Summary of the Air Quality and Atmospheric Issues Stakeholder Advisory Workshop

(Held February 27, 2014)

BioEarth

Biosphere-relevant earth system model

By working closely with stakeholders, we hope to better understand:

I. Regional decision makers' most pressing concerns about current issues and future changes.
II. What gaps exist in available information, and what model outputs would aid in making better decisions.
III. What interdisciplinary approaches are being used to address interactions between air quality and other sectors.

…this information will support development of a model that can be utilized by stakeholders beyond the academic community

Stakeholder Advisory Group Process

Sector-Specific Workshops:
2013: Nitrogen and Carbon Management, Water Supply
2014: Air Quality, Rangeland and Forest Management
Upcoming: Water Quality (Fall 2014)

Cross-Sector Workshops:
2015: Presentation of initial model outputs and opportunities for stakeholder input and model refinement, development of tools and resources for stakeholders based on BioEarth model outputs

Digital response "clickers" used in workshops

Atmospheric issues of interest and concern identified at the workshop

Social, economic, policy changes:

- Impacts of air quality on chronic illness
- Conversion of diesel to electric motors
- Incentive programs to replace old wood stoves
- Impacts of possible policy changes on the ability to meet air quality

Environmental issues:

- Impacts of climate change and transport of pollutants from Asia on the ability to meet air quality standards
- Sources/formation of ozone and PM 2.5, ultrafine particulate matter, transport of ammonium nitrate
- Visibility impacts from haze
- Ocean acidification as a result of SOx and NOx
- Water quality impacts from mercury, N deposition and other toxics
- Odor impacts from dairies

Management and decision-making:

- Direct and indirect impacts of biofuel production on air quality issues
- Impacts of prescribed burning on air quality and fire cycle
- Impacts of tillage and other agricultural management practices on agricultural dust
- Trade-offs between managing for criteria pollutants and other factors

Stakeholders' Perspectives on Scope, Time Frame and Scale

Model Scope:

- Feedbacks between agricultural practices and air quality, visibility and health
- Climate change impacts on air quality, water supply, forests and wildfire
- Different impacts of dry and wet N transport

Model Time Frame:

- Trends in criteria pollutants and N deposition need to be understood on a monthly or seasonal time scale
- Local planning agencies may need to focus most on near-term projections (~2 years), but regulatory recognize the need to think about long-term trends and worst-case scenarios

Model Geographic Scale:

- Climate change impacts on air quality at a fine spatial scale
- Dominant issues of concern are highly variable across the study region
- Most decision making and regulatory power is at the local or even individual level, but sources of the regional concerns are often global in scale

Scenarios to Explore:

- Worst case scenario impacts of climate change and transport of pollutants from Asia
- Assess impacts of a percentage reduction in regional or global GHG emissions.
- Shift from cropland to urban area (or from one crop to another). Assess implications for air and water quality (shifts in pesticides and herbicides).
- Assess demographic characteristics of populations most affected by air pollution
- Changing seasonality of water availability and impacts on wildfire Compare smoke-related air quality impacts from wildfires versus air quality impacts of aggressive thinning.
- Impacts of biofuel production and tillage practices on agricultural dust.
- Model a shift to public transportation with reduced auto pollution.
- Determine N critical loads for the high-elevation plant and aquatic communities and grasslands

In addition to the summary report, we developed detailed spreadsheets of stakeholders' input for the BioEarth research team:

- Concretely outline information needs and desirable model outputs identified by stakeholders
- Consider which stakeholder questions/ needs can be addressed in the context of BioEarth
- Identify who has expertise on specific issues
- Define action steps

Reccomendation	1 = model development 2 = running a scenario 3 = showing specific results	Person/Team assigned to developing a plan of action for this suggestion	Other people with expertise in this area	Models	Spatial and Temporal Domains and Scales	Frequency requested by stakeholders	Research Team Priority (0= not a prioroty at all, 1=low, 2=moderate, 3=high)	Effort required to address (does the capability to address it exist?)	Notes
CROPS (including irrigation and fertilization)			Jenny, Claudio, Brady, Chad, Kirti, Keyvan, Tung						
Precision N-application technology use	1,2,3	Site-specific Climate Farming (Dave Brown's initiative, Claudio working on this)	Dave Huggins	VIC-CropSyst (initially) RHESSys-crops (later). Is VIC capturing a level of detail that can be represented in an integrated model?	landscape scale processes	High++	High priority, Claudio currently investigating	in current SCF plan	To what extent do we try to capture this in BioEarth? Or is it something to leave for SCF or REACCH to address?
New crops, new genetic varities	1	Brady, Claudio				High (Fred Morscheck's main feedback)	current priority		Chad: one idea is to assume 2% improvement per year because of variety development?
Model current agricultural best management practices into the future	2					Med			
Unintended consequences of irrigation efficincy	2					Med		capability exists or in current plan	When there was rill irrigation, it was going into the ground, going back to the stream. More efficiency can actually create the same shift and flashiness that CC will cause.
Lower-yield agricultural systems	2					High			relevant at our scale?
More use of legumes, cover	2					High		capability exists	

Summary reports from all the BioEarth workshops to date are available at: http://www.cereo.wsu.edu/bioearth/publications.html