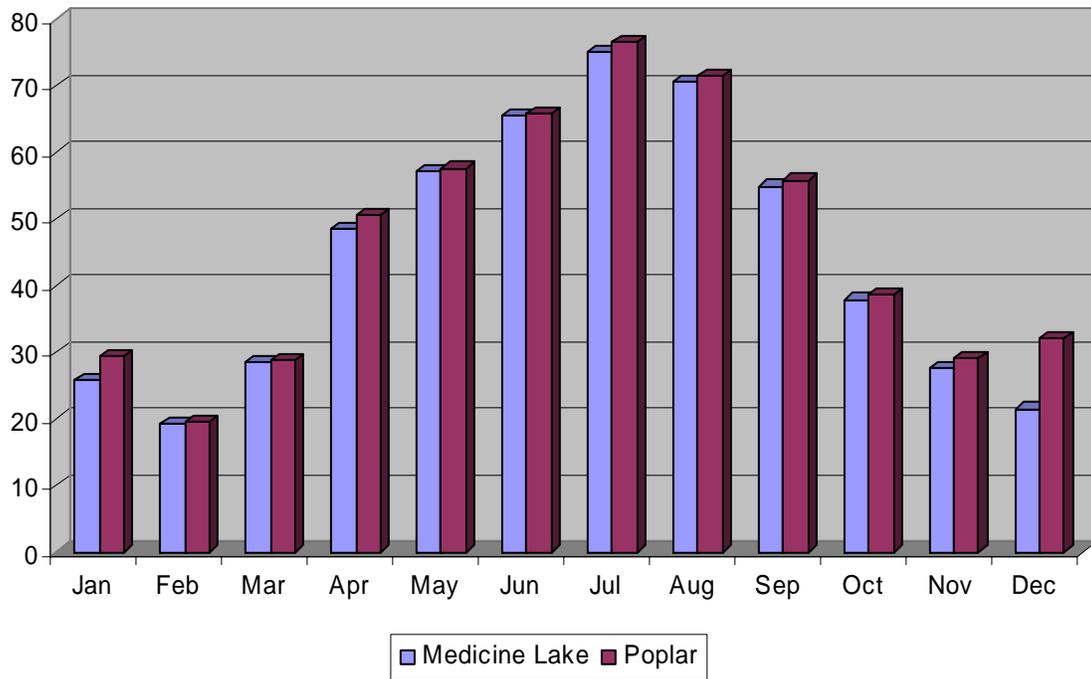
### Zone 119 Mean Temperatures - 2006



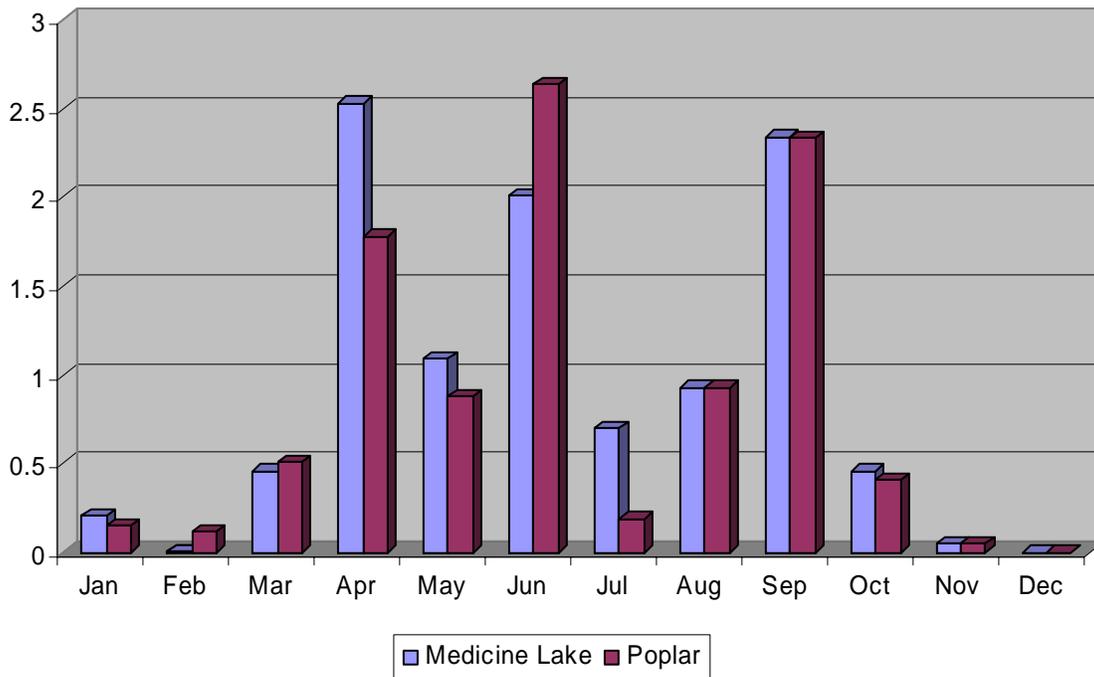
### Zone 119 Observed Precipitation - 2006



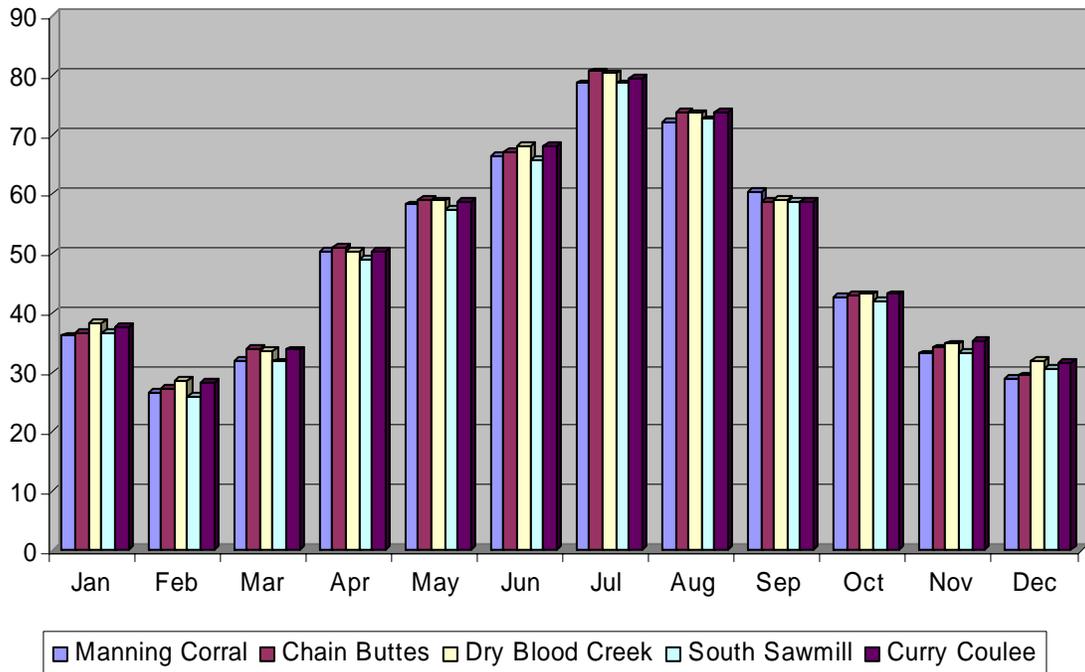
**Zone 120 Mean Temperatures - 2006**



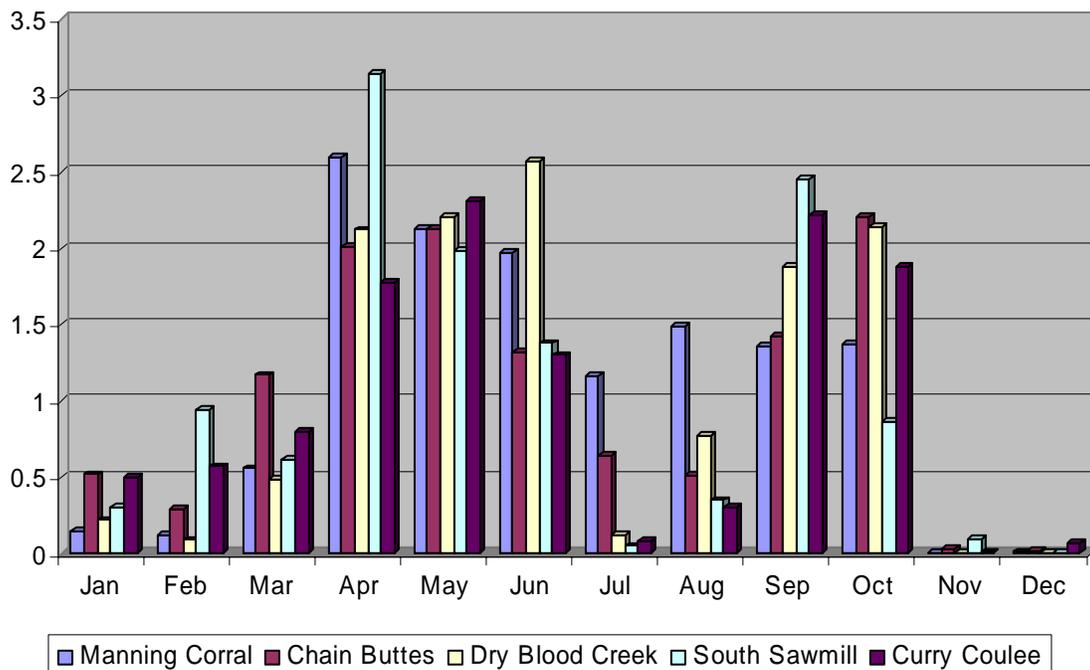
**Zone 120 Observed Precipitation - 2006**



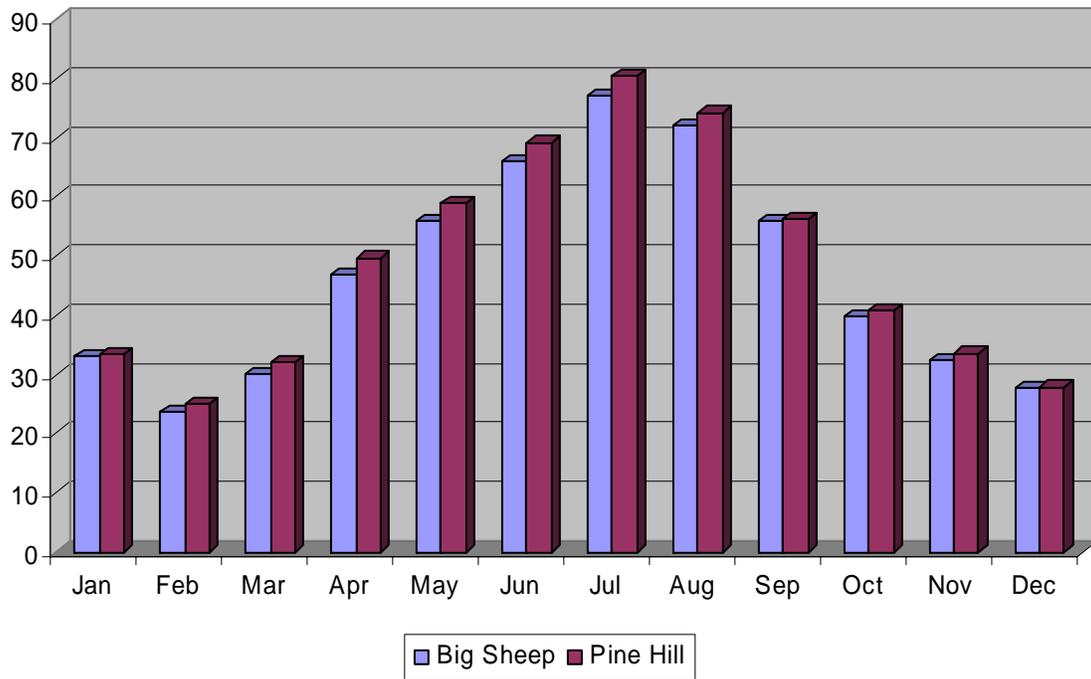
**Zone 121 Mean Temperatures - 2006**



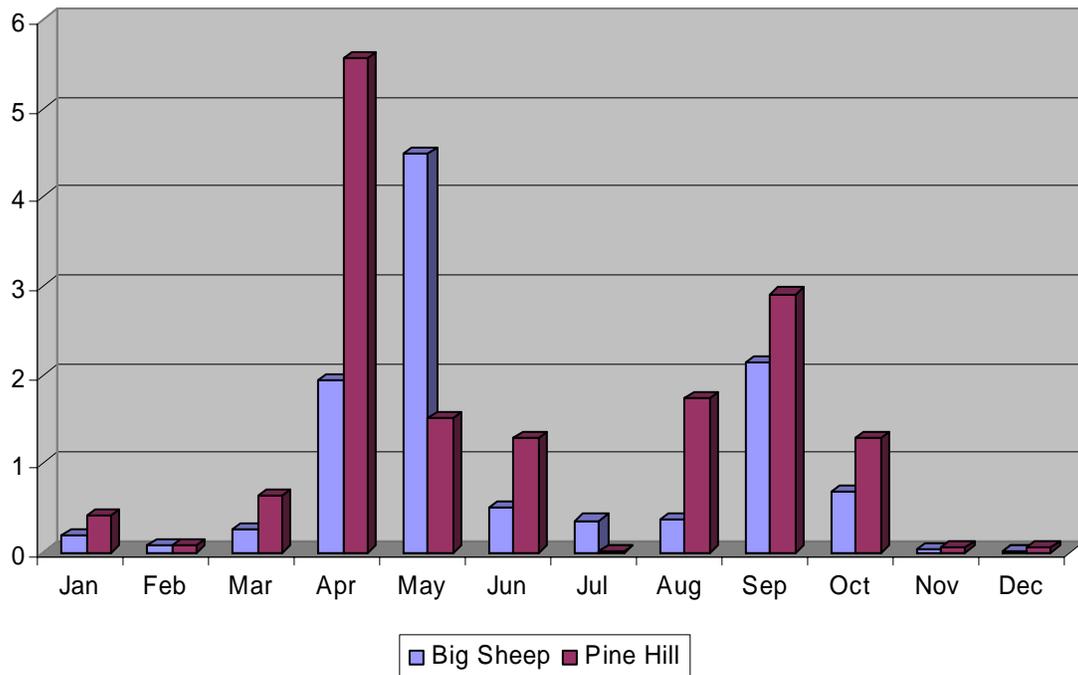
**Zone 121 Observed Precipitation - 2006**



**Zone 122 Mean Temperatures - 2006**



**Zone 122 Observed Precipitation - 2006**



## 2. Outreach

2006 was a busy year for outreach in the Glasgow service area. In the spring, Jennifer Zeltwanger, Fire Weather Program Leader/IMET, Julie Adolphson, Meteorologist-in-Charge, and Tanja Fransen, Warning Coordination Meteorologist, made a trip up to the Medicine Lake Wildlife Refuge to discuss weather products and burn plans. They also visited the Fort Peck Bureau of Indian Affairs fire office to touch base before the 2006 fire season. Jennifer and Julie also visited the Miles City and Lewistown BLM Dispatch Centers to discuss upcoming changes for the 2006 fire weather season. While in Lewistown, Jennifer and Julie made contact with representatives from the Charles M. Russell Wildlife Refuge and visited their station near the dispatch office.

As a result of the trip to Medicine Lake Wildlife Refuge, forecasters from the Glasgow office were able to visit after the initial spring trip to observe a prescribed burn. Three forecasters visited during the first trip, and one forecaster made a later trip up.

May of 2006 was the 10<sup>th</sup> Anniversary of the Glasgow weather office, and the station hosted an open house to celebrate. At the event, Jennifer presented a slide show on fire weather services. She also had a booth set up to display her IMET equipment.

Through peak fire season, Glasgow forecasters participated in a weekly fire restrictions conference call hosted by the BLM in Lewistown. In addition, they began the same service for the BLM in Miles City and their weekly fire restrictions calls.

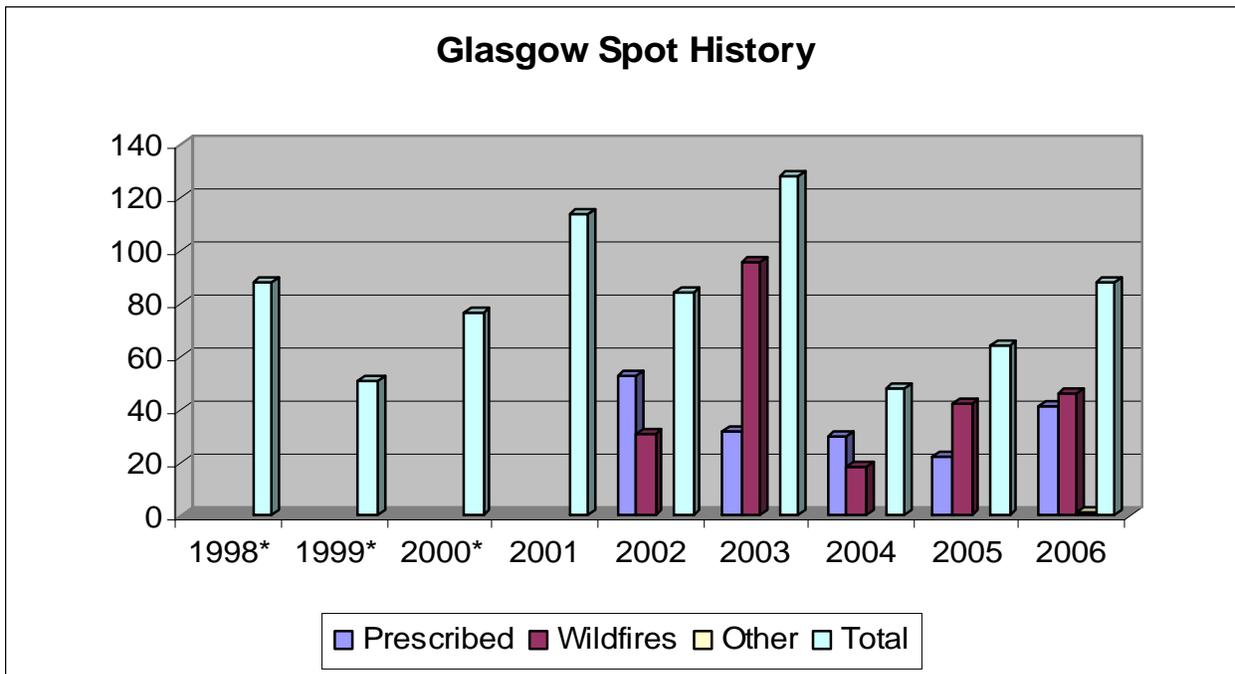
Once peak fire season was over, Jennifer hosted a conference call with fire customers from the Miles City area in order to perform a post-season service review.

## 3. Fire Weather Watch and Red Flag Warning Verification

	All Events	Synoptic Events	Dry Thunderstorm Events
Red Flag Warnings Issued	57	53	4
Actual Red Flag Events	59	55	4
Verified Warnings	53	49	4
Missed Warnings	6	6	0
Unverified Warnings	4	4	0
Warning Lead time	11.7 hours	12.0 hours	8.6 hours
Fire Weather Watches Issued	32	32	0
Verified Watches	31	32	0
Warnings Preceded by Watches	32	32	0
POD	0.90	0.89	1.00
FAR	0.07	0.08	0.00
CSI	0.84	0.83	1.00

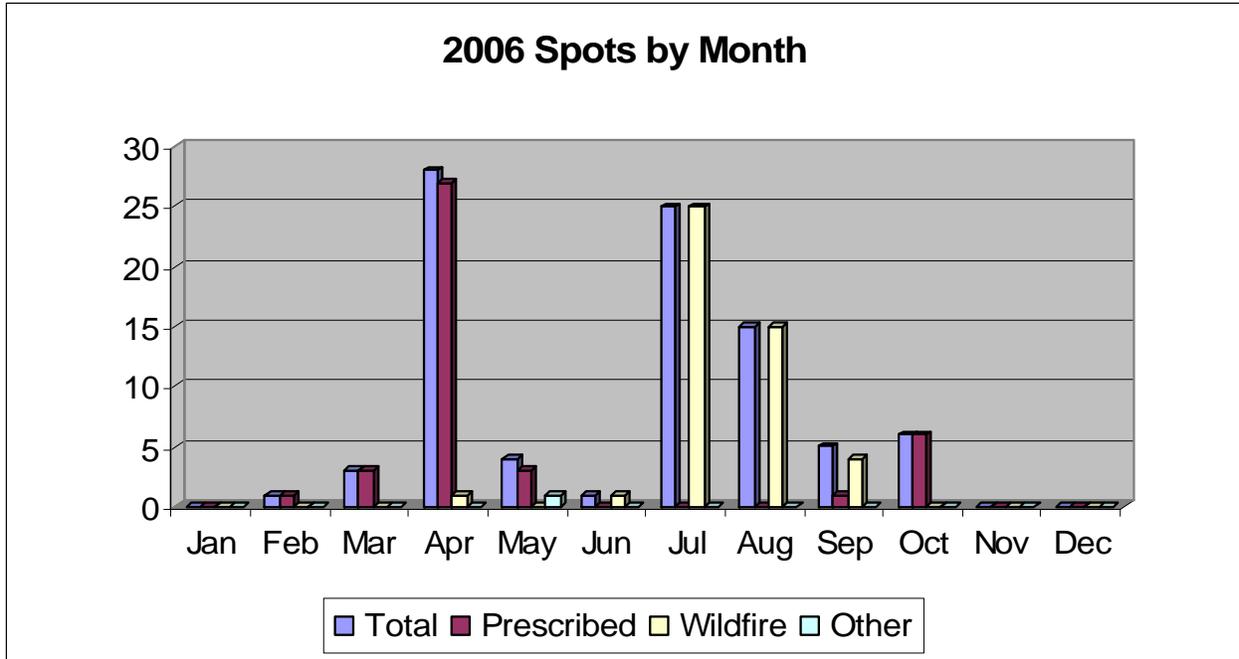
#### 4. Spot forecasts

WFO Glasgow did 88 spot forecasts in 2006. 41 were for prescribed burns, 46 were for wildfires, and one was for a Hazmat exercise. In comparison, we did 64 spots in 2005, 48 spots in 2004, 128 spots in 2003, 84 in 2002 and 114 in 2001. WFO Billings did 77 spots in our area in 2000, 51 in 1999, and 88 in 1998.



*\*1998-2000 spots in northeast Montana done by WFO Billings*

April was the busiest month for spot forecasts in 2006, the majority of which were for prescribed burns. July was the secondary peak, and all of those spots were for wildfires.

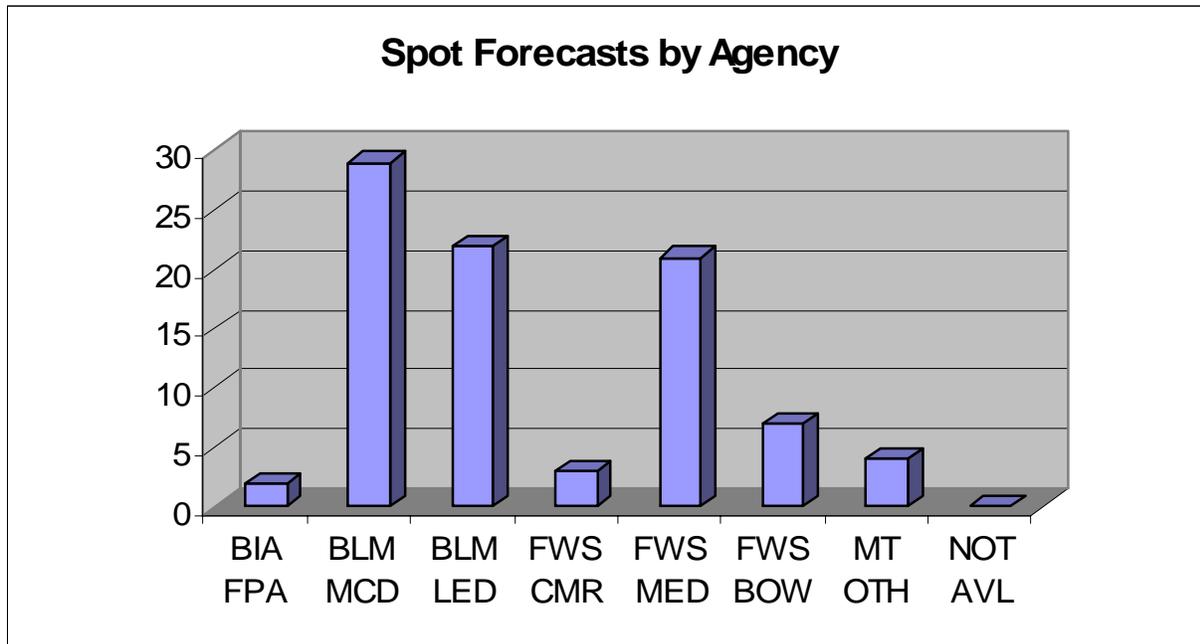


**Monthly Breakdown**

Month	Prescribed	Wildfire	Other	Total
January	0	0	0	0
February	1	0	0	1
March	3	0	0	3
April	27	1	0	28
May	3	0	1	4
June	0	1	0	1
July	0	25	0	25
August	0	15	0	15
September	4	1	0	5
October	6	0	0	6
November	0	0	0	0
December	0	0	0	0

## Agency Breakdown

The Lewistown BLM requested the most spots in 2006, in part due to the Black Pulaski Complex in July. The BLM in Miles City and Medicine Lake Wildlife Refuge requested the next highest number of spots. Miles City BLM spots were mostly wildfire, again in part due to the Black Pulaski Complex. Medicine Lake requested mostly prescribed burning spot forecasts.



Agency	Location	Projects	Prescribed	Wildfires	Total
BIA	Fort Peck (FPA)				2
BLM	Miles City (MCD)				29
BLM	Lewistown (LED)				22
USFWS	CMR				3
USFWS	Medicine Lake				21
USFWS	Bowdoin (BOW)				7
MT	Other (OTH)				4

## **5. IMET Report**

IMET Jennifer Zeltwanger had 3 separate dispatches for 4 different fires for a total of 36 days (including travel days).

July 16 through 23, 2006 – Jennifer's first fire of the season was in the Glasgow forecast area, the Black Pulaski Complex. This fire was managed by a Montana Type I team and burned approximately 150,000 acres.

July 25 through August 9, 2006 – Jennifer's second assignment was the Maxwell Fire in north-central Oregon. This fire was managed by a Washington Type II team and was in the Pendleton forecast area.

August 18 through 29, 2006 – Jennifer's final assignment for the 2006 season was a more complicated one. Her initial dispatch was to southeast Idaho in the Pocatello forecast area to work with a Type II team from Arizona on the Crystal Fire. The first dispatch was very short, so the team was re-assigned to a wildfire in the north-central Idaho mountains. The team brought Jennifer with them to the Boundary Complex where she finished out her assignment.