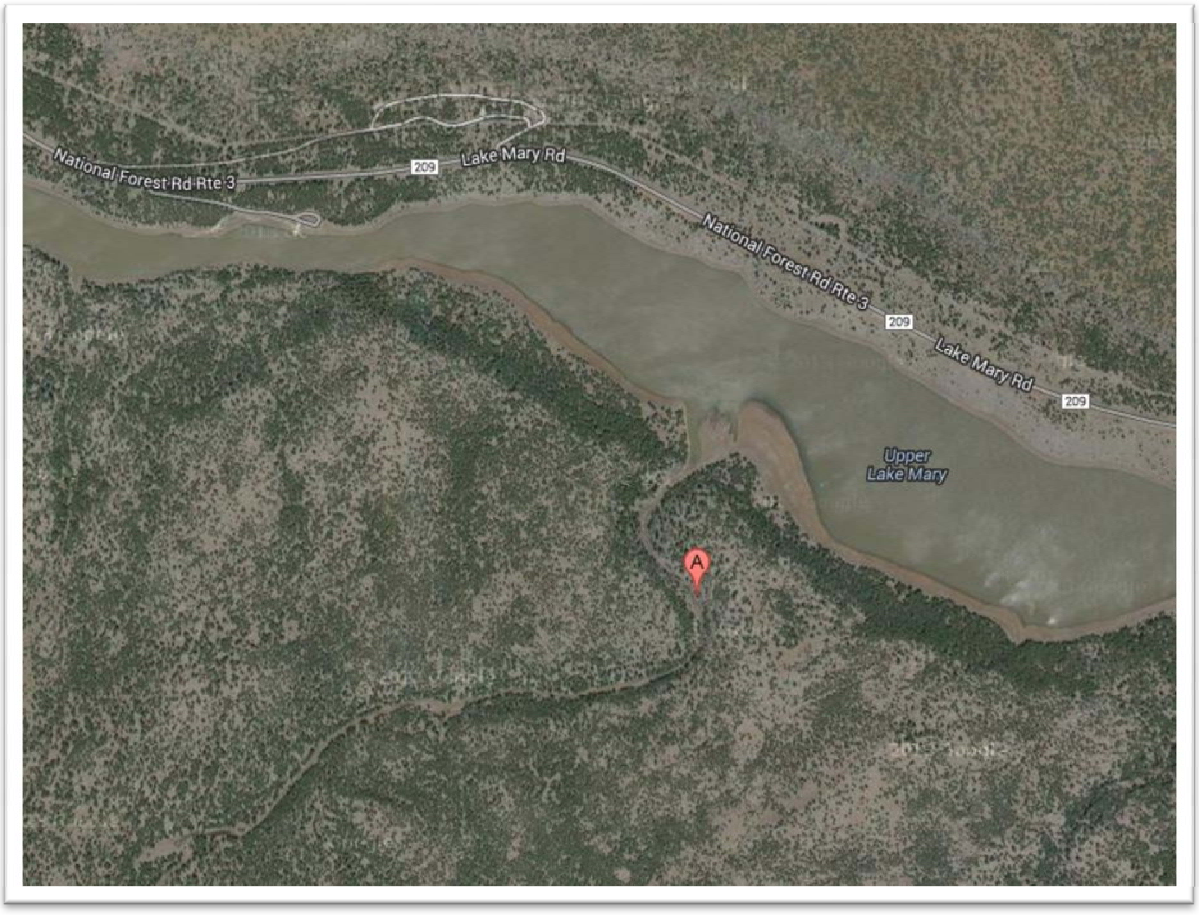
Newman Canyon Rainfall, Streamflow and Sediment Gauge Proposal

Upper Lake Mary serves as an important water source for the City of Flagstaff. The Lake Mary and Walnut Creek Technical Advisory Committee is proposing to fund a combination rainfall/streamflow gauge on Newman Canyon Wash, the largest tributary of the lake, in order to better monitor and understand the volume, timing and quality of surface water recharge into the lake from the surrounding forested areas. The proposed gauge will collect rainfall and stream flow data in real-time (as it occurs) and store it in a database for future analysis. These data will also be available on the internet within minutes of occurring, which will allow water managers to know when and at what level the wash is flowing and therefore, when water quality and sediment sampling from this intermittent/ephermal wash may be possible. The data may also be useful in evaluating changes in water quality and water quantity that result from forest thinning projects that will be occurring within the watershed.

The proposed gauging site is located in Ponderosa Pine forest on US Forest Service property at an elevation of approximately 6860 feet. The equipment will be installed, as shown in the figure below, on the right bank of Newman Canyon Wash approximately 1500 feet upstream of the mouth of the canyon at: 111° 29' 25.06"W; 35° 03' 24.4"N, in the NW ¼ , SW ¼ , Section 6, Township 19 North, Range 9 East.



The drainage area of Newman Canyon Wash at the gauge site is 22.3 square miles (14,276 acres). This location was chosen because the wash cuts through rock at this point, creating a relatively narrow canyon with a stable cross section. The streambed also drops abruptly 6-8 feet at this point and it appears that most of the low flows are directed through a narrow notch in the rock. This should help minimize backwater effects and hysteresis in the rating curve and make it easier to measure the full

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USDS Installation and MaitŜyance

The USGS operates a nationwide network of rainfall and streamflow gauges and is the primary Federal agency responsible for observing, understanding, predicting and delivering water science to the nation. As such, they have extensive experience installing and maintaining streamflow gauges and they cooperate with a variety of communities, agencies and organizations to do so. The data collected by the USGS is subject to strict quality standards and is archived in a database available to any interested person via the internet. As part of standard gage operation, USGS regularly measures discharge at the site to develop a robust rating curve that can collected by the USGS is transferred by sat approximately a 10 minute delay.

Gauges operated by the USGS can be monitored by the general public through the USGS website, http://waterdata.usgs.gov. Through this site, historic and real-time information on stream flow and precipitation can be viewed. Residents can also subscribe free of charge to the WaterAlert notification system. This system allows individuals to be notified via e-mail or cell phone text message when an alert occurs.

Staff from the USGS have done a preliminary evaluation of the proposed site and have estimated the initial cost of installation to be approximately $30,000 and the annual cost of maintenance to be $16,400/year. An example of a similar USGS site is shown in the photograph at right.

In addition to collecting streamflow data, the USGS can install equipment to collect suspended sediment samples. The USGS currently operates several streamflow gauging stations in northern Arizona equipped with automatic pump samplers (example shown in photograph below).

These samplers can be programmed to collect water samples automatically when the stream level reaches a predetermined height. The water samples can then be retrieved from the sampler when convenient. The collected water samples can be analyzed for a host of water-quality parameters including suspended sediment concentration.

As part of the Water Cooperative Program for the current fiscal year (FY2014) there are USGS matching funds available that could be used towards installing and operating a streamflow gauging station and automatic pump sampler in Newman Canyon. Additional matching funds may be available in subsequent years to contribute towards maintenance and operation of the streamflow gauge and pump sampler.

Proposed Budget for Installing Streamflow Gauging Station in Newman Canyon

	Cooperator Cost	USGS Contribution
Installation of streamflow gaging station including: environmental shelter, data logger, non-submersible pressure transducer, satellite transmitting system, solar charging system, tipping bucket rain gauge, stage-discharge relationship	$18,300	$11,700
Installation of automatic pump sampler	$4,150	$2,650
Total	**$22,450**	**$14,350**

Proposed Budget for Maintenance and Operation (July 1, 2014 – September 30, 2014)

	Cooperator Cost	USGS Contribution
Operation and maintenance of streamflow gauge and rain gauge including quality assurance/quality control and archiving of streamflow data	$2,050	$2,050
Operation and maintenance of automatic pump sampler and analysis of water-quality samples for suspended sediment concentration*	$2,000	$2,000
Total	**$4,050**	**$4,050**

*Suspended sediment concentration is the only analyte that would be measured.

Proposed Budget for Maintenance and Operation Fiscal Year 2015 (Oct 1, 2014 - Sept 30, 2015

	Cooperator Cost	USGS Contribution
Operation and maintenance of streamflow gauge and rain gauge including quality assurance/quality control and archiving of streamflow data	$8,200	$8,200
Operation and maintenance of automatic pump sampler and analysis of water-quality samples for suspended sediment concentration*	$4,000	$4,000
Total	**$12,200**	**$12,200**

*Suspended sediment concentration is the only analyte that would be measured.