Part 403 – Snow Survey and Water Supply Forecasting

403.0 Background

A. The Snow Survey and Water Supply Forecasting (SSWSF) Program operates within USDA. As outlined in legislative authorization, 7 CFR Part 612, the SSWSF Program—

> "…provides agricultural water users and other water management groups in the western states area with water supply forecasts to enable them to plan for efficient water management. The program also provides the public and the scientific community with a data base that can be used to accurately determine the extent of the snow resource."

B. The growing demands on the West's limited water supply and concerns about projected climate change impacts on hydrology have made the snowpack data and the water supply forecasting increasingly critical information for water managers and land managers in the West.

403.1 Program Objectives

A. Collect, analyze, interpret, display, and disseminate snowpack and water supply data and related information throughout the Western United States so people can make informed decisions regarding water use and management.

B. Provide reasonable and accurate water supply forecasts to individuals, groups of decision makers, communities, conservation districts, irrigation districts, units of State, local, Tribal, and Federal governments, and others involved in water use and management.

403.2 Scope of the Program

The SSWSF Program covers the Western United States, including Alaska, Arizona, northern California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

403.3 Authorities and Regulations

A. Soil Conservation and Domestic Allotment Act of 1935 (Public Law 74-46) (16 U.S.C. Section 590 a-g), (590q).

B. Snow Survey Authority: 26 Stat. 653; Sec. 8, Reorg. Plan No. IV of 1940, 54 Stat. 1234 (5 U.S.C. App. II); 5 FR 2421, 3 CFR Parts 1938-1943 Comp. P. 1288. Source: 40 FR 12067, Mar. 17, 1975, unless otherwise noted.

C. The Snow Survey and Water Supply Forecasting Program Rule, 7 CFR Part 612.

403.4 Roles and Responsibilities

A. National Headquarters Responsibilities

(1) Chief, NRCS.—The Chief, with line and staff assistance, provides overall strategic planning and national direction for the agency, including SSWSF Program activities.
(2) Deputy Chief for Soil Survey and Resource Assessment (DCSSRA).—The DCSSRA is the allottee for the SSWSF Program, provides program direction, and approves all program policy and budgets, as well as coordinating with other deputy areas to ensure the integration of the SSWSF Program information into other program activities.

(3) Director, Resource Inventory Division.—The RIDD provides management, supervision, and leadership for the division, including SSWSF Program activities. The RIDD provides oversight, approves and issues technical guidance for the SSWSF Program developed by the National Water and Climate Center (NWCC).

(4) National Program Manager (NPM), SSWSF.—The NPM assists the RIDD in providing overall leadership for the SSWSF Program. Responsibilities include—

(i) Developing program policy.
(ii) Developing program budget to meet agency direction and objectives.
(iii) Monitoring budget execution.
(iv) Approving requests for new sites, site relocations, and decommissioning.
(v) Coordinating program delivery with the NWCC and State Conservationists (STCs).
(vi) Serving as the agency point of contact for the SSWSF Program.
(vii) Representing the program in external and internal working groups, including agency administrators, national program leaders, legislative personnel, and other national level partners.
(viii) Working with other divisions for technology integration.
(ix) Integrating program objectives in national and regional strategic planning efforts.
(x) Reviewing the operational aspects of the SSWSF Program during program reviews.
(xi) Coordinating and carrying out program outreach activities.

(5) Director, National Water and Climate Center (NWCC).—The NWCC director is responsible for the day-to-day management of the NWCC and is the technical lead for the SSWSF Program. Responsibilities related to the SSWSF Program include—

(i) Coordinating data collection, processing, analysis, and product development activities.
(ii) Developing an annual program of work for the center.
(iii) Ensuring SSWSF data and product integrity.
(iv) Providing accurate and timely water supply forecasts and other climate products identified in the agency product line.
(v) Maintaining official NRCS SSWSF data and records.
(vi) Coordinating data and product integration into the agency's conservation delivery system technology.
(vii) Supervising NWCC staff.
(viii) Developing and maintains standards and specifications for snow survey field operations, including SNOTEL stations, master stations, snow courses, aerial markers, as well as data editing and archiving.
(ix) Developing detailed technical guidance in order to maintain consistent quality in the operation and maintenance of data collection sites, data management, tools, and products.
(x) Coordinating SSWSF database storage and access with the information technology center.
(xi) Maintaining the NWCC Internet site development and population of the home page.
(xii) Participating in program reviews to evaluate compliance with technical guidance and to ensure technical quality, technical consistency, and product quality.
(xiii) Representing the program and the agency on technical SSWSF issues at local, regional, and national conferences and workshops.
(xiv) Providing technical support to States on snow survey site maintenance, data collection, and information use.

B. Regional Conservationist Responsibilities

The Regional Conservationist, West Region (WRC).—The WRC provides overall administrative leadership, support, integration, and coordination of SSWSF Program activities within and between regions and States. Responsibilities include—

(i) Participating in the development of national program policy.
(ii) Appointing STCs to serve on the STC Advisory Committee (SnowSTAC).
(iii) Participating as an advisory member to the SnowSTAC.

C. State Responsibilities

(1) STC Responsibilities
(i) The STC provides overall leadership for the SSWSF Program within his or her State, effectively managing priorities; staffing, safety, and training; allocations; program outreach; conducting cultural resource assessments; compliance with the National Environmental Policy Act (NEPA) and the Endangered Species Act (ESA); and program delivery. STCs supervise data collection offices to ensure timely, accurate management of resources to meet the needs of the adjoining States served by the data collection office.
(ii) STCs must designate State SSWSF Program managers (SPMs). In general, the SPM provides support to the STC in carrying out the SSWSF Program by maintaining a high level of awareness of national, State, and local program issues; overseeing budget planning and execution; participating in national policy development; communicating internally and externally; participating in program reviews; and integrating snow survey into business and staffing plans. The SPM is responsible for meeting quality assurance standards and for property acquisition and oversight within the State Snow Survey Program.

(2) Data Collection Officers (DCO).—DCOs are responsible for managing the data collection offices. DCOs are established to gain efficiency in site maintenance and data collection efforts by serving multiple States. DCO responsibilities include—
(i) Working with the NWCC to assure high quality data collection and management.
(ii) Ensuring timely and accurate data collection, review, and editing to meet the established quality objectives.
(iii) Archiving field snow survey notes for sites within their jurisdiction.
(iv) Maintaining metadata files for SNOTEL sites within their jurisdiction.
(v) Resolving data collection and quality problems.
(vi) Maintaining, repairing, and installing snow measurement sites in accordance with standards and specifications.
(vii) Establishing approved new sites.
(viii) Maintaining the planned level of service to all States within the DCO boundary.
(ix) Maintaining effective communications with the water supply specialist (WSS) and SPM in States served.

(3) Water Supply Specialist (WSS).—Each State must designate a WSS as a full-time or part-time position. This position promotes the effective use of data, forecasts, and other climate information to meet the resource and conservation needs in the State by working effectively with internal and external resource managers. The WSS coordinates with the DCO to develop and implement annual field snow survey measurement schedules.

D. Committees

(1) SnowSTAC
(i) Duties
- Participate in the development of the strategic program direction, policies, initiatives, budget planning, outreach planning, etc.
- Identify program concerns
- Review and make recommendations relative to agreements or initiatives needed by the SSWSF Program to achieve NRCS objectives

- Increase the level of awareness and support of the SSWSF Program at all levels of NRCS

(ii) Membership

- The committee is made up of all STCs from the 12 western States.
- Advisory participants include the WRAC, DCSSRA, RIDD, NPM, and the NWCC director. Other participants may be asked to attend based on the agenda topics.

(iii) Meetings

- Meetings will be held at least once per year and will be called and chaired by the NPM.
- Informal teleconferences with the committee will be held throughout the year as issues arise that need input.

(2) Snow Survey and Water Supply Forecasting Program Advisory Committee (SnowPAC)

(i) Duties

- Provide recommendations to the NWCC director and the NPM regarding technical aspects of the program and product development needs
- Identify issues which may impact the SSWSF Program
- Identify concerns of State and regional significance from the areas they represent
- Ensure that coordination among the States and NWCC exists to promote efficiency and consistency in operations
- Actively participate in developing solutions to technical issues and making recommendations for adoption

(ii) Membership

- DCOs
- State WSSs
- NWCC director and assigned NWCC specialists
- Advisory participants may include the NPM, SPMs, and the national hydrologist

(iii) Meeting Location and Frequency

- Teleconferences will be scheduled by the NWCC director and held either monthly or as needed.
- Annual meetings will be held and chaired by the NWCC director.

403.5 Program Planning

A. General.—The DCSSRA is responsible for overall program management and will be the signatory on all program policy, budget, and national level agreements. Program management will be the responsibility of the NPM, who will coordinate with and prepare documents for the RIDD and DCSSRA as appropriate.

B. Program Planning.—Strategic program direction will be determined by the DCSSRA with input from the SnowSTAC committee. Actions to implement the strategic direction will be embedded in the Soil Survey and Resource Assessment 5-year plan.

C. Annual Business Planning.—Annual goals will be established to accomplish the items identified in the 5-year business plan.

403.6 Financial Management

A. Allocations of program funds will be made to meet national priorities, and to fund the activities of the NWCC and to the States in a manner that recognizes the necessary interdependency that enables the accomplishment of program goals.

B. Allocations to the States will be based on an approved allocation formula, with supplemental funds provided where appropriate to meet specific business plan goals.

C. The NPM will prepare all budget documents for approval of the DCSSRA.

403.7 Partnerships

A. NRCS will cooperate with other Federal, State, and local agencies, organizations, and with Canadian provinces and territories. NRCS has the authority to accept cooperator's funds, materials, or services for the purpose of establishing hydrometeorological stations, and to provide data and interpretive analyses.

B. Agreements, Contracts, and Volunteers

(1) All partnership arrangements must use the appropriate type of agreement or Federal contracts. National-level agreements may only be signed by the Chief. All State-level agreements must be signed by the STC, maintained in a central file, and be accessible for program reviews, audits, and other agency oversight.
(2) Contracting procedures for collection of snow survey data may be used where outside expertise exists and must follow the Federal Acquisition Regulations.
(3) Resource inventory and snow survey data may be collected through cooperative agreements with Federal, State, and local governmental agencies if the data will benefit each party contributing to the collection of data.

C. Considerations

(1) Consideration should be given to the safety requirements associated with snow survey field work when accomplished through a contract, cooperative agreement, or with Earth Team volunteers.
(2) In contracts, the responsibility of the contractor for safety equipment and training should be specified in the contract.
(3) When using cooperative agreements for in-kind services, the agreement should specify that cooperators are acting on their own behalf and not as an agent of NRCS. Cooperators are thus responsible for the safety of their participating employees.
(4) Volunteers are provided the same safety training, equipment, and physical examinations required for Federal employees conducting the same work. The expense for volunteer safety is borne by the agency.

403.8 Program Operations

A. Water and Climate Monitoring

(1) Data Collection Stations
(i) Basin Analyses.—An analysis of western river basins to identify optimal sites for data collection will be completed and maintained. Data collection sites will be optimal for basin water supply forecasting and basin water management decisions. Additional sites needed to meet localized needs will be identified. The analysis of sites will consider the location in relation to other snow measurement sites, National Weather Service (NWS) data collection sites, and United States Geological Survey (USGS) gaging stations.
(ii) Schedule and Approval of New Stations.—The NPM must approve the basin siting plan and any requests for the addition of stations not included in the plan. The NPM is responsible for establishing and annually updating a schedule for the installation of new sites. The schedule will be based upon the basin plan, but will consider other factors including partnership funding sources. The implementation schedule for new sites will

be adjusted annually based on available funding. The NPM will consult with the STCs, SPMs, or both in establishing the priority list for fund allocation.

(iii) Automated Stations.—All new sites must be SNOTEL or SnowLITE (abbreviated SNOTEL) sites and must be installed by the DCO in accordance with approved standards and specifications. Exceptions to this requirement must be approved by the NWCC and the NPM. Construction using Federal contracts must have a contracting officer's technical representative (COTR), and the State conservation engineer must certify all construction plans and specifications prior to installation.

(iv) Manual Snow Courses.—As automated sites are installed to enhance water supply forecasting in a basin, manual snow courses in the basin will be decommissioned when there is reasonable correlation for forecasting purposes. Specific snow courses to be maintained will be identified and approved as part of the basin plan. These should be limited to those where wilderness restrictions prevent automation or serve a distinct historical record that cannot be reliably estimated.

(v) Easements and Permits.—Any necessary easements, permits, or other agreements to allow installation will be the responsibility of the STC.

(2) Data Collection Management

(i) Data Transmission.—Data from the SNOTEL sites are transmitted through master stations in Idaho and Utah and through cellular and satellite telemetry. Operation and maintenance of the Idaho and Utah master stations must be done on a regular preventive maintenance schedule and is the responsibility of the NWCC. NWCC must work to ensure that the all master stations reliably poll the SNOTEL sites and transmit data to specified NRCS servers. The Alaska NRCS office is responsible for transmitting data utilizing the installed satellite phone system for their SNOTEL stations. The Alaska State office must work with the NWCC to ensure that the equipment and operations are comparable to and compatible with the Utah and Idaho master stations.

(ii) Maintenance of Data Collection Equipment and Sites

- Data collection sites must be maintained annually by the DCO in accordance with the standards and specifications.
- The DCO is responsible for repairing equipment malfunctions during the reporting season.

(3) Data Quality Assurance

(i) SNOTEL (precipitation and pillow data)

- DCOs must verify the accuracy of incoming data based on protocol established by the NWCC.
- The data must be edited by the DCO on a weekly basis. In watersheds where operational forecasts are developed, editing will be done on a daily basis.
- The data must be certified by the DCO as accurate annually.

(ii) Other data

- Coordination with other agencies to facilitate two-way data sharing is encouraged. Agreements defining NRCS requirements and responsibilities are required. Agreements must be approved at the appropriate level.
- The NWCC must work to ensure that there is appropriate data quality control protocol and technology for the additional data being collected at SNOTEL sites.

(4) Data Maintenance

Data certified by the DCOs will be received, maintained, and managed by the NWCC and made available electronically for external and internal use. See section 505.13 regarding data dissemination.

(5) New Technology

(i) Pilots of new technology will be planned and coordinated to provide documentation of processes and outcomes adequate to provide a basis for evaluation which may lead to adoption. Pilot projects must be reviewed for technical adequacy by the RIDD.

(ii) Adoption of piloted technology must be approved by the DCSSRA based on a recommendation from the NWCC.

B. Water Supply Forecasts and Snow Survey Products

(1) Product Line

(i) In line with the requirements for scientific and technical publications (Title 450, General Manual (GM), Part 410) the director of the NWCC will request from the RIDD an annual approval for snow survey program reports, forecasts, and publications. The requests must specify the type of proposed publications, method of publication (hardcopy or electronic), measures of data reliability, analytical process used if any, and quality assurance procedures. The STCs have policy and technical responsibility for scientific and technical publications within their State.

(ii) The NPM maintains a list of approved products that is automated and supported by the NWCC.

(iii) New products that would benefit multiple States must be put on a development priority list and automated for delivery by the NWCC.

(iv) States may develop additional products to meet local needs. The methodology utilized to develop the products must be approved by the NWCC director.

(2) Forecast Reliability

(i) Accuracy of the forecasts will be monitored and reported to the NPM by the NWCC for inclusion in the Program Assessment Rating Tool (PART) report on an annual basis.

(ii) The NWCC must identify steps to continually improve forecast accuracy.

(3) Modeling

(i) A list of approved models for use in providing water supply forecasts must be developed and maintained by the NWCC.

(ii) Forecast models require data from sources external to the Snow Survey Program data. The NWCC will work collaboratively to ensure that working agreements with external data sources are in place.

(iii) Requests for development of new models, or approval to adopt an externally developed model, for water supply forecasts require the approval of the RIDD.

(4) Data Dissemination

(i) For data that is made available prior to editing and certification for accuracy, the following disclaimer must be displayed: "The SNOTEL data that you have selected have not been verified. The data are provisional and subject to change until officially released by NRCS."

(ii) Similar disclaimer statements must be applied to all non-SNOTEL data and to reports based on such data.

(5) Technology Development

(i) Pilots of new technology must be planned and coordinated to provide documentation of processes and outcomes adequate to provide a basis for evaluation, which may lead to adoption. Pilot projects must be reviewed for technical adequacy by the NWCC, and funding will be approved by the NPM.

(ii) Adoption of piloted technology will be approved by the DCSSRA based on a recommendation from the NWCC.

403.9 Customer Service

A. States must maintain staff with the technical expertise to provide support to clients who utilize snow survey information and water supply forecasts within the State.

B. NRCS field employees should receive training on the program and the use of SSWSF Program in their local area.

C. States, in coordination with the NWCC, must issue and disseminate through the Internet monthly water supply outlook reports by river basin during the snowpack season, describing the current hydrologic conditions and containing streamflow forecasts. The primary access for other snow survey data, forecasts, and related reports is by computer communications.

403.10 Web Services

The SSWSF Program must maintain high-quality Internet access to data, products, and other information. Advances in Web technology must be incorporated into the program and supported by the NWCC. NWCC and NPM must actively pursue data sharing with other Federal agencies.

403.11 Safety and Health

A. Training and preparedness requirements must be met to provide appropriate level of risk management for employees and volunteers working at remote sites. These safety requirements are specified in 360-GM, Part 420, Subpart K, "Field Policy for Snow Survey, Snow Pack Telemetry, Soil Climate Analysis Network." For those offices utilizing flight operations, specifics are located in 360-GM, Part 420, Subpart L, "Use of Air Transportation on Official Work."

B. Supervisors should ensure that these requirements are met before assigning snow survey field duties.

C. Authority to have non-Federal persons accompany NRCS employees to SNOTEL sites must be approved by the STC. STCs are encouraged to develop a State safety policy that reduces risk.

403.12 Technical and Operational Reviews

A. The NWCC and the NPM must conduct technical and operational reviews in accordance with the approved review checklist. The NWCC must evaluate technical compliance of sites, data, and information accuracy. The NPM must assess program operations within the States.

B. Completed reports must be provided to the STC, RIDD, and the DCSSRA.

C. The reviews must be conducted at the DCO level and may involve more than one State. Each DCO must be reviewed every 3 years if sufficient funding and personnel are available to carry out the review.