Dear :

1. In 2005, the Western Governors' Association (WGA) recommended that the National Oceanic and Atmospheric Administration (NOAA) Office of the Federal Coordinator for Meteorological Services and Supporting Research (OFCM) complete a National Needs Assessment Report of federal, state, and local fire managers' needs for weather information in their wildfire and prescribed-fire decision-making processes, to include a framework to meet those needs by NOAA's National Weather Service and the federal wildland fire agencies' Predictive Services. The OFCM, at the request of the Interdepartmental Committee for Meteorological Services and Supporting Research, has formed a joint action group to act on the WGA's recommendation.

2. The OFCM Joint Action Group for the National Wildland Fire Weather Needs Assessment (JAG/NWFWNA), a group made up of representatives from many federal departments and agencies, as well as subject-matter experts from state, local, and the academic communities, has begun to conduct their assessment. The primary goals of the national wildland fire weather needs assessment are to: (1) conduct a comprehensive review and assessment of weather and climate needs of providers and users in their wildland fire and fuels management activities, and (2) assess the capabilities of the provider agencies to ensure that needed weather and climate information is available to fire managers and other users. **To meet these goals, the Joint Action Group has developed a fact-finding action, detailed below, for which we need your input by Month Day, 2006.**

Please find additional information concerning the JAG/NWFWNA in the attached one-pager.

3. **Action Requested**: The JAG/NWFWNA is gathering information to review and assess the weather and climate information needs of the users and stakeholders of this information. In order for us to complete our fact-finding assessment, we would greatly appreciate your input on the following questions (click here for a template to use). Please note that your input will help form the basis of a national need assessment report, and into the final report to the WGA in Spring 2007.

4. **Background information**: The following list of questions are broken up into two primary areas: one, the demographical information (7 questions defining who you are, your job position, your agency, etc.); and two, questions on the nine functional areas of the assessment. These functional areas are listed below. Along with the areas listed, the total number of questions per section are in parentheses, and include separate listings for functional area sub-groups (when possible):

1. Data collection, integrity, processing and archival (34)
2. Fire weather research and development (8)
3. Forecast products and services (10)
4. Modeling, prediction, and data assimilation (10)
5. Information dissemination and technologies (14)
6. Education, training, outreach, partnering, and collaboration (42 total)
    a. Continuing education (13)
    b. Formal education (4)
    c. Outreach (10)
    d. Collaboration (6)
    e. Partnering (6)
    f. General (3)
7. User response, decision support, and resulting user impacts (12)
8. Funding and human resource considerations (6)
9. Socioeconomic impacts (6)

5. **Directions**: Please answer **both the demographical area information, and at a minimum one functional area**. We encourage you to provide us information on all of the functional areas, but if you have limited time please feel free to answer only those areas which are the most important to your primary job. Each section provides an overview of the purpose we have in asking for your input. We hope this clarifies what we are after, and gives you further definition of each functional area.

6. Upon completion of the questions, save the template as a Word document to your computer, and send the document in an email back to ofcm.mail@noaa.gov. If you have any questions, please contact Lt. Col. David Andrus via email at david.andrus@noaa.gov, at phone number 301-427-2002, or by fax at 301-427-2007. The JAG/NWFWNA members look forward to working with you and thank you for your support.

Sincere regards,
Samuel P. Williamson
Office of the Federal Coordinator for Meteorology

NATIONAL WILDLAND FIRE WEATHER NEEDS ASSESSMENT

DEMOGRAPHICS

1a. Name:

1b. Organization:

1c. Mailing Address:

1d. Zip code:

1e. Phone Number:

1f. Email:

2. What is your job title?_____

3. Which fire weather related sector below best describes your job?
Operational/Tactical:

- Fire Management
  - Agency fire staff
  - Fire chief, deputy chief
  - Fire management officer
  - Fuels managers/prescribed fire specialist
  - Fire suppression managers
- Fire Fighters
  - Crew Supervisors
  - Battalion Chiefs
  - Company Officers (e.g. Fire Capt, Engine Foreman, Module Leader)
  - Strike Team Leader
- Coordination Systems Dispatchers (e.g. Duty Chief)
- Emergency Managers/Responders
  - Warning Coordination Meteorologists
  - Red Cross
  - National/Regional/Local Emergency Operations Center Staff
- Incident Management Teams (command and general staff)
  - Planning Section Chief
  - Public Information Officer
  - Aviation Operations
- Fire Behavior
  - Long Term Analysts
  - Fire Behavior Analysts

- Fire Danger Analysts
- Fire Weather Information Providers
    - Meteorologists (i.e., NWS Meteorologists (IMETS), Predictive Services)
    - Private/Industry providers of weather information
    - Media (includes agency public information, broadcast meteorologists)
    - Intelligence Officers
    - Fire Consortia for Advanced Modeling of Meteorology and Smoke (FCAMMS)
- Law Enforcement (Fire Prevention, State Police, Sheriffs, other local law enforcement)
- Air Quality Managers
    - Public Health Officials
    - Air Quality Meteorologists
    - Smoke Management Coordinators
- Public Officials (elected officials: federal, state, local)
- Resource Managers
    - Federal
    - State
    - Local
    - Private
    - Industrial
    - Tribal
- Surface Transportation -- State DOTs
    - Chief of Maintenance and Operations
    - Road Supervisor Type 1
    - Road Supervisor Type 2
- Other_____

Strategic:

- Fire Planners
- Fire Consortia for Advanced Modeling of Meteorology and Smoke (FCAMMS)
- Air Quality Planner
- Researchers
    - Federal
    - University
- Rehabilitation Specialists (including Burn Area Emergency Rehabilitation Teams (BAER)
- Fire Prevention Officers
- Foresters
    - Federal
    - State
    - Private
    - Industrial
    - Tribal
- Education
    - Fire weather educators (e.g., Fire Environment, Wildland Fire Education, and Training Working Teams)
    - Forestry Departments/Universities
    - National Association of Forestry and Professional Schools
    - Cooperative Program for Operational Meteorology, Education and Training (COMET)
- Non-Governmental Organizations (e.g., The Nature Conservancy)
- HHS, Health departments
- Homeland Security-related Agencies
- Public Stakeholders (e.g., general public, tourists, recreation)
- Other_____

3a. Does your job involve several of these areas of responsibility?

4. Please provide a brief description of your job as it specifically relates to wild land fires_____

5. Within your current scope of duties, what level of geographic responsibility do you have?

- Site or area specific (eg. For a particular incident)
- County
- State
- Regional
- National
- International

6. Which state or states do you mostly work in?_____

7. Within my duties, my work is specific to:

- My agency/entity only
- Private sector
- Associations
- Academia
- Non-Governmental Organizations
- Industry
- Private Forester
- Industrial Forester
- Other

FUNCTIONAL AREA #1: DATA COLLECTION, INTEGRITY, PROCESSING AND ARCHIVAL

Background ***(index in cover letter linked here)***

To fully define data requirements and standards, this segment of the questionnaire seeks to clearly define requirements and standards for the density, collection frequency, consistency, timeliness, and archiving of weather data used to support (1) fire management activities including suppression, planning, wildland fire use, prescribed fire, and air quality applications, (2) basic and applied research, and (3) the integrity of real-time observations and the long term climate record. Findings from this functional area will serve to document and recommend requirements and standards for both surface and upper air observations (taken either in-situ or remotely). This effort will also support the need for a robust set of data in three dimensions for operational and research activities. Topics to be examined in this functional area include:

1) *Data elements required and desired.*
2) *Current observation sources and techniques used to support needs related to fire weather.*
3) *Who uses each of the data sets and why they need it.*
4) *Opportunities for improvement in how data are collected, processed, archived, and delivered.*
5) *Existing inefficiencies and barriers (e.g., duplication of resources/effort, cumbersome procedures) with regard to collecting, processing, delivery, and archiving data.*
6) *Risks associated with data availability (e.g., interagency dependencies, single points of failure and insufficiencies, uncoordinated technological changes and data standards), data quality and quality assurance.*

1. Do you use fire weather data in your current position? *(Use this as filter question: If yes, please continue through section. If no, please skip to question X.)*

2. Which of the following data sources do you use?

- surface-based
- upper air
- satellite-based
- airborne
- fuel moisture

- human
- Other

3. Which weather data elements are most important to you in the performance of your duties? *(depending on desire for information, respondents could be asked here to indicate via rank their top 1 – 3, 3 – 5, etc.)*

- temperature
- wind direction
- wind speed
- humidity
- solar radiation
- precipitation (type/amount/duration)
- fuel moisture
- Other

3a. Of the data elements you have indicated, please provide a brief description of the impact these particular elements have in your work or operations. *(e.g., high, medium, low)*

- temperature
- wind direction
- wind speed
- humidity
- solar radiation
- precipitation (type/amount/duration)
- fuel moisture
- Other

3b. At what *resolution or range* do you need these data?

- temperature
- wind direction
- wind speed
- humidity
- solar radiation
- precipitation (type/amount/duration)
- fuel moisture
- Other

3c. To what *accuracy* do you need these data?

- temperature
- wind direction
- wind speed
- humidity
- solar radiation
- precipitation (type/amount/duration)
- fuel moisture
- Other

3d. At what *frequency* do you need these data?

- Obs 6hr 12hr 24hr 48hr 72hr >72hr Other
- temperature
- wind direction
- wind speed
- humidity

- solar radiation
- precipitation (type/amount/duration)
- fuel moisture
- Other

3e. What critical decision thresholds do you need for your most critical weather elements, and what are their impacts?

- Threshold Impact
- temperature
- wind direction
- wind speed
- humidity
- solar radiation
- precipitation (type/amount/duration)
- fuel moisture
- Other

3f. What lead time do you require for these critical decision thresholds?

- Obs 6hr 12hr 24hr 48hr 72hr >72hr Other
- temperature
- wind direction
- wind speed
- humidity
- solar radiation
- precipitation (type/amount/duration)
- fuel moisture
- Other

4. Which of the following observation systems provide the *surface based* weather data you use?

- RAWS
- Mesonets (local, private, state, DOE, DOD, university)
- ASOS/AWOS
- Incident observations (kestrels, hobos, …..)
  - Belt weather kits
- Cooperative Program Network / Climate Reference Network
- Snow measurements
  - SNOTEL (NRCS)
- Manual Weather Stations (NFDRS)
- IMPROVE
- CASTNET
- EPA/Air Regulatory (air quality: deposition, visibility, concentration)
- USGS Streamgages
- Surface Transportation - RWIS
- Buoy / CMAN
- Lightning detection network
- AERONET (NASA)
- Other

4a. What deficiencies, inefficiencies, and future opportunities do you perceive with regard to this source?

5. Which of the following observing systems provide the *upper air* weather data you use?

- Radiosondes

PIBALS
Dropsondes
Thethersondes

- Profiler
- Radar (WSR-88D, Lidar)
  Research radar
- Other

5a. What deficiencies, inefficiencies, and future opportunities do you perceive with regard to this source?

6. Which of the following systems provide the *satellite-based* weather data you use? (Satellite-based Data (Raw and derived products - reorganize)

- MODIS
- QUIKSCAT
- LANDSAT
- ASTER
- MOPPITT
- GOES
- ABBA (IR/VIS – GOES Imager)
- Sounder
- Imager
- Lightning (TRMM)
- NDVI
- HVDIR
- AVHRR
- DMSP
- Classified
- Polar
- Other

6a. Do you use visible? Infrared? Don't know?
6b. How do you use the data (e.g., operations, research, products)?
6c. What deficiencies, inefficiencies, and future opportunities do you perceive with regard to this source?

7. Which of the following systems provide the *Airborne* data you use?

- ACARS/MDCRS
- Aircraft-fixed (get from Rick)
- UAV/UAS (note for future use)
- Other

7a. What deficiencies, inefficiencies, and future opportunities do you perceive with regard to this source?

8. Which of the following systems or methods provide the *Fuel Moisture* data you use?

- NDVI and satellite greenness maps
- Manual sampling (collection, drying, weighing)
- Dead fuel moisture
- Other

8a. What deficiencies, inefficiencies, and future opportunities do you perceive with regard to this source?

9. Which of the following methods provide the *human observational* data you use?

- lookouts

- field observers
- Other

9a. What deficiencies, inefficiencies, and future opportunities do you perceive with regard to this source?

10. How do you use Surface-Based Observations in the performance of your job or operation?

Examples:
- For calculating the National Fire Danger Rating System (NFDRS)
- As input to or verification of fire weather forecasts
- Fire weather and fire potential forecasting
- For prediction of fire behavior
- For air quality decision-making
- To allow Incident Commanders, National, Regional and Local Fire Management personnel to make planning and staffing decisions
- To determine appropriate preparedness levels
- To determine fire potential (e.g., red flag warnings)
- To plan initial attack, suppression response, and rehabilitation activities
- For litigation purposes after the fact
- As input to research and operational weather and fire prediction models
- For aerial monitoring, and to map fire perimeter and intensity
- Planning and implementation of fire use (wildland fire use and prescribed fire)

Other_____

11. How do you use Upper Air Observations in the performance of your job or operation?

Examples:
- To assess fire danger
- As input to operational forecasts of fire behavior
- To verify fire weather forecasts
- Fire weather and fire potential forecasting
- For air quality decision-making
- To forecast smoke dispersion
- To determine current Haines Index and other indices
- To assess fire potential (e.g., red flag warnings)
- To assess aircraft safety for firefighting
- As input to research and operational weather and fire prediction models
- To assess lighting potential
- Scientific studies of the fire environment

Other_____

12. How do you use Satellite Data in the performance of your job or operation?

Examples:
- For fire detection, location, and validation
- To map fire areas and intensity
- To detect smoke and assess air quality for decision-making purposes
- To assess fire potential (e.g., red flag warnings)
- Fire weather and fire potential forecasting
- As input to research and operational weather and fire prediction models

- To monitor live fuel moisture and fuel loading
- To assess lightning potential

Other_____

13. How do you use Airborne data in the performance of your job or operation?

Examples:
-

Other_____

14. How do you use Fuel Moisture data in the performance of your job or operation?

Examples:
-

Other_____

15. What data related initiatives should be undertaken to improve your ability to perform your duties or operations? Select from below and/or add others.

Examples:
- Expand use of Unmanned Aerial Vehicles/Systems (UAV/UAS) for fire perimeter monitoring and mapping, air quality and meteorological parameters, fire behavior, fire effects.
- Provide solar radiation data for expanded fire danger analysis (surface, satellite, research).
- Attach sensors on fixed-wing aircraft to support IMET and spot forecasts.
- Replace and/or redesign existing observation platforms (e.g., replace surface-based observation with satellite or models).
- Explore applications of Aeronet (NASA network).
- Increase use of space-based weather, climate, and fire fuels information.
- Link all surface based networks in a common framework.
- Set Quality Assurance and Control (QA/QC) standards.

16. In the performance of your duties or operations, where do the most critical inefficiencies currently exist? Select from below and/or add others.

Examples:
- Observing Systems Management & Maintenance
- Interoperable databases and effective warehousing techniques
- Availability of national activity and fuel databases (for fuel moisture and smoke)
- Integration of fire data into ISOS and GEOSS
- Improvements in transmission and reception of data (to satellites and to users)
- Optimizing coverage of fire parameters

17. Archival (storage)
17a. What are your archival requirements?
17b. Do you archive your own data, do you depend on other sources?

18. Integrity (sufficiency, quality, accuracy)
18a. Are the data provided sufficient enough for you to make your decision? (accuracy/precision)
18b. Are the data provided in sufficient density to meet your needs?

18c. Are the data reliable and of high quality?
18d . Are the data provided sufficient for your needs?
18e. Is additional QA/QC needed?

Data Collection (sensors, coverage, etc.)

19. Are the weather observations in close enough proximity to the fire to meet your needs?
20. Is there a sufficient number of weather sensors (e.g. raws stations) positioned to meet your needs?

Processing (availability, timeliness)

21. Are the data accessible to you in a timely manner?
22. Of the following data sets, which do you *not use*:

- temperature
- wind direction
- wind speed
- humidity
- solar radiation
- precipitation (type/amount/duration)
- fuel moisture
- Other

22a. Would you like to use these data, but don't have access__
22b. Would you like to use these data, but not aware it is available__
22c. Is there another reason you do not use the data? (e.g., improper sighting)

23. What would you identify as your current, highest priority *data* related need?_____

24. Is it important to maintain year-round stations? Why or why not?

25. Do you know if the stations that you use meet NFDRS standards?

26. Is it more important for a station to be more representative of the broad scale landscape, or point specific?

27. Is climatology information of importance to your work? If so, how long should the period of record be?

28. Are the stations that you use adequately maintained? If not, what are the primary issues?

29. Is there sufficient and accessible meta-data available for the data that you use?

30. Portable RAWS

30a. Are there sufficient portable RAWS available for wildland fires and prescribed fires?
30b. IF you order, do you get it locally? Regional? National?
30c. Does it get delivered and setup in a timely manner?
30d. What is the quality of the weather data?

31. What issues related to *data* have been identified in the past, but have not been acted upon?
_____.

32. What would you site as the most critical opportunities for improvement in how data are collected, processed, archived, and delivered?

33. What would you site as the most critical existing inefficiencies and barriers (e.g., duplication of resources/effort, cumbersome procedures) with regard to collecting,

processing, delivery, and archiving data?

34. What would you site as the most critical risks associated with data availability (e.g., interagency dependencies, single points of failure and insufficiencies, uncoordinated technological changes and data standards), data quality and quality assurance.

Data (other data questions we should ask) *(Either place these in appropriate earlier question sections or number them 24-33.)*

- What are the standards for mesonet station site location?
- What are the standards for sensors and sensor calibration?
- What are the standards for fire weather data QA/QC?

FUNCTIONAL AREA #2: FIRE WEATHER RESEARCH AND DEVELOPMENT

Background ***(index in cover letter linked here)***

Fire Weather Research and Development includes basic and applied research and development (applications and technology) relating to wildland fire with focus upon fire meteorology, fire danger, fire behavior, and fuels condition as relating to the atmosphere. This section will provide input to fully define these research and development requirements and need assessment. Topics to be examined in this functional area include:

1) *Identify all current wildland fire research programs, projects, and initiatives relating to this functional area, across the scientific disciplines that impact advances in this area.*
2) *Assess knowledge gaps (and complementary) in the subject area.*
3) *Seek to understand the spectrum of users' needs and requirements in this functional area.*
4) *Specify existing and potential research capabilities pertaining to this functional area (by federal, state, local, private, universities), and explore redundant development.*
5) *Recommend potential partnerships.*
6) *Science delivery (transition from research & development to operations and decision-making).*

1. What are current research topics for fire weather and climate? *(Depending on information goal, could ask respondents to rank top 1-3, 1-10, etc. or check all that apply.)*

Examples:

- Surface weather and fine scale flows
- Upper air and boundary layer
- Smoke emissions and transport, dispersion potential
- Plume dynamics
- Fire danger
- Fire behavior
- Fuel consumption
- Fire potential (wildfire, prescribed fire, range of fires, wildland fire use) from daily to seasonal timescales, including severity
- Fire weather drivers for fuels state and condition
- Weather influences on fire transition states
- Remote sensing of fire occurrence, area, severity, and emissions
- Climate change and variability and fire ecology
- Forecasting of western Pacific typhoons/Rossby waves impacting CA Santa Ana strength and duration
- Measurement, assessment, and forecasting of fuel moisture in response to atmospheric conditions
- Understanding atmospheric flow in fire and fire environment
- Fire atmosphere interactions at multiple scales
- New community atmospheric models (i.e., WRF) and implementation in forecasting operations
- Weather forecasting technologies such as data assimilation, ensemble forecasting
- Regional climate modeling
- Atmospheric conditions leading to severe weather phenomena (i.e., fire whirls)
- Science of science delivery (research on how it gets through to impact)

- Lightning research
- Techniques for point and gridded fields
- Verification and validation
- Other

1a. What are your current development activities for fire weather and climate?

Examples:

- Gridded data incorporation into fire danger and fire behavior, etc.
- Scientific visualization (also related to information and dissemination and technologies funcational area)
- Science of delivery systems (note to include in the IDT FA; e.g., BlueSkyRains, FX-Net)
- Data quality control and estimation
- Other

2. Do you need or use this research?

3. In your opinion, how is this research useful? (OR How is the research useful to you?)

Examples:

- For forecasting National Fire Danger Rating System (NFDRS) Indexes
- To refine operational forecasts of fire behavior
- To verify and improve fire weather, climate, and fire potential forecasts (e.g., accuracy)
- For air quality decision-making
- To allow Incident Commanders to make operational decisions
- To assess current levels of preparedness
- To determine regional fire potential
- To improve warning accuracy and lead time (e.g., red flag warnings)
- For planning suppression response, and rehabilitation activities
- To serve as forecast initial and evolving conditions for other simulations tools (e.g., Farsite, WindWizard, NUATMOS, etc.)
- For litigation purposes after the fact
- As refinements to operational weather and fire prediction models
- Education
- Improve Government Performance and Results Act (GPRA) measurements
- Firefighting
- Rehabilitation
- Hazardous fuels reduction
- Community assistance
- Accountability
- Increase efficiencies
- Save money
- Improve decision-making capabilities

4. What opportunities exist for future Research and Development? *(Again, could ask to rank or check all that apply.)*

Examples:

- Provide improved smoke predictions and air quality impacts at multiple scales
- Provide improved fire behavior predictions and interactions with the atmosphere at multiple scales
- Expand use of Unmanned Aerial Vehicles/Systems (UAV/UAS) for fire perimeter mapping and air quality and meteorological parameters.
- Replace and/or redesign existing observation platforms (e.g., replace surface-based observation with satellite or models).
- Explore applications of Aeronet (NASA network).
- Increase use of space-based weather, climate, and fire fuels information.

- Explore use of miniaturized auto-networking sensors on Incidents
- Link all surface based networks in a common framework.
- Smart sensor technology - vehicle-integrated sensors
- Improved understanding of the winds and other atmospheric parameters in the fire environment
- Application of statistical point-based forecasting technologies
- Research into the economic benefits into the fire weather, fire danger, and fire potential forecasts
- How best to we portray (and how can they use it) fire danger to the public (with IDT; interviews)
- Improved use of geospatial data for wildland fireP
- Provide solar radiation data for expanded fire danger analysis (surface, satellite, research).
- Expand use of Unmanned Aerial Vehicles/Systems (UAV/UAS) for fire perimeter monitoring and mapping, air quality and meteorological parameters, fire behavior, fire effects.
- Attach sensors on fixed-wing aircraft to support IMET and spot forecasts.
- Replace and/or redesign existing observation platforms (e.g., replace surface-based observation with satellite or models).
- Explore applications of Aeronet (NASA network).
- Increase use of space-based weather, climate, and fire fuels information.
- Link all surface based networks in a common framework.
- Set Quality Assurance and Control (QA/QC) standards.

5. Where do inefficiencies currently exist in research and development?

Examples:

- Greater potential for partnerships
- Need for community models
- Need for improved science application or users' partnerships
- Integration of fire data into ISOS and GEOSS
- Available but un-deployed technologies
- Greater coordination of research efforts (wx, fire, remote sens)
- Better science delivery
- National infrastructure for science research

6. How can we improve science delivery?

7. Should a group of individuals having the primary focus of transitioning research into operations be formed?

8. Is there adequate funding for fire weather research and development?

FUNCTIONAL AREA #3: FORECAST PRODUCTS AND SERVICES

Background ***(index in cover letter linked here)***

The JAG/NWFWNA has identified the topic of "forecast products and services" as one of the major "functional areas" where clear requirements and standards are needed for users of fire weather information. Specific to this functional area, the JAG/NWFWNA will work to define weather and climate forecast product/services requirements and standards necessary that support sound fire management decisions for planning, preparedness, incident and prescribed fire management during wildfire, prescribed fire and wildland fire use fires (WFU). Sound fire management decisions are both tactical and strategic in nature, and specifically involve (1) proactive resource allocations, (2) adjusting daily to seasonal staffing and preparedness levels (3) managing smoke and its impact on air quality and its effect on public health and safety (4) assuring the protection of the lives of firefighters and the public, and (5) increasing public awareness. The JAG/NWFWNA will document and recommend basic requirements and standards for both forecast products and services, with special attention to differences in how forecast information is used geographically and by different user groups. Topics to be examined in this functional area include:

1) *Identify forecast elements required and desired.*
2) *Identify all current operational forecast products and services used to support needs related to fire weather.*
3) *Assess who uses products and services and why they need it.*
4) *Are there critical values used in the decision process?*

5) *Present examples of experimental and/or research products and identify how user need may be met with the transition of the research product into operations.*
6) *Identify opportunities for increased coordination and collaboration (e.g., coordination calls, operating plans) to improve products and services.*

1. What current forecast products and services do you use in your job? [*Note: need to alphabetize by group; could use a matrix/table here?]*

A. NOAA National Weather Service

- The daily fire weather forecast in either text or tabular format
  Elements:
  1) Introductory Discussion and Headlines
  2) Temperature (using forecast ranges and/or trends)
  3) Relative humidity (using forecast ranges and/or trends)
  4) 20-foot wind speed and direction (specified by topography [upcanyon and downcanyon] and time)
  5) Sky condition and state of the weather
  6) Chance of wetting rain (including precipitation duration)
  7) Haines Index
  8) Lightning Activity Level (LAL)
  9) Mixing heights (some offices)
  10) Transport winds (some offices)
  11) Special smoke parameters (limited locations)
    a. Davis Stability Class
    b. Inversion locations
    c. Ventilation Rates, Dispersion Index values, Stagnation Indicies
  12) Extended Forecast
- The National Fire Danger Rating System (NFDRS) daily point or trend forecasts
- Red Flag Warnings and/or Fire Weather Watches
  Elements:
  1) Headline
  2) Discussion
- Site Specific (Spot) Forecasts (requirements as directed for wildfire)
  Elements:
  1) Headline
  2) Discussion
  3) Three periods of:
    a. Sky/Weather
    b. Temperature
    c. Humidity
    d. Wind
    e. Optional elements requested by the user

  FARSITE data input files (from forecaster grids)
- Site Specific Spot Forecasts (other than wildfire)
  FARSITE data input files (from forecaster grids)
- Land Management Forecast (format locally established)
- Smoke Management Forecast (format locally established)
- Rangeland/Grassland Fire Danger Statement (format locally established)

- Storm Prediction Center Fire Weather Outlooks
  Elements:
  1) Text Product
    a. Headlines
    b. Synopsis of large scale weather conditions
    c. Discussion of individual critical fire weather areas
    d. Discussion of marginally critically fire weather areas
  2) Graphic

a. A map outlining critical fire weather areas
b. Rarely, outlines of extremely critical fire weather areas

- Incident Meteorology Services (IMETs)
- Weather Forecast Office (WFO) products (non-standardized)
  1) Point Forecast Matrices (PFM's)
  2) Weather Planner products for prescribed fire
  3) Haines, mixing height, transport wind graphics (experimental)
  4) Local fire weather/fire danger products
- Consultations and briefings
- National, centrally produced products.
  Examples:
  1) All Climate Prediction Center (CPC) outlooks and forecasts
     a. Medium range forecasts (days 3-7 and 8-14)
     b. Monthly forecasts
     b. Seasonal forecasts
     d. CPC long range assessment tools off CPC's website
  2) All Climate Diagnostics Center (CDC) products
  3) Drought monitor graphics and text
  4) National Center for Environmental Prediction (NCEP) products
- Regional and National Climate Centers
- Office of Science ant Technology (OST) smoke modeling (experimental)
  Air Resources Laboratory (ARL)
- National Center for Atmospheric Research (NCAR) (experimental)
  1) WRF-Fire
  2) WRF-Chem
- Other

B. Predictive Services

- Daily, 7-day, Weekly, Significant Fire Potential (Geographic Area product)
  (Product due to be implemented nationally for 2006 fire season)
  Elements:
  1) Graphic
     a. Broken down into Predictive Service Areas (PSA's)
     b. Fuel dryness categories (moist, dry or very dry)
     c. Significant weather triggers (wind, dry lightning, hot and dry)
  2) Text Product
     a. Weather synopsis
     b. Fire potential discussion
- Monthly National Wildland Fire Outlook (Geographic Area and National products)
  Elements:
  1) Graphic
     a. A map indicating areas of below, normal and above normal fire potential
  2) Text Product
     a. Summary of fire potential
     b. Long-range temperature outlook
     c. Long-range precipitation outlook
     d. Fuels/Fire Danger outlook
     e. Prescribed fire implications
     f. Miscellaneous statements on fire history and fire potential
- Seasonal National Wildland Fire Outlook (Geographic Area and National products)
  1) Graphic
     a. A map indicating areas of below, normal and above normal fire potential
  2) Text Product
     a. Summary of fire potential

b. Long-range temperature and precipitation outlook
c. Fuels/Fire Danger outlook
e. Resource implications
f. Miscellaneous statements on fire history and fire potential

- Incident Meteorology Services (IMETs)
- Consultations and briefings
- Other

C. Private Weather Services

Examples:

- Accuweather
- BARONS Services
- The Weather Channel
- Other

D. Research and University

Examples:

- Desert Research Institute (DRI)
    - Energy Release Component outlooks
    - Long range forecasts
    - Climatology data
- MAPSS
- Scripps Institute of Oceanography
- IRI
- Fire Consortia for Advanced Modeling of Meteorology and Smoke (FCAMMS)
    - Smoke emissions
    - Smoke dispersion and air quality impacts
        - BlueSky
        - Daysmoke
        - SHRMS 4S
    - Fire indexes based on gridded weather
        - Haines
        - Fosberg
    - Gridded fire weather products
        - Fire danger and potential
        - Fire behavior data sets
            - FARSITE input
            - BEHAVE input
    - Remote Sensing
        - Real-time smoke emissions
        - Near real-time fuels condition
    - Seasonal Fire Forecasts
        - Fire danger/potential
        - Prescribed burning tools (like weather planner)
- Other

E. State Meteorologists

Examples:

- State "Red Flag Alerts" (Florida)
- State Fire Weather Oultooks (Florida, South Dakota)
- Smoke management forecasts (Washington, Oregon, Florida, Georgia)
- Incident Meteorology Services (Florida, South Dakota)

- Spot forecasts (California, Georgia, Florida)
- Other

F. Other Federal Products or Services

Examples:
- Department of Defense
- EPA
- Other

2. For what purpose do you use the forecast and/or service?

Examples:

A. Daily pre-suppression, preparedness and staffing levels
- For calculating National Fire Danger Rating System (NFDRS) index values
- Managing access to public lands
- Setting staff levels
- Setting preparedness levels
- Go/No-go decisions on prescribed fires
- Pre-positioning of local, regional and national firefighting resources
- To plan initial attack, suppression response, and rehabilitation activities
- Other

B. Tactical fire management
- Input into operational forecasts of fire behavior
- Fire fighter safety
- Suppression tactics and placement of resources
- Aircraft operations
- Input into Incident Action Plans
- Smoke dispersion
- Other

C. Strategic fire management
- Assessing fire potential on weekly, monthly and seasonal timeframes
- Long-term project management, such as input into RERAP for Wildland Fire Use
- project plans
- Congressional briefings
- Other

D. Other (Fire Behavior specialists)
- To produce short term fire behavior forecasts for ongoing fires (Behave and FARSITE software)
- To research historical fires for publication purposes and for investigations (Behave and FARSITE software)
- To produce long term fire behavior potential and fire spread potential for ongoing fires (Behave, FARSITE and Rerap software)
- For fire planning purposes such as the Fire Program Analysis (FPA) PM module and HA module)
- For strategic fire planning both short term and long term. (The "what if" situations) (FARSITE and FLAMMAP software)
- Other

3. What opportunities exist for future improvements?

Examples:
- Utilizing digital forecast database information to display fire weather forecast fields.

- Expand use of GIS capabilities to depict forecasts, resource capability and fire data information.
- A clear and comprehensive set of forecast element requirements for both strategic and tactical fire management.
- A clear depiction of the levels of fire weather forecast and Predictive Service users and an understanding of the unique needs of local, regional and national users.
- Baseline performance evaluations for critical fire weather/Predictive Services forecast elements and a reasonable improvement plan along with corresponding operational impacts.
- Gridded forecasting verification schemes to establish current forecast accuracy.
- Greater collaboration on products and services
- Increased use of space-based weather, climate, and fire fuels information in the forecast process.
- Establishing a national fire weather operating plan based on agency requirements and forecasting standards.
- Defining the national needs and responsibilities of air quality forecasting and smoke management.
- Other

4. Where do inefficiencies currently exist?

Examples:

- Confusing product terminology (Red Flag Alerts, Fire "Potential", Different types of Weather Planners etc…)
- Agency requirements and associated actions taken based on forecasts are not clearly understood.
- Verifications schemes not understood and inconsistent.
- Fuels information into Red Flag program not coordinated and/or understood in some many areas.
- Other

5. Are there Agency policies in place requiring the use of certain forecast products? What are they?

6. In regards to the forecasts you use:

6a. Are the forecasts sufficient for your needs or do you require an edited or altered product it?
6b. Are the forecasts accessible in a timely manner?
6c. Are the forecasts reliable and of high quality?
6d. If you do not utilize it, would you like to but don't have access?
6e. Were you simply not aware of the forecast or service?
6f. What would you identify as your current, highest priority need with regard to this forecast product and service?

7. Are there any issues related to forecast products and services which have been identified in the past but still have not been acted upon?

8. Is your agency capable of or prepared to receive large amounts of information (e.g., grids)?

9. What makes a product "official?"

10. In relation to decision making:

10a. Do you need to receive certain products at a designated time?
10b. Do you get the forecast and/or product in time?
10c. How much weight is applied to the information given the decision?
10d. What is acceptable uncertainty in the forecast or information?

FUNCTIONAL AREA #4: MODELING, PREDICTION, AND DATA ASSIMILATION

Background ***(index in cover letter linked here)***

The JAG has identified the topic of "Modeling, Prediction, and Data Assimilation" as a major "functional area" where clear requirements and needs assessments are needed. Modeling, Prediction, and Data Assimilation refers to the numerical tools and data needed to produce fire/atmosphere prediction-related products. This functional area focuses on numerical tools related to fire weather, fire danger, smoke behavior, and fire behavior with associated techniques for data assimilation and display. Specific to this functional area, the JAG will work to document and recommend requirements and needs (knowledge gaps) for the wildland fire/atmospheric interface including the following topical areas: (1) fire weather data, (2) real-time fire planning, mitigation, and suppression, (3) fair danger and behavior, (4) air quality and smoke behavior, and (4) climate variability implications for fire severity. The JAG will define general research knowledge gaps and identify areas of likely research partnership. Additionally, the JAG will endeavor to provide general guidance on the time and resources that will be needed to fill these gaps. Topics to be examined in this functional area include:

1) *Identify current modeling platforms, prediction products, data ingestion needs, and data assimilation techniques.*
2) *Assess knowledge gaps.*
3) *Seek to understand the spectrum of users' needs and requirements.*
4) *Specify existing and potential capabilities in the federal sector.*
5) *Recommend potential partnerships.*

1. What current modeling tools, prediction products, and data assimilation techniques do you use for fire weather and climate?

Examples:

- Smoke emissions and transport
- Plume dynamics
- Fire danger
- Fire behavior
- Fire season outlook and severity
- Fuels state and condition
- Climate variability and fire ecology

2. For what purpose do you use these models, products, and techniques?

Examples:

- For calculating the National Fire Danger Rating System (NFDRS)
- To refine operational forecasts of fire behavior
- To verify fire weather forecasts
- For air quality decision-making
- To allow Incident Commanders to make staffing decisions
- To assess current levels of preparedness
- To determine fire potential (e.g., red flag warnings)
- To plan initial attack, suppression response, and rehabilitation activities
- For litigation purposes after the fact
- As refinements to operational weather and fire prediction models
- To produce short term fire behavior forecasts for ongoing fires (Behave and FARSITE software)
- To research historical fires for publication purposes and for investigations (Behave and FARSITE software)
- To produce long term fire behavior potential and fire spread potential for ongoing fires (Behave, FARSITE and Rerap software)
- For fire planning purposes such as the Fire Program Analysis (FPA) PM module and HA module)
- For strategic fire planning both short term and long term. (The "what if" situations) (FARSITE and FLAMMAP software)

3. What opportunities exist for deployment of improved modeling techniques and prediction products?

Examples:

- Provide improved and readily-accessible fire weather databases for model simulations

- Provide adequate databases for evaluation and potential improvements of modeling tools
- Expand use of data assimilation techniques in modeling tools
- Utilize the combined capabilities of existing dispersion/chemical modeling tools, including (but not limited) to those from USDA-FS, NOAA, EPA, and NCAR
- Utilize the data collected from Unmanned Aerial Vehicles/Systems (UAV/UAS) for fire perimeter mapping and air quality and meteorological parameters.
- Replace and/or redesign existing observation platforms (e.g., replace surface-based observation with satellite or models).
- Explore applications of Aeronet (NASA network).
- Increase use of space-based weather, climate, and fire fuels information.
- Link all surface based networks in a common framework.

4. Where do inefficiencies currently exist?

Examples:

- Potential for partnerships and leveraging of similar model prediction efforts
- Need for community models
- Need for improved science application or users' partnerships
- Integration of fire data into ISOS and GEOSS

5. Based on the existing suite of operational model algorithms, prediction products, and data assimilations:

5a. Is the product (application, model, etc.) sufficient for your needs or do you require more of it?
5b. Is the tool accessible?
5c. Is the tool reliable and of high quality?
5d. What deficiencies, inefficiencies, and future opportunities do you perceive with regard to this tool/application/knowledge gap (refer to lists in #5 within this section)

6. What would you identify as your current, highest priority need with regard to this functional area?

7. Are there any issues related to this functional area which have been identified in the past but still have not been acted upon?

8. For data assimilation:

8a. What mechanisms for cross-organization collaboration and coordination are currently used by your organization in the area of data assimilation for atmospheric and climate system prediction?
8b. What are their strengths and limitations?
8c. How would you suggest improving them? Please include both operational and R&D collaborations.
8d. Does your office have enough modeling and data assimilation expertise?

Please answer the next questions 9 and 10a-c if you are not in the federal sector:

9. Specify capabilities related to use and value of operational versus experimental versus research model products.

10. What are the requirements for:

10a. model development?
10b. operational running of models?
10c. use of model output?

FUNCTIONAL AREA #5: INFORMATION DISSEMINATION AND TECHNOLOGIES

Background ***(index in cover letter linked here)***

The JAG/NWFWNA has identified the topic of "information dissemination and technologies" as one of the major "functional areas" where clear requirements and standards are needed for users of fire weather information. Specific to

this functional area, the JAG/NWFWNA will work to define requirements and standards for the dissemination of information and related technologies necessary to support sound fire management decisions for planning, preparedness, incident and prescribed fire management during wildfire, prescribed fire and wildland fire use fires (WFU). Sound fire management decisions are both tactical and strategic in nature, and specifically involve (1) proactive resource allocations, (2) adjusting daily to seasonal staffing and preparedness levels (3) managing smoke and its impact on air quality and its effect on public health and safety (4) assuring the protection of the lives of firefighters and the public, and (5) increasing public awareness. The JAG/NWFWNA will document and recommend basic requirements and standards for information dissemination and related technologies. This will support the need for a process to transition current and future technologies to operational status in a timely and organized manner. Areas of further investigation into improving the collaboration of efforts with respect to the development of technologies will also be discovered and highlighted. Topics to be examined in this functional area include:

1) *Identify dissemination elements required and desired.*
2) *Identify all current information dissemination technologies used to support needs related to fire weather, and denote which technologies are currently operational.*
3) *Assess who uses each of the current technologies and why they need it .*
4) *Identify opportunities for improvement in how information is disseminated and technologies are developed.*
5) *Specify examples of experimental technologies and identify how user needs may be met with the transition of the experimental into operations.*
6) *Identify opportunities for increased coordination and collaboration (e.g. partnerships) to improve technology development.*

1. What are the current Information Dissemination Technologies you use in your job?

A. Operational

- ROMAN
- AWIPS, NAWIPS
- FX-Net (gridded and raster)
- ArcGIS (including ArcMap)
- WFAS
- FireFamily Plus
- Behave
- Farsite
- RERAP
- Internet websites (including Famweb)
- WIMS/ASCADS/KCFast/NIFMID/WFMI/DAPS
- Cheetah
- FlamMap
- Multi-channel radio
- Cell phone
- Satellite comms
- GOES
- COTS such as Fire Weather Plus
- Climate Centers (i.e. NCDC, Regional Climate Centers)

(sub-categorize these lists, methods, systems and products?)

B. Non-Operational / Experimental

- FCAMMS websites
- FSPro
- Experimental internet websites
- University enterprise systems
- Hand-held display devices (i.e. PDAs, GPS, Wireless, WiFi)
- Google Earth
- Wildland Fire AMR website for WFSAs and WFIPs

- COTS

2. What opportunities exist for future improvements?

Examples:

- A clear and comprehensive method for technology transfer from research to operations.
- Expand the use of alternative communications systems to convey weather and other information between dispatch offices and fire fighters in the field. (i.e., reduce the reliance on voice radio and acquire systems to transmit and receive alpha-numeric weather products, graphic products and imagery, to and from field sites.)
- Partnerships of organizations to develop technology for weather information acquisition, display, and dissemination at all levels supporting land and fire management, and fire fighting.
- Public notification of fire danger, warnings, EAS etc.
- Expand use of GIS capabilities to depict forecasts, resource capability, and fire data information. Coordinated interagency plans for the provision of GIS data.
- Provision of gridded observations/forecast data to remote sites.
- Collaboration of organizations to assist in science delivery (i.e. BlueSky RAINS)
- Collaboration of organizations to increase access to, use, and limit duplication of current and future fire weather/fire potential products and databases.
- Enhance current voice radio communication systems with technologies similar to
- "packet radio" to transmit and receive digitized information using a radio signal.
- Acquire currently available systems that are compatible with currently utilized communications (i.e., military, law enforcement, fire service and other tactical communications). Where possible, upgrade or enhance current communications to
- Increase compatibility with these tactical communications mechanisms.
- Other:_____

3. Where do deficiencies, inefficiencies, and insufficiencies currently exist?

Examples:

- There is a lack of adequate backup to the GOES system (see Shelley powerpoint slides).
- There are multiple discrepancies of data, metadata, data identifiers throughout the 5-6 systems regularly used by the wildland fire community and the National Weather Service for obtaining RAWS data.
- Need to improve methods for technology transfer from research to operations.
- No comprehensive method to assess the validity of data.
- Degree of uncertainty of product accuracy
- Other:_____

4. Are the end users getting what they need?

5. What transmission techniques are being used and what backup technologies can be used if this becomes unavailable?

6. Is more detailed/resolution data important or is more timely data important?

7. How would GIS based weather information help users?

8. Could information about the data help you tailor your forecast or improve the data collection process?

9. Are the Land Management Agency users getting the correct message and do they understand exactly how to react?

10. Is the public getting the correct message and do they understand exactly how to react?

11. Are the technologies provided sufficient for your needs?

12. Are the technologies accessible to you in a timely manner?

13. Are the technologies reliable and of high quality?
13a. Is additional QA/QC needed?

14. Do you know of current information technologies, or planned technologies that you want to see investigated, developed, or acquired that you believe may improve weather information dissemination?

FUNCTIONAL AREA #6: EDUCATION, TRAINING, OUTREACH, PARTNERING AND COLLABORATION

Background ***(index in cover letter linked here)***
The JAG has identified the topic of "education, training, outreach, partnering and collaboration" as one of the major "functional areas" where clear requirements and standards are needed for users of fire weather information. Specific to this functional area, the JAG will work to define education, training, outreach, partnering and collaboration necessary that support sound land management decisions during wildfire, prescribed fire and wildland fire use fires (WFU). The purpose of this survey questionnaire is to elicit from subject matter experts and users (1) the type of wildland fire education, training, outreach, partnering, and collaboration which currently exists, (2) where are the gaps in these areas, and (3) how can we better educate and reach out to wildland fire professionals as well as the public and others who use wildland fire information. Topics to be examined in this functional area include:

1) *Identify all current education, training, outreach, partnering and collaboration processes, including the intended audiences and purposes.*
2) *Assess who uses and conducts education, training, outreach, partnering and collaboration. Then identify why and how they employ such fire weather related topics and activities to support wildland fire programs.*
3) *Present examples of education, training, outreach, partnering and collaboration and identify how user need may be met with the transition of the research product into operations.*
4) *Identify opportunities for increased education, training, outreach, partnering and collaboration to improve products and services.*

I. Outreach to Product Users

1. Who are the primary users of wildland fire weather and climate products, services, and information? For example, who is the target audience?

2. How is information about wildland fire weather and climate products, services, and information communicated to the target audience (e.g., TV, the web, radio, etc)?
2a. Is there a need to improve how we communicate this information?
2b. If so, what should we do to improve how we communicate with the target audience?

3. Are users/the target audience fully aware of the different wildland fire weather and climate products, services, and information?
3a. If not, why?
3b. What can we do to educate the target audience about the fact that there are wildland fire weather and climate products, services, and information available for their use?
3c. Please give some examples of the wildland fire weather and climate products, services, and information of which the target audience is not fully aware?
3d. What are the potential barriers to communicating with the target audience?
3e. How can we address these barriers?

4. What are some success stories about how people, organizations, and/or the media are using wildland fire weather and climate products, services, and information?
4a. Are there lessons learned from these success stories?
4b. How are these lessons communicated to other users?
4c. How are these lessons replicated in other user communities?
4d. How are these lessons communicated to those developing the wildland fire weather and climate products, services, and information?

5. What are some unsuccessful stories about how people, organizations, and/or the media misused or did not use available wildland fire weather and climate products, services, and information?
5a. Are there lessons learned from these stories?
5b. How are these lessons communicated to other users?
5c. How are these lessons replicated in other user communities?
5d. How are these lessons communicated to those developing the wildland fire weather and climate products, services, and information?

6. Are these users not using wildland fire weather and climate products, services, and information appropriately (as intended)?
6a. If so, please give at least five examples
6b. How is this misuse being addressed? For example, are wildland fire weather or climate products, services, or information being scrapped in favor of some other product/service or information?
6c. Are people incorrectly drawing conclusions or making incorrect inferences from a wildland fire weather or climate product, service, or information?

7. Are there lessons learned from this type of use?
7a. How are these lessons communicated to other users?
7b. How (if at all) are these lessons being replicated in other user communities?

8. What new wildland fire weather and climate products, services, and information are needed to assist the target audience in responding to wildland fire situations?

9. Is the need for wildland fire weather and climate products, services, and information being addressed?
9a. If the need is being addressed (e.g., people are working on it), who is addressing this need?
9b. If the need is not being addressed, why do you think it is not being addressed?
9c. If the need is not being addressed, who or what organization should address this need?
9d. Who is the target audience for these products, services, and information?
9e. How will the target audience be informed when the wildland fire weather and climate product, service, or information need is addressed?

10. What types of outreach/educational programs which incorporate weather and climate information are available to provide assistance to people and/or communities, in reviewing options, or providing support after a fire disaster? These programs could be federal, state, local, or organizational (e.g., Red Cross).

II. Continuing Education

1. What training programs require weather and climate information?

2. Who is the target audience for this type of training?

3. Is that target audience being reached?

4. What are the barriers for reaching the target audience?
4a. How can these barriers be overcome?

5. What were the five most significant fire weather- and climate-related lessons learned from the past 3 wildland fire weather seasons?

6. Who (people/groups) do you think could benefit from knowing about these lessons?

7. How are these lessons communicated to those people/groups?
7a. Is that communication adequate?
7b. If so, please list five ways in which the communication is working

7c. If the communication is inadequate (or needs improving), list five ways in which the communication is inadequate.
7d. What are the potential barriers to communicating with the target audience?

8. Based on wildland fire weather and climate information, observations, and research, are there new findings which should be communicated to the wildland fire community and subject matter experts?

9. Is that communication adequate?
9a. If so, please list five ways in which the communication is working
9b. If the communication is inadequate (or needs improving), list five ways in which the communication is inadequate.
9c. What are the potential barriers to communicating with the target audience?

10. How are subject matter experts informed that there are continuing wildland fire weather and climate education opportunities available (e.g., what dissemination methods are used, TV, radio, publications, word-of-mouth, etc)?

11. Should there be improvements in the method for informing subject matter experts about the availability of wildland fire weather and climate continuing education?
11a. If so, please give at least three examples of how the dissemination method can be improved.

12. When people are taking training as it relates to wildland fire weather and climate, what methods are used (classroom, web-based, etc.)?

Examples:
- Television
- Web-based
- PDAs
- Pamphlets
- Classroom
- Conferences
- Lectures to organizations

13. Once people are trained in weather and climate as it relates to wildland fires, do they have an opportunity to use that training?
13a. How is that training incorporated into their activities?
13b. Is the training adequately reinforced by incorporating that training into their activities?
13c. Are there opportunities to better reinforce training by incorporating that training into activities? What are these opportunities?

III. Formal Education

1. Are there some weather- and climate-related disciplines or courses which should be part of the curriculum for wildland/urban interface firefighters and first responders? For example, based on information, observations, and research, are there new findings which should be incorporated into coursework?
1a. What are those findings and what disciplines /courses are affected by those findings?

2. In your opinion, are universities are doing enough to educate students in weather and climate as it relates to wildland fire management discipline or related fields?

3. With respect to weather and climate expertise as it relate to wildland fires, is there a subject matter expert pipeline issue?
3a. If yes, what specifically is the issue?
3b. If yes, list five ways to address the issue.

4. Are there enough students entering the wildland fire management field or related fields who will acquire an expertise in wildland fire weather and climate?

IV. Collaboration

Collaboration means working together for a greater purpose. It means finding common ground with individuals, groups, and organizations to work toward a common vision. It does not necessarily mean harmony or complete agreement with someone, but it does mean having a working relationship where shared interests are served through the processes of dialogue and cooperation. Please use the aforementioned definition as a guide in responding to the questions below.

1. Who are your primary collaborators in using fire weather and climate products (e.g., with whom do you work to achieve a goal which you would not have otherwise achieved). Please list (a) the collaborators, (b) describe the nature of that collaboration, and (c) describe the expected outcome.

Collaboration 1:
Collaboration 2:
Collaboration 3:
Collaboration 4:

2. Could you provide some success stories about your collaboration activities as they relate to wildland fire weather and climate?

3. Are there lessons learned from these success stories?
3a. How are these lessons communicated to others?
3b. How are these lessons replicated in other situations?
3c. How are these lessons communicated to those who are developing wildland fire weather products, services, and information?

4. Could you provide some unsuccessful stories about collaboration activities with respect to wildland fire weather and climate endeavors? For example, were there some expected outcomes from the collaboration which were not achieved or not achieved to the degree expected?

5. Are there lessons learned from these less than optimal collaboration efforts?
5a. How are these lessons communicated to others?
5b. How are these lessons communicated to those who are developing/using wildland fire weather and climate products, services, and information?
5c. How are the lessons (of less than optimal collaboration) being addressed?
5d. Is the collaboration getting better?
5e. If yes, what happened to make it better?

6. What opportunities for collaboration (with respect to wildland fire weather and climate endeavors) exist but are not being realized?
6a. What are the reasons for this unrealized collaboration?
6b. How is this missed opportunity for collaboration being communicated to users and developers of wildland fire weather and climate products, services, and information?
6c. How can this missed opportunity for collaboration be addressed?

V. Partnering

Partnering is working together on a task of common interest. Please use this definition as a guide in responding to the questions below.

1. Who are your primary partners in using fire weather products (e.g., with whom do you work because the task is a common interest?). Please list (a) the partners, (b) describe the nature of the task, and (c) describe the common interest.

Partnership 1:
Partnership 2:
Partnership 3:
Partnership 4:

2. Could you provide some success stories about your partnering activities as they relate to fire weather and climate products, services, and information?

3. Are there lessons learned from these success stories?
3a. How are these lessons communicated to others?
3b. How are these lessons replicated in other situations?
3c. How are these lessons communicated to those who are developing wildland fire weather products, services, and information?

4. Could you provide some unsuccessful stories about partnering activities as they relate to wildland fire weather and climate products, services, and information? For example, were there some tasks from the partnering which were not achieved or not achieved to the degree expected?

5. Are there lessons learned from these less than optimal partnering efforts?
5a. How are these lessons communicated to others?
5b. How are these lessons communicated to those who are developing/using wildland fire weather and climate products, services, and information?
5c. How are the lessons (of less than optimal partnering) being addressed? Is the partnering getting better? What happened to make it better?

6. What opportunities (relative to wildland fire weather and climate products, services, and information) for partnering exist but are not being realized?
6a. What are the reasons for this unrealized partnership?
6b. How is this missed opportunity for partnering being communicated to users and developers of wildland fire weather products, services, and information?
6c. How can this missed partnering opportunity be addressed?

VI. General Questions

1. What would you identify as your current, highest priority need with regard to training and/or outreach?

2. Are there any issues related to training and/or outreach which have been identified in the past but still have not been acted upon?

3. Are there specific questions your agency would like to see addressed?

FUNCTIONAL AREA #7: USER RESPONSE, DECISION SUPPORT, AND RESULTING USER IMPACTS

Background ***(index in cover letter linked here)***
The JAG has identified the topic of "user response, decision support, and resulting user impacts" as a major "functional area" where clear requirements and needs assessments are needed. User response, decision support, and resulting user impacts refers to the importance of fire/atmosphere prediction-related products as used by the fire management community. This functional area focuses on short, medium, and long term decisions and the timeliness, understandability, accuracy, and spatial coverage of the forecast products. Specific to this functional area, the JAG will work to define requirements and needs (knowledge and product gaps) for the wildland fire/atmospheric interface including the following topical areas: (1) fire weather forecasts, (2) real-time fire planning, mitigation, and suppression, (3) fair danger and behavior, (4) air quality and smoke behavior, and (4) climate variability implications for fire severity. Topics to be explored for this functional area are as follows:

1) *Identify current decision environments in the wildland fire community.*
2) *Assess current forecast products and services designed to inform these decisions.*
3) *Seek to understand the timeliness, spatial and temporal dimensions, and accuracy needs of the management decision environment.*
4) *Seek to understand the social, political, environmental and fiscal impact of management decisions and the associated importance of timely, accurate fire weather forecast products.*

5) *Specify existing and potential capabilities in the federal sector.*
6) *Recommend potential partnerships.*
7) *Recommend potential new products to meet identified gaps.*
8) *Recommend deletion of obsolete products.*

1. What are your current user decision environments requiring fire weather products and services?

Examples:

- Initial Attack suppression operations
- Prescribed fire go/no go decisions
- Prescribed fire (including fire use) smoke impacts and related public notification
- Extended attack/major fire operations
- Organizational adjustments (moving firefighters around) based on spikes in predicted fire potential and severity (red flag)
- Fire season outlook and severity
- Air Quality Assessment and Forecast
- Opportunity for fuel treatments/WFU

2. What are the impacts of your decisions? Consider benefits of good decisions and costs of bad decisions. (consider positive and negative wording of the following bullets)

Examples:

- Fire fighter safety (fatality and injury)
- Public safety
- Operational efficiency
- Government cost avoidance
- Private sector cost avoidance
- Liability impact for bad decisions
- Safety/public health (violations of health standards)
- Cost efficiency
- Property loss
- Environmental impact
- Notice of violation and fines
- Loss of public trust
- Loss of resources (timber)
- Fuels management
- Overall economic loss (tourism etc)

3. Review accident reports and for assessments of impacts and of deficiencies in the decision products and processes.

4. Who do you go to for current fire weather-related decision support products?
List source and give confidence rating (low/medium/high) by decision environment:

Examples:

- National Weather Service
- Predictive Services
- Storm Prediction Center
- University
- FCAMM Consortium
- WWW search
- Agency meteorologist
- Agency field (on-site observer or off-site observer (lookout)
- Remote Weather Station data

- Air Quality agency weather forecaster
- Television weather forecasts
- Newspaper weather forecasts
- NOAA Weather Radio
- Private sector
- RSAC
- State Meteorologists

5. Where do inefficiencies currently exist?

Examples:

- Potential for partnerships and leveraging of similar model prediction efforts
- Need for training on applying forecast information to decisions
- Need for improved science application or users' partnerships
- Lack of clear requirements, standards and policy
- Interagency cooperation in technology transfer
- Better implementation of life-cycle management of systems and equipment
- Lack of reasonable control for IT management
- Cross agency interoperability and turf issues in systems management
- Cross agency coordination of research activities

6. Based on the decision environment fire managers must be successful in:

6a. Are the forecast products sufficient for your needs or do you require something different?
6b. Are the decision tools accessible?
6c. Are the tools reliable and of high quality?
6d. What deficiencies, inefficiencies, and future opportunities do you perceive with regard to this tool/application/knowledge gap (refer to lists within this section)?
6e. What would you identify as your current, highest priority need with regard to User response, decision support, and resulting decision impact?
6f. Are there any issues related to this functional area which have been identified in the past but still have not been acted upon?

7. What are the opportunities for improved technology transfer and improved prediction products?

8. What kinds of decisions would benefit from better forecast products?

9. Would improved accuracy improve the decision? How?

10. Would improved spatial resolution improve the decision? How?

11. Would improved temporal resolution improve the decision? How?

12. Describe situations when bad outcomes happened after a decision was made.
12a. Would improved weather forecast products have made a difference?

FUNCTIONAL AREA #8: FUNDING AND HUMAN RESOURCES (CROSS-CUTTING)

Background ***(index in cover letter linked here)***

The JAG/NWFWNA has identified the topic of "funding and human resource considerations" as one of the major "functional areas" where clear requirements and needs assessments are desired. This is a crosscutting area relating to wildland fire. Specific to this functional area, the JAG/NWFWNA will work to document and recommend funding and human resource requirements and needs to support all the other functional areas covered in the assessment. For purposes of this area, the funding and human resource considerations are only those in the assessments' functional areas that are related to providing weather and climate needs of providers and users in their wildland fire, air quality, and fuels management activities. Topics to be explored for this functional area are as follows:

1) *Identify staffing needs to include numbers of employees, job series, skills, etc.*
2) *Identify equipment needs.*
3) *Identify funding requirements.*
4) *Identify additional capabilities or enhancements for wildland fire operations and readiness.*

Identify opportunities for funding and human resource improvements.

1. As related to the wildland fire weather "system," what does your agency see as best practices for funding or personnel use?

Examples:

- Use of trained IMETS .
- NWCG
- Farsite through FSPRO
- Predictive services
- Efficient use of limited resources
- Partnerships
- PPBES
- Demonstrating shared goals between agencies in the budget process
- Cooperative product development teams (drought monitor, CDC collaboration)

2. What are the operational deficiencies or needs, in terms of data, products, services, or research, that need to be addressed?

Examples:

- Higher suppression costs.
- Workforce reductions.
- Larger fires.
- Lack of on-site fire weather information on some fires when IMETS aren't present? (action Mary)
- Need for improved smoke management/air quality support.
- Availability of SMEs and personnel turnovers.
- Lack of back-up capabilities
- Lack of IT support dedicated to fire weather applications

3. Are there opportunities for future improvements? If so, please describe.

Examples:

- Identification and funding of fire weather programs through the budget process.
    - Separate agency line items for fire weather programs.
- Interagency initiatives.
- Engage in the CENR and USGEO

4. For the current level of operations and readiness,

4a. What are the staffing levels that currently exist, to include numbers of employees (full-time, part-time, intermittent, seasonal), job series, skills, etc?

4b. What are the staffing costs?

4c. What equipment is used?

4d. What is the value of the equipment?

4e. What are the operating, maintenance and replacement costs of the equipment?

5. For additional capabilities or enhancements which are considered to be necessary or desirable for wildland fire operations and readiness,

5a. Provide a description of the additional capability or enhancement.

5b. What are the additional staffing levels that are needed, to include numbers of employees (full-time, part-time, intermittent, seasonal), job series, skills, etc?

5c. What are the additional staffing costs?

5d. What additional equipment is needed?
5e. What would be the cost of the additional equipment?
5f. What would be the operating and maintenance costs of the additional equipment?
5g. What are the impacts if these are unfunded?
5h. What are their priorities?

6. Describe any opportunities for human resource, equipment, and funding improvements.

FUNCTIONAL AREA #9: SOCIOECONOMIC IMPACTS

(index in cover letter linked here)

1. What changes are needed in land use planning, building codes or zoning to mitigate wildland fire dangers and losses?

2. Are evacuation processes effective and efficient?

3. Are communication networks in place to warn residents and businesses about wildland fires?

4. Is more attention needed to provide warnings to tourists, campers, and other visitors to areas vulnerable to wildland fires?

5. What changes are needed in federal, state or local policies or programs that contribute to wildland fire safety?

6. What measures are needed to mitigate environmental impacts and or to protect endangered species from wildland fires?