



# 2013 Nitrogen Monitoring Update

## Rocky Mountain NP

*Jim Cheatham, Kristi Morris*



## How is nitrogen deposition at RMNP tracked for the Contingency Plan?

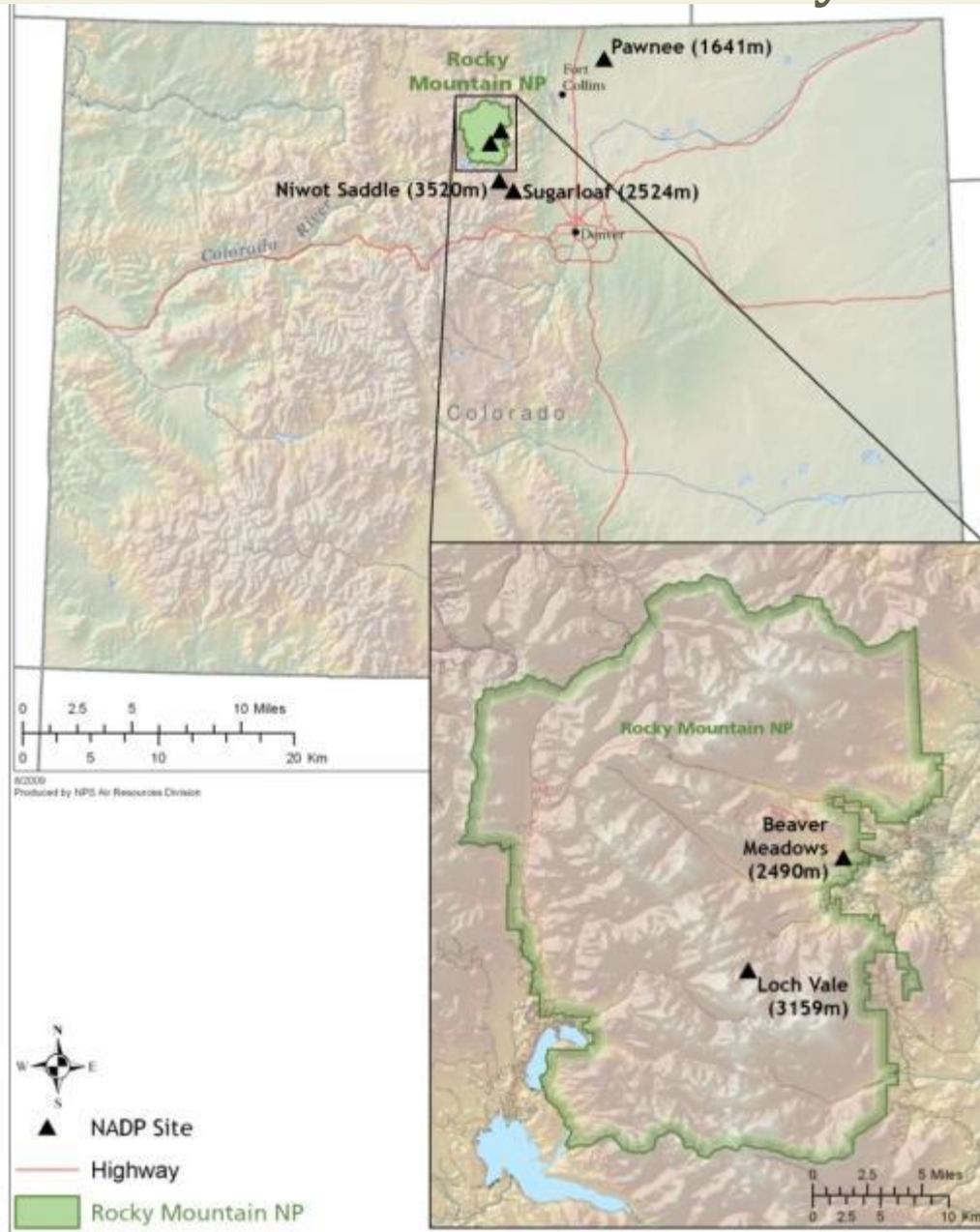
Several analyses will be used to track nitrogen deposition at RMNP. These analyses may be modified as better information becomes available and will include, but are not limited to:

- (1) assessment of progress along the glidepath,
- (2) long-term trend analyses for RMNP and other regional sites, and
- (3) shorter-term trends analyses for RMNP and other regional sites.

# Rocky Mountain National Park Loch Vale NADP Monitoring Station



# Regional NADP Sites for Trend Analyses



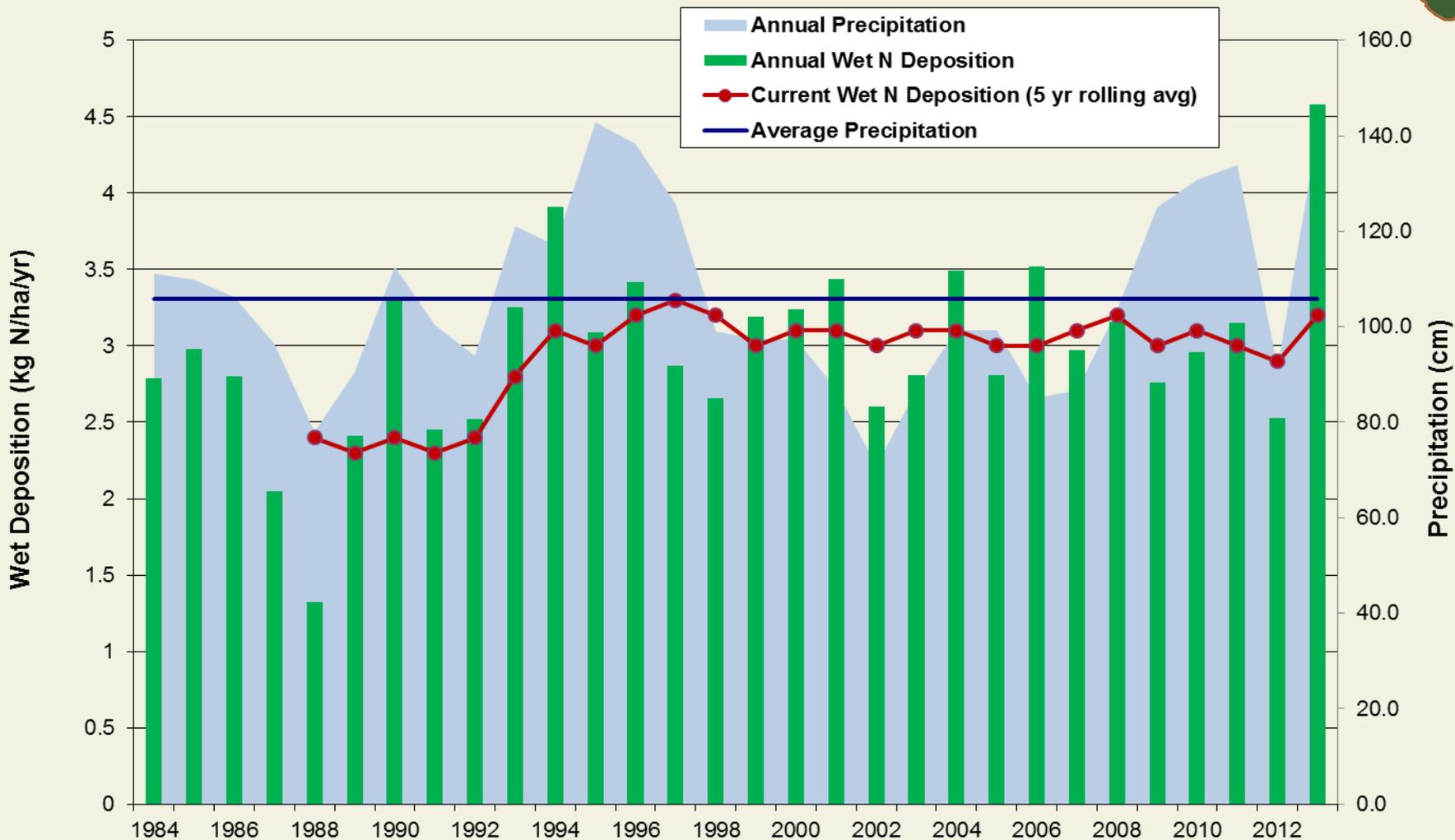
# Regional NADP Sites for Trend Analyses



<b>Site Name</b>	<b>Site ID</b>	<b>Start Date</b>	<b>Elevation (feet)</b>
Rocky Mountain National Park- Loch Vale	CO98	8/16/1983	10,364
Rocky Mountain National Park- Beaver Meadows	CO19	5/29/1980	8,169
Niwot Saddle	CO02	6/5/1984	11,549
Sugarloaf	CO94	11/4/1986	8,281
Pawnee	CO22	5/22/1979	5,384

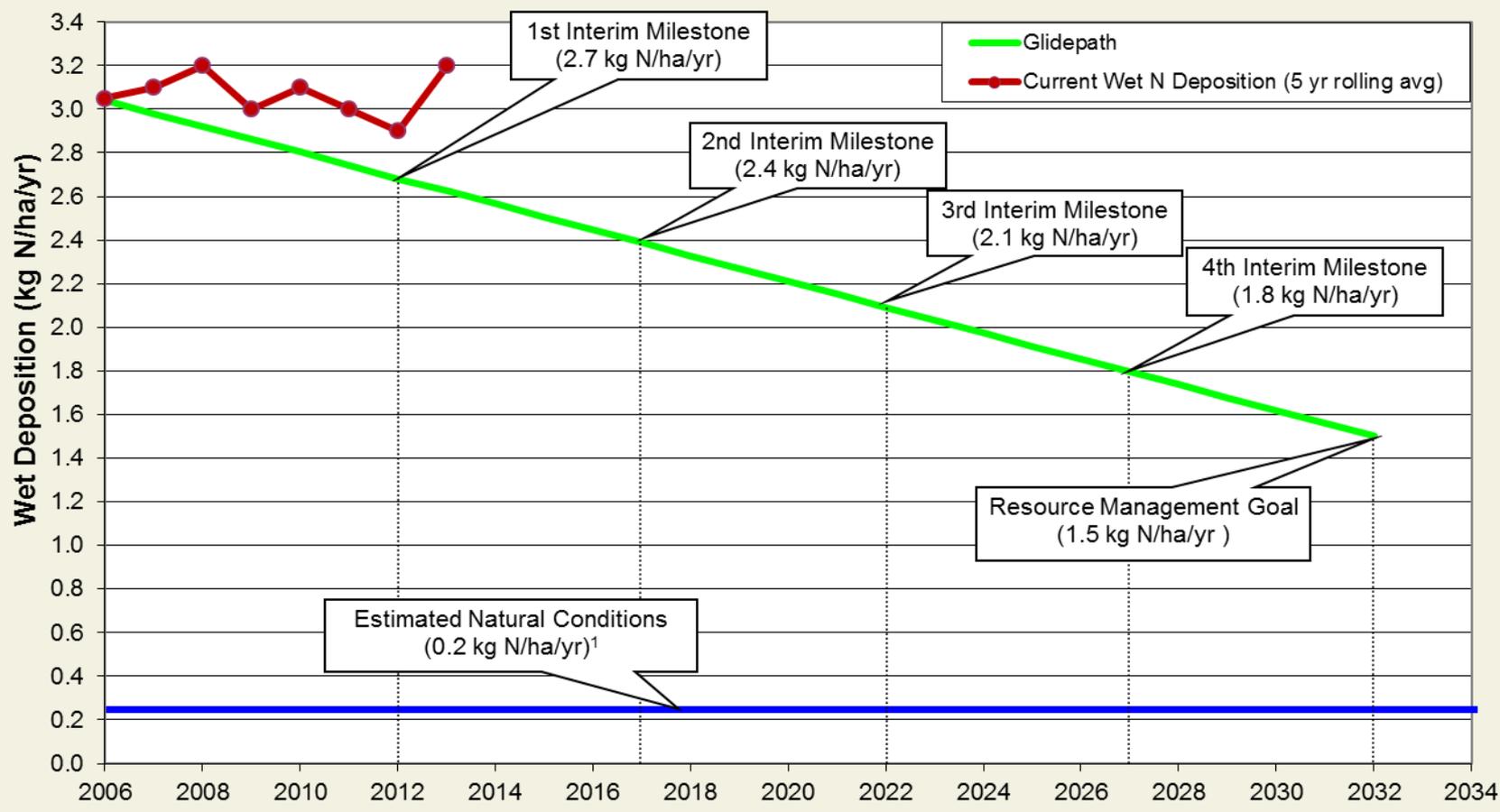


# RMNP Loch Vale Nitrogen Deposition





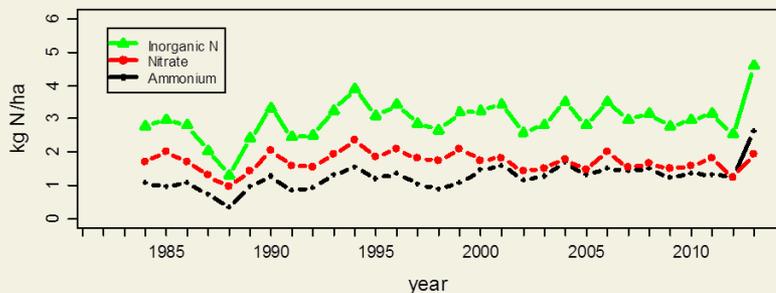
# RMNP Nitrogen Deposition Reduction Plan Glidepath



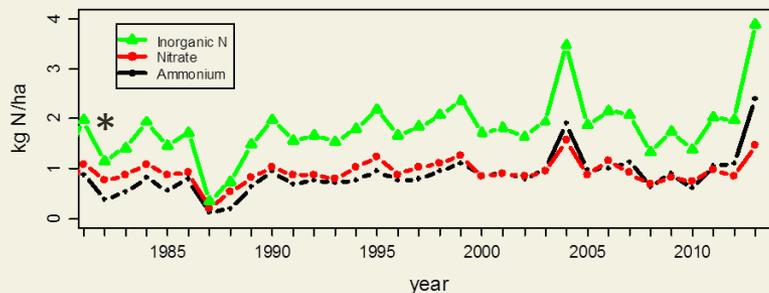
# Regional NADP Sites N Trends



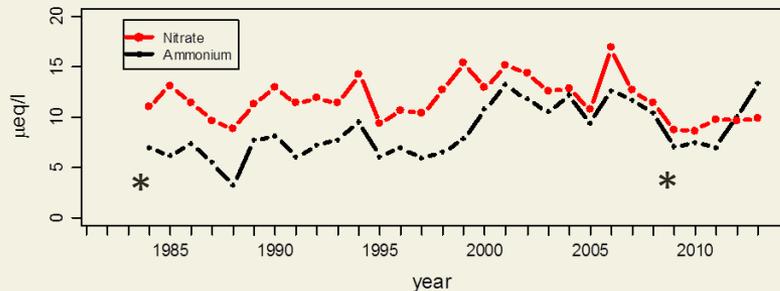
Annual Wet Deposition at Rocky Mountain National Park-Loch Vale (CO98)



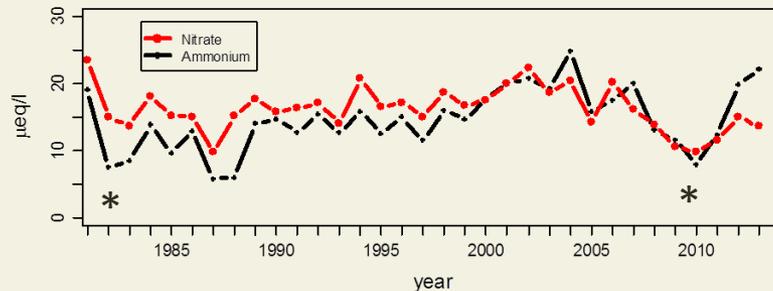
Annual Wet Deposition at Rocky Mountain National Park-Beaver Meadows (CO19)



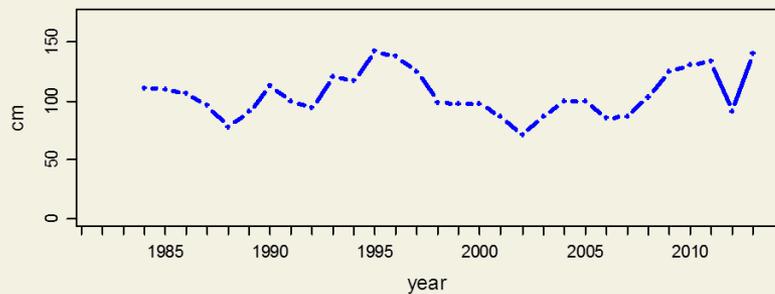
Mean Annual Precipitation Weighted Concentration at Rocky Mountain National Park-Loch Vale (CO98)



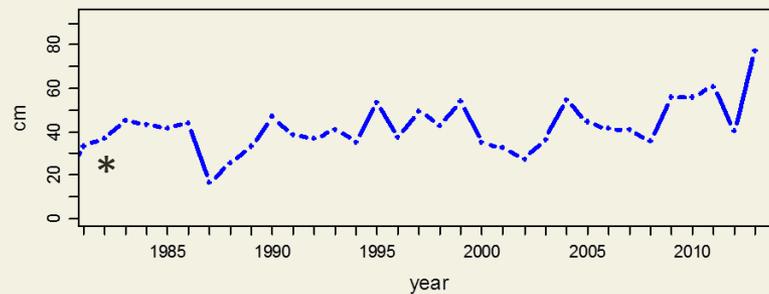
Mean Annual Precipitation Weighted Concentration at Rocky Mountain National Park-Beaver Meadows (CO19)



Annual Precipitation at Rocky Mountain National Park-Loch Vale (CO98)



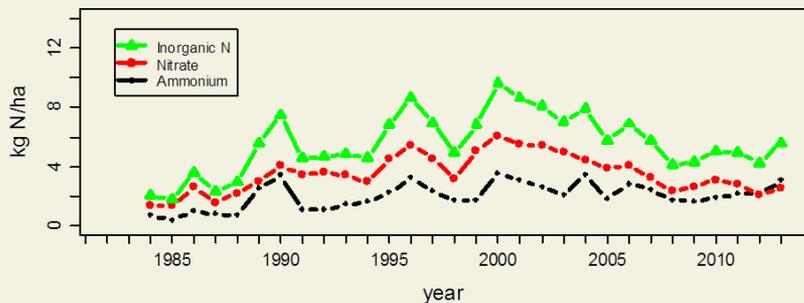
Annual Precipitation at Rocky Mountain National Park-Beaver Meadows (CO19)



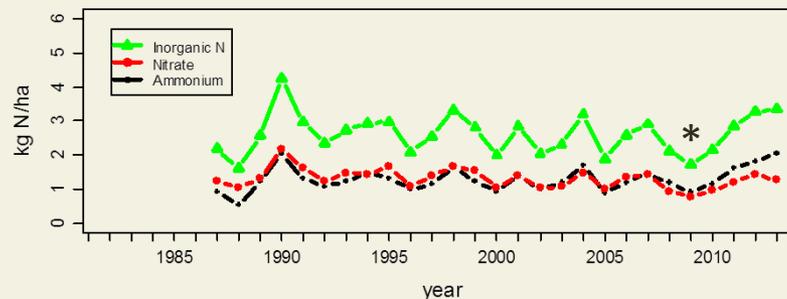
# Regional NADP Sites N Trends



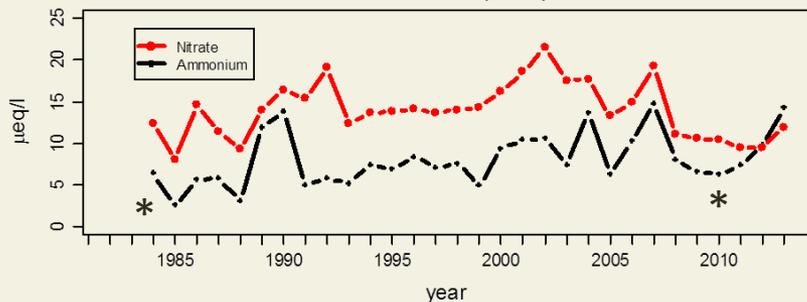
Annual Wet Deposition at Niwot Saddle (CO02)



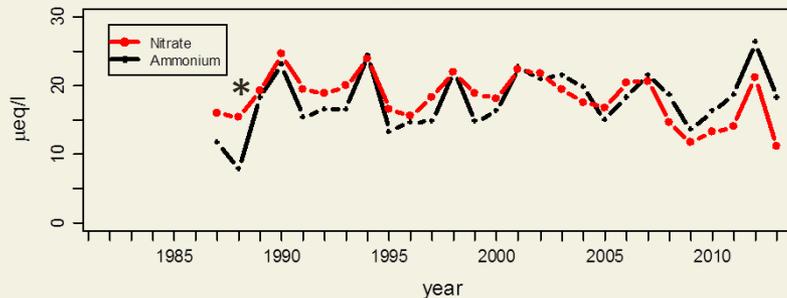
Annual Wet Deposition at Sugarloaf (CO94)



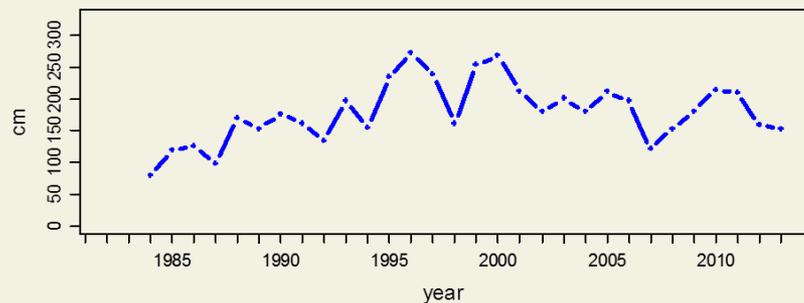
Mean Annual Precipitation Weighted Concentration at Niwot Saddle (CO02)



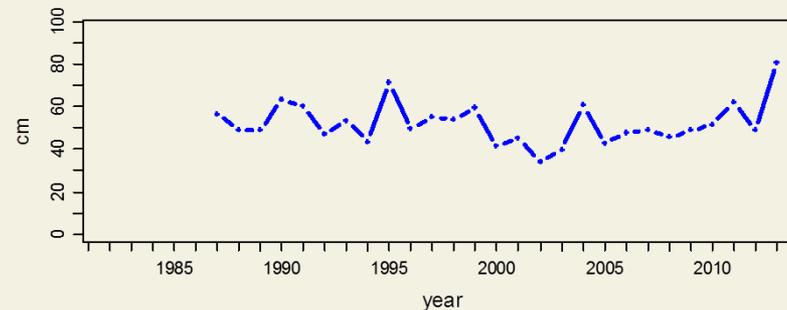
Mean Annual Precipitation Weighted Concentration at Sugarloaf (CO94)



Annual Precipitation at Niwot Saddle (CO02)



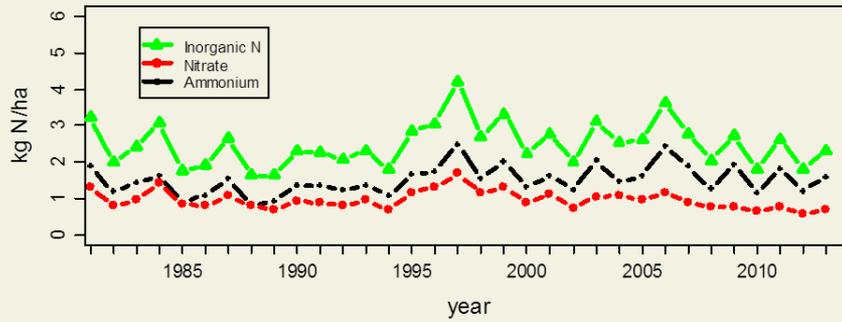
Annual Precipitation at Sugarloaf (CO94)



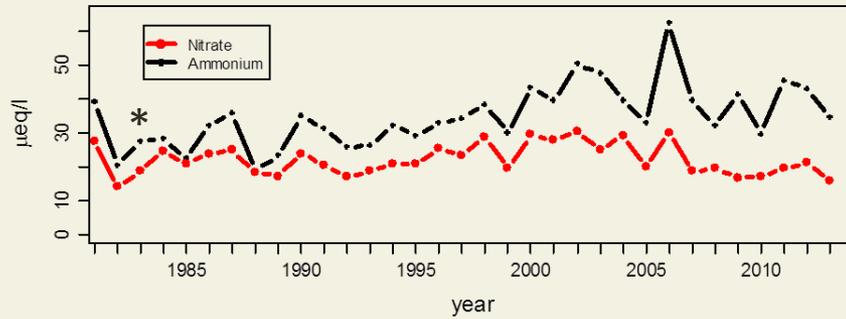
# Regional NADP Sites N Trends



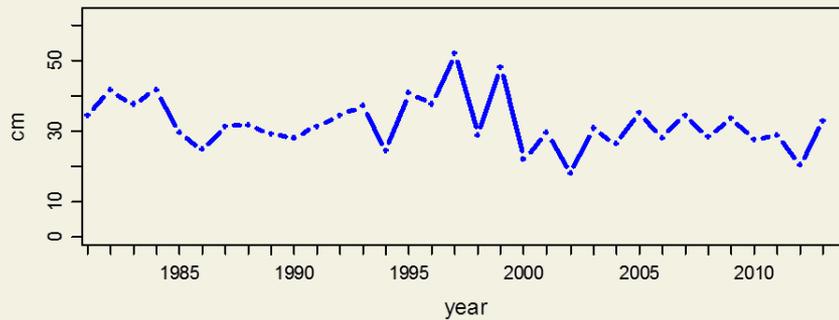
### Annual Wet Deposition at Pawnee (CO22)



### Mean Annual Precipitation Weighted Concentration at Pawnee (CO22)



### Annual Precipitation at Pawnee (CO22)





# Tracking Wet N Deposition Summary

**Assessment of progress along the glidepath.** Is current wet nitrogen deposition in RMNP on or below the glidepath?

- Wet nitrogen deposition was above the glidepath in 2013.

**Long-term trend analyses for RMNP and other regional sites.** Has nitrogen deposition decreased at RMNP and other sites in the region in the long term?

- Nitrogen deposition has not decreased at RMNP or other sites in the region over the long term.
- Significant increases were found in
  - Wet N deposition and precipitation at Beaver Meadows,
  - Ammonium concentrations at 4 of the 5 regional sites, and
- Significant decrease in nitrate concentrations at 1 of the 5 regional sites.

**Short-term trends analyses for RMNP and other regional sites.** Has nitrogen deposition recently decreased at RMNP and at other sites in the region?

- There is no trend in nitrogen deposition at RMNP over the short-term.
- Significant increases were found in
  - Wet N deposition at 1 site over the last 5-years,
  - Ammonium concentrations at 3 sites over the last 5-years,
- Nitrate concentrations that were decreasing last year at 3 sites over the last 7-years are now stable .

# Agricultural Best Management Practices:

*Helping to Reduce Nitrogen Impacts at Rocky Mountain National Park*



Rocky Mountain NP, Colorado

