Farm Evaluation Summary Report

(2014)

Submittal Date

August 1, 2015

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ECOSYSTEMS • CONSULTING

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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), the Sacramento Valley Water Quality Coalition (SVWQC or Coalition) is submitting a summary of management practice information obtained from Farm Evaluations (FEs). All members were required to complete and return surveys for enrolled parcels to the Coalition by March 1, 2015. A version of the Farm Evaluation survey, called the Managed Wetland Evaluation (MWE), was completed by members with land irrigated for aquaculture or wetland conservation, preservation, or restoration.

This report summarizes management practices implemented by members during the 2014 calendar year for standard Farm Evaluations and between March 2013 and February 2014 for Managed Wetland Evaluations. Data from the FEs and MWEs can be used to evaluate changes in surface water quality relative to changes in management practices. The standard FEs are designed to collect 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 specific to both surface and groundwater management practices from growers:

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 areas) and a description of where this occurs,
5. identification of whether or not water leaves the property and is conveyed downstream and a description of where this occurs,
6. location of active irrigation wells and abandoned wells, and
7. 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 2013 through February 2014, 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.

While all members were required to complete the Farm Evaluations for 2014, requirements for survey updates differ based on vulnerability designations (Table 1). High vulnerability areas are the geographic regions within the Coalition area where there is a management plan due to surface or groundwater quality impairments or where the area has been determined to be highly vulnerable for groundwater in the Groundwater Assessment Report (GAR). The GAR for SVWQC was approved by the Central Valley Regional Water Quality Control Board (CVRWQCB) on September 18, 2014.

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, 2015	March 1 Annually	August 1, 2015[1]
Low	Farm Evaluation	March 1, 2015	March 1 Every 5 years	August 1, 2015[1]

[1]On February 24, 2015 the Coalition submitted a request to extend the Annual Report Component 20 from May 1, 2015 to August 1, 2015 (approved April 21, 2015).

Due to the size and diversity of the Coalition, FEs were distributed and processed through the thirteen sub-watershed organizations that comprise the Sacramento Valley Water Quality Coalition. 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 provided with resources to assist with filling out the surveys and to answer any questions. Members known to have managed wetlands were mailed MWEs.

Members Survey responses were recorded electronically by each sub-watershed group then compiled into a master database for analysis. Survey responses were linked to unique identifiers per parcel with either a code or Assessor Parcel Number (APN) and the associated acreage. Results are being submitted in an Access database by Township with this report.

Growers and members were offered assistance with completing their surveys by each sub-watershed organization. The following actions were taken to ensure accurate data collection and reporting:

- Workshops were held to provide members with in-person help from Coalition representatives. Providing assistance with answering questions was important to ensure that the member was able to fill in the survey accurately.

- Private appointments were offered to assist members unable to attend workshops.
- Members unable to travel to group offices 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 the submission of this report.
- Data were reviewed in the database to reduce errors including comparing acreages provided by the members versus acreages enrolled with the Coalition.

During the data entry process, reviewing responses indicated several areas of concern:

- Some parcels were not included on returned surveys or groups of parcels were unclear. Data entry personnel cannot accurately make assumptions as to the meaning behind such actions.
- Many members did not divide their APN acreage into each Site ID/Field ID. It is unclear whether this was because of a lack of understanding of how to subdivide their APNs or if they simply failed to complete the subdivision as requested. Failure to complete this task potentially affects the accuracy of the acreage associated with each management practice. If acreage was not filled in by the member and they could not be reached for clarification, the default became the enrolled acreage.
- Surveys were returned without all questions completed. When surveys were reviewed and missing responses were noted, the sub-watershed organizations called as many members as possible to complete the missing responses.

SUMMARY

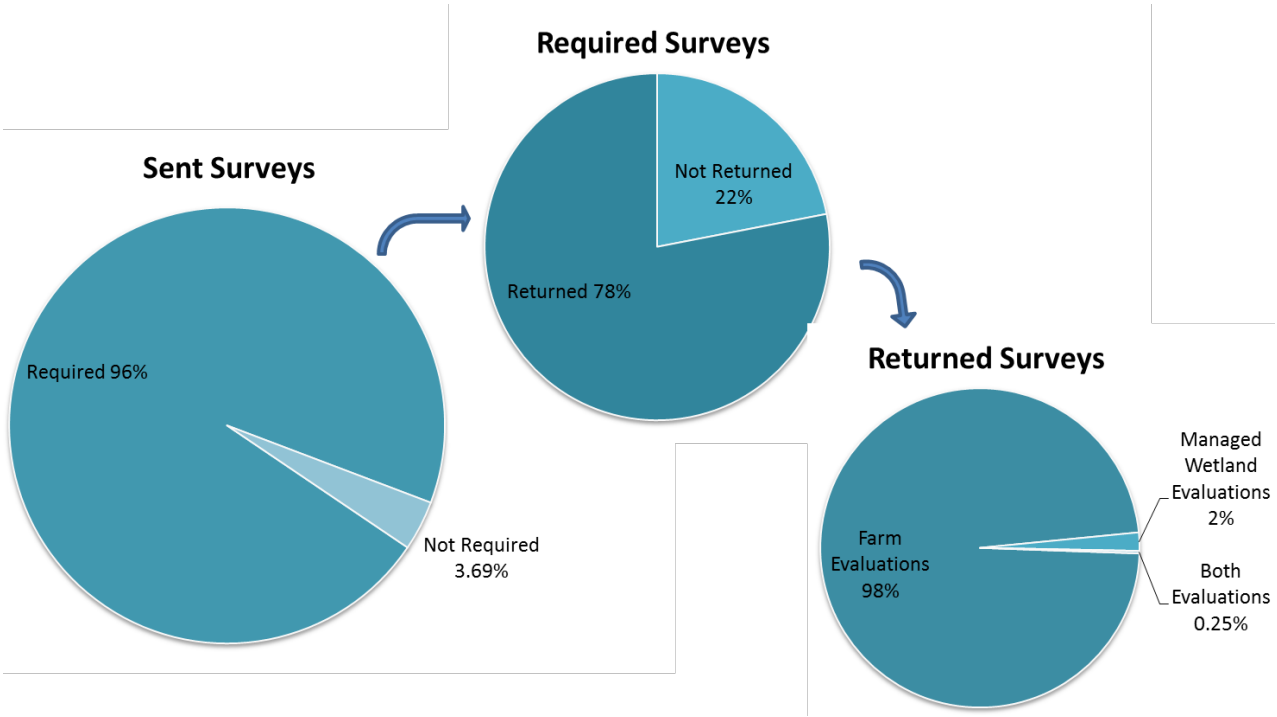
OVERALL

All members in the Coalition were required to complete and return a Farm Evaluation survey for 2014. The SVWQC received surveys from 78% of the members representing 83% of the Coalition acreage (Table 2). Less than one percent of these memberships submitted both Farm and Managed Wetland Evaluations. Four percent of members making up 1.19 percent of the Coalition acreage were sent a survey for completion in 2014, but were not required to return surveys for one of three possible reasons: 1) the member had no irrigated acreage in the Coalition during 2014 (a member may do this if the ground was temporarily fallowed), 2) they did not farm in 2014 (new members who recently acquired the land), or 3) they are no longer a member (Figure 1).

Table 2. Acreage and membership totals of returned 2014 Evaluations.

Survey Status	Evaluation	Sum of Acreage	Count of Members
Returned	Farm	1,022,111	5,857
	Managed Wetland	42,223	111
	Mixed	13,135	15
Returned Total		**1,075,190**	**5,983**
Not Returned Total		**220,221**	**1,683**
Expected Grand Total		**1,295,411**	**7,666**
Percent Returned of Expected		**83%**	**78%**

Figure 1. An illustration of the memberships requiring surveys compared to overall sent surveys, the percent of required surveys that were returned, and, of the surveys returned, what type of survey was filled out. Percentages were calculated using membership counts.



STANDARD FARM EVALUATION

Of the returned surveys, 95% of the acreage was reported with standard Farm Evaluation surveys, representing 98% of the memberships with returned surveys (Table 2). Many Coalition members reported parcel specific crop information on their FE for 2014. In the case of multiple crops per parcel, the first crop listed was recorded as the primary crop, Crop 1, and the remaining crops as Crop 2, Crop 3, and so on. Primary crops were classified into general crop groups to look at the prominence of each crop within the Coalition; Table 3 lists the general crop group and the specific primary crops in each of the groups. Figure 2 illustrates the percentage of total reported acreage for each general crop group entered by members on returned Farm Evaluations. Nut tree crops, grain crops, and irrigated pasture are the three most common crop types reported in the Coalition area. The acreage for nut tree crops is comprised almost equally by almonds and walnuts with each crop making up almost half of the total nut tree acreage (Table 3). A very small percentage of acreage is devoted to pistachios, pecans, and chestnuts, altogether about 2.5 percent (Table 3). Wetland habitat, representing three percent of the

crops for which surveys were returned, is discussed further in a separate Managed Wetland Evaluation section of the report.

Many members reported multiple crops per parcel and/or management unit. The acreage cannot be calculated for secondary crops, but the percent occurrence acts as a proxy for the prominence of other crops in the Coalition acreage. Figure 2 includes a graph of the secondary crops associated with nut trees. Combinations of nut crops were also very common. For example, both walnuts and almonds were farmed on the same parcel (Figure 2).

Figure 2. Reported crops in 2014 Farm Evaluations, including Managed Wetland Evaluations, displayed as percent of total reported acreage.

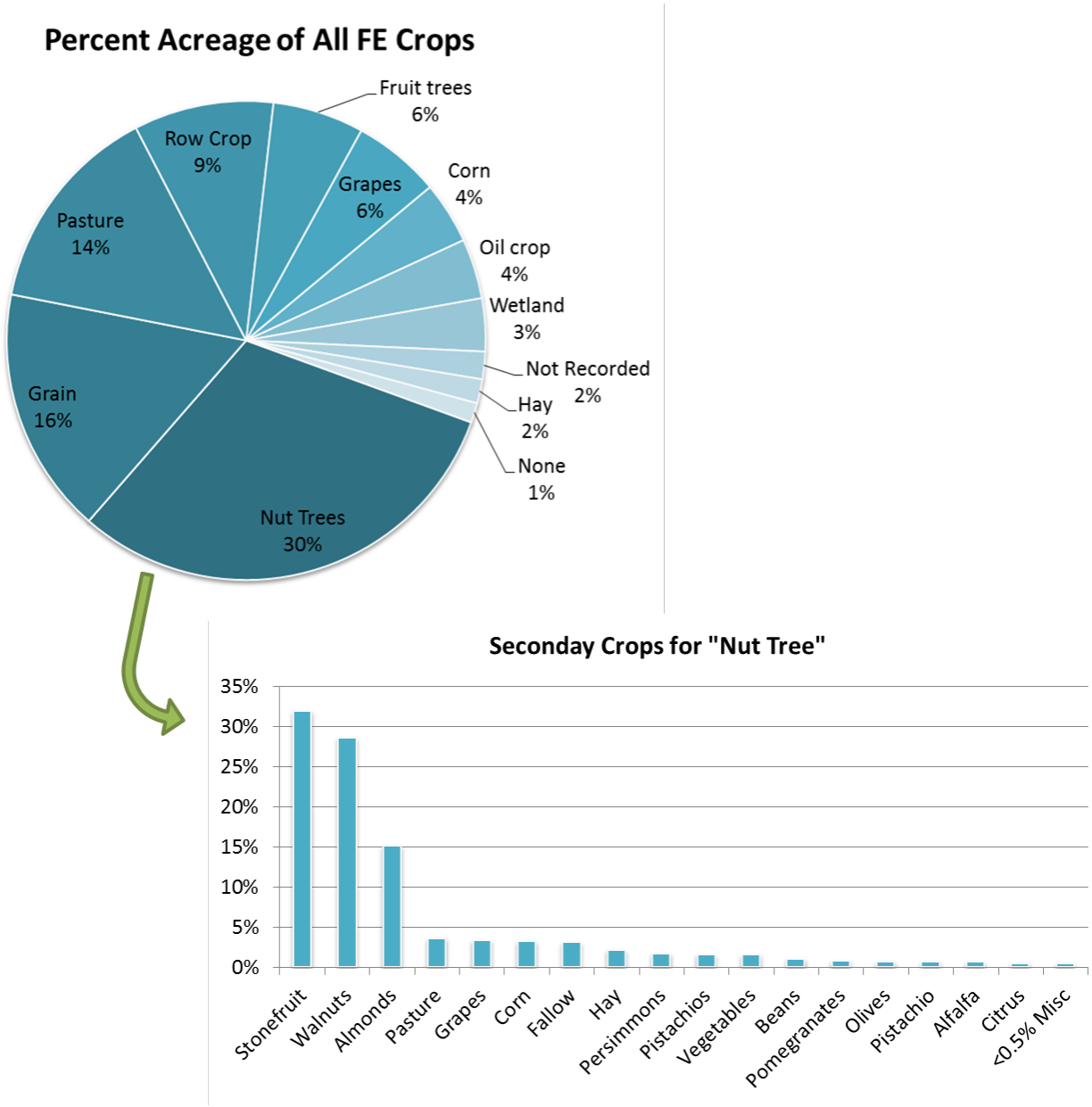


Table 3. General crop classifications from Figure 2 and their specific crops as reported by members.

General Classification	Primary Crop	Percentage of Acreage
Berries	Berries	0.06%
Citrus	Citrus	0.06%
Corn	Corn	4.05%
Dry	Dry	0.07%
Fruit trees	Cherries	0.13%
Fruit trees	Figs	0.02%
Fruit trees	Fruit Trees	0.04%
Fruit trees	Kiwis	0.06%
Fruit trees	Olives	1.77%
Fruit trees	Persimmons	0.04%
Fruit trees	Pome fruit	0.56%
Fruit trees	Pomegranates	0.01%
Fruit trees	Stonefruit	3.36%
Grain	Alfalfa	9.35%
Grain	Barley	0.07%
Grain	Grain	0.18%
Grain	Hops	< 0.01%
Grain	Oats	0.37%
Grain	Rice	0.96%
Grain	Rye	0.44%
Grain	Sorghum Milo	0.14%
Grain	Sudan	0.28%
Grain	Teff	0.01%
Grain	Triticale	0.52%
Grain	Wheat	3.84%
Grapes	Grapes	5.76%
Hay	Hay	1.58%
Herbs/Spices	Cloves	0.01%
Herbs/Spices	Herbs/Spices	0.05%
Misc	Bamboo	< 0.01%
Misc	Cotton	0.11%
Misc	Cover Crop	< 0.01%
Misc	Garlic	0.09%
Misc	Misc	0.39%
Misc	Shrubs	< 0.01%
Misc	Sod	0.06%
Native Vegetation	Native vegetation	0.21%
None	Domestic	< 0.01%
None	Fallow	1.21%
None	None	0.07%
Not Recorded	Not Recorded	2.58%
Nursery/Ornamental	Flowers	< 0.01%
Nursery/Ornamental	Nursery	0.11%
Nursery/Ornamental	Nursery cover	< 0.01%
Nursery/Ornamental	Ornamental plants	0.06%
Nut Trees	Almonds	14.71%
Nut Trees	Chestnuts	< 0.01%
Nut Trees	Nut Trees	0.06%
Nut Trees	Pecans	0.14%

General Classification	Primary Crop	Percentage of Acreage
Nut Trees	Pistachios	0.65%
Nut Trees	Walnuts	14.33%
Oil Crop	Canola	0.01%
Oil crop	Safflower	0.65%
Oil crop	Sunflowers	3.26%
Pasture	Pasture	13.86%
Row Crop	Asparagus	0.01%
Row Crop	Beans	1.04%
Row Crop	Bell Peppers	0.03%
Row Crop	Carrots	< 0.01%
Row Crop	Cucumbers	0.23%
Row Crop	Melons	0.29%
Row Crop	Misc Produce	0.10%
Row Crop	Onions	0.03%
Row Crop	Peas	0.03%
Row Crop	Peppers	0.06%
Row Crop	Potatoes	< 0.01%
Row Crop	Pumpkins	0.06%
Row Crop	Radish	< 0.01%
Row Crop	Salad Greens	< 0.01%
Row Crop	Squash	0.05%
Row Crop	Tomatillos	< 0.01%
Row Crop	Tomatoes	6.56%
Row Crop	Vegetables	0.65%
Seed	Alfalfa Seed	< 0.01%
Seed	Asparagus Seed	0.01%
Seed	Beet Seed	0.01%
Seed	Carrot Seed	0.01%
Seed	Conifer Seed	< 0.01%
Seed	Cucumber Seed	0.01%
Seed	Melon Seed	0.00%
Seed	Misc Seed	0.04%
Seed	Onion Seed	0.07%
Seed	Radish Seed	< 0.01%
Seed	Salad green Seed	0.01%
Seed	Millet Seed	0.01%
Seed	Sorghum Milo Seed	< 0.01%
Seed	Squash Seed	< 0.01%
Seed	Sudan Seed	0.03%
Seed	Sunflower Seed	0.21%
Seed	Tomato Seed	0.02%
Seed	Vegetable Seed	0.07%
Trees	Conifer Trees	0.03%
Trees	Orchard	0.48%
Trees	Trees	0.05%
Wetland	Brood Pond	0.15%
Wetland	Irrigated Upland	< 0.01%
Wetland	Managed Wetland	1.74%
Wetland	Permanent Wetland	0.04%
Wetland	Seasonal Wetland	0.15%
Wetland	Semi - Permanent Wetland	0.02%
Wetland	General Wetlands	1.37%

Irrigation Management Practices

Members use many different techniques to efficiently irrigate their fields. Over three-quarters of the Coalition acreage was irrigated only when the crop required irrigation (water application schedule to need, Table 4). About half of the Coalition has leveled fields to maximize irrigation water distribution and manage flows (Table 4). Most members utilize only primary irrigation methods, although sprinklers were reported as the most prominent secondary system (Table 4, Figure 3 and Figure 4). For primary irrigation practices the largest acreages were associated with flood irrigation and drip irrigation; each method included 25% of the reported acreage (Figure 3). Sprinklers, micro sprinklers, and furrow were all reported with acreages slightly over half that of flood irrigation (Figure 3). Border strip irrigation was not frequently used as a primary irrigation method. FE data shows Coalition members are following many Best Management Practices by managing their water usage and leveling their fields (Table 4). These methods indicate that Coalition members are thoughtful about their irrigation methods. Many members continue to strive towards even greater irrigation efficacy, noting that they are transitioning their fields to more efficient methods such as drip irrigation.

Table 4. Irrigation efficiency and methods reported my Coalition members in terms of associated parcel acreage.

Survey Section	Question	Response	Acreage
B	Irrigation Efficiency Practices		
		Water application scheduled to need	916,152
		Laser Leveling	573,157
		Use of moisture probe	535,860
		Use of ET in scheduling irrigations	390,612
		Pressure Bomb	169,449
		Soil Moisture Neutron Probe	103,162
		Other	83,689
		No Selection	17,303
B	Primary Irrigation Practices		
		Flood	271,669
		Drip	269,795
		Sprinkler	186,296
		Micro Sprinkler	163,412
		Furrow	150,855
		Border Strip	22,084
		No Selection	11,585
B	Secondary Irrigation Practices		
		No Selection	771,018
		Sprinkler	111,250
		Flood	47,544
		Micro Sprinkler	40,857
		Drip	29,880
		Furrow	27,303
		Border Strip	15,501

Figure 3. Primary irrigation practices utilized by members in the Coalition.

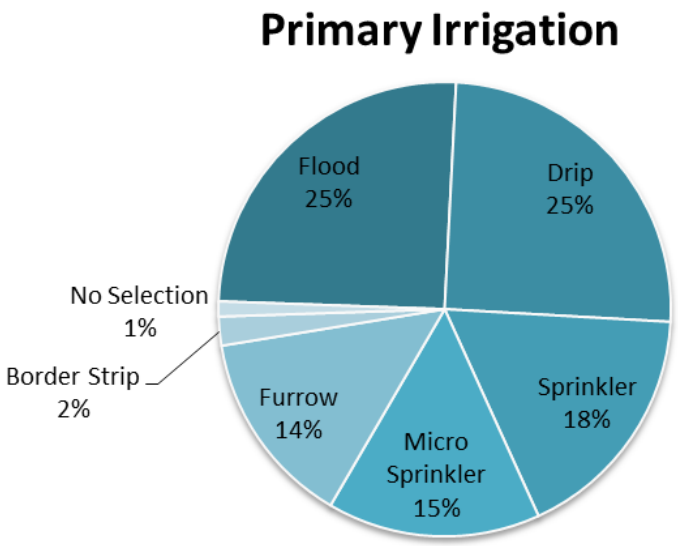
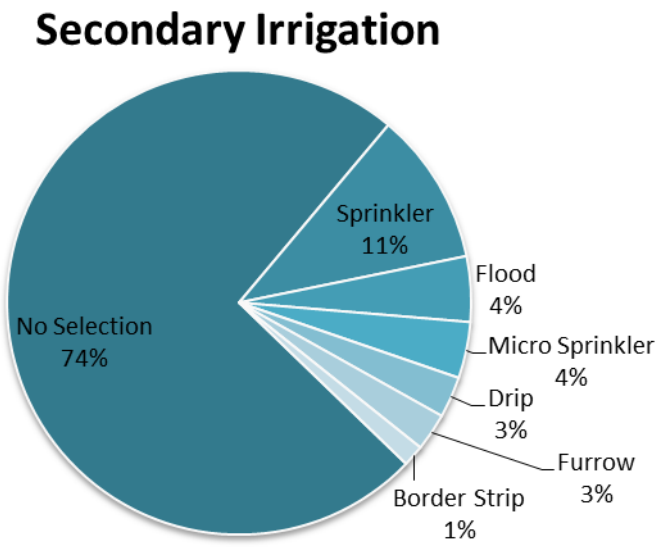


Figure 4. Secondary irrigation practices utilized by members in the Coalition.



Sediment Management Practices

The majority of Coalition members use management practices to control the movement of sediment; members typically employ more than one method on a parcel (Table 5). 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. Reducing tillage to a minimum and allowing native vegetation to stabilize soils were also commonly reported (Table 5, Figure 5). The most reported irrigation method used to control sediment and erosion was coordinating the timing between pesticide applications and irrigation. Drip irrigation and shortened irrigation runs were also frequently used (Table 5, Figure 6).

Table 5. Sediment and erosion control techniques implemented by members in terms of associated parcel acreage.

Survey Section	Question	Response	Acreage
A	Does your farm have the potential to discharge sediment to off-farm surface waters?		
		No	514,880
		Yes	499,840
		No Selection	24,341
D	Cultural Practices to Manage Sediment and Erosion		
		Soil water penetration.	657,676
		Minimum tillage incorporated to minimize erosion.	590,872
		Cover crops or native vegetation.	585,159
		Crop rows are graded, directed and at a length.	486,719
		Vegetated ditches.	481,760
		Creek banks and stream banks have been stabilized.	291,520
		Vegetative filter strips and buffers.	290,853
		Berms.	261,983
		Storm water is captured using field borders.	250,409
		Hedgerows or trees.	214,089
		Subsurface pipelines are used to channel runoff water.	188,202
		Sediment basins / holding ponds.	185,671
		No storm drainage due to field or soil conditions.	140,314
		Field is lower than surrounding terrain.	74,844
		No Selection	32,124
		Other	4,878
D	Irrigation Practices for Managing Sediment and Erosion		
		Lengthen time between pesticide applications and irrigation.	607,875
		Use drip or micro-irrigation to eliminate irrigation drainage.	470,061
		Shorter irrigation runs are used with checks.	409,025
		No irrigation drainage due to field or soil conditions.	321,712
		Tailwater Return System.	218,796
		In-furrow dams.	192,447
		Catchment Basin.	170,748
		Use of flow dissipaters.	86,988
		Other	35,690
		No Selection	31,059
		PAM (polyacrylamide) used in furrow and flood fields.	16,434

Figure 5. Acreage reported for cultural practices for sediment and erosion control.

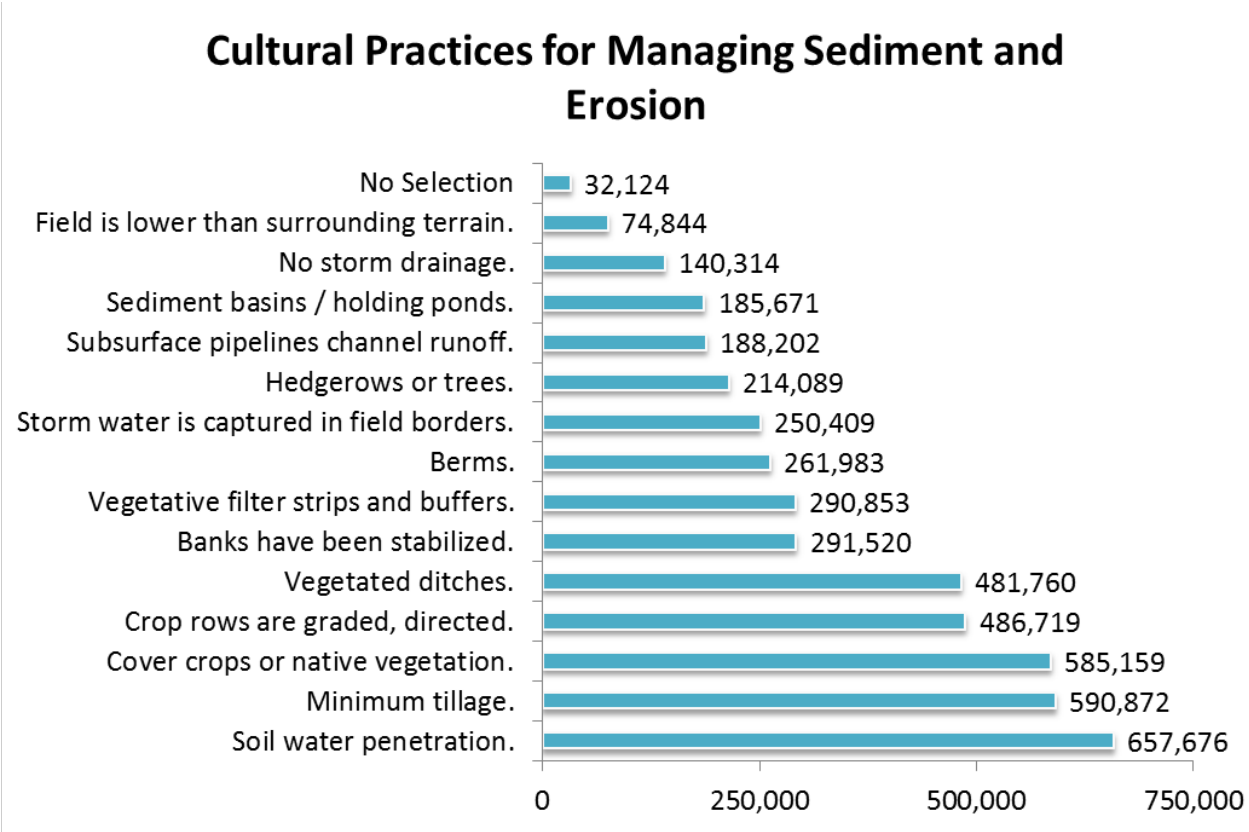
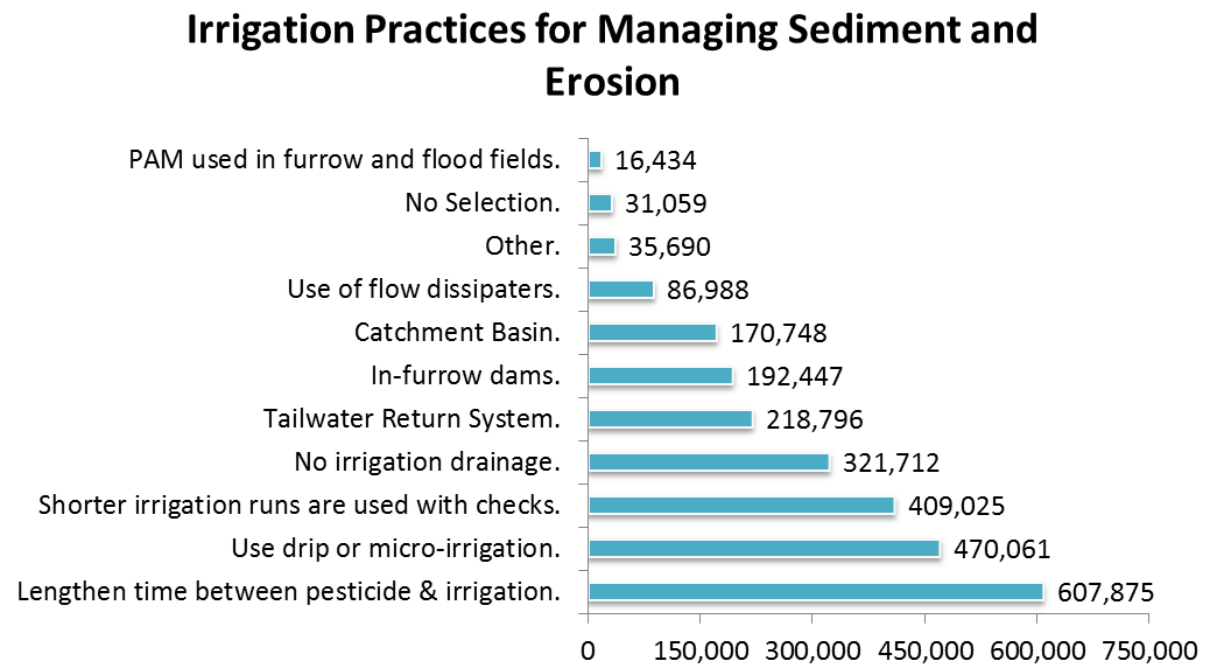


Figure 6. Acreage reported for irrigation practices for sediment and erosion control.



Pesticide & Nutrient Management

SVWQC members employ several practices to reduce the movement of pesticides and nutrients to surface waters at one time (Table 6, Figure 7, Figure 8 and Figure 9). A majority of the members implemented between seven and 11 different pesticide management practices including following pesticide application practices, label restriction and County permit requirements (Table 6, Figure 7).

Based on survey responses, 5,190 members farming 1,028, 415 acres engage a professional in nutrient management to prepare their fertility plan, most often with a PCA or CCA certification (Figure 8). The two most reported nitrogen management practices were split fertilizer applications throughout the growing season and testing soil or plant tissue. Applications through foliar treatments and fertigation were also common (Figure 9).

Table 6. Pesticide and nutrient management practices implemented by members shown in terms of associated parcel acreage.

SURVEY SECTION	QUESTION	RESPONSE	ACREAGE
A	Pesticide Application Practices		
		Attend Trainings	840,257
		Avoid Surface Water When Spraying	858,474
		Chemigation	209,021
		County Permit Followed	910,428
		End of Row Shutoff When Spraying	804,193
		Follow Label Restrictions	911,252
		Monitor Rain Forecasts	848,367
		Monitor Wind Conditions	896,627
		No Pesticides Applied	113,137
		Reapply Rinsate to Treated Field	500,338
		Sensitive Areas Mapped	478,602
		Target Sensing Sprayer used	163,473
		Use Appropriate Buffer Zones	778,639
		Use Drift Control Agents	726,143
		Use PCA Recommendations	838,535
		Use Vegetated Drain Ditches	417,814
		Other	51,089
		No Selection	5,425
A	Who do you have help develop your crop fertility plan?		
		Pest Control Advisor (PCA)	844,879
		Certified Crop Advisor (CCA)	458,053
		UC Farm Advisor	282,605

Survey Section	Question	Response	Acreage
		Professional Soil Scientist	281,360
		Professional Agronomist	265,692
		Independently Prepared by Member	207,889
		None of the above	96,726
		Certified Technical Service Providers by NRCS	41,879
		No Selection	9,903
B	Nitrogen Management Methods to Minimize Leaching Past The Root Zone		
		Split Fertilizer Applications	740,092
		Soil Testing	680,037
		Tissue/Petiole Testing	589,660
		Fertigation	374,600
		Foliar N Application	328,194
		Cover Crops	318,900
		Irrigation Water N Testing	270,564
		Do Not Apply Nitrogen	126,538
		Variable Rate Applications using GPS	79,288
		Other	53,084
		No Selection	27,237

Figure 7. Pesticide management practices implemented by members shown in terms of associated parcel acreage.

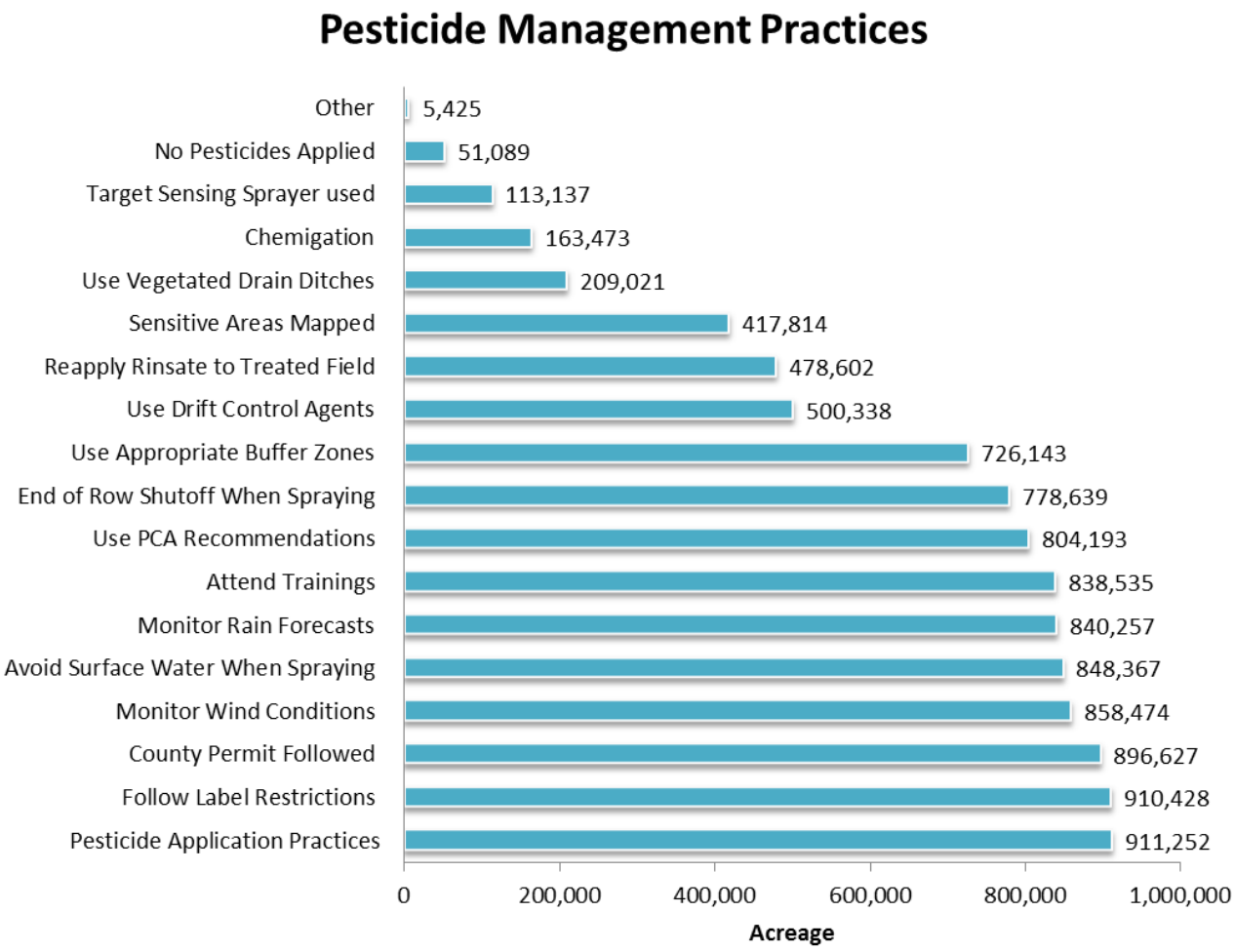


Figure 8. Parties involved in developing crop fertility plans.

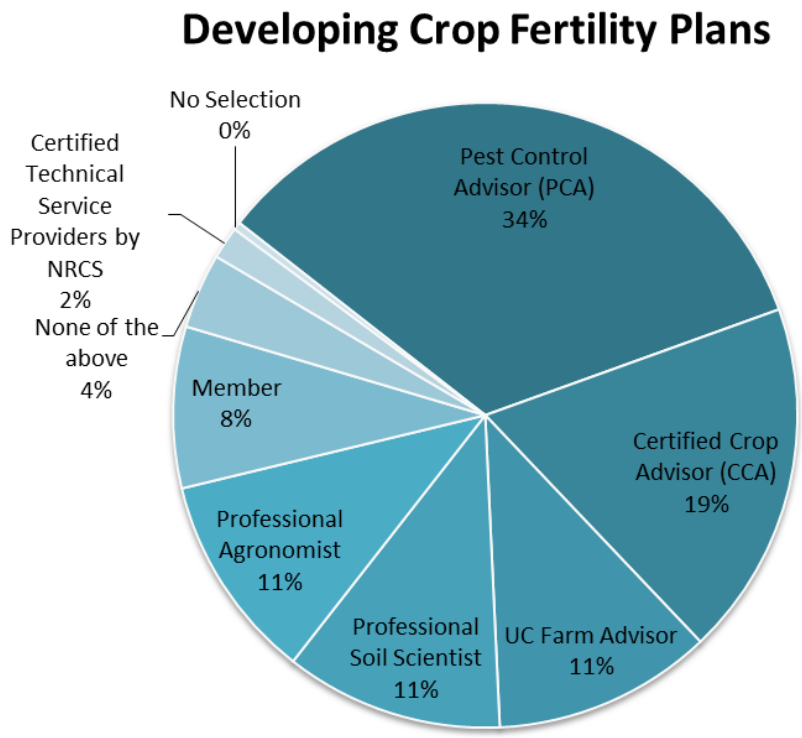
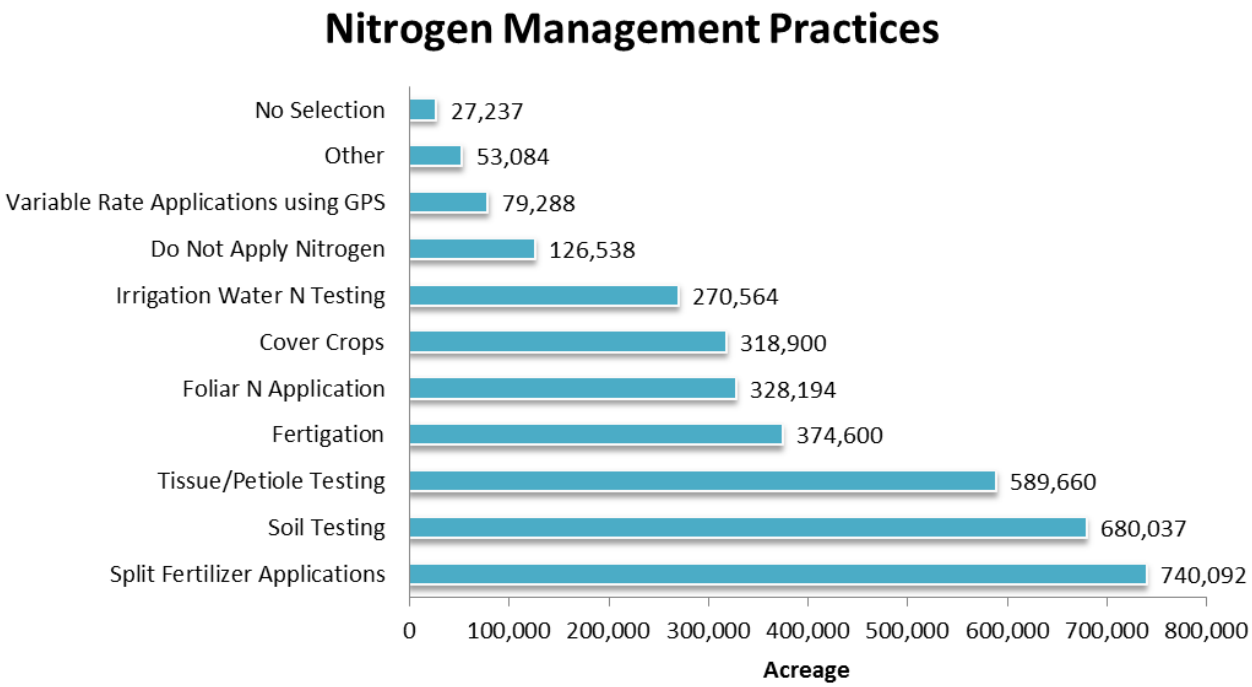


Figure 9. Nitrogen management practices implemented by members shown in terms of associated parcel acreage.



Well Management Practices

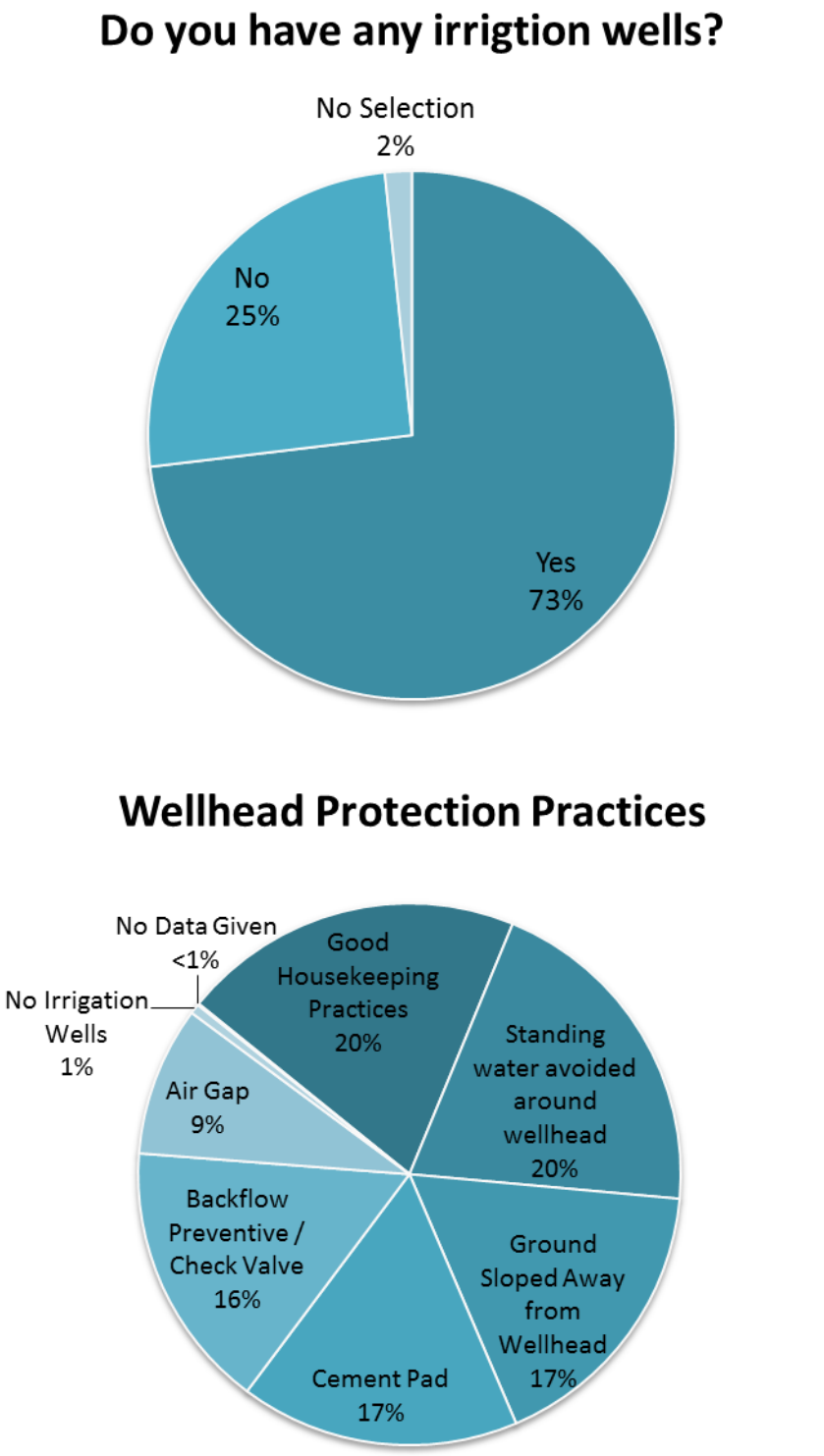
Irrigation Wells

The majority of enrolled parcels have at least one irrigation well (Table 7, Figure 12). Wellhead protection practices implemented on active irrigation wells are meant to prevent pollution to the groundwater system through wellheads. As shown in the even distribution of acreage between the six protection practices in Figure 10, most wells were reported to have four to five practices used to prevent groundwater pollution. The most common practices used by Coalition members include following good housekeeping procedures and preventing standing water around the wellhead.

Table 7. Irrigation well info by membership acreage.

Survey Section	Question	Response	Count	Acreage
C	Do you have any irrigation wells on parcels associated with this Farm Evaluation?			
		Yes	3248	759,372
		No	2653	262,552
		No Selection	73	17,106
C	Wellhead Protection Practices			
		Good Housekeeping Practices	8816	9,046,506
		Standing water avoided around wellhead	8558	8,979,016
		Ground Sloped Away from Wellhead	7907	7,602,580
		Cement Pad	7155	7,387,578
		Backflow Preventive / Check Valve	6518	7,109,278
		Air Gap	3252	3,962,833
		N/A (No Irrigation Wells)	-	261,988
		No Data Given	110	36,945

Figure 10. Percent acres associated with irrigation wells and management practices.



Abandoned Wells

The Coalition region contains many abandoned wells; a large portion of these abandoned wells have been properly destroyed (Table 8, Figure 11). The number of wells abandoned over the years has fluctuated. The greatest number of wells abandoned in a single year was 2014 when 20 wells were abandoned; however, 64 wells have an unknown year of abandonment (Table 9, Figure 12).

Table 8. Abandoned well practices to minimize the potential for ground water pollution.

Survey Section	Question	Response	Count (Members/ Wells)	Acreage
C	Are you aware of any known abandoned wells associated with this Farm Evaluation?			
		No	5530	925,350
		Yes	101	92,639
		No Selection	343	21,051
C	Abandoned Well Practices			
		N/A (Has No Abandoned Wells)	-	924,210
		Destroyed - Unknown method	208	64,485
		No Data Entered	216	55,179
		Destroyed by licensed professional	62	50,297
		Destroyed – certified by county	33	21,621

Table 9. Count of wells abandoned each year as reported by members.

Survey Section	Question	Response	Count of Wells
C	Well Abandoned Year		
		1920	1
		1940	1
		1948	1
		1950	1
		1951	1
		1955	2
		1958	2
		1960	2
		1964	1
		1968	2
		1970	4
		1975	2
		1977	2
		1978	2
		1979	2
		1980	7
		1982	1
		1983	1
		1984	1

Survey Section	Question	Response	Count of Wells
		1985	5
		1986	2
		1987	3
		1988	1
		1989	3
		1990	8
		1991	1
		1992	1
		1993	1
		1994	1
		1995	3
		1997	2
		1998	8
		1999	3
		2000	10
		2001	3
		2002	3
		2004	4
		2005	2
		2006	4
		2007	1
		2008	3
		2009	6
		2010	8
		2011	6
		2012	8
		2013	8
		2014	20
		2015	3
		Unknown	64
Total			**231**

Figure 11. Percent acres associated with abandoned wells and management practices.

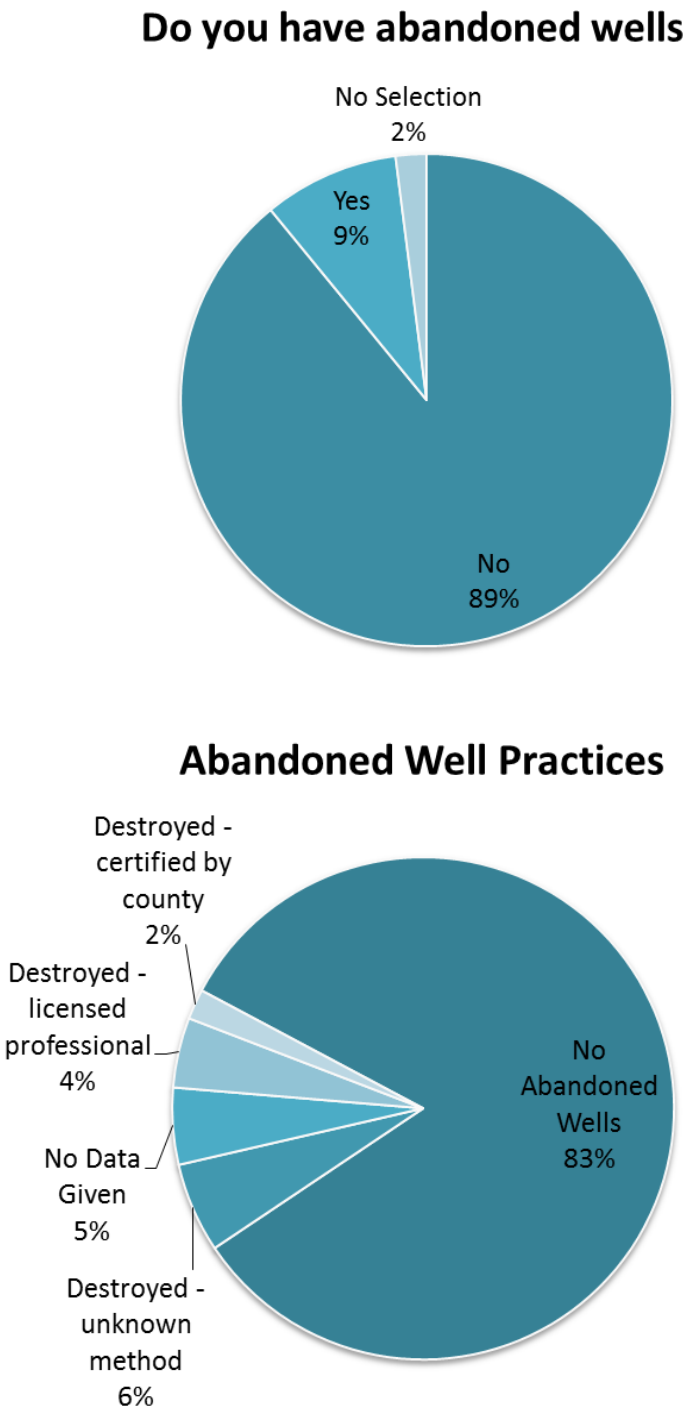
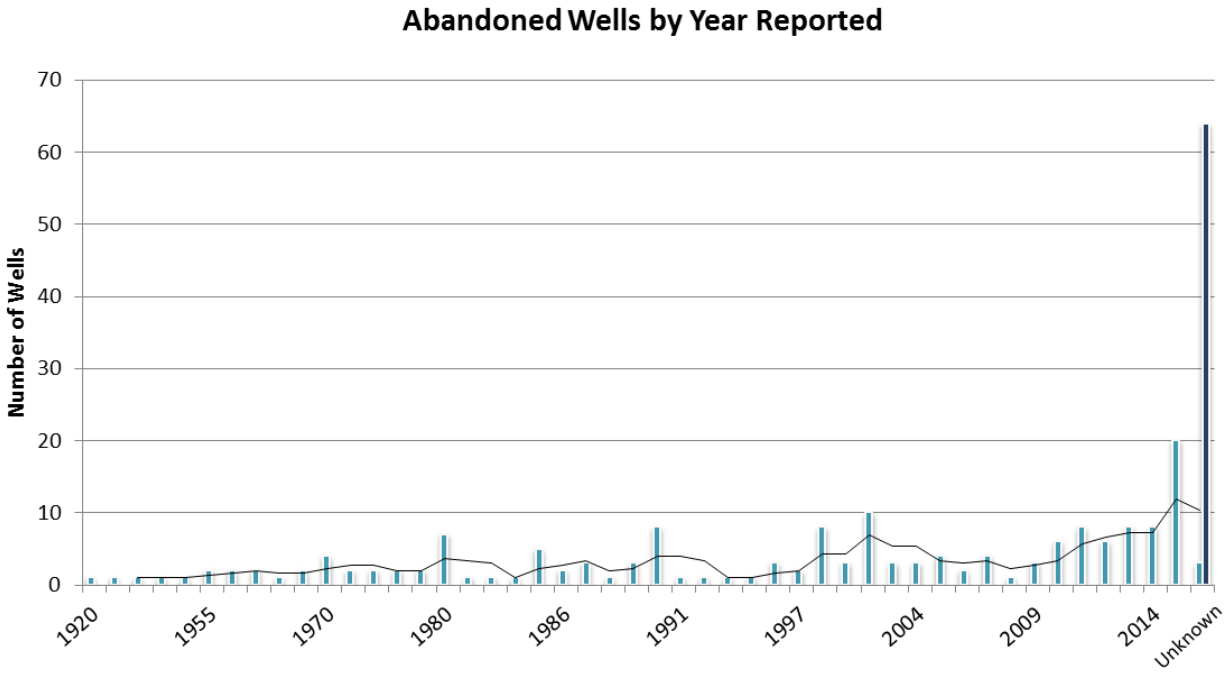


Figure 12. The number of abandoned wells per year as reported by Coalition members. Note the moving average trend line displaying the three point average of wells per report year.



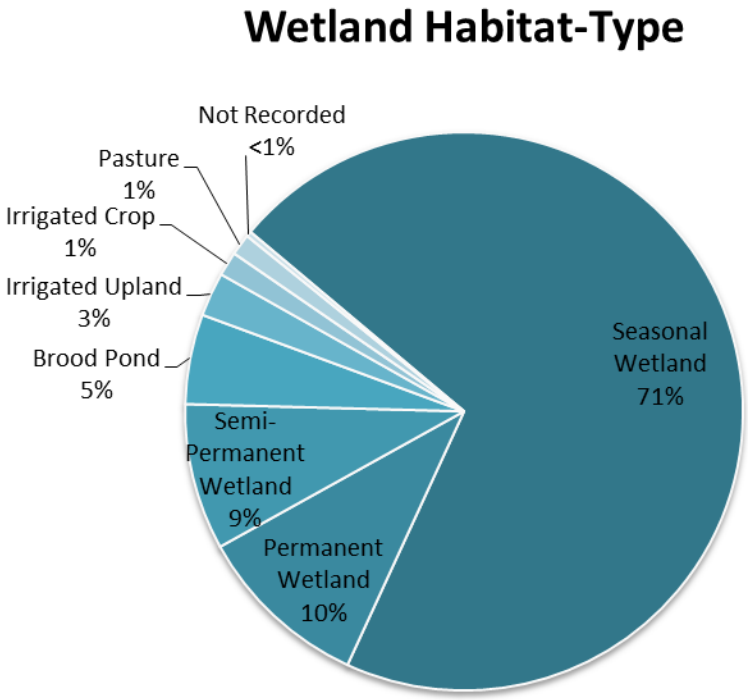
MANAGED WETLAND EVALUATIONS

Of the returned evaluations, two percent were Managed Wetland Evaluations, which represents four percent of the total Coalition acreage (Figure 1). Wetland habitat makes up three percent of the reported crop acreage (Figure 2). Coalition members with managed wetlands reported specific habitat-types contained on their parcels. A majority of the wetland habitat associated with MWE's is Seasonal Wetland indicating that it is flooded between August and April (Table 10, Figure 13). Figure 13 illustrates the percentage of total reported acreage for each primary habitat listed by members on returned MWEs. A small number of growers reported wetland as a crop on their Farm Evaluation. This acreage is included in Table 10; however, it is not incorporated into the MWE habitat breakdown in Figure 13. Survey responses for these fields are included in the FE summary above.

Table 10. Acreage associated with each reported managed wetland habitat type.

HABITAT TYPE	ACREAGE
Seasonal Wetland (Flooded August-April)	26,269
Permanent Wetland (Flooded Year Round)	3,741
Semi-Permanent (Flooded September-July)	3,147
Brood Pond/Reverse Cycle (Flooded March-August)	1,931
FE Wetland	1,086
Irrigated Upland	946
Irrigated Crop	522
Irrigated Pasture (Grazing)	461
No Selection	109

Figure 13. Managed Wetland habitat types as reported on evaluations.



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 in the Coalition is seasonal wetland, which leaves the habitat flooded from August to April (Figure 13). Members reported the time periods of their Irrigation, Flood-Up, and Drawdown by writing in the months in which these occur. For reporting purposes it was assumed that all time periods were referring to March 2013 through February 2014. If a time period exceeded February 2014, it was assumed that those months were forward looking into the 2014-2015 season.

Irrigation generally occurs in late spring through summer for brood ponds, irrigated pasture, and some semi-permanent wetlands. For seasonal wetlands, irrigation was reported for various periods throughout the year (Figure 14). Flood up for seasonal and semi-permanent wetland generally occurs in fall and winter (Figure 15). Drawdown was most commonly reported to occur in early spring; although there are many other instances throughout the year as well (Figure 16).

Figure 14. Time periods for irrigation as provided in by Coalition growers; the color of the bar reflects the percent of surveys returned with that specific irrigation time period specified.

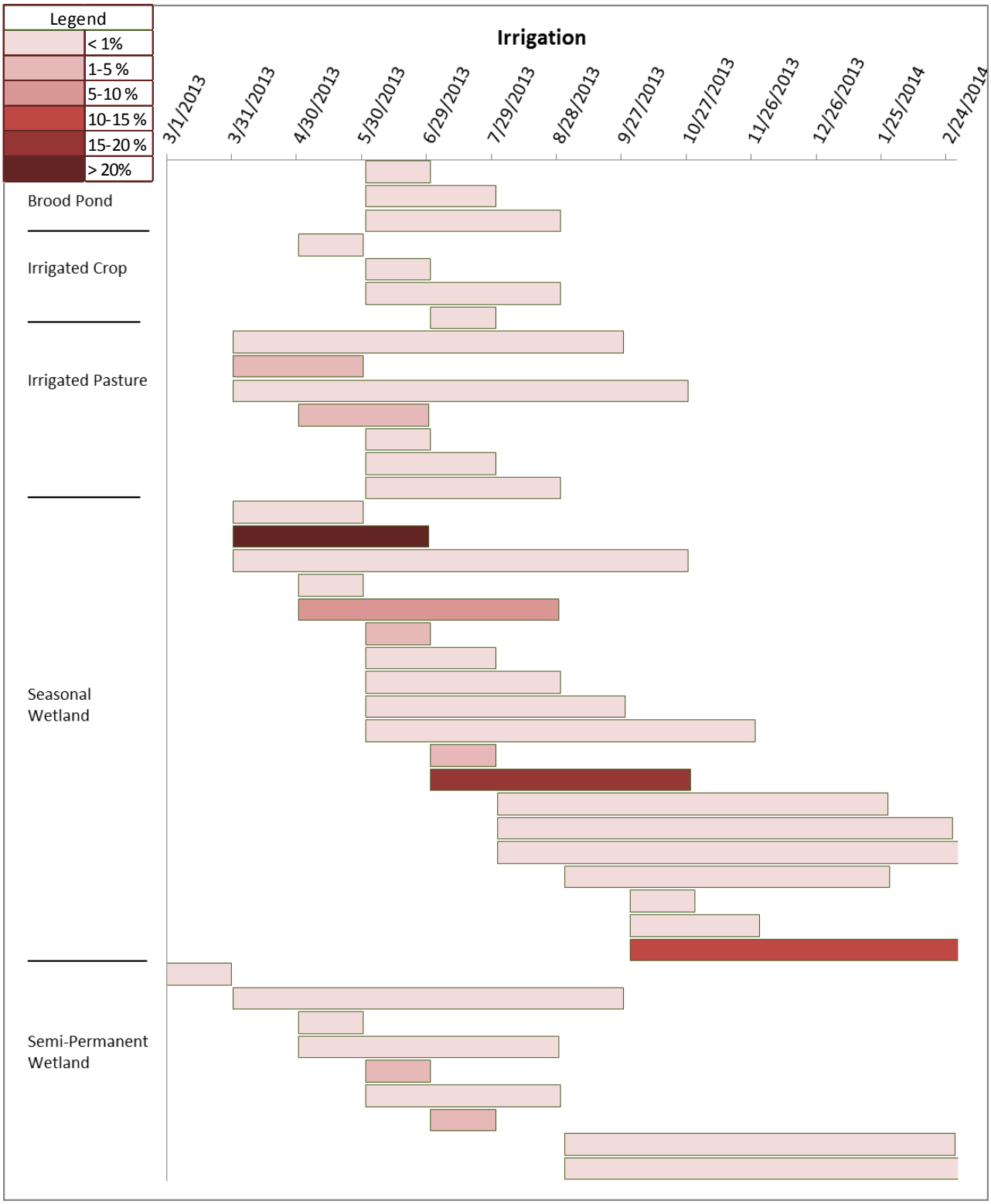


Figure 15. Time periods for flood up as provided in by Coalition growers; the color of the bar reflects the percent of surveys returned with that specific drawdown time period specified.

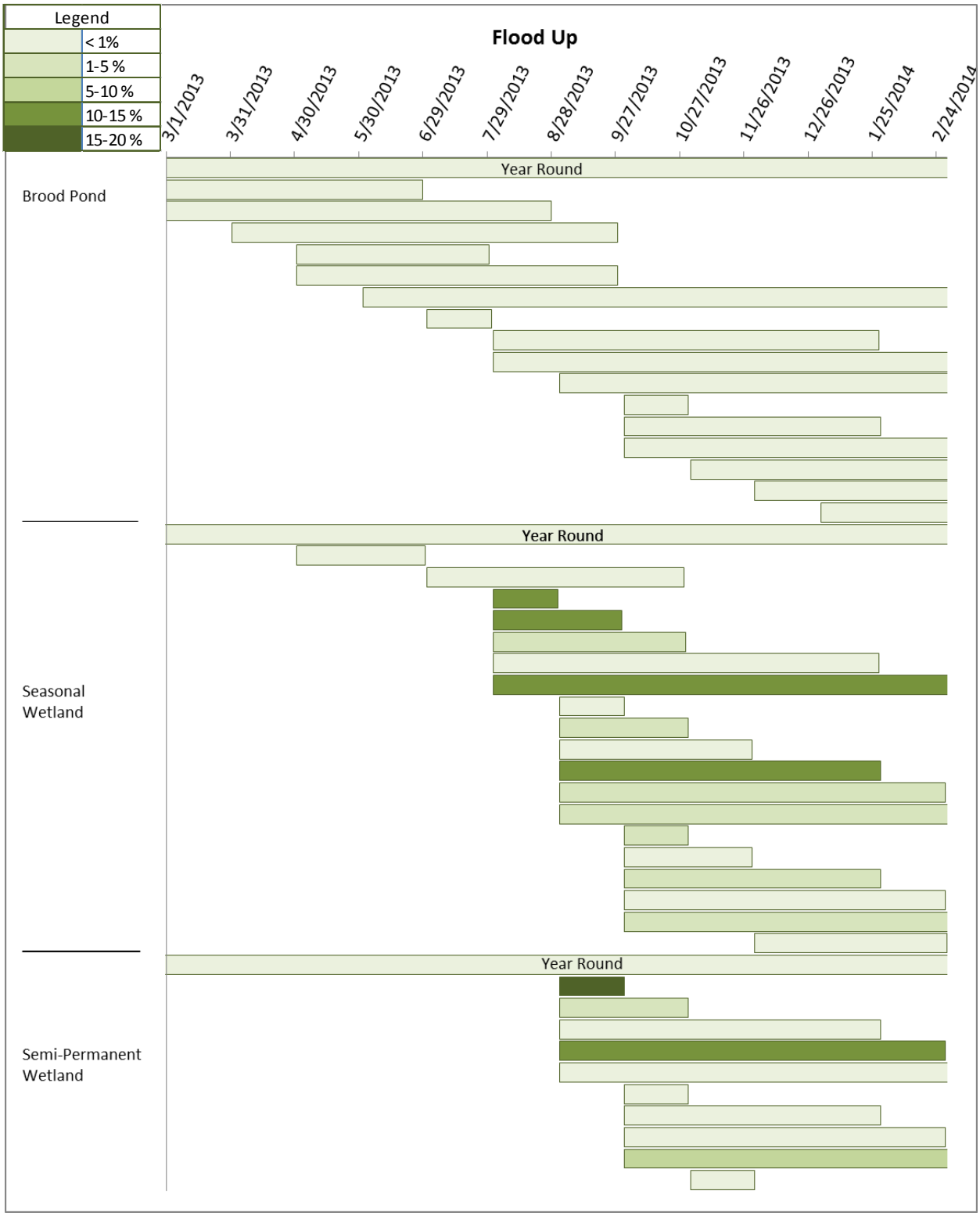
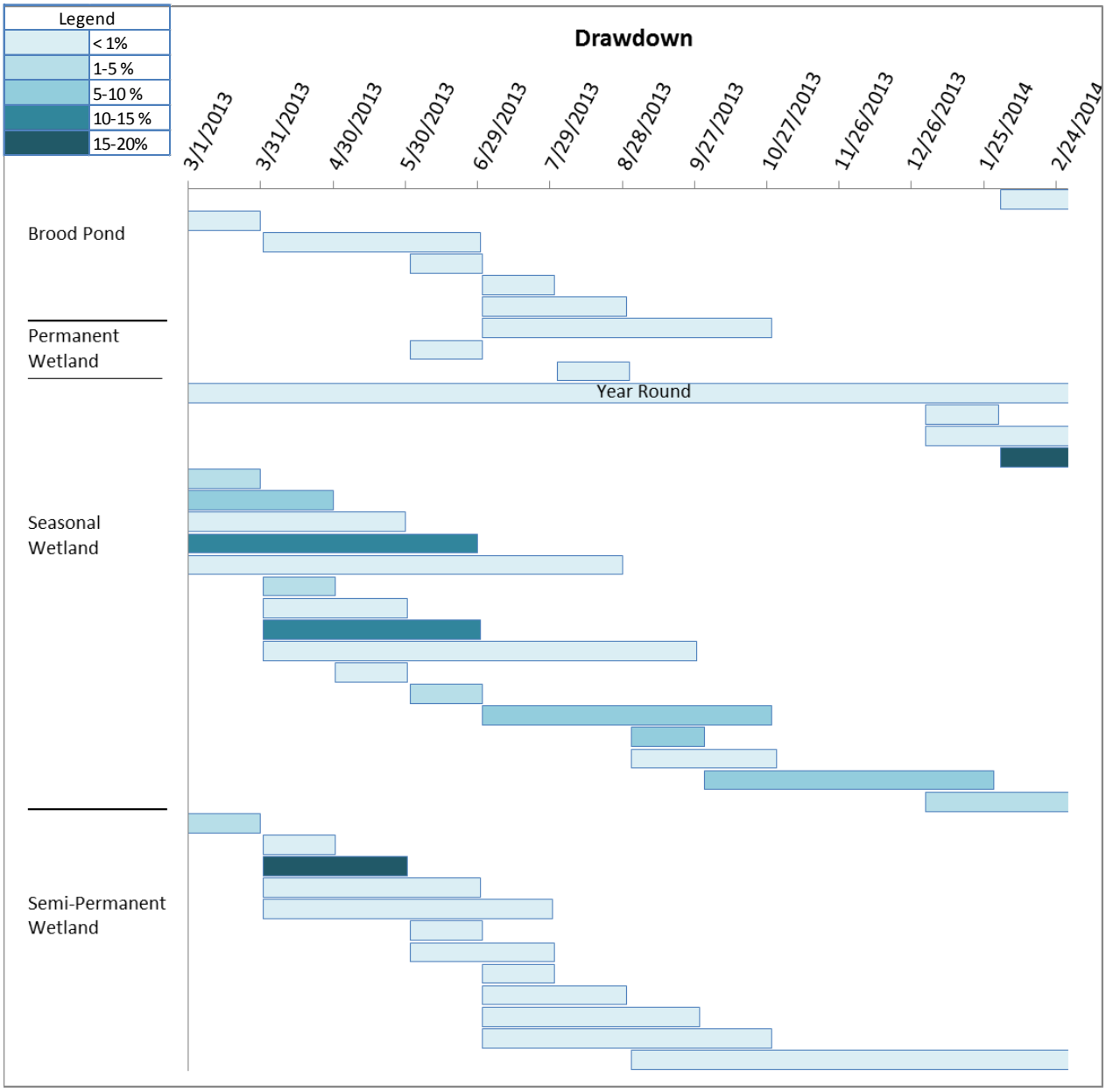


Figure 16. Time periods for drawdown as provided in by Coalition growers; the color of the bar reflects the percent of surveys returned with that specific drawdown time period specified.



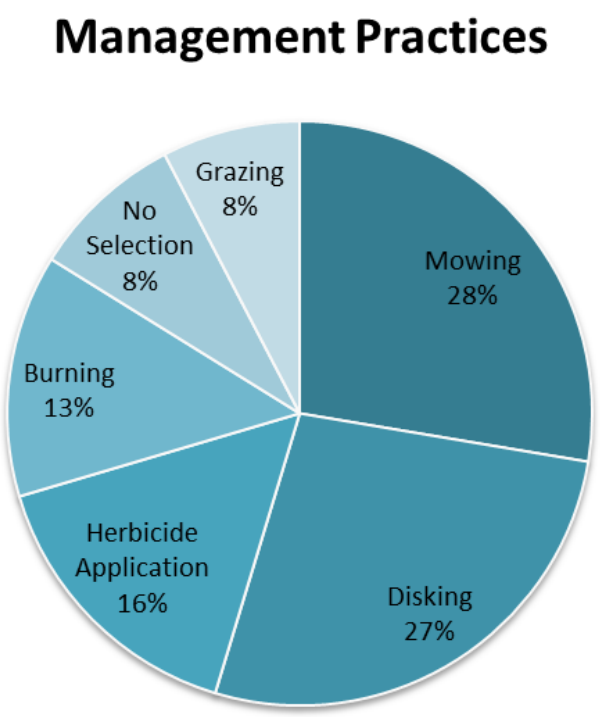
Management Practices

Members use a variety of practices to manage wetland habitat and make improvements for wildlife. In general, Coalition members managing wetlands employ more than one practice throughout the year. As shown by the total reported acreage, two to three practices are commonly used by members to improve habitat (Table 11). The two most reported management practices were mowing and disking, each reported on over half of the Managed Wetland acreage in the Coalition (Table 11, Figure 17).

Table 11. Management practices used by members to improve wildlife habitat on Managed Wetlands.

Survey Section	Question	Response	Acreage
MW	Herbicide Application Practices		
		Mowing	28,774
		Disking	28,144
		Herbicide Application	16,392
		Burning	13,958
		No Selection	8,854
		Grazing	7,973

Figure 17. Wetland management practices reported by members.



Herbicide Management

Similar to pesticide applications, certain management practices are implemented to manage herbicide applications to protect groundwater and neighboring fields. Only about 15% of members with Managed Wetlands apply herbicides to their fields. Members employ several practices to reduce the movement of herbicides to surface waters (Table 12, Figure 18). The majority of members that apply herbicides follow label restrictions and monitor weather conditions. Of the herbicides marked as applied to wetlands, 38% was glyphosate of the wetland acreage with MWEs (Figure 19).

Table 12. Herbicide management practices used by members on Managed Wetland fields.

Survey Section	Question	Response	Acreage
MW	Herbicide Application Practices		
		Follow Label Restrictions	18,311
		Monitor Wind Conditions	18,129
		Monitor Rain Forecasts	17,294
		County Permit Followed	16,761
		Attend Trainings	13,830
		Use PCA Recommendations	13,712
		Avoid Surface Water When Spraying	13,635
		No Selection	11,527
		Other	11,426
		Sensitive Areas Mapped	9,667

Figure 18. Herbicide management practices and common herbicides used my Coalition members.

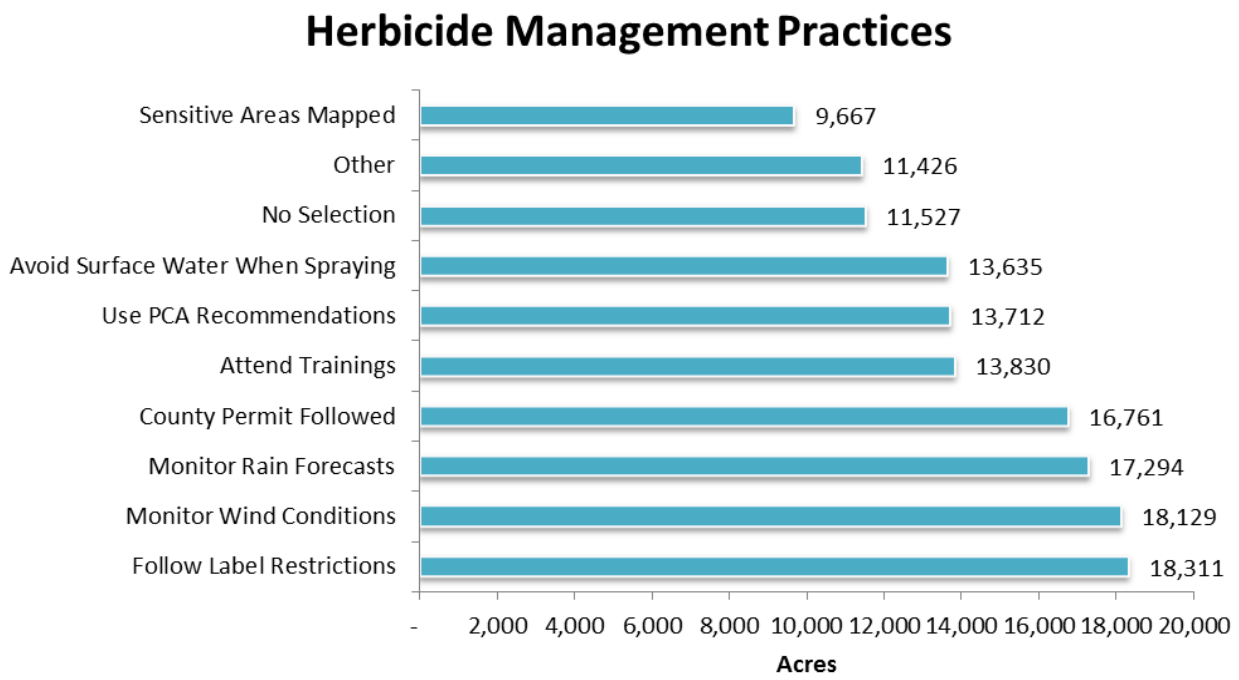
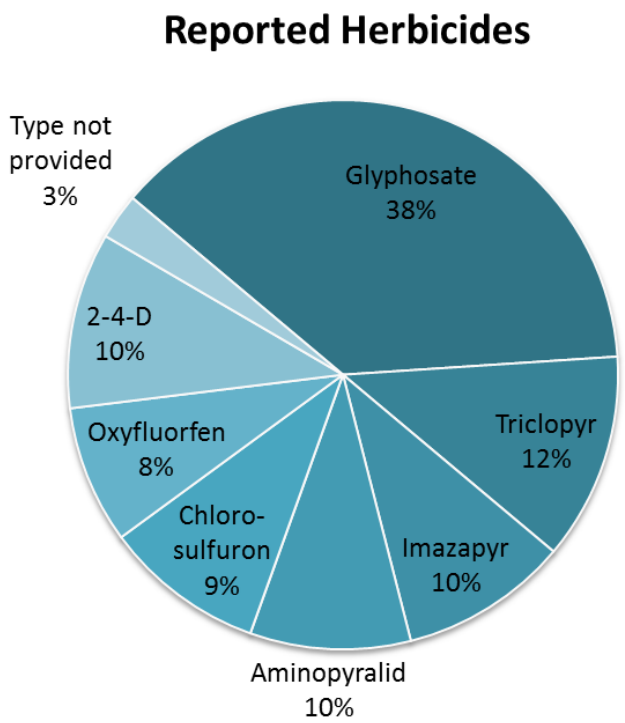


Figure 19. Specific herbicide use as reported by the members applying herbicides.



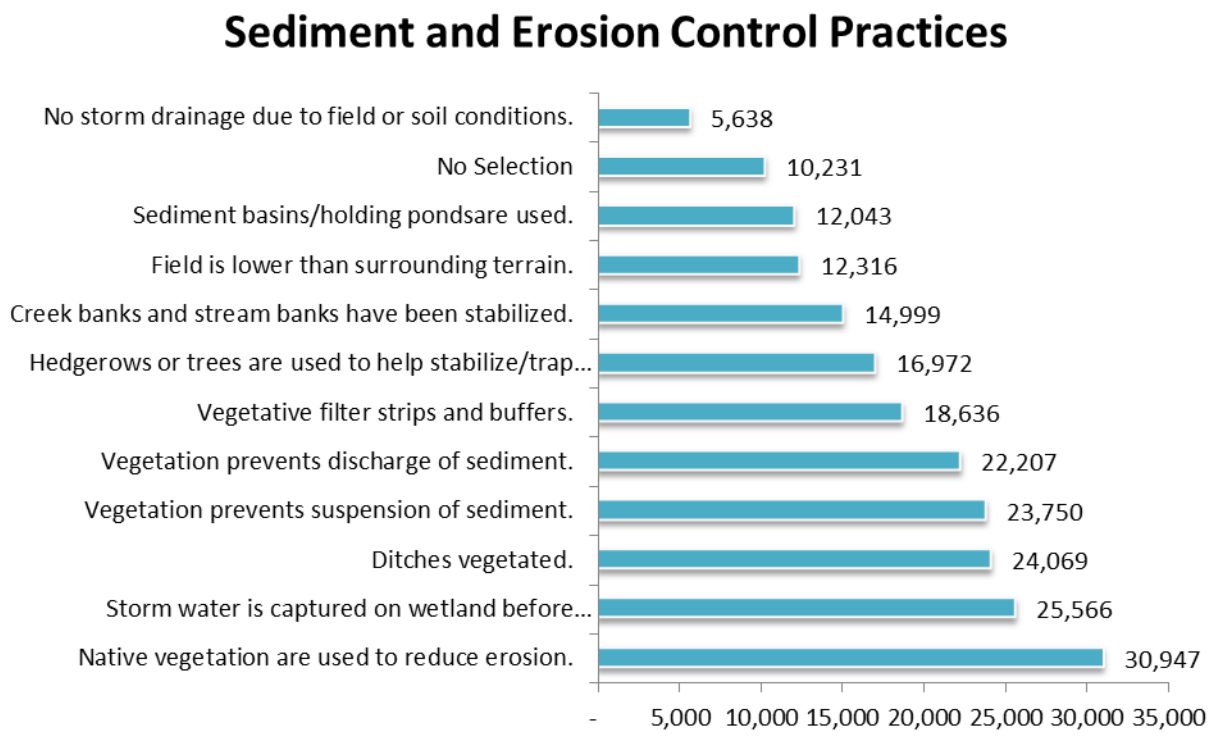
Sediment Management Practices

Almost all Coalition members who manage wetlands use management practices to control the movement of sediment; members typically employ more than one method on a parcel, as shown by the total acreage reported within sediment management practices greatly exceeding the total enrolled Managed Wetland acres (Table 13, Figure 20, and Figure 18). The most common method to reduce erosion was utilizing native vegetation to capture sediment and strengthen soils. Other top reported practices were capturing sediment in storm water and irrigation water using wetlands and vegetated ditches and filter strips prior to discharge in order to settle out sediment (Table 13).

Table 13. Practices used by Coalition members to manage sediment and control erosion on their managed wetland fields.

Survey Section	Question	Response	Acreage
MW	Sediment and Erosion Control Practices		
		Native vegetation are used to reduce erosion.	30,947
		Storm water is captured on wetland areas before discharge.	25,566
		Ditches and conveyances vegetated and prevent suspension and discharge of sediment.	24,069
		Vegetation prevents suspension of sediment.	23,750
		Vegetation prevents discharge of sediment.	22,207
		Vegetative filter strips and buffers are used to capture flows.	18,636
		Hedgerows or trees are used to help stabilize soils and trap sediment movement.	16,972
		Creek banks and stream banks have been stabilized.	14,999
		Field is lower than surrounding terrain.	12,316
		Sediment basins/holding ponds are used to settle out sediment from irrigation and storm runoff.	12,043
		No Selection	10,231
		No storm drainage due to field or soil conditions.	5,638

Figure 20. Sediment control practices used by members to minimize or eliminate the movement of sediment.



Well Management Practices

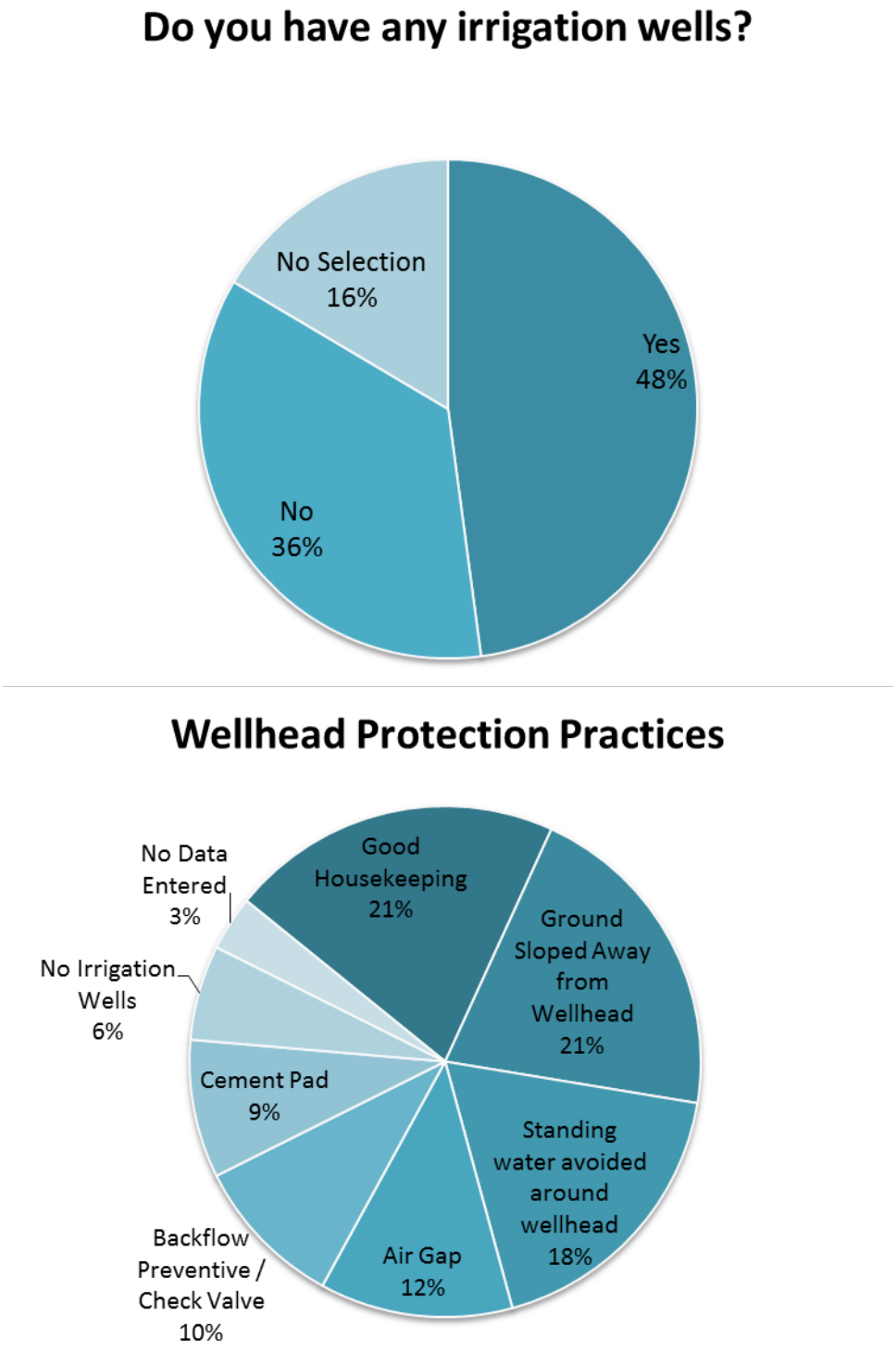
Irrigation Wells

Most members with Managed Wetlands reported at least one irrigation well on their property. Three to four Wellhead Protection Practices were reported for most wells. Implementing good housekeeping methods and sloping surrounding ground away from the wellhead were the most reported practices on MWEs (Table 14, Figure 21).

Table 14. Wellhead protection practice information for wells on managed wetlands.

SURVEY SECTION	QUESTION	RESPONSE	COUNT	ACREAGE
C	Do you have any irrigation wells on parcels associated with this Farm Evaluation?			
		Yes	42	21,638
		No	83	16,095
		No Selection	2	7,450
C	Wellhead Protection Practices			
		Good “Housekeeping” Practices*	72	55,297
		Ground Sloped Away from Wellhead	68	54,744
		Standing water avoided around wellhead	64	47,849
		Air Gap (for non-pressurized systems	41	32,160
		Backflow Preventive / Check Valve	36	25,434
		Cement Pad	52	23,041
		N/A (Has No Irrigation Wells)	83	15,822
		No Data Entered	9	9,109

Figure 21. The breakdown of MWEs with irrigation wells and the practices used on those wells to prevent groundwater pollution.



Abandoned Wells

Managed Wetlands in the Coalition area contain several abandoned wells, most of which have been destroyed (Table 15, Figure 22). Table 16 shows that many members did not provide the year of abandonment for their wells.

Table 15. Information for abandoned wells on Managed Wetlands.

Survey Section	Question	Response	Count (Members / Wells)	Acreage
C	Are you aware of any known abandoned wells associated with this Farm Evaluation?			
		No	116	24,017
		Yes	7	12,590
		No Selection	4	8,576
C	Abandoned Well Practices			
		No Abandoned Wells	116	23,745
		No Data Entered	6	11,744
		Destroyed by licensed professional	3	8,659
		Destroyed - Unknown method	4	5,364
		Destroyed – certified by county	0	0

Table 16. Reported years wells were abandoned on managed wetlands.

Survey Section	Question	Response	Count of Wells
C	Year Abandoned		
		1990	1
		1999	2
		2000	1
		Unknown	2
		(blank)	39

Figure 22. Reported presence of abandoned wells and their management on managed wetlands.