



CLEAN, FLOWING WATERS FOR WASHINGTON

The Center for
Environmental Law & Policy

FACTS ABOUT WATER USE ON WASHINGTON STATE UNIVERSITY'S PALOUSE RIDGE GOLF COURSE

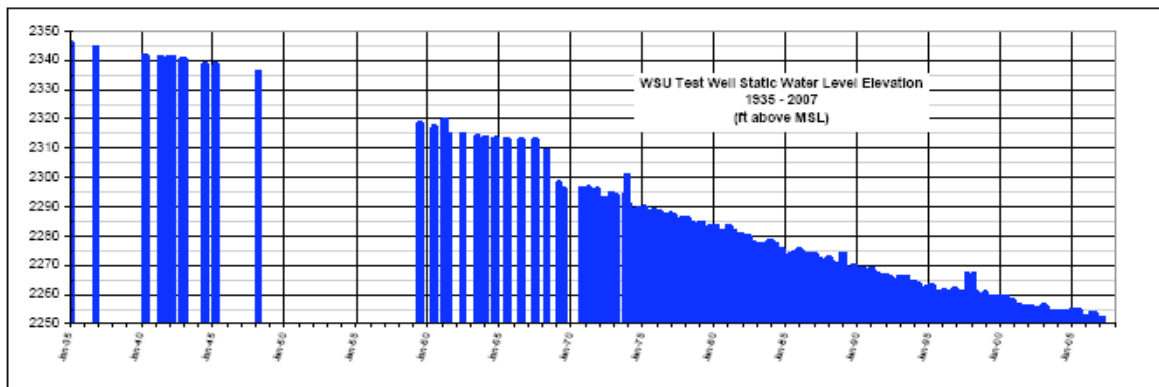
About Palouse Ridge Golf Course

In 2004, WSU president Lane Rawlins (now retired), made the decision to upgrade the WSU golf course, from a 9-hole student-oriented facility to an 18-hole "state of the art," "world class" golf course & club. The golf course proposal is controversial, largely because of its water usage. As described below, water supply in the Pullman-Moscow region is at risk because of a persistent, decades-long decline in the water levels of the Grande Ronde Aquifer – sole source of water for the region. Increased use of large quantities of Grande Ronde water for a golf course depletes community water supply and hastens the date when water is not available for basic human needs. As indicated in the figures below, the new WSU golf course will use substantially more water in the future than in the past.

About the Grande Ronde Aquifer

The Grande Ronde Aquifer is the primary source of water for the cities of Pullman, Washington and Moscow, Idaho, the University of Idaho, and Washington State University. The Grande Ronde is a problematic source of supply, however, because water levels have declined at a rate of about 2 feet per year for several decades. (See Figure 1). The current state of knowledge about the Grande Ronde Aquifer is inadequate, and no plan exists to reverse the downward trend in water levels.

Figure 1. Grand Ronde Aquifer water level trends in WSU's test well (1935-2007).



Source: Palouse Basin Aquifer Committee, Pumping and Water Levels (May 2007).

Water Use on the WSU Golf Course

Water usage on the new WSU golf course is expected to at least double that used on the old golf course and may be seven times as large as previous usage. See Figures 2 and 3.

Historically, the old WSU golf course used an average of 15 million gallons per year for irrigation of 35 acres. WSU has frequently stated that the old course used 30 million gallons per year, but newly-discovered pumping records indicate usage was significantly less.

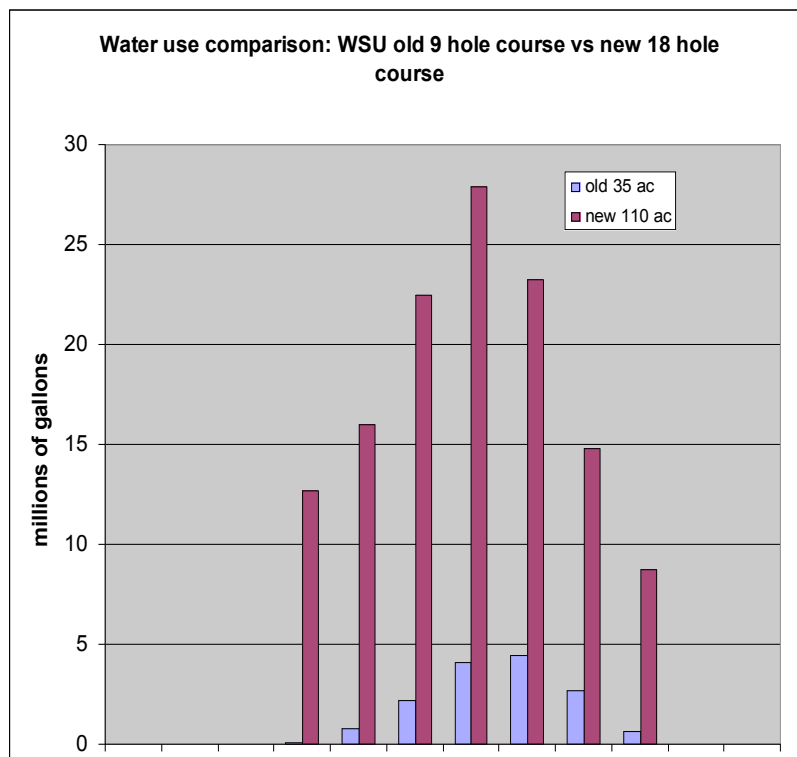
WSU's Capital Planning department states that the new golf course is projected to use between 30-55 million gallons per year for irrigation of 110 acres. However, irrigation engineering documents indicate the golf course could use up to 125 million gallons per year – seven times the usage of the old golf course and up to one-sixth of the water usage for the entire campus.

Additionally, the golf course reservoir, a 2.6 acre pond, will lose 2 million gallons per year to evaporation.

The golf course operator (an outside contractor) will not be required to pay a consumption-based rate for water or electricity costs associated with pumping water, thus eliminating a prime incentive to conserve.

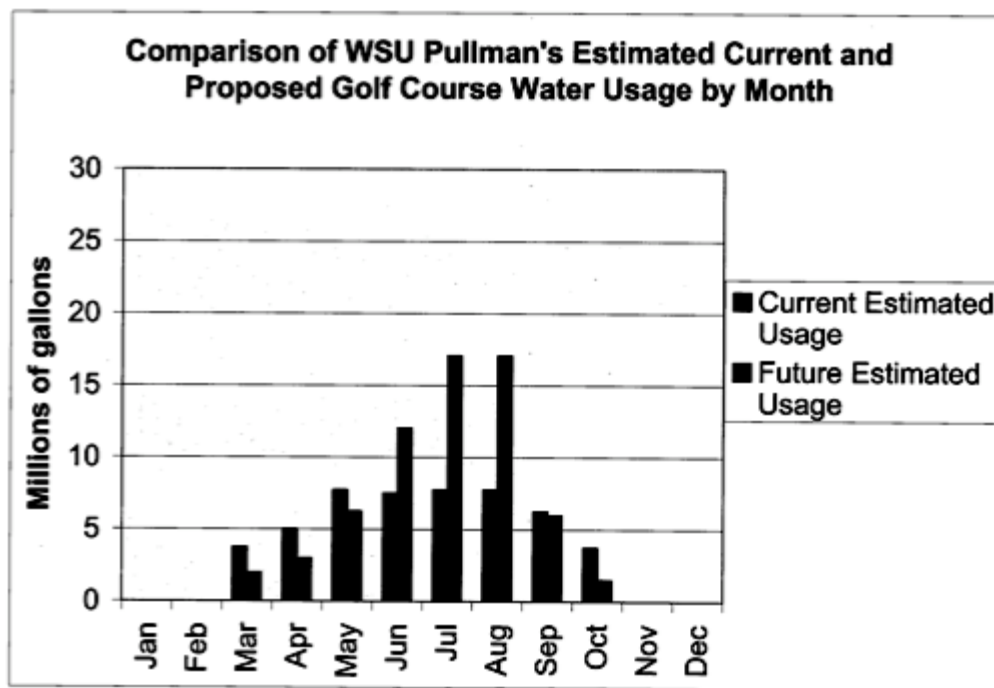
In the last several years WSU has reduced its water use by replacing the steam plant and making other usage improvements. Unfortunately, rather than maintaining reduced water usage to stabilize water declines in the Grande Ronde Aquifer, WSU is using its water savings as justification to dramatically increase usage on the new Palouse Ridge Golf Course.

Figure 2. Comparison of water usage on the old and new WSU golf courses according to recently disclosed WSU files. New golf course water usage totals approximately 125 million gallons per year.



Source: WSU.
Old golf course usage figures derive from average of 11 years of pumpage data (1995-2005). New golf course usage figures derive from Kuhn Associates (WSU irrigation consultants) projections for the new 110-acre course. See Attachments 1 & 2.

Figure 3. Comparison of water usage on the old and new WSU golf courses utilized in WSU presentations. According to WSU, water usage for the new course totals approximately 62 million gallons per year, about half the water use projected by WSU irrigation consultants.



Source: Annual City of Pullman & WSU Project Review & Coordination (n.d.)

Are Other Water Options Available?

In a word, no. WSU's golf course engineer examined other potential sources of water for the golf course and all have come up short:

- Surface water runoff is seasonal and would not provide a consistent supply during summer months. A storage reservoir to capture spring run-off would be too large, and would lose substantial water to evaporation.
- Reclaimed water is not available. WSU has tried to obtain funding to reclaim water from the Pullman treatment plant, but has run into obstacles, including the need for protection of existing water rights and instream flows in the Palouse River.
- Shallow aquifer irrigation is too uncertain to be reliable and WSU lacks water rights.

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For further information contact:

Center for Environmental Law and Policy
P.O. Box 9007, Spokane, WA 99209
(206) 547-5047 or (509) 939-1290

More information can also be found at www.columbia-institute.org/ws/WSUhome/home.html. The Center for Environmental Law & Policy is a public interest organization dedicated to promoting sustainable and equitable use of the freshwater resources of western Washington and the Columbia River watershed.

Historical water usage WSU GC (9 holes)
35 irrigated acres

	1995 gallons	1996 gallons	1997 gallons	1998 gallons	1999 gallons	2000 gallons	2001 gallons	2002 gallons	2003 gallons	2004 gallons	2005 gallons	Average gallons
April	27000	5100	46200	282700	0	21800	7900	55400	900	403900	0	77355
May	1154200	666900	1079400	1060000	243800	905000	567300	261300	1150000	805300	250000	740291
June	1960000	3832700	1861500	2153000	2549200	1485000	1895900	2239900	3433500	1112200	1255000	2161627
July	3716200	3393600	2161300	2662800	3981000	3628700	4328500	4132000	5843300	5873300	4884400	4055009
August	4042000	2093300	3825700	7075700	6122200	3539300	4288600	5695000	3471100	2854400	5946100	4450309
September	3185500	1748200	1892500	606800	6006900	978500	2761800	4032600	2911100	833400	4440900	2672564
October	196000	956700	392300	993200	180200	472700	150000	570700	1462200	1065600	543600	634836
November	0	0	200	17100	19700	31500	15600	0	0	0	0	7645
Total	14280900	12696500	11259100	14851300	19103000	11062500	14015600	16986900	18272100	12948100	17320000	14799636

SYSTEM CAPABILITY

SYSTEM IS DESIGNED TO PROVIDE 1.66 INCHES OF PRECIPITATION PER WEEK, OPERATING SIX HOURS PER NIGHT, AT 2,500 GPM DISCHARGE. THE SYSTEM SHALL BE PROGRAMMED TO PROVIDE A MAXIMUM FLOW RATE OF 2,350 GPM WHEN POSSIBLE. MOST SPRINKLERS ARE ANTICIPATED TO OPERATE FOR APPROXIMATELY 19 TO 21 MINUTES (MULTIPLE SETS) PER NIGHT DURING THE WARMEST AND DRYEST PART OF THE SEASON.

MONTH	APPROX. PRECIP. PER WEEK	AVERAGE RUN TIME PER SPRINKLER EACH NIGHT	APPROXIMATE OPERATING HOURS PER NIGHT	APPROXIMATE SYSTEM FLOW RATE
APRIL	0.82 INCHES	10 MINUTES	3 HOURS	2,350 GPM 423,000
MAY	1.04 INCHES	13 MINUTES	3 HOURS 40 MINUTES	2,350 GPM 477,300
JUNE	1.33 INCHES	17 MINUTES	5 HOURS	2,350 GPM 750,000
JULY	1.66 INCHES	21 MINUTES	6 HOURS	2,500 GPM 900,000
AUG	1.35 INCHES	17 MINUTES	5 HOURS	2,500 GPM 780,000
SEPT	0.98 INCHES	12 MINUTES	3 HOURS 30 MINUTES	2,350 GPM 493,500
OCT	0.45 INCHES	6 MINUTES	2 HOURS	2,350 GPM 282,000

NOTE: THE WEEKLY PRECIPITATION SHOWN ABOVE IS AN AVERAGE RATE. THE WEEKLY PRECIPITATION RATE AND OPERATING HOURS PER NIGHT MAY BE MORE ON CERTAIN DAYS DURING THE WARMEST AND DRYEST PARTS OF THE SEASON. THE WEEKLY PRECIPITATION RATE AND OPERATING HOURS PER NIGHT MAY ALSO BE LESS ON CERTAIN DAYS.

SPRINKLER SPACING

THE 25.8-GPM FULL-CIRCLE ROTOR SPRINKLERS (TORO 834) AND 23.3-GPM FULL-CIRCLE ROTOR SPRINKLERS (TORO 836) ARE SPACED AT APPROXIMATELY 65 FEET TRIANGULAR (EXCEPT 60 FEET TRIANGULAR AT WIND EXPOSED HIGH POINTS) OR 60 FEET SQUARE.

SYSTEM OPERATING SCHEDULE

1. START TIME AND DURATION OF OPERATION OF EACH SPRINKLER (AND VALVE) STATION CAN BE SCHEDULED INDEPENDENTLY OF ALL OTHER SPRINKLER (AND VALVE) STATIONS TO MEET SPECIFIC IRRIGATION REQUIREMENTS OF AREAS SERVED BY EACH SPRINKLER STATION (OR VALVE ZONE). TO ENHANCE USEFUL LIFE OF HYDRAULIC SUBSYSTEM COMPONENTS, SCHEDULE SPRINKLER OPERATION SO THAT NO MORE THAN NINETY-ONE (91) 25.8-GPM SPRINKLER HEADS (TORO 834 ROTORS), OR EQUIVALENT GPM COMBINATIONS, OPERATE CONCURRENTLY. OPERATE NO MORE THAN TWO (2) SPRINKLERS CONCURRENTLY ON THE SAME LATERAL ZONE. ALWAYS ENSURE THAT THE HEADS SELECTED TO OPERATE CONCURRENTLY ARE EVENLY DISTRIBUTED THROUGHOUT GOLF COURSE. A BRANCH AND FLOW ZONE TABLE WILL ALSO BE CREATED BY THE ENGINEER FOR THE MAINLINE NETWORK LIMITING THE NUMBER OF SPRINKLERS OPERATING CONCURRENTLY IN EACH BRANCH AND FLOW ZONE.

2. EXAMPLE SCHEDULE: WARMEST AND DRYEST PART OF THE SEASON

- A. FIRST SET - OPERATE EACH STATION FOR 12 MINUTES
STARTS: 10:00PM
Q = 2,350 GPM

OPERATE NO MORE THAN NINETY-ONE (91) 25.8-GPM SPRINKLER HEADS (TORO 834 ROTORS) CONCURRENTLY, OR EQUIVALENT GPM COMBINATIONS, NOT TO EXCEED 2,350 GPM (EVENLY DISTRIBUTED THROUGHOUT 18-HOLE GOLF COURSE AND DRIVING RANGE)

- B. SECOND SET - OPERATE EACH STATION FOR 9 MINUTES
STARTS: 1:00AM
Q = 2,350 GPM

REPEAT CYCLE FOR ALL NINETY-ONE (91) 25.8-GPM SPRINKLER HEADS (TORO 834 ROTORS), OR EQUIVALENT GPM COMBINATIONS.

- C. COMPLETE IRRIGATION AT 4:00 AM

NOTE: IRRIGATION CAN BE APPLIED USING A GREATER NUMBER OF SHORTER SETS. FOR EXAMPLE, INSTEAD OF ONE 12-MINUTE SET, PROGRAM TWO SIX MINUTE SETS OR THREE 4-MINUTE SETS. INSTEAD OF ONE 9-MINUTE SET, PROGRAM THREE 3-MINUTE SETS.

NOTES

- REFER TO OTHER DRAWINGS FOR LOCATIONS OF UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION. BEFORE DIGGING, CONTACT ONE-CALL TO MARK LOCATIONS OF APPLICABLE UNDERGROUND UTILITIES. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING FIELD MARKINGS SHOWING LOCATIONS OF BURIED UTILITIES UNTIL COMPLETION OF CONSTRUCTION. IF CONTRACTOR DAMAGES A BURIED UTILITY, CONTRACTOR SHALL IMMEDIATELY NOTIFY OWNER AND TAKE ALL ACTIONS NECESSARY TO MINIMIZE FURTHER DAMAGE.
- NEW MAINLINE LOCATIONS SHOWN ON PLAN ARE SCHEMATIC ONLY. OWNER REPRESENTATIVE SHALL PRE-APPROVE LOCATION OF ALL NEW IRRIGATION MAINLINES PRIOR TO TRENCH EXCAVATION. ALL VALVE BOXES SHALL BE INSTALLED IN ROUGH. ALL BELOW GRADE PIPING SHALL BE INSTALLED WITH WIRE FOR LOCATING PIPE IN FUTURE. INSTALL TRACER WIRE WITH RESERVOIR-FILL AND SYSTEM DRAIN PIPE AND ANY OTHER PIPE OTHERWISE WITHOUT WIRE.

3. MATERIALS REQUIRED

REV.	APPD.	DATE	DESCRIPTION



Kuhn Associates

CONSULTING CIVIL / IRRIGATION / DRAINAGE ENGINEERING
P.O. BOX 483
MENDOTA, ILL. 61840-0483
PHONE (309) 332-8220 FAX (309) 332-8886

urbottle Design

1000 Oak Creek S.W.
N. Washington, Maine
2013-182-1000
C (201) 542-8009