



Palouse Basin Aquifer Committee

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February 21, 2008 Meeting Minutes

Pullman City Hall, East End (Large) Conference Room

Attendance

X	UI: Michael Holthaus (Chair), Water Systems Manager		WSU: Keith Bloom, Director, Const Servs, Cap Plan Dev
X	UI: Joe Kline, Director, Utilities and Engineering	X	WSU: Rob Corcoran, Asst Dir, Arch, Engr & Const Services
X	Moscow: Tom Scallorn, Water Dept Superintendent	X	Pullman: Mark Workman (Vice Chair), Director of Public Works
X	Moscow: Walter Steed, City Council Member		Pullman: Art Garro, Maintenance & Operations Superintendent
X	Moscow: Les MacDonald, Director of Public Works	X	Pullman: Barney Waldrop, City Council Member
X	Latah County: Paul Kimmell, Citizen and County Representative	X	Whitman County: Mark Storey, Director of Public Works
X	Latah County: Tom Stroschein, County Commissioner		Whitman County: Jerry Finch, County Commissioner
X	Colfax: Carl Thompson, City Administrator		Colfax: Andy Rogers, Public Works Supervisor

Visitors and Others

David Hall, PWCN; Alyssa Gersdorf, Golder; Bob Haynes, IDWR; Guy Gregory, Ecology; Ree Brannon, CAG; Chuck Harris, UI-WoW; Cheryl Morgan, Self; Scotty Cornelius, Self; Jan Boll, UI-WoW; Fritz Fiedler, UI-WoW; Allyson Beall, UI-WoW; Barb Cosens, UI-WoW; Steve Robischon, PBAC

Call to Order

Mike Holthaus, PBAC Chair, called the meeting to order at 2:01 pm.

1) Approval of the January 17, 2008 Meeting Minutes

The January minutes were approved by consensus. Waldrop noted that the details related to the scheduling (start – end) of the Moscow Wanapum pumping project need to be included in the record. *(Note: as these dates were not specifically mentioned at the meeting they will be reported at the March meeting and included in the March meeting minutes).*

2) Presentations –

Palouse Participatory Modeling Project – Fritz Fiedler and Allyson Beall

Fiedler introduced the proposed pilot project and indicated the goal is for PBAC and CAG to collaboratively develop a decision support tool using a participatory systems dynamics modeling approach. Fiedler introduced Allyson Beall, who will be doing the bulk of the facilitation of the process. Beall presented information related to the modeling approach and examples of where it is currently being utilized.

A question and answer session ensued followed by a request for participation from PBAC members. Kline, Storey and Kimmell indicated they will participate, and members from WSU, Moscow and Pullman indicated that they will also provide participants. The group agreed to include CAG representation on the modeling team and indicated a desire to encourage the representation of local technical experts.

As currently planned, the process will involve a series of meetings over the course of approximately six months. The first meeting will be a workshop format. Robischon will solicit contact and availability information from participants, and Fiedler and Beall will attend the 2/21 CAG meeting and propose participation by CAG members.

2007 Pumping and Water Levels – Steve Robischon

Robischon presented information on 2007 pumping and water levels. Aggregate (Pullman, Moscow, WSU, UI, Colfax, Palouse) pumping for 2007 was 2% less than in 2006 and 10% less than in 1992 (the initial year of the Ground water Management Plan). Robischon noted that it appears as though the Moscow water conservation ordinance is having an effect upon summertime use. Robischon will post the information to the PBAC web site.

3) Discussion -

Moscow-Hawkins Mediation Process – Walter Steed

Steed led a discussion of the terms of the settlement agreement between Moscow and The Hawkins Companies. Steed noted that an assumption going in to the mediation was that the Hawkins development was going to occur regardless of Moscow's appeals and that the appeal process would involve significant City expenditures. Haynes indicated that IDWR and the City of Moscow have initiated discussions of what will be required for the Moscow-Hawkins sale of water to occur. Kline reported results of his analysis of the water quantity impacts of the development. Further discussion touched upon on a variety of topics related to the details of the transaction and potential implications.

4) New Business –

Proposed Grande Ronde Monitoring/Testing Continuation Project

Robischon handed out copies of a proposal by Jim Osiensky for a project that would develop tools to evaluate the impacts upon well water levels of various ASR configuration scenarios. The project would include continuation of the Grande Ronde monitoring activities currently being accomplished by Aaren Fiedler (when he graduates this May). Several members expressed reservations about approving the project at this time, and Robischon was directed to bring this item back to the Committee for consideration at the March meeting.

5) Unfinished Business, Reports, Announcements -

As the meeting was running long, and there were no unfinished business items that required immediate PBAC decisions, the group decided to table this item.

6) Next Meeting Date

The next regular meeting of PBAC is scheduled for

March 20, 2008

Moscow UI Facilities Services Center, Jack's Creek Meeting Room, 2:00 PM

7) Adjournment


The meeting was adjourned at 4:20 PM.

Submitted for review and approved at the March 20, 2008 PBAC meeting.

Steve Robischon, Executive Manager

● ● ● | Participatory Decision Support using System Dynamics

Waters of the West
Allyson Beall, Jan Boll, Barb Cosens,
Fritz Fiedler, Chuck Harris



University of Idaho

● ● ● | Participatory decision support using system dynamics

- Who?
- What?
- Where?
- When?
- Why?
- What is it?
- Why use it?
- Who is using it?
 - Where
 - When

● ● ● | What: Participatory Approaches using System Dynamics

- Also known as
 - group model building
 - mediated modeling
 - stakeholder assisted modeling
 - computer-aided negotiation (CAN)
 - Shared Vision Planning (SVP)
 - Computer Assisted Dispute Resolution (CADRe)

What: Participatory Approaches using System Dynamics

- o System dynamics
 - Stock and flow modeling software
 - Integrates multiple data types
 - historic stream flow, biological parameters
 - Insights/outputs from Modflow, Riverware
 - Economics, social concerns, policy
 - Captures system feedbacks
 - Good for uncertainty and sensitivity analysis
- o Group model building
 - Transparency
 - Collaboration
- o Facilitated problem solving

Process creates decision support tool

Why use Participatory Modeling?

Looking outward....

- o **For explanation**
 - Public education
 - Scoping
 - Building trust
 - Conflict prevention and resolution
 - What if...

Looking inward....

- o **For understanding**
 - Clarify mental models
 - Identify data needs
 - Assess implications of system feedbacks
 - Uncertainty and sensitivity analysis
 - What if...

A systems approach to scoping, planning, problem solving, conflict prevention and resolution

- o Uses the tenets of scientific theory, hypothesis testing and clear statements of assumptions
- o A nexus of science and local knowledge
 - Professional science
 - Street science
 - Experiential knowledge
- o Simulation models let users experiment with "what if" scenarios

Who: Participatory Modeling in US Agencies

- o Department of the Interior
 - Adaptive management
 - MUSIC
- o US Army Corps of Engineers
 - Shared Vision Planning
 - Computer Assisted Dispute Resolution (CADRe)

US Army Corp of Engineers

About Shared Vision Planning

Shared Vision Planning (SVP) is a collaborative approach to formulating water management solutions that combines three disparate practices: 1) traditional water resources planning, 2) structured public participation and 3) collaborative computer modeling. Although each of these elements has been successfully applied, what makes Shared Vision Planning unique is the integration of traditional planning processes with structured public participation and collaborative computer modeling.

Goal

The goal of Shared Vision Planning is to improve the economic, environmental and social outcomes of water management decisions. Shared Vision Planning facilitates a common understanding of a natural resource system and provides a consensus-based forum for stakeholders to identify tradeoffs and new management options. Shared Vision Planning creates user-friendly and understandable computer models that are

Shared Vision Planning integrates:
- Intrad and Inter Planning principles

About Shared Vision Planning

- o "Shared Vision Planning (SVP) is a collaborative approach to formulating water management solutions that combines three disparate practices:
 - traditional water resources planning
 - structured public participation
 - collaborative computer modeling
- o The goal of Shared Vision Planning is to improve the economic, environmental and social outcomes of water management decisions."
- o <http://www.svp.iwr.usace.army.mil/index.cfm>

The Corp and CADRe

- o Computer-aided dispute resolution (CADRe) is an approach to decision-making that supports negotiation among disagreeing parties with computer simulation models.
 - negotiation/bargaining as a means of resolving water resource decision making disputes
 - development of computer based systems models intended to support water resource management.
- o <http://www.iwr.usace.army.mil/cadre/index.cfm>

The Corp, SVP and CADRE

- o Alabama-Coosa-Tallapoosa-Apalachicola-Chattahoochee-Flint Basins Shared Vision Planning
- o California State Water Planning Support
- o Interstate Commission on the Potomac River Basin Cooperative Water Supply Operations
- o Lake Ontario-St. Lawrence River Study
- o National Drought Study
- o Drought Preparedness Study
 - Cedar and Green Rivers
 - Boston Metropolitan Studies
 - James River
- o RiverWare Application Development for the Upper Rio Grande Water Operations Management Program (URGWOMP)
- o <http://www.svp.iwr.usace.army.mil/resCase.cfm>

Middle Rio Grande

<http://nmh2o.sandia.gov/ExTrainSD/SDWelcome.asp>

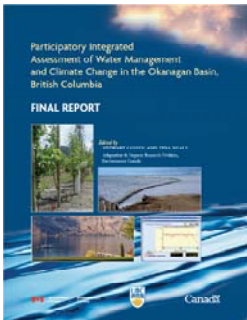
● ● ● Middle Rio Grande

- What is the region's available water supply?
- What is the region's future water demand?
- How will the region undertake to meet demand with supply?

“Key model results are expressed in terms of the Rio Grande Compact balance (the key legal constraint for the basin), aquifer depletions, water savings, and costs (including construction, operation and maintenance).”

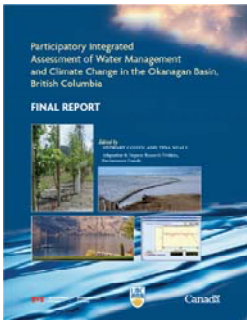
● ● ● Okanagan Basin, British Columbia Scoping model

- Participatory modeling participants
 - First nations
 - Federal
 - Provincial (BC)
 - Regional Districts
 - Local governments
 - NGOs
 - Academia
 - Agriculture



● ● ● Okanagan Basin, British Columbia Scoping model

- Concerns
 - Climate change
 - Population growth
- Model included
 - Stream flow
 - Imported water
 - Land use
 - Forestry
 - Population
 - Urban development
 - Residential demand
 - Crop water demand
- http://www.ires.ubc.ca/downloads/publications/layout_Okanagan_final.pdf



● ● ● | **Participatory Modeling in the Palouse Basin**

- Clarify what you do know
 - Assists explanation of technical elements
 - Assists explanation of decisions based on expertise and experience
- Clarify what you don't know
 - Do unknowns significantly affect decisions?
- Clarify what you need to know
 - What areas need research in near future?

● ● ● | **Participatory Modeling in the Palouse Basin**

- Provides a platform to integrate social concerns with technical information
 - Supply and demand issues
- Provides a platform to explore different concepts of the future
 - Hopes and fears

Decision support tool based on PBAC and stakeholder needs and interests

● ● ● | **Palouse Basin Pilot Project**

- Project timeline for scoping model
 - Group model building component ~ 6 months
 - 5-6 group meetings with PBAC and CAG
 - Individual meetings as needed for data input and verification
- Initial workshop structure
 - Introduction to systems thinking
 - How did we get where we are?
 - What do we currently know?
 - What is our desired future?
 - Visioning exercises for model structure

● ● ● | Resources

- Shared Vision Planning
 - <http://www.svp.iwr.usace.army.mil/index.cfm>
- CADRe
 - <http://www.iwr.usace.army.mil/cadre/index.cfm>
- Middle Rio Grande (Sandia Water Portal)
 - <http://nmh2o.sandia.gov/ExTrainSD/SDWelcome.asp>
- Okanagan
 - http://www.ires.ubc.ca/downloads/publications/layout_Okanagan_final.pdf
- Beall 2007
 - http://www.dissertations.wsu.edu/Dissertations/Fall2007/a_beall_2111907.pdf

**Development of Predictive Hydraulic Tools For the Palouse Basin in
Relation to Potential Future Pumping Variations and/or ASR Development**

Project Type: Research Proposal

Focus Categories: Aquifer Test Data Analysis, Well Drawdown Predictive Model(s), ASR Predictive Model(s)

Research Category: Ground Water Management Tool

Keywords: aquifer test results, drawdown predictions, estimates of ASR effects, predictive model(s)

Start Date: August 25, 2008

End Date: May 14, 2010

Principal Investigator:

James L Osiensky, Hydrology Program, Department of Geological Sciences, University of Idaho, Moscow, ID 83844-3022.

Phone: (208) 885-4681; email: osiensky@uidaho.edu

Development of Predictive Hydraulic Tools For the Palouse Basin in Relation to Potential Future Pumping Variations and/or ASR Development

The Grande Ronde and Wanapum aquifer systems of the Palouse Basin provide ground water for more than 50,000 residents of Latah County, Idaho and Whitman County, Washington. Ground water levels in the Grande Ronde aquifer system have been declining regionally (like in many basalt aquifer systems in the northwest) at a rate between about 0.5 and 1.5 feet per year since at least the 1960's. Ground water levels in the Wanapum aquifer system fluctuate annually relative to the degree of balance between pumping and seasonal recharge. Scientific evidence suggests that the ground water contained within the basalt flows, and interbedded sediments, of the Grande Ronde aquifer system is old with reported, spatially distributed, C-14 age dates between 4,000 and 31,000 years before present; ground water in the Wanapum aquifer system ranges in age from recent (2008) to 14,600 years before present (Crosby and Chatters, 1965; Douglas, 2004; Douglas et al., 2007, Silar, 1969). Overlapping cones of depression associated with municipal and university pumping centers have been delineated between Moscow and Pullman. Hydraulic gradients formed by 40+ years of pumping together with the existence of spatially variable, in situ water ages, suggest strongly that ground water currently is being withdrawn locally (i.e., based on wells sampled) from Palouse Basin aquifers faster than it can be redistributed and homogenized by age. This aspect of the basin hydrogeology has potentially significant ramifications relative to the detailed understanding of the ground water movement and water storage relationships within the basin aquifer systems. Because of historical ground water level declines within the Palouse Basin, water resource managers are faced with three primary options:

- 1) Conserve as much water as possible, and live with declining ground water levels.
- 2) Harvest runoff and build surface water reservoir(s) to store excess seasonal water, or pump water from the Clearwater River as was proposed in the 1960's and 1970's when it was predicted that the region would be "depleted of ground water" by 2010.
- 3) Harvest runoff, store excess seasonal water in underground reservoirs, and maximize the use of existing water distribution systems by developing ASR systems for the Palouse Basin.

Some recognized benefits of Aquifer Storage and Recovery are (<http://www.ecy.wa.gov/programs/wr/asr/asr-home.html>):

- Substantial amounts of water can be stored deep underground. This may reduce the need to construct large and expensive surface reservoirs.
- ASR systems are considered to be more environmentally friendly than surface reservoirs. They also offer more protection from tampering.

- ASR may restore and expand the function of an aquifer that has experienced long-term declines in water levels due to heavy pumping necessary to meet growing urban and agricultural water needs.

The goal of this proposed research is to develop defensible and useful tools (localized hydraulic models), based on the results of the past 40+ years of research in the Palouse Basin, that can be used to predict well interference effects from continued ground water pumping, and/or predict the “bubble(s)” of influence from potential ASR activities. The significance of this goal cannot be overstated because the results of many of the experiments, tests, well driller discussions, well log interpretations, brainstorming sessions, disproved conceptual models, etc. over the past 40+ years have never been published in written form, but have been preserved from researcher to researcher as “hand-me-down” empirical information over years of personal communications (e.g., hallway, office, and even local tavern discussions). Unfortunately, these types of details tend to be lost with time as researchers retire, move from the area, or pass away, leaving new investigators to “reinvent the wheel” because of their limited historical perspective. To accomplish the goal of this proposed research, the results of many years of geological and hydrogeological research will be incorporated into the development of predictive tools based on our current state of knowledge of the Palouse Basin hydrogeology. These tools will be developed based on detailed information compiled by PBAC (e.g., 2007 Annual Report). The predictive tools being proposed herein should not be confused with the regional ground water flow models of the past (Lum, et al., 1990; Barker, 1979). No attempt will be made to refine these models; however, the information and data compiled during this proposed investigation will include key details on the ground water hydraulics within portions of the Palouse Basin (e.g., effects of crystalline rock boundaries, proven hydraulic connections, etc.) that will be crucial for the development of an accurate, useful, regional ground water model some time in the future. In addition, the information and data compiled during this proposed investigation will benefit water resource managers because the predictive tools developed will allow for the rapid evaluation of potential drawdown and “artificial recharge” interference effects within the basin from pumping wells, and potential ASR wells, respectively.

The proposed research project will be designed as a two-year (four-semester) MS thesis project for one new graduate student in the Hydrology Program at the University of Idaho. Research will begin at the start of fall semester 2008 (August 25), and continue through spring semester 2010 (May 14). Data collection and analysis will begin immediately at the start of the project, and development of predictive tools will begin soon thereafter. Data collection will include scheduled maintenance of the Grande Ronde ground water monitoring network (download dataloggers), and continued database development (update database). All project tasks and deliverables will be coordinated between PBAC,

the principal investigator, and graduate student investigator. The completed MS thesis in Hydrology will constitute the final project completion report.

Table 1. Budget Breakdown

Project Title Development of Predictive Hydraulic Tools For the Palouse Basin in Relation to Potential Future Pumping Variations and/or ASR Development

Cost Category	Total
1. Salaries and Wages	
<u>Principal Investigator</u> <u>James L. Osiensky</u>	\$0.0
<u>Graduate Student</u>	\$31,016
2. Fringe Benefits	\$933
3. Supplies	\$500
4. Equipment	---
5. Services or Consultants	---
6. Travel	\$1300
7. Other direct costs	\$14,884
8. Total direct costs	\$48,633

Table 2. Budget Justification

Project Title: **Development of Predictive Hydraulic Tools For the Palouse Basin in Relation to Potential Future Pumping Variations and/or ASR Development**

Salaries and Wages.
Graduate Student Salary - \$1500/month (20 hrs/wk), begin 8/25/08, end 5/14/10
Fringe Benefits.
Graduate Student Fringe – 1% except for summer 2009 (May 16 through August 23, 2009), 9% during the summer.
Supplies.
Miscellaneous expenses and supplies related to research (Total \$500)
Travel.
Travel expenses include local travel within the Palouse Basin for data collection. (Total \$1,300)
Other Direct Costs
Graduate Student Health Insurance (4 semesters) (Total \$2,952) Graduate Student Fees (4 semesters) (Total \$11, 432) Graduate Student Thesis/Report Production Costs (Total \$500)

REFERENCES

Barker, R.A., 1979, Computer simulation and geohydrology of a basalt aquifer system in the Pullman-Moscow basin, Washington and Idaho. 48, Washington Department of Ecology.

Crosby, J.W. III. and R.M. Chatters. 1965. Water dating techniques as applied to the Pullman-Moscow ground-water basin. Bulletin 296, Washington State University College of Engineering Research Division, Pullman, Washington.

Douglas, A.A. 2004. Radiocarbon dating as a tool for hydrogeological investigations in the Palouse Basin. M.S. thesis, Hydrology Program, Department of Geological Sciences, University of Idaho, Moscow, Idaho.

Douglas, A.A., J.L. Osiensky and C.K. Keller. 2007. Carbon-14 dating of ground water in the Palouse Basin of the Columbia river basalts. *Journal of Hydrology*, 334, 502-512.

Lum, W.E.I., J.L. Smoot and D.R. Ralston. 1990. Geohydrology and numerical analysis of ground-water flow in the Pullman-Moscow area, Washington and Idaho. U.S. Geological Survey Water-Resources Investigations Report 89-4103. 73p.

Silar, J. 1969. Ground-water structures and ages in the eastern Columbia basin, Washington. Bulletin 315, Washington State University College of Engineering Research Division, Pullman, Washington.