

NRCS Guidance for Source Water Assessments for NWQI

Source Water is any surface water (streams, rivers, and lakes) or ground water (aquifers) that serves or has the potential to serve as a source of drinking water. Source water provides water for public drinking water supplies and private water wells. Source water protection is a proactive approach to safeguard or improve the quality and/or quantity of drinking water sources and their contributing areas

A source water assessment **for NWQI purposes** will include all elements described below. It can be completed through the Planning Phase of NWQI if currently available assessments or plans do not include all the required elements. For example, some of this information may be available in source water assessments developed specifically for the Safe Drinking Water Act, or any other plans or documents (such as state Non-Point Source Management Plans, Clean Water Act Section 305(B) Water Quality or Assessment Reports, state Hazard Mitigation plans, or watershed-based plans). These documents can be referenced in the NWQI source water assessment and the information does not need to be duplicated. Required elements or gaps in data or analyses that are missing from existing documents should be identified and completed to have a comprehensive source water assessment.

For source water protection (SWP) projects to be approved for NWQI Implementation Phase (receiving financial assistance for implementation), **there must be a source water assessment developed during the Planning Phase or an existing assessment or plan already developed by the state or utility that meets the requirements described in this guidance.** The assessment should delineate the area or areas of protection using surface or ground-water modeling or other analytical methods to determine the approximate area of the watershed(s) or aquifer contributing untreated water to the drinking water system and the area where potential contamination of this water supply could occur. Expanded areas will be considered when proposed by drinking water partners.

This guidance provides the critical elements needed to determine source water potential threats from agricultural land use, and to inform best placement and type of conservation systems for water quality concerns. This guidance follows the general planning process for development of an NRCS area-wide assessment as documented in the *National Planning Procedures Handbook (NPPH), Subpart F – Area-wide Conservation Planning (NPPH Part 600.50 B. (2))*. A thorough inventory should inform the analyses for surface or ground water quality for the delineated area(s).

Engaging the EPA regional, state drinking water and/or source water protection program and/or the water utilities in the area will create useful partnerships and provide expertise and resources to projects to assist with project planning and source water assessments.

- I. Overview of the Source Water Protection Area and At-Risk Public Water System(s).
 - a. Describe the drinking water system(s) at risk from impaired source water quality:
 - i. Describe how source water quality relates to challenges with treatment and finished drinking water quality.
 - ii. Information to include may be: general characteristics (surface or ground system; size of public water system, etc.), source water facilities and locations, treatment technologies, management capacity/structure, service capacity (MGD/day), challenges (e.g., fluctuations in ambient water quality, drinking water Maximum

Contaminant Level violations, treatment challenges and/or complexity), plans developed

- b. Characterize the population that would benefit from source water protection, including those served by public water supply systems. Include populations served by non-public water supply systems and private domestic-use wells if conservation treatment may have impacts.
- c. Identification of contaminants (e.g., coliforms) or conditions (e.g., harmful algal blooms) of concern that pose a risk to drinking water that would benefit from source water protection measures for either surface or ground water.
- d. An assessment of NRCS' ability to help partners reach the source water protection goals and objectives that partners establish through the planning process.

II. Characterization of the Area(s) of Influence for SWP

An overview of the protection area or area of influence (determined through partner collaboration) and identification of NRCS resource concerns. This characterization should be information that is useful for the surface or ground-water quality assessment and not just a laundry list of collected information. There are resources available to assist in this characterization including State specific source water protection guidance and the American Water Works Association/ANSI G300 standard for source water protection where key elements of assessment and characterization are clearly described.

- a. Location of surface or ground water protection area/area of influence. Explain the methodology employed to delineate the protection area boundaries, or areas of influence, that relate to agricultural land use impacts.
- b. Landscape setting and characteristics of the MLRA/ecoregion in which the surface or ground water protection area is located.
- c. Geology. Provide context for landscape and hydrogeological conditions expanded upon in Section III.
- d. Geomorphology and soils/soil interpretations.
- e. Climate. Provide context for land cover/uses with respect to hydrologic conditions, like ground-water recharge.
- f. Topography and drainage system. Provide basis for surface water/ground water interaction discussion in Section III.
- g. Land cover/land and water uses. Especially relevant are uses that may alter natural watershed hydrology and the delivery (i.e., timing and quantity) of water to surface and ground water bodies, and uses that may impact water quality and supply, such as wastewater lagoons, ground water injection, surface runoff, and significant water withdrawals.
- h. Socioeconomic conditions.
- i. Other relevant information to characterize the protection area.

III. Hydrology and Water Quality Characterization

Fully describe the hydrology and water quality conditions. The discussion should include surface and ground water transport for pollutants of concern, including the spatial and temporal characteristics of transport, surface hydrology, primary aquifers and aquitards, recharge areas and mechanisms, and groundwater flow.

- a. Available data and resources.
 - i. U.S. Geological Survey (USGS) local and regional Water-Supply Papers, Water-Resource Investigations, Bulletins, Professional Papers, Hydrologic Atlases, and other reports.

- ii. Reports of the State Geological Survey, Department of Environmental Quality, Department of Water Resources, or similar state agencies or university Water Resources Institutes.
 - iii. Surface and Groundwater monitoring data, both water level and quality, from USGS, state, public water systems, or other sources. Access water quality data at the [Water Quality Portal](http://www.waterqualitydata.us). (www.waterqualitydata.us)
 - iv. Source water quality data from the intake area available from the public water system(s) or possibly NGOs or others. (see <https://pubs.usgs.gov/circ/1346/> for a USGS overview of water quality of public water supplies across the US).
 - v. Data sources on potential sources of contamination/pollutants: Water system source water assessments, city or local planning departments, state water agency databases (e.g., State Emergency Planning and Community Right-to-know Act Tier II data), federal programs and databases (EPA's Drinking Water Mapping Application to Protect Source Water—DWMAPS, Toxic Release Inventory, TSCA Inventory, Envirofacts)
- b. Hydrogeology of the source water protection area including:
- i. Major and minor aquifers providing domestic and public water supplies
 - ii. Ground water (aquifer) depths, potentiometric levels, and flow directions
 - iii. Surface and Ground water withdrawals
 - iv. Characterization of aquifer water chemistry
- c. Recharge and discharge areas; surface water-ground water interconnections
- d. Runoff and streamflow hydrology
- i. Runoff and streamflow generation processes
 - ii. Precipitation-runoff budget
 - iii. Spatial and temporal distribution of runoff
 - iv. Surface water drainage networks – GIS-derived flow network
- e. Comprehensive description of potential contaminants of concern and sources including:
- i. Agricultural sources of concern
 - 1. Crop growing operations
 - 2. Animal feeding operations
 - ii. Other potential sources (which may confound agricultural conservation solutions)
 - 1. Urban and industrial wastewater lagoons
 - 2. Septic systems
 - 3. Active and non-active landfills
 - 4. Mining (active/abandoned), petroleum operations, and underground injection
 - iii. Contaminant physical and chemical properties that influence modes of transport to the surface and ground water systems
- f. Description of ambient water quality conditions and problems/threats in relation to pollutant issue of concern, including:
- i. Water quality data (physical, chemical and biological indicators) to show water quality impacts from pollution or pollutants of concern.

IV. Resource Analysis/Source Assessment

Documentation and comparisons between existing and potential conditions (related to water quality or other resource conditions that impact water quality – soil quality, riparian zone stability/bank condition, wildlife habitat, etc.). A preliminary analysis of what could be accomplished, if conservation treatments were applied. The types of conservation practices and extent needed to assist in meeting the SWP goals and objectives. The potential tools that can be used to analyze the resource problems identified, and results.

- a. Identify/locate source cause(s) of the surface or ground water contamination problem.

- b. Preliminary analysis to address the concerns, including hydrologic modeling, GIS analysis and other tools. Identify areas with the greatest need for treatment (critical areas).
 - i. Identify areas where surface water is impacted or is at risk using available tools
 - 1. Nutrient mass balance
 - 2. Sediment delivery budget
 - 3. Load reduction spreadsheets
 - 4. Watershed based modeling of potential sources and treatment effects
 - 5. GIS modeling, GIS vulnerability analysis
 - ii. Identify aquifers/areas where ground water quality is impacted, is at risk, or not at risk.
 - 1. Current "hot spots"
 - 2. Expected contaminant transport, direction, and rates
 - 3. Current water withdrawal locations
 - 4. Level of current and future risk to the aquifer and water users
 - 5. Potential for aquifer recovery and protection
- c. Analysis of treatment and opportunities
 - i. Level of treatment in the watershed
 - 1. Current
 - 2. Potential
 - ii. An analysis of producers available in the watershed to participate in the initiative and their likely willingness to participate.
 - iii. An assessment of how critical area treatment is balanced with participation to achieve the most effective prioritization of implementation.
 - iv. A set of preferred conservation systems, locations, extent, responsible parties, costs, and timelines should be described based on the above analyses.

V. Summary and Recommendations

- a. Description of water quality impairments/concerns and treatments needed to prevent current or future risk of impairments within the protection area.
- b. Description of the SWP goals and objectives and practice efficiencies.
- c. Establish interim metrics to track progress. Both implementation (practices implemented on vulnerable acres) and effectiveness metrics (estimates of the water quality impacts of implementation should be selected).
- d. Locations of critical source areas or vulnerable acres needing treatment.
- e. Description/evaluation of planned practice scenarios/alternatives that meet the protection area objectives, including estimation of treatment costs. What are the best suites of practices to use, and how much is needed to accomplish the treatment objectives?
- f. Documentation of NEPA concerns – refer to the CPA-52 example on the NWQI Sharepoint for area wide planning.

VI. Appendix: Follow-Up

Although this is an assessment (NRCS Planning Steps 1-6), you will need to complete Steps 7-9 for a successful SWP project. Tracking progress towards meeting SWP goals and objectives will be required, using the metrics established in section V. Interim metrics are established to assure the project is on track for meeting objectives for agricultural lands in the protection area. Evaluation of alternatives may be necessary if anticipated progress is not being met. A water monitoring program can provide data for evaluating water quality improvements and/or whether protection goals are being met.

An outreach plan is required. The outreach plan should use the identified critical areas from the assessment to target producers in those areas for elevated level of outreach.