

**Appendix B: TWDB Irrigation Water Use Methodologies:
1994-2007**

TWDB Irrigation Water Use Methodologies: 1994-2007

A frequent issue is the considerable variation in annual irrigation use for some counties when viewing a table of historic irrigation water use presented by TWDB staff. TWDB staff believes that the reason for this variation is that this includes information essentially developed from four different sources of information and methodologies that we have had to utilize to obtain our information. In addition, actual conditions of changes in irrigated acreage and availability of groundwater and surface water supplies has affected several counties during this historic period. The following describes the methodologies used to calculate annual irrigation water for the periods of: 1994 and 2000; 1995-1999; 2001-2002; and 2003-2007.

1994 and 2000

Data for these two years was provided exclusively by USDA-Natural Resources Conservation Service (NRCS) and is often referred to as the detailed irrigation surveys. Each local county office of NRCS was responsible for completion of a paper copy map showing location and extent of irrigated land supplied by either groundwater or surface water. Each county office also completed a worksheet containing data on about 23 crops (if applicable). This data was the irrigated acreage of that crop (cotton for example) and the average representative value of irrigation water applied (inches per acre) to that crop during that specific year. Data was supplied separately for acreage supplied by groundwater or surface water. Summation of these data inputs provided the total irrigated acreage and groundwater and surface water use for the county. It is important to note that the estimated irrigation water use is for on-farm use and did not reflect the total amount of surface water that was initially diverted for delivery to the farmers' fields.(*)

1995-1999

During this period, the annual irrigation water use estimates were developed by a combination of NRCS irrigated crop water use data and Texas Agricultural Statistics Service irrigated acreage data. NRCS did not want to supply the maps or irrigated acreage data but did continue to provide estimates of irrigation water use by crop type in each county. Again, this was the average representative value of irrigation water applied (inches per acre) to that crop during that specific year. Texas Agricultural Statistics Service (TASS) could provide estimates on irrigated acreages for the major crop types. For crops not included in these data, TWDB relied on data from the most recent NRCS detailed survey. The distribution of the resulting total irrigated acreage and total irrigation water use was divided into groundwater and surface water use based on estimates provided by NRCS based on the detailed surveys. Again, the surface water use component is on-farm use (*).

2001-2002

These two years were a transition period. NRCS decided it could no longer provide any of the data it was previously providing. For irrigated acreage data we had to continue using the TASS major crop acreage data and data from 2000 NRCS survey for the other crop types. Irrigation water use (inches per acre) was based on the historic data and adjusted if necessary for rainfall conditions in 2001 and 2002. Once again, the surface water use component is on-farm use (*).

(*) **On the TWDB web site under irrigation water use estimates:**

<http://www.twdb.state.tx.us/assistance/conservation/ASPApps/Survey.asp>

the data presented is for this on-farm use. In the data files of the combination annual water use surveys:

<http://www.twdb.state.tx.us/wushistorical/>

and in data used in regional planning studies, irrigation use of surface water is sometimes adjusted to account for some distribution losses between diversion point and delivery to the farmers' field.

2003-2007

Beginning with the year 2003, TWDB was able to obtain data that was not previously available. The State Office of USDA-Farm Service Agency (FSA) finally agreed that they could/would provide us their data of irrigated crop acreages for each county in the state. Discussions with Texas Commission of Environmental Quality (TCEQ) resulted in our requests to obtain annual reported irrigation water use from files in the Austin TCEQ Office and from the Watermaster offices.

To develop irrigation water use estimates by crop by county, TWDB staff instituted a procedure of developing a tabulation of the historic estimates by crop by county. Then, for the same time period and same crops a tabulation of theoretical Potential Evaporation-Transpiration (PET) values was developed. Using these data, a ratio value of historic use versus PET was developed by crop by county whenever possible. Then for calculations for a given year, rainfall and PET data for that county is used with the ratio value to estimate irrigated crop water use in that year. This procedure attempts to take into account variations due to rainfall and weather conditions. TWDB staff is attempting to obtain better information on availability of PET data and then utilize this data in our calculations. However, it must be pointed out that regardless of the number and location of PET stations and the accuracy of PET data, the irrigation farmer may or may not be utilizing irrigation water as estimated by the PET calculations.

Using FSA irrigated crop acreage data and estimates of irrigated crop water use, the data is compiled on county worksheets. Using data on use of surface water obtained from TCEQ, the total irrigation water use is distributed between groundwater and surface water in each county to complete the INITIAL estimates for each county. Since 2003, the estimates of surface water use do include any distribution losses between diversion and delivery to farms. In some cases, this value can be considerable larger than the amount of irrigation water actually used on the field. This initial applicable county data is then mailed to each groundwater conservation district and most irrigation districts in the state asking for their review and comments on our estimates of irrigated crop acreages, irrigation water use by crops, and the total volume of groundwater and surface water use. To the extent possible, comments and proposed revisions are utilized in the final version of the annual irrigation water use estimates.

The critical point is that this is our attempt to account for the variation from year to year in actual irrigation water use as influenced by actual conditions of effective rainfall, availability of groundwater and surface water supplies, irrigated cropping patterns, and efficiency of irrigation systems.