Wednesday, July 16, 2008, 10:00 to 1:00
Water Subcommittee of the
Natural Resources Committee of the
Global Warming Commission

Venue: Department of Agriculture's Food Innovation Center
1207 NW Naito Pkwy
Portland, Oregon

Summary: The meeting began with a baseline view of Oregon's freshwater resources, and moved into what scientific models are predicting about the future impact of climate change on water resources in Oregon. The group then engaged presenters in a question and answer session, and conducted two group discussion sessions with the following questions: 1) what one "no regrets" public policy would you recommend Oregon pursue in order to adapt to Climate Change, and 2) what do you find "scary" about such a public policy?

This meeting is the first in a series, hosted by the water subcommittee.

Participants:

Joe Whitworth, Oregon Trout (Subcommittee Co-Chair)
Phil Ward, Oregon Water Resources Dept. (Sub Co-Chair)
Matt Donegan, Forest Capital (Committee Co-chair)
Russ Hoeflich, The Nature Conservancy (Comm. Co-Chair)

Allison Aldous, The Nature Conservancy
John Audley, The Nature Conservancy
Betsy B., Canyon Farms
Jane Bacchieri, Governor's Ofc
Leslie Bach, The Nature Conservancy
Brenda Bateman, Oregon Water Resources Dept.
Lisa Brown, Water Watch of Oregon
Michael Campana, Institute of Water & Watersheds, OSU
Katy Coba, Oregon Dept. of Agriculture
Mike Dennis, The Nature Conservancy
Dept. of Agriculture's Food Innovations Center
Phil Donovan, Umatilla Tribes
Andrea Durbin, Oregon Environmental Council
Nan Evans, The Nature Conservancy
Alan Hamlet, Climate Impacts Group, Univ. of Washington
Delvis Heath/Jim Noteboom, Warm Springs Tribe
Tod Heisler, Deschutes River Conservancy
Teresa Huntsinger, Oregon Environmental Council
Eric Lemuelson, Lemuelson Vineyards
Holly Michael, Oregon Dept. of Fish and Wildlife
Peter Mohr, Attorney
Sara O'Brien, Defenders of Wildlife
David Pilz, Oregon Water Trust
Jim Rue
Gabrielle Schiffer, State Building Codes Divison
John Schlosser, Watch Watch
Siletz Indian Tribes
April Snell, Oregon Water Resources Congress
Lorna Stickel, Portland Water Bureau
Kay Teisl, Oregon Cattleman's Association
Jeff Webber, DLCD's Coastal Program
Terry Witt, Oregonians for Food and Shelter

I. Overview of Water Subcommittee

Welcome, introductions, overview from Water Subcommittee Chairs, Joe Whitworth and Phil Ward

Opening comments by Joe Whitworth: The GWC was tasked by the Governor to consult with state agencies and others on mitigation and adaptation strategies and actions proposed, and may by formal motion recommend such strategies and actions as consistent, generally consistent but indeterminate as to how/when the goals would be realized, lacking sufficient information, or inconsistent with Oregon global warming goals. Three other subcommittees are in operation (Agriculture, Fish & Wildlife, and Forestry), looking at the implications of climate change on these resources. In the case of this subcommittee, we are focused on water, and are now in an information gathering mode to provide the group a common set of understandings upon which we can build. It the hope of this Chair that we can do more than merely line up along the historic skirmish lines of water management and begin to develop a durable group of interests that are looking to make progress—as the days of easy water are over for Oregon.

Welcome from Natural Resource Committee Chairs, Matt Donegan and Russ Hoeflich

II. Introductions
See above for meeting participants.

III. Dr. Michael Campana, Institute for Water and Watersheds, OSU
See accompanying power point file, "Oregon's Fresh Water Resources Landscape—an Overview."

Summary:

- Oregon's Critical Water Issues (about 13 listed, including taking a resource inventory).

- Water Status Report (based on the work of the Oregon Business Council). Surface water generally already allocated in summer months. Stream flows do not necessarily meet instream needs.

  Oregon activities underway or proposed: Governor's H_2O Initiative; water roundtables scheduled for Sept.-Oct. 2008 in Salem, Medford, Newport, Bend, Ontario; Oregon Business Council interested in a water agenda, the Oregon Water Resources Department's Oregon Water Supply and Conservation Initiative (OWSCI), OWRD Community Grant Programs, etc.

- Water Quality, Quantity and Use. While interconnected, they continue to be regulated separately (e.g., TMDLs require flow information). Temperature, a key component of TMDLs will likely increase in importance with global warming.

- Water Planning/Strategizing, Means establishing an orderly plan, assessing what water resources you have so that you can protect it, developing scenarios, making policy recommendations. Suggest looking at New Mexico model (see www.waterassembly.org, the internet site for the Middle Rio Grande Water Assembly, formed as a result of the MRG Regional Water Plan); The New Mexico state plan is assembled from 16 regional plans, but does not specifically account for the presence of more than 20 tribes & pueblos. Recent developments in New Mexico's planning include climate change. Questions one should ask during the planning process: what is the available water supply? What will future requirements be? How should the region guarantee public participation?

- Concluding Remarks. Comprehensive assessment of water resources is crucial. Ensure integrated water planning. Integrate water and land-use planning. Use "soft path" approaches (not hard infrastructure) where possible. Encourage community governance and partnerships, agency coordination, research support. Don't forget ground water and the environment!

Comment / Q&A Period:

1. Oregon is starting the data collection process with the Oregon Water Supply and Conservation Initiative as a foundation. The Department does coordinate its water rights permitting process with county land-use planners.

2. Where does economics enter the equation? Campana: Water markets, ecosystem markets, pollution trading, demand management.

3. Talk more about water-land coordination. Ward: the Water Resources Department needs better information regarding the status of Oregon's groundwater resources, so that local jurisdictions have the data they need to make siting decisions. During last decade, these budget resources have dwindled.

4. Should counties have staff with knowledge of water? Ward: Water permitting is a significant scientific discipline; WRD has 10 hydrologists and would like have a liaison with each of the counties to get and provide information. Campana: Benton County is grappling with this very issue; counties are going to have to step up with some local resources, while working collaboratively with the state. The county's job is not to allocate water.

IV. Dr. Alan Hamlet, Climate Impacts Group,
University of Washington's Civil & Environmental Engineering Dept.

See two accompanying power point files, "Hydrologic Modeling Studies to Support Diverse Climate Change Planning Needs in the Columbia River Basin" and "Hydrologic Implications of Climate Change for the Pacific Northwest and Columbia River Basin."

Phil Mote at UW can go into more detail about the actual science that went into the graphs and conclusions presented here today. The public has been inundated with time series pictures, demonstrating changes in climate. As a result of "Inconvenient Truth" and other high profile presentations, the discussion has moved away from "is this really happening?" to "what should we do about it?" As a result, UW's Climate Impacts Group is spread thin in response to requests for research.

Who here has read the IPPC's executive summaries? It's good quality; good place to start your research.
They conclude with 90 percent confidence levels that humans are changing climate by burning fossil fuels.
Data shows steady temperature rise, with other natural variables (volcanoes, solar variability) not enough to explain the constant increase.

Now come down in scale to North America. Regarding temperature, we see strong warming trends, especially in high latitudes. The greenhouse effect will be very strong during winter, partly because it is so dark; we'll see strong warming during summer in the Pacific Northwest (PNW). Regarding precipitation, we'll see quite a bit of drying across the whole picture, especially in the sub tropics. PNW will see little change in overall precipitation, but seasonally, we'll see wetter winters and drier summers.

Temperature Models. More on Phil Mote's data: He applied 10 climate models to the PNW (e.g., coupling our economy with fossil fuel use, de-coupling the economy from fossil fuel use, and more scenarios). The average warming across all models was approximately 2 degrees Celsius by the end of the 20th Century. Even aggressive mitigation scenarios show temperature rise because of the inertia at work to increase temperatures (transportation systems, ocean characteristics). Therefore, we're going to need an adaptation plan as well. We have high confidence levels in these models; they show very strong warming signals.

Still looking at the 10 models, but with a view of precipitation. We have a much lower confidence level in these models. The question is: will it be warm and wet or warm and dry? The answer is "both," at different times. Look at an example from the Columbia River Basin, based heavily on precipitation records between October and March. We've seen the Basin warm and dry for 25 yrs, followed by a warm and wet period for 30 years, and then all over again. Policy makers will need to choose flexible solutions, capable of handling these kinds of patterns. We don't know much about the sequencing. If we experience a warm & wet era first, we'll be lulled into complacency, and fail to plan our infrastructure, behaviors, and policy for the warm & dry period.

Precipitation Models. Precipitation in warmer locations will be the most sensitive to warming (e.g., Coast, West side of the Cascades, Olympic Peninsula). Snow is dramatically altered in these models. We've seen 80 percent loss of snowpack over the course of 80 years in observed data. The computer-generated models closely mirror these data.

The Problem with Historical Data. Historically, water management has depended greatly on observed stream flow data. We're moving into an era where we'll have to depend on modeling (developing scenarios not yet seen before). We will need to develop new kinds of hydrologic and snow models. Regression equations, by comparison, have more wildcards and less dependability in a global warming scenario and are probably not appropriate tools.

For example, the Columbia River Basin Treaty assumed a stationary climate. When we warm the basin through computer modeling, we get very different results in Canada vs. US (i.e., 12% loss of Canada snowpack vs. US 30%). Current treaties and agreements will become "unbalanced" by climate change.

In another example, look at a modeled hydrograph of stream flow changes in Naches River Basin associated with two degrees Celsius increase. If you keep precipitation the same, but raise temperature, you'll see more winter rain, elevated stream flows, less snowpack, less natural storage, more evaporation instead of snow melt. You'll see a dramatic loss of water availability during the summertime. Peak flows used to be in June because of snow melt; but new models are showing peak flows in December because of rainfall/ runoff.

We'll also need to keep an eye on the extremes (droughts and floods).
Flood risk decreases in snow-dependent basins because warming and precipitation are moving in opposite directions. Flood risks will be higher in rain-fed basins, because of even more rain, and not much change in warming.

Note broad, landscape-scale ecosystem impacts. The entire PNW will get warmer at the same time, resulting in large-scale impacts, e.g., mountain pine beetle attacks (80% of the Fraser Basin), fire risk (resulting in sediment transport), loss of glacial mass, change in water quality, impact on land cover, the energy sector, outdoor recreation, environmental services, transportation corridors, sea levels, and engineering design standards.

For approaches to adaptation and planning, see research conducted by Laura Whitely-Binder at U of W.
Her recommendations include:

1. Use scenario-based planning, rather than relying solely on historical records
2. Expect surprises. We don't know a lot right now.
3. Plan for the long haul. Design adaptive responses and agreements that will be "self tending" given the coming changes. We won't be able to intercede from the policy side over and over again to adjust for the unexpected surprises. Create more robust behavior to store water, keep water cold, conserve water, etc.

Part II of Dr. Hamlet's Presentation: Specific Climate Impact Group Study

Funded primarily by HB 2860 in Washington State, plus Oregon Water Resources Dept., British Columbia, Portland Water Bureau, Bonneville Power Administration, Northwest Power Conservation Council, U.S. Bureau of Reclamation/Dept. of Interior, Idaho, Montana, and US Army Corps of Engineers' Seattle and Portland Districts.

Purpose: create widespread scenarios across entire Columbia River Basin (already had studies for flood control, hydropower, and geographic studies specific to the Portland and Seattle areas).
Geographic scope: 267 stream flow locations to generate study data.
Study Components: Temperature, precipitation, solar radiation, soil moisture, evaporation, and streamflow
Cost: $16 million total in studies related to enhancing agricultural and municipal water supplies in the Columbia R. Basin
Research applications will include:
- A new, detailed meteorological database
- Water resources planning studies (water supply, hydro prod, flood control, env services, rec)
- Ecological studies (forests, fish)
- Engineering Design Standards

Resulting medium scale studies = 4 basins in Washington
Proposed downscaled scenarios (40 locations for different time pds in the future, integrating precipitation & temperature)
Project Status: Completed data sets, selected stream flow locations
2008: Calibrating and building models, running scenarios this winter
2009: Put everything on line and make publicly accessible next Spring/Summer

Comment / Q&A Period:

Q1: given Naches slide showing a change in stream flow hydrographs, what should we do?
Hamlet: There are two schools of thought on this. From an engineering standpoint, we'll have a loss in natural storage. Engineers use this to justify more storage so that we have a mechanism to transfer water from wet to dry seasons. To avoid environmentally undesirable effects, we're leaning toward below-ground storage instead of above ground. However, we also have huge gains to make from just reducing water use.

Q2. I'm skeptical of passing laws based on solely on computer modeling. Agricultural and municipal users will clamor for more capture and storage infrastructure.
Hamlet: But there's a lot of innovative thinking that can come from modeling. For example, you can use existing canals to recharge shallow aquifers in the wintertime; this may help summer flows. In Idaho, however, they found that with their clay layers, such an approach doesn't work well and they needed to use injection wells.
Campana: Aquifer Storage and Recovery (ASR) is an option we're considering right now in Oregon and should consider more. It's not a panacea and won't work everywhere. However, where it is appropriate, ASR will likely have fewer environmental consequences than additional above-ground storage and could also be used to augment stream flow. Use conservation, economics, and "soft" (non-infrastructure) solutions as very serious options.

Q3: Dr. Hamlet talked about flood risk, but the hydrographics data and resulting conclusions don't seem to match very well. Rain-on-snow dominated hydrographs show reduced peak flows, which SHOULD mean reduced flood risk. We may have an opportunity to use flood control reservoirs for a different purpose in the future.
Hamlet: The Willamette and Columbia Basins as a whole should decrease in risk, yes. In fact, with the Corps' current rule-curves, we won't be able to fill the reservoirs under climate change scenarios. USACE needs to take an opportunity to get climate change and policy needs into their research budgets.

Q4: Regarding temperature and precipitation graphs, how far back did you go?
Hamlet: 1915.
And, how far back with your climate reconstruction go?
Hamlet: 1580s. 1780s. 1980s.
And, can we find out what the 267 streamflow points are?
Hamlet: we just finalized these last week and can make these available.

Q5: Do the models incorporate ground water recharge sufficiently?
Hamlet: These tools are not well developed for many of the basins, particularly those strong in ground water. Much of the domain is dominated by surface water and there's a great need to integrate both surface water and ground water models. Studying ground water was a great need identified in Washington State, but they just couldn't get it funded.
Campana: USGS's Michael Dettinger at Scripps is working on this. It's often harder to make the case for ground water research dollars for climate change impacts because of the "out of sight out of mind" phenomenon. We don't have a good handle on ground water in Oregon (particularly in the Cascades volcanics). We need to get these data! In the whole US, there are only 130 ground water wells suitable to provide inferences on the effects of climate change.

Q6: If you were to give guidance to global warming commission, we could say one cost effective action is to restore the watershed function. What specific recommendations should we pursue to accomplish this?
Hamlet: where you have deep soil, leave it there. Developers like to scrape off topsoil, which retains all the water. Seriously consider the value of beaver dams. Deal not only with quantity, but quality (temperature) of water too.
Campana: Watershed functions help with the timing of streamflow too, because of ground water recharge and return flows. The US Forest Service is increasingly examining the role of upland/forested watersheds for recharge and water quality.

Q7: Give us 2-3 "no regrets" strategies that we should pursue (i.e., if the models turn out to be wrong, what policies should we pursue that leave us with "no regrets"?
Hamlet: Use less water and energy across the board. Individuals, communities, and agencies can all do this! This helps with our mitigation efforts as well as our adaptation efforts. On the demand side, we have a huge amount of "slop." The average household in Seattle uses 80 gallons per day of water, compared to what we use in our household (20 gpd). And we can look at the irrigation sector, where there's room for increased efficiencies as well. We also need better way to facilitate transfer of water to different uses. Washington looked closely at this policy approach. Finally, look at watershed functions, land-use decisions, and the ground water component.
Campana: Look seriously at water reuse and demand management. Economics can be used to provide solutions that we wouldn't consider before; provide incentives for people to pursue conservation. Don't forget ASR for storage options.

V. Group Discussion Session.

Part 1. Instructions from the Chair: Come up with one "no regrets" action that we can recommend as a group. The groups were created by randomly numbering off the stakeholders and given 20 minutes to discuss the question before presenting their one "no regrets" strategy back to the broader group.

Group 1: Present information that's trusted and transparent, having used a multi-agency approach. Streamline water re-use water regulations (e.g., direct injection of winter water underground). Use demonstration projects to restore watershed functions and also help with ground water storage; perhaps develop five sizable pilot projects around the state to use as test cases.

Group 2: Replicate the "McKinsey Chart" [discussed during the previous Global Warming Commission meeting], paying attention to net present value. Focus on efficiencies.

Group 3: Encourage "demand-side management" (i.e., decreasing water demand) by providing incentives for voluntary conservation (tax credits, rebates, pricing structures, ways to reduce your sewage bill, etc.). Protect senior water rights, while providing ways to conserve in both the agricultural and municipal sectors.

Group 4: Reauthorize Measure 66 funds; conduct long-term state-wide integrated water planning (including research); restore watersheds. The key to all of this is funding.

Group 5: Given the way water law works, there seems to be a strong disincentive to conserve water. The state needs to provide stronger incentives to increase water conservation, while protecting water rights. Some basins have greater opportunity to conserve agricultural water, while other basins have more opportunity to conserve municipal water. Tiered pricing is very important.

[Added later from 7/17/08 agriculture subcommittee brainstorming exercise: consider water storage and water markets!]

Part 2. Question from the Chair. What's "scary" about any or all of this?

- Scared of creating "one size fits all water efficiency standards," between and within the agricultural and municipal sectors.
- Scared of watershed restoration, if it imposes requirements on landowners.
- The state can't afford to pay for all of these programs!
- Getting rid of disincentives may mean we're tempted to "mess with the water code."
- What's scary is what's not been mentioned. The challenge before us requires something more than a "no regrets approach."
- Maintaining the status quo is terrifying. We have water problems right now without climate change.
- Designing actions based on just PNW or US models, when each of our watersheds and geoclimates are so different.
- US Bureau of Land Management controls some of Oregon's largest watersheds and they're not at the table today.

- Worried about re-creating the wheel. Take a look at what other states have done. The list of potential solutions is a lot more exhaustive than what we've created here today.
- Climate refugees; population projections are predicting 1 million people additional people in Portland in next 25 years, and that doesn't even include climate refugees (those arriving from hotter regions).

Please set aside August 8, 2008 as the next potential meeting date.
The group adjourned at 1:05.