Subpart E – Hydrogeologic Investigations

531.50 General

A. Consideration of project hydrogeology is essential in the conservation planning, development, operation, and maintenance phases of many NRCS programs. Investigations for the development of groundwater resources, the management of groundwater quality, and engineering control or management of underground water are conducted under the supervision of the NRCS geologist and coordinated with other disciplines, as appropriate. Depending on the needed intensity of investigation and complexity of the site, there are conditions, as defined in this policy, under which it is acceptable for a person holding appropriate engineering job-approval authority for the class of structure to conduct an investigation or study.

B. The NRCS geologist has responsibility for the following types of investigations, evaluations, and studies:

(1) Evaluating groundwater development potential of aquifers
(2) Conducting groundwater budget analyses in watersheds
(3) Evaluating groundwater quantity, quality, and geologic factors that influence design and construction of production wells, and recommending well head protection measures
(4) Estimating groundwater consumption or demand in watersheds
(5) Evaluating potential for underground disposal of surface waters
(6) Evaluating potential for conjunctive use of groundwater with surface water supplies
(7) Determining aquifer boundary conditions and potential for well interference
(8) Evaluating influence of karst terrain on construction and performance of conservation practices and structures
(9) Locating groundwater divides and delimiting recharge areas
(10) Assessing subsidence associated with groundwater withdrawal
(11) Assessing groundwater conditions as part of geologic investigations of Group-A dam sites
(12) Determining engineering performance of conservation practices or components by employing groundwater quality monitoring, sampling, and testing methods, practices, or geophysical techniques according to appropriate industry consensus standards

C. A qualified geologist, in consultation with the responsible engineer and other pertinent specialists, must conduct the investigations, evaluations, and recommendations for groundwater resource development, groundwater quality protection, and groundwater control, such as dewatering operations in dam construction.

531.51 Groundwater for Conservation Engineering

A. The NRCS person holding appropriate engineering job approval authority for the class of structure may investigate and evaluate—

(1) Agricultural drainage conditions and irrigation water management activities.
(2) Engineering drainage conditions for excavation dewatering of foundations, borrow areas, quarries, buildings, and mines.
(3) Seepage evaluations for blankets, drains, filters, and grouting.
(4) Engineering subsurface drainage conditions for slope stability.

B. Technical guidance for investigation of the water table provided in Title 210, National Engineering Handbook (NEH), Part 631, Chapters 30 through 33, and in 210-NEH, Part 651, Chapter 7, “Geologic and Groundwater Conditions.”

C. A qualified geologist must be consulted in areas where experience or information is limited or geologic conditions are complex.

531.52 Groundwater Quality Management

A. Hydrogeologic investigations are conducted to support the planning and design of reservoirs, waste storage facilities, and other practices that can impact or be impacted by groundwater quality. Anticipated changes in the groundwater regime must be evaluated with respect to the intended function of the structure or practice.

B. To provide sufficient information for planning or design purposes, the NRCS geologist investigates and evaluates the following:

(1) Groundwater pollution potential of agricultural point (or concentrated) and nonpoint (or dispersed) sources, including components of agricultural waste management systems
(2) Wellhead protection, including delineating wellhead protection zones
(3) Aquifer restoration or enhancement
(4) Location, construction, rehabilitation, decommissioning, and problem investigations of water wells
(5) Potential for groundwater pollution by components of agricultural waste management systems
(6) Delimiting recharge areas in karst terrain and other highly soluble geologic materials, and the influence of karst topography on construction and performance of conservation practices and structures
(7) Locating groundwater divides, areas of groundwater recharge potential, and determining aquifer characteristics
(8) Saline seeps and areas where they may develop
(9) Areas with potential for saltwater intrusion
(10) Hydraulic connection between streams and floodplain deposits

C. Technical guidance on groundwater quality investigations is provided in 210-NEH, Part 651, Chapter 7, "Geologic and Groundwater Consideration," and numerous industry consensus standards, particularly, ASTMs.

531.53 Groundwater Resource Development

A. The NRCS geologist is responsible for—

(1) Rehabilitation, decommissioning, and investigation of water well problems and deficiencies.
(2) Assessing groundwater recharge potential.
(3) Evaluating groundwater development potential of aquifers.
(4) Conducting groundwater budget analyses in watersheds and evaluating groundwater overdraft potential.
(5) Estimating groundwater consumption or demand in watersheds.
(6) Evaluating potential for underground disposal of surface waters.
(7) Evaluating potential for conjunctive use of groundwater with surface water supplies.
(8) Determining aquifer boundary conditions and potential for well interference.
(9) Evaluating groundwater quantity, quality, and geologic factors that influence design and construction of production wells and wellhead protection measures.

B. Technical guidance for groundwater resource development is provided in 210-NEH, Parts 631.30 through 631.33. Other methods not described in these references may be considered at the discretion of the investigating geologist.