Second Supplemental Report of Diane S. Moore

In the Matter of

Duarte Nursery v. United States of America

May, 2017

Prepared for: Briscoe, Ivester & Bazel LLP

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SECTION I
INTRODUCTION

In my 2015 Expert Report and Rebuttal Report, I described vegetation communities observed in parts of the site and opined on the potential effects of the tillage and the drought on those vegetation communities. I concluded the vegetation communities in waters and wetlands sampled in the site that had been tilled were similar to those in waters and wetlands sampled in the site that had not been tilled. In my 2015 Expert Report, I also opined that drought conditions could impact the mapping of wetlands and the degree to which wetland indicators (e.g., wetland vegetation) is present and observable.

On April 21, 2016, I documented "relatively normal rainfall year" plant species composition in a subset of the tilled and non-tilled wetlands from my 2015 Botanical Study and in a subset of the wetlands where the DOJ Expert Team collected vegetation data in 2015. The methods and findings are presented in my 2016 Supplemental Expert Report.

A second consecutive year of more normal precipitation during the winter of 2016-2017 provided a second opportunity to further observe vegetation in the site under more normal conditions, re-test my opinions, and re-confirm the identification of a few plant species. On May 11, 2017, I conducted a supplemental field survey at the site with Thomas Skordal. This field survey was conducted under very good conditions for wetland plant identification, though it was conducted later in the vegetation flowering season, under somewhat dryer conditions, than in 2016.

The purpose of this Second Supplemental Expert Report is to present the results of the May 11, 2017 field survey. The primary objective of the 2017 field survey was to confirm my opinion whether vegetation communities in the tilled and non-tilled wetlands sampled in my Botanical Study are comparable by re-assessing

them under more normal conditions. A secondary objective of the recent field survey was to observe more broadly the vegetation communities in waters and wetlands in the site following a second consecutive relatively normal rainfall year.

My 2017 observations during the second consecutive year of more normal precipitation further support the conclusions in my June 2015 Expert Report and my July 2015 Rebuttal Report that the vegetation communities in waters and wetlands on the site that had been tilled were similar to those in waters and wetlands on the site that had not been tilled. The 2017 observations further confirm drought conditions can impact the mapping of wetlands and the degree to which wetland indicators (e.g., wetland vegetation) are present and observable.

The 2017 field observations under more normal conditions provide further confirmation the plant species in my Botanical Studies during 2015 and 2016 were correctly identified. The 2017 data also leads to further skepticism on the validity of the plant identifications by the DOJ Expert Team, and associated conclusions, in relatively normal rainfall years, regarding the relatively high cover of facultative upland and/or upland species reported as occurring in on-site wetlands during 2015.

SECTION II
METHODS

A supplemental field survey was conducted on May 11, 2017. The survey was timed to coincide with flowering time of seasonal wetland plants, and following a winter and spring with 121% of average rainfall recorded in nearby Red Bluff. The survey involved locating the previously surveyed locations with a Trimble GeoXT Global Positioning System (GPS) unit.

Botanical Update

I revisited the same subset of tilled and non-tilled wetlands from my 2015 Botanical Study that I visited in 2016. The survey sites included two wetlands that had not been subject to tillage during November and December 2012 (i.e., "control" wetlands 135 and 149) and two wetlands that had been subject to tillage during November and December 2012 (i.e., "tilled" wetlands 63 and 66) (Figure 1). Using the "50/20 Rule" (ACOE, 2008), I identified and recorded the dominant plant species at each location. I also identified and recorded several associated plant species at each location and made general observations of habitat conditions. At each location, photographs were taken to document plant species composition and habitat conditions .

DOJ Expert Team Data Locations

I also revisited two of the wetlands that I visited in 2016 where I assessed vegetation at the Department of Justice (DOJ) Team Expert Data Locations. Wetlands and 19 were visited (Figure 2). Using the "50/20 Rule" (ACOE, 2008), I identified and recorded the dominant plant species at each location. I also identified and recorded several associated plant species at each location and made general observations of habitat conditions. At each location, photographs were taken to document plant species composition and habitat conditions.

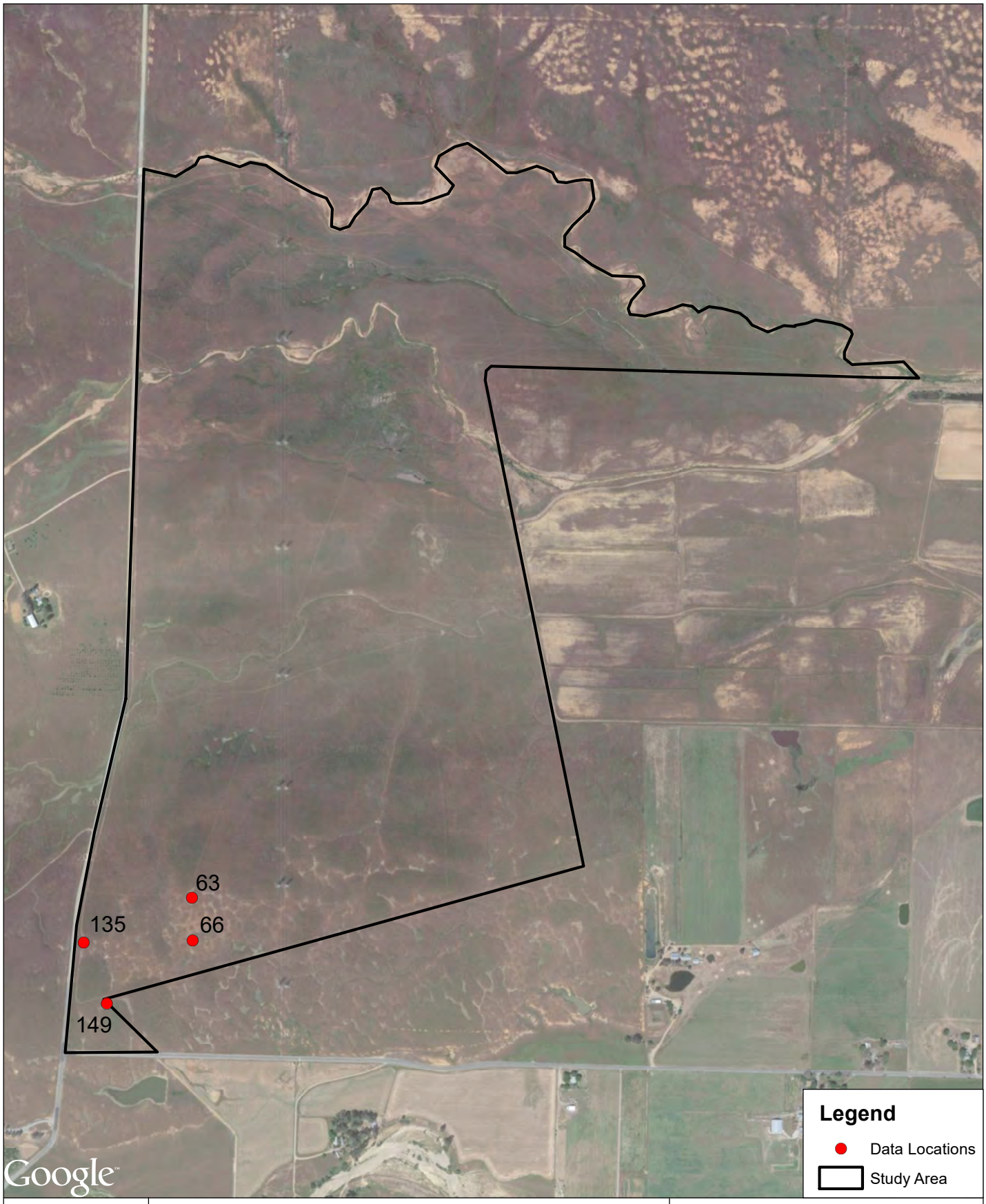


Figure 1

0 500 1,000

1 inch = 1,000 feet

N
W E
S

2015 Coordinates: DOJ Expert Team
Aerial Source: Google Earth (2015)

2017
BOTANICAL UPDATE

Tehama County, CA

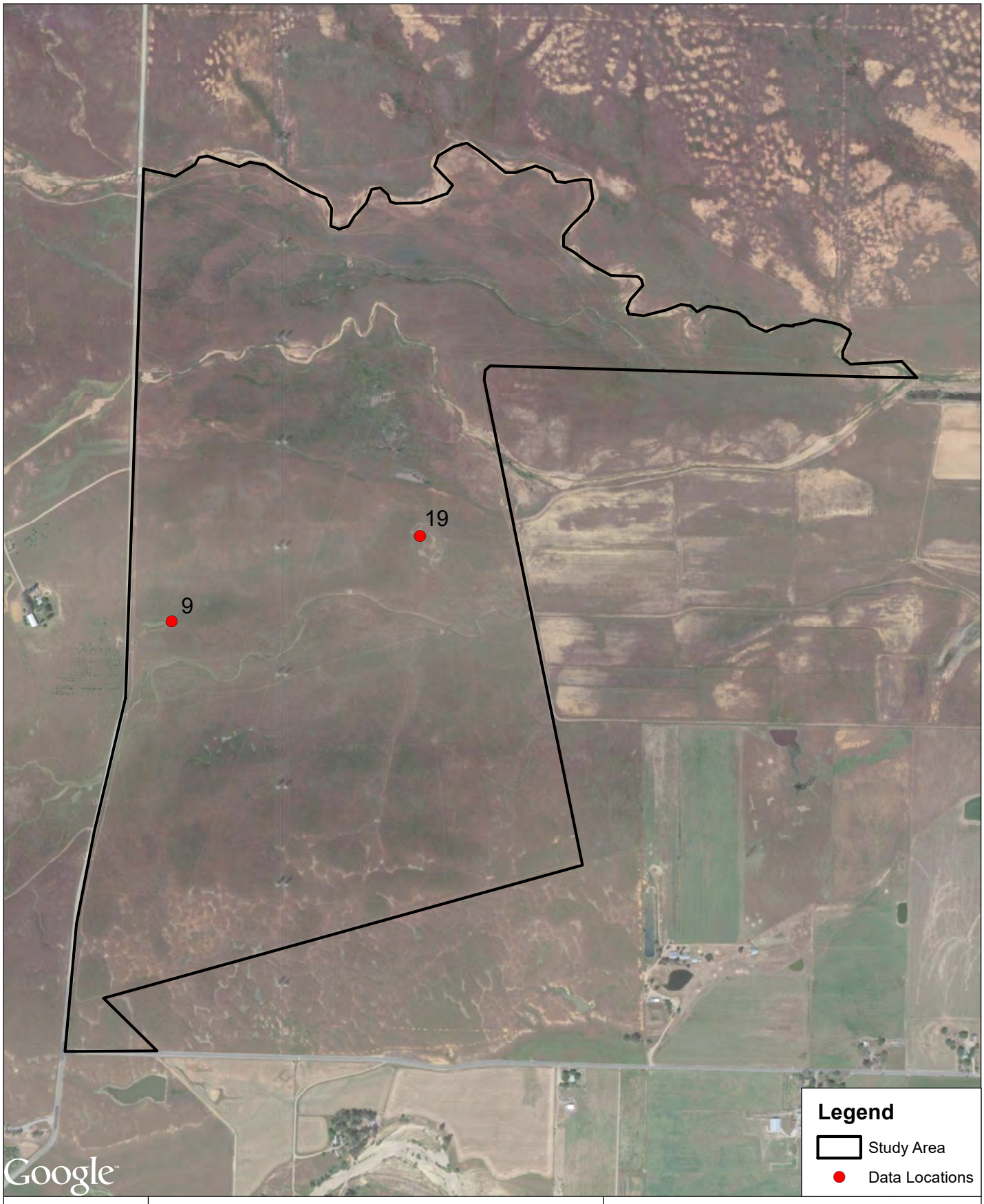


Figure 2

0 500 1,000

1 inch = 1,000 feet

N
W E
S

2015 Coordinates: DOJ Expert Team
Aerial Source: Google Earth (2015)

2017
SURVEY LOCATIONS (DOJ)

Tehama County, CA

SECTION III
RESULTS AND DISCUSSION

Botanical Update

The 2017 survey was conducted during the peak of the blooming period when the majority of seasonal wetland plants were identifiable. Most of the vegetation in the site and surrounding parcels was turning from green to tan.

The 2017 data re-validate my conclusions from 2015 and 2016 and provide further confirmation that the vegetation communities in the tilled and non-tilled depressional wetlands are comparable to each other during relatively normal climatological conditions. Within the waters and wetlands sampled in 2017, the plant species composition, aerial coverage of species, and assortment of species in waters and wetlands on the site subject to agricultural activities in late-2012 are similar to those in waters and wetlands on the site that were not subject to agricultural activities.

Vernal Pools 63 and 135

In 2017, the relatively more dominant species in Vernal Pool 63 (which had been tilled) are *Lasthenia fremontii, Eyngium vaseyi, and Navarretia leucocephala* (Figure 3). *Lasthenia fremontii and Eyngium vaseyi* are also relatively more dominant species in Vernal Pool 135 (which had not been tilled), as well as *Navarretia leucocephala,* and *Psilocarphus brevissimus* (Figure 4). All of these plants have indicator status of obligate or facultative-wet and are common species of Central Valley vernal pools. All of these species are "Vernal pool species", as listed in Appendix I of the California Rapid Assessment Method Handbook (CRAM, 2013).

Vernal Pool 63, looking northwest; 04/21/16.

Vernal Pool 63, looking northwest; 05/11/17. Vegetation was comparable to that of 2016. There is little evidence of the furrows apparent above, and cattle hoof prints are abundant in the pool.

Figure 3. Vernal Pool 63 in 2016 and 2017

Seasonal Wetland 66, looking northwest; 04/21/16.

Seasonal Wetland 66, looking northwest; 05/11/17. Vegetation was comparable to that of 2016. The furrows on the wetland floor are no longer apparent and cattle hoof prints are abundant.

Figure 4. Seasonal Wetland 66 in 2016 and 2017

Seasonal Wetlands 66 and 149

In 2017, the relatively more dominant species in Seasonal Wetland 66 (which had been tilled) are *Lasthenia fremontii, Eyngium vaseyi, and Downingia ornatissima var. ornatissima* (Figure 5). *Lasthenia fremontii and Downingia ornatissima var. ornatissima* are also relatively more dominant species in Vernal Pool 135 (which had not been tilled), as well as *Deschampsia danthonioides* and *Psilocarphus brevissimus*. All of these plants have indicator status of obligate or facultative-wet and are common species of Central Valley vernal pools. All of these species are "Vernal pool species", as listed in Appendix I of the California Rapid Assessment Method Handbook (CRAM, 2013).

Similar to my observations during Spring 2016, the 2017 plant communities in the wetlands are dominated by strong hydrophtyic species (i.e., plants with an indicator status of obligate or facultative-wet) and contained lesser amounts of facultative, facultative-upland, and non-wetland than documented in 2015. For example, in 2015 *Leontodon saxatilis* (a facultative-upland species) was present in every wetland sampled and a dominant species in many of the wetlands. During 2017, if *Leontodon saxatilis* was observed in a wetland, it was limited to the outer edges of the wetland. As an example, *Leontodon saxatilis* was widespread around the edges of Control Wetland 135 during 2015, was far less prevalent in 2016, and was entirely absent in 2017. This difference is apparent in photographs of the site taken from approximately the same location during 2015 and during 2017 (Figure 5).

DOJ Expert Team Data Locations

My 2017 observations at DOJ Expert Team locations 9 and 19 re-validate my conclusions from 2016 and provide further confirmation that dominant plant species in these area differ substantially from those recorded on the data sheets in Appendix A and field notes in Appendix C of the DOJ Expert Team Report. Overall, the vegetation I observed at DOJ Expert Team locations 9 and 19 in

Vernal Pool 135, looking northwest; 04/17/15. The yellow flowers circled in red are Leontodon saxatilis, a facultative upland species that was abundant around the edges of the pool during drought conditions.

Vernal Pool 135, looking northwest; 05/11/17. Following an above-average rainfall winter, Leontodon saxatilis is absent; Downingia ornatissima, Erygium vaseyi, and Lasthenia fremontii are dominant in the same area.

Figure 5. Vernal Pool 135 in 2015 and 2017

both locations contained higher coverage of wetland species than those reported in the DOJ Expert Team Report.

Location 9

DOJ Expert Team location 9 is in vernal pool in the west-central part of the site (Figure 2). The area had been tilled during late-2012. During the 2017 survey, the small furrows and inter-furrows observed in the wetland in 2015 and 2016 were no longer apparent, and cattle hoof prints were widespread (Figure 6).

Five dominant plant species were observed in 2017 at DOJ Expert Team location 9: *Downingia ornatissima var. ornatissima, Ranunculus bonariensis var. trisepalus, Eryngium vaseyi, Lasthenia fremontii,* and *Psilocarphus brevissimus var. brevissimus.* All of these plants have indicator status of obligate or facultative-wet and are common species of Central Valley vernal pools. These species blanketed the floor of the wetland in a nearly uniform manner (Figure 6).

In comparison, only three dominant plant species were observed in the same areas during 2016: *Downingia ornatissima var. ornatissima, Ranunculus bonariensis var. trisepalus,* and *Eryngium vaseyi.* The increase from three to five dominant obligate or facultative-wet plant species during from 2016 to 2017 may be partially attributable to a second consecutive relatively normal rainfall year. Recent grazing throughout the site may also have contributed to the increased number of dominant vernal pool species, as grazing reduces thatch and often results in increased plant diversity in seasonal wetlands.

In contrast to the 2016 and 2017 botanical observations, the DOJ Expert Team reported three different dominant species at this same location in 2015, with *Hypochaeris radicata,* a facultative upland species, listed at 66% coverage.

USA Data Location 9, looking east; 04/21/16. This photograph shows several furrows supporting Ranunculus bonariensis, Downingia ornatissima, Eyngium vaseyi, and Psilocarpus brevissimus.

Same location at USA Data Location 9 following a second above-average rainfall winter; 05/11/17. The vegetation is comparable to that in 2016. The furrows on the wetland floor are no longer apparent and cattle hoof prints (several noted with arrows) are abundant.

Figure 6. USA Data Location 9 in 2016 and 2017

Location 19

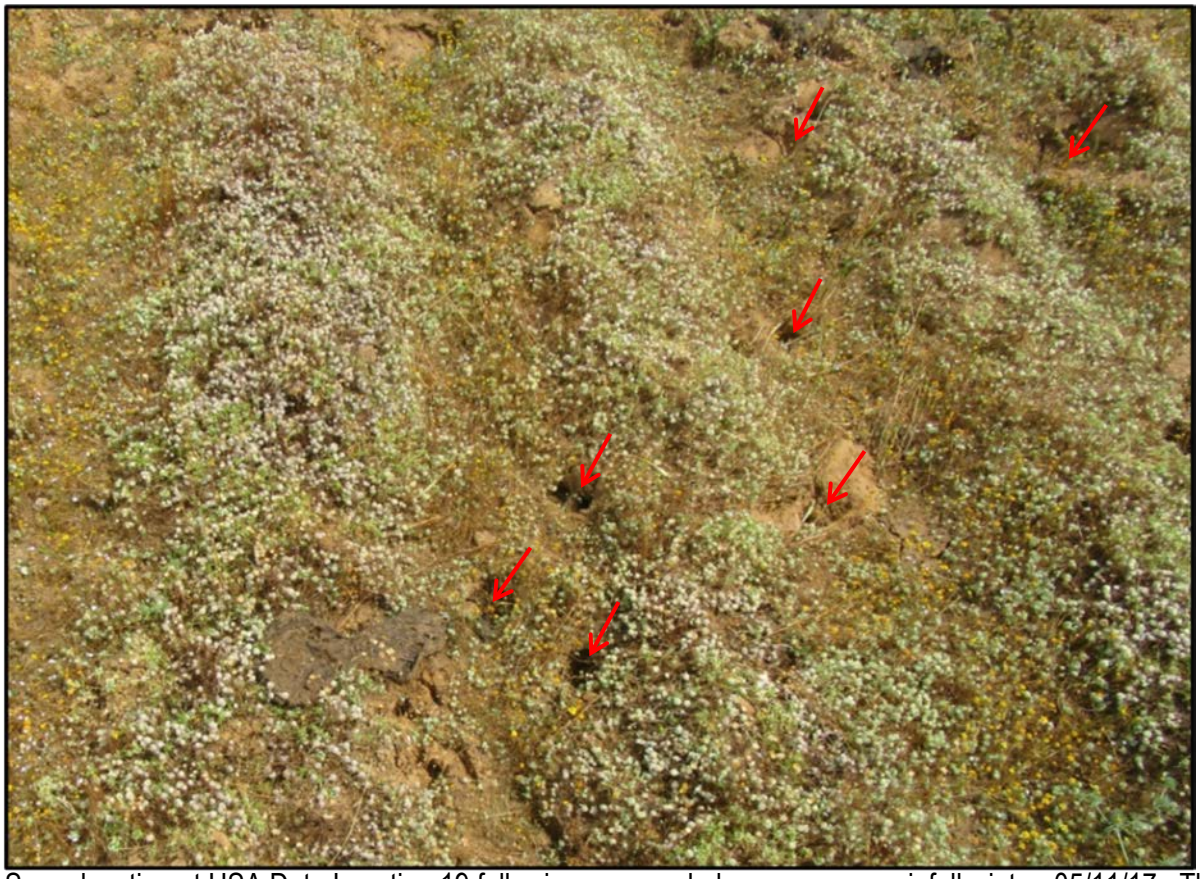
DOJ Expert Team location 19 is in a vernal pool in the east-central part of the site (Figure 2). The area had been tilled during late-2012. During the 2017 survey, the small furrows and inter-furrows observed in the wetland in 2015 and 2016 were still present, but less apparent and less prominent than in prior years (Figure 7). There was evidence of recent grazing, although the cattle hoof prints were limited, and far less widespread than at DOJ Expert Team location 9.

Dominant plant species at DOJ Expert Team location 19 observed in 2017 include the same three dominant species present in 2016: *Lasthenia fremontii, Navarretia leucocephala,* and *Psilocarphus brevissimus.* These species are common species of Central Valley vernal pools, especially on the floors of the pools subject to relatively longer periods of inundation and/or saturation. These species blanketed the floor of the wetland in a nearly uniform manner (Figure 7).

In contrast to the 2016 and 2017 botanical observations, the DOJ Expert Team reported an unknown *Navarretia* at this location in 2015 with an assigned facultative-upland indicator status, *Psilocarphus tenellus* (an obligate wetland species), and *Hypochaeris radicata* listed at 13% coverage.

The 2016 and 2017 data collected at USA Data Locations provide confirmation that the plant species included in my 2015 Botanical Study were correctly identified.

USA Data Location 19, looking west; 04/21/16. Lasthenia fremontii, Navarretia leucocephala, Downingia ornatissima, Ranunculus bonariensis, and Psilocarpus brevissimus are dominant species.



Same location at USA Data Location 19 following a second above-average rainfall winter; 05/11/17. The vegetation is comparable to that in 2016. The furrows are less apparent; there are also widely scattered cattle hoof prints (a few noted with arrows) on the wetland floor.

Figure 7. USA Data Location 19 in 2016 and 2017

SECTION IV
CONCLUSIONS

My 2017 observations during the second consecutive year of more normal precipitation further support the conclusions in my June 2015 Expert Report and my July 2015 Rebuttal Report that the vegetation communities in waters and wetlands on the site that had been tilled were similar to those in waters and wetlands on the site that had not been tilled. The 2017 observations further confirm drought conditions can impact the mapping of wetlands and the degree to which wetland indicators (e.g., wetland vegetation) are present and observable.

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SECTION V
REFERENCES

ACOE (U.S. Army Corps of Engineers). 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region. U.S. Army Engineer Research and Development Center, Vicksburg, MS. September.

CRAM (California Rapid Assessment Method). 2013. Vernal Pool Systems and Individual Vernal Pools. Version 6.1. Appendix 1. Vernal Pool Endemic Plant List. May. http://www.cramwetlands.org/sites/default/files/CRAMVernal%20Pool%20Endemics-final.pdf