

OVERVIEW

ARIZONA'S SOURCE WATER ASSESSMENT PROGRAM

DRAFT

September 3, 2003



Arizona Department of Environmental Quality

**Water Quality Division
Drinking Water Section**

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BACKGROUND

The Source Water Assessment Program (SWAP) is part of a nationwide effort initiated in 1996 by amendments to the Safe Drinking Water Act. The intent of the SWAP is to complete an evaluation of all sources of water (wells, surface water intakes and springs) that provide drinking water to public water systems in Arizona. This evaluation determines the degree to which the source of water is protected. Arizona's SWAP was approved by the US Environmental Protection Agency in November 1999. The goal of the SWAP is to promote community awareness, and to facilitate and encourage source water protection at the community level. A glossary listing terms and acronyms is provided in Appendix A. Map(s) illustrating each individual source of water (wells, surface water intakes or springs) along with its corresponding adjacent land uses (Land Uses) are provided in Appendix B. Appendix C provides a summary matrix of all the elements of the SWAP which result in an overall rating of high or low risk.

SWAP provides detailed information on public water system drinking water sources by evaluating the hydrogeologic setting in which the source is located and any adjacent land uses that are in a specified proximity of the drinking water source. Once this information is gathered, it is evaluated to determine the extent to which the drinking water sources are protected from future natural or man-made contamination. Water sources are then categorized as either "high risk" or "low risk". A designation of high risk indicates there are additional source water protection measures that can be implemented at the local level. A low risk designation indicates that most source water protection measures are either already implemented, and/or the hydrogeologic setting is such that it is protective of the source water.

All public water systems are required to comply with federal and state laws for monitoring and reporting to ensure that the water they serve to the public meets national drinking water standards. Regardless of the risk rating, ADEQ encourages local communities to actively engage in source water protection activities.

SOURCE WATER ASSESSMENT ELEMENTS

The risk rating is achieved through a three-step process: 1) delineating the assessment area around the source water; 2) compiling and evaluating each adjacent land use within the assessment area; and, 3) assessing the sensitivity of the hydrogeological setting in which the water source is located. These are described in more detail below.

A. ASSESSMENT AREA DELINEATION

An assessment area shows, through the use of land surface maps, the greatest distance that groundwater may flow to a well within five years. If a pollutant is spilled within this area, it is possible that this contaminant may reach the well within five years or less. Different methods are used to delineate the assessment areas depending on the water sources involved.

For ground water sources (wells), methods used to delineate the assessment areas are in the following order of preference:

1. groundwater Wellhead Protection Area (WHPA) computer model
2. calculated fixed radius
3. 1/2-mile radius, and
4. 100-foot radius

For springs, the method used to delineate the assessment areas is 1/2-mile radius.

For surface water sources (intakes), a five-year travel time is not applicable to assessment areas. Therefore, the methods used to delineate these assessment areas are as follows:

1. rivers streams and canals: 500-foot zone laterally and downstream of the intake and 10 miles upstream or to the state boundary; and
2. lakes and reservoirs: 500-foot zone surrounding the water body and 10 miles upstream.

B. INVENTORY AND EVALUATION OF LAND USES

Upon delineation of the assessment area, all land uses located within this zone are identified and evaluated. The following land uses are considered in the assessment: agricultural associated activities; landfills; areas of reuse irrigation; production, storage and distribution centers of petroleum products; superfund sites; golf courses; metal plating facilities; underground fuel storage tanks; marinas; foundries and smelters; manufacturing and storage of pesticides and herbicides; mine sites; hazardous waste storage and disposal facilities; gas stations; cemeteries; waste water treatment plants; cesspools; and large capacity septic tanks.

Each land use is evaluated and given a rating (low or high) using the following criteria:

1. Is an environmental permit required for the business activities? If one is required, has the business obtained, or is in the process of obtaining, the appropriate permit? Is the business complying with the permit?
2. Does the business have an active Best Management Practice Plan?
3. Have there been any reportable releases of regulated contaminants at the site? If so, have they been properly cleaned-up?

C. HYDROGEOLOGY SENSITIVITY DETERMINATION

Hydrogeologic sensitivity is the degree to which a source water (i.e., aquifer) is naturally protected from contamination by a geologic barrier. All surface water sources are considered hydrogeologically sensitive because they are open to the atmosphere. However, the sensitivity determination completed for drinking water wells and springs consists of an evaluation of the geology within the assessment area, and then of the potential for contamination to reach the screened zone of the well. This evaluation is based on three separate criteria:

1. Does a 50-foot combined thickness of clay as described in the well drillers log exist? If 50 feet or more of clay is documented in the log above the well screen and proven to be laterally continuous, the well will not be determined hydrogeologically sensitive.
2. Has the physical integrity of the well, as indicated on its most recent Sanitary Survey Inspection, been compromised? If yes, the well will be considered hydrogeologically sensitive.
3. Have contaminants been detected at concentrations above the Drinking Water Standards from samples collected from the well during the past three years? If yes, the well will be considered hydrogeologically sensitive.

The assessment area, in conjunction with the evaluation of the adjacent land uses and the sensitivity of the hydrogeology within the source water area, are used concurrently to make the susceptibility determination of the source water to contamination.

SOURCE WATER ASSESSMENT REPORT

Each Source Water Assessment Report will include:

1. Map(s) illustrating each individual source of water (wells, surface water intakes or springs) along with its corresponding adjacent land uses;
2. A summary of the hydrogeology of the source water, including the delineated boundaries of a source water assessment area and the sensitivity determination of the source water; and,
3. A summary of all the elements of the SWAP that result in an overall rating of high or low risk in a matrix (Appendix C of the report).

DRAFT SOURCE WATER ASSESSMENT REPORT

FLAGSTAFF MUNICIPAL WATER
Public Water System ID 03008
Flagstaff, Coconino County, Arizona

September 3, 2003

INTRODUCTION

This report assesses the drinking water source(s) of public water system (PWS) ID 03008. The report provides detailed information on public water system drinking water source(s) by evaluating the hydrogeologic setting in which the sources are located and identifying adjacent land uses that are in a specified proximity of the drinking water source(s). The outcome of this assessment is a listing of the degree to which drinking water sources are protected by designating them as either "high risk" or "low risk". A designation of high risk indicates there are additional source water protection measures that can be implemented on the local level. A low risk designation indicates that most source water protection measures are either already implemented or the hydrogeologic setting is such that it protects the source water. A glossary listing all terms and acronyms is provided in Appendix A. Map(s) illustrating each individual source of water (wells, surface water intakes or springs) along with its corresponding adjacent land uses are provided in Appendix B. Appendix C provides a summary of all the elements of the SWAP that result in an overall rating of high or low risk in a matrix format.

WATER SYSTEM INFORMATION

PWS ID number	Name
03008	FLAGSTAFF MUNICIPAL WATER

Address

211 W Aspen, Flagstaff, AZ 86001

System Type	Water Sources	Population Served
Community	20 Ground Water Wells	53000
	2 Surface Water Intakes	

SOURCE WATER ASSESSMENT REPORT

This report includes map(s), a description of the hydrogeology within the vicinity of the source water area and land use evaluation:

A. ASSESSMENT AREA DELINEATION

Map(s) were compiled to illustrate this water system. These maps illustrate watershed boundaries, the sources of water (i.e. wells or surface water intakes), the corresponding assessment areas, and the land uses within the assessment areas. These maps are included in Appendix B. The water system's source(s) and the related delineation methods are indicated below.

Source ID number	Source Name	Delineation Method
55-501228	LAKE MARY 8	Calculated Fixed Radius
55-509026	WOODY MTN #9	Calculated Fixed Radius
55-532282	LAKE MARY 9	Calculated Fixed Radius
55-548560	WELL 10	Calculated Fixed Radius
55-559572	FOXGLENN WELL	Calculated Fixed Radius
55-560805	CONTINENTAL WEL	Calculated Fixed Radius
55-606195	WELL	Calculated Fixed Radius
55-606196	LAKE MARY 2	Calculated Fixed Radius
55-606198	LAKE MARY 4	Calculated Fixed Radius
55-606199	LAKE MARY 5	Calculated Fixed Radius
55-606201	WOODY MTN #1	Calculated Fixed Radius
55-606202	WOODY MTN #2	Calculated Fixed Radius
55-606203	WOODY MTN #3	Calculated Fixed Radius
55-606204	WOODY MTN #4	Calculated Fixed Radius
55-606205	WOODY MTN #5	Calculated Fixed Radius
55-606206	WOODY MTN #6	Calculated Fixed Radius
55-606207	WOODY MTN #7	Calculated Fixed Radius
55-606209	INNER BASIN 9	Calculated Fixed Radius
55-606210	INNER BASIN 11	Calculated Fixed Radius
55-606211	INNER BASIN #14	Calculated Fixed Radius
U030080	LAKE MARY PLANT	Reservoir
U030081	RESEVIOR FILTRA	1/2 Mile Radius

B. Hydrogeology

This water system is located within the Plateau Uplands Province of Arizona, which is characterized by thick sequences of relatively flat-lying sedimentary rock intruded by volcanic rocks that core the mountain peaks. The sedimentary rock sequence consists of limestones, sandstones, and shales. The sandstones host the primary aquifers in this province. Local aquifers contained in alluvial deposits in major stream valleys and in volcanic rocks can be hydrogeologically sensitive to contamination due to releases of pollutants at the surface or subsurface.

The water system's source(s) and related hydrogeology sensitivity determination are described below.

Source ID number	Source Name	Hydrogeologically Sensitive
55-501228	LAKE MARY 8	YES
55-509026	WOODY MTN #9	YES
55-532282	LAKE MARY 9	YES
55-548560	WELL 10	YES
55-559572	FOXGLENN WELL	YES
55-560805	CONTINENTAL WEL	YES
55-606195	WELL	YES
55-606196	LAKE MARY 2	YES
55-606198	LAKE MARY 4	YES
55-606199	LAKE MARY 5	YES
55-606201	WOODY MTN #1	YES
55-606202	WOODY MTN #2	YES
55-606203	WOODY MTN #3	YES
55-606204	WOODY MTN #4	YES
55-606205	WOODY MTN #5	YES
55-606206	WOODY MTN #6	YES
55-606207	WOODY MTN #7	YES
55-606209	INNER BASIN 9	YES
55-606210	INNER BASIN 11	YES
55-606211	INNER BASIN #14	YES
U030080	LAKE MARY PLANT	YES
U030081	RESEVIOR FILTRA	YES

C. ADJACENT LAND USES EVALUATION

The risk of each land use identified in the assessment area was evaluated based on compliance status with environmental regulations. The results are summarized in the matrix provided in Appendix C.

CONCLUSION

Based on the information currently available on the hydrogeologic settings of and the adjacent land uses that are in the specified proximity of the drinking water source(s) of this public water system, the department has given a low risk designation for the degree to which this public water system drinking water source(s) are protected. A low risk designation indicates that most source water protection measures are either already implemented, or the hydrogeology is such that the source water protection measures will have little impact on protection. Specific water quality data has not been included in this report, however that information can be obtained from the Consumer Confidence Report that is compiled and distributed by your local Water Provider or municipality. A summary of this Source Water Assessment report will also be included in the Consumer Confidence Report.

This Source Water Assessment report provides a one-time evaluation of your source water. All regulated water systems are required to test their water regularly and to ensure the quality of water meets the requirements of State and federal water quality standards for over 90 contaminants. While ADEQ encourages the development of a source water protection plan for water systems with a higher risk, source water protection plans can be beneficial for systems with a lower risk rating as well. A source water protection plan can be a useful tool for a water system with a lower risk rating in making future decisions that could possibly effect water quality. Source water protection is voluntary, and the decision to develop a plan lays with the water system and its customers. There are various technical and financial resources available to guide and finance the development of a source water protection plan. Technical guidance can be obtained from ADEQ, Drinking Water Section, Monitoring and Assessment Unit, 1110 W. Washington Sreet, Phoenix, AZ 85007, or by calling 1-800-234-5677 ext. 4644. Publications such as "Wellhead Protection: A Guide to Arizona Communities", 1997, by ADEQ's Robert Wallin, or "Wellhead Protection: A Guide for Small Communities", 1993, EPA document No. EPA/625/R-93/002. Additional information can be obtained from the ADEQ's website at www.adeq.state.az.us or the EPA's website at www.epa.gov. Numerous funding sources are also listed in the EPA's website at www.epa.gov/OWOW/watershed/wacademy/fund.html. Preventing contamination of a source water is far less expensive than cleaning it up, or finding a new replacement source after contamination has occurred.

APPENDIX A

GLOSSARY

Alluvium	A general term for clay, silt, sand, gravel, or similar unconsolidated material deposited during comparatively recent geologic time by a stream or other body of running water as a sediment in the bed of a stream or its floodplain or as a fan at the base of a mountain slope.
ALU	Adjacent Land Use. ALUs are those facilities or land use activities where chemicals or contaminants, regulated under the SDWA are commonly used or present, including microorganism <i>Cryptosporidium</i> .
Assessment	A specified proximity "capture zone" of the drinking water source through which water travels to the drinking water source within a specific time. For ground water, Arizona's plan uses a five year time of travel. For surface water, Arizona's plan uses a set capture zone independent of travel time that is based on the surface water source type (i.e.: canals, rivers lakes). Based on the chemical characteristics of the potential contaminant and the soil, some chemicals travel faster than water while others lag.
Aquifer	A water-bearing unit that will yield water in a usable quantity to a well or spring.
Basin	A broad sediment-filled trough that lies between mountains.
Bedrock	Solid rock that underlies soil.
BMPs	Best Management Practices.
CAP	Central Arizona Project.
Delineation	Determination of the boundary of the assessment area.
Groundwater	The water that lies beneath the ground surface, filling the cracks, crevices, and pore spaces of rocks.
Hydrogeology	The study of the interrelationships of geologic materials and processes with water, especially groundwater.
Igneous rock	Rock formed from solidification of magma.
Metamorphic rock	Rock formed from the transformation of pre-existing rock into new rock as a result of high temperature, high pressure, or both.
Porous	The open space in a rock or sediment.

Sedimentary rock	Rock that has formed from the consolidation of sediments.
Sensitivity determination	A sensitivity determination consists of examining the hydrogeologic characteristics of the source, groundwater quality, and the well's physical integrity. Based on the review, the groundwater source is determined to be either sensitive or not sensitive based on the criteria.
Source water	A surface water intake, spring, or groundwater well used to supply drinking water to a public water system.
Source water protection	A method to identify, develop and implement local measures that advance the protection of the drinking water supply.
Susceptibility determination	A susceptibility determination assesses the risk that ALUs might pose to a drinking water source. The susceptibility determination results from examining the hydrogeological setting (sensitivity determination) of the source water supplying drinking water to the PWS along with evaluating ALUs located within the assessment areas.
Transmissivity	The capacity of an aquifer to transmit water; equal to the hydraulic conductivity times the aquifer thickness.
Unregulated chemicals	Those chemicals for which the drinking water regulations require testing that do not have an established Maximum Contaminant Level (MCL).
Unsaturated zone	The subsurface zone, usually starting at the land surface, that contains both water and air.
Water table	The level in the saturated zone at which the water is under pressure equal to the atmospheric pressure.
Watershed	Land area that contributes water to a particular stream system.
Well screen	A filtering device used to keep sediment from entering a well.
Wellhead protection	A program to protect groundwaters that contribute to public water supply systems.
WHPA	Wellhead Protection Area.

APPENDIX B

MAP(S)

APPENDIX C

SWAP SUMMARY MATRIX

Source Water ID	Source Water	Land Use	Land Use Evaluation					Susceptibility	
			Permit Status or Active BMPs	Historic Reportable Releases or Spills	Releases or Spills Remediated	ALU Rating	Evaluation Date	Hydro-geology Sensitivity	Risk to Source Water
55-501228	LAKE MARY 8	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-509026	WOODY MTN #9	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-532282	LAKE MARY 9	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-548560	WELL 10	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-559572	FOXGLENN WELL	FOXGLENN PARK	YES	NO	N/A	LOW	04/03/2003	YES	LOW
55-560805	CONTINENTAL WEL	CONTINENTAL PARK	YES	NO	N/A	LOW	04/03/2003	YES	LOW
55-606195	WELL	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-606196	LAKE MARY 2	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-606198	LAKE MARY 4	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-606199	LAKE MARY 5	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-606201	WOODY MTN #1	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-606202	WOODY MTN #2	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-606203	WOODY MTN #3	NONE	N/A	N/A	N/A	N/A		YES	LOW
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55-606205	WOODY MTN #5	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-606206	WOODY MTN #6	NONE	N/A	N/A	N/A	N/A		YES	LOW
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55-606209	INNER BASIN 9	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-606210	INNER BASIN 11	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-606211	INNER BASIN #14	NONE	N/A	N/A	N/A	N/A		YES	LOW

Source Water ID	Source Water	Land Use	Land Use Evaluation				Susceptibility		
			Permit Status or Active BMPs	Historic Reportable Releases or Spills	Releases or Spills Remediated	ALU Rating	Evaluation Date	Hydro-geology Sensitivity	Risk to Source Water
U030080	LAKE MARY PLANT	NONE	N/A	N/A	N/A	N/A		YES	LOW
U030081	RESEVIOR FILTRA	NONE	N/A	N/A	N/A	N/A		YES	LOW

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List of Appendixes

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Appendix B	Maps
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BACKGROUND

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SOURCE WATER ASSESSMENT ELEMENTS

The risk rating is achieved through a three-step process: 1) delineating the assessment area around the source water; 2) compiling and evaluating each adjacent land use within the assessment area; and, 3) assessing the sensitivity of the hydrogeological setting in which the water source is located. These are described in more detail below.

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3. Have contaminants been detected at concentrations above the Drinking Water Standards from samples collected from the well during the past three years? If yes, the well will be considered hydrogeologically sensitive.

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Each Source Water Assessment Report will include:

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DRAFT SOURCE WATER ASSESSMENT REPORT

**Flagstaff Municipal Water
Public Water System ID 03008
Flagstaff Coconino County, Arizona**

September 3, 2003

INTRODUCTION

This report assesses the drinking water source(s) of public water system (PWS) ID 03008. The report provides detailed information on public water system drinking water source(s) by evaluating the hydrogeologic setting in which the sources are located and identifying adjacent land uses that are in a specified proximity of the drinking water source(s). The outcome of this assessment is a listing of the degree to which drinking water sources are protected by designating them as either "high risk" or "low risk". A designation of high risk indicates there are additional source water protection measures that can be implemented on the local level. A low risk designation indicates that most source water protection measures are either already implemented or the hydrogeologic setting is such that it protects the source water. A glossary listing all terms and acronyms is provided in Appendix A. Map(s) illustrating each individual source of water (wells, surface water intakes or springs) along with its corresponding adjacent land uses are provided in Appendix B. Appendix C provides a summary of all the elements of the SWAP that result in an overall rating of high or low risk in a matrix format.

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This report includes map(s), a description of the hydrogeology within the vicinity of the source water area and land use evaluation:

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Map(s) were compiled to illustrate this water system. These maps illustrate watershed boundaries, the sources of water (i.e. wells or surface water intakes), the corresponding assessment areas, and the land uses within the assessment areas. These maps are included in Appendix B. The water system's source(s) and the related delineation methods are indicated below.

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This water system is located within the Plateau Uplands Province of Arizona, which is characterized by thick sequences of relatively flat-lying sedimentary rock intruded by volcanic rocks that core the mountain peaks. The sedimentary rock sequence consists of limestones, sandstones, and shales. The sandstones host the primary aquifers in this province. Local aquifers contained in alluvial deposits in major stream valleys and in volcanic rocks can be hydrogeologically sensitive to contamination due to releases of pollutants at the surface or subsurface.

The water system's source(s) and related hydrogeology sensitivity determination are described below.

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55-606198	LAKE MARY 4	YES
55-606199	LAKE MARY 5	YES
55-606201	WOODY MTN #1	YES
55-606202	WOODY MTN #2	YES
55-606203	WOODY MTN #3	YES
55-606204	WOODY MTN #4	YES
55-606205	WOODY MTN #5	YES
55-606206	WOODY MTN #6	YES
55-606207	WOODY MTN #7	YES
55-606209	INNER BASIN 9	YES
55-606210	INNER BASIN 11	YES
55-606211	INNER BASIN #14	YES
U030080	LAKE MARY PLANT	YES
U030081	RESEVIOR FILTRA	YES

C. ADJACENT LAND USES EVALUATION

The risk of each land use identified in the assessment area was evaluated based on compliance status with environmental regulations. The results are summarized in the matrix provided in Appendix C.

CONCLUSION

Based on the information currently available on the hydrogeologic settings of and the adjacent land uses that are in the specified proximity of the drinking water source(s) of this public water system, the department has given a low risk designation for the degree to which this public water system drinking water source(s) are protected. A low risk designation indicates that most source water protection measures are either already implemented, or the hydrogeology is such that the source water protection measures will have little impact on protection. Specific water quality data has not been included in this report, however that information can be obtained from the Consumer Confidence Report that is compiled and distributed by your local Water Provider or municipality. A summary of this Source Water Assessment report will also be included in the Consumer Confidence Report.

This Source Water Assessment report provides a one-time evaluation of your source water. All regulated water systems are required to test their water regularly and to ensure the quality of water meets the requirements of State and federal water quality standards for over 90 contaminants. While ADEQ encourages the development of a source water protection plan for water systems with a higher risk, source water protection plans can be beneficial for systems with a lower risk rating as well. A source water protection plan can be a useful tool for a water system with a lower risk rating in making future decisions that could possibly effect water quality. Source water protection is voluntary, and the decision to develop a plan lays with the water system and its customers. There are various technical and financial resources available to guide and finance the development of a source water protection plan. Technical guidance can be obtained from ADEQ, Drinking Water Section, Monitoring and Assessment Unit, 1110 W. Washington Sreet, Phoenix, AZ 85007, or by calling 1-800-234-5677 ext. 4644. Publications such as "Wellhead Protection: A Guide to Arizona Communities", 1997, by ADEQ's Robert Wallin, or "Wellhead Protection: A Guide for Small Communities", 1993, EPA document No. EPA/625/R-93/002. Additional information can be obtained from the ADEQ's website at www.adeq.state.az.us or the EPA's website at www.epa.gov. Numerous funding sources are also listed in the EPA's website at www.epa.gov/OWOW/watershed/wacademy/fund.html. Preventing contamination of a source water is far less expensive than cleaning it up, or finding a new replacement source after contamination has occurred.

APPENDIX A

GLOSSARY

Alluvium	A general term for clay, silt, sand, gravel, or similar unconsolidated material deposited during comparatively recent geologic time by a stream or other body of running water as a sediment in the bed of a stream or its floodplain or as a fan at the base of a mountain slope.
ALU	Adjacent Land Use. ALUs are those facilities or land use activities where chemicals or contaminants, regulated under the SDWA are commonly used or present, including microorganism <i>Cryptosporidium</i> .
Assessment	A specified proximity "capture zone" of the drinking water source through which water travels to the drinking water source within a specific time. For ground water, Arizona's plan uses a five year time of travel. For surface water, Arizona's plan uses a set capture zone independent of travel time that is based on the surface water source type (i.e.: canals, rivers lakes). Based on the chemical characteristics of the potential contaminant and the soil, some chemicals travel faster than water while others lag.
Aquifer	A water-bearing unit that will yield water in a usable quantity to a well or spring.
Basin	A broad sediment-filled trough that lies between mountains.
Bedrock	Solid rock that underlies soil.
BMPs	Best Management Practices.
CAP	Central Arizona Project.
Delineation	Determination of the boundary of the assessment area.
Groundwater	The water that lies beneath the ground surface, filling the cracks, crevices, and pore spaces of rocks.
Hydrogeology	The study of the interrelationships of geologic materials and processes with water, especially groundwater.
Igneous rock	Rock formed from solidification of magma.
Metamorphic rock	Rock formed from the transformation of pre-existing rock into new rock as a result of high temperature, high pressure, or both.
Porous	The open space in a rock or sediment.

Sedimentary rock	Rock that has formed from the consolidation of sediments.
Sensitivity determination	A sensitivity determination consists of examining the hydrogeologic characteristics of the source, groundwater quality, and the well's physical integrity. Based on the review, the groundwater source is determined to be either sensitive or not sensitive based on the criteria.
Source water	A surface water intake, spring, or groundwater well used to supply drinking water to a public water system.
Source water protection	A method to identify, develop and implement local measures that advance the protection of the drinking water supply.
Susceptibility determination	A susceptibility determination assesses the risk that ALUs might pose to a drinking water source. The susceptibility determination results from examining the hydrogeological setting (sensitivity determination) of the source water supplying drinking water to the PWS along with evaluating ALUs located within the assessment areas.
Transmissivity	The capacity of an aquifer to transmit water; equal to the hydraulic conductivity times the aquifer thickness.
Unregulated chemicals	Those chemicals for which the drinking water regulations require testing that do not have an established Maximum Contaminant Level (MCL).
Unsaturated zone	The subsurface zone, usually starting at the land surface, that contains both water and air.
Water table	The level in the saturated zone at which the water is under pressure equal to the atmospheric pressure.
Watershed	Land area that contributes water to a particular stream system.
Well screen	A filtering device used to keep sediment from entering a well.
Wellhead protection	A program to protect groundwaters that contribute to public water supply systems.
WHPA	Wellhead Protection Area.

APPENDIX B

MAP(S)

APPENDIX C

SWAP SUMMARY MATRIX

Source Water ID	Source Water	Land Use	Land Use Evaluation					Susceptibility	
			Permit Status or Active BMPs	Historic Reportable Releases or Spills	Releases or Spills Remediated	ALU Rating	Evaluation Date	Hydro-geology Sensitivity	Risk to Source Water
55-501228	LAKE MARY 8	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-509026	WOODY MTN #9	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-532282	LAKE MARY 9	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-548560	WELL 10	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-559572	FOXGLENN WELL	FOXGLENN PARK	YES	NO	N/A	LOW	04/03/2003	YES	LOW
55-560805	CONTINENTAL WEL	CONTINENTAL PARK	YES	NO	N/A	LOW	04/03/2003	YES	LOW
55-606195	WELL	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-606196	LAKE MARY 2	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-606198	LAKE MARY 4	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-606199	LAKE MARY 5	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-606201	WOODY MTN #1	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-606202	WOODY MTN #2	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-606203	WOODY MTN #3	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-606204	WOODY MTN #4	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-606205	WOODY MTN #5	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-606206	WOODY MTN #6	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-606207	WOODY MTN #7	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-606209	INNER BASIN 9	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-606210	INNER BASIN 11	NONE	N/A	N/A	N/A	N/A		YES	LOW
55-606211	INNER BASIN #14	NONE	N/A	N/A	N/A	N/A		YES	LOW

Source Water ID	Source Water	Land Use	Land Use Evaluation				Susceptibility		
			Permit Status or Active BMPs	Historic Reportable Releases or Spills	Releases or Spills Remediated	ALU Rating	Evaluation Date	Hydro-geology Sensitivity	Risk to Source Water
U030080	LAKE MARY PLANT	NONE	N/A	N/A	N/A	N/A		YES	LOW
U030081	RESEVIOR FILTRA	NONE	N/A	N/A	N/A	N/A		YES	LOW

Source Water Assessment Area for Flagstaff Municipal Water System# 03008 (Lake Mary Plant)



Legend

- Surface Water Intake
- Adjacent Land Uses**
- Agriculture
- Cemetery
- Dry Cleaner
- G Golf Course
- Haz Material
- Landfill
- Marina
- Metal Plating
- Petroleum Product
- Underground Storage Tanks
- Foundry/Smelter
- Pesticide/Herbicide
- Mining
- Superfund
- WWTP/Septic/Cesspool
- Roads
- Other Streams

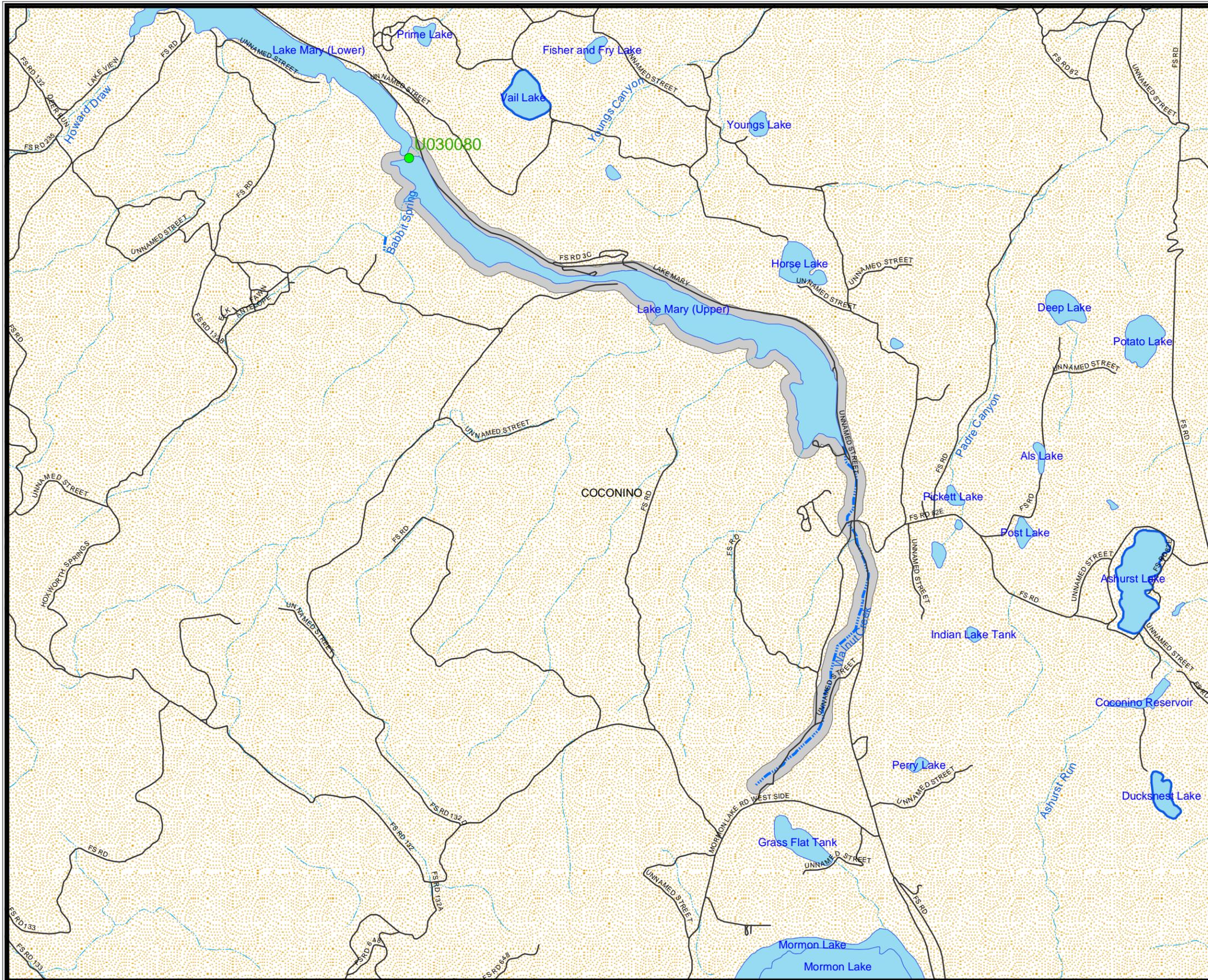


SWAP Streams

- Intermittent
- Perennial
- Lake
- Source Water Assessment Area
- City
- County

1:63,962
0 0.5 1 2 Miles

Arizona Department of Environmental Quality
Water Quality Division
Drinking Water Section
Map Prepared by: D. Nield
September 5, 2003



Source Water Assessment Area for Flagstaff Municipal Water System# 03008 (Reservoir Filtration)



Legend

- Surface Water Intake
- Adjacent Land Uses**
- Agriculture
- △ Cemetery
- Dry Cleaner
- ⊙ Golf Course
- Haz Material
- Landfill
- △ Marina
- ⊙ Metal Plating
- Petroleum Product
- Underground Storage Tanks
- ⊠ Foundry/Smelter
- ◇ Pesticide/Herbicide
- Mining
- ⊠ Superfund
- ⊕ WWTP/Septic/Cesspool
- Other Streams



SWAP Streams

- Intermittent
- Perennial
- Lake
- Source Water Assessment Area
- City
- County



Arizona Department of Environmental Quality
Water Quality Division
Drinking Water Section
Map Prepared by: D. Nield
September 5, 2003

