Farm Evaluation Summary Report

(2016 Crop Year)

Submittal Date

June 30, 2017

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

GAR	Groundwater Quality Assessment Report
FE	Farm Evaluation survey
MWE	Managed Wetland Evaluation survey
SVWQC	Sacramento Valley Water Quality Coalition
CVRWQCB	Central Valley Regional Water Quality Control Board

FARM EVALUATION REPORT

As outlined in the Waste Discharge Requirements General Order for Growers within the Sacramento River Watershed (WDR or General Order; Order No. R5-2014-0030-R1), the Sacramento Valley Water Quality Coalition (SVWQC or Coalition) is submitting a summary of management practice information obtained from 2016 Farm Evaluations (FEs). Farm Evaluations are required annually for parcels in high vulnerability areas and every 5 years for parcels in low vulnerability areas starting with the 2014 Crop Year (due March 1, 2015). Members with parcels in high vulnerability areas, or with parcels in low vulnerability areas without a previously completed survey (e.g. a new member), were required to return a completed 2016 survey for enrolled parcels to the Coalition by March 1, 2017. A version of the Farm Evaluation survey, called the Managed Wetland Evaluation (MWE), was completed by members with private or publically managed land irrigated for wetland conservation, preservation, or restoration (Table 1).

The Regional Board reviews management practices used by growers on FEs and MWEs and compiled in this Farm Evaluation Summary, along with water quality monitoring results to determine if Coalition Members are taking actions protective of surface and groundwater quality beneficial uses. The standard FEs are designed to collect management practice information in four survey "Parts":

- Part A: whole farm evaluation,
- Part B: specific field evaluation,
- Part C: irrigation well information, and
- Part D: sediment and erosion control practices.

The survey parts gather information on management practices that affect both surface and groundwater quality:

1. Identification of crops grown and the irrigated acreage of each crop,
2. Geographical location of the member's farm,
3. Identification of on-farm management practices implemented to achieve the WDR farm management performance standards,
4. Identification of whether or not there is movement of soil during storm events and/or during irrigation (sediment and erosion risk),
5. Location of active irrigation wells and abandoned wells, and
6. Applied wellhead protection and backflow prevention practices and devices.

Managed Wetland Evaluations are designed to include only practices that may be used in managing wetland habitat. These MWEs are completed with information from March 2015 through February 2016 including the following:

1. Identification of enrolled parcels included as managed wetland,
2. Identification of habitat type and acreage,
3. Geographical location of the property,
4. Identification of irrigation practices implemented for each habitat type and the months in which they occur,
5. Identification of management practices for irrigation, herbicide application, and sediment control used to ensure water quality standards,
6. Location of active irrigation wells and abandoned wells, and applied wellhead protection and backflow prevention practices and devices, and
7. Identification of whether or not water leaves the property and is conveyed downstream and a description of where this occurs.

Eight of the Coalition's 13 Subwatershed Groups are classified as high vulnerability, and therefore require FE submittals. These include: Butte Yuba Sutter, Colusa Glenn, Dixon Solano, Northeastern California, Placer-Nevada-South Sutter-North Sacramento, Sacramento Amador, Shasta Tehama, and Yolo groups. The Executive Officer of the Central Valley Regional Water Quality Control Board (Regional Water Board) has approved Reduced Monitoring Management Practices Verification alternatives for El Dorado, Lake, and Napa. These areas are only required to submit Farm Evaluations every fifth year.

Table 1. Farm Evaluation deadlines for high and low vulnerability areas in the SVWQC.

VULNERABILITY	DOCUMENT REQUIRED	DUE DATE	UPDATES REQUIRED	REPORT TO RB
High	Farm Evaluation	March 1, 2017	March 1 Annually	June 30, 2017[1]
Low	Farm Evaluation	March 1, 2015	March 1 Every 5 years	May 1, 2020

[1] On March 22, 2017 the Coalition submitted a request to extend the Farm Evaluation component deadline from May 1, 2017 to June 30, 2017 (approved April 5, 2017).

Due to the size and diversity of the Coalition, FEs were distributed and processed through Subwatershed Groups. These smaller organizations more efficiently communicate with individual members. Lists of active members were used to evaluate the status of returned FEs. All members on these lists were sent notifications regarding FE completion deadlines and were provided with both resources and assistance with completing the surveys and to answer any questions. Members known to have managed wetlands were provided MWEs. A majority of FE and MWE surveys were prepopulated based on 2015 FE/MWE responses.

Member survey responses were recorded electronically by each Subwatershed Group and entered into the Coalition Access database for analysis. Survey responses were linked to unique identifiers per parcel with an Assessor Parcel Number (APN) and the associated acreage. The results are being submitted in an Access database along with this report and are identified on a Township-Range level, where the Township is assigned based on the centroid of each parcel.

Members were offered assistance with completing their surveys by each Subwatershed Group. The following actions were taken to ensure accurate data collection and reporting:

- Surveys were pre-populated by many Subwatershed Groups based on the previous year's answers. The member was given the opportunity to change their answer or indicate that no changes has occurred. If questions were not answered the year before, the question was marked with an arrow and a note indicated that the question was left blank last year and needed to be answered this year.
- Providing assistance with answering questions was important to ensure that the member was able to complete the survey accurately.
- Private appointments were offered to assist members.
- Members were also assisted via phone and email.
- Members were contacted by phone for follow-up when unanswered questions or unclear responses were found during survey entry; this only occurred for priority questions that were essential to the survey (management practice questions) and not all members could be contacted prior to the submission of this report.
- Data entry systems were updated to improve entry efficiency and accuracy.

Data were reviewed to identify data entry errors, missing data, and potentially inaccurate data. The review included comparing acreages provided by the members to acreages enrolled with the Coalition, and ensuring a response was recorded for every question on the survey. The following issues were identified that could not be corrected:

- Some parcels were new on the 2015 FE and it was unclear which responses applied to them. These surveys were marked for follow up and as many members as possible were contacted to resolve these issues.
- Some parcels were non-agriculture, but not clearly marked as such on returned FEs. The Coalition added verbiage to the cover letter in an attempt to minimize this issue; however, some surveys still required follow up calls.
- In situations where members have multiple parcels with different fields and management practices, some members did not report acreage for each Site ID/Field ID. If acreage was not filled in by the member and they could not be reached for clarification, the enrolled irrigated acreage was used.
- Some members did not provide crop information per field. If the crop type was not filled in by the member, and they could not be reached for clarification, the membership data was utilized when possible.

RESOURCES REQUIRED TO DOCUMENT FARM EVALUATION MANAGEMENT PRACTICES

As the largest water quality coalition in the Central Valley, both in irrigated acreage (1.3 million irrigated acres) and number of participants (over 8,000) enrolled, assisting owners and operators of irrigated lands in the Sacramento Valley Water Quality Coalition (SVWQC) complete the Farm Evaluation requirements was an "all hands on deck" effort that required thousands of hours and upwards of $750,000 to complete in 2014. While the Coalition was able to streamline the data collection and entry process in both 2015 and 2016, it is estimated that significant resources were spent costing approximately $300,000. These costs reflect both investments in technology systems to improve the members' ability to efficiently and accurately complete reports, staffing resources necessary to distribute, collect and enter data, material costs of producing maps, and providing assistance to Coalition members with questions on completing the FE.

A number of workshops and open houses were held for owners and operators of irrigated agriculture in the counties of the SVWQC requiring 2016 surveys. Thousands of letters were mailed, monthly newsletters were sent during the months which FE distribution and collection efforts were underway, follow-up emails or letters were sent to those who hadn't returned Farm Evaluations, and appointments were made with individual members to help them complete the forms.

In addition to the outreach described above, there was a significant capital investment in developing a database system, purchasing upgraded hardware and software systems and training full time and temporary help to input the data in a consistent manner. Costs ranged from an average $7,000 for a Subwatershed Group with less than 100 members to $75,000 for Subwatershed Groups with over 1,500 members and/or 225,000 irrigated acres.

The Central Valley Regional Water Quality Board should not view these costs in insolation or merely the first year costs for the SVWQC Waste Discharge Requirements (WDR) Order. Agriculture faces increasing cost pressures, not only from regulation, but from other areas (e.g., water master fees, fire tax), all "coming from the same pocket" of the grower and challenging the sustainability of California agriculture. Additionally, future costs of implementing groundwater quality elements of the WDR require the Regional Board to balance priorities and streamline requirements.

SUMMARY

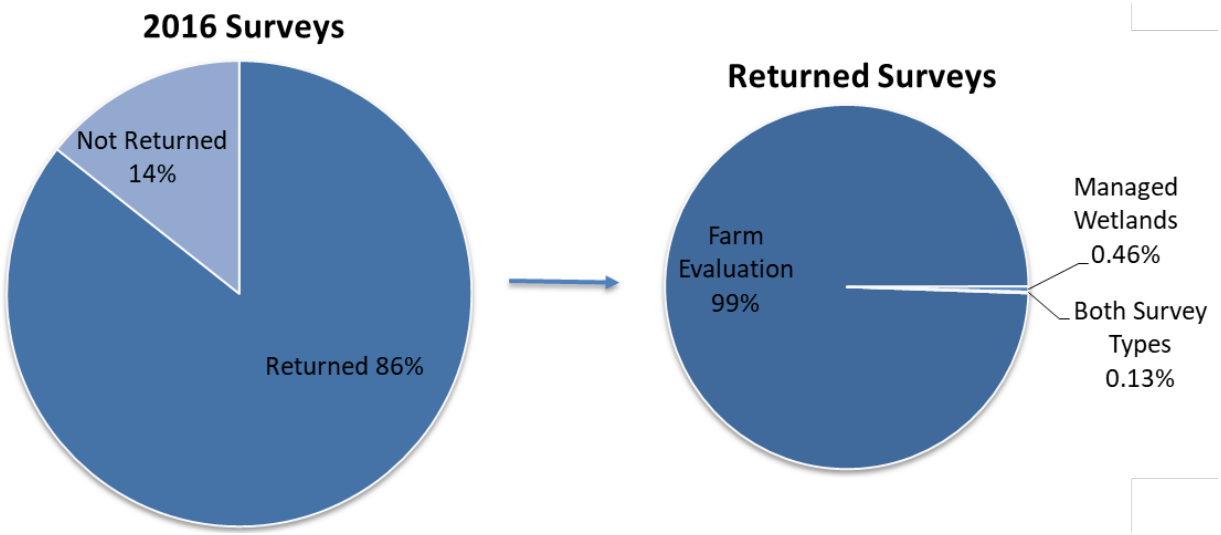
Members with high vulnerability parcels or without prior surveys were required to complete and return a FE or MWE survey for the 2016 crop year. The SVWQC received surveys from 86% of the members representing 92% of the expected acreage by April 5. Less than one percent of members required a MWE for a portion or all of their membership (Table 2). Since the April 5, 2017 deadline, the Coalition has received additional surveys from growers. The late surveys will be entered and result in an overall increase in returned surveys.

Table 2. Acreage and membership totals of returned 2016 FE and MWEs.

Survey Status	Survey Type	Sum of Acreage	Count of Members
Returned	Farm Evaluation	1,051,331	5,369
	Managed Wetland Evaluation	18,981	25
	Mixed	13,490	7
Returned Total[1]		**1,083,801**	**5,401**
Not Returned Total		**98,205**	**905**
Expected Grand Total		**1,182,006**	**6,306**
Percent Returned of Expected		**92%**	**86%**

[1] Total includes 12 members with 1,355 acres returned surveys that were not required for 2016 from Butte Yuba Sutter, Colusa Glenn, and Yolo groups.

Figure 1. An illustration of the percent of 2016 surveys that were returned, and the type of survey returned (FE, MWE or both). Percentages were calculated using membership counts.



NOTE: "Not Returned" survey count includes surveys that were received and entered after April 5, 2017.

STANDARD FARM EVALUATION

Of the returned surveys, 99% of the acreage was reported with standard Farm Evaluation surveys (Table 2).

Farm Evaluation answers are associated to a parcel, acreage, and crop. In situations where a grower reported more than one crop per parcel, the first crop listed was recorded as the primary crop.

Primary crops were grouped into sub categories and general categories. For example, the primary crop Almonds is associated with a subcategory of Nut Trees and a general category of Orchard. General categories include Pasture/Hay/Grain, Orchard, Row Crop, Vineyard, and Habitat. In some cases, surveys were returned without a crop designation (1% of the acreage) and the crop information was listed as Not Recorded. Less than 1% of the acreage was fallow and assigned to the general category of Not Farmed (Figure 2). Table 3 includes the percentage of reported acreage by general category, subcategory and primary crop for all surveys returned (both FE and MWE surveys).

Orchards represent the largest percent of acreage (44%) followed by Pasture/Hay/Grain (27%) and Row Crops (18%; Figure 2). Of the surveys returned associated with an Orchard general category, nut trees have more acreage than any other type of orchard including fruit trees (82% of the acreage; Figure 3). Almonds and walnuts each cover approximately half of the total nut tree acreage (Figure 3, Table 3). Wetland habitat is discussed further in a separate MWE section of the report.

Figure 2. General categories of reported crops in 2016 Farm Evaluations, including Managed Wetland Evaluations, displayed as percent of total reported acreage.

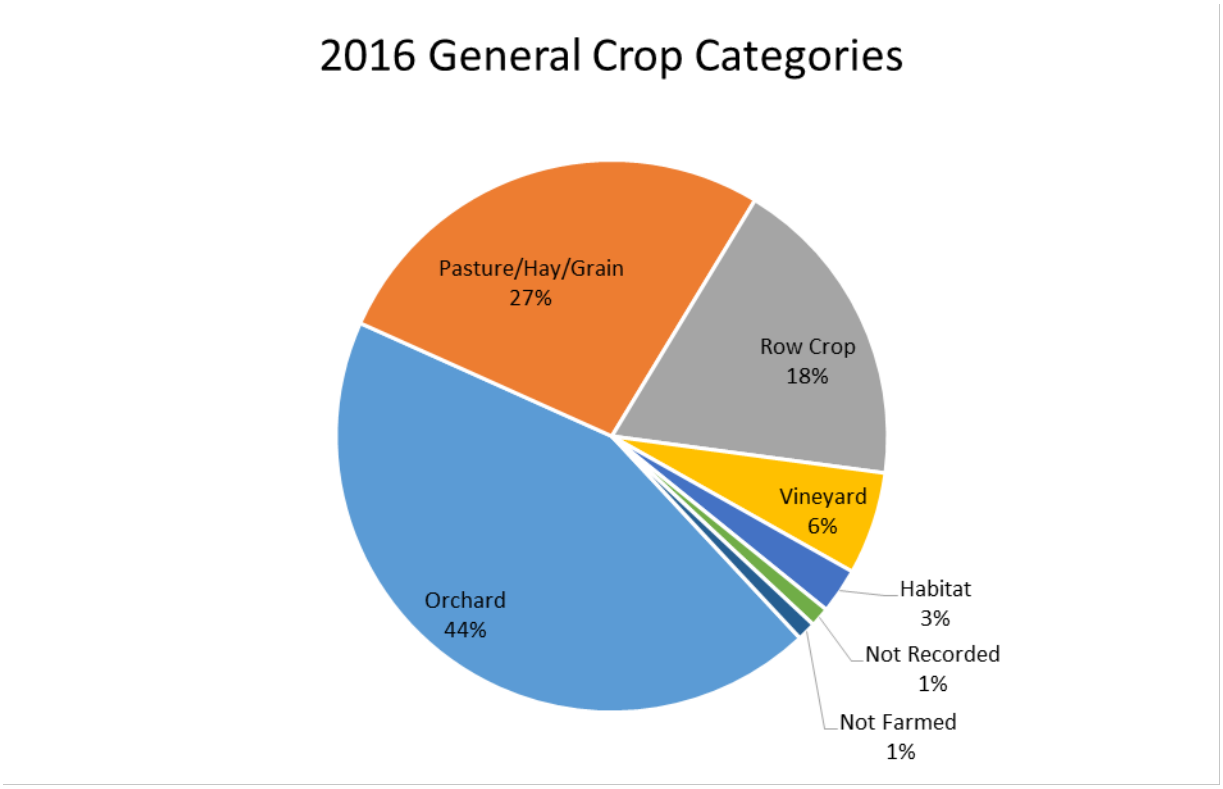


Figure 3. A summary of the type of orchards associated with 2016 Farm Evaluations; displayed as percent of acres reported.

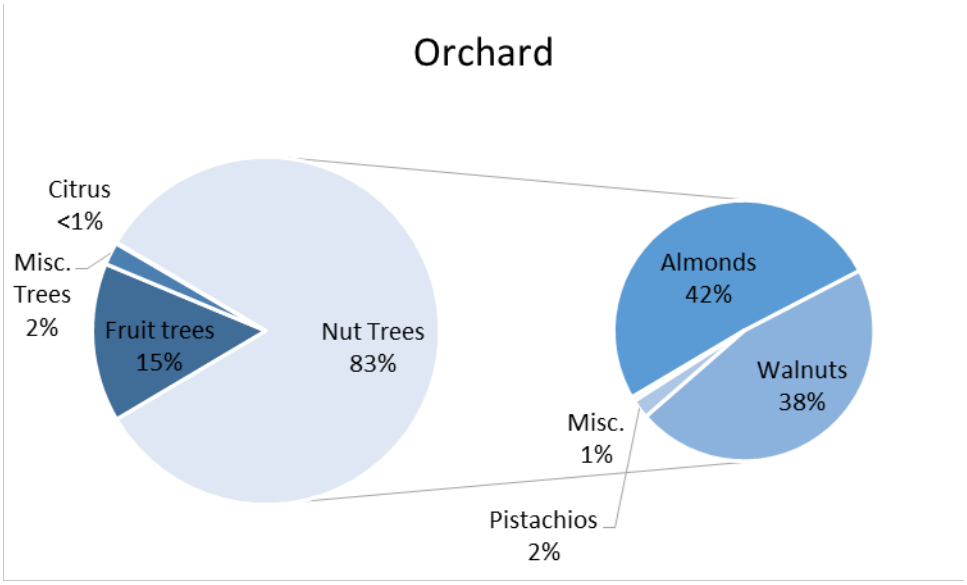


Table 3. Crop classifications associated with primary crops reported by members for the 2016 crop year.

General Category	Sub Category	Primary Crop	Percentage of Acreage
Pasture/Hay/Grain	Grain	Barley	0.08%
		Grain	0.20%
		Hay	< 0.00%
		Hops	< 0.00%
		Milo	0.05%
		Oats	0.33%
		Rice	0.85%
		Rye	0.26%
		Sorghum Milo	0.30%
		Sudan	0.51%
		Teff	0.04%
		Triticale	0.36%
		Wheat	4.13%
	Hay	Alfalfa	8.45%
		Hay	1.46%
	Pasture	Pasture	9.94%
Row Crop	Berries	Berries	0.03%
	Corn	Corn	3.41%
	Herbs/Spices	Herbs/Spices	0.07%
	Misc	Cotton	0.14%
		Cover Crop	0.05%
		Garlic	0.11%
		Misc	0.20%
		Shrubs	< 0.00%
		Sod	0.05%
	Nursery/Ornamental	Flowers	< 0.00%
		Nursery	0.11%
		Ornamental Plants	0.07%
Row Crop	Oil Crop	Canola	< 0.00%
		Safflower	1.10%
		Sunflowers	3.74%
	Row Crop	Asparagus	0.02%
		Beans	0.87%
		Beets	< 0.00%
		Bell Peppers	0.01%
		Broccoli	0.03%
		Carrots	0.05%
		Celery	< 0.00%
		Corn	< 0.00%
		Cucumbers	0.27%
		Melons	0.39%
		Misc Produce	0.16%
		Onions	0.05%
		Peppers	0.12%
		Potatoes	0.02%
		Pumpkins	0.04%
		Salad Greens	< 0.00%
		Squash	0.07%
		Sweet Potatoes	< 0.00%

General Category	Sub Category	Primary Crop	Percentage of Acreage
		Tomatillos	< 0.00%
		Tomatoes	6.16%
		Vegetables	0.67%
	Seed	Asparagus	< 0.00%
		Christmas Trees	< 0.00%
		Cucumbers	0.01%
		Melons	< 0.00%
		Misc	< 0.00%
		Onions	0.01%
		Squash	< 0.00%
		Sunflowers	0.15%
		Vegetables	0.25%
Habitat	Native Vegetation	Native Vegetation	0.12%
	Wetland	Brood Pond	0.09%
		Managed Wetland	0.07%
		Permanent Wetland	0.04%
		Seasonal Wetland	0.96%
		Semi - Permanent Wetland	0.02%
		Semi-Permanent Wetland	0.69%
		Wetlands	0.67%
Not Farmed	Dry	Dry	0.05%
	None	Fallow	0.96%
		None	0.08%
Not Recorded	Not Recorded	Not Recorded	1.15%
Orchard	Citrus	Citrus	0.05%
	Fruit Trees	Cherries	0.11%
		Figs	0.02%
		Fruit Trees	0.13%
		Olives	1.93%
		Persimmons	0.03%
Orchard	Fruit trees	Pome fruit	0.66%
		Pomegranates	< 0.00%
		Stonefruit	3.57%
	Nut Trees	Almonds	18.43%
		Chestnuts	< 0.00%
		Nut trees	0.06%
		Pecans	0.14%
		Pistachios	0.85%
		Walnuts	16.74%
	Misc. Trees	Christmas Trees	0.01%
		Orchard	0.88%
		Trees	0.03%
Vineyard	Grapes	Grapes	5.94%
	Kiwis	Kiwis	0.08%

Irrigation Management Practices

Members use several techniques to efficiently irrigate their fields. Eighty-five percent of members reported scheduling irrigation according to field needs, which continues to be the most commonly

reported efficiency method (Table 4, Figure 4). Drip irrigation and flood irrigation also continue to be the two most utilized primary irrigation methods; combined these two irrigation practices were utilized on 50% of the reported acreage (Figure 5). Most members utilized only primary irrigation methods, although sprinklers were reported as the most common secondary irrigation system (Table 5).

Table 4. Irrigation efficiency methods and irrigation practices utilized in 2016, displayed in acreage and member response count.

Survey Section	Question	Response	Acreage	Member Count	Percent Acres[1]
B	Irrigation Efficiency Practices	Scheduled to need	960,032	4,643	32%
		Laser Leveling	623,617	2,155	21%
		Use moisture probe	584,538	2,076	19%
		Use ET for scheduling	467,996	1,437	15%
		Pressure Bomb	188,816	521	6%
		Other	118,238	671	4%
		Soil Moisture Neutron Probe	85,992	291	3%
		No Selection	4,917	62	<1%
	Primary Irrigation Practices	Drip	324,675	1,371	28%
		Flood	247,133	1,736	22%
		Sprinkler	197,270	1,510	17%
		Micro Sprinkler	195,934	1,240	17%
		Furrow	145,980	608	13%
		Border Strip	25,936	160	2%
		No Selection	10,438	65	1%
	Secondary Irrigation Practices	No Selection	780,199	4,339	72%
		Sprinkler	108,392	435	10%
		Flood	62,561	373	6%
		Drip	49,347	225	5%
		Micro Sprinkler	41,230	211	4%
		Furrow	35,899	124	3%
		Border Strip	6,914	47	1%

[1] Percent of total acres reported per question.

Figure 4. Reported acreage associated with each irrigation efficiency practice.

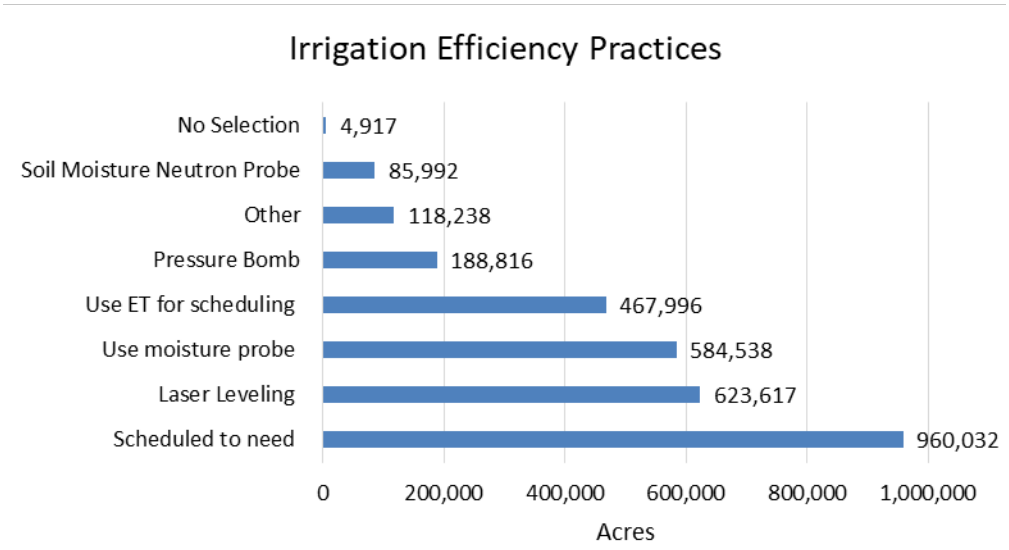


Figure 5. Percentage of acreage associated with each primary irrigation practice.

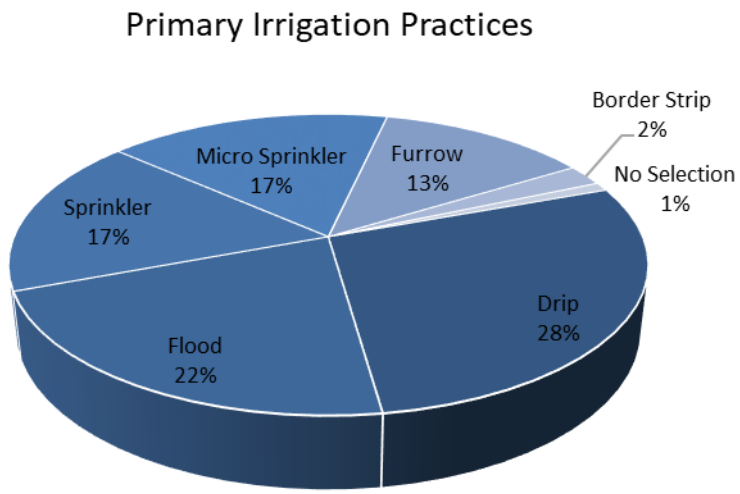


Table 5. Count of management units with secondary irrigation practices reported with primary irrigation practices.

		Secondary Irrigation						
		Border Strip	Drip	Flood	Furrow	Micro Sprinkler	Sprinkler	No Selection
Primary Irrigation	Border Strip	19	3	32	6	2	5	138
	Drip	4	140	37	32	63	176	1231
	Flood	14	28	180	25	22	81	1605
	Furrow	10	12	74	47	6	108	534
	Micro Sprinkler	10	40	68	10	114	71	1097
	Sprinkler	11	44	66	22	36	138	1394
	No Selection	-	-	5	1	-	1	64
Management Unit Total		**68**	**267**	**462**	**143**	**243**	**580**	**6,063**

Sediment Management Practices

Members with 74% of the reported acreage indicated they do not have the potential to discharge sediment to off-farm surface waters (Table 6). Top reported sediment and erosion control practices for the 2016 crop year were consistent with those of previous years. The most common cultural method to control sediment and erosion was increasing water penetration into the soil through amendments, such as deep ripping and aeration (720,941 acres). Reducing tillage to a minimum and allowing native vegetation to stabilize soils were also commonly reported practices (Table 6, Figure 6). Members commonly increase the timing between pesticide applications and irrigation as well as use drip or micro irrigation to control sediment discharge and erosion (Table 6, Figure 7).

Table 6. Sediment and erosion control management practices implemented by members in parcel acreage and response counts.

Survey Section	Question	Response	Acreage	Response Count	Percent Acres
A	Does your farm have the potential to discharge sediment to off-farm surface waters?	No	795,678	4,482	74%
		Yes	268,844	932	25%
		No Selection	3,898	35	<1%
D	Cultural Practices to Manage Sediment and Erosion	Soil water penetration increased with amendments (deep ripping/ aeration)	720,941	2,408	14%
		Minimum tillage incorporated to minimize erosion	634,334	2,855	12%
		Cover crops or native vegetation are used to reduce erosion	585,936	2,817	12%
		Vegetated ditches to remove sediment, pesticides, & fertilizers	516,838	1,781	10%
		Crop rows are graded to optimize rain and irrigation water	495,286	1,652	10%
		Vegetative filter strips and buffers are used to capture flows	311,054	1159	6%
		Creek banks and stream banks have been stabilized	308,725	922	6%

Survey Section	Question	Response	Acreage	Response Count	Percent Acres
D	Cultural Practices to Manage Sediment and Erosion	Berms capture runoff and trap sediment	301,148	1,198	6%
		Storm water is captured using field borders	300,351	1,110	6%
		Hedgerows/trees help stabilize soils & trap sediment movement	233,253	1037	5%
		Sediment basins/holding ponds settle out sediment & pesticides	201,966	688	4%
		Subsurface pipelines are used to channel runoff water	193,537	473	4%
		No storm drainage due to field or soil conditions	158,743	1,669	3%
		Field is lower than surrounding terrain	84,445	541	2%
		Other	34,038	181	1%
		No Selection	7,387	63	<1%
	Irrigation Practices for Managing Sediment and Erosion	The time increased between pesticide applications and irrigation	688,049	2,581	25%
		Use drip or micro-irrigation to eliminate irrigation drainage	518,893	2,360	19%
		Shorter irrigation runs with checks manage and capture flows	408,327	1,693	15%
		No irrigation drainage due to field or soil conditions	361,388	2,639	13%
		Tailwater Return System	226,304	566	8%
		Catchment Basin	196,155	659	7%
		In-furrow dams used to increase infiltration and settle sediment	195,737	742	7%
		Use of flow dissipaters to minimize erosion at discharge point	106,114	344	4%
		Other	62,228	319	2%
		PAM used to bind sediment & increase infiltration	17,752	47	1%
		No Selection	9,613	64	<1%

Figure 6. Acreage reported for cultural practices implemented to manage sediment and erosion.

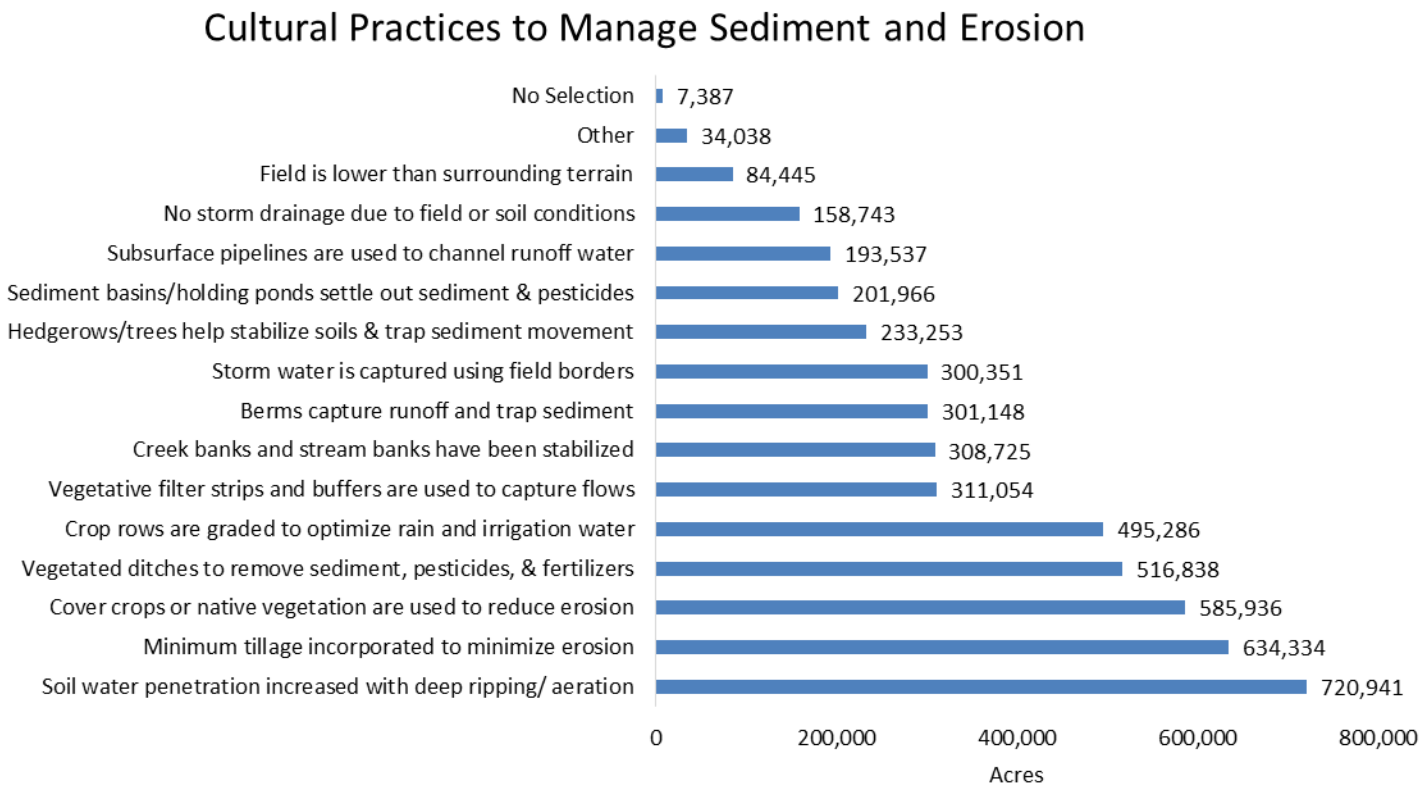
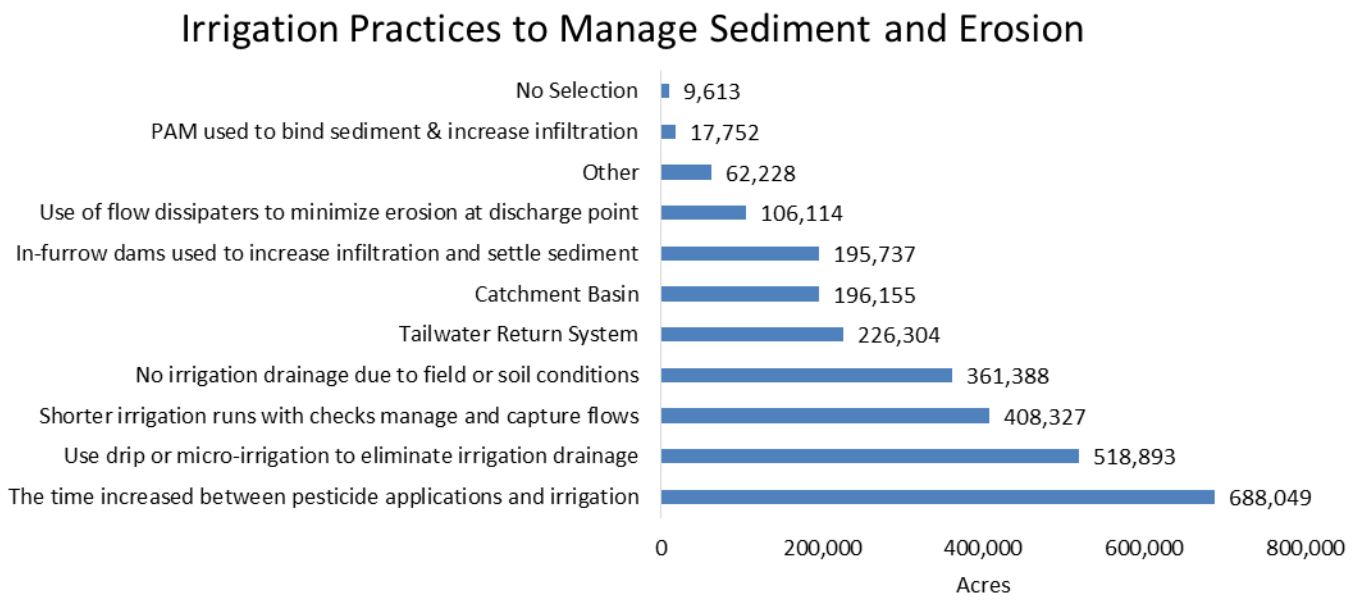


Figure 7. Acreage associated with irrigation practices to manage sediment and erosion.



Pesticide & Nutrient Management

Minimal changes occurred in the overall utilization of pesticide and nutrient management practices between 2016 and previous years. SVWQC members continue to employ several practices at one time to reduce the movement of pesticides and nutrients to surface waters (Table 7, Figure 8, and Figure 9). Members commonly implemented between 11 and 12 different pesticide management practices; the three most reported pesticide management practices were following label restrictions, following county permit requirements, and monitoring wind conditions (Table 7, Figure 8).

In keeping with prior survey year trends, a majority of the members employed PCAs or CCAs in 2016 to develop their crop fertility plan (Table 7). The most commonly reported nitrogen management methods continue to be soil testing (21%), splitting fertilizer applications throughout the growing season (19%), and testing plant tissue (16%, Table 7, Figure 9). Orchards cover the majority of the response acreage for each of these practices.

Table 7. Pesticide and nutrient management methods implemented by members, shown in acreage and member response count.

Survey Section	Question	Response	Acreage	Member Count	Percent Acres
A	Pesticide Application Practices	Follow Label Restrictions	976,600	4,052	9%
		County Permit Followed	975,933	3,998	9%
		Monitor Wind Conditions	963,988	3,933	8%
		Avoid Surface Water When Spraying	933,909	3,646	8%
		Use PCA Recommendations	931,718	3,584	8%
		Attend Trainings	929,831	3,502	8%
		Monitor Rain Forecasts	915,675	3,611	8%
		End of Row Shutoff When Spraying	898,908	3,576	8%
		Use Appropriate Buffer Zones	856,069	3,181	8%
		Use Drift Control Agents	796,637	2,819	7%
		Reapply Rinsate to Treated Field	593,337	1,962	5%
		Sensitive Areas Mapped	566,672	1,905	5%
		Use Vegetated Drain Ditches	511,988	1,545	4%
		Chemigation	234,365	658	2%
		Target Sensing Sprayer used	184,546	656	2%
		No Pesticides Applied	83,160	1,269	1%
		Other	48,901	256	<1%
		No Selection	983	16	<1%
	Who helps develop the crop fertility plan?	Pest Control Advisor (PCA)	926,242	3,604	35%
		Certified Crop Advisor (CCA)	532,602	1,814	20%
		Professional Soil Scientist	299,706	880	11%
		UC Farm Advisor	288,219	909	11%
		Professional Agronomist	282,771	780	11%
		Independently Prepared by Member	224,745	906	8%
		None of the above	61,148	1,063	2%
		Certified Technical Service Providers by NRCS	51,885	203	2%
		No Selection	1,920	21	<1%
B	Nitrogen Management Practices	Split Fertilizer Applications	813,480	3,179	21%
		Soil Testing	758,815	2,788	19%

Survey Section	Question	Response	Acreage	Member Count	Percent Acres
		Tissue/Petiole Testing	634,107	2,368	16%
		Fertigation	440,721	1,482	11%
		Foliar N Application	381,779	1,464	10%
		Irrigation Water N Testing	365,210	1,046	9%
		Cover Crops	343,511	1423	9%
		Do Not Apply Nitrogen	104,775	1,417	3%
		Variable Rate Applications using GPS	70,370	216	2%
		Other	38,766	278	1%
		No Selection	6,643	59	<1%

Figure 8. Pesticide management practices implemented by members shown in terms of reported parcel acreage.

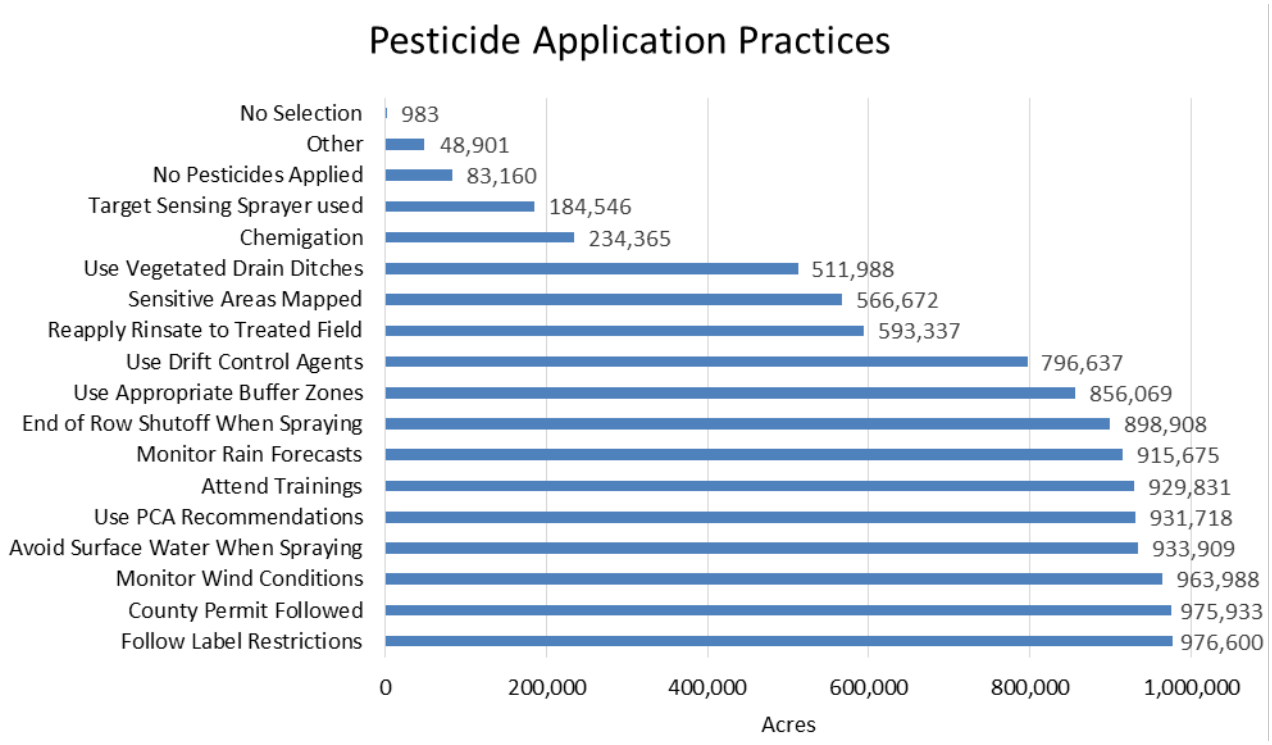
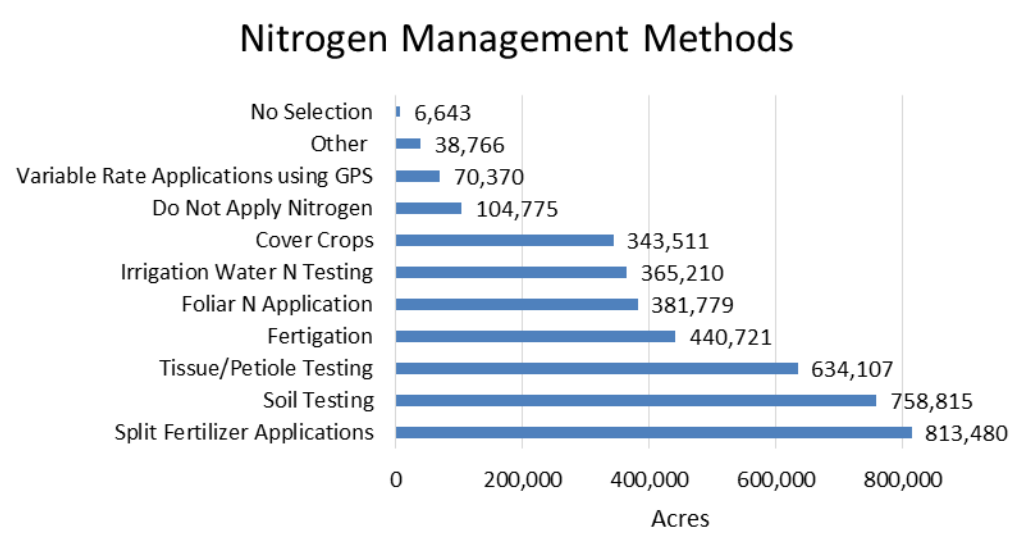


Figure 9. Nitrogen management practices implemented by members shown in reported parcel acreage.



Well Management Practices

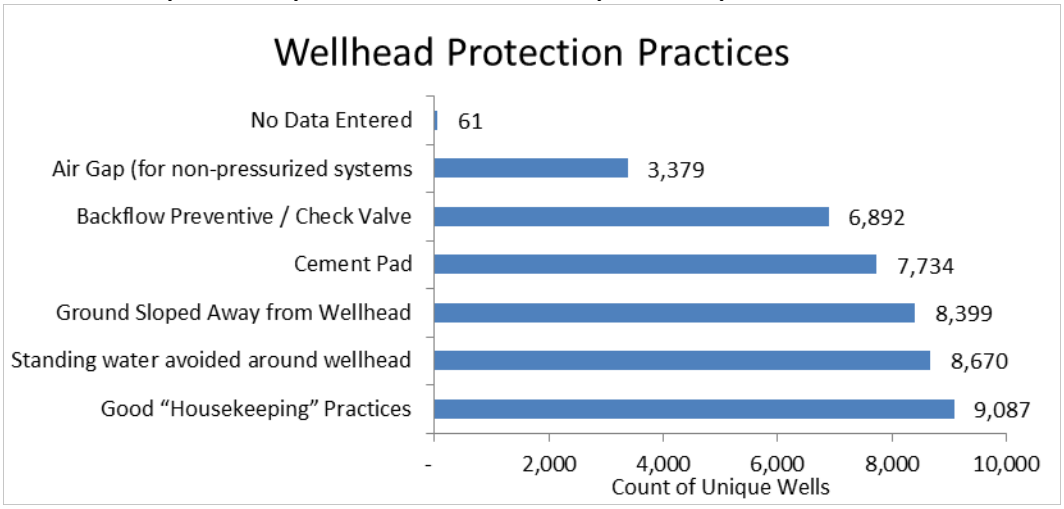
Irrigation Wells

The majority of members have at least one irrigation well (Table 8). Wellhead protection practices implemented on active irrigation wells are meant to prevent pollution to the groundwater system through wellheads. Most wells were reported to have three to four practices used to prevent groundwater pollution. The most common practices used by Coalition members continues to include following good housekeeping procedures and preventing standing water around the wellhead (Table 8, Figure 10).

Table 8. Irrigation well info by membership acreage, member count, and well count.

Survey Section	Question	Response	Acreage	Count
				Response
C	Do you have any irrigation wells on parcels associated with this Farm Evaluation?	Yes	804,699	3,339
		No	252,589	2,155
		No Selection	7,612	49
				Well
	Wellhead Protection Practices	Good "Housekeeping" Practices	-	9,087
		Standing water avoided around wellhead	-	8,670
		Ground sloped away from wellhead	-	8,399
		Cement Pad	-	7,734
		Backflow Preventive / Check Valve	-	6,892
		Air Gap (for non-pressurized systems)	-	3,379
		No Selection	-	61
			Unique Irrigation Wells	9,337

Figure 10. Count of unique wells reported with each wellhead protection practice.



Abandoned Wells

On 2016 FEs, 95% of members reported no abandoned wells on their parcels, although the Coalition region does contain abandoned wells. Most abandoned wells have been properly destroyed. Many members with abandoned wells selected more than one response in the Well Chart (Table 9). Table 10 lists the year that growers reported the wells were abandoned. Members reported a total of 276 abandoned wells. When a decade was given by the grower, the first year of the decade was used for totaling purposes. The number of wells abandoned over the years has fluctuated without a clear trend with respect to quantity of wells abandoned across time.

Table 9. Abandoned well practices by acreage, response count, and well count.

Survey Section	Question	Response	Acreage	Count
C				Response
	Are you aware of any known abandoned wells associated with this Farm Evaluation?	No	963,304	5,174
		Yes	96,595	278
		No Selection	7,332	44
				Wells
	Abandoned Well Practices	Destroyed - Unknown method	-	197
		No Data Entered	-	127
		Destroyed by licensed professional	-	71
		Destroyed – certified by county	-	47

Table 10. Count of wells abandoned in each reported year.

Well Abandoned Year on the Farm Response (Survey Section C)	Count of Wells
1920	3
1940	6
1950	4
1951	1
1954	1
1955	2

Well Abandoned Year on the Farm Response (Survey Section C)	Count of Wells
1958	2
1960	6
1968	2
1970	5
1973	1
1977	1
1978	1
1979	1
1980	6
1982	1
1983	2
1984	1
1985	4
1986	2
1987	3
1988	3
1989	2
1990	3
1991	1
1992	1
1993	1
1994	3
1995	2
1996	1
1997	2
1998	2
1999	2
2000	6
2001	3
2002	3
2004	2
2005	1
2006	7
2007	2
2008	3
2009	4
2010	8
2011	5
2012	10
2013	7
2014	24
2015	13
2016	10
unknown	88
Total	**274**

MANAGED WETLAND EVALUATIONS

Out of required 2016 surveys, only 32 memberships needed Managed Wetland Evaluations (Table 2, Figure 1, and Figure 2). A majority of the wetland habitat associated with 2016 MWE's is Seasonal Wetland indicating that it is flooded between August and April (Table 11).

Table 11. Acreage associated with each reported managed wetland habitat type.

Habitat Type	Acreage	Response Count
Seasonal Wetland (Flooded August-April)	4,338	21
Semi-Permanent (Flooded September-July)	2,225	9
Permanent Wetland (Flooded Year Round)	293	2
Brood Pond/Reverse Cycle (Flooded March-August)	130	4

Irrigation Practices

Managed wetlands fall into any of six habitat types: seasonal wetland, semi-permanent, permanent wetland, brood pond, irrigated pasture, or irrigated upland. For all wetland types and brood ponds, the land is irrigated in order to flood the field for a portion of the year. Then, the water is released to support different stages of waterfowl and other wetland wildlife lifecycles. The most common habitat type reported in 2016 is seasonal wetland, which is flooded from August to April (Table 11). Members reported the time periods of their irrigation, flood-up, and drawdown by writing in the months in which these occur.

Irrigation generally occurred in summer for brood ponds. For seasonal wetlands, irrigation was reported for various periods throughout the year (Figure 11). Flood up for seasonal and semi-permanent wetland generally occurred in fall and winter (Figure 12). Drawdown occurred between February and August with the most common period being between March and June (Figure 13). Irrigation, flood up, and drawdown patterns are consistent with those reported for prior years.

Figure 11. Time periods for irrigation provided on surveys; the color of the bar reflects the percent of surveys returned with that specific irrigation time period specified.

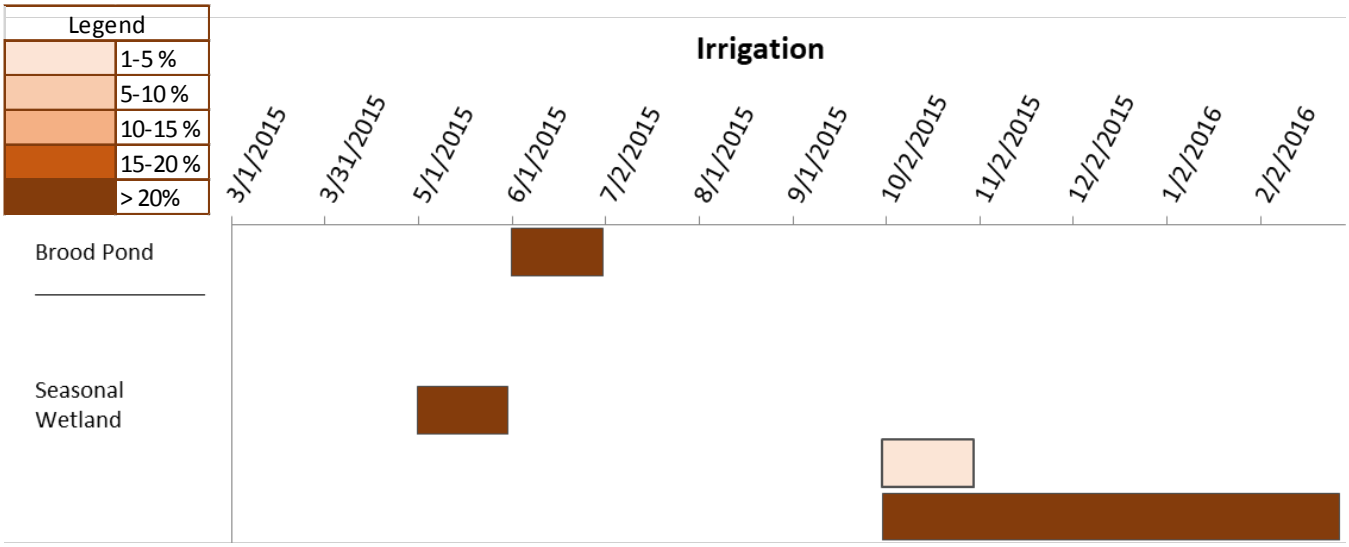


Figure 12. Time periods for flood up provided on surveys; the color of the bar reflects the percent of surveys returned with that specific flood up time period specified.

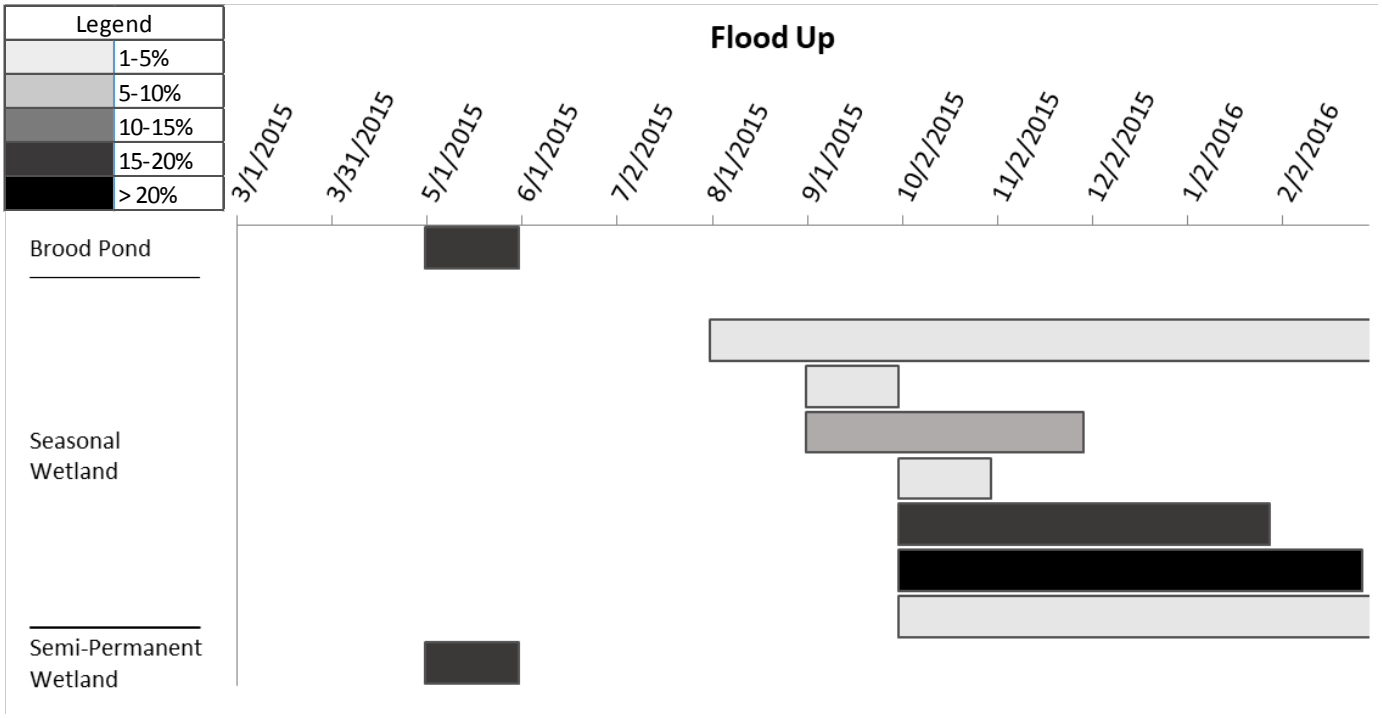
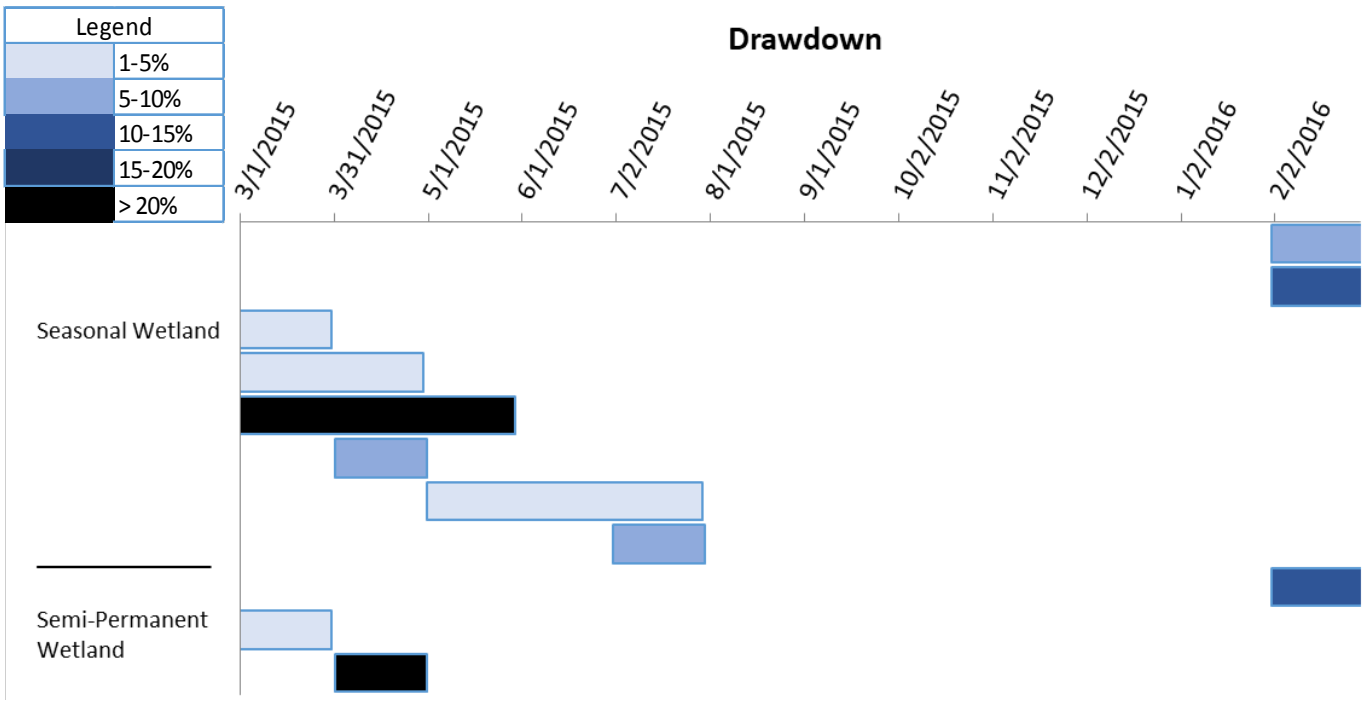


Figure 13. Time periods for drawdown provided on surveys; the color of the bar reflects the percent of surveys returned with that specific drawdown time period specified.



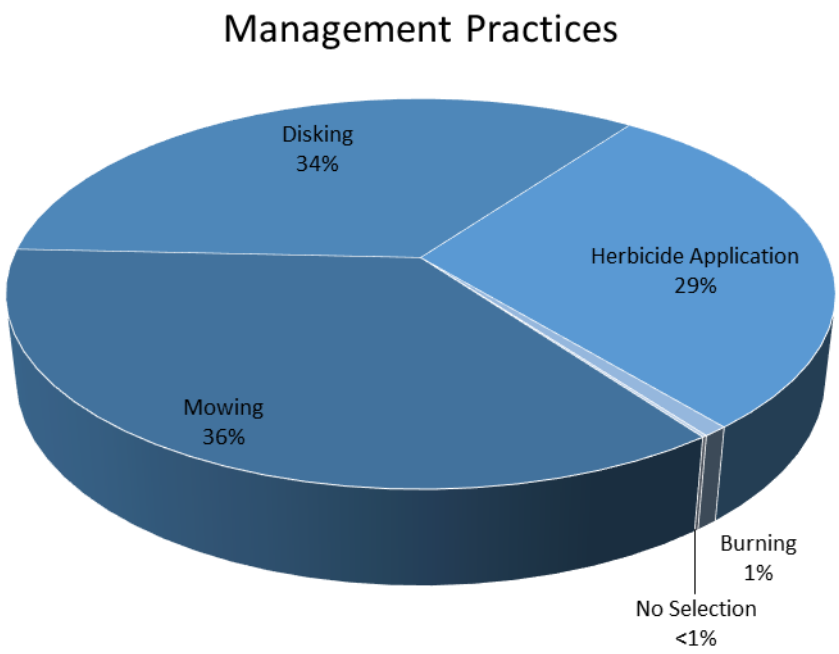
Management Practices

Members use a variety of practices to manage wetland habitat and make improvements for wildlife. Typically one to two practices are used by each member (Table 12). The two most reported management practices on 2016 surveys, similar to prior years, were mowing and disking (Table 12, Figure 14).

Table 12. Summary of management practices implemented by members to improve wildlife habitat on managed wetlands.

Question	Response	Acreage	Response Count	Percent Acres
Herbicide Application Practices	Mowing	18,062	26	36%
	Disking	17,350	18	34%
	Herbicide Application	14,651	10	29%
	Burning	426	3	1%
	No Selection	80	1	<1%

Figure 14. Wetland management practices reported by members, in percent reported acreage.



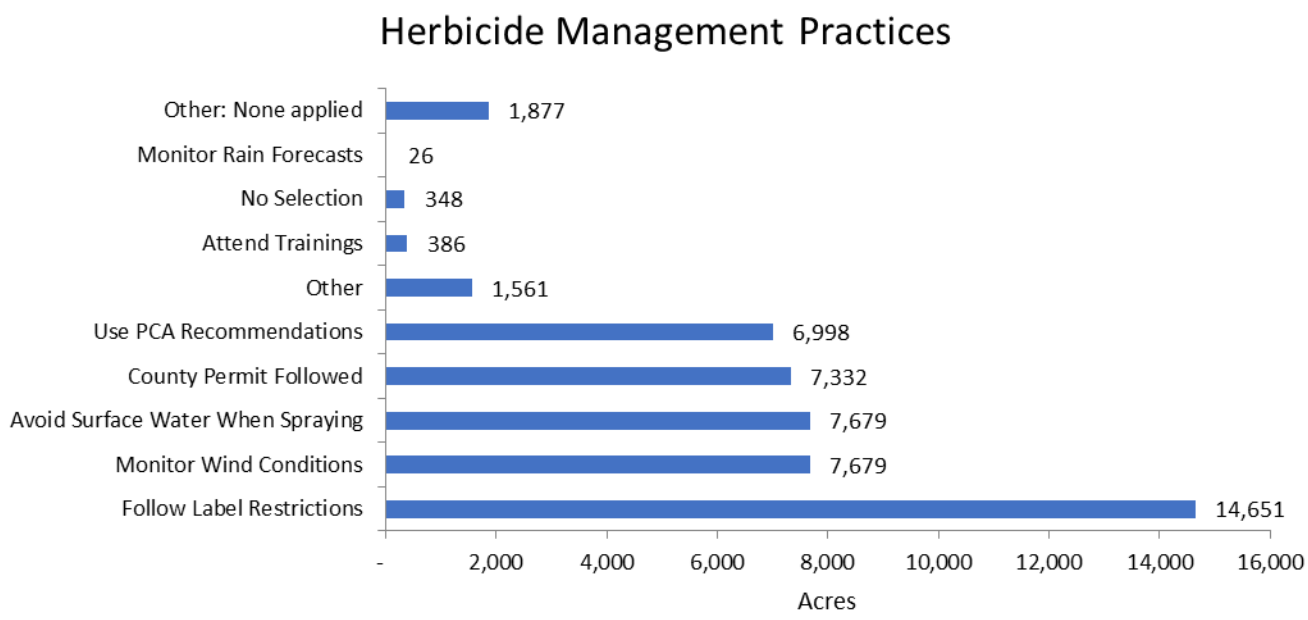
Herbicide Management

Similar to pesticide applications, certain management practices are implemented to manage herbicide applications to protect surface and groundwater systems. Members employ several practices to reduce the movement of herbicides to surface waters (Table 13, Figure 15). The most common management practices were following label restrictions and county permits, monitoring wind conditions, and avoiding surface waters while spraying the herbicides. All of the reported herbicides included glyphosate based formulations. Five members also noted applying 2-4D or triclopyr in combination with glyphosate.

Table 13. Herbicide management practices used by members on managed wetland fields.

Question	Response	Acreage	Response Count	Percent Acres
Herbicide Application Practices	Follow Label Restrictions	14,651	10	31%
	Monitor Wind Conditions	7,679	6	16%
	Avoid Surface Water When Spraying	7,679	6	16%
	County Permit Followed	7,332	6	15%
	Use PCA Recommendations	6,998	6	15%
	Other	1,561	6	3%
	Attend Trainings	386	3	1%
	No Selection	348	3	1%
	Monitor Rain Forecasts	26	2	<1%
	Other: None applied	1,877	5	4%

Figure 15. Herbicide management practices implemented by Coalition members, displayed in reported acreage.



Sediment Management Practices

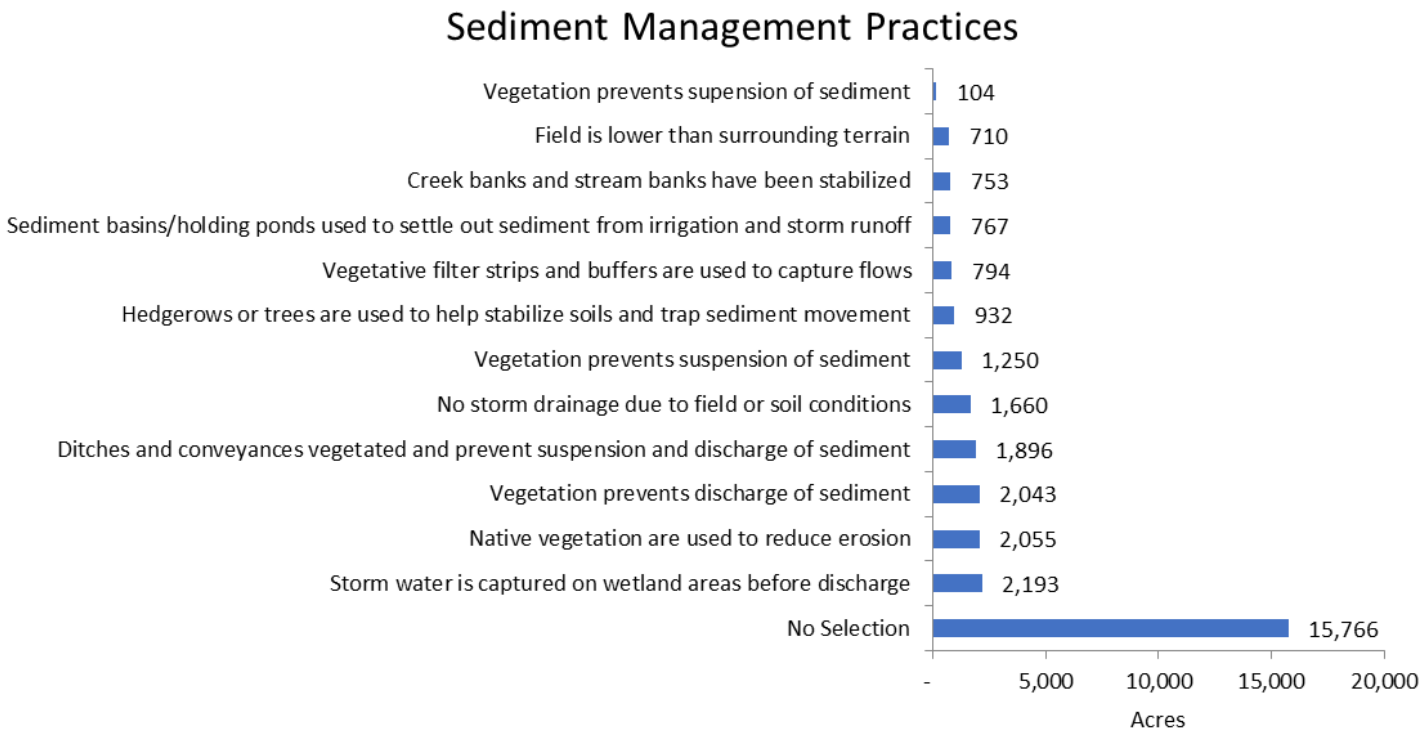
Many Coalition members who manage wetlands use management practices to control the movement of sediment; members typically employ more than one method on a parcel (Table 14, Figure 16). While 40% of the memberships with managed wetlands did not report sediment management practices, those that did indicated that storm water was captured by their wetland area before it is discharged off-farm. Member also commonly utilized native vegetation and planted vegetation to capture sediment and strengthen soils (Table 14).

Table 14. Practices implemented by Coalition members to manage sediment and control erosion on their managed wetland fields.

Question	Response	Acreage	Response Count	Percent Acres
Sediment and Erosion Control Practices	No Selection	15,766	13	51%
	Storm water is captured on wetland areas before discharge	2,193	12	7%
	Native vegetation are used to reduce erosion	2,055	11	7%
	Vegetation prevents discharge of sediment	2,043	11	7%
	Ditches and conveyances vegetated and prevent suspension and discharge of sediment	1,896	10	6%
	No storm drainage due to field or soil conditions	1,660	7	5%
	Vegetation prevents suspension of sediment	1,250	10	4%
	Hedgerows or trees are used to help stabilize soils and trap sediment movement	932	8	3%
	Vegetative filter strips and buffers are used to capture flows	794	6	3%
	Sediment basins/holding ponds are used to settle out sediment from irrigation and storm runoff	767	4	2%
	Creek banks and stream banks have been stabilized	753	6	2%

Question	Response	Acreage	Response Count	Percent Acres
	Field is lower than surrounding terrain	710	5	2%
	Vegetation prevents suspension of sediment	104	1	<1%

Figure 16. Sediment control practices used by members to minimize or eliminate the movement of sediment.



Well Management Practices

Irrigation Wells

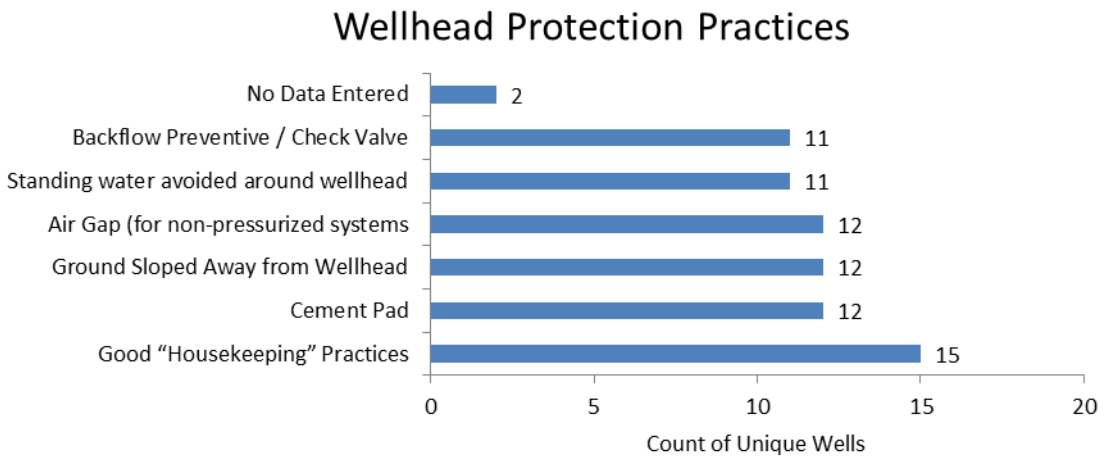
Several members with managed wetlands reported at least one irrigation well on their property with three to four Wellhead Protection Practices in place. Implementing good housekeeping methods continues to be the most reported practice for irrigation wells associated with wetlands (Table 15, Figure 17).

Table 15. Wellhead protection practice information for wells on managed wetlands.

Survey Section	Question	Response	Acreage	Count
C				Member
	Do you have any irrigation wells on parcels associated with this survey?	No	12,134	20
		Yes	7,225	11
		No Selection	302	1
				Well
	Wellhead Protection Practices	Good "Housekeeping" Practices	-	15
		Cement Pad	-	12

Survey Section	Question	Response	Acreage	Count
		Ground Sloped Away	-	12
		Air Gap	-	12
		Standing water avoided	-	11
		Backflow Preventive / Check Valve	-	11
		No Data Entered	-	2
			Unique Irrigation Wells	**15**

Figure 17. Count of unique wells reported with wellhead protection practices on managed wetland management units.



Abandoned Wells

Of the small number of required 2016 MWEs, only one membership was aware of an abandoned well on their property. This well was destroyed by a licensed professional in 2015 (Table 16).

Table 16. Summary of known abandoned wells on managed wetlands.

Survey Section	Question	Response	Acreage	Count
C				**Member**
	Are you aware of any known abandoned wells associated with this survey?	No	19,319	30
		Yes	40	1
		No Selection	302	1
				Wells
	Abandoned Well Practices	N/A (Has No Abandoned Wells)		30
		No Data Entered		1
		Destroyed by licensed professional		1