Arkansas Water Plan Update

Agriculture Water Demand Work Group Meeting Summary

March 15, 2013 from 9-1 pm CST

The following summary was prepared by CDM Smith and is intended to capture the general topics, and discussion that was held and is not intended to be a verbatim transcription of the meeting. Meeting space was provided by the Rose Law Firm, Little Rock and the following individuals participated in the meeting:

Evan Teague – Arkansas Farm Bureau
Davis Bell – Farmer
Dennis Carmen, White River Irrigation District
Terry Dabbs - Farmer
Andrew Grobmyer – Agricultural Council of Arkansas
Cynthia Edwards – Arkansas Department of Agriculture
Becky Cross – United States Department of Agriculture (USDA) – Agricultural Statistics
Charles Glover, Arkansas Association of Conservation Districts
Andrew Wargo III, Arkansas Association of Conservation Districts
David Gairhan, Farmer and Arkansas Rice Federation
Chad Causey - Arkansas Rice Federation
Chris Henry – University of Arkansas, Rice Research Center
Tim Snell – The Nature Conservancy, by phone
Park Eldridge - Lehman Elevator, by phone
Dan Carthel - USDA, Natural Resource Conservation Services
Mike Armstrong – Arkansas Game and Fish Commission
Chris Soller – Arkansas Natural Resource Commission (ANRC)
Ken Brazil - ANRC
Edward Swaim - ANRC
Todd Fugitt - ANRC
Brian Rosenthal - Rose Law Firm
Terry Holland - United State Geologic Survey, by phone
Rodger Dodds - FTN Associates
Jessica Fritsche – CDM Smith
Rick Brown - CDM Smith
Mitch Horrie – CDM Smith, by phone

Please note that the meeting was very dynamic and there were several conversations that moved back and forth. Additionally, the discussion was sometimes not linear in nature. Consequently, to facilitate more clear interpretation of outcomes the meeting summary is first presented more general narrative followed by specific outcomes for the major elements of the forecast.

Meeting Overview

The meeting began at 9 am CST time and followed the agenda.

Rick Brown, CDM Smith provided introductory remarks and noted the follow goals for the Agricultural Demand Work Group (work group):

- Please try to view take a comprehensive and statewide perspective for the agriculture water use sector. Please try to represent your overall water use sector as well as you individual perspectives.
- We are striving to have the forecast that reflect the most likely agricultural water use future, not necessarily what we desire; we encourage you to help us develop the most likely future that we want to put forward as our forecast.
- Remember we have a data driven forecast so our forecast will be constrained by availability and quality of our data. Today we want to move toward consensus on the data sources and methods to be used in the forecast effort.
- As we get into today's discussion there will be a lot of detail and some differences in data sets. If things get confusing for you try to remember there are 2 basic elements of the forecast that we want to come to consensus on. First, is the forecast driver and that driver is use and growth in acres or livestock counts. Second, is to determine the water use factor for crops and livestock.
- Finally remember our schedule is to meet with the full demand work group to review and share forecasts from all demand sectors and we are targeting the first or second week in May 2013 for this meeting.

Rick then turned the meeting over to Jessica Fritsche, CDM Smith, and Jessica utilized a PowerPoint presentation to structure the discussion. Jessica emphasized that while we do have a presentation, the goal is to have a discussion so questions and comments were welcomed at any point. Jessica first presented the information and data source for livestock counts and water use; followed by crop acreage and irrigation water application rates by crop type.

The work group spent considerable time discussing the need to be accurate documenting data sources and being clear about definitions. In addition, the merits and limitation of different data sets was discussed. In regard to livestock counts and water needs, data and comparisons were presented for both Arkansas trends and national projections.

Several clarifying questions were asked regarding ANRC Water-Use Data Base (WUDBS), USDA Data Bases, and USGS Data Bases. The work group encouraged CDM Smith to complete cross checking of values from different data sources especially if large differences exist. The work group identified several follow-up recommendations that are summarized under the section below in the "Overall Conclusion(s) Drawn from the Meeting" section of this meeting summary.

During the discussion of Livestock counts, water use, and growth trend data, the work group noted that it is critical to do more work on seasonality of water use, determine if data exists for different life stages, and to update chicken counts with the most recent available data sets.

Jessica then outlined information regarding irrigated water use starting with the approach to irrigated acreage quantification, followed by crop water use, and then methods for projecting growth. The discussion started with the recommendation to use the ANRC WUDBS as the primary data source for irrigated acreage. Jessica showed initial results from the WUDBS, USDA National Agricultural Statistical Services (NASS) Annual Survey, USDA Agricultural Census (completed every 5 years), and USDA Crop Data Layer. The work group had a very lively discussion of each of the data sets. Overall the work group felt that information in NASS may be the most complete and most accurate. The work group noted that the data provided by producers to USDA Farm Service Agency (FSA) is a very good source and they believe that producers generally take more time and care when completing this information. Becky Cross from USDA

NASS noted that the NASS programs and their data collection take many measure to ensure that the data is collected and followed up upon with producers. Further, she noted that NASS program(s) conduct administrative checks between NASS and FSA to help ensure a robust accounting of irrigated acreage.

The work group noted that the ANRC data base for acreage is very good but that there may be a higher probability of reporting more general estimates, and possibly cross county reporting generalizations. It was also noted that in the early 2000s the WUDBS was undergoing some software changes and this may have led to some variation in data reporting. It was also noted that the other factor to consider in favor of using the WUDBS is the fact that the USGS uses this information in their reporting for 5-year reports, and it is the main data set for the ANRC groundwater program and modeling efforts.

The work group noted that even though there is some variation in reported crop acreage within a single year for each of the data sets that the trend for all of the data sets are similar over the period being reviewed. It was noted that data for soybean in particular should be looked at more closely because larger differences were observed for this crop. Additionally, several work group members felt that the NASS Annual Survey and Agricultural Census data should track more closely and asked for follow-up on this difference. Overall the work group felt that NASS may be the best data set for the crops that are consistently included (rice, cotton, soybeans) and NASS was generally showing more acreage so would be more conservative forecast approach. The work group also felt that for other crop acreage not consistently included in NASS (corn and other smaller crops) the WUDBS is a good source for this data.

ANRC noted that if the work group does go with NASS, to keep in mind that the groundwater program and model of the alluvial and Sparta Aquifers was developed and calibrated using the WUDBS. ANRC and the State of Arkansas are heavily invested in the WUDBS and we need to be sure that the forecast efforts are consistent with WUDBS.

The work group then discussed trends and growth rates for crops by crop type. Growth rates and preliminary acreage projection results were shown using trend data from 2000-2010 for all crops except corn, which used price forecast data to project trends. For all crops time appears to explain growth trends pretty well, and for corn price seems to be the best growth indicator. The preliminary results that were shown first allowed growth to continue unconstrained. However, it was noted that a reasonable maximum is needed because crop irrigation will not exceed total available crop land. Once the reasonable maximum is included the unconstrained growth is held to a more realistic level.

The work group then discussed crop water use and generally felt the numbers derived from the WUDBS were pretty close to their individual experience. Several work group member noted that differences in crop application rates are expected depending on the county you are in. These differences are in response to local soil differences including salt and organic content, local water availability, producer behavior, and reporting differences, among others. A few group members noted that overall the crop irrigation application rates look pretty close but noting that rice maybe slightly high and corn is maybe a little low. The work group asked that follow-up be done to double check these values.

It was noted that many farms now have tail water recovery and asked if the WUBDS shows reporting of surface water coming from tail water recovery ponds. We do not see it reported separately but we will look at the data set to see if there may be surface water source identified as a secondary/additional source of

supply i.e., groundwater first application then combination of surface water from tail water recovery and/or on-farm storage and groundwater from subsequent irrigation.

The work group noted that off-season irrigation water use for Duck hunting habitat is November and December. Other off-season water use is likely reservoir filling.

Next the group discussed water efficiency trends focusing on multiple-inlet rice irrigation (MIRI) and noted that there has been a "modest" adoption rate of this method of irrigation in some areas, but that the trend may or may not continue. The work group noted more information should be collected to see what is reasonable to assume regarding the irrigation method.

Finally, the work group discussed whether any changes in the current ratio of groundwater to surface water irrigation sources should be changed going into the future (higher or lower groundwater use in relation to surface water use) the work group agreed that the ratio should remain constant.

The meeting concluded with the work group voicing general support for the work completed to date and encourage CDM Smith to go forward with additional data analysis and to follow-up on the action items identified by the work group.

The following section provides more details on the forecasting approach, specific action items, and general agreement reached by the work group.

Overall Conclusion(s) Drawn from the Meeting

- CDM Smith should proceed with collecting additional data and generating preliminary numbers for the crop irrigation and livestock forecast. Additional follow-up and recommendations from the work group should be completed and incorporated into the forecast (see below for more detail).
- Livestock Counts - There was general agreement on the following points:
    1. Animal Counts will focus on Dairy Cows, Beef Cattle, Hogs and Pigs, Chickens, Turkeys, Sheep and Goat, Horses. The USDA NASS Agricultural Census (1997, 2002, 2007), and USDA NASS Annual Survey (2012) will be used to derive animal counts.
    2. Animal Count Growth rates will be derived from the national USDA Agricultural Projections though 2022. Growth rate will be held constant; unless a reliable growth factor can be identified for the 2022 to 2050 period. **Action Items**: Overall the work group was comfortable with a conservative forecast (hold constant or growth), and that past years declining trends in Arkansas for dairy, beef cattle and hogs and pigs is not likely to continue especially in light of the National forecasts from USDA that generally shows growth. However, the work group noted that national hog and pig growth of 11% does not seem credible for Arkansas given past trends. The group had a leaning to keep the animal count for hogs and pigs constant, or if other data suggests, a slight increase. Conversely, the work group felt that the national growth data for chickens (14%) may be low in light of the expansion in chicken counts in Arkansas since 2000. **Action Item**: A look at the regional/national data and the relationship that Arkansas has played in national animal production to determine, if possible, if any adjustments to the growth rates that were presented are warranted.

3. A more clear definition of baseline animal counts should be provided. **Action Item:** Work on definitions and follow-up with USDA to obtain 2012 poultry numbers if they are readily available.

- Animal Water User Requirements – There was general agreement to:
  1. Utilize USGS animal water use requirement data. **Action Item**: Do additional research to see if useful information on animal water use requirements can be obtained from USDA and/or NRCS.
  2. The component of animal water use were discussed; ingestion, cooling and sanitation. It was noted that the USGS numbers presented are for all components of water use. **Action Item**: The work group asked for additional follow-up to see if the above animal water use components have specific data (it was noted that we do not think we can get this level of detail but will check and at a minimum verify what is included in the estimates).
  3. Livestock seasonality of water use and life stage variations in water use was discussed and the work group asked that more research be completed to determine seasonality and variation of use based on life stage. **Action Item**: Information will be sought.
- Irrigated Acreage – There was general agreement to:
  1. Utilize the USDA NASS Annual Survey for rice, cotton, and soybeans. **Action Item**: The work group requested that additional follow-up be conducted to verify how the USDA Farm Services Agency data, and the 5 year USDA Agricultural Census, and NASS Annual Survey are utilized, incorporated and/or related to one another to ensure the most rigorous crop acreage count. The work group also asked for a closer look at the differences in soybean acres reported between NASS and the WUDBS.
  2. Utilize the ANRC WUDBS to obtain acreage for other major crops. **Action Item**: The work group requested that more descriptive information be included on the WUDS reporting process and program. There is some confusion as to what is initially registered and reported versus "computer or technician generated".
  3. Utilize the period 2000 to 2010 for trend assessment and water use information.
  4. Develop growth rates utilizing time for forecasted crops, except for corn where price (from USDA Long-term Projections to 2022) is a better variable for determining growth, to derive forecast through 2050.
  5. The utilization of a reasonable maximum number of irrigated acres by county was discussed and supported. The proposed reasonable maximum is to utilize non-irrigated row crop lands by county from the USDA 2010 Crop Data Layer (aerial imagery) information as the primary data source for quantifying potential future growth in irrigated acres. **Action Item**: The work group requested that more information be provided to more clearly show total cropland, total irrigated crop land, and total non-irrigated row crop land to better illustrate the concept of the reasonable maximum. It was also noted in side conversations that some may perceive this as a property rights concern and that thoughtful communication and depiction of this information is critical. CDM Smith's initial thinking on this is that all non-irrigated croplands are candidates for irrigation systems. For forecasting it is generally believed that for economic reasons the most likely non-irrigated land cropland to become irrigated will be non-irrigated row crops. **Action Item**: Some irrigation of pasture grass has occurred and the work group wondered if this might be an immerging trend and asked that some more thought be given to this topic.
  6. Conservation Reserve Program (CRP) lands were also discussed in term or their potential to be converted to irrigated producing lands. It was generally agreed that it can be time

consuming and challenging to move lands out of CRP for a variety of economic and programmatic reasons.

7. For source of supply the current ratio of groundwater to surface water will be utilized when describing future irrigation sources of supply.

- Crop Irrigation Application Rates
    1. It was generally agreed to use the WUDBS data to derive irrigation application rates for the major crops that will be forecasted. Caution was noted to make sure that dual cropping and multiple sources of supply are not impacting the application rates that were presented. **Action Item**: The work group asked for additional follow-up on results from rice research and that corn application rates seemed a little low.
    2. It was noted that crop irrigation application rates are different than crop consumption rates and that efficiency values need to be developed for each of the major application methods (flood, sprinkler, etc.).
    3. Irrigation water conservation practices were discussed and the rate of implementation of certain conservation practices may also affect water use and forecasting. MIRI was specifically discussed in regard to whether this method has a high probability of continued implementation. **Action Item**: Dennis and/or Chris H. will see if any information from Delta Plastics may provide insight into MIRI.
    4. It was acknowledged that the ANRC groundwater program utilizes groundwater pumping data to determine withdrawals for groundwater modeling. The use of WUDBS data (withdrawals and acres irrigated) to determine crop irrigation application rates (inches per acre) helps ensure consistency with the program. Using these WUDBS to derive crop irrigation application rates multiplied times the number of NASS reported acres (in lieu of WUDBS acres) introduces a variable that differs from the ANRC groundwater program. It was noted that at this time the analysis has not proceeded far enough to determine if any substantive difference in results may occur. **Action Item**: If substantive difference occur it may be necessary to develop a “calibration factor” or “range of results” approach to help ensure consistency in policy and programs (state and federal).