



WATER MANAGEMENT PLAN EXAMPLE FORMAT INSTRUCTIONS FOR MARCELLUS SHALE GAS WELL DEVELOPMENT

GENERAL INFORMATION

The following is suggested as an example format for a water management plan, rather than a “form”, indicating the type of information to be provided. It is anticipated that this example format and any necessary further explanation of the information sought would be provided in a manner similar to that utilized for PPC Plans, with the objective that information will be provided in a way that can be readily identified and reviewed. The goal is to provide a vehicle that can readily be amended and updated, as needed (e.g., by submitting an updated table A listing a new water source, plus just the information applicable for that type of new water source.

Regardless of which basin the water source is located in, a water management plan must be completed that covers the water sources utilized for fracture stimulation of each Marcellus Shale natural gas well project in the Commonwealth. Applicants are encouraged to contact their DEP regional oil and gas management office regarding any questions concerning the completion of any part of a water management plan.

DEP Regional Oil and Gas Offices

Northwest Regional Office
230 Chestnut Street
Meadville, PA 16335-3481
Telephone #: 814-332-6860

Southwest Regional Office
400 Waterfront Drive
Pittsburgh, PA 15522-3481
Telephone #: 412-442-4024

Northcentral Regional Office
207 West Third Street
Williamsport, PA 17701-6448
Telephone #: 570-327-3636

Notification must be provided to municipalities and counties where the water source is located prior to submittal of the water management plan. Please attach proof of notification. If source is located in the Susquehanna or Delaware basin, SRBC and DRBC notification requirements will be accepted. Please attach SRBC and DRBC proof of notification documentation if applicable.

Send four (4) copies of the completed water management plan package to the appropriate regional office.

OPERATOR AND PLAN COVERAGE INFORMATION

Describe the area where Marcellus Shale gas wells are located which will be utilizing the water sources described in this plan. Sources serving such wells may be located in more than one DEP region.

WATER MANAGEMENT PLAN

SECTION A. GENERAL SOURCE WATER INFORMATION

Provide a listing of the water sources proposed for utilization in development of the Marcellus Shale natural gas wells within the covered area.

To facilitate DEP review, DEP requests that operators organize the list of sources by subbasin (Hydrologic Unit Level 4/HUC-8 watershed), using the appropriate HUC-8 code. Pennsylvania has 55 such watersheds with an 8-digit subbasin code (see attached HUC watershed map).

With respect to each source, identify the major river basin where the source is located. Abbreviations are acceptable (e.g., DEL = Delaware River Basin; GL = Great Lakes River Basin (including the Genesee River Basin); OHIO = Ohio River Basin (including the Monongahela and Allegheny Rivers); POT = Potomac River Basin; and SUS = Susquehanna River Basin. With regard to each source, list anticipated maximum 30-day average daily quantity of withdrawal in gallons per day (gpd) and the maximum rate of withdrawal (gpm). Indicate the type of source (the example format uses a check box) Note: wastewater discharges include Publicly Owned Treatment Plants (POTWs) or Acid Mine Drainage (AMD) Treatment Plants, and also include other mine waters and cooling water sources.

The Example Format requests specific information with respect to each source, which varies depending on the type of source.

Note: To reduce duplication, if a water source and amount are subject to approval by SRBC or DRBC, attach approvals (dockets and ABRs) or forward those approvals when issued. The Department will rely upon the information gathered, data analyses performed and expertise of the SRBC and DRBC regarding the proposed water source but will reserve for itself the ultimate decision and exercise its independent judgment concerning whether or not to approve the Water Management Plan.

For surface water sources, provide the information indicated in Section C.

For groundwater sources, provide the information indicated in Section D.

For wastewater, cooling water, or mine water discharge sources, provide the information indicated in Section E.

For each public water supply source, provide the information indicated in Section F.

SECTION B. WATER SOURCE AND USE MONITORING/ACT 220 WATER USE REGISTRATION AND REPORTING

For sources in Susquehanna River Basin, refer to a water withdrawal and consumptive use metering and monitoring plan meeting SRBC requirements. For sources in Delaware River Basin, refer to a water withdrawal and use monitoring plan meeting DRBC requirements. ***Water withdrawal and use monitoring plans approved meeting SRBC and DRBC requirements may be incorporated by reference and are accepted by DEP.***

For sources in other basins, provide a water source and use monitoring plan.

Will the total water withdrawn from listed sources and other sources operated by the gas well operator in same watershed exceed an average rate of 10,000 gpd in any 30-day period?

If yes, note that an Act 220 registration must be filed within 30 days of initiating a water withdrawal or use.

The Water Resources Planning Act (Act 220) requires each person whose total withdrawal from one or more points of withdrawal within a watershed operated as a system either concurrently or sequentially that exceed an average rate of 10,000 gpd in any 30-day period to register with DEP the source, location and amount of withdrawal. In accordance with 25 Pa. Code Ch. 110, each person who obtains water through interconnection in an amount that exceeds an average rate of 100,000 gpd in any 30-day period must also register that use. Registrations shall be submitted no later than 30 days following the initiation of any such withdrawal or use.

The Act 220 registration webpage is available at:

<http://www.depweb.state.pa.us/watershedmgmt/cwp/view.asp?a=1426&q=513264&watershedmgmtNav=|38164|>

Water source and use monitoring plan

Monitoring, Reporting and Recordkeeping: For sources subject to SRBC and DRBC approvals, water monitoring and reporting plans meeting DRBC and SRBC requirements satisfy DEP's requirements. Reports should be submitted to SRBC and DRBC respectively. Since DEP has access to those reports, separate periodic reports need not be submitted to DEP, but operators must file their annual Act 220 water use reports with DEP.

For sources that are not subject to DRBC and SRBC approval, the water source and use monitoring plan should identify the methods to be utilized for accurately monitoring the amount of water withdrawn from each source on a daily basis, and how such data will be recorded and maintained. Monitoring may utilize methods that can accurately measure or estimate the amount of withdrawal in accordance with Act 220 and 25 Pa. Code Ch. 110, which may include (but are not limited to) use of meters or logging of truckloads. The plan should provide for the compilation and maintenance of records regarding the daily amount of water withdrawn from each source, and the monthly average amount of water withdrawn from each source. Water withdrawal data must be retained for a period of at least five years, and be available for review by DEP upon request. The plan should indicate that operators will submit Act 220 water withdrawal data to DEP on at least a quarterly basis utilizing the DEP GreenPort system, providing the monthly total amount of withdrawals from each source and the number of days on which withdrawals were made from each source. Information on daily withdrawal volumes for each source need not be submitted as part of such quarterly reports, but must be retained and available for review upon DEP request.

In addition, the water source and use monitoring plan needs to include a description of maintenance of the proposed measuring and recording devices to insure accurate measurement of the water source.

Maximum Rate Compliance: The water source and use monitoring plan should also describe the methods proposed by the operator for assuring compliance with any maximum rate limitations on the withdrawal. Acceptable methods may include, without limitation, (i) physical constraints on equipment; (ii) automatic limiters which cutoff or reduce pumping rates if maximum flow rates are exceeded; or (iii) flow monitoring and recording methods.

Passby Flow Monitoring: The water source and use monitoring plan should describe the method to be utilized to monitor compliance with any applicable passby flow conditions. Acceptable methods may include: (i) utilization of an existing upstream or downstream gaging station; (ii) utilization of a surrogate USGS or other established gaging station on another watershed in the geohydrologic area that would signal low flow conditions in the area; (iii) installation and utilization of staff gages or utilization of existing fixed water level markers (e.g., on bridges) which are correlated to flow values; or (iv) other methods approved by DEP.

Coordination of Information Regarding Source Initiation: In order to assist in responding to public inquiries, DEP requests that operators provide the DEP regional office with notice prior to the first use of an approved source. This would be a one-time notification. The water source and use monitoring plan should include the procedure and a statement of intent by the operator to provide oral or e-mail notice to the DEP regional office prior to first use of each newly approved source, with the objective of providing such notice at least 48-hours prior to the first withdrawal. This is intended as an information coordination process, not a permit condition.

SECTION C. SURFACE WATER SOURCES

C.1. Source Identification and Notification

Describe location of proposed source relative to nearby roads or landmarks. For sources not subject to SRBC or DRBC approval, attach a copy of the notification letter provided to municipality and county where source is located.

For sources subject to SRBC and DRBC approval, notification to the county and municipality per the SRBC and DRBC procedures suffices. For sources not subject to SRBC and DRBC approval, a one-time notice letter must be provided to the county and municipality where the source is located prior to submission of the Water Management Plan or supplement to the plan first listing that source. For water sources previously approved by DEP which are being included in a plan, no additional county and municipal notification is required.

C.2. River Basin Commission Approvals

When issued, a copy of the SRBC or DRBC approval should be supplied to the applicable DEP regional office.

If the source is subject to DRBC or SRBC approval, Sections C.3 - C.6 do not need to be completed, as the same analysis is considered by DRBC and SRBC. The Department will rely upon the information gathered, data analyses performed and expertise of the SRBC and DRBC regarding the proposed water source but will reserve for itself the ultimate decision and exercise its independent judgment concerning whether or not to approve the Water Management Plan.

C. 3 Low Flow Analysis

Provide the method of computation for the low flow analysis of the source of water or submit copies of flow data (attach explanation on separate sheet if necessary). For all run-of-stream sources, groundwater withdrawals that impact a stream and sources with limited storage, compute 7-day, 10-year low flow (Q₇₋₁₀) using low flow statistical data and appropriate hydrologic engineering techniques. Whenever an intake is located on an ungaged stream, the applicant must use an acceptable method for computing the Q₇₋₁₀, such as (i) selecting a reference USGS gaging station and proportioning the yield based on drainage area, or (ii) utilization of information provided by StreamStats <http://streamstats.usgs.gov/paststreamstats/>. Any data provided should state the method used to measure the flow (current meter, weir, etc.), the dates of observation and the flow observed.

Notes:

(1) If using a reference gaging station and proportionate drainage area calculation, the selected gaging station must be on a watershed having similar geologic and climatic characteristics to those of the ungaged watershed. Other factors to consider are relative size of drainage areas and whether the reference gaging station is influenced by upstream reservoirs or other flow regulation activities. Up-to-date low-flow data for specific gaged watersheds may be obtained from the USGS district offices. Actual flow data collected at the project intake may be used to supplement the use of a reference gaging station.

(2) DEP views StreamStats as one source of information for estimation of Q₇₋₁₀ and average daily flow values; but in some cases it may not necessarily be the best source for determining such information. Attach Stream Stats printout if used for Q₇₋₁₀ determination.

(3) DEP encourages operators to employ or engage professionals who are experienced with hydrologic issues to assist in evaluation of such flow issues.

C.4. Stream Classification and Uses

Identify the current designated water uses and recognized existing water uses of the stream or other surface water body at the location from which the withdrawal is proposed.

Current designated water uses are listed at 25 Pa Code Chapter 93.9. A current copy of this chapter of the Pennsylvania Code can be obtained from the DEP regional office or it can be viewed on the Legislative Reference Bureau website at: <http://www.pacode.com/secure/data/025/chapter93/chap93toc.html>.

A current list of existing water uses is maintained on the DEP website (Keyword- Existing Use) or at: <http://www.depweb.state.pa.us/watersupply/cwp/view.asp?a=1261&q=449172>.

A current list of stream sections supporting natural reproduction of trout is located at: http://www.fish.state.pa.us/trout_repro.htm

C.5. PA Natural Diversity Inventory (PNDI)

A PNDI search must be conducted prior to submitting a Water Management Plan. The PNDI database includes plant and animal species classified as rare, threatened, endangered, tentatively undetermined or candidate as well as other taxa of conservation concern, significant natural communities, special concern plant populations and unique geologic features. The online PNDI Environmental Review and Project Planning Tool is available at www.naturalheritage.state.pa.us. The operator must provide documentation of resolution of any conflicts involving threatened or endangered species identified prior to submitting a Water Management Plan or the Water Management Plan will be deemed incomplete. If a source has a threatened or endangered species hit, it should not be included in the Water Management Plan until resolution has been reached. If conflicts or concerns are identified for species other than threatened or endangered species, the Department will address these during its review of the Water Management Plan.

C.6. Withdrawal Impacts Analysis

Include a narrative impact analysis which addresses anticipated impacts on certain items (see specific impact questions in Example Format), and describes the methods proposed to avoid or mitigate impacts (such as proposed passby flow conditions or seasonal withdrawal scenarios). The description of anticipated impacts would include impacts after giving effect to the proposed avoidance or mitigation measures.

Certain agencies, including SRBC, have indicated Class A trout streams may be subject to the most limited impact on fish habitat applying a PIFM-analysis, while other classes of streams may be subject to more liberal habitat impact criteria.

Note: If the proposed withdrawal is $\leq 10\%$ of the Q₇₋₁₀ flow at the point of withdrawal, there is a general presumption that impacts will be minimal and not significant, absent special circumstances. If there are no special circumstances, you may reference the general presumption in your impact analysis, and avoid detailed responses to the following items. If you are aware of special circumstances, describe those circumstances, and address the questions listed in the Example Format as applicable. Because gas well operators do not have access to detailed information on other withdrawals, DEP understands that operators can only answer this question as to the relationship of their own withdrawal to the Q₇₋₁₀ flow of the source. Situations involving cumulative withdrawal impacts may qualify as "special circumstances," and if DEP becomes aware of such a situation it will advise the operator and may request further analysis of potential impacts if deemed necessary.

Notes regarding specific questions:

- b. Wetlands.** The area of evaluation (e.g., distance downstream of the proposed withdrawal point) may vary depending upon the quantity and duration of the proposed withdrawal in relation to stream flow, and will be subject to an exercise of professional judgment.
- d.-e.** Indicate whether the operator is aware of the particular items identified. It is recognized that DEP may have additional information on those items (for example, regarding the location of downstream discharges) which will be considered during DEP's review of the plan.

SECTION D. GROUNDWATER SOURCES

D.1. Source Identification and Notification

Describe location of proposed source relative to nearby roads or landmarks. For sources not subject to SRBC or DRBC approval, attach a copy of the notification letter provided to municipality and county where source is located.

For sources subject to SRBC and DRBC approval, notification to the county and municipality per the SRBC and DRBC procedures suffices. For sources not subject to SRBC and DRBC approval, a one-time notice letter must be provided to the county and municipality where the source is located prior to submission of the Water Management Plan or supplement to the plan first listing that source. For water sources previously approved by DEP which are being included in a plan, no additional county and municipal notification is required.

D.2. River Basin Commission Approvals

When issued, a copy of the SRBC or DRBC approval should be supplied to the applicable DEP regional office.

If the source is subject to DRBC or SRBC approval, Sections D.3 - D.6 do not need to be completed, as the same analysis is considered by DRBC and SRBC. The Department will rely upon the information gathered, data analyses performed and expertise of the SRBC and DRBC regarding the proposed water source but will reserve for itself the ultimate decision and exercise its independent judgment concerning whether or not to approve the Water Management Plan.

D.3. Stream Impact and Low Flow Analysis

Provide the method of computation for the low flow analysis of the source of water or submit copies of flow data (attach explanation on separate sheet if necessary). For all run-of-stream sources, groundwater withdrawals that impact a stream and sources with limited storage, compute 7-day, 10-year low flow (Q₇₋₁₀) using low flow statistical data and appropriate hydrologic engineering techniques. Whenever an intake is located on an ungaged stream, the applicant must use an acceptable method for computing the Q₇₋₁₀, such as (i) selecting a reference USGS gaging station and proportioning the yield based on drainage area, or (ii) utilization of information provided by StreamStats <http://streamstats.usgs.gov/pastreamstats/>. Any data provided should state the method used to measure the flow (current meter, weir, etc.), the dates of observation and the flow observed.

Notes:

(1) If using a reference gaging station and proportionate drainage area calculation, the selected gaging station must be on a watershed having similar geologic and climatic characteristics to those of the ungaged watershed. Other factors to consider are relative size of drainage areas and whether the reference gaging station is influenced by upstream reservoirs or other flow regulation activities. Up-to-date low-flow data for specific gaged watersheds may be obtained from the USGS district offices. Actual flow data collected at the project intake may be used to supplement the use of a reference gaging station.

(2) DEP views StreamStats as one source of information for estimation of Q₇₋₁₀ and average daily flow values; but in some cases it may not necessarily be the best source for determining such information. Attach Stream Stats printout if used for Q₇₋₁₀ determination.

(3) DEP encourages operators to employ or engage professionals who are experienced with hydrologic issues to assist in evaluation of such flow issues.

D.4 Stream Classification and Uses

Identify the current designated water uses and recognized existing water uses of the stream or other surface water body at the location from which the withdrawal is proposed.

Current designated water uses are listed at 25 Pa Code Chapter 93.9. A current copy of this chapter of the Pennsylvania Code can be obtained from the DEP regional office or it can be viewed on the Legislative Reference Bureau website at: <http://www.pacode.com/secure/data/025/chapter93/chap93toc.html>.

A current list of existing water uses is maintained on the DEP website (Keyword- Existing Use) or at: <http://www.depweb.state.pa.us/watersupply/cwp/view.asp?a=1261&q=449172>.

A current list of stream sections supporting natural reproduction of trout is located at: http://www.fish.state.pa.us/trout_repro.htm

D.5 PA Natural Diversity Inventory (PNDI)

A PNDI search must be conducted prior to submitting a Water Management Plan. The PNDI database includes plant and animal species classified as rare, threatened, endangered, tentatively undetermined or candidate as well as other taxa of conservation concern, significant natural communities, special concern plant populations and unique geologic features. The online PNDI Environmental Review and Project Planning Tool is available at www.naturalheritage.state.pa.us. The operator must provide documentation of resolution of any conflicts involving threatened or endangered species identified prior to submitting a Water Management Plan or the Water Management Plan will be deemed incomplete. If a source has a threatened or endangered species hit, it should not be included in the Water Management Plan until resolution has been reached. If conflicts or concerns are identified for species other than threatened or endangered species, the Department will address these during its review of the Water Management Plan.

D.6. Withdrawal Impacts Analysis

Because gas well operators do not have access to detailed information on other withdrawals, they can only answer this question as to the relationship of their own withdrawal to the Q₇₋₁₀ flow of the source. Situations involving cumulative withdrawal impacts may qualify as "special circumstances" referred to in C.6 above.

SECTION E. WASTEWATER, COOLING WATER OR MINE WATER DISCHARGE SOURCES

E.1. Source Identification & Notifications

Describe location of proposed source relative to nearby roads or landmarks. For sources not subject to SRBC or DRBC approval, attach a copy of the notification letter provided to municipality and county where source is located.

For sources subject to SRBC and DRBC approval, notification to the county and municipality per the SRBC and DRBC procedures suffices. For sources not subject to SRBC and DRBC approval, a one-time notice letter must be provided to the county and municipality where the source is located prior to submission of the Water Management

Plan or supplement to the plan first listing that source. For water sources previously approved by DEP which are being included in a plan, no additional county and municipal notification is required.

E.2. River Basin Commission Approvals

For those obtaining water from a wastewater discharger located in the Susquehanna River Basin, complete and submit to SRBC the SRBC Notice of Intent (NOI) Approval By Rule Application. Attach a copy of the SRBC's approval and insert the approval number and date issued in the appropriate place on the application.

When issued, a copy of the SRBC or DRBC approval should be supplied to the applicable DEP regional office.

If the source is subject to DRBC or SRBC approval, Sections E.3 - E.5 do not need to be completed, as the same analysis is considered by DRBC and SRBC. The Department will rely upon the information gathered, data analyses performed and expertise of the SRBC and DRBC regarding the proposed water source but will reserve for itself the ultimate decision and exercise its independent judgment concerning whether or not to approve the Water Management Plan.

E.3. Wastewater, Cooling Water, or Mine Water Diversion Impact Analysis

If the proposed diversion of wastewater, cooling water or mine water equates to $\leq 10\%$ of the Q_{7-10} flow just below point of the existing wastewater, cooling water, or mine water discharge, there is a general presumption that impacts will be minimal and not significant, absent special circumstances, and you may reference the general presumption in your impact analysis, and avoid detailed responses to the following items. If you are aware of special circumstances, describe those circumstances, and address the following items on the Example Format as applicable. The diverting of wastewater, cooling water and mine water is not necessarily equivalent to withdrawing freshwater. In its review of such sources, DEP may consider whether if and when a passby flow may be necessary where the diverted wastewater is $> 10\%$ of Q_{7-10} . Such a decision requires balancing of a number of factors, including the benefits derived from diverting the wastewater, cooling water, or minewater and thereby reducing the loadings and impacts of pollutants at the point they would otherwise be discharged, and the need for the wastewater, cooling water, or minewater flow in terms of supporting streamflow used for fish habitat and providing assimilative capacity for significant downstream discharges.

SECTION F. PUBLIC WATER SUPPLY SOURCES

F.1. Source Identification

If obtaining water from a Public Water Supplier, provide the name of the Public Water Supplier, the specific system name and the PADWIS identification number. In addition, for those obtaining water from a Public Water Supplier located in the Susquehanna River Basin, complete and submit to SRBC the SRBC Notice of Intent (NOI) Approval By Rule Application. Attach a copy of the SRBC's approval and insert the approval number and date issued in the appropriate place on the application.

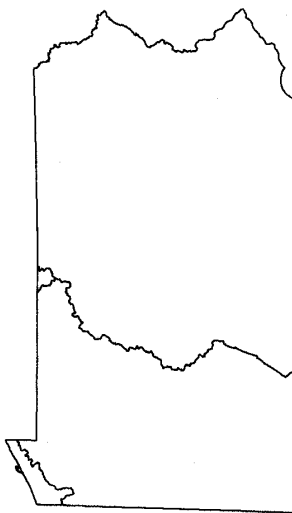
For sources not subject to SRBC or DRBC approval, attach a copy of the notification letter provided to municipality and county where source is located.

For sources subject to SRBC and DRBC approval, notification to the county and municipality per the SRBC and DRBC procedures suffices. For sources not subject to SRBC and DRBC approval, a one-time notice letter must be provided to the county or municipality where the source is located prior to submission of the Water Management Plan or supplement to the plan first listing that source. For water sources previously approved by DEP which are being included in a plan, no additional county and municipal notification is required.

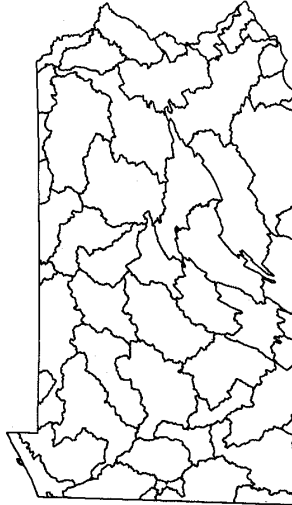
SECTION G. SIGNATURE

Complete and sign the application.

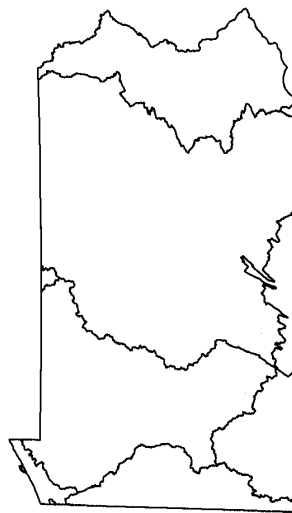
Pennsylvania's Watersheds (HUC) Hydrologic Unit Levels



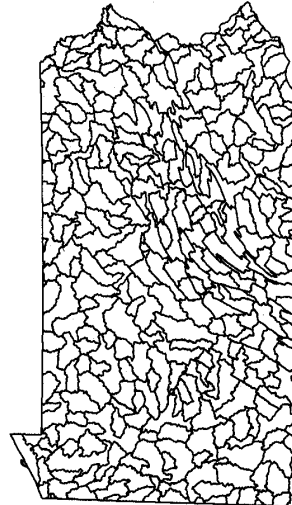
Level	Name	Digits	Avg. Size (mi ²)	Units
1	Region	2	15,100	3



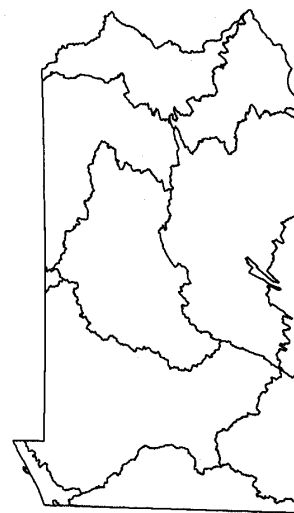
Level	Name	Digits	Avg. Size (mi ²)	Units
4	Sub-basin	8	824	55



Level	Name	Digits	Avg. Size (mi ²)	Units
2	Sub-region	4	4,530	10



Level	Name	Digits	Avg. Size (mi ²)	Units
5	Watershed	10	139	327



Level	Name	Digits	Avg. Size (mi ²)	Units
3	Basin	6	3,485	13



Level	Name	Digits	Avg. Size (mi ²)	Units
6	Subwatershed	12	31	1,452

Source: USDA-NRCS National Cartography & Geospatial Center (NCGC), 2008