Carol M. Ciliberti

"Knowledge, Skills and Abilities" Narrative

1. Knowledge of meteorology and climatology

I earned B.S and M.S. degrees in Meteorology from the University of Utah and have completed most of the requirements for a doctorate. My background is strong in math and science, including calculus, differential equations, computer programming, chemistry and physics in addition to an extensive meteorology curriculum. My meteorology class work covered aspects of climatology, including local climate issues and global climate change. A synoptic meteorology class provided me with a basic knowledge of weather forecasting procedures and methodology, and familiarization with a variety of weather products including both large-scale and mesoscale numerical model configuration and output. My classes in dynamic meteorology, radiation, cloud physics and mesoscale meteorology provided me with an excellent basis in atmospheric theory. A series of classes in numerical methods taught me numerical prediction methodology, and helped me develop understanding of how numerical weather prediction models and analysis systems work.

The meteorology department at the University of Utah is relatively small, enabling me to have a high quality personal interaction with my professors. This personal interaction was a valuable part of my learning process. I also earned a research assistantship as an undergraduate, which provided good initial experience in meteorological research. Class work at the University helped me develop a practical and methodical approach to problem solving. This has aided me in research and weather forecasting work, and in avalanche hazard assessment.

My practical experience includes mountain weather forecasting for the Utah Avalanche Center and forecasting for field research experiments. The latter involved providing hand-drawn precipitation forecasts, and presenting detailed weather briefings to the attendant group of scientists. In some cases I prepared specialized forecasts, such as surface wind speeds in localized areas.

2. Skill in providing and monitoring fire weather products/services

The core of my ongoing work at the Utah Avalanche Center involves monitoring mountain weather conditions, snowpack stability, and avalanche activity within our forecast area. This is accomplished by making observations of current and recent weather activity in the field, examining snowpack structure and evaluating snowpack stability. I gather information from a number of disparate sources including: field observations, remote surface weather station data, avalanche and mountain weather information from the ski resort snow safety teams and the state avalanche workers, and reports from contracted avalanche observers in areas outside the ski resorts. This diverse data set enables me to monitor weather conditions and avalanche hazard in the mountains. We also keep careful records of all incoming data so that a progression of weather events, and the resulting avalanche activity, can be clearly seen.

An important part of my job is compiling and processing the vast amount of information available in order to prepare concise and informative products. This is done under strict time constraints. These products include written mountain weather forecasts and avalanche advisories, available on several internet web sites. We also create a number of recorded avalanche advisories to be accessed by telephone, and perform two live radio broadcasts daily.

The skills applied in monitoring mountain weather and snowpack conditions for avalanche advisories would readily be translated to monitoring and providing fire weather products and services.

3. Ability to plan, organize and direct weather processing systems, fire weather station networks, fire danger rating systems and other weather/data systems

I currently maintain an extensive network of operational weather products related to the Utah Advanced Regional Prediction System (ARPS) Data Assimilation System (ADAS). I worked with a small team of researchers to implement the analysis system over regions of complex terrain. I wrote computer programs to interface local data sets with the analysis system. I developed a technique to improve local data assimilation over regions of sharp terrain gradients. I put together c-shell scripts that run several versions of the Utah ADAS on a near-real time basis, with operational

products available on the internet at hourly and 15 minute intervals. I am currently involved in training other research group members in the maintenance of our operational products.

I organized efforts to implement ADAS products on Advanced Weather Interactive Processing System (AWIPS) workstations at all forecast offices in the National Weather Service (NWS) Western Region. I worked with NWS personnel to implement an in-house version of ADAS at the NWS Western Region Headquarters. I continue to provide technical support for this project, and for the creation of training seminar materials for the forecast offices. I created a web site featuring a wide array of graphical products and information pertaining to ADAS and the analysis technique. My web site includes graphical weather products specifically designed to aid in fire weather forecasting and nowcasting. I also provide maps of several convective indices for use in rating the potential of severe convective storms, including the lifted index and convective available potential energy (CAPE).

I directed seminars demonstrating the structure of my operational scripts that run ADAS, and provided training on running and maintaining those scripts. I coordinated with the Penn State/NCAR Mesoscale Model (MM5) modeling group at the University of Utah to provide ADAS surface analyses for operational model initialization. We are currently planning to implement a 4-km ADAS analysis to initialize a high resolution MM5 forecast for Olympic weather support. We also plan to develop additional ADAS analyses for MM5 ensemble forecasts, again aimed at enhancing Olympic weather support.

An important part of the Utah ADAS is the local surface data set provided by MesoWest (a cooperative network of surface mesonets in the Western United States, maintained by the Cooperative Institute for Regional Prediction at the University of Utah). This extensive network of observations covers an area of over 2000 square meters, with station separation varying from under 1 km, to over 40 km across the western portion of North America. I work closely with MesoWest personnel on quality control and data availability issues, and have become familiar with the variety of data networks available, and the general quality and timeliness of the different networks.

I believe this experience in coordinating research efforts, and organizing an extensive system of operational weather products would prove to be useful experience when developing fire weather processing and danger-rating systems. My work with MesoWest would aid in the transition to organizing fire weather station networks, and effectively using that data.

4. Ability to communicate orally and in writing, facilitate and lead meetings, and to conduct formal presentations/weather briefings

My current positions involve a considerable amount of both oral and written communication. This experience includes the formal writing and presentation of scientific papers and the more informal presentation of weather briefings, recorded avalanche advisories, and public avalanche seminars. I have received positive feedback on my oral presentations. For example, response to my avalanche advisories includes the terms “very informative”, “straightforward”, and “includes everything you need to know”. Response to my conference presentations included the descriptions “informative and organized” and “thoroughly detailed”.

I am listed as first author on two conference papers, as co-author on two others, and as second author on a refereed journal paper currently in review. I frequently present research results at local and international conferences. These accomplishments display well-developed written and oral presentation skills. I focus on creating presentations that are informative, and appropriate to the audience and subject material.

I participated in and have helped to lead meetings for the Forest Service, and for research groups associated with the University of Utah. An example is my experience preparing and presenting weather briefings, and leading the resulting weather discussions for the The Vertical Transport and Mixing Experiment (VTMX) held in the Salt Lake Valley during October of 2000. This research group involved a diverse group of scientists from universities and research facilities around the country. Other examples include facilitating research planning meetings at the University of Utah, and directing a crew of workers for the Forest Service.

5. Ability to transfer knowledge in fire weather and climatology

Good communication skills demonstrate an ability to effectively transfer knowledge and information to others. An essential part of transferring knowledge is to first understand the subject, then to communicate clearly and effectively. I have never been satisfied with allowing technology to behave as a “black box”. I prefer to carefully examine the way a system works, whether it be a numerical model parameterization, a calculus equation, a convective index,

or a danger rating system. My belief is that an in-depth understanding of the system at hand, including a theoretical background and a practical knowledge, will enable an effective transfer of knowledge.

I believe the presentation of research material at conferences is an important means of transferring knowledge. In such a setting it is essential to construct a well-organized presentation which clearly explains and demonstrates the subject matter. I always follow up conference presentations by discussion with other researchers and scientists, feeling that such an exchange of knowledge is extremely useful.

In the case of weather briefings it is imperative to carefully research the current and forecast weather. It is equally important to understand what people in operations need to know, so that the necessary weather information can be conveyed effectively. For this reason, a fire weather forecaster should be familiar with local scale weather forecasting techniques, and be able to properly address fire management concerns. My background in fire fighting, followed by a career in research might help me to approach the transfer of fire weather information from a practical and an intellectual viewpoint.