

Four Corners Air Quality Group handout on Four Corners area current studies

Online here: http://www.nmenv.state.nm.us/aqb/4C/Documents/4CAQGStudies_082709.pdf

Aug 27, 2009

Ozone Studies

- Annual Ozone Monitoring Results Report from Shamrock Monitoring Station (FS/BLM Southwest CO), April 30, 2009: www.air-resource.com/fsairpgm/pdf/fsproj01b-08.pdf
- US Forest Service and Mountain Studies Institute started a monitoring program to look at foliar damage to sensitive plants from ozone at high altitude (2009), <http://www.mountainstudies.org/Research/msiProjects.htm>
- New Mexico Environment Department is conducting ozone precursor and passive ozone sampling from 4/2009 – 10/2009 at Substation and Navajo Lake sites
- Mesa Verde National Park NPS ozone monitor (conditions and trends tracked at <http://www.nature.nps.gov/air/Monitoring/O3Plots/index.cfm>)
- Colorado State University is studying ozone impacts from oil and gas development quantifying the peak ozone impacts from oil and gas emissions in the western U.S., with a focus on Mesa Verde. A short paper has been written: <http://www.cira.colostate.edu/publications/newsletter/spring2008.pdf>
- Passive ozone study completed in Aug-Sept 2007 in SW Colorado.
- Ozone Precursors Emissions Inventory for San Juan and Rio Arriba Counties, New Mexico prepared for NMED by Environ (2006), http://www.nmenv.state.nm.us/aqb/projects/San_Juan_Ozone/NM_Area_Emissions_report.pdf, http://www.nmenv.state.nm.us/aqb/projects/San_Juan_Ozone/Errata_SanJuanRioArribaEI_0107.pdf
- Passive ozone study completed in San Juan County, New Mexico in 2004 and 2005 (with results used for locating the Navajo Lake monitor)

Mercury Studies

- Mountain Studies Institute (MSI) San Juan Mountains Mercury Studies: <http://www.mountainstudies.org/Research/msiProjects.htm>
 - Organizing Mercury Advisory Committee to be a Four Corners mercury forum
 - Study of methyl mercury in small lake zooplankton
 - Study of Mercury in Lake Sediment Cores
 - Bulk deposition collector at Molas Pass operating since April 2007, and snowpack studies
 - Ongoing 2009-2010 study of ecological effects and sources of mercury deposition at Mesa Verde. This is a pilot study to better understand if mercury is bioaccumulated in habitats in Mesa Verde and adjacent landscapes.
 - Includes measuring mercury in wetland songbirds
 - & sampling fish and crayfish from the Mancos River in Mesa Verde.
 - New study looking at sources of mercury deposition at Mesa Verde. This project will include back-trajectory modeling of storm trajectories to Mesa Verde.
- Mercury Fingerprinting Study (University of Michigan study - in process). Research on fingerprinting mercury from different combustion sources in the atmosphere was published in October 2008 Environmental Science and Technology Journal article "Mercury isotopes may put the finger on coal." (<http://pubs.acs.org/cgi-bin/sample.cgi/esthag/asap/html/es802623b.html>). NM provided coal samples from San Juan Generating Station and Four Corners Power Plant. Researchers currently working on Four Corners area coal analysis.
- Mesa Verde NPS Mercury Deposition Network (MDN) monitor. NADP-MDN website (<http://nadp.sws.uiuc.edu/mdn/>) includes temporal trend graph for mercury. Total Hg in wet deposition has been monitored at Mesa Verde NP since 2002.
- San Juan Generating Station (SJGS) is studying the effects of using emissions control (baghouse and different types of activated carbon injection) on mercury emissions. SJGS is currently seeing greater than 90 percent removal efficiency for mercury with baghouses and activated carbon injection.

- Pine River Watershed Group has studied mercury in the Upper Pine River Watershed and Vallecito Reservoir in SW Colorado. The group measures mercury in precipitation at the Vallecito Reservoir.
- Dr. Richard Grossman has studied the concentration of Hg in human hair in Four Corners area.
- US Geological Survey (USGS) has measured Hg concentrations in snowpack at a few sites in the San Juan Mountains

Multiple Pollutant and Other Deposition Studies

- **AIR QUALITY MODELING STUDY FOR THE FOUR CORNERS REGION, Revised Report August 2009** <http://www.nmenv.state.nm.us/aqb/4C/Modeling.html>
 - Detailed annual modeling of the Four Corners region for ozone and particulate matter impacts was conducted with updated emissions estimates for 2005, and a projected inventory for 2018. The resulting modeling database was used to examine the air quality impacts of five alternative mitigation scenarios focused on various combinations of emissions reductions from electric generating units (EGUs) and fuel combustion and evaporative sources associated with oil and gas exploration and production activities in the Four Corners region.
- Southern Ute Indian Tribe Air Quality Program installed a Volatile Organic Compound (VOC) monitor as part of the EPA School Air Toxics Monitoring Pilot Project at Sunnyside Elementary School (2009)
- EPA Region 6 completed a passive ammonia study in 2007. A peer reviewed paper has been published in the Journal of Environmental Monitoring on "Baseline Ambient Gaseous Ammonia Concentrations in the Four Corners Area and Eastern Oklahoma, USA," September 25, 2008. Report available here: http://www.nmenv.state.nm.us/aqb/4C/Documents/Ogawa_Ammonia_4Corners_Sather_JEM08.pdf. The study was related to our Four Corners Air Quality Task Force work. There will be continued sampling in 2008 and 2009 under a national program (report in possibly in 2010).
- Kirby Chapman, KSU, Oil and Gas Engine Control Studies: <http://www.ngml.ksu.edu/>
 - "Characterization of NSCR Performance on Four Stroke Natural Gas-Fueled Rich Burn Engines," October 2008.
- Mesa Verde NPS
 - National Atmospheric Deposition Program (NADP) monitor (NPS Air Resources Division's Government Performance and Results Act (GPRA) track conditions and trends.) <http://www.nature.nps.gov/air/who/npsPerfMeasures.cfm>
 - Modeling simulations (CAMx) for total dry deposition in Mesa Verde. CASTNet only measures nitric acid, PM ammonium and PM nitrate. Modeling will estimate NH₃, NO₃ radical and organic nitrates to get a total dry deposition. (Analysis by Fall 2009)
- FS has funded several nitrogen deposition studies over the past 15 years (ongoing long-term commitment)
 - Full analysis of existing Wilderness Lakes data, including spatial and temporal trends and correlation of measurements with watershed and lake characteristics, completed by USFS up to 2004
 - High Lake Deposition Studies, NADP Program; Research results in: Musselman, R.C. and W. L. Slauson, 2004. Water chemistry of high elevation lakes in Colorado. Biogeochemistry 71:387-414. Also see: NADP 2006 Summary at <http://nadp.sws.uiuc.edu/lib/data/2006as.pdf>
 - FS/USGS High Alpine Snow Pack Studies (ongoing) at <http://pubs.usgs.gov/fs/FS-043-97/>
- Chronic Respiratory Study (NM Health Dept, "The Association between Ambient Air Quality Ozone levels and Medical Visits for San Juan County (2007) <http://www.nmenv.state.nm.us/aqb/4C/Documents/SanJuanAsthmaDocBW.pdf>
- Some trends research work done by Dr. Winn Wright and the Pine River Watershed Group (Vallecito Reservoir) <http://www.swhydrologic.com/prwg.htm>
- Four Corners Aerometric and Hydrometric Monitoring Networks. GIS Mapping, Data Access and Analysis (DOE/Argonne) (<https://web.ead.anl.gov/fourcorners/index.cfm>)
- Modeling analysis for proposed Desert Rock Energy Facility (DREF) (http://vista.cira.colostate.edu/improve/Publications/GrayLit/020_DesertRockSimulations/DesertRock_Mcarlo.pdf http://vista.cira.colostate.edu/improve/Publications/GrayLit/020_DesertRockSimulations/DesertRock_camx.pdf