

Water Use Reporting for Agricultural Irrigation Use in Arkansas

**2017 Nonpoint Source Pollution
Stakeholder Meeting
September 27-28, 2017**



Update of Arkansas Water Plan

- **Data from Water Use Database (WUDB) used to estimate future water demand**
- **“The accuracy of water use reported for agricultural irrigation has been questioned because the water use is not measured or metered.”**
- **Arkansas Statute A.C.A. § 15-22-302
Withdrawal of Groundwater**



Water Plan Recommendations

1. **Form an Agricultural Irrigation Science Technical Work Group (AISTWG)**
 - Review the reporting process
 - Review ranges for accepted water use by crop type
 - Evaluate Quality Assurance Criteria
 - Assess adequacy of the existing monitoring network to confirm cumulative withdrawal volumes
 - Propose incentives to report water use more accurately

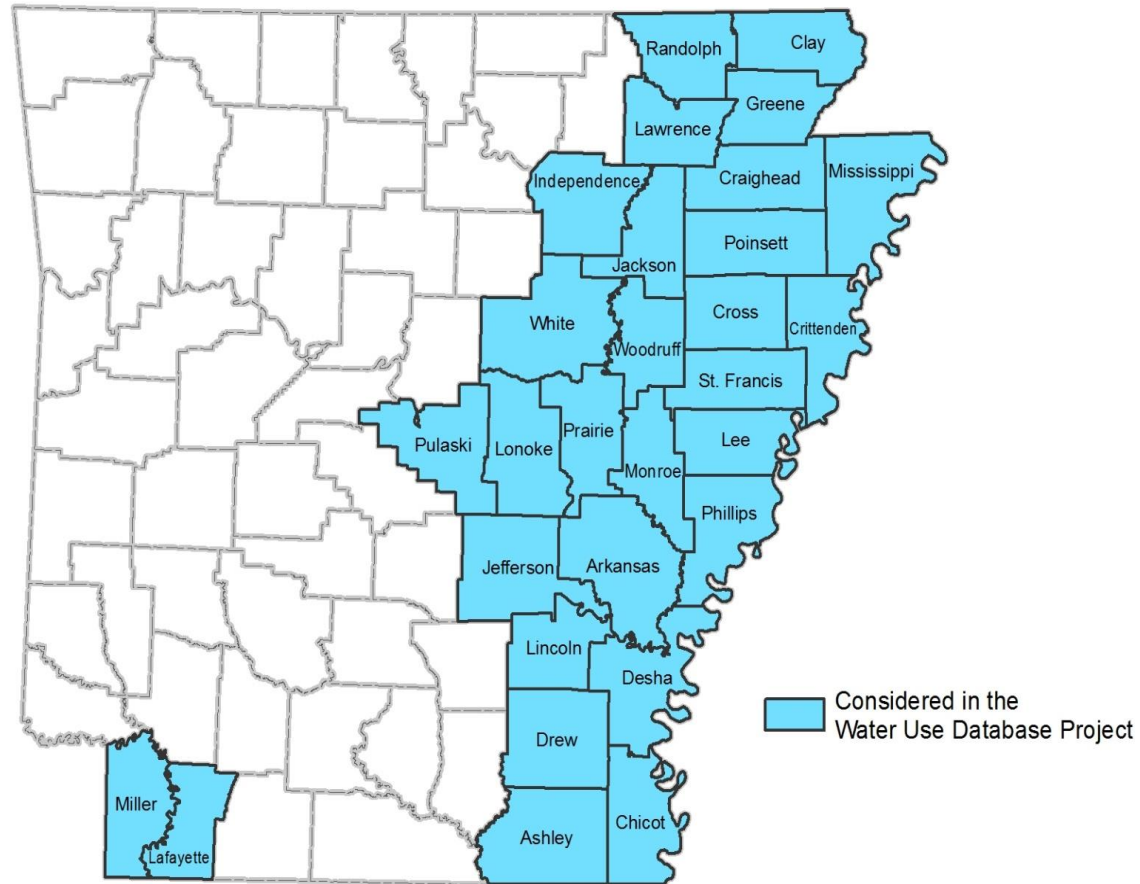


Recommendations (cont)

2. **The Agricultural Irrigation Science Technical Work Group should also periodically review advances in technology**
3. **Arkansas Natural Resources Commission (ANRC) should continue and improve awareness and education programs with Conservation Districts**



Target Counties



Three parts of the Project

- 💧 **Convene the AISTWG**
- 💧 **Interview Conservation Districts**
- 💧 **Review the Water Use Database (WUDB)**



AISTWG Process

- 💧 **Who – Identify appropriate members**
- 💧 **What - Develop a charge**
- 💧 **When – Four meetings spread over the 11 month project**



AISTWG Members

- 💧 **ANRC**
- 💧 **USGS**
- 💧 **Arkansas Rice Growers**
- 💧 **Natural Resources Conservation Service**
- 💧 **UA Division of Agriculture and Cooperative Extension Service**
- 💧 **Farmers – leaders in AR agriculture community**
- 💧 **Former ANRC Commissioner who is a Delta farmer**



AISTWG Charge

- **Participate in review of the WUDB**
- **Identify deficiencies in collection and compilation**
- **Recommend procedures:**
 - **Data collection**
 - **Compilation of the data**
 - **Framework for getting consistent and quality data**
- **Develop recommendations for ANRC Commissioners that would provide an accurate database that supports the 2014 Arkansas Water Plan**



AISTWG Meetings

- **Meeting 1, November 3, 2016**
 - **Define FTN role in process**
 - **Background**
 - **Arkansas Water Plan, UA Div Ag review**
 - **USGS Role**
 - **Pilot project with select Conservation Districts**
- **Meeting 2, December 15, 2016**
 - **Pilot Project results**
 - **Database plots**
 - **Brainstorm goals for recommendations**



AISTWG Meetings

- **Meeting 3, April 6, 2017**
 - **Conservation District Interview report**
 - **USGS software update**
 - **Draft recommendations by category**
- **Meeting 4, June 15, 2017**
 - **Review of draft recommendations**
 - **Final Report to be completed by June 30, 2017**
 - **AISTWG members want to stay involved**



Three parts of the Project

- 💧 Convene the AISTWG
- 💧 **Interview Conservation Districts**
- 💧 Review the Water Use Database (WUDB)

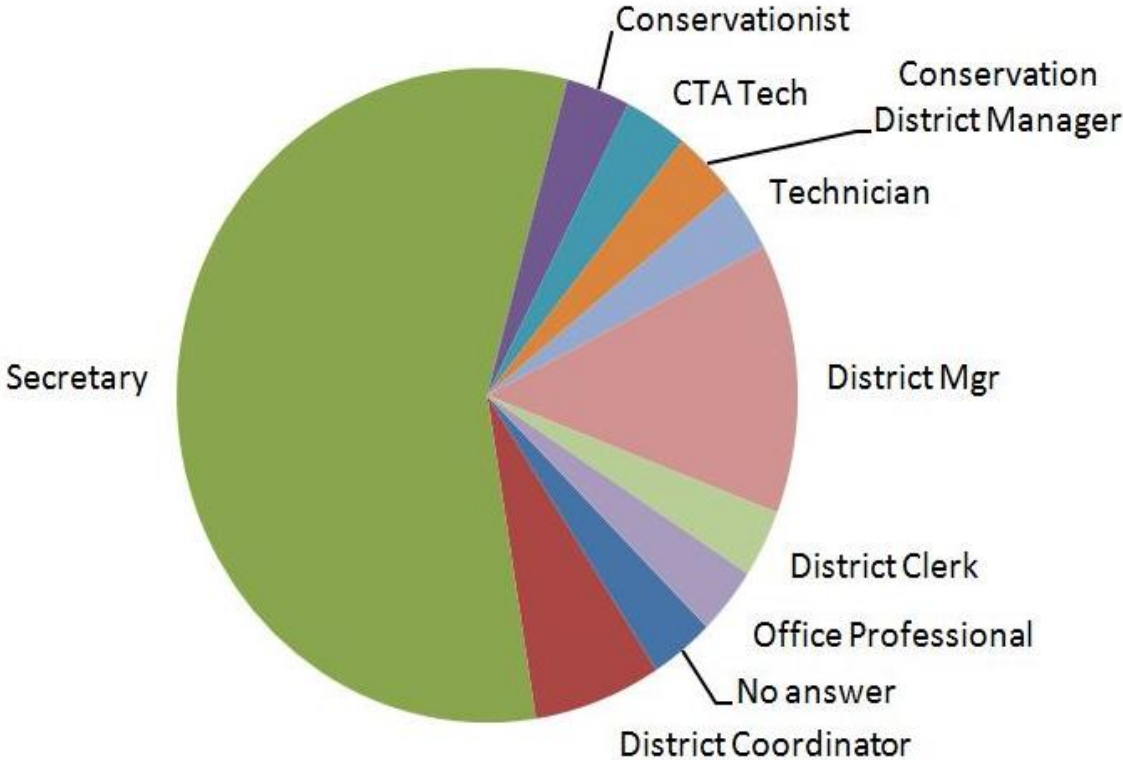


Conservation District Interviews

- **Information sought**
 - **Who collects the Water Use Information?**
 - **How information is provided from users/owners?**
 - **What data is collected?**
 - **How are data entered into the WUDB?**
 - **What quality assurance practices in place?**
 - **Improvement?**
- **Pilot Project with 5 Districts**
- **Interviews completed with 28 of 29 Districts**



Who Collects Water Use Information



What data is collected?

- **Crop type irrigated– All Districts**
- **Acreage of each crop type irrigated– All Districts**
- **Irrigation method – All Districts**
- **Number of times watered – 23 of 28 Districts**
- **Amount of water used**
 - **User/Owner provided – 9 Districts**
 - **District applies application rate to estimate**
 - **“Same as last year”**



Time period for data

- Statute says data use is to be reported for previous water year use
 - Confusion
 - Previous crop season – March or April to October or November
- Use Reports are to be submitted between October 1 and March 1

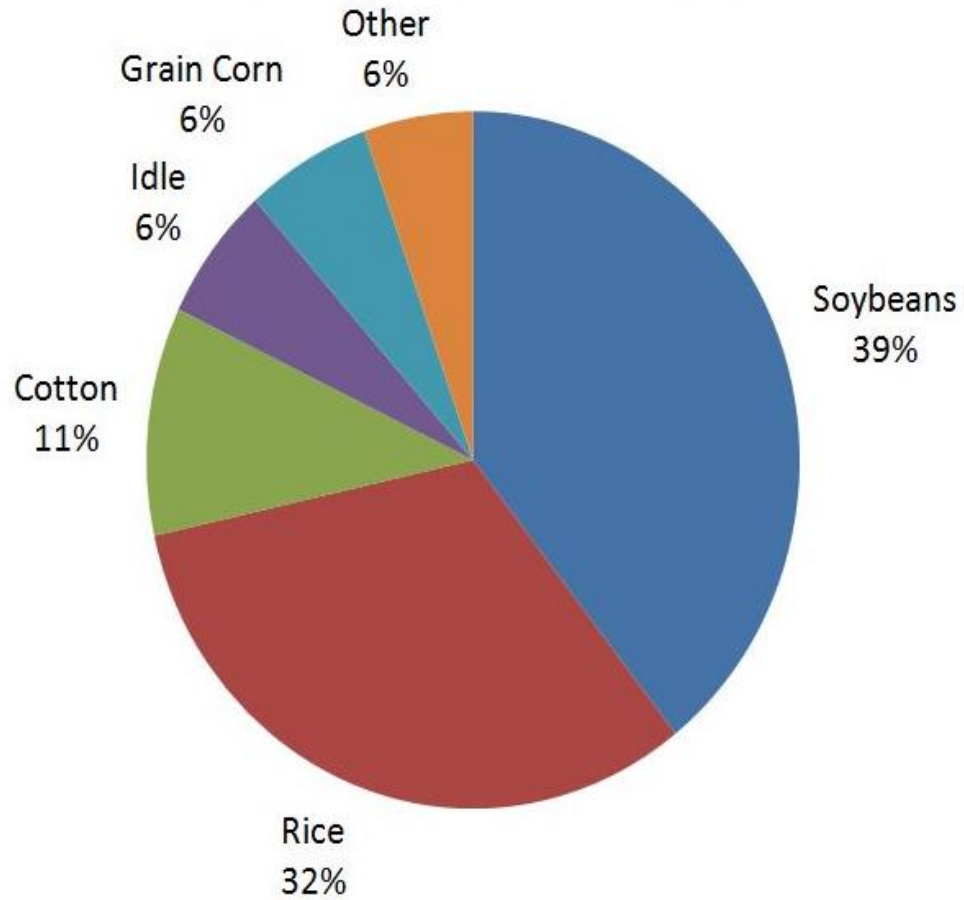


How are data entered into WUDB?

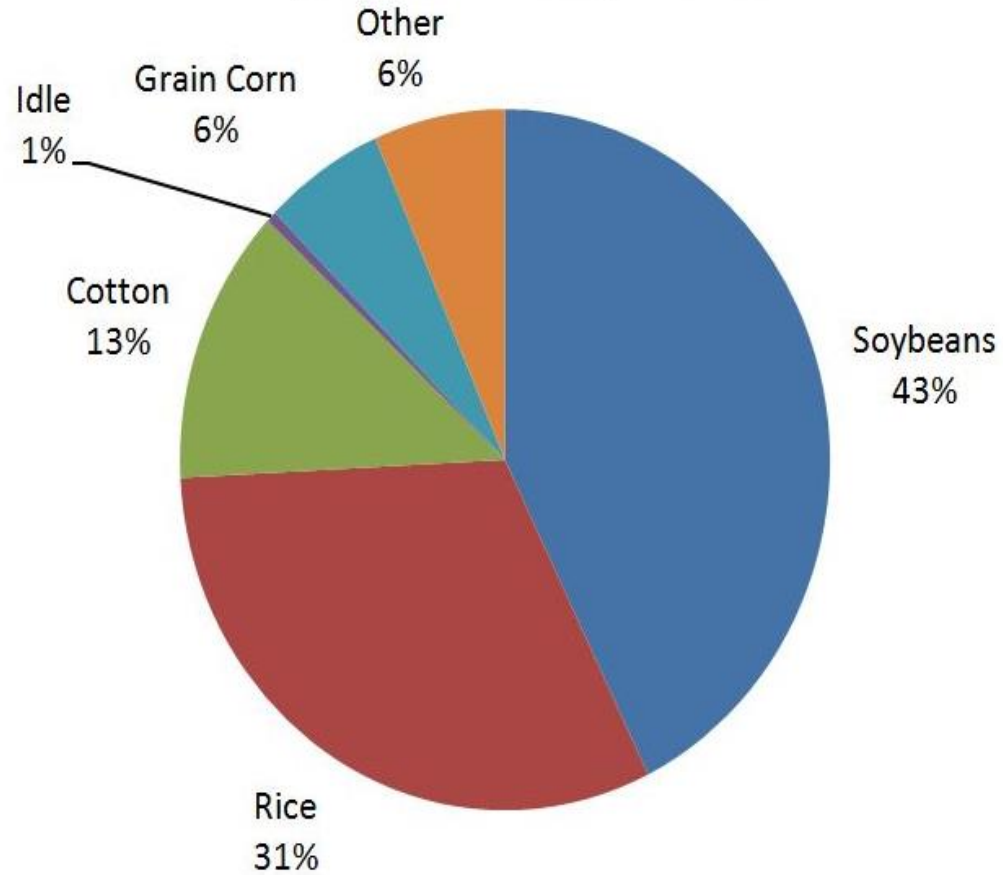
- **Data collected from 40 - 2,500 Users/Owners in each District**
- **Number of wells reported: 543 – 20,000 per District**
- **Most Users/Owners report data directly in person**
- **3-30 minutes per User/Owner on average**
- **Data Entry**
 - **Entered on ANRC provided form**
 - **Direct entry to database**



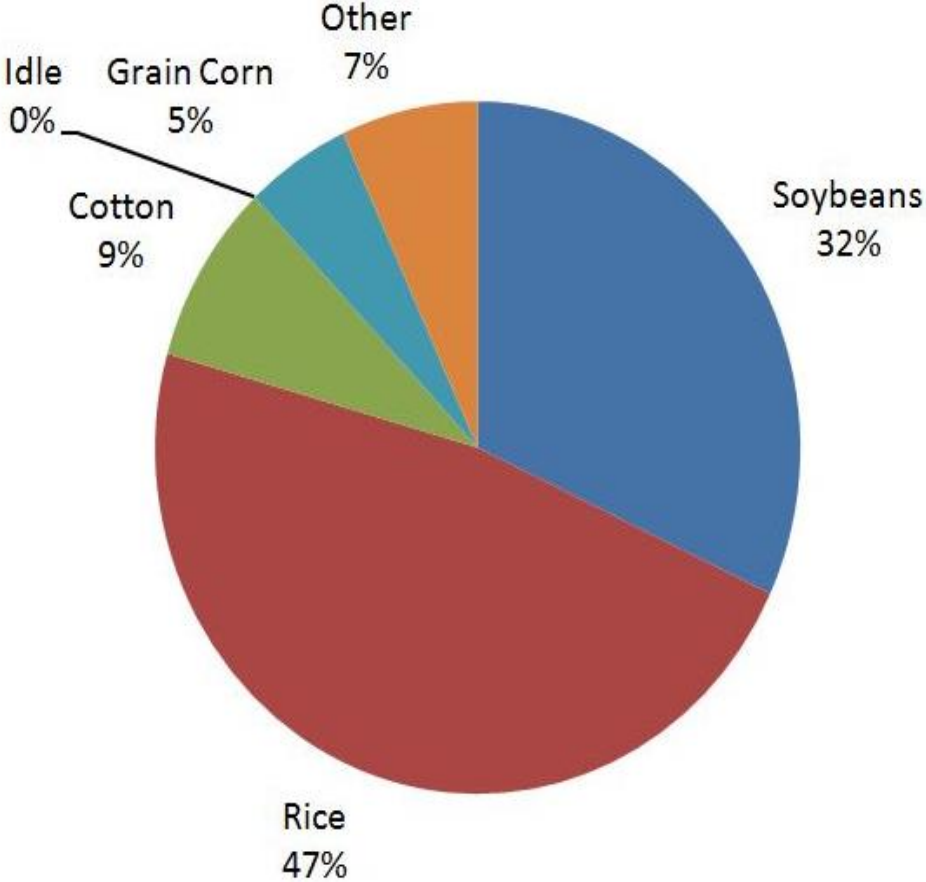
Number of Records



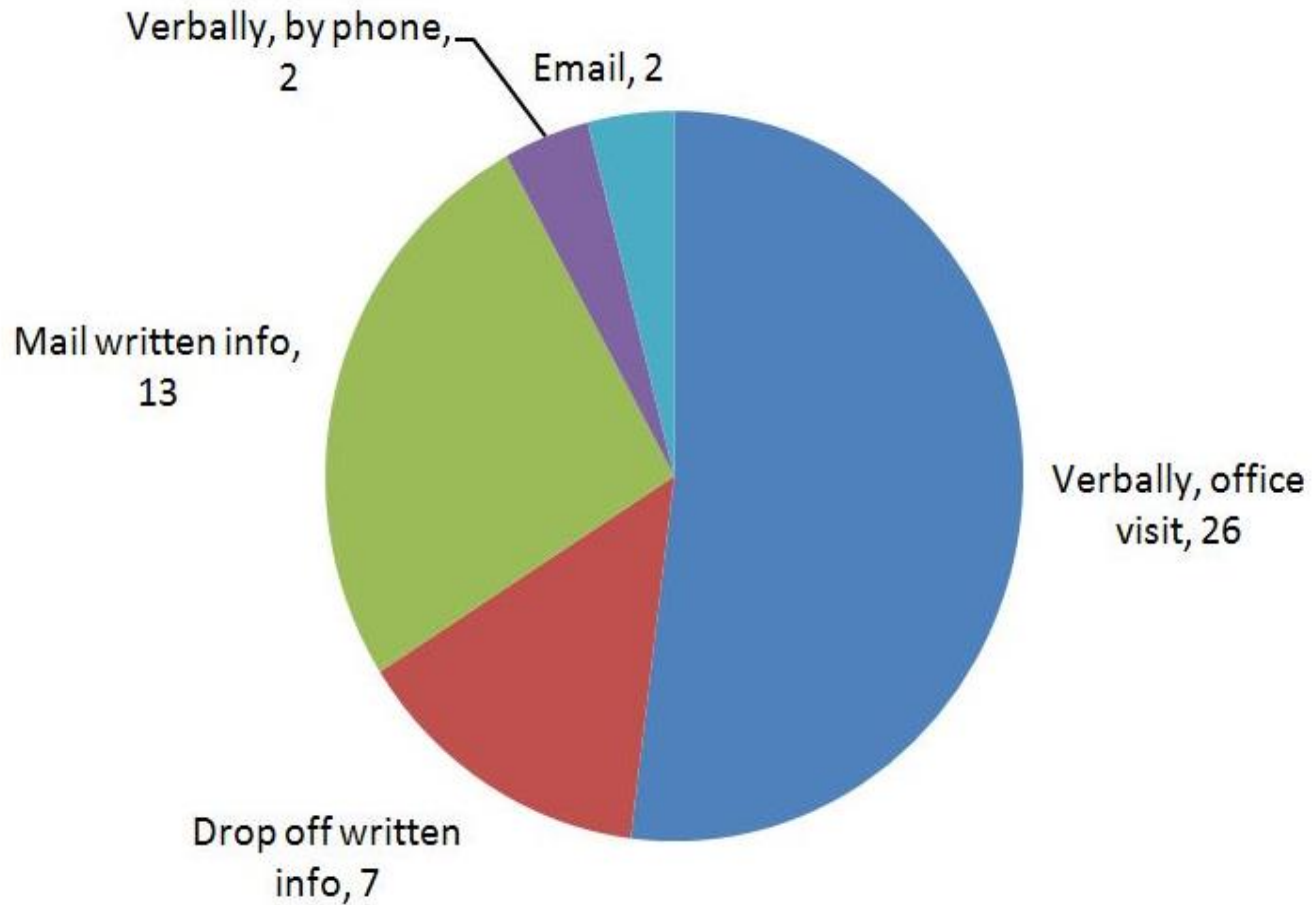
Irrigated Area, Acres



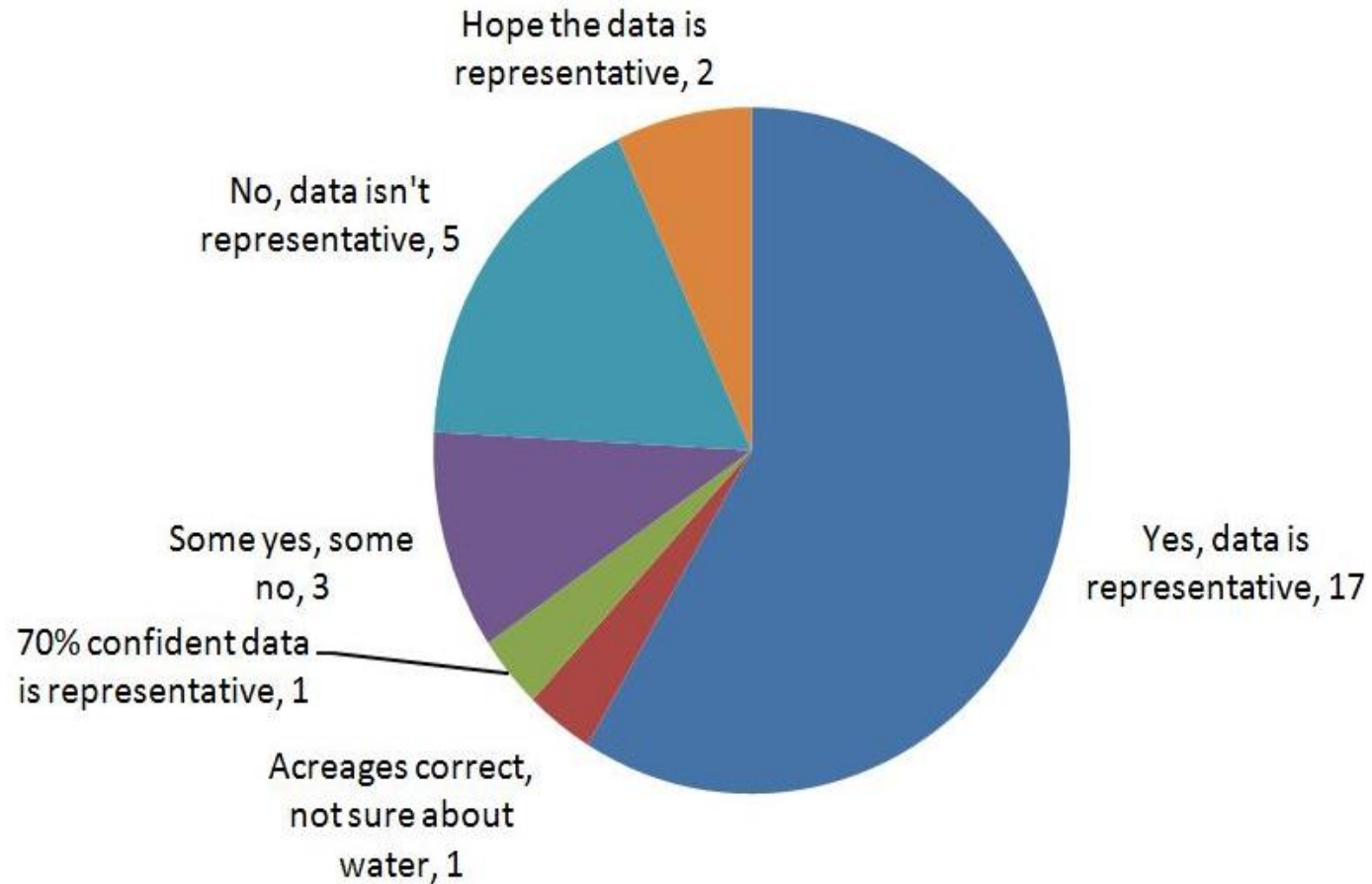
Water Use, Ac-ft



How Water Use Data is Submitted



District Data Confidence



Comments / Improvements

- 💧 No real consequences for not reporting
- 💧 Timing of the reporting period
- 💧 Improve reliability of access to the WUDB
- 💧 Need ability to print a status report
- 💧 Users/Owners complaints about paying the well fee
- 💧 Need better communication on what the data is used for



Some District Concerns

- 💧 **Multiple User/Owner records for same User/Owner**
- 💧 **Active wells – no fees collected or use information**
- 💧 **New wells not registered, use not being reported**
- 💧 **Site descriptions not useful to Users/Owners**
- 💧 **Well location coordinates are incorrect and cannot be changed**

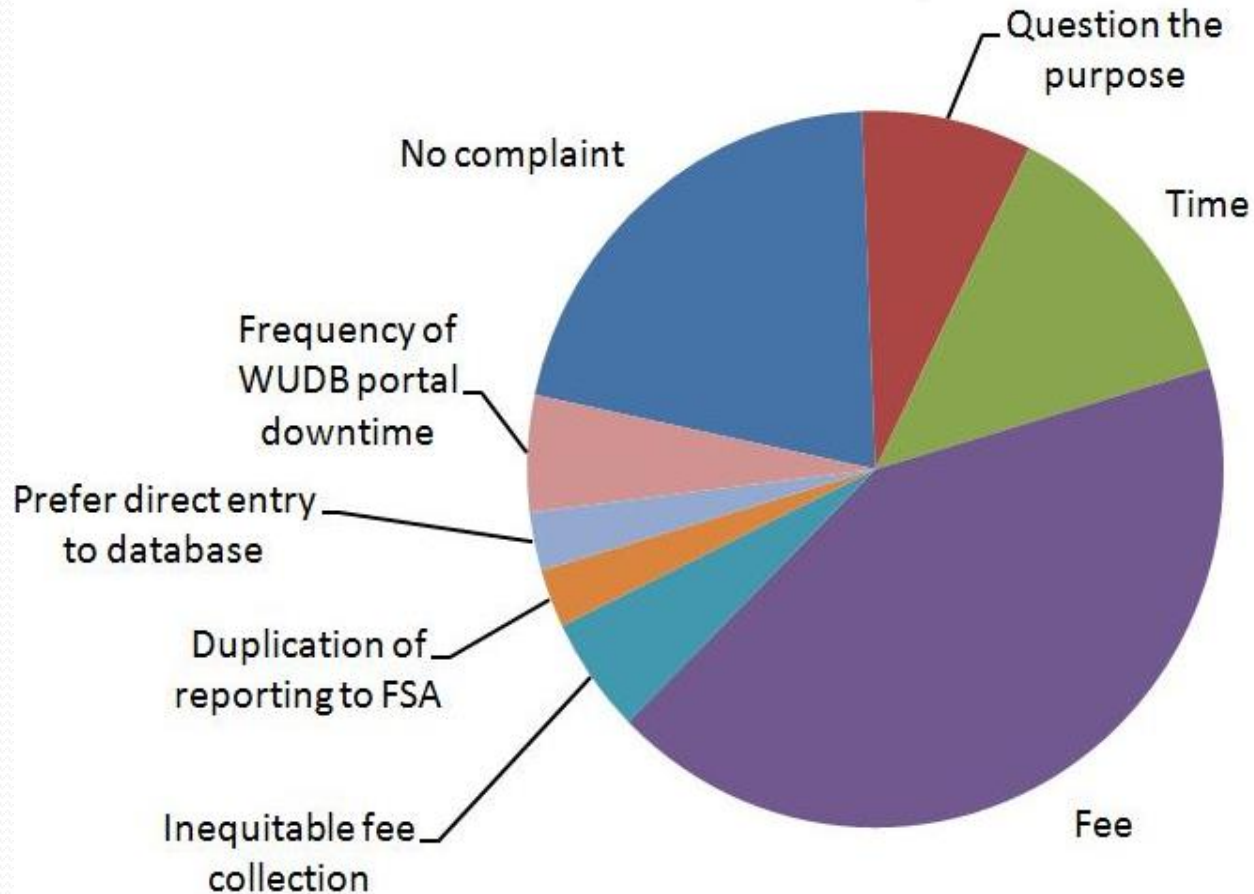


Some District Concerns

- 💧 **Data collection is not consistent**
- 💧 **Little or no QAQC of the data entered**
- 💧 **All had some concern or complaint about the data or the software**
- 💧 **Users/Owners don't like paying the well fee**



User Complaints



Three parts of the Project

- 💧 Convene the AISTWG
- 💧 Interview Conservation Districts
- 💧 **Review the Water Use Database (WUDB)**



Review the Water Use Database

- 💧 **Reporting Consistency**
- 💧 **Use vs Precipitation**
- 💧 **Application Rates**



Water Use Database

- 💧 Database at time of project start (1985-2015)
- 💧 Henry and Watkins (2014) analyzed 2000-2010
- 💧 FTN analyzed 2000-2015
- 💧 32 different crop types
- 💧 Corn, Cotton, Rice, and Soybeans (2000-2015):
 - 88% of the irrigation records
 - 93% of the irrigated acres
 - 92% of the reported water use



Reporting Consistency

- 💧 Irrigated area reported to WUDB consistently greater than area reported to the Census of Agriculture
- 💧 Mean application rates for crops are not always similar between adjacent counties for the same months
- 💧 Not consistent across Districts
- 💧 “Same as last year”



Water Use vs Precipitation

- 💧 **Compare county mean application rate to total precipitation**
- 💧 **Not able to correlate between precipitation and the amount of water used to irrigate**
- 💧 **No guidance given to Districts on adjustment for wet or dry years**

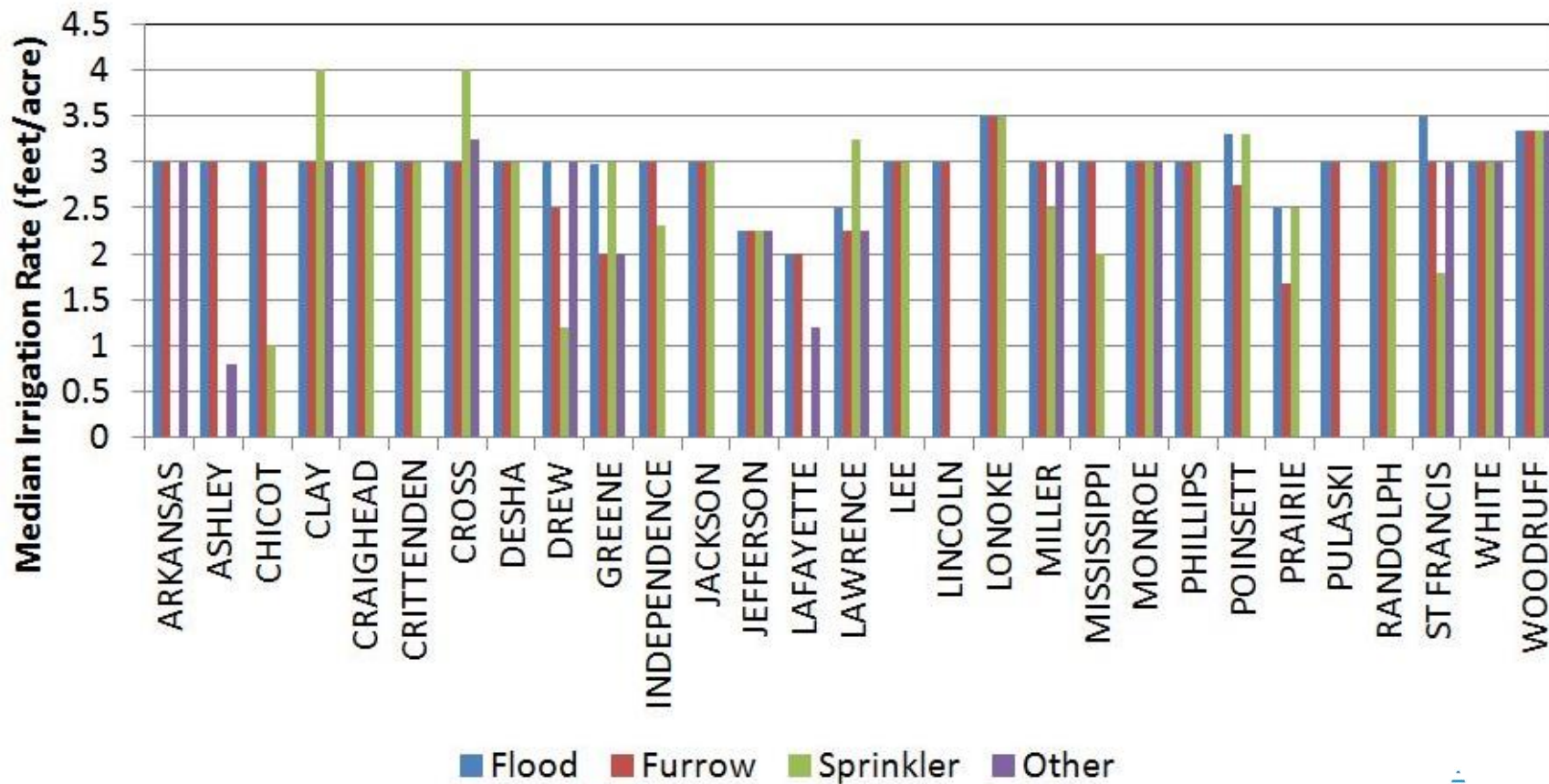


Application Rates

- 💧 Majority of rates reported relatively similar among counties (ranges provided by ANRC)
- 💧 Outliers not flagged by software: mean of 3.03 feet, but value of 120 feet included
- 💧 Rice application rates very similar across counties
- 💧 Corn, cotton, and soybeans rates vary widely



Data for Rice 2000 through 2015



Median Irrigation Rate for Rice



Focus Moving Forward

- 💧 **Education and interaction**
- 💧 **Encourage accurate reporting**
- 💧 **Reduce the time required for reporting**
- 💧 **Improve water use estimates by crop**



Questions?



Thank You!

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