JP2.4 SNOWBOARDS FOR NATIONAL WEATHER SERVICE SNOWFALL MEASUREMENTS

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1. INTRODUCTION

Snow has a profound effect on the national economy, with both positive and negative impacts. Heavy snowstorms can paralyze large metropolitan areas and isolate entire regions for days, affecting millions of people and resulting in the loss of lives and billions of dollars. In contrast, winter recreational activities depend on snow to generate tens of billions of dollars of revenue, and melting western-mountain snow pack is the primary source of water in many western states.

Accurate and consistent snowfall measurements are necessary for monitoring weather conditions and verifying forecasts. Snow data are used by a wide variety of users, including NWS weather and hydrology forecasters, other federal agencies, climate change researchers, water resource managers, construction engineers, plow operators, airport managers, winter resort managers, farmers, and weather risk managers.

Snowfall is one the most difficult but important weather elements to measure accurately and consistently. NWS cooperative observers are the nation's primary source for snowfall data. Given the increasing importance for the diverse applications and customers noted above, there has been a commensurate increase in the importance of accurate and consistent snowfall measurements.

Cooperative observers must be provided with the equipment necessary to take quality snowfall measurement. Basic snowfall measurement must follow three steps: 1) find a good location; 2) use good judgment; and 3) use a snowboard. Many cooperative observers can only satisfy steps one and two.

The NWS Office of Climate, Water, and Weather Services (OCWWS) understands the nations's need for accurate and consistent snowfall measurements. Within OCWWS, the Climate Services Division, formed in late 2000, sets requirements for climate observations and has led the effort to implement national use of snowboards.

OCWWS has expended significant resources towards this goal in the last several years. Cooperative observer snowfall measurement guidelines have been rewritten and clarified. In addition, a snow measurement training video has been produced in collaboration with Colorado State University and provided to each Weather Forecast Office (WFO) and to approximately 6,000 cooperative observers.

In the fall of 2002, NWS procured snowboards for distribution to cooperative observers.

2. STANDARDS FOR MEASUREMENT

The purpose of standards is to ensure that the most accurate, consistent measurements are taken and recorded at all stations. Specifically, snowboards provide a standard surface for measuring fresh snowfall. NWS observers until now, unequipped with snowboards, use non-standard surfaces for measurement such as grassy areas, heated airport terminal rooftops, picnic tables, asphalt driveways, and car roofs. Inconsistent measurement surfaces from station to station or even at the same location for different snowfalls contributes to inaccurate and incompatible snowfall measurements and an inconsistent data base for economic decision-making.

3. REQUIREMENTS

Snowboards have been identified as standard equipment for snowfall measurements through internal NWS documentation, meetings, and correspondence for years. Examples include:

- 2000: 4th Cold Region Hydrology Workshop
- 1999: NWS Western/Alaska Regions Snow Workshop
- 1998: Training Guide in Surface Weather Observations; Sec. 8.3.3, Snowboards
- 1998: NWS Eastern Region Snow Workshop
- 1997: Snowfall Measurement Guidelines for NWS Cooperative Observers, pg. 2
- 1997: Director, NWS signed memo to all RDs, MICs, and CPMs; "Adherence to Snowfall and Snow Depth Measurement Standards and Guidelines". stating that "a lack of the use of snowboards" needs corrective action
- 1989: NWS Observing Handbook No. 2 Cooperative Station Observations, pg.21

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Both internal NOAA and external climate community scientists continue to voice their support for snowboard use.

All NWS Cooperative Observers Program (COOP) and WFO snowfall reporting stations will be equipped with snowboards.

4. SNOW BOARD SPECIFICATIONS

The snowboards have the following characteristics:

a. Size: 16 by 24 inches
b. Thickness: 0.32 inches
c. Weight: 2.7 pounds
d. Material: PVC (polyvinyl chloride)
e. Color: White
f. Life expectancy: > 5 years
g. Maintenance: very low

5. SUMMARY

For the first time, the NWS is providing WFOs and cooperative observers with snowboards for use during the 2002-2003 winter season. This equipment provides a standard surface for making more accurate and consistent snowfall measurements.

5. REFERENCES

Doesken, Nolan J., A. Judson, 1996: *The Snow Booklet: A Guide to the Science, Climatology, and Measurement of Snow in the United States*. Colorado State University.

U.S. Department of Commerce, 1997: *Snow Measurement Guidelines for National Weather Service Cooperative Observers*. Silver Spring, MD.