

A large center pivot irrigation system is shown in a field, with water being sprayed from multiple wheels. The background features a range of mountains under a clear sky. The text is overlaid on the image.

Monitoring Colorado Climate, Tracking Changes and Thinking Ahead

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Conference, El Paso, TX, June 17, 2008**

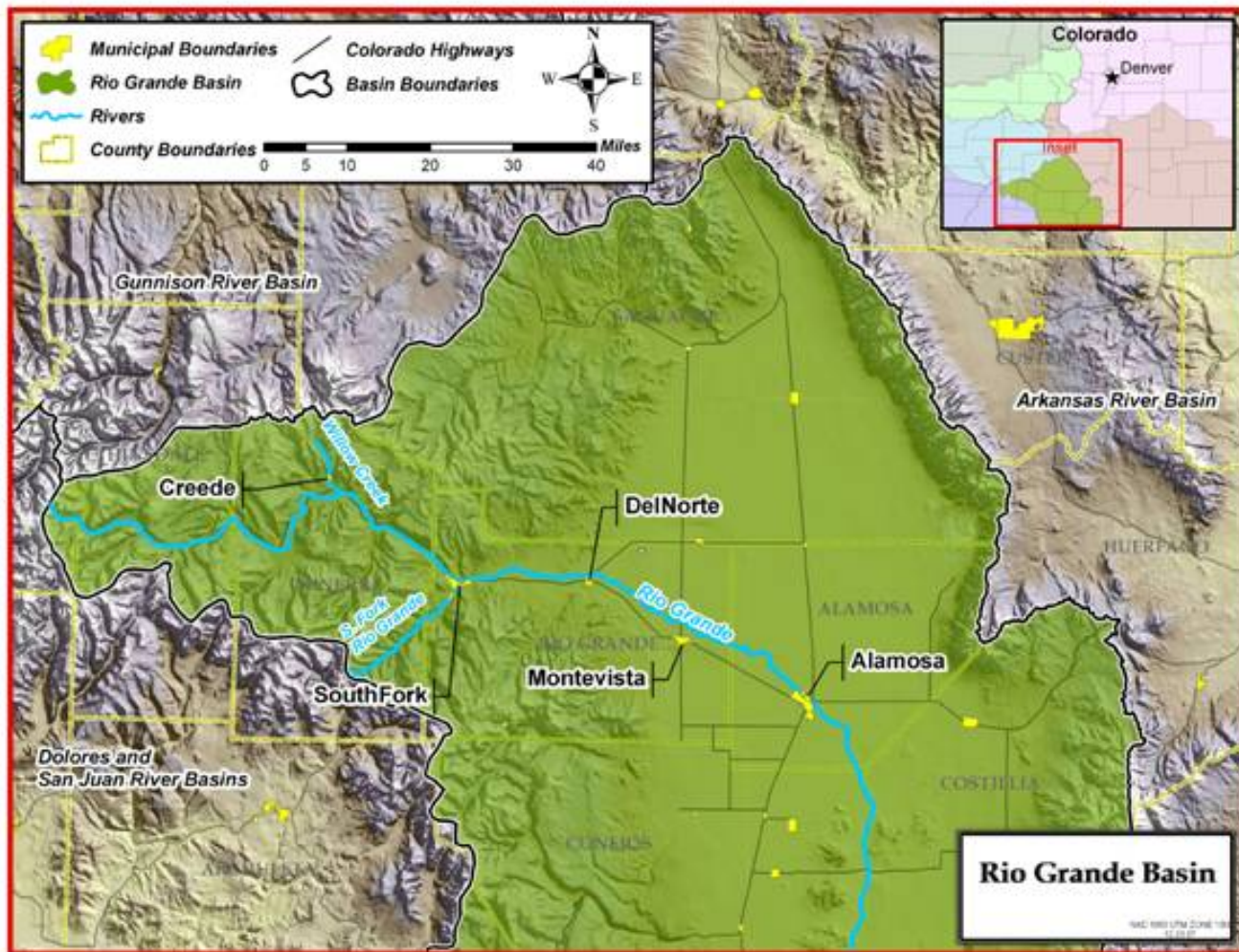
Prepared by Odie Bliss

Rio Grande Basin in Colorado



One of Four major river systems with headwaters in Colorado

Rio Grande Basin in Colorado

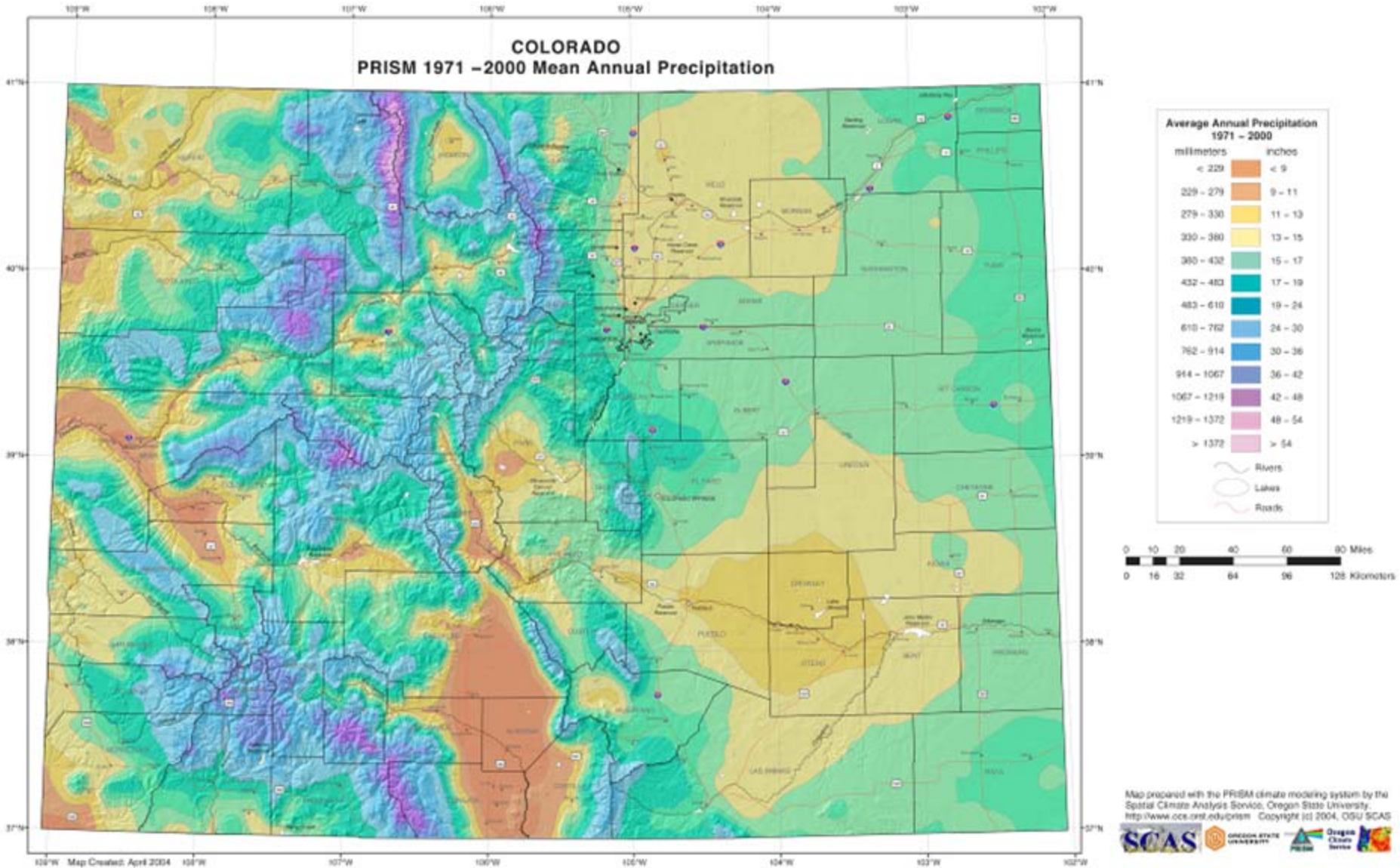


From <http://riograndeheadwaters.org/>

Climate data in this basin date back to the late 1800s, but few weather stations have continuous long-term time series – especially in the high mountains.

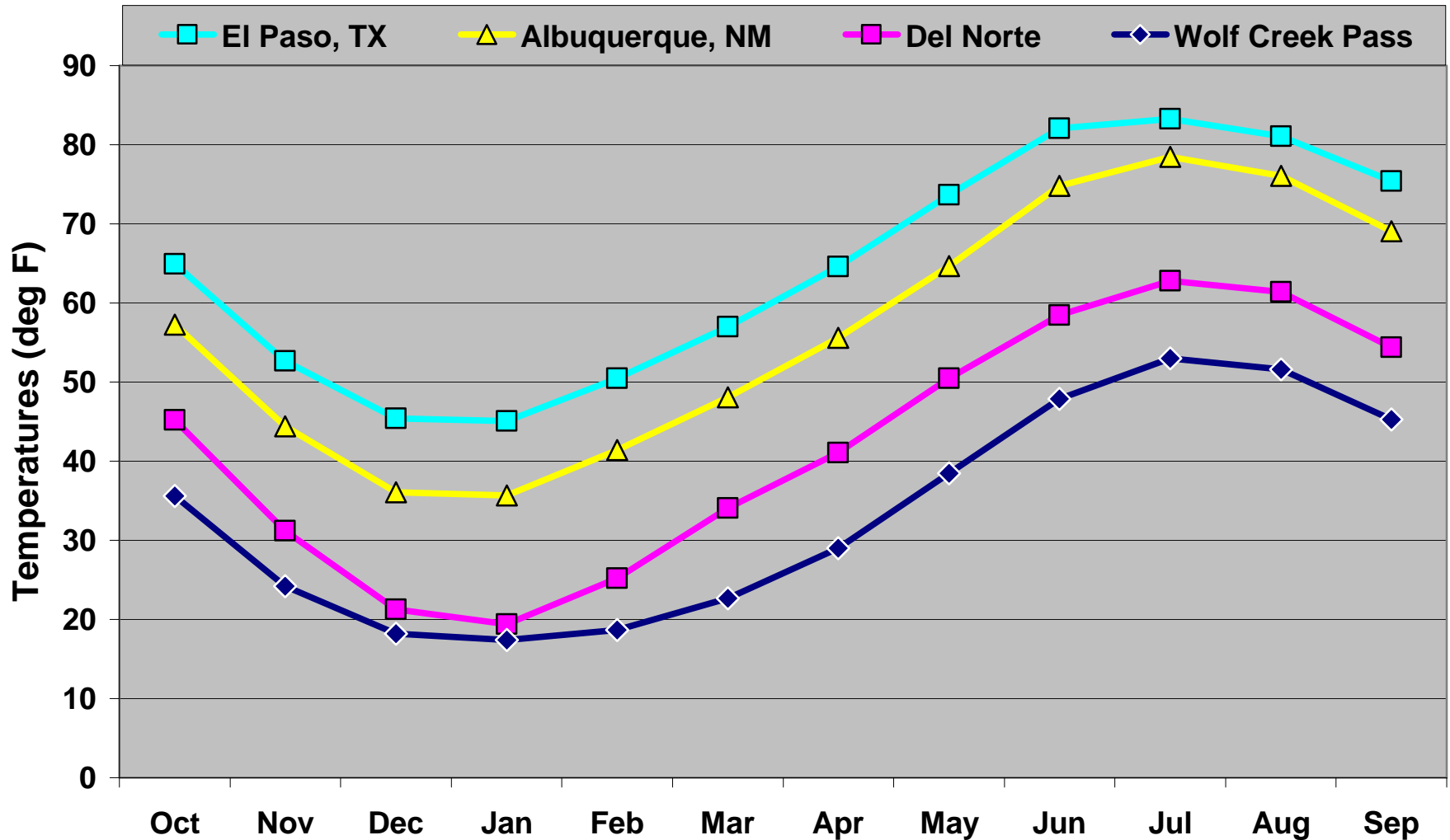
Average Annual Precipitation

The Rio Grande Basin contains the driest and some of the wetter areas of Colorado



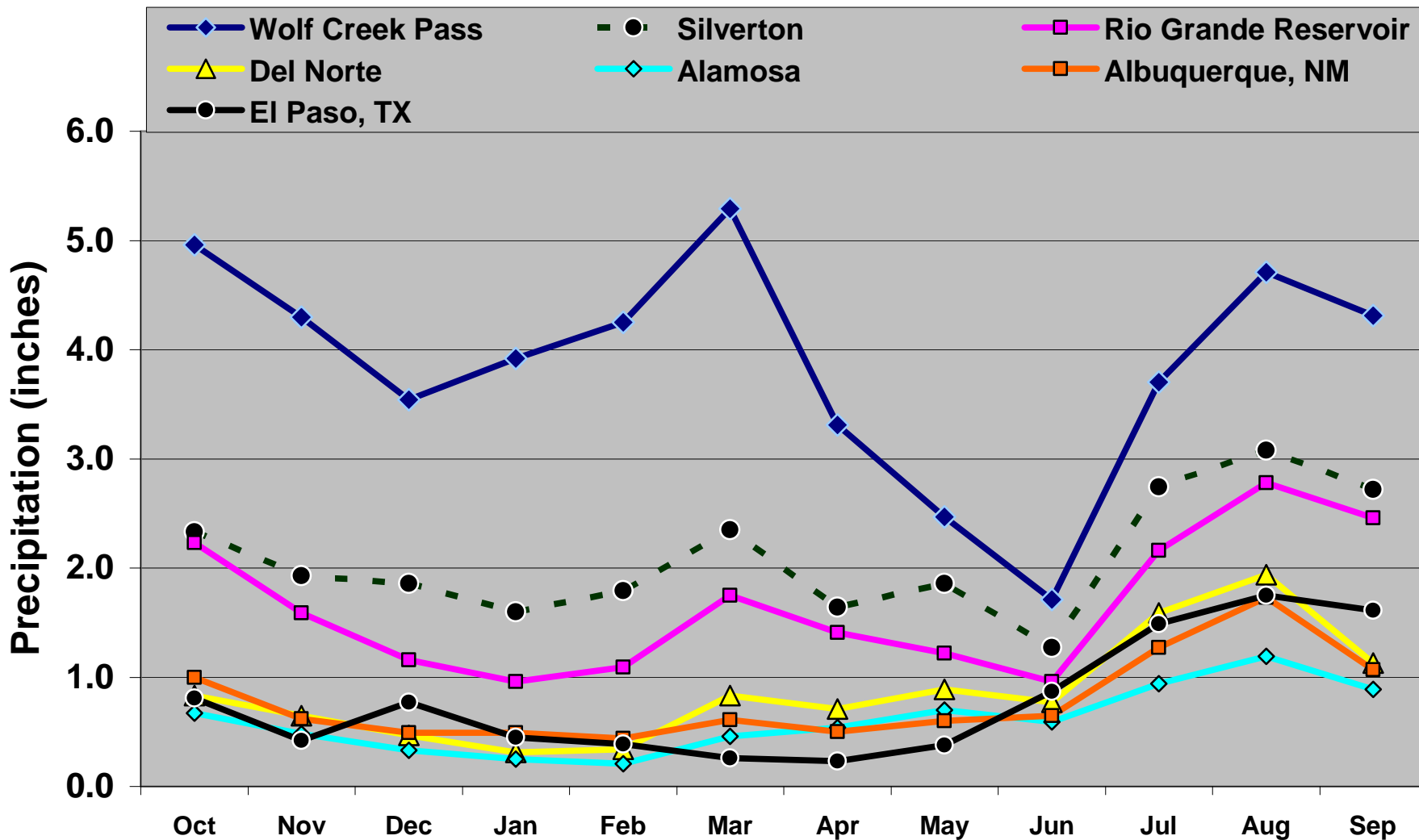
Average Temperatures in the Rio Grande Basin

Average Monthly Temperatures
(1971-2000)



Precipitation Seasonality in the Rio Grande Basin

Average Monthly Precipitation
(1971-2000)

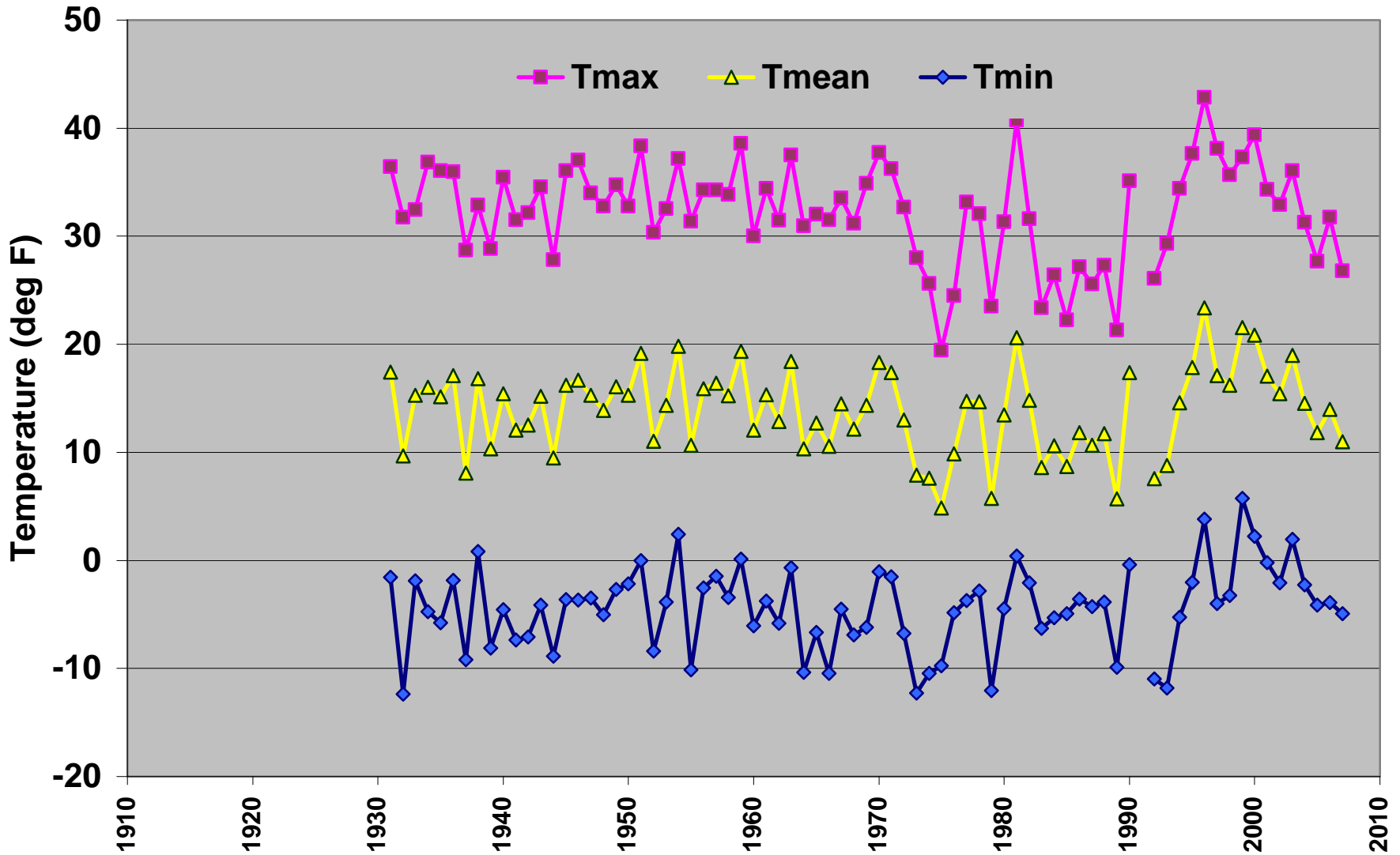


Observed Temperatures in the Rio Grande Basin from 1920 - 2007

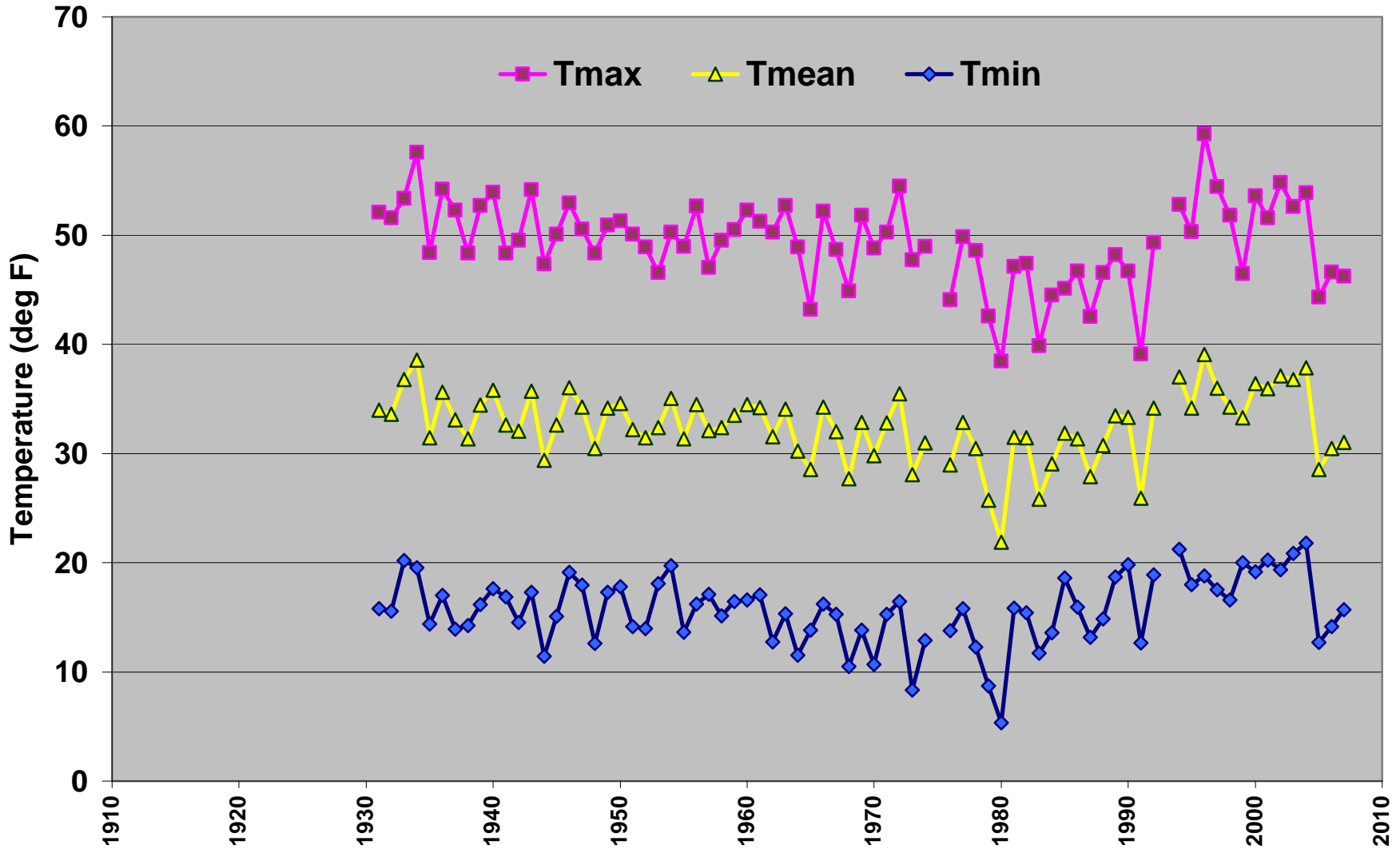
- *Few long-term stations with continuous temperature records*
- *Existing long-term stations primarily in mountain valleys*
- *Hermit and Del Norte are two stations with long-term data. Both have significant station changes in the past 20 years making time series interpretation difficult*

Hermit, Colo, 05-3951, Elevation 9010 feet

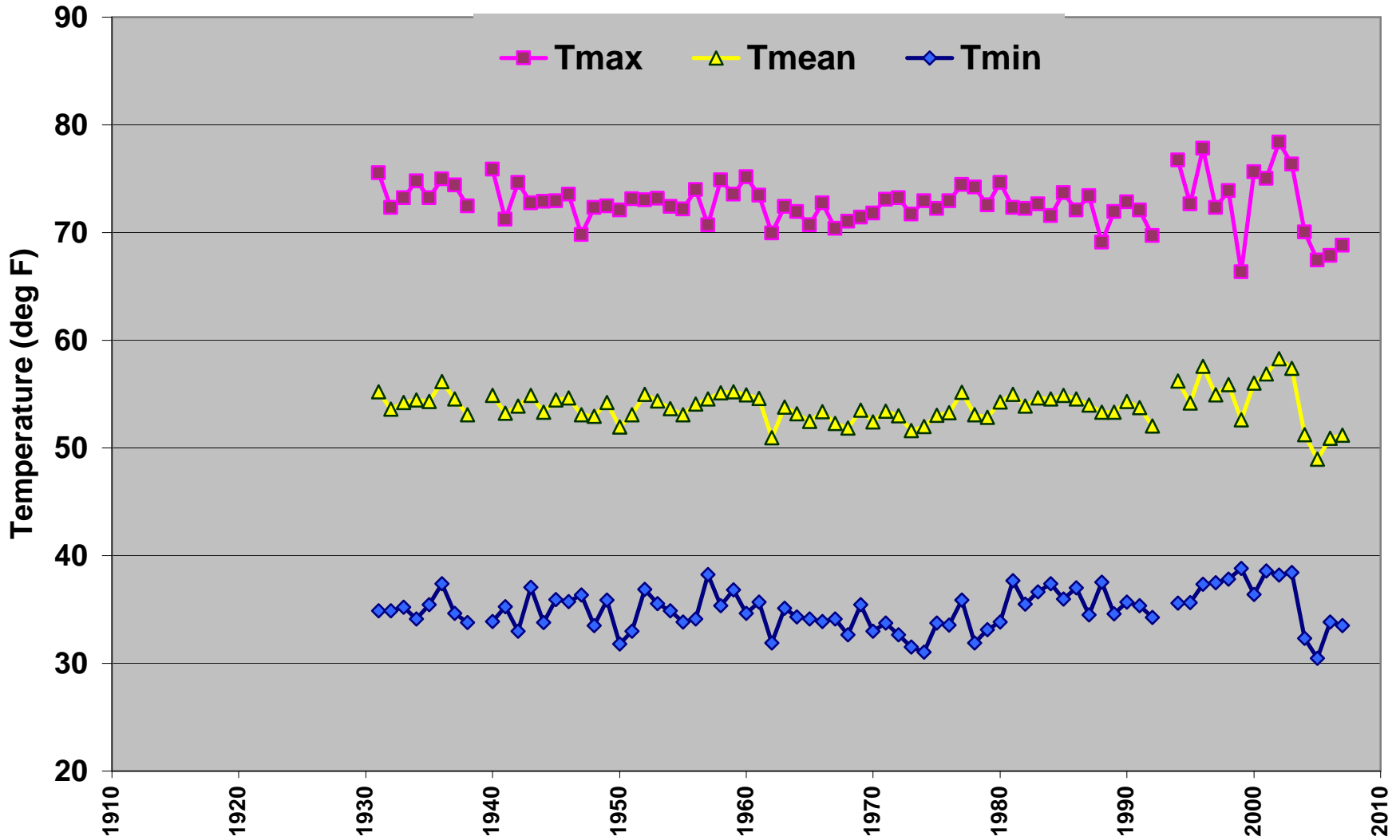
Winter (DJF) Temperatures



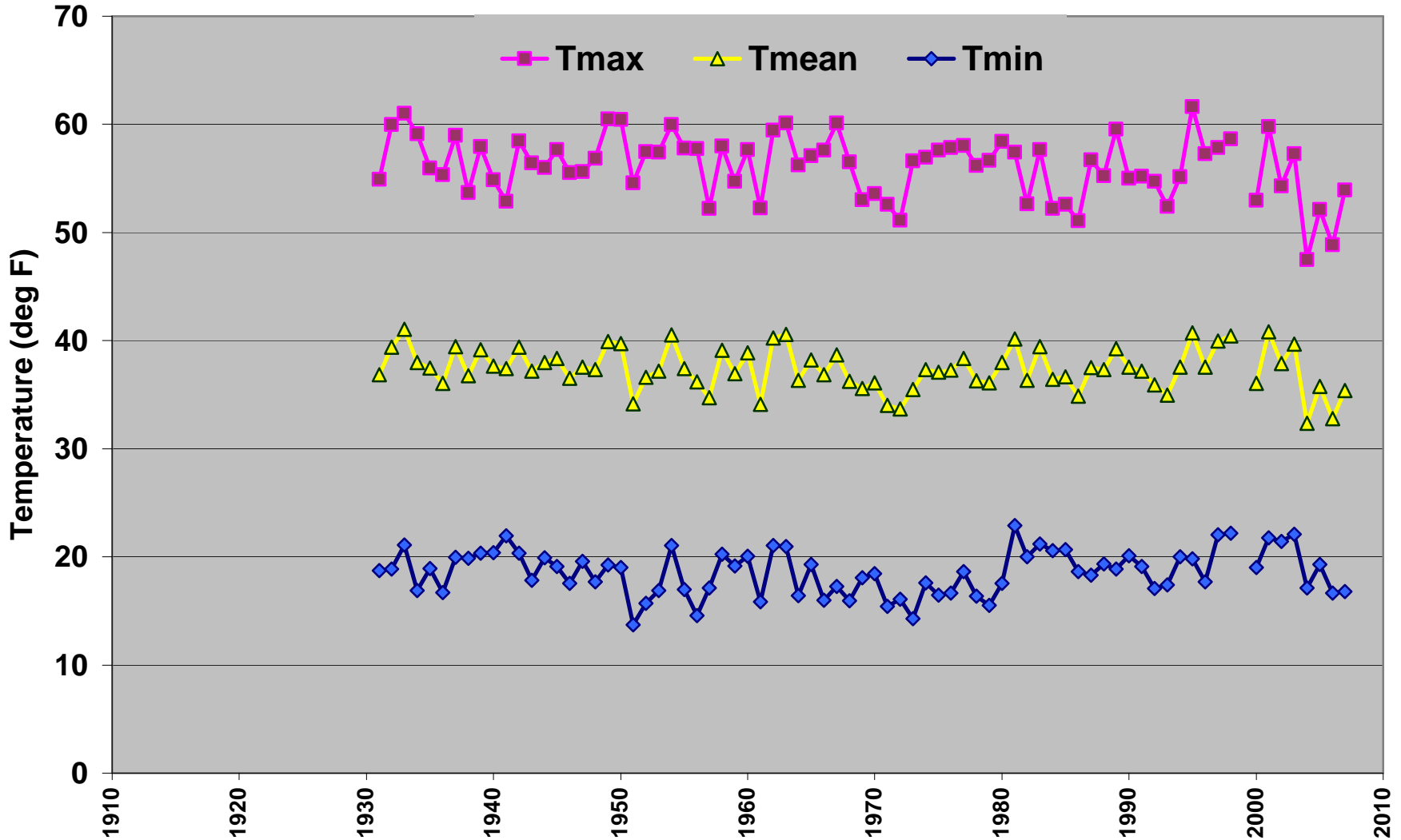
Hermit, Colo, 05-3951, Elevation 9010 feet Spring (MAM) Temperatures



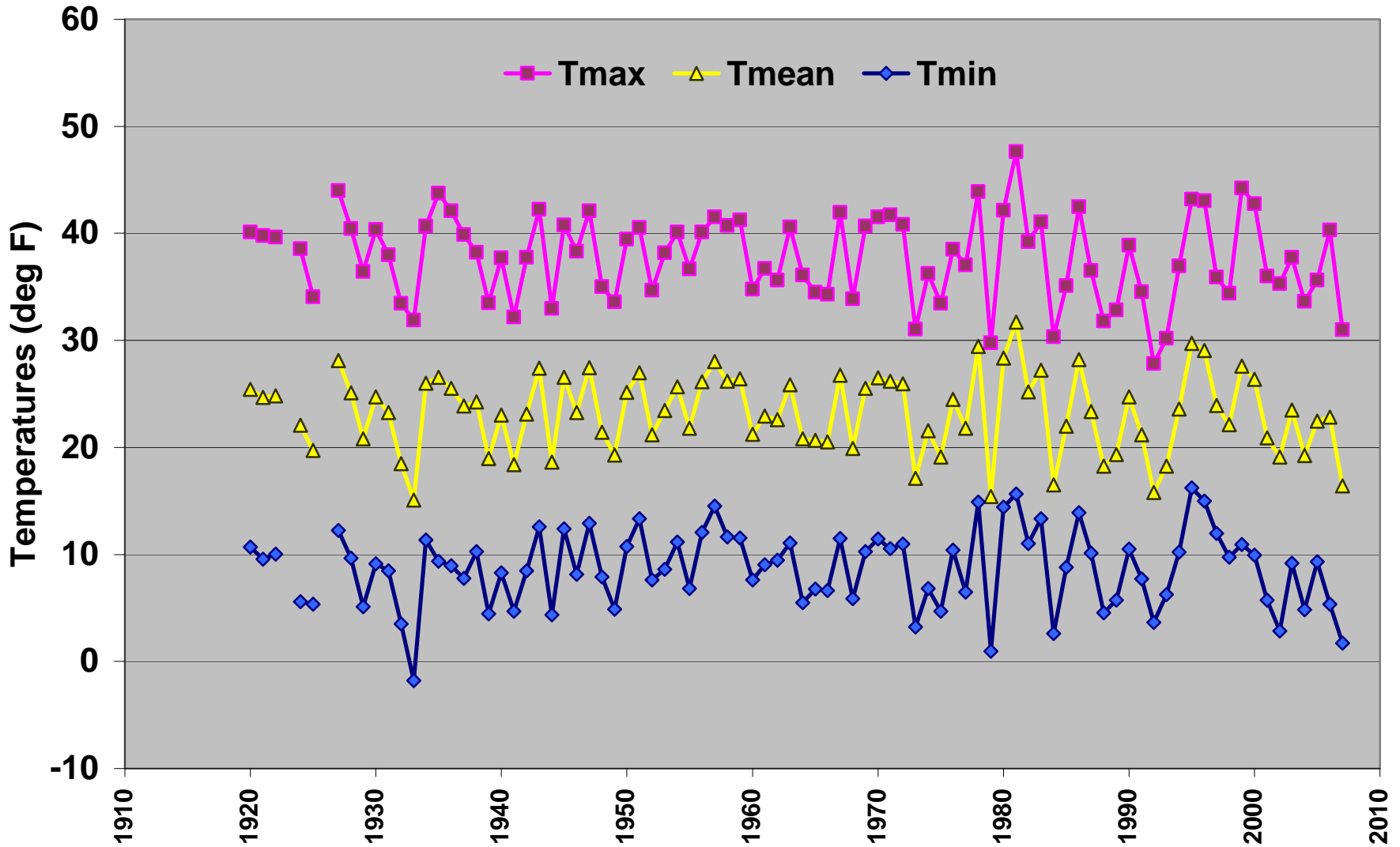
Hermit, Colo, 05-3951, Elevation 9010 feet Summer (JJA) Temperatures



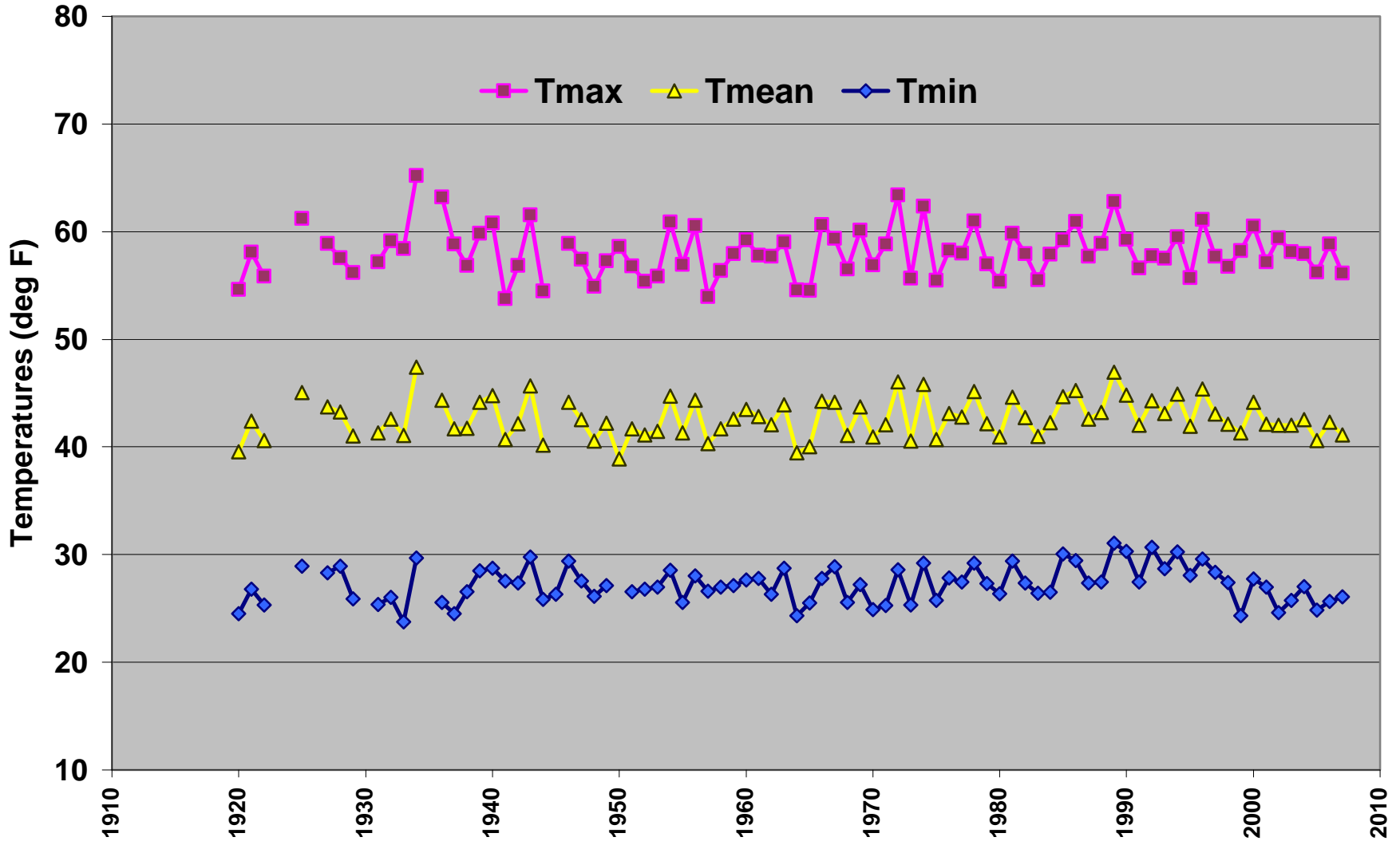
Hermit, Colo, 05-3951, Elevation 9010 feet Fall (SON) Temperatures



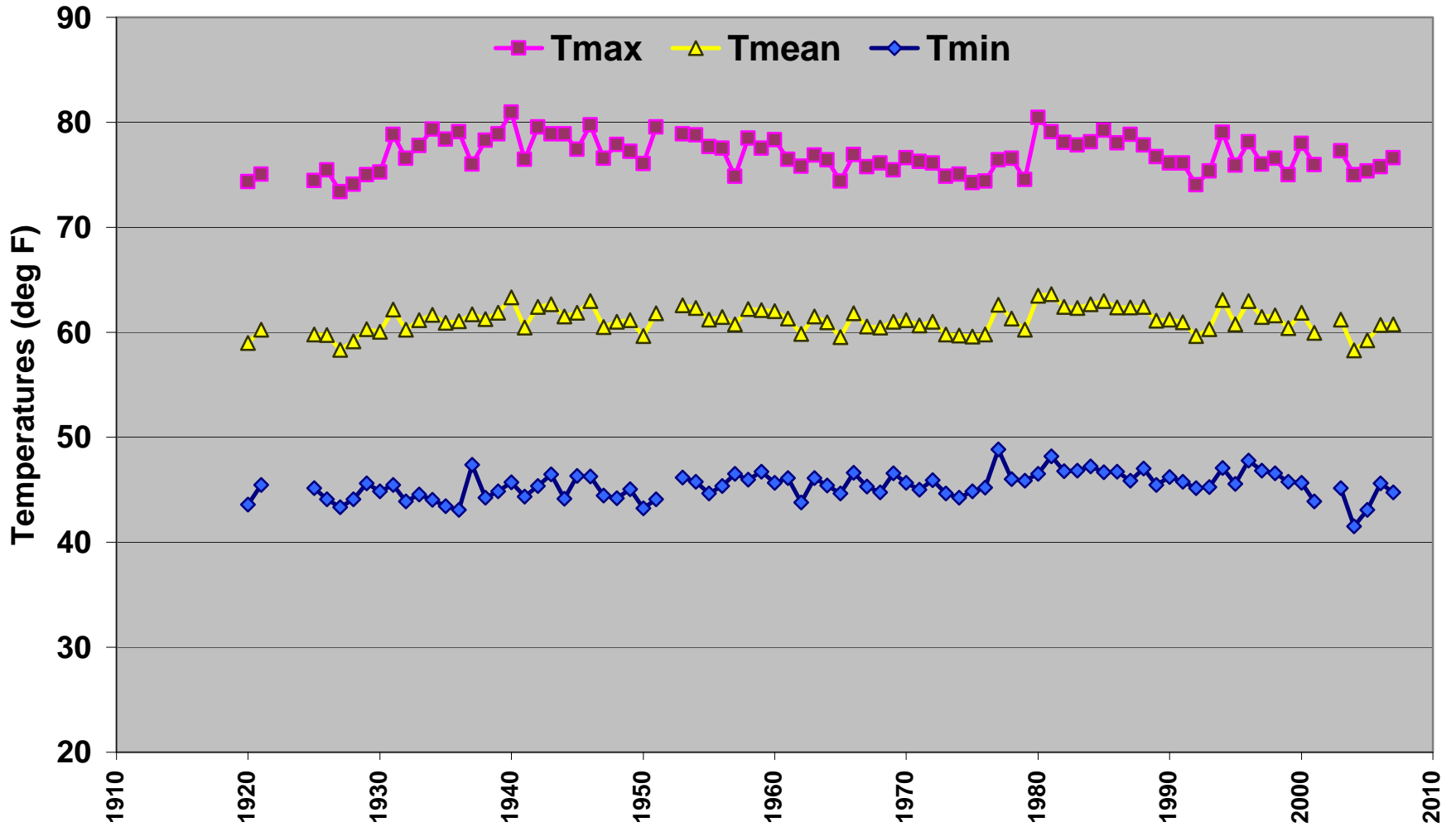
Del Norte, Colo, 05-2184, Elevation 7870 feet
Winter (DJF) Temperatures



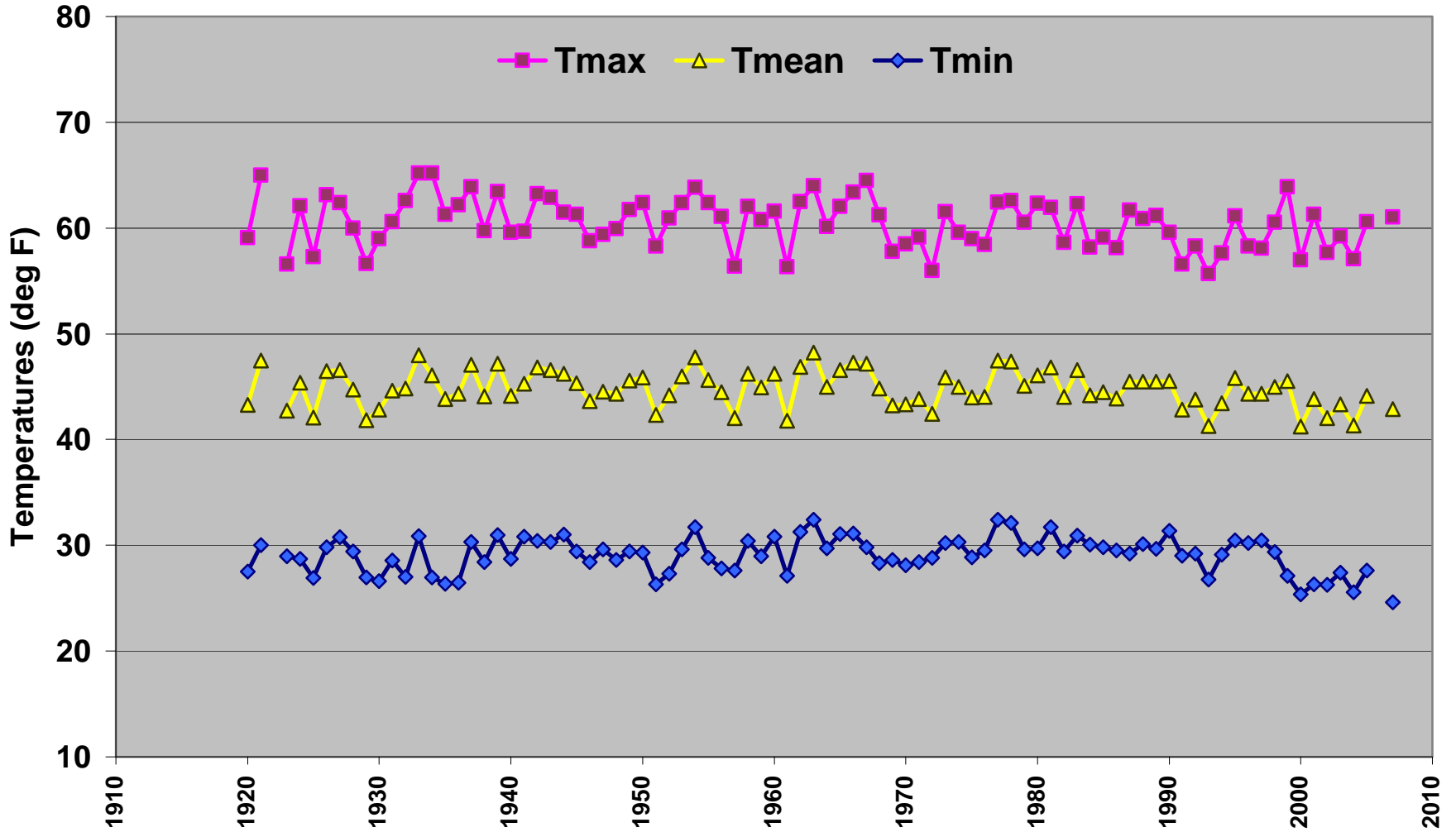
Del Norte, Colo, 05-2184, Elevation 7870 feet Spring (MAM) Temperatures



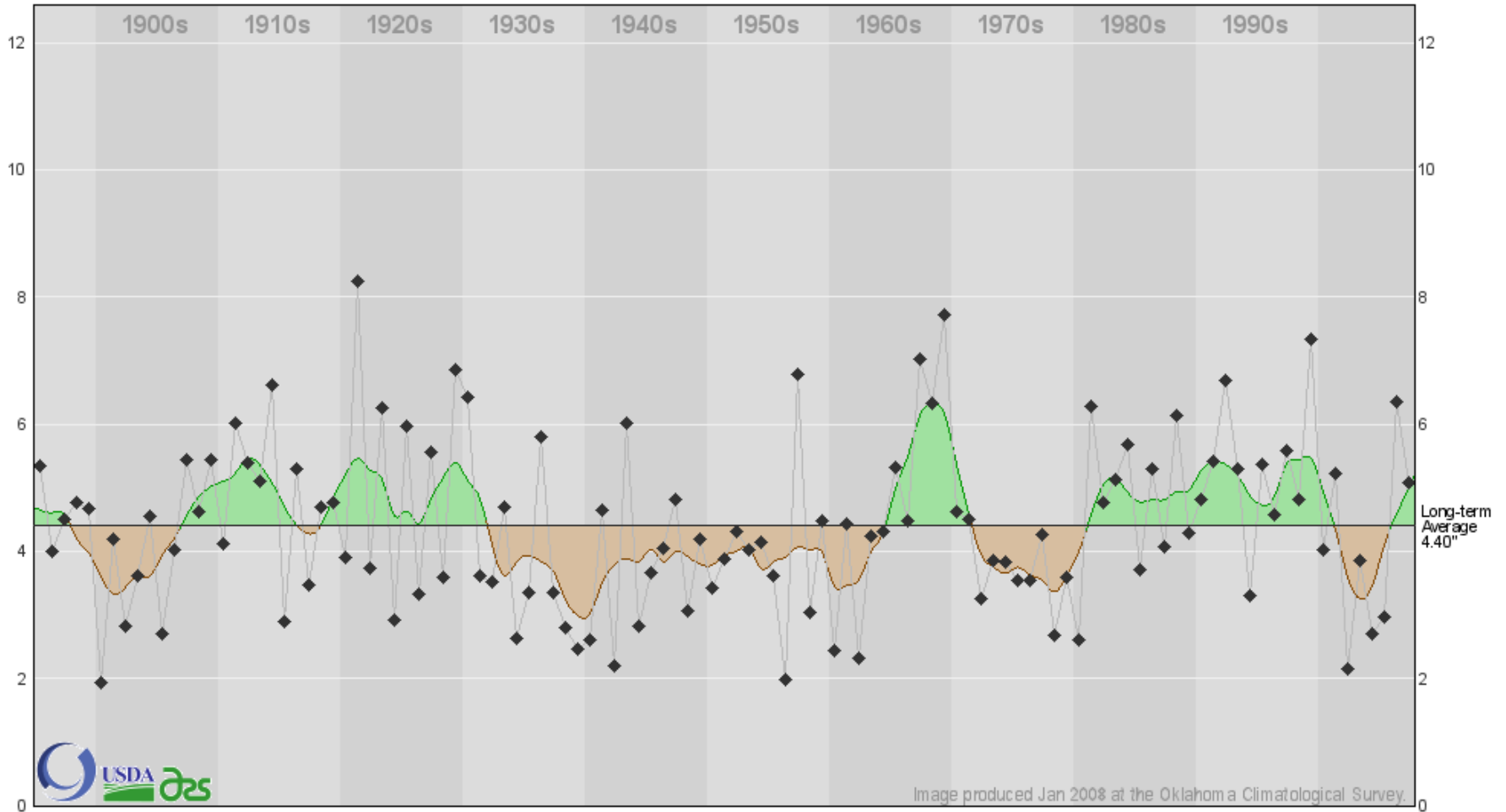
Del Norte, Colo, 05-2184, Elevation 7870 feet Summer (JJA) Temperatures



Del Norte, Colo, 05-2184, Elevation 7870 feet Fall (SON) Temperatures



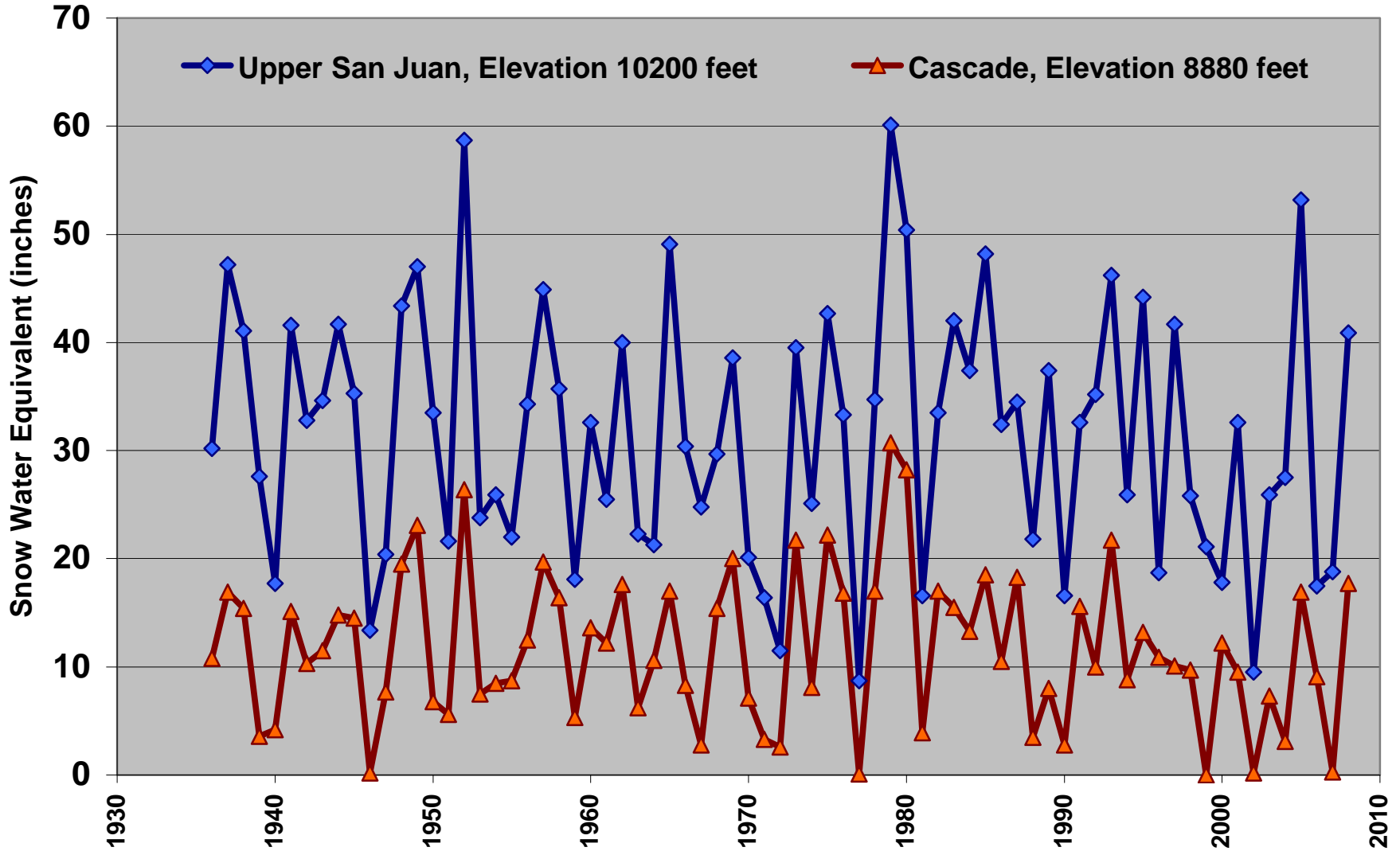
Precipitation and Snow Accumulation are Highly Variable from Year to Year



Summer Precipitation History with 5-year Tendencies
CO-CD5 (Rio Grande Drainage): 1895-2007

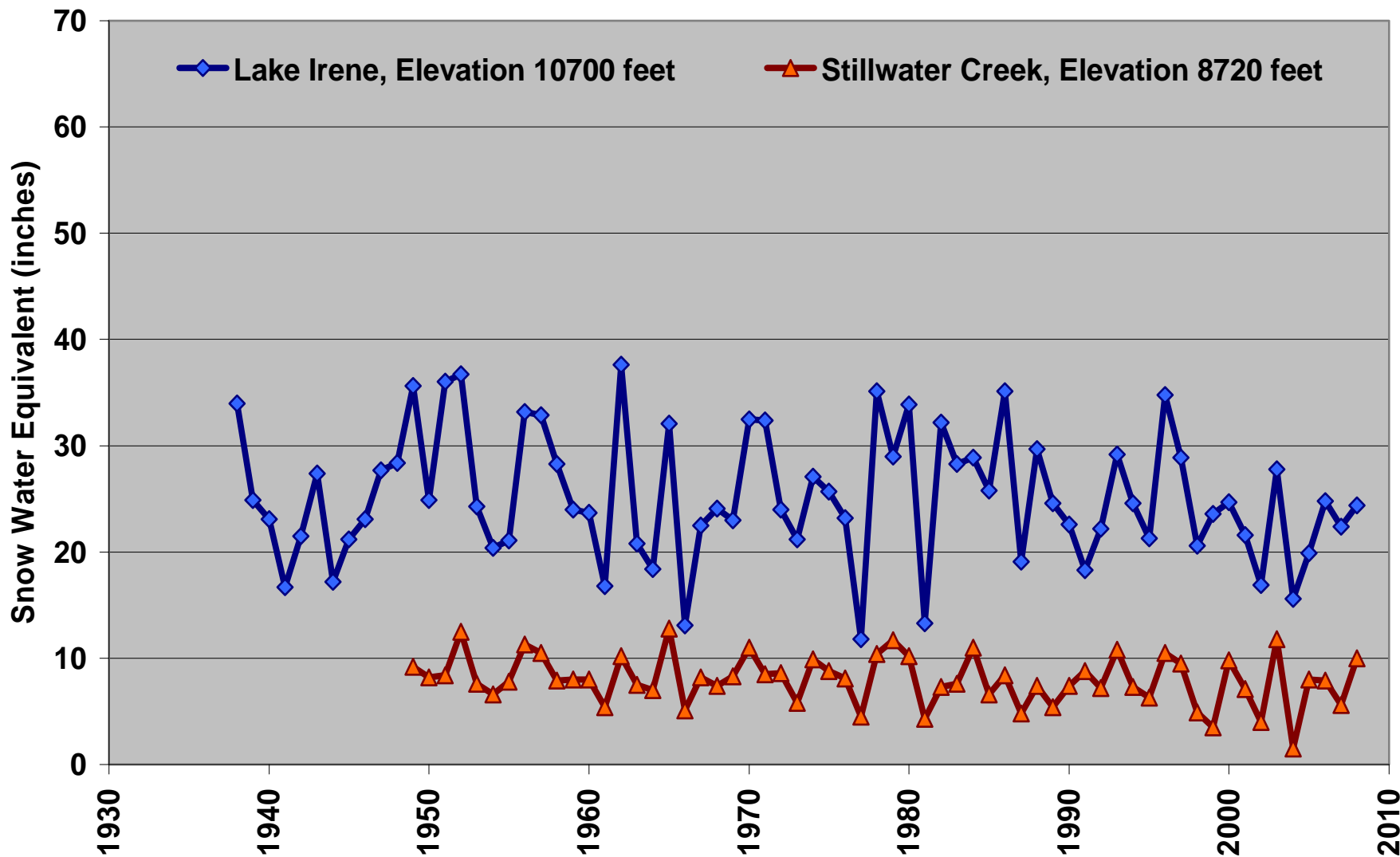
- Wetter historical periods
- Drier historical periods
- ◆ Individual Summer precipitation value

San Juan Mountains April 1 Snow Water Equivalent History



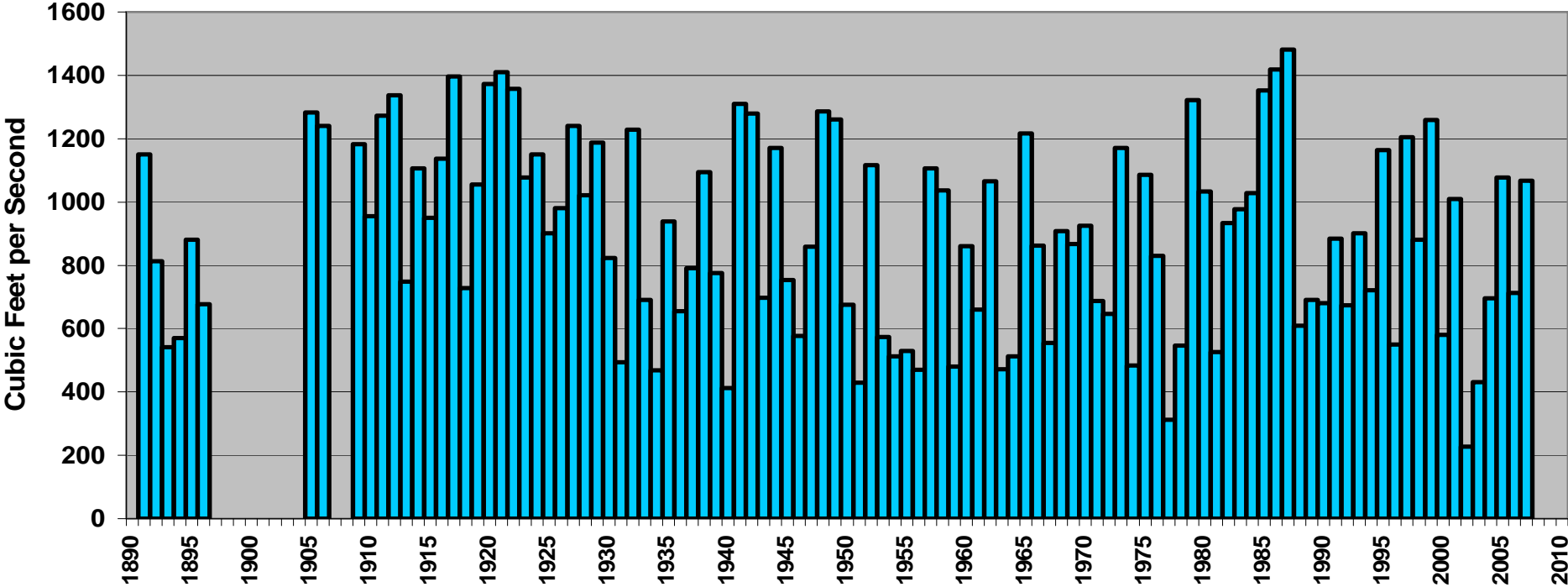
Stations at similar elevations in northern Colorado show much less variability

Northern Mountains April 1 Snow Water Equivalent History



Rio Grande River Historical Streamflow

Historical Streamflow Rio Grande at Del Norte, Colorado



Data from <http://waterdata.usgs.gov>

Conclusions

- Based on observed climate over the past Century in the upper Rio Grande basin:
 - There are no profound changes noted in temperatures ... yet!
 - The region experiences extreme interannual variability in precipitation, so detecting change in precipitation will be difficult for many years
 - There is some evidence that lower elevation snow pack has been melting out a bit earlier in recent years

Thinking Ahead

- Extreme drought in 2002 undermined the confidence Colorado water managers had in their history-based estimates of “firm yield”
- The 2007 IPCC reports anticipating accelerated warming and possible drying in the SW in the 21st century have received attention and have raised concern. Warming would most likely mean less water – and that is troubling.

What is Colorado Doing?

- WWA (Western Water Assessment at the University of Colorado) is serving as climate science information broker to the water resource community. The Inter-Basin Compact Committee (IBCC) and Basin Roundtables have been formed in each river basin to assess current and future water uses and needs
- At least two municipal water providers in Colorado have hired climate change specialists.
- The Colorado Water Conservation Board (CWCB) is developing planning strategies.
- The Upper Colorado River has been selected to pilot test a drought early warning system for the new National Integrated Drought Information System (NIDIS).
- Many meetings have been conducted and more are planned to share the latest information, to understand the range of possible impacts and to scope possible actions, mitigation and adaptation.

Governor's Conference on Managing Drought & Climate Risk



October 8-10, 2008
Denver, Colorado



This 2½ day conference will help water providers, planners, managers, and agency officials assess drought risk, impacts, and preparedness in Colorado and the improvements that may be needed for management under different conditions such as climate change. Conference goals are to share information and experience on drought preparedness and information services needed, and to identify pathways for adaptation to the impacts of climate change and demand on water resources in the State.

Featured Speakers:

- Governor Bill Ritter
- Harris Sherman, Executive Director, Department of Natural Resources
- Intergovernmental Panel on Climate Change Authors

Registration Information:

- \$100 includes registration, meals (breakfast and lunch) and conference proceedings
- For registration information, go to www.cwcb.state.co.us
- Online registration available June 16th
- For more information, contact CWCB at 303.866.3370

Colorado Climate Center

Data and Power Point Presentations
available for downloading

<http://ccc.atmos.colostate.edu>



Colorado
State
University