

FireCAMMS: Fire Consortia for Advanced Modeling of Meteorology and Smoke

*USDA Forest Service Research and Development
USDA Forest Service State and Private Forestry
USDA Forest Service National Forest Systems*



Overview of FCAMMS

- What, where, who & how?
- Answers to your written questions.
- Discussion.



What are FireCAMMS?

- *Fire Consortia for Advanced Modeling of Meteorology and Smoke (FireCAMMS)* are a coordinated group of regional cooperative centers for high-resolution simulation modeling of *weather, fire & smoke*.
- They are initiated under support from FS Research as part of the National Fire Plan.



FireCAMMS do this...

By providing timely, high resolution, data that will:

- Help managers burn more by identifying additional windows for burning;
- Help fire fighters burn safer relative to escaped fire;
- Help managers burn cleaner and avoid air quality problems;
- Help fire fighters combat wildfire with relevant weather intelligence.



Forest and rangeland fires are on the increase and a US National Fire Plan has been developed...

- **8.4 million** acres burned in 2000 (about **222%** above the 10 year average)
- **This year:**
 - **6.7 million** acres burned through September;
 - **2.1 million** acres of prescribed fire fuel treatments were conducted by federal agencies through September;
 - National preparedness & response reached their highest levels 5 weeks earlier than ever before and remained up for an unprecedented 62 days.
- Each year fuel management targets are increasing.



Why is smoke important?

- Legal mandates:
 - Clean Air Act;
 - State & Local regulatory programs.
- Public Relations:
 - Fire fighter safety;
 - Public safety.
- The right thing to do...?



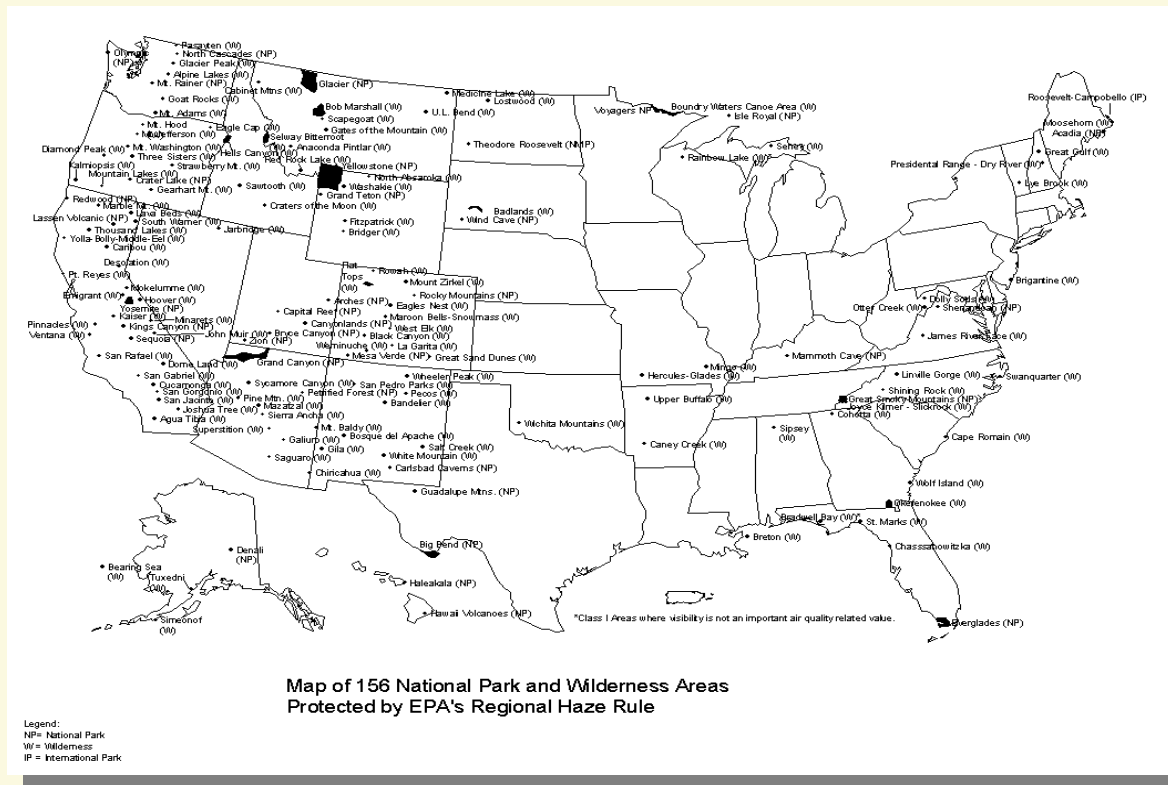


Regional Haze is a very important issue
for smoke management





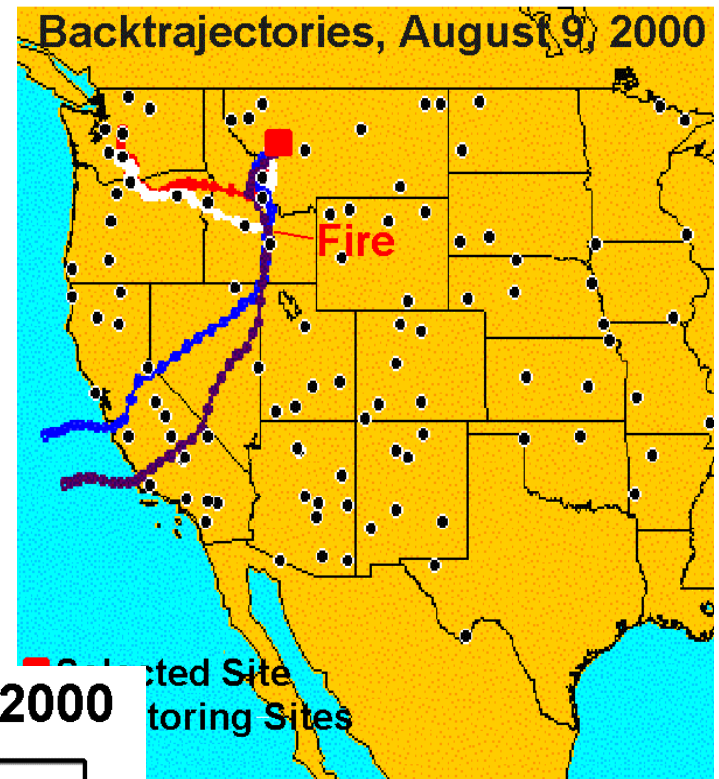
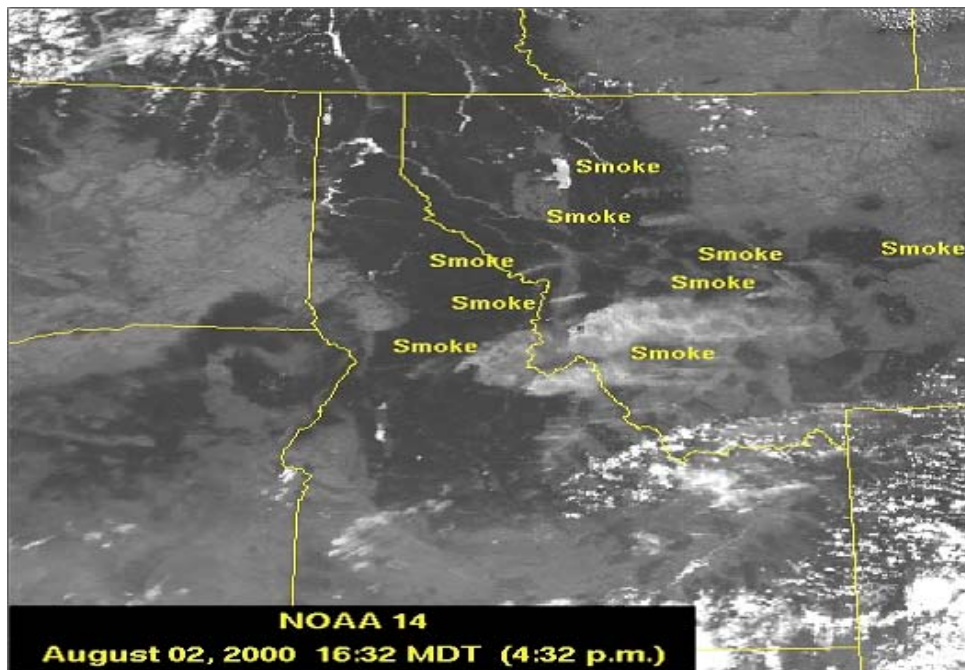
Class I AQ & visibility impacts are a legally mandated special concern for Federal land managers & AQ regulators



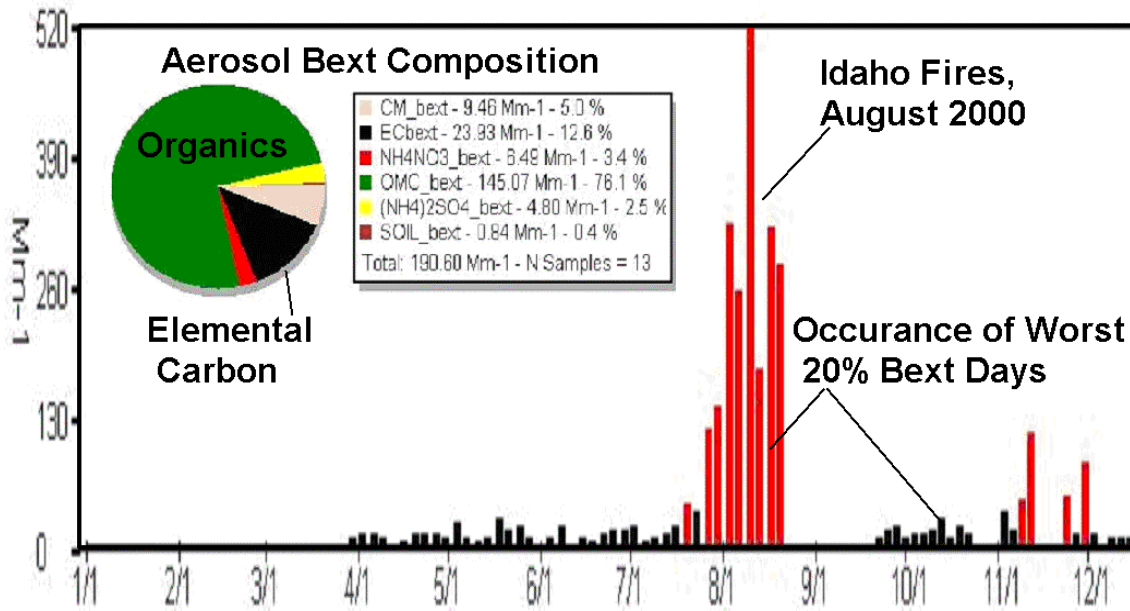


Fire effects visibility & PM2.5

- IMPROVE monitoring suggests a range of 10%-40% of OC (organic carbon contribution to PM2.5) on the high mass days (20% worst visibility) may be from fires.
- Current research suggests biogenic OC is relatively larger than fossil OC, even in eastern urban air.
- In southeast, OC appears to come from live vegetation in summer & fire in winter.



Worst 20% Haze Days at Monture, MT in 2000



August 2000
Idaho/Montana wildfire
contribution to
regulatory regional
haze at Bob Marshall
wilderness,
VIEWS website

USDA Forest Service must interact constructively with RPO's





Technical data & analysis will be required to support FS interests in....

- **Smoke Management Programs (SMP)**
- **Visibility/Regional Haze S/TIPS**
- **NAAQS S/TIPS**
 - **PM2.5 & Ozone**
- **Public endangerment (highway accidents)**
- **HAPs (toxic emissions like Mercury)**

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Caring for the land and serving people

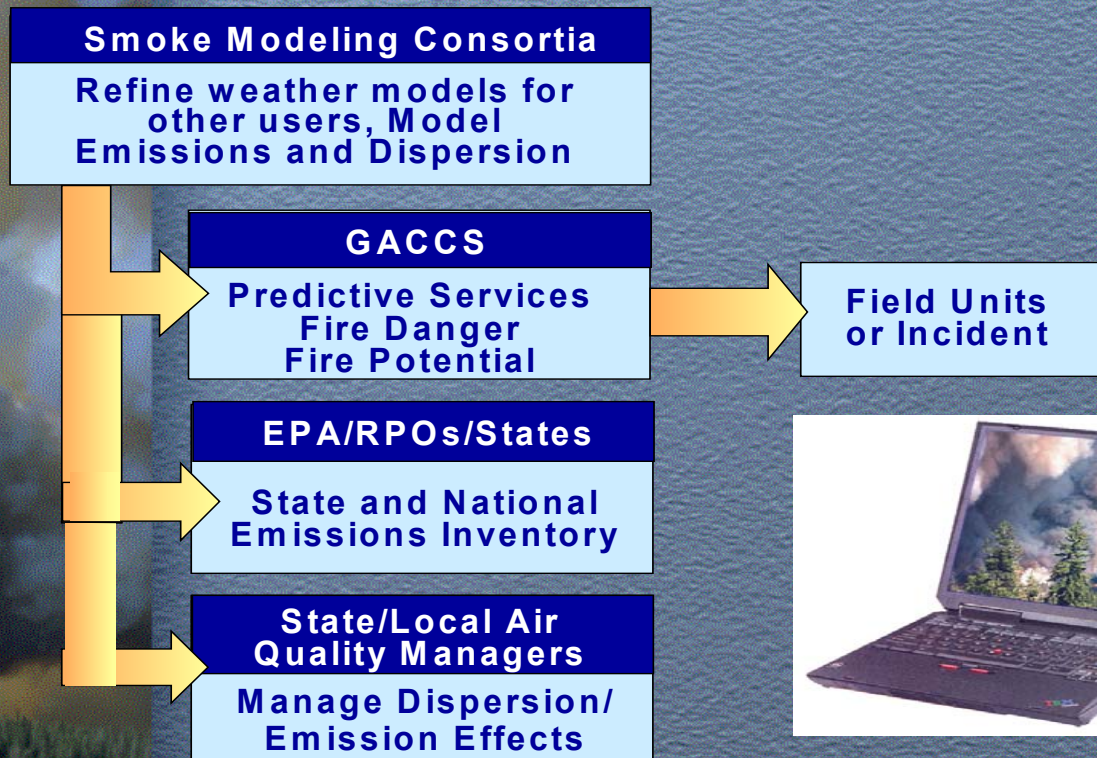


Fire and fire emissions are a complex set of issues that will challenge resource management, regulatory, and scientific communities to improve cooperation.

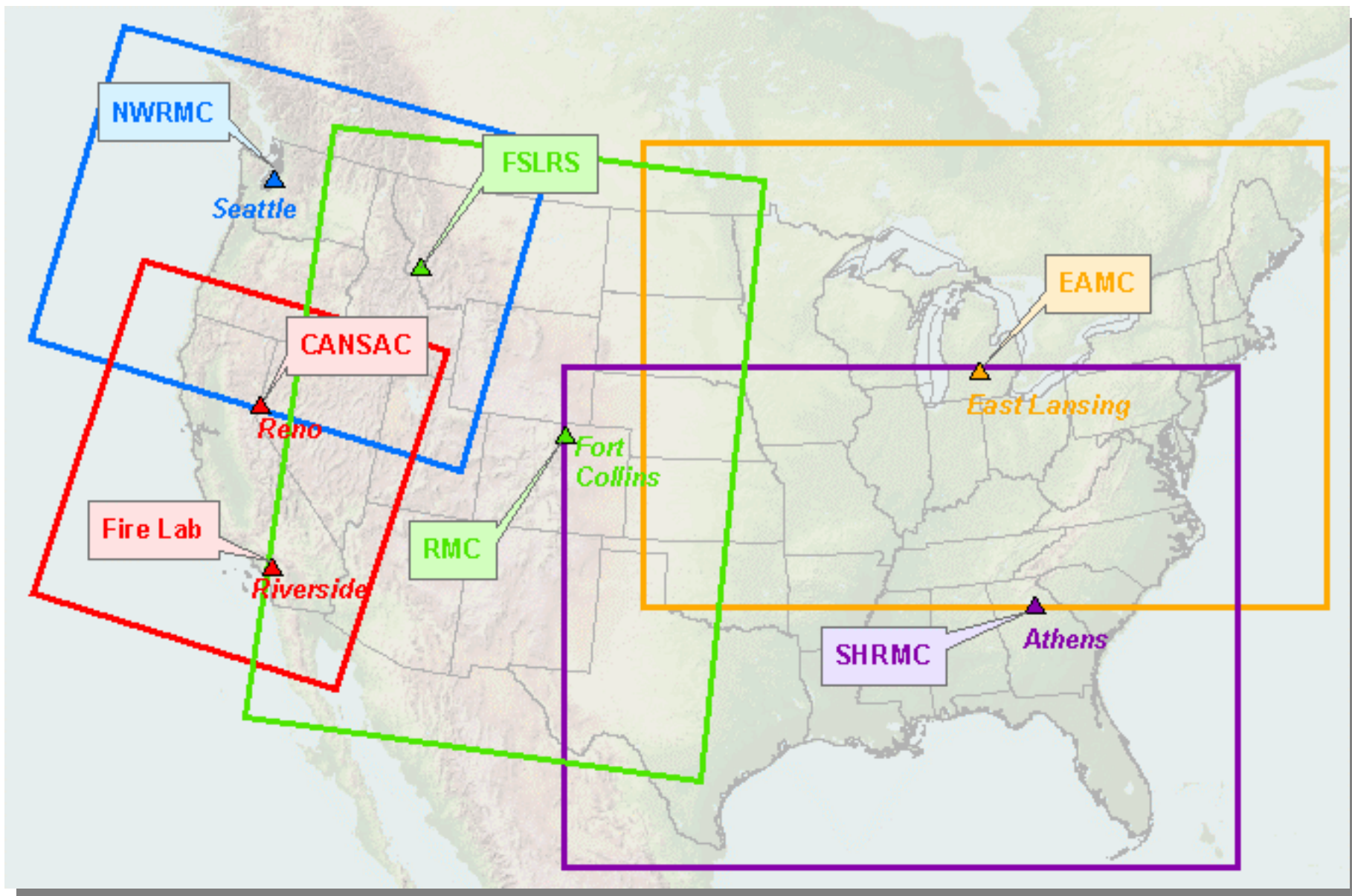




Fire Weather Strategy



FCAMMS locations & domains...

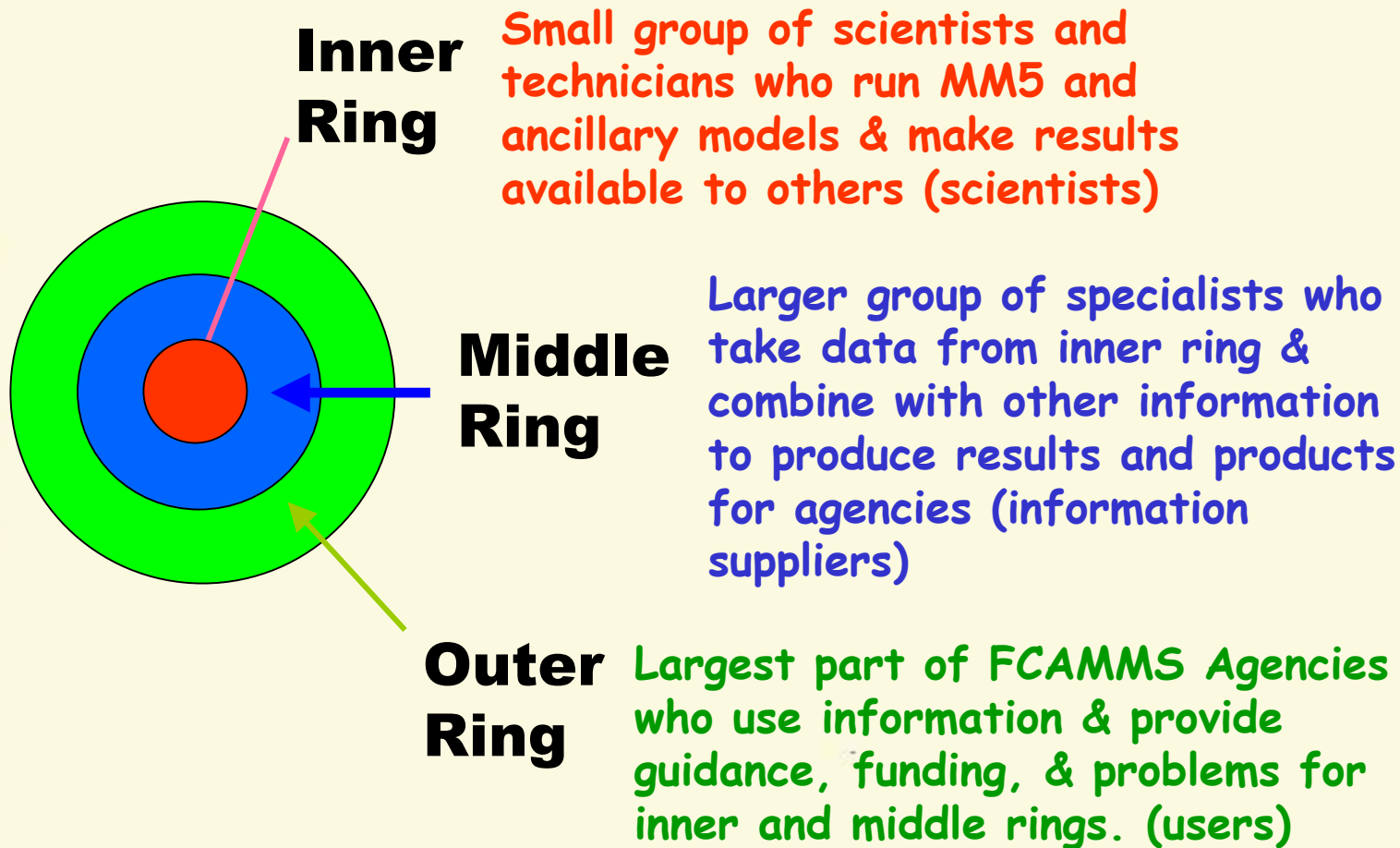




What do FCAMMS do?

- Build consortia to implement and deliver models of:
 - meteorology,
 - fire related phenomena, and
 - smoke;
- develop & support **contemporary computational resources** needed to deliver timely products;
- **build Forest Service capacity** by hiring and training appropriate research scientists and other personnel.

Conceptual structure for FCAMMS





Conceptual structure for FCAMMS

Ring	Meteorology	Fire	Smoke
Scientists & Technicians	Met modelers & atmos sci.	Fire modelers & scientists	Air Quality modelers & scientists
Information Suppliers	GACCS & Fire Wx forecasters	FBO's	RPO's, ? ?
Users	Fire fighters	Fire fighters	Air Quality Regulators & public



So, what are the meteorological products?

- One to four day high resolution (4-12 km) forecasts of the fire products & indices mentioned;
- Regional scale weather forecasts, including:
 - Wind fields,
 - Temperature & relative humidity,
 - Precipitation;
- Regional scale inputs to smoke dispersion models;
- Others....

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Caring for the land and serving people



<i>Fire CAMMS</i>	Frequency of Model Runs	Run Time	Initialize Times	Model Domain Grid Spacing	Product Web Address
EAMC	Twice-daily	48-hr	00Z, 12Z	36km, 12km, 4km	http://www.ncrs.fs.fed.us/eamc
NWRMC	Twice-daily	72hr 48hr	00Z, 12Z	36km, 12km, 4km	http://www.atmos.washington.edu/pnw_environment/
SHRMC	4 times - daily	48hr	00Z, 06Z, 12Z, 18Z	36km, 12km,	http://shrmc.ggy.uga.edu/
CANSAC UCSB NPG MHPCC	Twice Twice	48hr 48hr 48hr	00Z,12Z 00Z,12Z 06Z	36,12,6,4,2km 108,36,12km 27,9,3,1km	http://www.cefa.dri.edu/COFF/coffframe.html http://www.crseo.ucsb.edu/asr/mm5_forecasts.htm http://www.weather.nps.navy.mil/~dkmiller/MM5/ http://weather.mhpcc.edu/
RMC / FSLRS	4 times/ day various Satellite obs	24- 60hr NA	03Z, 09Z, 15Z, 21Z NA	12km, 4km NA	http://laps.fsl.noaa.gov/usfs/usfs_home.html http://www.firelab.org/rsl/



...the fire products?

- Special fire weather indices:
 - Haines Index;
 - Fosberg Fire Weather index;
 - Ventilation Index.
- US & Canadian Fire Danger Rating indices;
- Others....



... the smoke products?

- Smoke emissions;
- Smoke related indices:
 - Ventilation index,
 - Dispersion indices;
- Smoke trajectories;
- Aerosol & other chemical concentrations as a function of time and space.
- Other....

BLUESKY



What models will FCAMMS use?

- Mesoscale meteorological models:
 - MM5
 - Others as needed.
- Fire models
 - NFDRS & CFDRS models
 - FARSITE/BURNUP (e.g., fire behavior models)
- Smoke models
 - EPM/Consume/FOFEM/CSEM
 - CALPUFF family
 - CMAQ
 - Hysplit & related trajectory models
 - SASEM
 - VSMOKE



Your Questions

- How do/will FCAMMS obtain critical data such as fire activity and emissions data?
- Who is invited/expected to participate?
 - Are the FCAMMS operational or research or some combination of both?
- What are the costs if any to NFS or S&PF for the FCAMMS?
- How long will the FCAMMS be around?
- What should the relationship be between FCAMMS scientists and the field?



How do/will FCAMMS obtain critical data such as fire activity and emissions data?

- Meteorological initial data come from NCEP (NOAA)
- Fire activity will need to come from:
 - satellite observations;
 - regional data efforts;
 - State & local fire tracking programs.
- BlueSky emissions calculations.



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Conceptual structure for FCAMMS

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Research

National programs

Local



Who is invited/expected to participate?

- FCAMMS have both operational and research components.
- FCAMMS have attempted to identify key partners in:
 - Meteorological simulation;
 - Fire sciences;
 - Air Quality & Smoke Management.
- **FCAMMS need partners at the information supply & user levels!**



What are the costs if any to NFS or S&PF for the FCAMMS

- Clearly, research funds can only be used to demonstrate & test new concepts & products.
- Continuing routine operations will require support funding.
- Each FCAMMS will need to approach this issue.



How long will FCAMMS be around?

- Funding through FY 05 appropriation is expected under the National Fire Plan.
- Do **you** think FCAMMS should stay around?
- How can we work together to insure they stay?



What should the relationship be between FCAMMS scientists and the field?

- Ideally a working partnership between FCAMMS, Fire & Air Quality specialists where all:
 - come to rely on products produced;
 - identify needs for new and improved products;
 - mutually support the activity providing information suppliers & liaison with user communities.



Who are the FCAMMS PI's?

- **Dr. Gary Achtemeier**, USDA Forest Service, Southern Research Station, Athens, GA
- **Dr. Warren Heilman**, USDA Forest Service, North Central Research Station, East Lansing, MI
- **Dr. WeiMin Hao**, USDA Forest Service, Rocky Mountain Research Station, Missoula, MT
- **Dr. Francis Fujioka**, USDA Forest Service, Pacific Southwest Research Station, Riverside, CA
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- **Dr. Karl Zeller**, USDA Forest Service, Rocky Mountain Research Station, Fort Collins, CO



Questions on FCAMMS?

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Eastern Area Modeling Consortium

- Web Page:
<http://www.ncrs.fs.fed.us/eamc/>
- Dr. Warren Heilman,
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Rocky Mountain Center

- **Web Sites:**

http://laps.fsl.noaa.gov/usfs/usfs_home.html

<http://www.firelab.org/rsi/>

Dr. Karl Zeller & Dr. WeiMin Hao,

- Rocky Mountain Research Station,
Ft. Collins, CO & Missoula, Mt.



California & Nevada Smoke & Air Council

<http://www.rfl.psw.fs.fed.us/met/index.html>

<http://www.cefa.dri.edu/COFF/coffframe.html>

http://www.crseo.ucsb.edu/asr/mm5_forecasts.htm

<http://www.weather.nps.navy.mil/~dkmiller/MM5/>

<http://weather.mhpcc.edu/>

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NWRMC

- http://www.atmos.washington.edu/pnw_environ/
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