FLM ISSUES AROUND THE COUNTRY

EPA REGION 4 AIR QUALITY MODELERS WORKSHOP

2014

Disclaimer

- The following presentation represents the current views and ideas of the federal land management agencies' staff and does not necessarily represent the official position of the Department of the Interior, the Department of Agriculture, or the agencies or bureaus of these departments.
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Clean Air Act Overview

Provides Additional protection for Class I areas

National Parks > 6,000 acres

Federal Wilderness Areas > 5,000 acres

In existence as of 1977

Clean Air Act Overview

Provides Additional protection for Class I areas

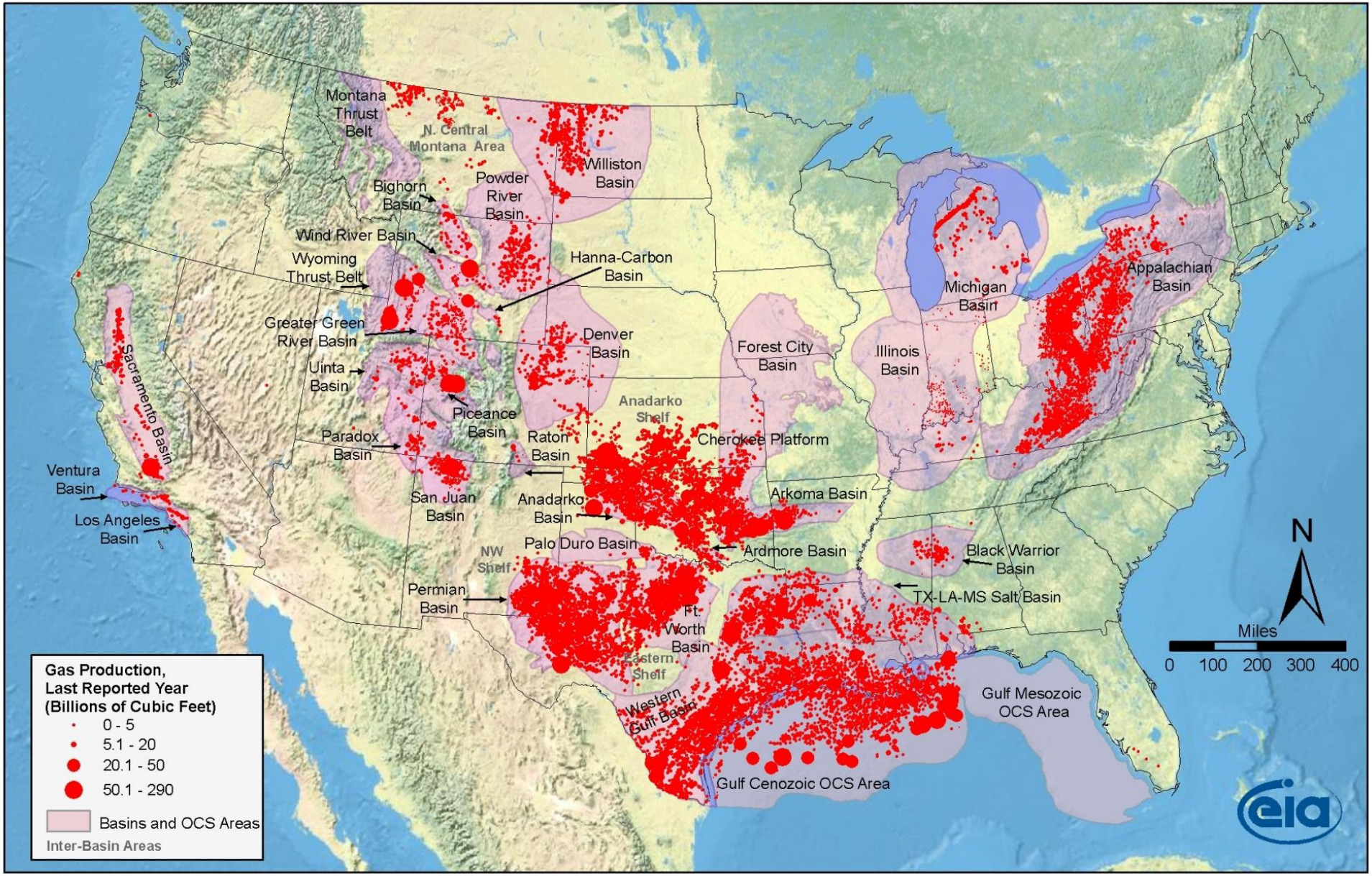
- Preserve AQ and Air Quality Related Values (AQRVs)
  - AQRVs include resources sensitive to air pollution (e.g., soil, water, visibility, plants, animals)
- Regional Haze Programs and national visibility goals for Class I areas

National Visibility Goal: "remedy any existing and prevent any future manmade visibility impairment in mandatory Class I areas"

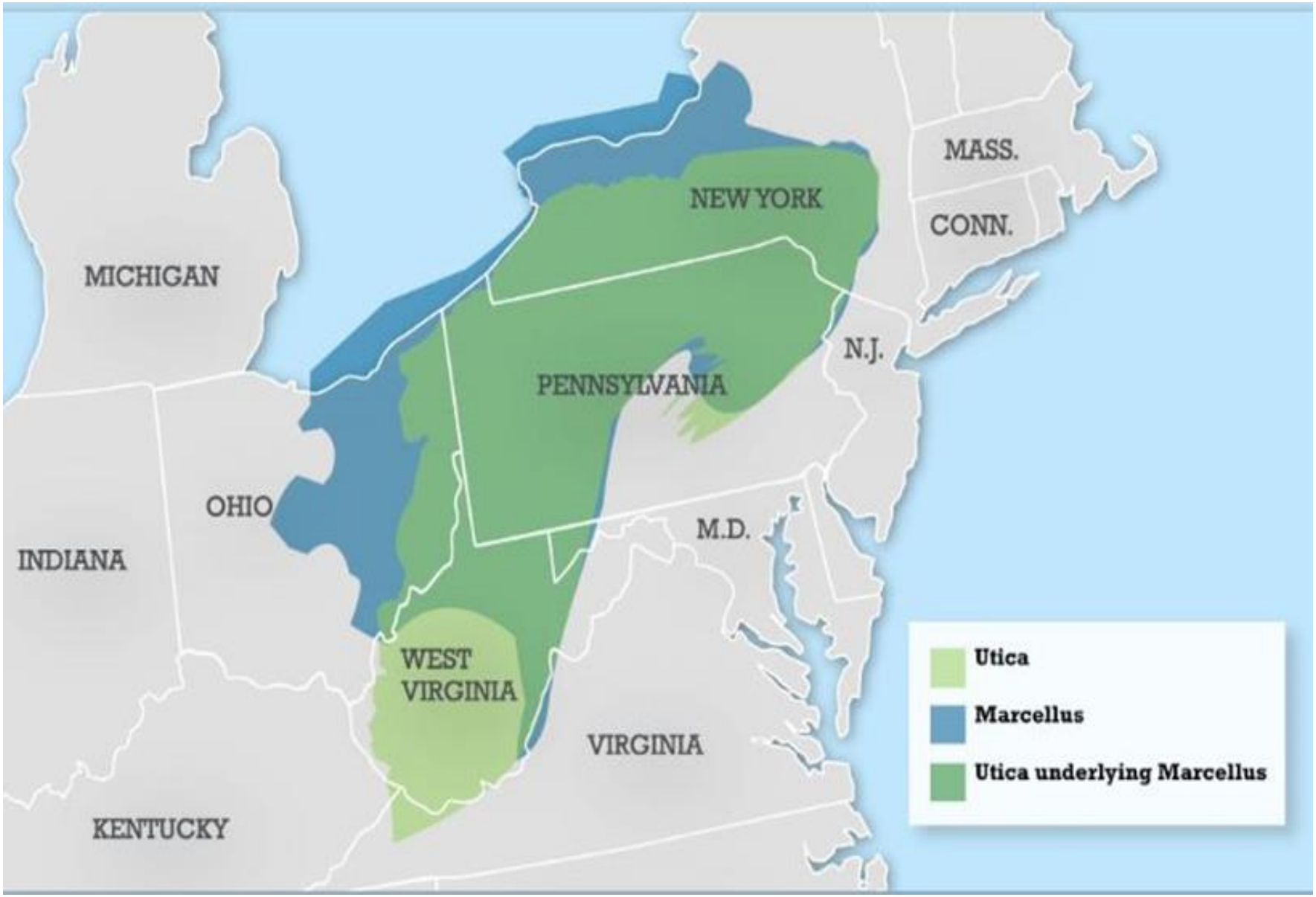
SCREENING OUT OF A CLASS I AIR QUALITY RELATED ANALYSIS PER CLASS I AREA

- EMISSIONS / DISTANCE TO EACH CLASS I AREA(S)
- EMISSIONS = MAXIMUM 24 HOUR EMISSION LIMITS FOR:
- $SO_2 + SO_4 + NO_X$ + PMC + PMF + SOA + EC X 8760 / 2000 = TPY
- DISTANCE TO EACH CLASS I AREA IN KILOMETERS
- IS Q/D ≤ 10 PER CLASS I AREA

Gas Production in Conventional Fields, Lower 48 States



Source: Energy Information Administration based on data from HPDI, IN Geological Survey, USGS
Updated: April 8, 2009


MASS.
NEW YORK
CONN.
MICHIGAN
N.J.
PENNSYLVANIA
OHIO
M.D.
INDIANA
WEST VIRGINIA
VIRGINIA
KENTUCKY
Utica
Marcellus
Utica underlying Marcellus

Offshore Oil and Gas Activity

- FLM agencies review offshore oil and gas activity following the FLAG guidance
- Both BOEM and EPA have offshore jurisdictions
- There are approximately 4000 operations happening in the Gulf of Mexico, some within several kilometers of the Breton Wilderness

State/EPA Permits vs. BOEM Plans

State/EPA		BOEM
PSD Permit	⟷	Plan under 30 CFR Part 250, subpart B • Exploration Plan (EP) • Development Operations Coordination Document (DOCD)
Best Available Control Technology (BACT)	⟷	Emission Reduction Measures
Endangered Species Protection	⟷	ESA, MMPA – handled by a assigned FWS Ecological Services Field Office
Class I Area Air Quality/AQRV Modeling – follows 40 CFR 51 Appendix W technical guidelines	⟷	Modeling report, per 30 CFR 250.303 if indicated – follows 40 CFR 51 Appendix W

FLAG is based upon 40 CFR 51 Appendix W

Technical Implications & Applications of MOU / (Air Modeling) for Federal Oil & Gas NEPA Decisions

Bureau of Land Management
U.S. Forest Service
Environmental Protection Agency
National Park Service
Fish & Wildlife Service

NEPA OIL AND GAS

- LARGE SCALE AND NUMEROUS GAS PROJECTS MOSTLY IN THE WEST. NEAR NPS, USFS, AND FWS CLASS I and CLASS II AREAS. (Thousands of well for some projects)
- MT, WY, ND, SD, CO, NM, UT, Gulf of Mexico
- IMPACTS TO VISIBILITY, OZONE, NITROGEN DEPOSITION
- LEASING OF THE ALASKAN PETROLEUM RESERVE NEAR ANWAR ARCTIC NATIONAL WILDLIFE RESERVE (FWS) NPS units Gates of the ARCTIC & NOATAC PRESERVE (Class II) . (CALPUFF WITH MMIF MET)
- MARCELLUS & UTICA SHALE, increasing field development, pipelines, compressor stations, gas to liquid plant in Ohio
- FWS work with BOEM (Bureau Ocean Energy Management for offshore development

DRAFT

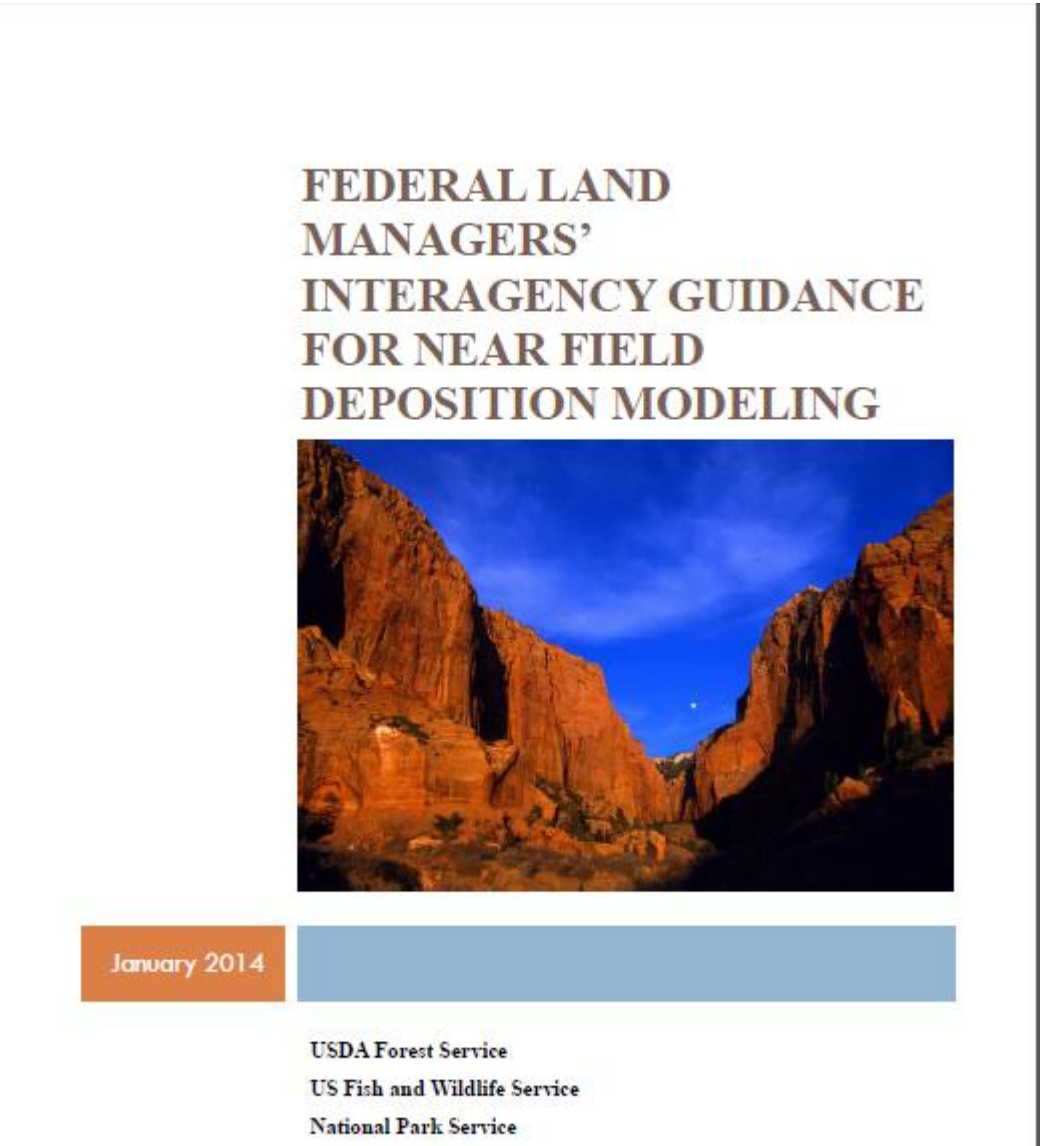
- Increase in number of NEPA projects and PSD applications that are within 50-km of Class I and sensitive Class II areas.
  - 50-km is the bright line distance modelers use to determine which class of models are used for AQRV analysis. For distances greater than 50-km, CALPUFF is currently recommended for both visibility and deposition analyses.
  - Applicants have universally requested to use AERMOD to satisfy deposition modeling requirements since run data has already been developed for near-field NAAQS and increment analysis.
  - FS has observed little consistency in model setup and deposition parameters used, implying need for guidance to promote consistency in application of models in the near-field.
- Federal Land Managers' Air Quality Related Values Workgroup Phase I Report (FLAG) largely silent to deposition in the near-field.
  - Q/D screen is only applicable for distances beyond 50-km.
  - VISCREEN/PLUVUE II recommended for plume blight analysis (within 50-km) but no corresponding recommendations for deposition.

Deposition Issues

- AERMOD design has limitations which affect how any potential guidance is structured.
  - AERMOD is designed for prediction of air concentrations of chemically inert pollutants.
  - AERMOD is a “steady-state” model, meaning it only uses a single station of meteorology and transport is uniform across entire modeling domain.
  - Best for “line of sight” impacts (usually 0 – 10-km), not complex meteorological environments where many Class I areas are situated.

Guidance at a Glance

- First draft released to FS, NPS, and FWS in November 2013. Revised draft released in January 2014.
- Recommends a 3-tier screening approach for modeling deposition in the near-field.
  - Tier I (AERMOD) – conservative deposition velocities defined for SO_2 and NO_x.
  - Tier II (AERMOD) – slightly more refined approach, allowing for pollutant specific properties to be considered in deposition analysis.
  - Tier III (CALPUFF) – two approaches, based upon source-receptor distances, making use of CALPUFF first-order chemical mechanism.



Tiers I & II - AERMOD

- Tier I based upon IWAQM Phase I approach which recommends defining a conservative deposition velocity for both SO_2 and NO_x input manually into AERMOD.
- Tier II approach based upon defining specific deposition parameters.
  - NOx/NO_2 has low deposition velocity, so NOx is treated fully converted to HNO_3 (highest deposition velocity of various N species)

Tier III (CALPUFF)

- Tier III approach uses CALPUFF with first-order chemical mechanism to treat conversion
  - Within 0-20-km, if applicant can adequately demonstrate that steady-state meteorological conditions dominate source-receptor relationships, FLM will consider use of CALPUFF with AERMOD surface and upper air data.
  - All other applications will develop 3-D wind fields consistent with the unique nature of near-field application of model.
    - August 31, 2009 EPA memorandum regarding CALMET settings for LRT applications is not considered universally appropriate. Protocol necessary to discuss CALMET settings appropriate for near-field application of model.

OTHER REGIONAL MODELING

- Assisting EPA Regions in addressing State Regional Haze FIPs
- Five sources in AZ, 4 coal fired power plants, 1 cement plant
- MN and MI taconite plants for impacts at VOYA NP, BOWA WA, ISRO NP, SEANY WA
- Two MN power plants for impacts at VOYAGUERS NP, ISRO NP
- Three Utah power plants
- And others

MINING
impacts to USFS NPS BLM FWS

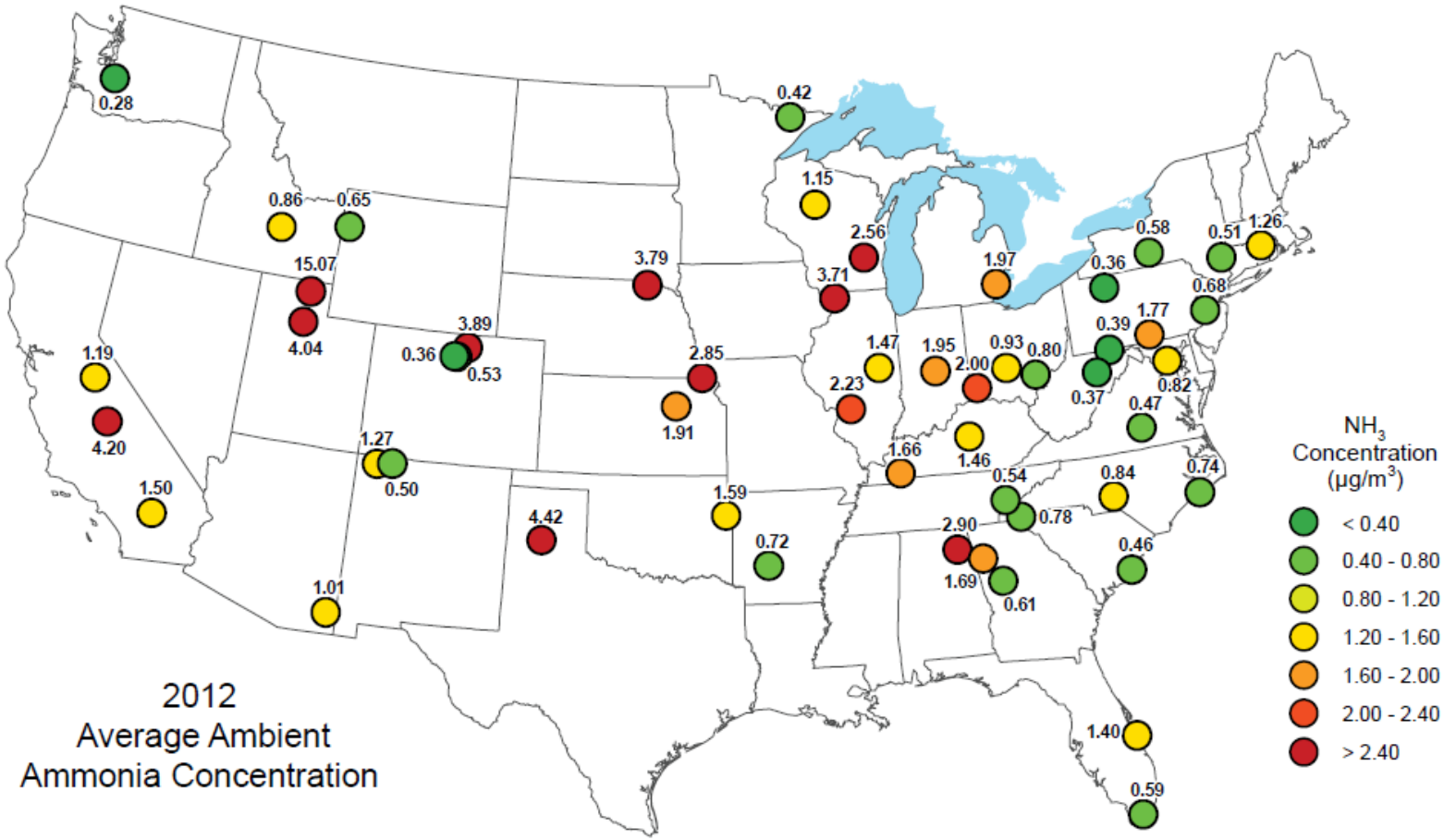
- COPPER MINES IN AZ with USFS
- COAL MINES UT, AZ, WY, MT
- Gold mines in AK
- POTASH MINES, UT, NV
- URANIUM MINES, AZ

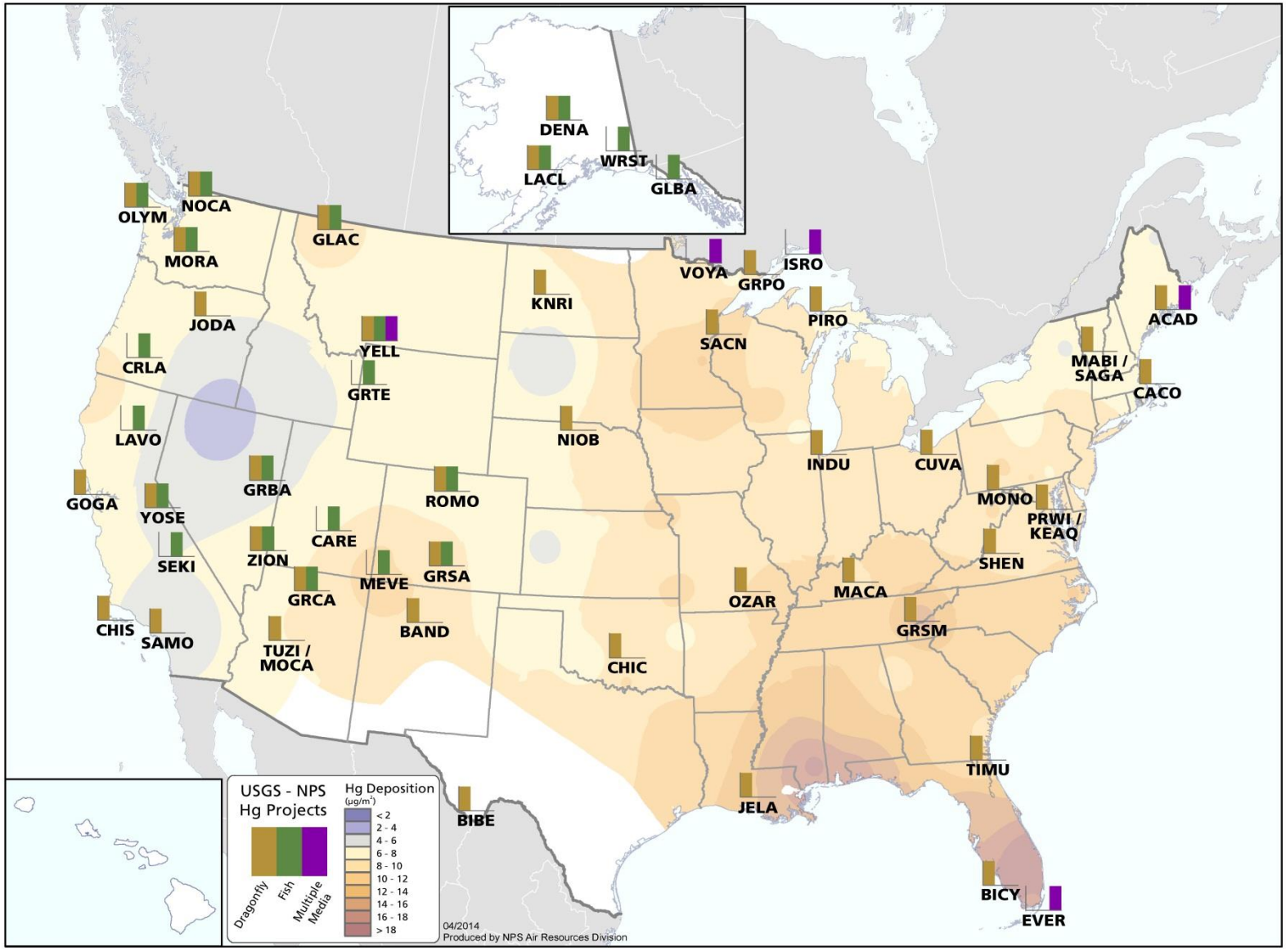
Conditions and Trends

Trend results (2003–2012) and condition assessments (2008–2012).				
NPS Unit	Condition and Trend Symbol			
	Visibility	Total Nitrogen Deposition	Sulfur Deposition	Ozone
Everglades NP				
Great Smoky Mountains NP				
Indiana Dunes NL				
Isle Royale NP				
Mammoth Cave NP				
Shenandoah NP				
Voyageurs NP				

Condition Status		Trend in Condition	
	Warrants Significant Concern		Condition is Improving
	Warrants Moderate Concern		Condition is Unchanging
	Resource is in Good Condition		Condition is Deteriorating

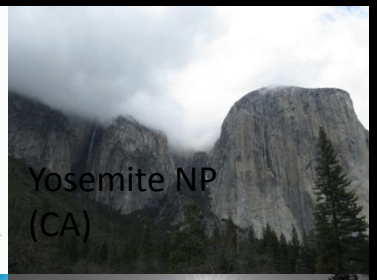
National Atmospheric Deposition Program
Ammonia Monitoring

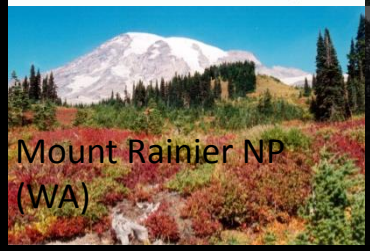


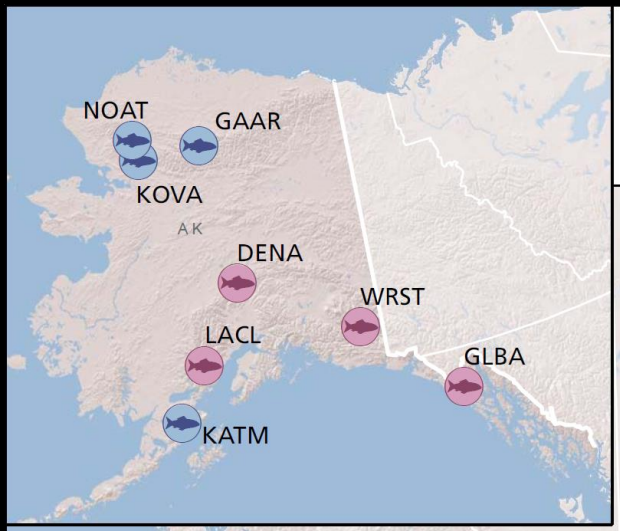


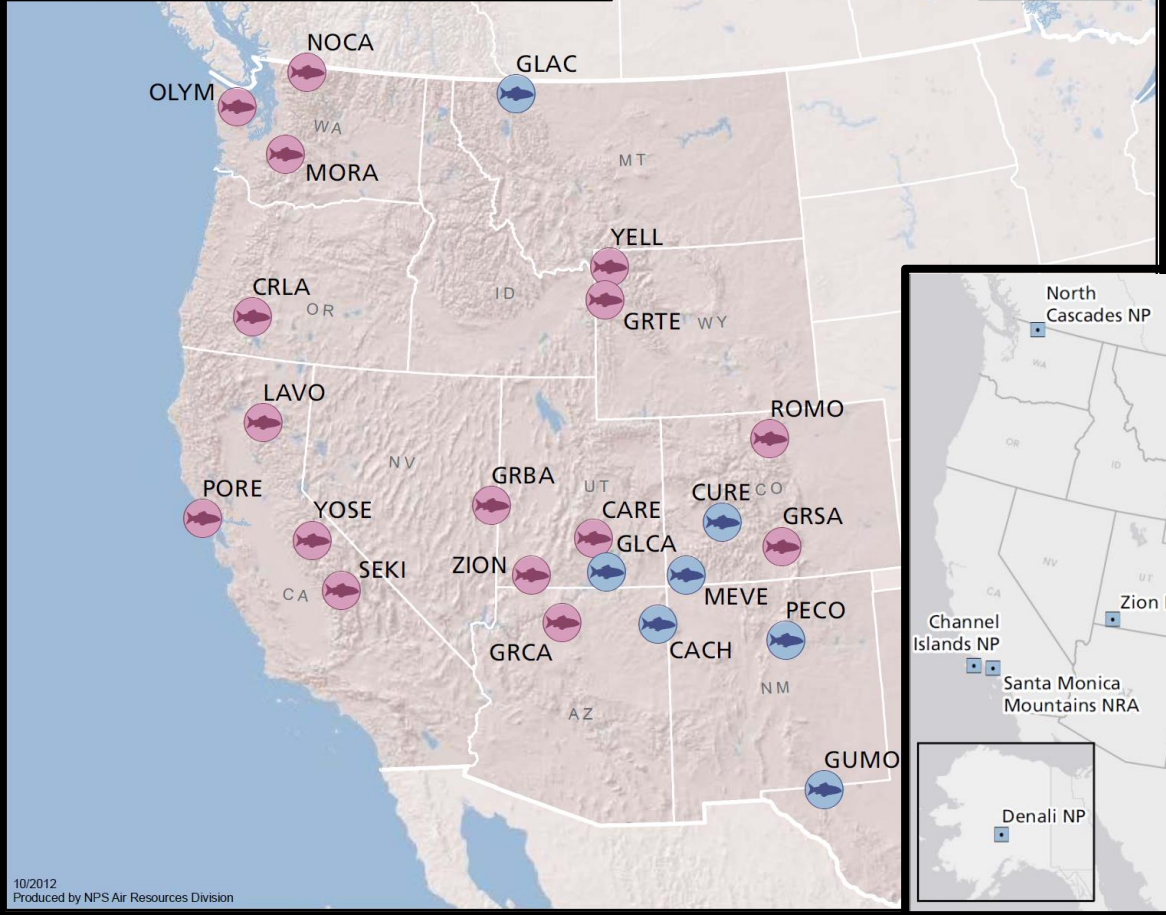
- Hg Monitoring sites

Fish

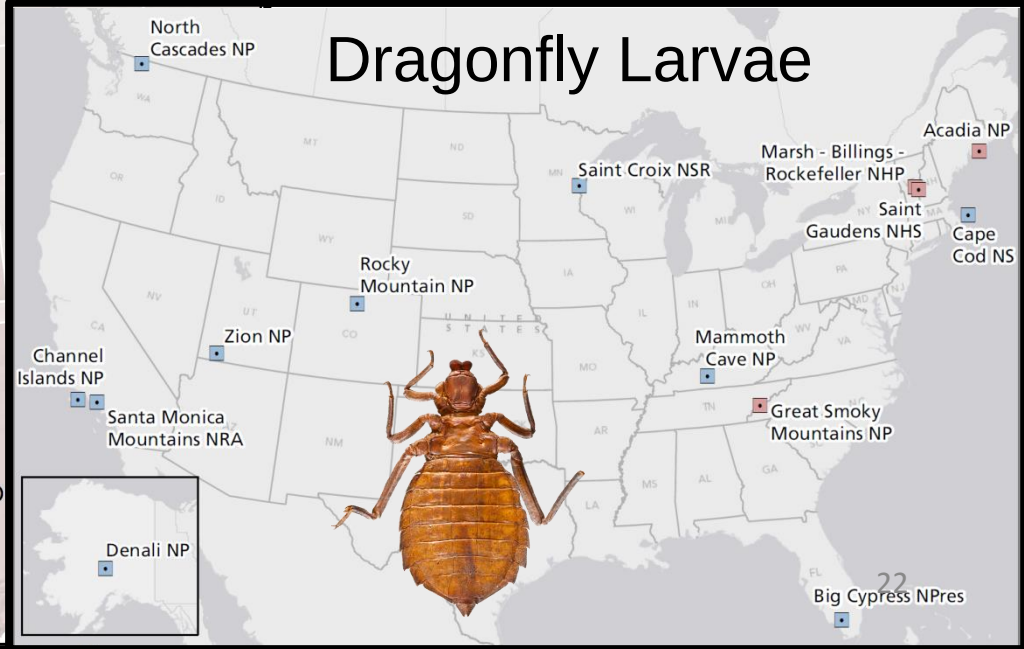




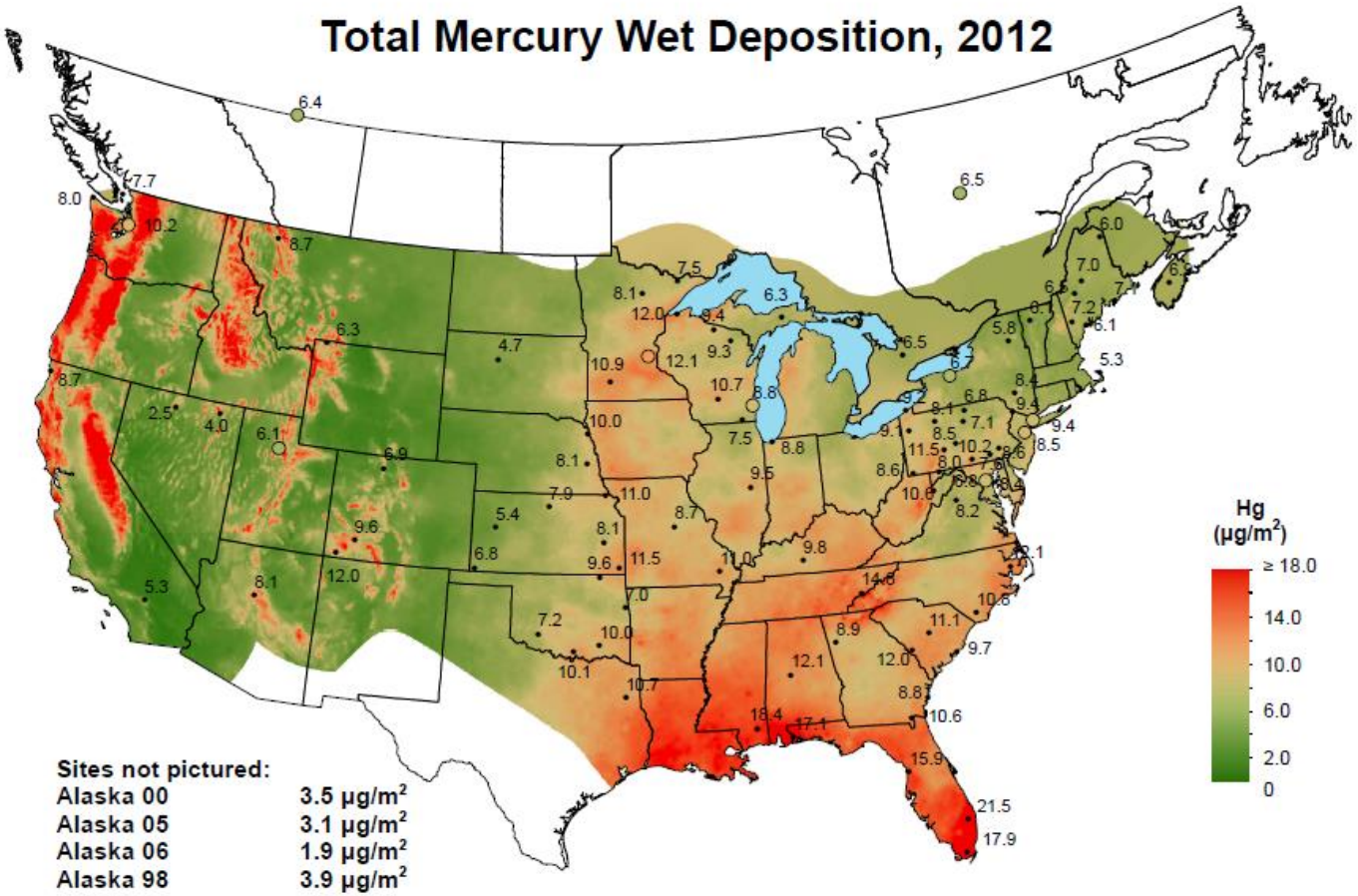




Dragonfly Larvae



National Atmospheric Deposition Program
Mercury Monitoring



National Atmospheric Deposition Program/Mercury Deposition Network
http://nadp.isws.illinois.edu

CAMx for SINGLE SOURCE MODELING

- Bret Anderson USFS
- Tim Allen FWS