

2000 ANNUAL REPORT

The Palouse Basin Aquifer Committee



Water Use in the Palouse Basin

**Juliet M. McKenna
Palouse Basin Aquifer Committee**

April 2001



University of Idaho

PO Box 443011 • Moscow, Idaho 83844-3011
ph 208.885.4569 • fx 208.885.6431
pbac@uidaho.edu • www.uidaho.edu/pbac

2000 ANNUAL REPORT

The Palouse Basin Aquifer Committee

Water Use in the Palouse Basin

1	Introduction
3	2000 Goals and Accomplishments
3	Goals of PBAC
4	Accomplishments During 2000
6	Entity Action Plans
6	2001 Workplan
7	Groundwater Pumpage
7	Treated Effluent or “Reclaimed Water”
8	Voluntary Pumping Limits
10	Monthly and Peak Water Use
11	Per Capita Water Use
12	Groundwater Levels
13	Water Quality
14	PBAC Representatives
14	References and Additional Information
15	Appendix

Executive Summary

The communities of the Palouse region rely on groundwater from the Palouse Groundwater Basin as their sole source of drinking water. In 2000, the Palouse Basin Aquifer Committee (PBAC), previously called the Pullman-Moscow Water Resources Committee, reevaluated the goals of the Committee and passed a new goal to stabilize the declining groundwater levels in the deep Grande Ronde aquifer that supplies over 90 percent of the water to the communities by the year 2020. PBAC also created a 20-Year Plan to outline a timeline and strategy for accomplishing PBAC's goals.

Research funded by PBAC continued in 2000, and has greatly improved PBAC's understanding of how groundwater moves in and out of the basin. However, because of the complexity of the basin, many basic features regarding basin size and recharge are not well characterized at this point. PBAC pursued funding from both Washington and Idaho to broaden the scope of research and initiated contacts with federal agencies for potential future funding. In 2000, PBAC continued to maintain a high profile in the community by making public presentations, organizing water awareness events, and maintaining the PBAC website. Groundwater pumping by the four major pumping entities in 2000 increased approximately 1 percent from 1999, for a total of 2.7 billion gallons. Water levels in the Grande Ronde wells continue to decline at a steady rate of 1 to 2 feet per year.

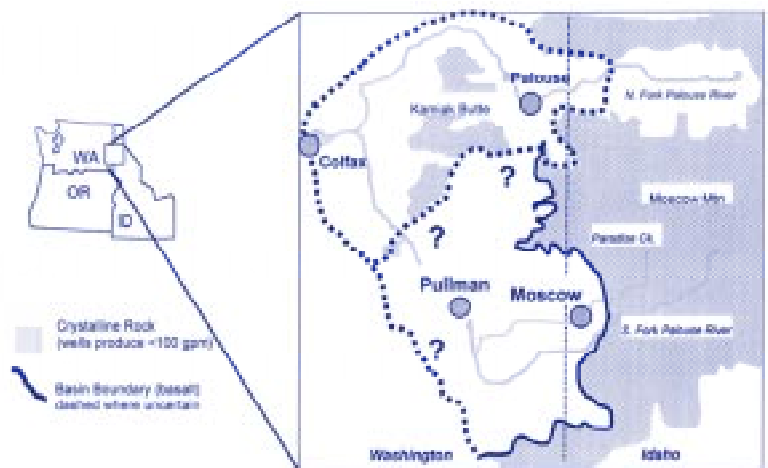
To provide for future beneficial use of the basin groundwater without depleting the basin aquifers while protecting the quality of the water.

The Palouse Basin Aquifer Committee

Groundwater is pumped in the Palouse basin by four major water suppliers (Moscow, Pullman, the University of Idaho, and Washington State University) several smaller towns, and thousands of rural residents living in unincorporated areas of Latah County, Idaho and Whitman County, Washington. Concern over declining groundwater levels in local aquifers led to the formation of PBAC in the late 1960s. The purpose of PBAC has always been to provide a forum for the stakeholders to work together to secure a reliable long-term quality water supply for all users in the basin. PBAC is a voluntary, cooperative, multijurisdictional committee currently comprised of six entities: Pullman, Washington; Moscow, Idaho; University of Idaho (UI), Washington State University (WSU), Whitman County, and Latah County. PBAC is guided by an Intergovernmental Agreement signed by the six stakeholder representatives and an Interagency Agreement signed by the Washington Department of Ecology (WDOE) and the Idaho Department of Water Resources (IDWR).

2000 Annual Report

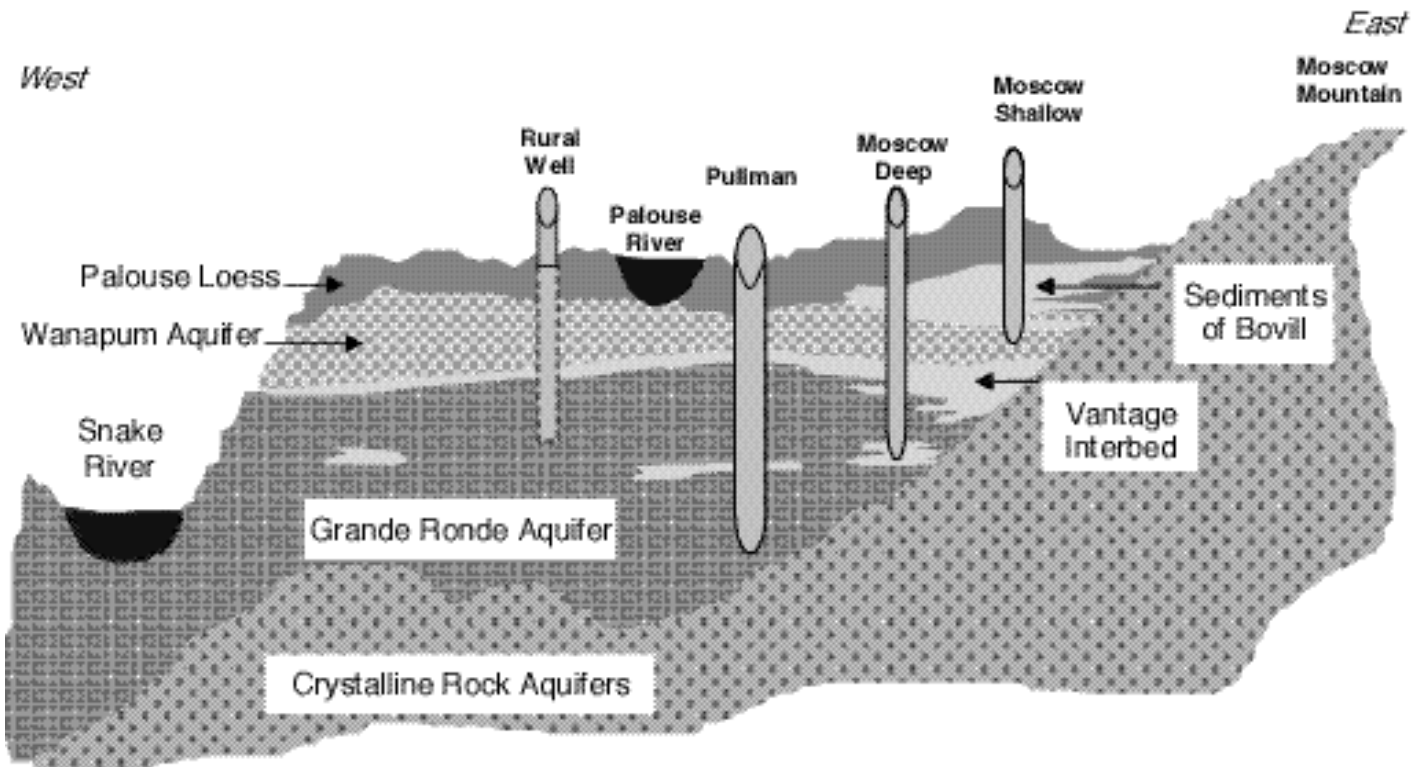
In 1992, PBAC drafted and signed a Groundwater Management Plan, which requires that an annual report be published by the Committee. The 2000 report presents a summary of accomplishments of the past year, planned activities for the coming year, annual groundwater pumpage, and annual groundwater levels. Readers are referred to the 1999 Annual Report for more detailed information on the history of PBAC, groundwater management strategies, voluntary pumping limits, basin hydrogeology, historical pumping quantities, and water level declines. The 1999 report can be viewed at <http://www.uidaho.edu/pbac> or a copy can be obtained by contacting PBAC directly.



Pullman, Washington; Moscow, Idaho and parts of Whitman and Latah Counties lie within the boundaries of the Palouse Groundwater Basin. To the east, the basin is bounded by the crystalline rock of Moscow Mountain and the Palouse Range. Current research is aimed at better defining the basin boundaries to the west, north, and south in Whitman County.

Groundwater in the Palouse basin is pumped from two basalt aquifer systems. The basalt units are part of the Columbia River Basalt Group, which consist of thousands of feet of lava flows that cover most of eastern Washington as a result of massive “flood basalt” eruptions between 12 and 17 million years ago. The primary municipal drinking water source in the Palouse basin is the deep Grande Ronde aquifer. The shallower Wanapum (Priest Rapids) aquifer is the primary water supply for rural residents of Latah County within the basin limits and in some areas of Whitman County.

Water levels in the Grande Ronde aquifer have been declining by 1 to 2 feet per year for 50 years or more. Wells in the Wanapum aquifer typically pump up to 1,250 gallons per minute (gpm) whereas wells in the Grande Ronde aquifer can pump in excess of 2,000 gpm. Water levels in wells in the Wanapum aquifer respond to changes in precipitation and pumping, suggesting the aquifer is recharged from the surface whereas steadily declining water levels indicate there is likely very little recharge to the Grande Ronde aquifer.



Conceptual hydrogeologic cross section of Palouse groundwater basin. (Not to scale)

There are significant differences in the geology from east to west across the basin. The Sediments of Bovill, and Vantage interbed (sedimentary unit) become thin west of Moscow. Sedimentary interbeds within the basalt aquifers are much more abundant beneath Moscow than beneath Pullman. The Grande Ronde aquifer is thicker beneath Pullman.

2000 Goals and Accomplishments



UI hydrology graduate student Landon Beck prepares to install a pressure transducer in a monitoring well at the University of Idaho's Groundwater Research Site. The transducer is programmed to record small changes in water levels by measuring changes in pressure. The data are periodically downloaded to a laptop computer and compared to water level and pumping data from other wells around the basin in order to better understand basin dynamics.

Goals of PBAC

PBAC reviewed and updated its original goals from the Groundwater Management Plan and, in May 2000, adopted the following revised goals:

- 1** Stabilize the groundwater levels in the Grande Ronde aquifer by 2020.
- 2** Implement efficient water use and water conservation practices to reduce pumping from the deep Grande Ronde aquifer.
- 3** Promote a program of public outreach and education for efficient water use and awareness of groundwater issues in the Basin.
- 4** Continue data collection and analysis of groundwater levels and usage data for the basin.
- 5** Support research of basin hydrogeologic conditions affecting the regional water level declines and facilitating sustainable development of the groundwater resource.
- 6** Protect the high quality of groundwater in the Palouse Basin.

These goals form the foundation of the PBAC 20-Year Plan, which was also adopted by PBAC in 2000. The 20-Year Plan outlines a strategy and timeline for PBAC to meet the goal of stabilizing water levels in the Grande Ronde aquifer by the year 2020.

Accomplishments During 2000

In the 1999 Annual Report, PBAC outlined several specific objectives to accomplish during 2000. A summary of the progress on each objective is provided below.

Research

Continue to improve understanding of hydro-geological conditions of Palouse Basin through support of the basin research and the UI-WSU Basin Research Project.

The current phase of PBAC-funded research began in July 1999. PBAC funding totaling as much as \$80,000 per year is committed through June 2002. The project is funded by Pullman, Moscow, UI, and WSU. The research is being conducted by Drs. Jim Osiensky of the UI and Kent Keller of WSU and, currently, three hydrology graduate students. The results of the study will support informed water management decisions to ensure the quality and quantity of the groundwater for long-term sustained use. The approach is interdisciplinary, utilizing field investigations and physical and chemical hydrology.

During the first half of the project, 12 pressure transducers equipped with dataloggers were purchased and have been rotated among numerous wells in the basin to measure and record water level changes. These data will provide information on how responsive water levels are to pumping throughout the basin. Several basin-wide aquifer tests were coordinated by the team in the last year, for example, to observe the effects in Moscow of pumping in Pullman, and vice versa.

Springs along Union Flat Creek have been sampled and measured during baseflow periods in order to assess the discharge and source of groundwater to surface water. Groundwater and surface water samples have also been collected from around the basin and analyzed for chemistry and isotopic composition. Additional samples will be collected for further isotopic and carbon-14 dating in 2001. One goal is to ascertain the source of spring water entering the Snake River.

Funding

Attempt to secure supplemental funding for additional research and related projects from the states of Idaho and Washington.

The groundwork was laid for a funding request to Idaho during 1999 and 2000 by working closely with state legislators and the Idaho Department of Water Resources to define project needs and objectives. PBAC's current request from the state of Idaho for research funds amounts to \$200,000 over two years and has a good chance of being approved during the 2001 legislative session. PBAC, along with representatives from the City of Pullman and Washington State University, worked with Washington state legislators to request matching funds from the state of Washington. As a result of this effort, a request by the City of Pullman to fund the design portion of a wastewater reuse project is being put before the state legislature in 2001.

Strategy

Develop a long-term funding mechanism for halting the water level decline in the deep aquifer.

PBAC began this process in the 20-Year Plan by outlining a strategy to halt declining water levels. During 2000, PBAC contacted the following groups about funding possibilities for various water-related projects that would serve to increase the understanding of the basin or reduce water demand from the Grande Ronde aquifer: Idaho and Washington, the US Army Corps of Engineers, the US Environmental Protection Agency, and the Idaho Community Foundation. At this point, a long-term funding plan for accomplishing the PBAC goals has not been worked out, although annual contributions from the six entities are expected to continue to provide funding for PBAC operational costs.

Groundwater Management Plan

Complete update.

New goals were passed (see previous section) and a new Intergovernmental Agreement and Bylaws were drawn up. The update to the Plan includes the new goals, Bylaws, and Intergovernmental Agreement and will be signed by all parties and published in 2001.



City of Pullman Horticulturist Varnell Williams (second from right) gives a tour of Pullman's Demonstration Xeriscape Garden located at Lawson Gardens City Park. The plants in the garden were chosen because they are hardy in the Palouse climate and require little to no supplemental watering.

PBAC Website

Regularly update and continue to improve.

Since coming on-line in late 1999, the website is updated monthly with minutes and upcoming meeting agendas. Pumping data are posted semi-annually. The website could be further improved with water conservation information and links to related websites.

Data Collection

Collect and analyze hydro-geologic data obtained from drilling the new municipal supply Well 7 in Pullman and new Whitman County well at the Colfax Airport.

Pullman Well 7 and the Colfax airport wells were drilled and drill cuttings were collected, but were not analyzed in 2000. Drill cutting analysis, stratigraphic interpretation, and pump test data will be available from Pullman Well 7 in early 2001. There are currently no plans to look at the cuttings from the Colfax Airport well.

Community Outreach

Increase community leadership awareness of groundwater and local water supply issues.

The Executive Secretary/Technical Advisor made presentations to both City Councils, both Boards of County Commissioners, the public, and at the Quarterly Regional Leadership Breakfast on January 3, 2001. Local media coverage accompanied most of the presentations followed by numerous inquiries for additional information from the general public. PBAC also organized activities for the public as a part of Water Week 2000, designated by numerous national environmental and drinking water organizations as the first week of May.

Economic Study

Initiate an economic evaluation of supplemental water sources for the entities.

The US Army Corps of Engineers (COE) was approached to perform this study in June 2000 under a cost-sharing agreement, but declined to pursue the project because the COE felt it was not able to adequately address all supplemental sources. PBAC is looking for alternative ways to fund this study, and is still in contact with the COE about the project. This study should include the costs of supplemental water sources as well as other strategies to reduce pumping from the Grande Ronde Aquifer including, but not necessarily limited to:

1. Institutional and municipal conservation programs and public education
2. Development/expansion of reclaimed water for irrigation in Pullman and Moscow
3. Increased pumping from and increased recharge to the Wanapum aquifer
4. Artificial recharge to the Grande Ronde aquifer
5. Direct use of surface water
6. Importing water from outside the basin

Water Conservation

Continue efforts to encourage water conservation by entities and citizens that rely on groundwater from the basin for all their water supply needs.

PBAC hired a part-time conservation coordinator for the summer of 2000 to prepare display materials and work with the cities and universities on conservation initiatives and public outreach. PBAC is encouraging the cities and universities to enact or expand their own public education programs. The City of Moscow now has staff and a budget dedicated to this task and is beginning outreach to water customers and in elementary schools. PBAC serves as a resource to all six entities and the community at-large for water conservation issues.

Entity Action Plans

The Groundwater Management Plan includes Action Plans adopted by each entity in 1992 outlining specific actions that would reduce water use and help achieve the voluntary pumping limits. According to the terms of the Groundwater Management Plan, the Entities are to provide PBAC with an annual compliance report on progress towards implementing their Action Plan. Copies of the Action Plans can be obtained by contacting PBAC directly. If the Entity hasn't already done so in 2000, Action Plans will be updated in 2001, and published in the Groundwater Management Plan Update. 2000 Action Plan Compliance reports are included in the Appendix of this report.

2001 Workplan

The objectives of PBAC during the year 2001 are generally the same as 2000. Continued yearly progress on each of these issues is essential to accomplish the 20-Year Plan.

1. Continue to improve understanding of hydrogeological conditions of Palouse Basin through support of the basin research.
2. Secure supplemental funding for additional research and related projects from states of Idaho and Washington and work towards developing a long-term funding mechanism for halting the water level decline in the deep aquifer.
3. Complete and publish the Groundwater Management Plan Update.
4. Regularly update and continue to improve PBAC website.
5. Increase community leadership awareness of groundwater and local water supply issues.
6. Initiate an economic evaluation of supplemental water sources for the entities.
7. Continue efforts to encourage water conservation by entities and citizens that rely on groundwater from the basin for all their water supply needs.

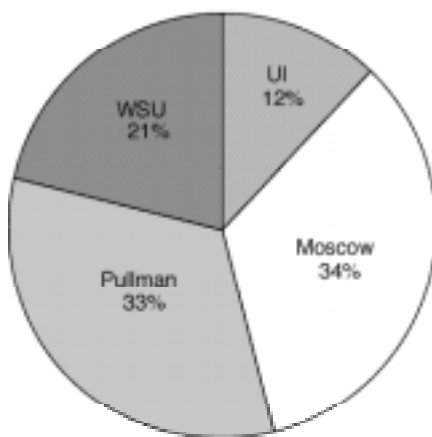
Groundwater Pumpage

The total amount of groundwater pumped during 2000 by the four major pumping entities was 2,695 million gallons per year (mgy)– a 1 percent increase from 1999.



The University of Idaho Golf Course and the Arboretum and Botanical Gardens (background) are irrigated using reclaimed water from the Moscow wastewater treatment plant, thereby decreasing the need to pump water from the Grande Ronde aquifer.

Percentage of Groundwater Pumped by Each Entity in 2000



The proportion of groundwater pumped by each entity has remained approximately constant for the last few years.

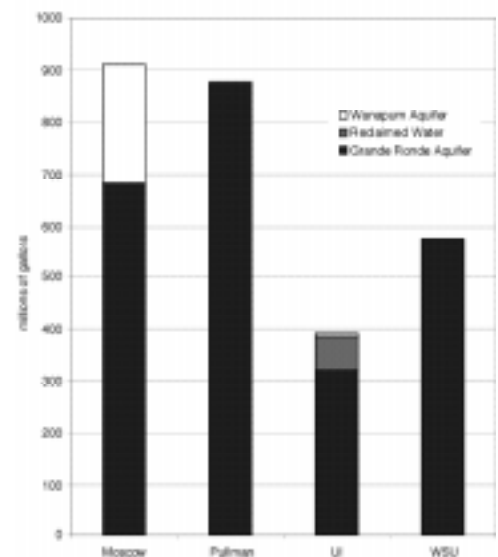
The Grande Ronde aquifer supplied over 90 percent of the water used by the four major pumping entities in 2000. Moscow was able to meet 25 percent of potable water demand with water from the Wanapum aquifer, and the UI used a small amount of groundwater from the Wanapum aquifer for its aquaculture facilities, accounting for approximately 2 percent of the UI's total potable water demand. The Wanapum aquifer is thinner in the Pullman area than beneath Moscow. Therefore, Pullman and WSU rely exclusively on the Grande Ronde aquifer for potable water.

Treated Effluent or “Reclaimed Water”

UI utilizes “reclaimed” water supplied by Moscow’s wastewater treatment plant and the UI’s aquaculture lab for outdoor irrigation on large green spaces, playing fields, the arboretum, and the golf course. Reclaimed water use at UI between May through October amounted to 65 mgy, or 17 percent of UI’s total water usage in 2000. UI plans to expand the system in the future to include the Administration Building lawn. Reusing water for irrigation alleviates some demand for groundwater.

Pullman and WSU have reopened discussions for using treated effluent from the Pullman wastewater treatment plant to irrigate on campus and city green spaces. An engineering study was completed by WSU in 2000 to assess the feasibility of the project (performed by Parametrix, Inc.), and Pullman and WSU are in search of funding to initiate project design. If completed, this project could reduce dependence on groundwater by as much as 100 mgy.

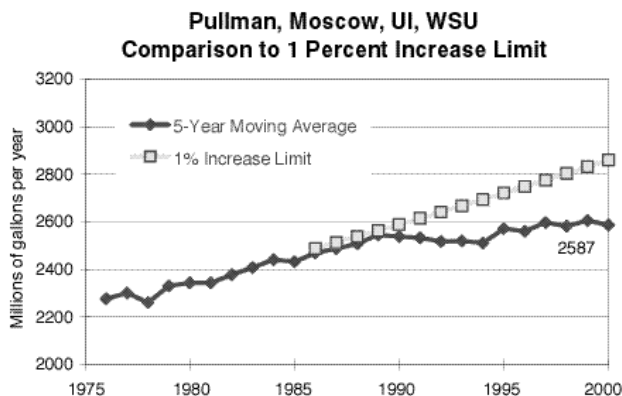
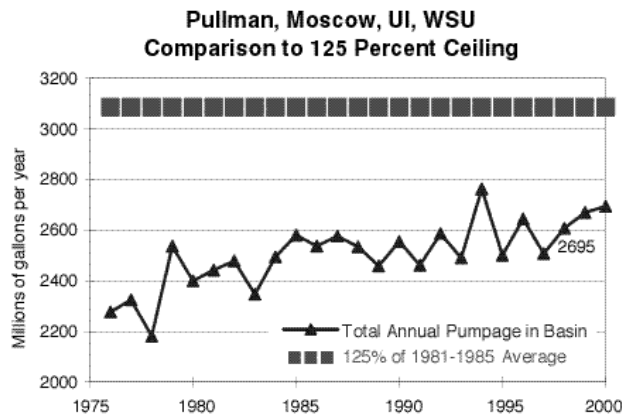
Sources of Water in 2000



Meeting the goal of stabilizing water levels in the Grande Ronde aquifer requires that reclaimed water and the Wanapum aquifer continue to meet some of the basin’s water demand.

Voluntary Pumping Limits

As part of the Groundwater Management Plan, in 1992 the four pumping entities agreed to attempt to limit yearly pumping increases, based on a five-year moving average, to a 1 percent increase of the average during the years 1982 to 1986, and not to exceed 125 percent of the average pumped between 1981 to 1985. The annual pumping quantities for the period 1976 through 2000 are compared to the voluntary pumping limits for the basin as a whole and each entity in the following charts.



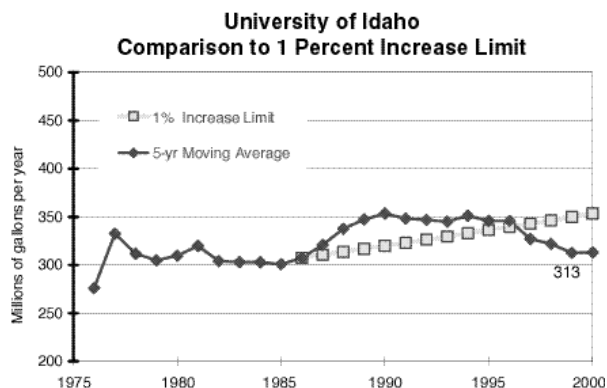
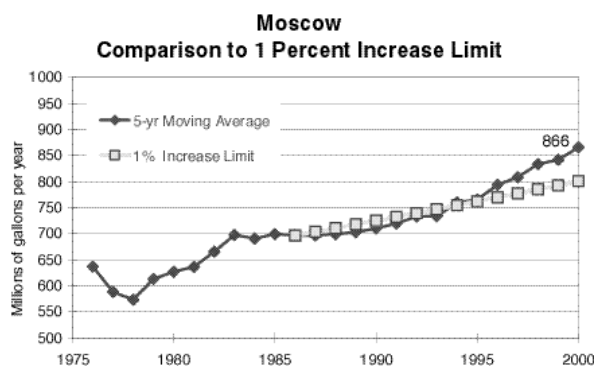
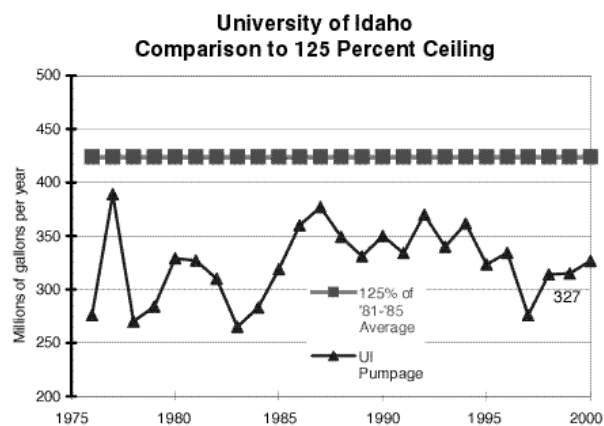
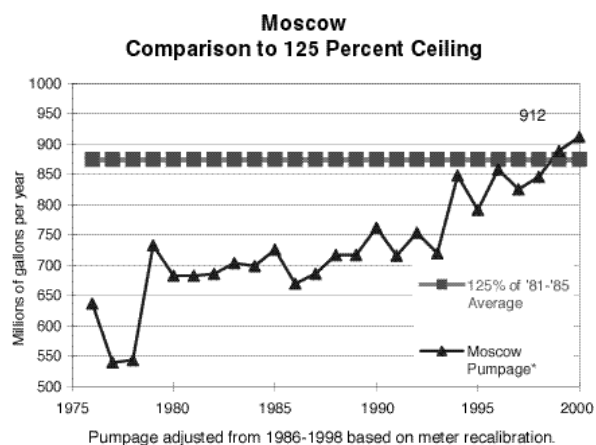
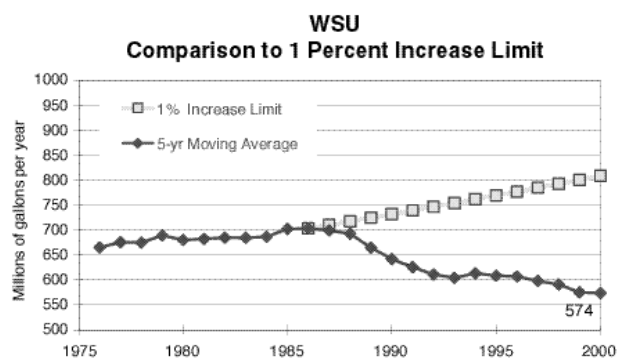
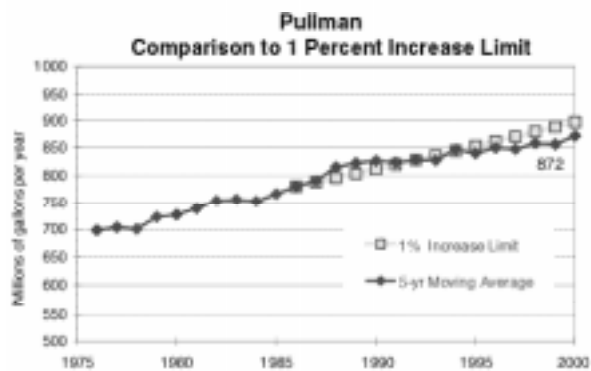
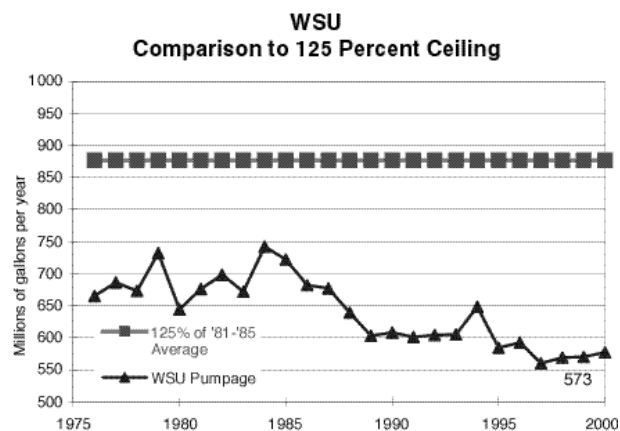
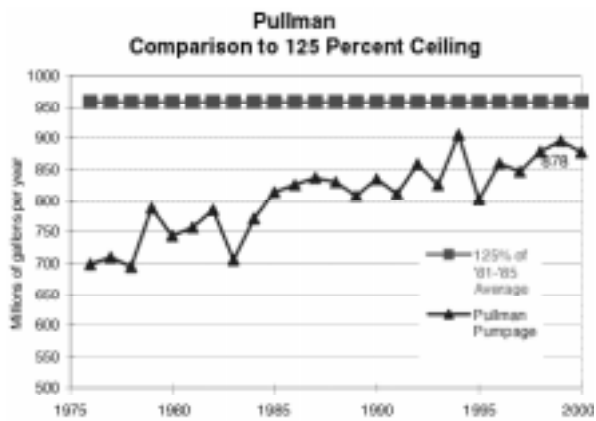
Combined, the four entities remain below the voluntary pumping limits.

Enactment of pumping limits spurred the water suppliers to introduce water management policies that resulted in increased efficiencies and reduced per capita water use. As a result, the annual rate of increase in pumping per year in the 1990s has been slowed significantly. Groundwater pumpage for all four pumping entities has increased at an average rate of 0.5 percent since 1990 compared to average annual rate of 0.9 percent between 1976 and 1989. Taking population growth into account makes these pumping reductions in the last decade even more impressive. According to population data provided by the cities, the combined Pullman-Moscow population (which includes university students) grew an average of approximately 0.5 percent per year between 1976 and 1989, and in the 1990s grew at an average annual rate of 1.5 percent per year.

Moscow's pumpage has exceeded the 125-percent ceiling limit and the allowable 1-percent curve for several consecutive years. Due to the higher concentrations of iron and manganese in the city's wells, particularly in Wells 2 and 3 that pump from the Wanapum aquifer, the city filters this water before it enters the distribution system. Because of this, Moscow is required to regularly flush hydrants to reduce iron and manganese build-up in water lines and to routinely backwash the filter system, which accounts for some of the city's water usage.

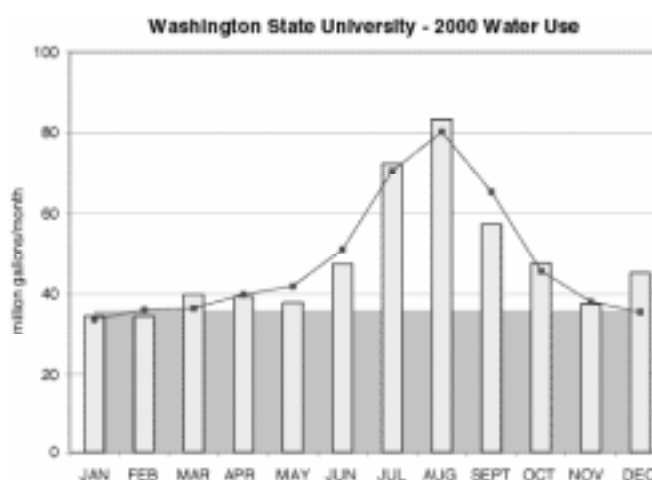
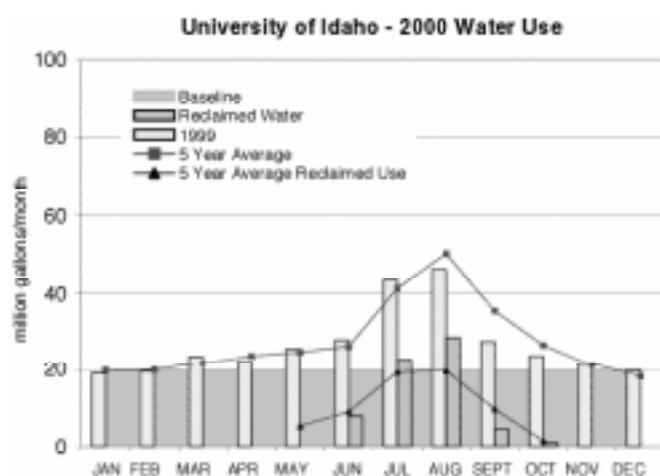
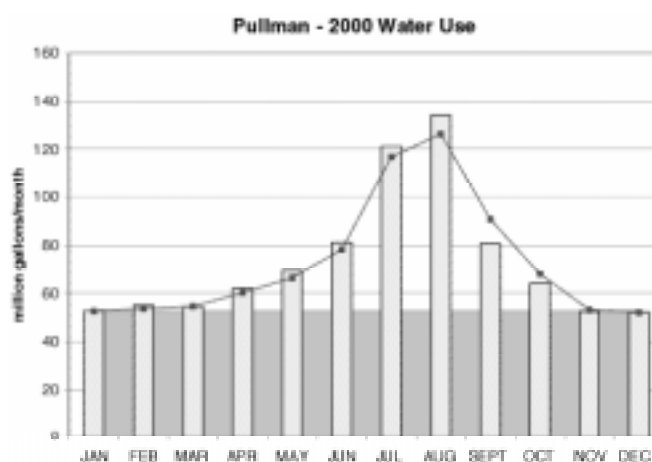
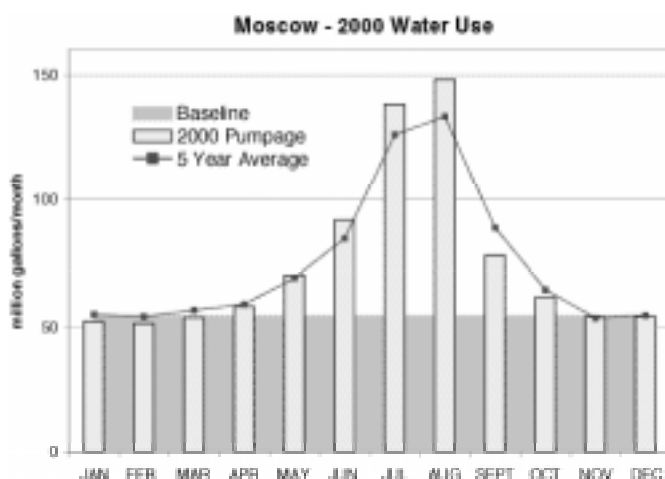
PBAC attempted to estimate the amount of groundwater pumped in unincorporated areas of Whitman and Latah Counties. Residential well owners are not required to monitor or report pumping. Using 1999 Latah County tax records that indicate if a property has a well, it was estimated that residential wells in the basin in unincorporated Latah County pump approximately 100 mgd, including indoor use and outdoor irrigation, which is equal to 3.7 percent of total groundwater pumped by the four pumping entities. Rural Latah County wells are typically shallow (less than 250 feet) and therefore most likely pump from the Wanapum aquifer, which has not experienced recent water level declines. Whitman County has not provided similar tax records to PBAC so there is no estimate available of water use outside of Pullman city limits. Without a well count, it is difficult to estimate water usage. The area of the basin in Whitman County is larger than Latah County; however, homesite density may be less. Because the Wanapum aquifer is thin in parts of Whitman County, it is likely that many residential wells pump from the Grande Ronde aquifer and are affected by basin-wide water level declines.

In 2000, Pullman's pumping decreased slightly from 1999 levels, whereas pumping at Moscow, WSU, and UI all increased. Of the four entities, only Moscow exceeds the voluntary pumping limits.



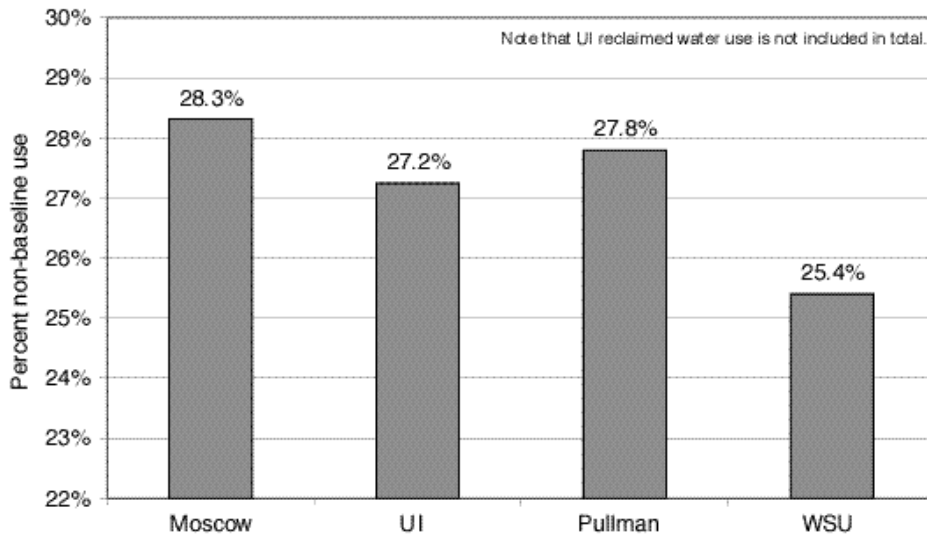
Monthly and Peak Water Use

The difference between average winter and summer pumping provides a general indication of the amount of groundwater pumped for outdoor use during the summer months. Due to irrigation demands, residential and institutional water demand is much greater in the hotter and drier summer months than during the rest of year. This water use pattern is typical in the arid western half of the country. On the following charts, the **baseline** water use is defined as the average monthly pumpage for November through February for the five previous years (1995 through 1999). Peak water use is equal to the amount that exceeds baseline use. Peak water use is primarily irrigation, but it also includes other outdoor activities like swimming pool filling, car washing, and sidewalk cleaning. Reducing peak water use is extremely cost-effective for utilities, since infrastructure is built to meet the maximum peak demand.



In 2000, all four entities had the highest monthly water usage during August. The total amount of water pumped by all four entities during August (412 mg) was more than 2.5 times greater than the monthly baseline (163 mg).

Non-Baseline Water Use (Primarily Irrigation) as a Percent of Total Groundwater Use in 2000



As a percentage of total groundwater pumped in 2000, non-baseline groundwater pumpage accounted for between 25 and 28 percent of total pumping by each entity.

Per Capita Water Use

Per capita water use is defined as the amount of water used by one person in one day. Previously published per capita water use data for Pullman and Moscow (including the universities) ranged from around 150 to 180 gallons per person per day (gpd), with an average of approximately 160 gpd using population data from the 1990 U.S. Census, and assuming a constant annual growth rate to estimate population in subsequent years. Census data from 2000 should become available during 2001 and will allow for a more accurate comparison of per capita water use between Pullman and Moscow than is currently possible. In spite of the limitations of the available population data, it appears that per capita water use has declined in the last decade. Between 1990 and 1999, population increased by as much as 13 percent based on data provided by the cities of Pullman and Moscow (refer to PBAC 1999 Annual Report) while total water use increased only 4.6 percent.

Note that the available per capita usage figures are calculated from total pumpage divided by total population, and therefore include commercial and institutional uses of water as well as household use. This number should not be confused with *indoor residential per capita use*, which quantifies the amount of water used in a residence by an individual for personal needs (showers, laundry, toilets, dishwasher etc), and averages 69.3 gpd nationally (AWWARF, 1999). Because of the difficulty in collecting these data, there no information currently available on residential end uses of water in the Palouse area to compare with the national average.

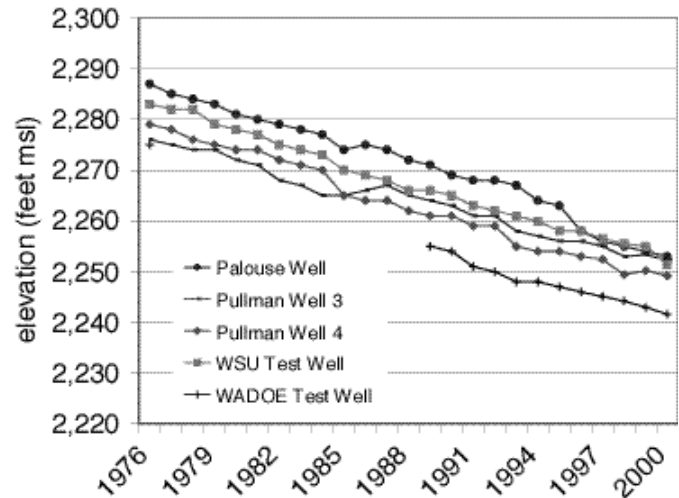
Groundwater Levels

Regardless of annual increases or decreases in amount of groundwater pumped since groundwater development began in the late 1890's, the groundwater levels in municipal wells in the Grande Ronde aquifer have generally experienced consistent annual drops in water levels of 1 to 2 feet per year. In 2000, PBAC realized that the continually declining water levels in spite of the recent attempts in the 1990s to stabilize annual pumping rates indicate that the amount of groundwater pumped is more than the amount that is being naturally recharged, or replaced, to the Grande Ronde aquifer. These data also suggest that the rate of groundwater decline occurring in the Pullman area is more uniform than the rate of groundwater decline in the Moscow area, although some of the fluctuation in Moscow's water levels has been attributed to recalibration or replacement of measuring devices in 1997-1998.

Water level datas are supplied to PBAC by each entity and, until recently, there was no method to verify measuring techniques or calibration. As part of the research that PBAC is funding, well elevations will be surveyed and a network of monitoring wells will be established using the newly acquired water level transducers/data loggers. This network means that water level changes will be recorded much more accurately across the basin in the future.

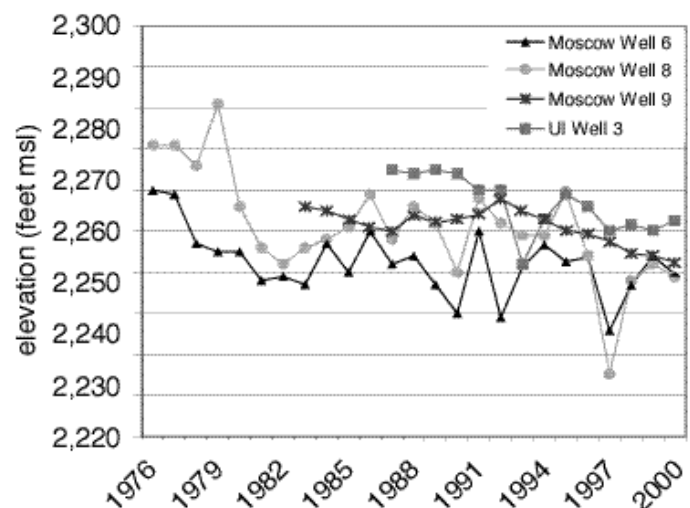
Historical water level data for the Wanapum aquifer is obtained from water leveling devices installed in Moscow Wells 2 and 3. Pumpage from the Wanapum has decreased since the 1950s when declining groundwater levels prompted Moscow and UI to drill new wells into the Grande Ronde. Some fluctuations may be due in part to inaccurate measuring devices.

Water Level Elevations in Grande Ronde Wells - Pullman area



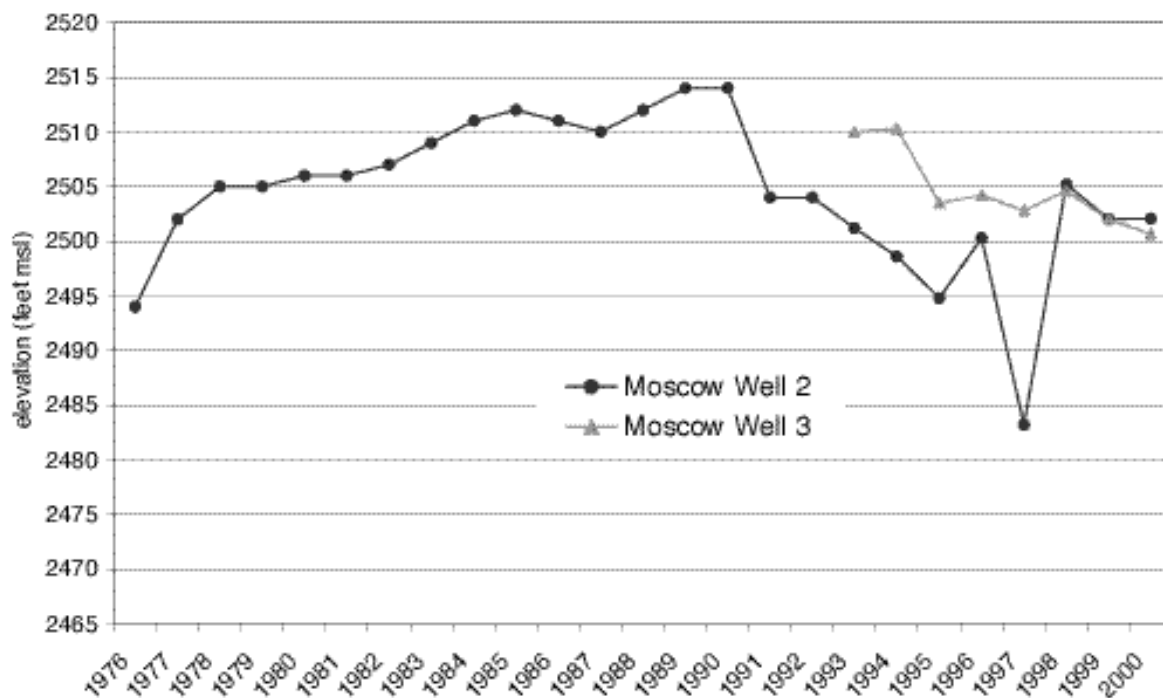
Water levels in Grande Ronde wells in Whitman County, Washington show a steady decline between 1 and 1.5 feet per year during the last 25 years. The Washington State DOE well is located along the Moscow-Pullman Highway, approximately halfway between the two towns.

Water Level Elevations in Grande Ronde Wells- Moscow area



Water levels in Grande Ronde wells in the Moscow area also are declining, although the rate of decline is apparently not as constant as it is in the Pullman area.

Water Level Elevations-Wanapum Wells



Groundwater level elevations in Wanapum wells fluctuate in response to pumping, but have declined approximately three ft in the last three years.

Water Quality

Water quality in the Palouse basin remains very high. No violations of health-based standards for analyzed constituents were reported in 1999, the year for which most recent data are available. Concentrations in water supplied to the public were below federal drinking water standards, or Maximum Contaminant Limits (MCLs), for all analyzed constituents. Because of the high quality of groundwater, the water suppliers need only treat the water with a small amount of chlorine to prevent bacteria growth from occurring in the water supply system. No additional treatment is necessary, except to remove iron and manganese in from water pumped from several of Moscow's wells. Higher concentrations of iron and manganese in Moscow's water supply are attributed to a greater abundance of sedimentary interbeds enriched in iron and manganese in eastern portion of the Palouse Basin.

PBAC Representatives

Moscow

Tom Scallorn, Water Department Superintendent	<i>moswtr@attglobal.net</i>	208-883-7107
Steve Busch, City Council President	<i>steveb@moscow.com</i>	208-883-3021
Gary Presol, Director of Public Works (<i>retired Dec. 2000</i>)		

Pullman

Mark Workman, Director of Public Works	<i>mark.workman@ci.pullman.wa.us</i>	509-334-4555
Sue Hinz, City Council Member	<i>hinz@wsu.edu</i>	509-335-3583

University of Idaho

Larry Kirkland, Chair 1999-2000, Energy and Environmental Engineer	<i>larryk@uidaho.edu</i>	208-885-6683
Jay Becker, Vice-Chair (<i>beginning 2000</i>) Assistant Director of Utilities	<i>jayb@uidaho.edu</i>	208-885-4298

Washington State University

Craig Benjamin, Vice-Chair 1999-2000; Chair 2000-2001, Asst. Director of Facilities Operations	<i>craig_benjamin@wsu.edu</i>	509-335-9017
Pete Grigas, Campus Planning Manager (<i>beginning 2000</i>)	<i>grigas@wsu.edu</i>	509-335-3978
Jay Becker, Facilities Operations (<i>ending 2000</i>)		

Latah County

Tom Townsend, Citizen	<i>ttownsend@moscow.com</i>	208-882-0061
Loreca Stauber, Board of County Commissioners	<i>stauber@latah.id.us</i>	208-882-8580

Whitman County

Derek Pohle, County Engineer	<i>derekp@co.whitman.wa.us</i>	509-397-6206
Jerry Finch, Board of County Commissioners (<i>beginning 2001</i>)	<i>maribethb@co.whitma.wa.us</i>	509-397-6200
Les Wigen, Board of County Commissioners (<i>ending 2001</i>)		

Executive Secretary and Technical Advisor

Juliet McKenna	<i>pbac@uidaho.edu</i>	208-885-4569
----------------	------------------------	--------------

References and Additional Information

Available from PBAC upon request.

Appendix 2000 ACTION PLAN COMPLIANCE REPORTS

In 1992, Pullman, Moscow, Washington State University, the University of Idaho, Latah County, and Whitman County each established action plans for the use and protection of groundwater from the local aquifers. Below are the compliance reports highlighting the major accomplishments of Pullman, Moscow, UI, and WSU.

City of Pullman

1. The City of Pullman has consistently maintained pumping below the 1% limit. The pumpage in 2000 was 872 million gallons, a decrease from the 1999 pumpage of 896 million gallons. The 125% pumping ceiling has not been exceeded. Perhaps more important than the numbers themselves are the efforts that have been made by the City of Pullman to account for and control the production of water:
 - a. In 1987 the City of Pullman started testing and calibrating the master meters on the wells every 5 years for more accurate pumping records.
 - b. In 1987, the City of Pullman also started a water meter replacement program by replacing 150 to 200 old (23+ years in service) meters yearly. This program improves the reliability of consumption records.
 - c. In 1989, the City of Pullman initiated a leak detection program by hiring a contractor to survey approximately 20 miles of water distribution lines yearly. The leak survey and repair of found leaks drastically improves the water consumed/water pumped percentage.
 - d. In the early nineties, the City of Pullman conducted a field survey to verify that all buildings were metered and that the utility accounts matched.
 - e. In 1986, the City of Pullman purchased Itron electronic hand held meter reading equipment. On accounts that have a 50% higher usage compared to the usage of the previous year, a check is made to verify the meter reading and the customer is also notified of a possible leak on their side of the meter.
 2. Conservation of potable water resources was addressed in the Comprehensive Plan adopted in April 1999. Specific mention of this is made in Policy LU8.3 and Goal CF2 and it's corresponding policies. Zoning Code provisions to implement some of these policies are in the process of revision.
 3. The gallon-per-minute demand for new developments is calculated based on the number and type of plumbing fixtures proposed. This information is used to size water meters.
 4. The City of Pullman adopted the 1997 Uniform Plumbing Code as amended by the State of Washington which implements water conservation performance standards. Maximums are as follows:

Toilets	1.6 gallons/flush
Urinals	1 gallon/flush
Faucets/Shower	2.5 gallons/minute
 5. In 1988, the City of Pullman, in conjunction with Washington Water Power, provided residents with low flow fixtures for sinks and showers and also toilet dams. A limited number of kits were available and these were primarily provided to the larger apartment complexes. The kits were not particularly easy to give away, with many potential recipients wanting city personnel to install the kits as a condition of taking them. Significant efforts in this regard since that time have not been made and currently there are no such plans for the near future.
 6. The water rates adopted by the City of Pullman in 1998 included a volume surcharge of approximately \$0.22 per 100CF for the billing months of June through September. The first year of implementation for this surcharge was 2000.
 7. Landscaping at new City of Pullman facilities is typically with drought-tolerant plantings that do not require irrigating except for perhaps the first year or two. Landscaping at existing facilities is gradually being modified to replace grass with shrub beds that require little, if any, irrigation. As irrigation systems require maintenance, irrigation heads are updated with more efficient heads.
 8. The City of Pullman has published water conservation articles and tips in the local papers and on the City of Pullman's government access TV channel. Beginning in 2000, the monthly bills also include a printed water conservation tip printed at the bottom of each bill and also include the usage from the previous year for comparison purposes. Conservation/billing notice fliers are also periodically included with water bills.
 9. A low irrigation demand (xeriscape) landscaping demonstration project was constructed at Lawson Gardens.
 10. City of Pullman has consistently supported membership in PBAC with funding for studies and research projects.
 11. The City of Pullman complies with all State and Federal regulations pertaining to hazardous materials, storm water disposal, solid waste disposal, sewage sludge disposal, non-point source, household contributions, and well construction and abandonment.
- The following items from the Action Plan have not yet been implemented.
1. Requiring installation of low water use landscaping on all new commercial and multi-family developments will be considered

as part of the Zoning Code revisions currently in process. The Planning Commission and City Council are expected to deliberate over these revisions in 2001.

2. The City has not enacted a conservation surcharge on all users with revenues dedicated to education efforts including Committee sponsored research projects. The appropriate time to consider such a surcharge will be when a new utility rate schedule is next considered, which will not be until at least 2003.

City of Moscow (Action Plan updated on March 6, 2000)

1. Moscow maintains summer/winter rates to encourage water conservation and is actively reviewing other options and billing programs.
2. The City has begun to require developers to loop dead-end water mains on a case by case basis; some discretion is being exercised in regard to the very short dead-ends that do not need to be looped. This eliminates water quality problems, and subsequent hydrant flushing that wastes large quantities of water.
3. The City participates in numerous water conservation programs that involve education and water conserving devices including: participation in Project WET to educate teachers in Moscow, display of water conservation material at the Moscow School District's "School to Work Program," and installation of water conservation devices in about 35 homes, including 92 shower heads and 124 bath aerators, 35 kitchen sink aerators and 10 commode flappers.
4. The FY 2001 budget contains \$24,800, for water conservation programs.
5. Water use is metered at public facilities such as parks and public buildings and new meters are being added as needed.
6. The City continues to make wastewater effluent available for irrigation on University of Idaho campus. In addition to providing wastewater to the UI, Moscow recently retained Kimball Engineering to prepare a Facility Study, that addresses using reclaimed water on City Parks and other city-owned property.
7. The City of Moscow irrigates the wastewater treatment plant landscaping with effluent and plans to continue the practice.
8. Moscow has pledged funds to assist in creation of a low-water-use (xeriscape) demonstration garden in the University of Idaho Arboretum and Botanical Gardens that will be used to educate water consumers on ways to reduce irrigation demand at residential properties.
9. The City supplies PBAC researchers with water levels and pumping data in a timely manner. The City recently hired a consultant to access historical data that would be used for a UI senior's research project that supports the PBAC-funded research.
10. In order to improve data collection abilities, the City plans to install guide tubes in all wells to allow access for monitoring

water levels. Well 6 will be done in 2001, Wells 2 and 3 have been completed, although there are some issues with Well 3 that need to be resolved. Flow meters are calibrated on each well every five years.

11. The City assures that groundwater quality is protected in the Basin by reviewing any project with possible recharge to the aquifers, complying with State and EPA water quality standards for discharge into streams, regulating toxic and hazardous waste storage to strict standards to prevent aquifer contamination, prohibiting chemical dump sites over the aquifers, and continuing compliance with EPA regulations regarding underground storage tanks. A new waste water treatment plant is currently under construction to improve effluent water quality.
12. The City continues to pump from the Wanapum aquifer to help reduce the pumpage of the Grande Ronde.

Several goals in the 2000 Action Plan have not been addressed at this time. These include:

1. Establish realistic pumping limits.
2. Require commercial developers to project annual water usage (*note: the City Engineer has the authority to require this for residential development*) for each development and indicate how they have encouraged water conservation in their proposed development, as referenced in the "Moscow Comprehensive Plan 1999", section 8 'Public Services, Facilities, and Utilities', page 8-2.
3. Encourage local plumbing codes that encourage new water users to utilize water conservation appliances.
4. Maintain accuracy of customer meters by some reasonable process or procedure to address the problem of "unaccounted" for water.
5. Encourage water recycling at building permit level for major water users.

Washington State University

1. WSU has not only stayed within the voluntary limit of a one percent (1%) increase of its pumping volume based on a five (5) year moving average starting with 1986, but has actually reduced its pumping volume by 10% (from 642 mgd to 575 mgd).
2. WSU has converted 90 percent of its irrigation to computer controlled automatic systems.
3. WSU eliminated over 20 gpm of cooling water to the drain by piping condenser water to cooling towers and/or the chilled water system.
4. WSU has continued to financially support the COMMITTEE activity, including the voluntary support of \$60,000 for the 'OK' research project currently in progress.

5. WSU continues to report appropriate water data to the COMMITTEE for analysis.
6. WSU led the regional effort to hold pumping stable for the period from 1992 to 1994 by actually reducing its consumption. This helped keep regional pumping totals very stable for nearly a decade.
7. WSU continues to protect the groundwater quality by a variety of practices including maintaining good landscape practices, eliminated underground storage, monitoring of the old hazardous waste site, monitoring sewer systems and correcting any deficiencies (leaks, cross connections, etc.) noted, completing the well head protection program and insuring that proper well construction procedures are followed, and complying with all State and Federal regulations pertaining to groundwater and surface water quality.

Additionally, WSU has undertaken a pre-design study of the potential wastewater reclaimed water project (in conjunction with the City of Pullman) and has included the project in its 10-year capital request. It is anticipated that funding for construction will be requested in the 2003-2005 and the 2005-2007 biennia.

Two of the 1992 goals were not met by WSU. These will be included in the updated (2001) action plan being formalized at this time. They are:

- Install water meters on its major water users.
- Supplement the Committee's education program with distribution of appropriate information on campus.

University of Idaho

The University of Idaho has in part met all its 1992 action plan goals. The attempt to increase recharge via land application of excess water from the waste water treatment plant and Paradise Creek did not provide sufficiently encouraging results to continue this effort. Primarily because of the low production from shallow wells 5, 6 and 7, the switching of more pumping from the deep aquifer to the shallow aquifer has not happened to the extent originally anticipated. Switching additional pumping to the shallow aquifer is now a revised goal.

UI has managed to decrease the 5 year pumping average in recent years in spite of continued campus growth. A variety of actions have contributed to this accomplishment.

1. UI has expanded the effluent irrigation system significantly over the past 9 years. A part of this is new watering, as in the expanded arboretum, but much of it is replacement of deep aquifer water irrigation with effluent. The campus' Bandfield and Central Mall Plaza have been converted to effluent irrigation and sprinkler systems on several fields, including Wicks Field, have been automated for greater efficiency. UI plans to continue the expansion of the effluent system to replace additional deep aquifer water in the next 5 years.

2. In 2000 UI installed a new effluent pump and made some improvements to the lagoons, which will help to minimize the times UI needs to fall back on deep aquifer water for irrigation of major green spaces and the golf course.
3. New technology is permitting more and more reuse of fish tank water which means less pumping of deep aquifer water. In 2000 west campus aquaculture put in a setting/storage tank so that 90 to 95% of fish water is recycled most of the year, greatly reducing the need to pump shallow aquifer water as well as removing the need for any deep aquifer water.
4. UI has also moved some of its water intensive fish research to southern Idaho, which has significantly lowered the demand for deep aquifer water for fish tanks.
5. UI implementation of centralized chilling has made it possible to reduce the amount of water used for once-through cooling and in cooling towers. UI will continue to replace once-through cooling with highly efficient central cooling as it expands the district cooling system. The Commons came online in February 2000 using UI district cooling. This minimized the amount of water lost to evaporative cooling and once-through cooling with the addition of this new building.
6. Each time UI has remodeled a bathroom or shower facility, the old fixtures have been replaced with more efficient water use models. UI will continue to follow this policy.
7. UI now requires all new buildings to have efficient water-use facilities, fixtures, equipment and appliances.
8. All new buildings on the UI campus will also have water meters to document water use. Meters are very important to understanding water use and where conservation efforts will be most effective.
9. UI grounds department is evaluating all new landscaping for suitability of using xeriscape plants that minimize the need for irrigation in the summer dry season.

In the area of maintaining water quality, UI:

1. is attempting to comply with all appropriate state and federal regulations pertaining to water use and wastewater disposal and land application.
2. continues to upgrade runoff from all new parking lots by adding grease and oil traps and has eliminated blowdown from the power plant entering Paradise Creek.
3. is working with the City of Moscow to minimize contamination of the storm drainage system by eliminating cross connections with building drains and prevent chemicals from entering the waste water system.

