North Platte Roundtable Meeting Minutes, 06-26-2007
7-9 pm, Parks District USFS Conference Room
Minutes submitted by Curran Trick.

Members/Guests Present

Deb Alpe
Mike Alpe
Rick Wyatt
John Rich
Kent Crowder
Paula Belcher
Greg Kernohan (Ducks Unltd.)
Dr. Dan Smith (CSU)
Mike Allnutt
Erin Light
Bob Plaska
Sara Duncan
Richard Leonard
Sandra Knox

Kent Crowder called the meeting to order.

Meeting Guests: Sarah Duncan – of the Denver Water Dept., introduced herself and her husband Dick Leonard, they are here to sit in on the meeting.

Dr. Dan Smith from CSU Soil and Crop Sciences made a presentation on high altitude crop coefficients. He came at request of Reagan Watson (sp?), director of the Water Resources Research Institute(?).

His last project was looking at better local adaptability of crop coefficients in Gunnison basin, much like N. Platte roundtable is looking at here.
Dan started by confirming that the roundtable is looking at local adaptability—and also to stress that he is not here to tell the roundtable what to do, just here to recommend.

Dan's Presentation:

"Methods of Estimating Crop Water Use" – how we look at consumptive water use.

Micrometeorological methods - something going on in the air above the crop tells us something about consumptive use, or demand (atmospheric) of the crop. Occurs on a daily basis in most environments.

There are 2 categories of methods to estimate crop coefficients – Combination methods (very sophisticated, strict data requirements, data acquisition, etc.) developed in 1948; and Empirical methods (not in use as long as the more sophisticated methods).

*Results that you get are partially defined by the methods you use; you're at the mercy of the measurement.
Empirical methods are not as accurate, but have minimal data requirements. You trade the cost-savings of minimum data requirements with less accurate data, but they are widely used. *Legal community and engineering community both use empirical methods, and so do the state's decision support systems.

COMBINATION METHODS[1]
*What are you actually computing with a Combination method? Computing a reference ET, or consumptive water use by using a reference crop.
Example of a reference crop: Grass maintained at a reference height of 10"-12" (grass reference + 15% ET = alfalfa reference). For corn or any other non-reference crop--take reference measurement and apply a crop coefficient that accounts for life cycle of crop. (Kc value)

EMPERICAL METHODS[2]

Hargreaves method -- measures temperature in a way that allows us to mimic radiation. You are computing a reference ET. Hargreaves developed a strict measure of radiation. This method can estimate radiation using temperature measurements (by taking the difference between the maximum and minimum daily temperatures, or t-diff). This is important in high-altitude environment. Why? Cloud cover holds in radiation. On a cloudy day, the difference between max and min temperature is small.
This Hargreaves method is just as accurate as a combination method. It has been used as the basis for consumptive water use in the Rio Grande decision support systems. It will not work well in mountain meadow situations, because we have never really gotten very good baseline reference measures in mountain meadow areas.

BLANEY-CRIDDLE METHODS

Consumptive use factor is the function of avg. daily temp and day length factor.
Problem – the crop coefficient depends on crop factors and environmental factors at the same time, or it just doesn't work.
K = crop coefficient

Most Colorado applications have dropped use of SCS Blaney-Criddle, and use original 1962 Blaney-Criddle model if above 6500 ft. in elevation, due to errors in the method when average daily temperatures are below 76 degrees.

***POINT (especially at high-altitudes): USE 1962 BLANEY-CRIDDLE METHOD WITH A LOCALLY CALLIBRATED K VALUE, OR CROP COEFFICIENT. K values jump around every year, and that frustrates people.**

*So, how to locally calibrate a K-Value?
Use lysimeter studies. You are mimicking a continuously flooded system. The results you get are *site* and *year* specific, that's the limitation. The studies are designed to be

used over intervals of about a month. K = ET divided by consumptive use (locally calibrated k value).

*He recommends cutting back on number of lysimeter sites and intensifying what you do on each site. K values varied across the four year period, which is not uncommon for lysimeter studies.

Dan talked about the history of what he did in Gunnison area from 1999-2003:[3]

Data in North Park: We only have one weather station that he could find: Walden weather station has temp records from 1948-2005. He used our temperature records, 1962 Blaney Criddle, and state CU model K values. Came up with mean consumptive use values for May, June, July, August, and September. Selected highest and lowest average values.

***Recommendation**- our model gives a good way to estimate local values, but we need locally calibrated K values. North Park doesn't have the temperature data here that is necessary to work with.
If the roundtable wants to get a grant to do work, they should establish a network of weather data, maybe using a HOBO apparatus weather station, or someone to go out and measure the data, so that North Park can have a running data set for the basin. Adjust K-values for sites and years, to have locally calibrated K value, because that is the driving variable.

Kent asked if the crop coefficients for mountain meadow hay are different here in this basin than in Gunnison basin. Yes, it varies due to temperature differences, Dan said. *The temperature model drives the crop coefficients.*

Kent asked if Dan was recommending that we put in weather monitoring stations and not lysimeters. Dan said yes, because the model is robust for predicting coefficients, as long as you have localized temperature data, and the North Platte basin only has limited temperature data currently.
Also, we have to look at where the weather data is coming from--do airports and town weather stations replicate meadow data? No. There is a 3-7 degree difference in maximum daily temperature and a 2 degree difference in minimum average daily temperature. Higher altitude = bigger difference in average daily temperature.[4]

*Division engineer does have one lysimeter site here, so Dan recommends more intensive monitoring for that lysimeter. Have an intensive effort to monitor the temperature at that site. HOBO devices – you can set up a site for less than $100. The big cost is data collection. He also said to try and download data more frequently so you can monitor every minute.

Kent said that we are talking about doing more intensive monitoring for North Park. Ray is supposed to be doing scope of work for a major project.

Kent thought crop coefficients were more dependent on species of plant. Dan said that Blaney-Criddle uses a combination of plant species and environmental factors, which is why the temperature measure is so important.

Sandy Knox asked if soil type affects the crop coefficients. Dan said soils don't affect them all that much.

Dan finished his presentation, also mentioned that the Hargreaves method will be expanded in the future, probably.

Kent pointed out that the minutes from the May 22, 2007 meeting were not yet approved. John Rich motioned to approve the minutes, Sandy Knox seconded the motion, and the motion was passed.

Sandy Knox returned to her question about soil. She thought it would make more of a difference on crop coefficients than Dan was indicating. Discussion ensued. Others did not think soil made much of a difference.

Greg Kernohan from Ducks Unlimited got up to give his presentation. DU is looking to come to the roundtable for some funds for a couple of projects they are proposing, and they have not been able to come up with the money thus far.
DU is looking for funds for two projects currently, Tointon and Arapaho (on the first page of the handout Greg distributed). He also listed some other projects they have done since January of 2005.

Greg gave an overview of ducks unlimited – to conserve, restore, and manage wetlands for waterfowl. Organization was started in dustbowl times to get wetlands back. They currently have 725,000 members across the U.S. They deal with a continental resource, and work in three countries. North Park is the second most important waterfowl habitat in Colorado, and the Platte river watershed is important.

DU approach offers restoration and enhancement-type projects, land protection, and a management program.

Restoration: recharging water is big focus for DU. 85% of their projects are on public lands. They also want to work with landowners to get decreed water rights back into use. Proposing to expand irrigated acres to decreed water rights.
DU works with partnerships, they take every dollar they receive and leverage those dollars six to eight times over, and work with partners to raise grant matches.

DU would like to consider a NAWCA grant for North park. Greg wants to see dollar match and partners at NAWCA. He believes that's why TNC was not successful with their grant, because of a lack of partners involved in the project.

DU requires funding and conservation land agreements with the landowner when they do projects. It's a 25 year agreement, usually.

Kent talked about the decree and what we can expand in this basin without a new water-related activity.

Greg raised a question about reservoirs; do they count as a new water related activity or are they covered under the decree? The decree only covers irrigated acres; storage for irrigation is limited to 17,000 acre feet. Kent doesn't think the decree limits storage for non-irrigation waters.

Greg showed a map of the proposed Tointon restoration, which is putting a new diversion structure in for irrigation. They want to dig out oxbows, expand ditches, etc. Greg wanted to know from the roundtable:

1. Is this something the roundtable would support?
2. Does the roundtable have suggestions for further projects to increase decreed water rights? If so, is there a way for DU to contact those landowners?

Kent asked Greg how he sees this working within three state agreement. Higher consumption will result from expanding these water rights. Kent can see the roundtable looking at projects from the non-consumptive needs position. We would have to look at it as helping non-consumptive needs. Greg suggested that the roundtable should be asking for some money from SPWRAP since we are a member. They have seen the power of leveraging dollars, Greg said, and they will be interested in helping roundtable accomplish goals.

Kent asked Greg if DU has put together any water supply reserve account applications. Greg said yes, in the next couple of weeks they will be going to the S. Platte and the Metro roundtables, and they are due by July 15th at the state level.
DU's request for the roundtable would be from the basin account, for about $50,000 or $100,000.

Kent explained to Greg that the roundtable is still considering criteria and guidelines for applications. It's too late to hit September meeting of the CWCB, but by the July meeting the roundtable should have their guidelines set. The roundtable can't say yes or no to the project until they see the application.

Greg said he just wanted to get a feel from the group to see if this is the type of thing they are interested in. If so, he will submit applications for sure. Because of threshold levels within the bylaws, Greg didn't think this project would compete at the state level. In the future, if they have more partners, DU could put together a statewide application for a project like this.

Bob Plaska asked at what point when developing a project does DU start looking at the impact on water rights. Do they do an analysis of the owner's water rights?
Yes, Greg said, they do a biological assessment and an engineering assessment, along with a cost-benefit analysis. If those numbers click, then they ask the landowner to come back with water rights and have those proved. DU has had luck on getting a few water rights off the abandonment list and putting them back to work for the landowner.

Bob brought up the issue of groundwater. Greg said that DU does not expose groundwater during projects, they have a state engineer come and look at everything. Bob wanted to make sure they were aware of nuances in over-appropriated situations.

Greg said that all of DU's work is pretty much word-of-mouth. North Park is only one of areas that they have had limited success.

Sandy asked if private landowners participate in program, do they open up their land to public use. No, Greg said, you maintain all of your trespass rights.
Sandy also asked if DU requires fencing to prevent livestock from coming in to area. There are too many theories with how grazing affects things, so not really, Greg said.

Greg ended his presentation.

Since Hal Hagen and Ty Wattenberg are not here, they can't present on the non-consumptive needs workshop they attended.
Kent asked if everybody has seen the information that has come out of the needs assessment and the power-point presentations. No, they have not. Kent said he can make sure everyone gets them, and they can get the minutes from the meeting also.

Bob Plaska reported that he was talking to Nicole, and she wanted us to know that CDM would like to come up for the July meeting to give a non-consumptive presentation to the roundtable. Kent requested to have Nicole get a hold of him so he can put her on the agenda for next meeting.

Criteria and guidelines committee:

Deb Alpe reported that the committee used the Colorado basin roundtable as an example. Deb passed out a document and explained it.
Paula reported that they set up a subcommittee in the Colorado basin to make sure the components of the proposed projects fit, and the committee fills out a worksheet prior to the whole roundtable voting. They tried to fit IBCC and CWCB criteria. There wasn't a ranking system in place yet. Paula did bring an example of the basalt water conservancy district project so the roundtable could see how the tables were filled out.

Deb mentioned that "local preference" might shut down some options for projects. There aren't that many local applicants as it is. The local vs. non-local issue was brought up. What is considered local? Discussion ensued. We don't know what might actually benefit the basin. That would be real tough to define. Kent said we could have North Platte Basin specific criteria, and could put a local issue section in that category, and also add a ranking system. He also said that the roundtable talked about using criteria and guidelines from CWCB and IBCC.

John Rich will make a pending motion to accept criteria from Colorado basin with a ranking system, and the motion will be decided on in the next meeting, so the group has time to take the documents home and consider them. Another question is, do we only

need a ranking system for multiple applications, or do we need a ranking system if there is only one application to consider at a time? When the roundtable sits down in July, and if everyone likes the criteria they can be adopted at that time. Kent would like the entire roundtable to rank applications, not just a sub-committee.

Mike Allnutt brought up a side issue--during the DU presentation, Greg said the headgate at the Refuge was wooden and decrepit, Mike disagrees with that. He said the headgate is fine and currently working. That is something that can be brought up if DU submits an application to the roundtable.

Kent gave an update on the surface water modeling project – Ray Alvarado is developing a scope of work. Kent will probably run this through the county and the commissioners. This project is coming from CWCB money. Kent said he saw Ray in Montrose, and it might be better to come in with basin account and specifically delineating irrigated hay diversion structures, and update that with some 2005 imagery. Ray is going to talk to Riverside Technology. This will be a water supply reserve account project, probably a basin account.

The consumptive group kickoff meeting will be August 1, at the REI flagship store in Denver. The purpose is to assist roundtables in addressing their consumptive needs assessment, and to address common technical platform issues for the basin roundtable needs assessment. Does anyone from the North Platte basin roundtable want to be added to the consumptive workgroup, and attend the kickoff meeting?

John Rich volunteered if no one else can go.

Next meeting is July 24th, Kelly Elder might be able to show up and talk about what's going on with the beetle.

Bob Plaska mentioned that earmarked money from task orders that hasn't been spent will be carried over to next year.

Kent talked about southwest roundtable and how applications were let through when some people thought the projects were bad, which relates to the "local vs. non-local" issue.

The IBCC is looking for pictures from the local basin, and pictures of North Park to put on their website. Anyone who has pictures should get these to Curran by July 20th to be put on the website.

Kent adjourned the meeting.

Next Meeting Date: July 24, 2007, 7-9 p.m.

ENDNOTES

[1] Mechanistic.
Methods: (Penman, Kimberly-Penman, Penman-Meredith, Penman-Monteith)
Data requirements: have to have continuous measurements of radiation, wind, humidity and temperature.
Called combination methods b/c they measure combined evaporative effects of radiation term (net radiation) and aerodynamic term. Radiation is most abundant source of energy available to drive evaporation. Aerodynamic term measures turbulence and humidity, and wind in combination with temperature.
Combination methods are the most accurate in western U.S, due to various factors.
Radiation accounts for the majority of evaporation that occurs. Can't measure it alone, though; you have to add in the aerodynamic term.

[2] Blaney-Criddle -- widely used
SCS Blaney-Criddle
Hargreaves
Radiation is the hardest variable to measure effectively.
Data requirements for Empirical Methods- Maximum and minimum daily temperature are the only strict data requirements. Also have indirect measure of day length which is the P factor (P Factor = Total # of sunshine hours/year, or monthly, divide monthly by annually, and that's the P factor (for summer months it is around 10%). It varies with latitude.

[3] Data for May, June, and July are best. August and September are usually too variable.
They had 9 sites.
One of objectives in Gunnison was to look at different temperature expressions to account for variability; they averaged the temperature throughout the day instead of using maximum and minimum temperatures.
Modeling the K value – can adjust for site specific and year specific events. Prediction equations developed for each month.
Summarized all the data and decided that one coefficient will work on an average basis if you look at long-term averages, don't look at year-to-year data.

[4] Temperature average in Walden in the month of May, from 1948-2005 was 44.7 degrees.
Difference between maximum and minimum daily temperatures was 38 – 23 degrees.