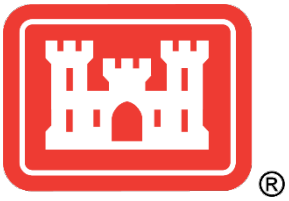
2022 ANNUAL REPORT
WETLAND HYDROLOGY AND WATER QUALITY MONITORING
FORMER FORT ORD, CALIFORNIA

Prepared for:



U.S. Army Corps of Engineers
Sacramento District
1325 J Street
Sacramento, CA 95814-2922

Prepared by:
Bart Kowalski
Chenega Tri-Services

March 2023

This page intentionally left blank

CONTENTS

1 INTRODUCTION 1
2 SITE DESCRIPTION 1
3 METHODS 6
3.1 Hydrology Monitoring 6
3.2 Evaluation for Data Quality Objectives and Success Criteria 7
4 RESULTS 8
4.1 Pond 5 8
4.2 Pond 101 East (East) 9
4.3 Pond 997 10
4.4 Pond 75 11
4.5 Pond 16 12
4.6 Pond 39 13
4.7 Pond 40 South 14
4.8 Pond 41 15
4.9 Pond 42 16
4.10 Pond 61 17
5 DISCUSSION 18
5.1 Pond 5 – Reference 21
5.1.1 Data Quality Objective 1 23
5.1.2 Data Quality Objective 2 23
5.1.3 Performance Standard: Hydrological Conditions and Inundation Area 23
5.1.4 Data Quality Objective 4 24
5.1.5 Performance Standard: Wildlife Usage 24
5.1.6 Conclusion 24
5.2 Pond 101 East (East) – Reference 26
5.2.1 Data Quality Objective 1 26
5.2.2 Data Quality Objective 2 26
5.2.3 Performance Standard: Hydrological Conditions and Inundation Area 26
5.2.4 Data Quality Objective 4 28
5.2.5 Performance Standard: Wildlife Usage 28
5.2.6 Conclusion 28
5.3 Pond 997 – Reference 30

5.3.1 Data Quality Objective 1 30
5.3.2 Data Quality Objective 2 30
5.3.3 Performance Standard: Hydrological Conditions and Inundation Area 30
5.3.4 Data Quality Objective 4 30
5.3.5 Performance Standard: Wildlife Usage 33
5.3.6 Conclusion 33
5.4 Pond 75 – Baseline 33
5.4.1 Data Quality Objective 1 33
5.4.2 Data Quality Objective 2 33
5.4.3 Performance Standard: Hydrological Conditions and Inundation Area 33
5.4.4 Data Quality Objective 4 33
5.4.5 Performance Standard: Wildlife Usage 34
5.4.6 Conclusion 34
5.5 Pond 16 – Year 4 35
5.5.1 Data Quality Objective 1 35
5.5.2 Data Quality Objective 2 35
5.5.3 Performance Standard: Hydrological Conditions and Inundation Area 35
5.5.4 Data Quality Objective 4 37
5.5.5 Performance Standard: Wildlife Usage 37
5.5.6 Conclusion 37
5.6 Pond 39 – Year 3 39
5.6.1 Data Quality Objective 1 39
5.6.2 Data Quality Objective 2 39
5.6.3 Performance Standard: Hydrological Conditions and Inundation Area 39
5.6.4 Data Quality Objective 4 39
5.6.5 Performance Standard: Wildlife Usage 42
5.6.6 Conclusion 42
5.7 Pond 40 South – Year 4 42
5.7.1 Data Quality Objective 1 44
5.7.2 Data Quality Objective 2 44
5.7.3 Performance Standard: Hydrological Conditions and Inundation Area 44
5.7.4 Data Quality Objective 4 44
5.7.5 Performance Standard: Wildlife Usage 44
5.7.6 Conclusion 46
5.8 Pond 41 – Year 3 46

5.8.1 Data Quality Objective 1 47
5.8.2 Data Quality Objective 2 47
5.8.3 Performance Standard: Hydrological Conditions and Inundation Area 48
5.8.4 Data Quality Objective 4 48
5.8.5 Performance Standard: Wildlife Usage 48
5.8.6 Conclusion 48
5.9 Pond 42 – Year 3 50
5.9.1 Data Quality Objective 1 52
5.9.2 Data Quality Objective 2 52
5.9.3 Performance Standard: Hydrological Conditions and Inundation Area 52
5.9.4 Data Quality Objective 4 52
5.9.5 Performance Standard: Wildlife Usage 52
5.9.6 Conclusion 54
5.10 Pond 61 – Year 4 54
5.10.1 Data Quality Objective 1 56
5.10.2 Data Quality Objective 2 57
5.10.3 Performance Standard: Hydrological Conditions and Inundation Area 57
5.10.4 Data Quality Objective 4 57
5.10.5 Performance Standard: Wildlife Usage 58
5.10.6 Conclusion 58
6 CONCLUSION 60
7 REFERENCES 61

FIGURES

Figure 2-1. Location Map of Vernal Pools on Former Fort Ord 3
Figure 2-2. Cumulative Monthly Precipitation for the 2022 Water Year compared to the 30-Year Normal (mean 1991-2020), the 2022 water year, and the 25% and 75% Probabilities 4
Figure 2-3. Monthly Precipitation for the 2022 Water-Year, and Normal Monthly Precipitation 4
Figure 2-4. Location Map of Ponds 5, 101 East (East), 997, 75, 16, 39, 40 South, 41, 42, and 61 5
Figure 4-1. Pond 5 (Reference) Depth and Precipitation on the Former Fort Ord, 2022 Water Year Water Year 9
Figure 4-2. Pond 101 East (East) (Reference) Depth and Precipitation on Former Fort Ord, 2021 10
Figure 4-3. Pond 997 (Reference) Depth and Precipitation on Former Fort Ord, 2021 11
Figure 4-4. Pond 75 (Baseline) Depth and Precipitation on the Former Fort Ord, 2022 Water Year Water Year 12
Figure 4-5. Pond 16 (Year 4 Post-Subsurface Munitions Remediation) Depth and Precipitation on the Former Fort Ord, 2022 Water Year Water Year 12

Figure 4-6. Pond 39 (Year 4 Post-Subsurface Munitions Remediation) Depth and Precipitation on the Former Fort Ord, 2022 Water Year Water Year 14
Figure 4-7. Pond 40 South (Year 4 Post-Subsurface Munitions Remediation) Depth and Precipitation on the Former Fort Ord, 2022 Water Year Water Year 14
Figure 4-8. Pond 41 (Year 4 Post-Subsurface Munitions Remediation) Depth and Precipitation on the Former Fort Ord, 2022 Water Year Water Year 15
Figure 4-9. Pond 42 (Year 4 Post-Subsurface Munitions Remediation) Depth and Precipitation on the Former Fort Ord, 2022 Water Year Water Year 16
Figure 4-10. Pond 61 West (Year 4 Post-Subsurface Munitions Remediation) Depth and Precipitation on the Former Fort Ord, 2022 Water Year Water Year 17
Figure 5-1. Plot of Historical Depth vs Inundation Area data going back to water year 1998 for all ponds surveyed in the 2022 water year except for pond 75. 19
Figure 5-2. Plot of Historical pH Values going back to water year 1998 for all ponds surveyed in the 2022 water year. 20
Figure 5-3. Plot of Historical Temperature Values going back to water year 1992 for all ponds surveyed in the 2022 water year. 20
Figure 5-4. Plot of Historical Turbidity Values going back to water year 2015 for all ponds surveyed in the 2022 water year. 21
Figure 5-5. Plot of Historical Dissolved Oxygen Values going back to water year 2000 for all ponds surveyed in the 2022 water year. 21
Figure 5-6. Pond 5 (Reference) Historical Mean Monthly Depths and Cumulative Monthly Precipitation Compared to the 30-Year Normal (mean 1991-2020) (NCDC NOAA, 2022) 22
Figure 5-7. Pond 5 (Reference) Plot of Depth vs Inundation Area since 2013 Water Year 23
Figure 5-8. Pond 5 (Reference) historical and 2022 water quality measurements for pH, Temperature (C), Dissolved Oxygen (mg/L), and Turbidity (FNU). 24
Figure 5-9. Pond 5 (Reference) inundations.. 25
Figure 5-10. Pond 101 East (East) (Reference) Historical Mean Monthly Depths and Cumulative Monthly Precipitation Compared to the 30-Year Normal (mean 1991-2020) (NCDC NOAA, 2022) 27
Figure 5-11. Pond 101 East (East) Plot of Depth vs Area since 2007 Water Year 27
Figure 5-12. Pond 101 East (East) (Reference) historical and 2022 water quality measurements for pH, Temperature (C), Dissolved Oxygen (mg/L), and Turbidity (FNU). 28
Figure 5-13. Pond 101 East (East) (Reference) inundations. 29
Figure 5-14. Pond 997 (Reference) Historical Mean Monthly Depths and Cumulative Monthly Precipitation Compared to the 30-Year Normal (mean 1991-2020) (NCDC NOAA, 2022) 30
Figure 5-15. Pond 997 (Reference) Plot of Depth vs Area since 2017 Water Year 31
Figure 5-16. Pond 997 (Reference) historical water quality measurements for pH, Temperature (C), Dissolved Oxygen (mg/L), and Turbidity (FNU). 31
Figure 5-17. Pond 997 (Reference) inundations. 32
Figure 5-18. Pond 75 (Baseline) Inundation for 2022 (below normal precipitation).. 34
Figure 5-19. Pond 16 (Year 4 Post-Subsurface Munitions Remediation) Historical Mean Monthly Depths and Cumulative Monthly Precipitation Compared to the 30-Year Normal (mean 1991-2020) (NCDC NOAA, 2022) 35
Figure 5-20. Pond 16 (Year 4 Post-Subsurface Munitions Remediation) Plot of Depth vs Area since 2009 Water Year. 36
Figure 5-21. Pond 16 (Year 4 Post-Subsurface Munitions Remediation) water quality measurements for pH, Temperature (C), Dissolved Oxygen (mg/L), and Turbidity (FNU) 37
Figure 5-22. Pond 16 (Year 4 Post-Subsurface Munitions Remediation) Inundations for 2018 and 2022 (both years had below normal precipitation). 38

Figure 5-23. Pond 39 (Year 4 Post-Subsurface Munitions Remediation) Historical Mean Monthly Depths and Cumulative Monthly Precipitation Compared to the 30-Year Normal (mean 1991-2020) (NPS, 2021; NCDC NOAA, 2021) 40
Figure 5-24. Pond 39 (Year 4 Post-Subsurface Munitions Remediation) Plot of Depth vs Area Since Water Year 2015. 40
Figure 5-25. Pond 39 (Year 4 Post-Subsurface Munitions Remediation) Inundations for 2018 and 2022 (both below normal water years). 41
Figure 5-26. Pond 39 (Year 4 Post-Subsurface Munitions Remediation) water quality measurements for pH, Temperature (C), Dissolved Oxygen (mg/L), and Turbidity (FNU). 42
Figure 5-27. Pond 40 South (Year 4 Post-Subsurface Munitions Remediation) Historical Mean Monthly Depths and Cumulative Monthly Precipitation Compared to the 30-Year Normal (mean 1991-2020) (NCDC NOAA, 2022) 43
Figure 5-28. Pond 40 South (Year 4 Post-Subsurface Munitions Remediation) Plot of Depth vs Area Since Water Year 2015. 44
Figure 5-29. Pond 40 South (Year 4 Post-Subsurface Munitions Remediation) Inundations for 2018 and 2022 (both below normal water years). 45
Figure 5-30. Pond 40 South (Year 4 Post-Subsurface Munitions Remediation) historical water quality measurements for pH, Temperature (C), Dissolved Oxygen (mg/L), and Turbidity (FNU).. 46
Figure 5-31. Pond 41 (Year 4 Post-Subsurface Munitions Remediation) Historical Mean Monthly Depths and Cumulative Monthly Precipitation Compared to the 30-Year Normal (mean 1991-2020) (NCDC NOAA, 2021) 47
Figure 5-32. Pond 41 (Year 4 Post-Subsurface Munitions Remediation) Plot of Depth vs Area Since Water Year 2016. 48
Figure 5-33. Pond 41 (Year 4 Post-Subsurface Munitions Remediation) Inundations for 2015 (consecutive drought year) and 2022 (below normal water year). 49
Figure 5-34. Pond 41 (Year 4 Post-Subsurface Munitions Remediation) historical water quality measurements for pH, Temperature (C), Dissolved Oxygen (mg/L), and Turbidity (FNU).. 50
Figure 5-35. Pond 42 (Year 4 Post-Subsurface Munitions Remediation) Historical Mean Monthly Depths and Cumulative Monthly Precipitation Compared to the 30-Year Normal (mean 1991-2020) (NCDC NOAA, 2022) 51
Figure 5-36. Pond 42 (Year 4 Post-Subsurface Munitions Remediation) Plot of Depth vs Area Data since 2001 Water Year. 52
Figure 5-37. Pond 42 (Year 4 Post-Subsurface Munitions Remediation) Inundations for 2018 and 2022 (both below normal precipitation years). 53
Figure 5-38. Pond 42 (Year 4 Post-Subsurface Munitions Remediation) water quality measurements for pH, Temperature (C), Dissolved Oxygen (mg/L), and Turbidity (FNU). 54
Figure 5-39. Pond 61 East (Year 4 Post-Subsurface Munitions Remediation) Historical Mean Monthly Depths and Cumulative Monthly Precipitation Compared to the 30-Year Normal (mean 1991-2020) (NCDC NOAA, 2021) 55
Figure 5-40. Pond 61 West (Year 4 Post-Subsurface Munitions Remediation) Historical Mean Monthly Depths and Cumulative Monthly Precipitation Compared to the 30-Year Normal (mean 1991-2020) (NCDC NOAA, 2022) 55
Figure 5-41. Pond 61 East (Year 4 Post-Subsurface Munitions Remediation) Plot of Depth vs Area since 2017 Water Year. 56
Figure 5-42. Pond 61 West (Year 4 Post-Subsurface Munitions Remediation) Plot of Depth vs Area since 2021 Water Year. 56
Figure 5-43. Pond 61 West (Year 4 Post-Subsurface Munitions Remediation) water quality measurements for pH, Temperature (C), Dissolved Oxygen (mg/L), and Turbidity (FNU). 57

Figure 5-44. Ponds 61 East and 61 West (Year 4 Post-Subsurface Munitions Remediation) Inundations for 2018 and 2022 (both below normal precipitation water years)..... 59

TABLES

Table 1-1. 2021-2022 Monitoring Status of Vernal Pools on Former Fort Ord 2
Table 4-1. Pond 5 (Reference) Hydrology Monitoring Results 9
Table 4-2. Pond 101 East (East) (Reference) Hydrology Monitoring Results..... 10
Table 4-5. Pond 16 (Year 4 Post-Subsurface Munitions Remediation) Hydrology Monitoring Results..... 13
Table 4-6. Pond 39 (Year 4 Post-Subsurface Munitions Remediation) Hydrology Monitoring Results..... 13
Table 4-7. Pond 40 South (Year 4 Post-Subsurface Munitions Remediation) Hydrology Monitoring Results..... 15
Table 4-9. Pond 42 (Year 4 Post-Subsurface Munitions Remediation) Hydrology Monitoring Results..... 17
Table 4-10. Pond 61 (Year 4 Post-Subsurface Munitions Remediation) Hydrology Monitoring Results..... 18
Table 5-1. Success at Pond 5 (Reference) Based on Performance Standards and Applicable Data Quality Objectives..... 24
Table 5-2. Success at Pond 101 East (East) (Reference) Based on Performance Standards and Applicable Data Quality Objectives..... 28
Table 5-3. Success at Pond 997 (Reference) Based on Performance Standards and Applicable Data Quality Objectives..... 33
Table 5-4. Success at Pond 75 (Baseline) Based on Performance Standards and Applicable Data Quality Objectives..... 34
Table 5-5. Success at Pond 16 (Year 4 Post-Subsurface Munitions Remediation) Based on Performance Standards and Applicable Data Quality Objectives..... 37
Table 5-6. Success at Pond 39 (Year 4 Post-Subsurface Munitions Remediation) Based on Performance Standards and Applicable Data Quality Objectives..... 42
Table 5-7. Success at Pond 40 South (Year 4 Post-Subsurface Munitions Remediation) Based on Performance Standards and Applicable Data Quality Objectives..... 46
Table 5-8. Success at Pond 41 (Year 4 Post-Subsurface Munitions Remediation) Based on Performance Standards and Applicable Data Quality Objectives..... 48
Table 5-9. Success at Pond 42 (Year 4 Post-Subsurface Munitions Remediation) Based on Performance Standards and Applicable Data Quality Objectives..... 54
Table 5-10. Success at Pond 61 (Year 4 Post-Subsurface Munitions Remediation) Based on Performance Standards and Applicable Data Quality Objectives..... 58
Table 6-1. 2021 Remediated Vernal Pools and Performance Standards Status..... 60

APPENDICES

A WATER QUALITY RESULTS AND INUNDATED AREA FOR VERNAL POOLS BY MONTH
B HISTORIC HYDROLOGY MONITORING RESULTS
C SITE PHOTOS

ACRONYMS AND ABBREVIATIONS

BRAC	Base Realignment and Closure
Burleson	Burleson Consulting, Inc.

Chenega	Chenega Tri-Services, LLC.
CTS	California Tiger Salamander
cm	centimeter(s)
DQO	Data Quality Objective
fairy shrimp	California Fairy Shrimp
FNU	Formazin Nephelometric Unit
HLA	Harding Lawson and Associates
HMP	Habitat Management Plan
MEC	Munitions and Explosives of Concern
m	meter(s)
mg/L	milligram(s) per liter
NCDC	National Climatic Data Center
NOAA	National Oceanic and Atmospheric Administration
NWSFO	National Weather Service Forecast Office
PBO	Programmatic Biological Opinion
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
Wetland Plan	Wetland Monitoring and Restoration Plan for Munitions and Contaminated Soil Remediation

1 INTRODUCTION

The United States Army (Army) is required to conduct baseline and follow-up wetland monitoring at former Fort Ord, and to evaluate if vernal pools were affected by remediation activities, as described in the *Installation-wide Multispecies Habitat Management Plan* (HMP), and the *Programmatic Biological Opinion for Cleanup and Property Transfer Actions Conducted at the Former Fort Ord, Monterey County, California* (PBO) (USACE, 1997; USFWS, 2017). Wetland monitoring includes three types of monitoring: hydrology and water quality, vegetation, and wildlife. The United States Army Corps of Engineers (USACE) contracted Chenega Tri-Services (Chenega) to conduct hydrology and water quality monitoring in the 2022 water year and this report describes the methods and results of those efforts. Vegetation and wildlife monitoring were performed by another contractor and are reported elsewhere (Burleson, 2023).

Vernal pools are evaluated against success criteria identified in the HMP, PBO, and the *Wetland Monitoring and Restoration Plan for Munitions and Contaminated Soil Remedial Activities at Former Fort Ord* (Wetland Plan, Burleson, 2006). The PBO outlines specific success criteria for the state and federally threatened central California population of California Tiger Salamander (CTS) and the federally endangered Contra Costa Goldfields (CCG). It states that reestablishment of these species will be considered successful if, at the end of monitoring, wetland function, wildlife usage, wetland plant cover, diversity and dominance, and CCG abundance are directly comparable to the conditions before remediation. These assessments are conducted using performance standards which are evaluated for vernal pool depth, inundation, vegetation, water quality, and wildlife using Data Quality Objectives (DQO) described in the Wetland Plan. This report provides assessment of performance standards of hydrological conditions and inundation area (DQOs 1 and 2), and partial assessment of wildlife usage (DQOs 1 and 4), while assessment of performance standards for plant cover and species diversity (DQO 3) and wildlife usage (DQO 5) are presented in a separate report (Burleson, 2023).

Vernal pools selected for the monitoring include those which had at least 50 percent of their watershed burned or masticated, those that had masticated vegetation within their basin, and those which were disturbed by subsurface munitions remediation activities. Vernal pools assessed in the 2022 water year included three reference ponds: 5, 101 East (East), 997; one baseline pond: 75; and six remediated ponds: 16, 39, 40 South, 41, 42, and 61 (Table 1-1). Ponds 16, 39, 40 South, 41, 42, and 61 were in their fourth year of required follow up monitoring for post subsurface munitions remediation.

2 SITE DESCRIPTION

Former Fort Ord is located in the northwestern part of Monterey County, California, on the boundary of Monterey Bay, approximately 80 miles south of San Francisco. Fort Ord was established in 1917 as a military training base for infantry troops. In January 1991, the U.S. Secretary of Defense announced the closure of the base. In October 1996, portions of the property were transferred to the Bureau of Land Management (BLM). In April 2012, Fort Ord National Monument (FONM) was established by proclamation of the President of the United States, which includes lands managed by BLM and the Army.

FONM comprises 14,658 acres of primarily coast live oak woodland, maritime chaparral, and annual grasslands. The area managed by BLM contains the northern, eastern, and south-eastern portion of FONM, while the area managed by the Army contains central, western, and south-western portion and includes the Impact Area and part of BLM Area B (Figure 2-1).

Table 1-1. 2021-2022 Monitoring Status of Vernal Pools on Former Fort Ord

Index	Vernal Pool	Monitoring Status
1	Pond 5	Reference
2	Pond 997	Reference
3	Pond 101 East (East)	Reference
4	Pond 75	Baseline
5	Pond 16	Year 4 Post Subsurface munitions remediation
6	Pond 39	Year 4 Post Subsurface munitions remediation
7	Pond 40 South	Year 4 Post Subsurface munitions remediation
8	Pond 41	Year 4 Post Subsurface munitions remediation
9	Pond 42	Year 4 Post Subsurface munitions remediation
10	Pond 61	Year 4 Post Subsurface munitions remediation

The area's maritime climate is characterized by cool, overcast, foggy summers, and cool rainy winters, with the warmest days generally occurring in late summer and early fall. In the 2022 water year (Oct 2021 to Sept 2022), the Monterey area received only 69% of normal cumulative precipitation (National Oceanic and Atmospheric Administration, 2022; Figure 2-2). Precipitation during the fall months was well above normal, but there was no rain in January and the spring precipitation was well below normal during the 2022 water year. Overall, the period of precipitation was biomodal with the majority of it occurring before January; and the last significant rain event occurred in September (Figure 2-3).

Vernal pools are internally drained basins in low-lying areas that collect rainfall and surface runoff. Water accumulates in these depressions because of an impervious soil layer that prevents infiltration of water into the soil profile. The frequency and duration of this seasonal inundation varies among vernal pools, depending on the size of the basin and its watershed, soil depth to the impervious layer, and patterns of rainfall. Vernal pools provide habitat for plants and wildlife adapted to complete their life cycle under the extreme conditions of winter and spring inundation and summer and fall desiccation. Two listed species occur in Fort Ord vernal pools; the state and federally threatened central California population of California Tiger Salamander (*Ambystoma californiense*), and the federally endangered Contra Costa Goldfields (*Lasthenia conjugens*). California fairy shrimp (*Linderiella occidentalis*) also occurs in Fort Ord vernal pools, and it is one of the species listed in the HMP.

Fort Ord vernal pools are most common in areas containing Antioch soils in isolated grassland patches within a matrix of maritime chaparral and oak woodlands. All but two of the vernal pools monitored in the 2022 water year are located in the northern portion of FONM, while Ponds 16 and 75 are located in the southern section inside the Impact Area (Figure 2-4).

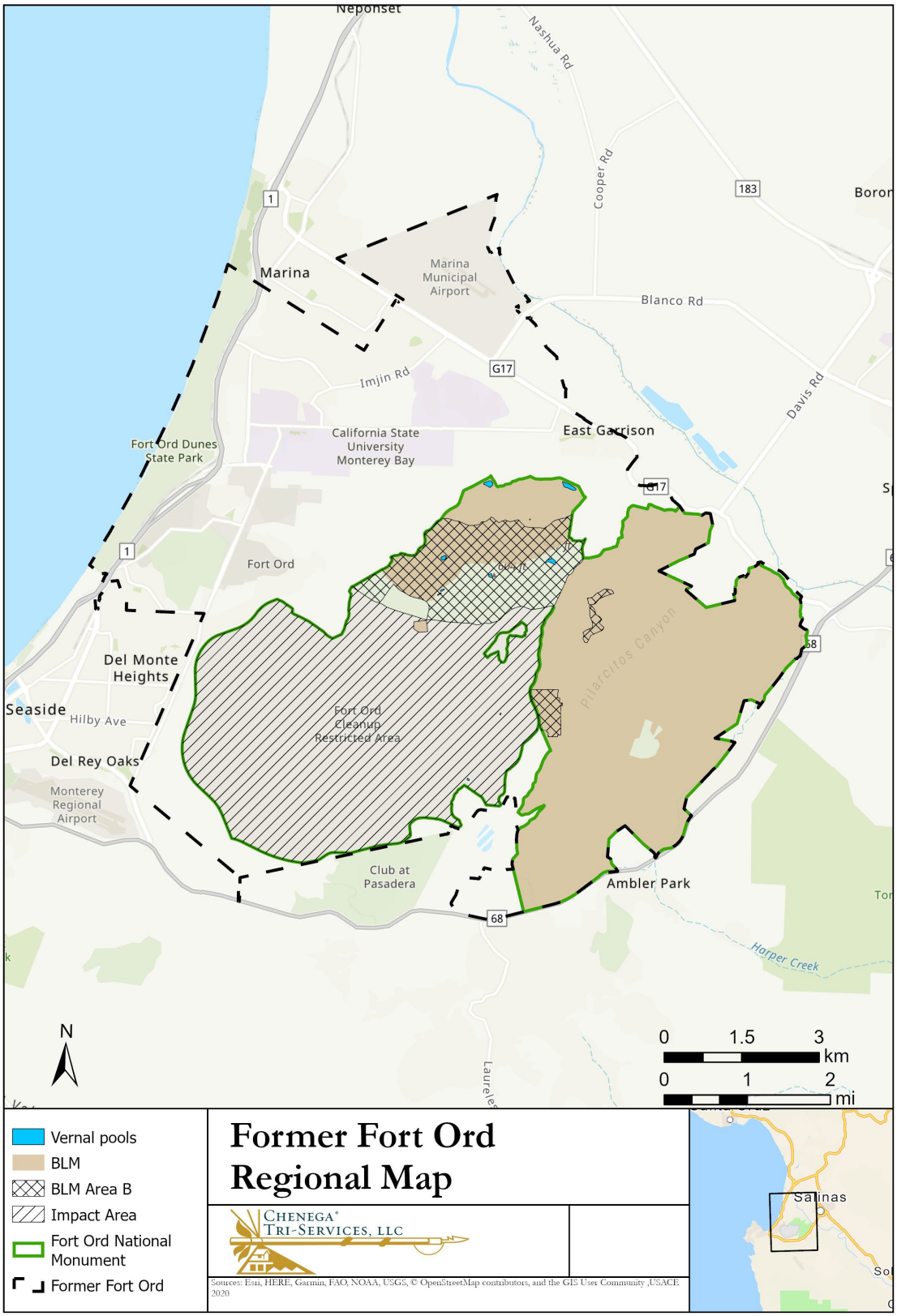


Figure 2-1. Location Map of Vernal Pools on Former Fort Ord

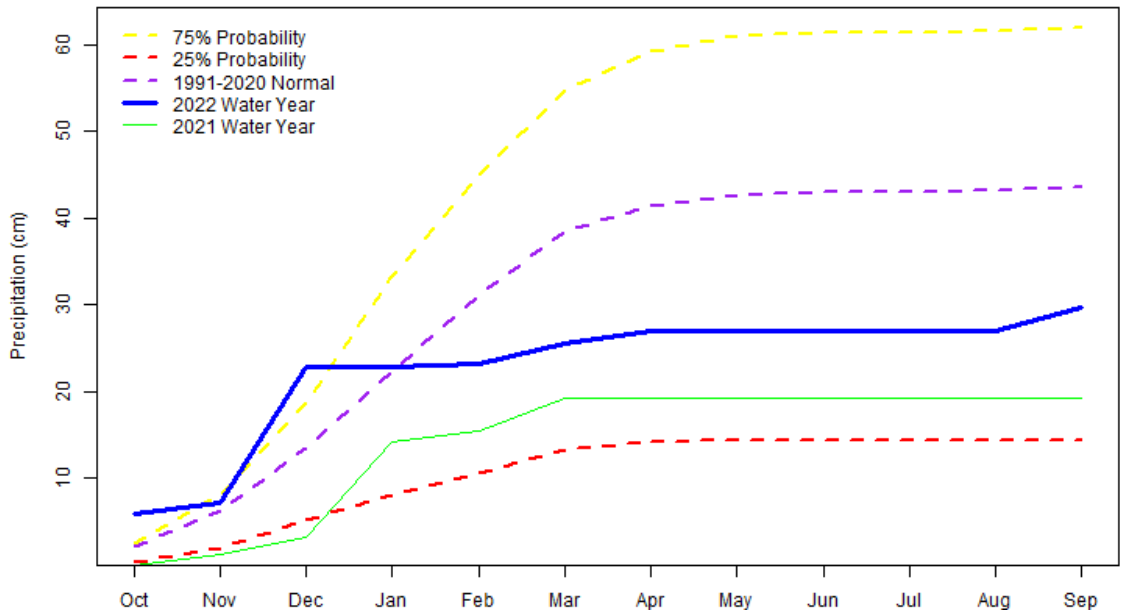


Figure 2-2. Cumulative Monthly Precipitation for the 2022 Water Year compared to the 30-Year Normal (mean 1991-2020), the 2022 water year, and the 25% and 75% Probabilities (National Oceanic and Atmospheric Administration [NOAA], 2022)

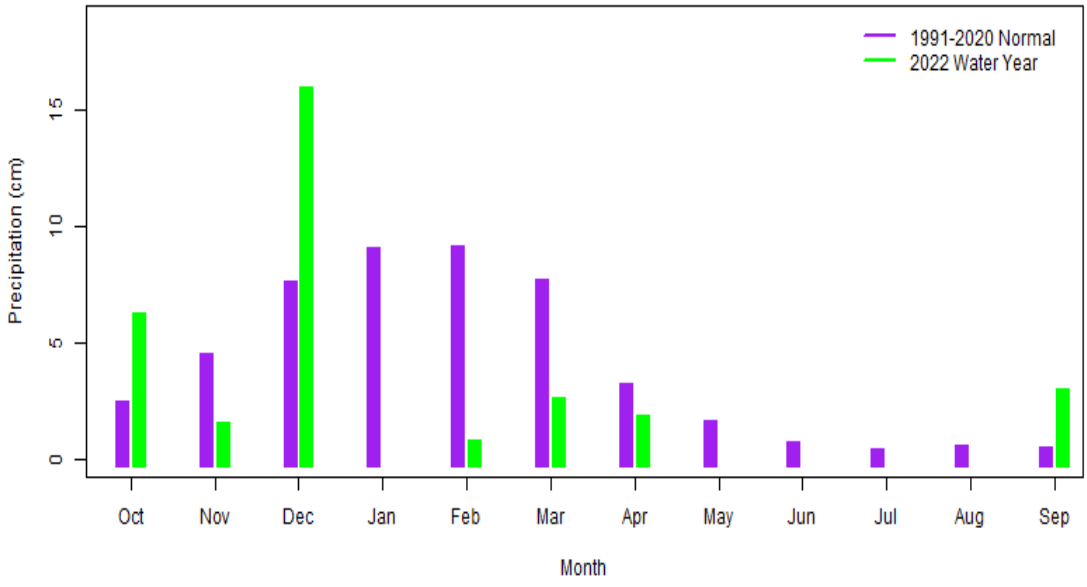


Figure 2-3. Monthly Precipitation for the 2022 Water-Year, and Normal Monthly Precipitation (National Oceanic and Atmospheric Administration [NOAA], 2022)

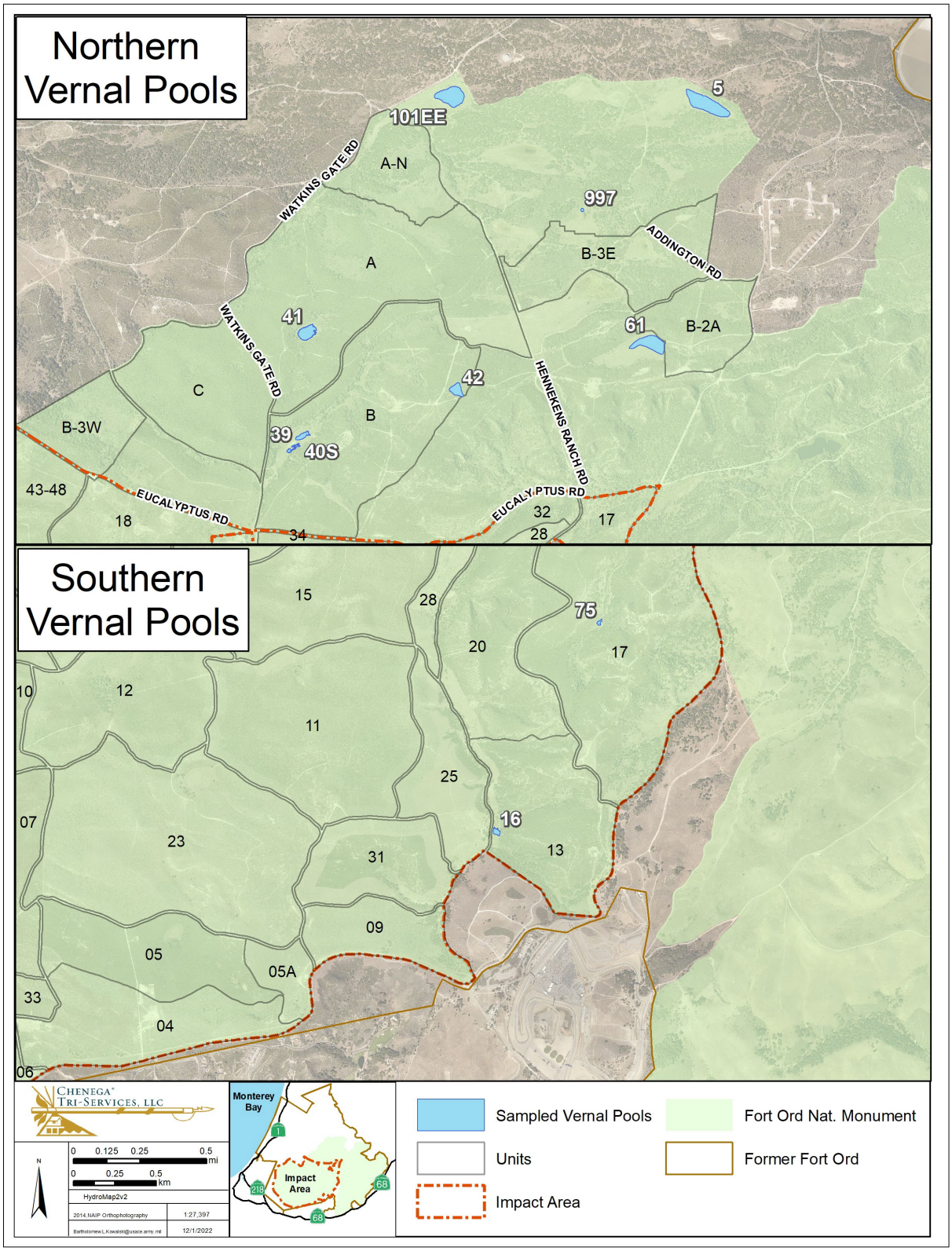


Figure 2-4. Location Map of Ponds 5, 101 East (East), 997, 75, 16, 39, 40 South, 41, 42, and 61.

3 METHODS

Sampling methods for hydrology and water quality monitoring were consistent with the PBO and the Wetland Plan (USFWS, 2017; Burleson, 2006). Vernal pools must be monitored for baseline conditions prior to any remedial activities such as prescribed burns, mastication, excavation, or artificial draining (USFWS, 2017). As described in the PBO, the Army conducts two years of pre-activity larval CTS sampling, to the extent possible, in the ponds where more than 50 percent of the watershed is likely going to be affected by remedial actions; or subsurface remediation activities are expected within the vernal pool basin (USFWS, 2017). Historical accounts of all surveys are presented in Appendix B.

Vernal pools are then monitored following remedial activities for 3 to 5 years depending on the type and level of disturbance. Post-burn monitoring occurs in vernal pools if more than 50 percent of the watershed of a vernal pool is affected and is conducted annually for the first three years following a burn (USFWS, 2017). The same standard is applied to vernal pools where more than 50 percent of the watershed was masticated, but no mastication of vegetation occurred within the inundation area. If vegetation is mowed within the inundation area, the vernal pool is monitored for vegetation in the first, third, and fifth years following mastication (Burleson, 2006). Vernal pools where subsurface munitions remediation activities disturbed less than 10 square feet and were shallower than four feet deep are monitored in the first, third, and fifth years following remediation, whereas vernal pools with greater and/or deeper disturbance are monitored annually for five years following remediation (Burleson, 2006). In cases of vernal pools where more than one type of remedial activity occurred, the most stringent monitoring frequency is followed. Three reference vernal pools that were not remediated were monitored for comparison: Ponds 5, 101 East (East), and 997.

In 2016, vegetation within the watershed and basin of Pond 16 was masticated. In 2017, vegetation within watersheds of Ponds 42, and 61 was masticated. In the same year, vegetation within watersheds of 39, 40 South and 42 was burned. In 2018 Ponds 16, 39, 40 South, 41, 42, and 61 were investigated for geophysical anomalies that potentially represented munitions and explosives of concern (MEC) items, and subsurface munitions remediation was performed in all of those ponds (Kemron, 2020a).

In the 2022 water year, Pond 75 was monitored for the second year of baseline, and ponds 16, 39, 40 South, 41, 42, and 61 were monitored for year 4 post-subsurface munitions remediation. A summary of monitored ponds and their monitoring status is presented in Table 1-1.

3.1 Hydrology Monitoring

Vernal pools were surveyed at least once a month but in many instances additional monitoring was conducted. Depth measurements at some of the vernal pools were also recorded opportunistically while conducting other field activities. Earlier in the season, surveys were generally timed to occur after major precipitation events. As the vernal pools started to dry out later in the season, some of them were visited more frequently than once a month to get a more accurate timing of when they dried out completely. Gauge depth readings were taken during all visits. Area of inundation was measured approximately once per month, and when vernal pools were deep enough, water quality metrics of pH, turbidity, temperature, dissolved oxygen, and conductivity were also measured at that time. Although conductivity is not a required water quality parameter per wetland plan and PBO, it was recorded since it was one of the default metrics measured by the water quality probe, but data available for comparison is from 2020 water year only. Water quality data were collected using a YSI Pro-DSS Multi-parameter meter. The meter was calibrated prior to each data collection event. Monitoring ceased at the beginning of September or when vernal pools became completely dry, whichever came first. These sampling methods are consistent with the PBO (USFWS, 2017) and the Wetland Plan (Burleson, 2006).

Water quality data were collected at mid-pool and mid-depth in all vernal pools. The staff gauge is generally located at the deepest point of the vernal pool, and mid-pool was therefore considered the location of the staff gauge, regardless of the variable vernal pool perimeter. Mid-depth was dependent on the depth of the vernal pool during the time of monitoring. Recommendations to collect mid-pool, mid-depth data necessitated entry into the vernal pool. All the vernal pools monitored in the 2022 water year were deemed safe to enter by the Base Realignment and Closure (BRAC) office except for pond 75, which was accessed with an UXO escort.

During water quality surveys care was taken to ensure the probe was completely submerged in water, and when that wasn't possible due to insufficient depth of water in the vernal pool, this was noted. The pH, temperature, turbidity, dissolved oxygen, and conductivity were logged and recorded on the field data sheet. The dissolved oxygen probe within the Pro DSS Multi-parameter meter utilizes optical luminescence sensor that has no flow dependence and does not require the probe to be vertically bobbed up and down in the water column during measurement.

Inundated surface area was recorded with a Trimble® Geoexplorer 6000 ® GPS unit. The perimeter only included ponded areas that had surface hydrological connectivity to the ponded area at the staff gauge. Peripheral ponding was observed and documented but was not mapped. Areas were calculated from the resultant shape files using ArcGIS (Esri, 2018). Depths of vernal pools were recorded from the installed staff gauges. Photographs of each vernal pool were taken at established photo points and at locations that allowed for recording water levels at the staff gauge.

Daily precipitation values were obtained from the Monterey Peninsula Regional Airport (MPRA) meteorological tower, approximately 2 miles southwest of Site 39 on former Fort Ord, through the National Centers for Environmental Information portal (NDC NOAA, 2022). Normal rainfall was based on a 30-year average that at the end of each decade is moved forward another 10 years. Normal for the MPRA tower is defined as the mean precipitation from years 1991-2020.

3.2 Evaluation for Data Quality Objectives and Success Criteria

Data quality objectives (DQOs) and performance standards outlined in the Wetland Plan were used to measure successful wetland function following MEC remediation activities. DQOs can be summarized as:

- DQO 1: depth – average of 25 cm through March for CTS and an average of at least 10 cm for 18 consecutive days through May for fairy shrimp
- DQO 2: inundation – consistent with baseline and similar to reference vernal pool trends
- DQO 3: vegetation – similar hydrophytic vegetation as reference control wetlands
- DQO 4: water quality – adequate for the presence of CTS and/or fairy shrimp
- DQO 5: wildlife – consistent with baseline and similar to reference control wetland trends

This report focuses on hydrological conditions and inundation area performance standard, which was assessed using DQO 1 and DQO 2. The performance standard was assessed by evaluating if the vernal pools held a sufficient average depth of water appropriate for CTS and fairy shrimp for the duration of the breeding season, and if inundation of the vernal pools was consistent with observed inundation trends during baseline years and at reference vernal pools, given the precipitation volume and frequency. DQO 1 was also used to assess wildlife usage performance standard. Suitable CTS habitat was defined as a vernal pool that retains an average depth of at least 25 cm from the first rain event through March (Burleson, 2006). Suitable fairy shrimp habitat was defined as a vernal pool that retains an

average depth of 10 cm for 18 consecutive days through May. Wildlife usage performance standard was also evaluated for water quality, using DQO 4. Water quality measurements were compared to historical values as well as to values from other vernal pools because observed water quality parameters are variable due to the complex interactions between ambient air temperature, plant respiration rates, microbial community structure, and soil chemistry. Plant cover and species diversity performance standard was assessed using DQO 3, and wildlife usage was additionally assessed using DQO 5, both of which were analyzed in a separate report (Burleson, 2023).

In addition to DQOs outlined in the Wetland Plan, the PBO describes the following success criteria specifically for CTS and CCG (USFWS, 2017). Species reestablishment will be considered successful if, at the end of monitoring, each of the following is directly comparable to the conditions before the start of work:

1. Wetland function, as measured by the parameters of hydrologic conditions (inundation area and depth, pH, temperature, dissolved oxygen levels);
2. Wildlife usage, specifically CTS larval presence;
3. Plant cover and wetland plant species diversity and dominance; and
4. CCG abundance.

These four conditions were assessed in conjunction with the DQOs. Wetland function was assessed with DQO 1, DQO 2, and DQO 4, which are described in this report. Wildlife usage was assessed with DQO 5. Plant cover and wetland plant species diversity and dominance, as well as Contra Costa goldfield abundance, were assessed with DQO 3.

Historic data for cumulative precipitation, physical characteristics, and water quality for all reference and post-remediation vernal pools were summarized by vernal pool. Inundated areas of vernal pools were mapped and compared to the inundations in previous years at remediated and reference vernal pools. A historic outline of inundation and water quality compared to the precipitation year is provided in Appendix B.

4 RESULTS

Hydrology surveys were conducted monthly from October through March when water was present. Measurable ponding was observed in only six vernal pools monitored in the 2022 water year: ponds 5, 101 East East, 39, 41, 42, and 61 West. These vernal pools were inundated for a short period between November and February as a result of low cumulative precipitation in the 2022 water year (Figure 2-2).

Observed water quality measurements were similar to previous years for the five vernal pools that were inundated. Mean temperature was 12.2 °C in December, and 12.5 °C in January. Mean dissolved oxygen values was 8.5 milligrams per liter (mg/L) in December, and 10.2 (mg/L) in January. The mean pH value was 6.5 in December and 6.8 in January. Mean turbidity value was 88.8 FNU in December, and 8.2 FNU in January.

4.1 Pond 5

Pond 5 is a reference vernal pool that was monitored as a control for comparison to the remediated vernal pools. Depth of Pond 5 was monitored eight times during 2022 water year. Pond 5 was inundated

from mid December through beginning of March. Water quality parameters were measured once in mid January (Table 4-1 and Figure 4-1).

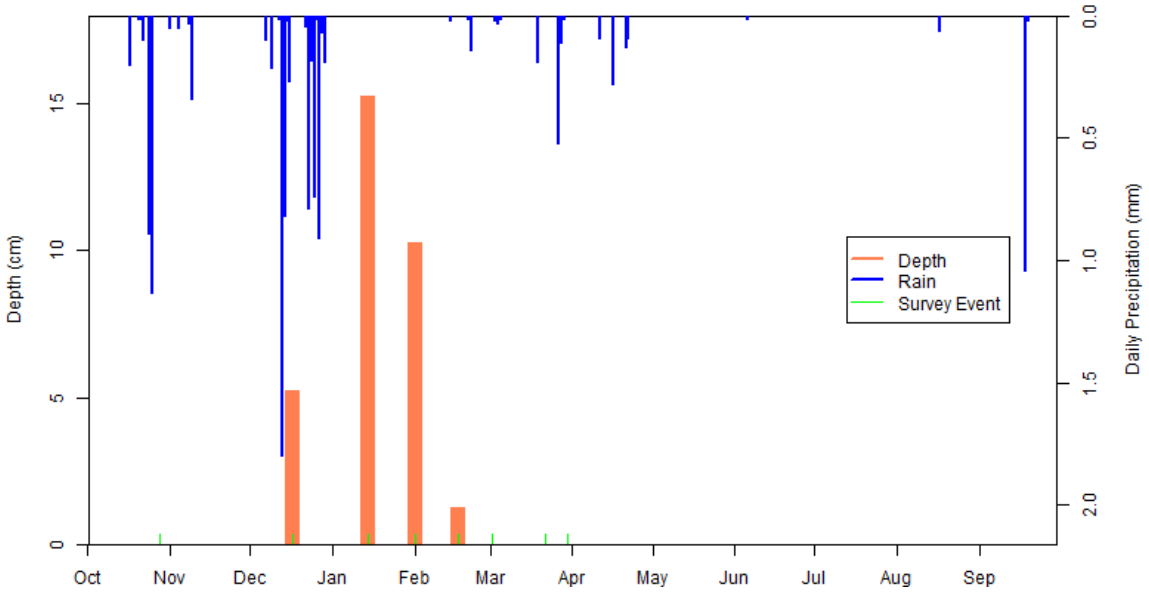


Figure 4-1. Pond 5 (Reference) Depth and Precipitation on the Former Fort Ord, 2022 Water Year

Table 4-1. Pond 5 (Reference) Hydrology Monitoring Results

Pond 5							
Date	Inundated Surface Area (acres)	Max Depth (cm)	Dissolved Oxygen (mg/L)	Temperature (C)	Turbidity (FNU)	pH	Conductivity (µs/cm)
2021-10-28	0	0					
2021-12-17^	0.5021	5	NS	NS	NS	NS	NS
2022-01-14	2.2563	15	10.26	13.2	2.38	6.44	484.2
2022-02-01	NS	10	NS	NS	NS	NS	NS
2022-02-17#	0.3719	1	NS	NS	NS	NS	NS
2022-03-02^	0	0					
2022-03-22	0	0					
2022-03-30	0	0					

NS = Not Surveyed

^Peripheral inundation present

#Pond too shallow for water quality probe

4.2 Pond 101 East (East)

Pond 101 East (East) is a reference vernal pool that was monitored as a control for comparison to the remediated vernal pools. Depth of Pond 101 East (East) was monitored six times during 2022 water

year. Pond 101 East (East) was briefly inundated from mid January to beginning of February, and water quality parameters were measured once in mid January (Table 4-2 and Figure 4-2).

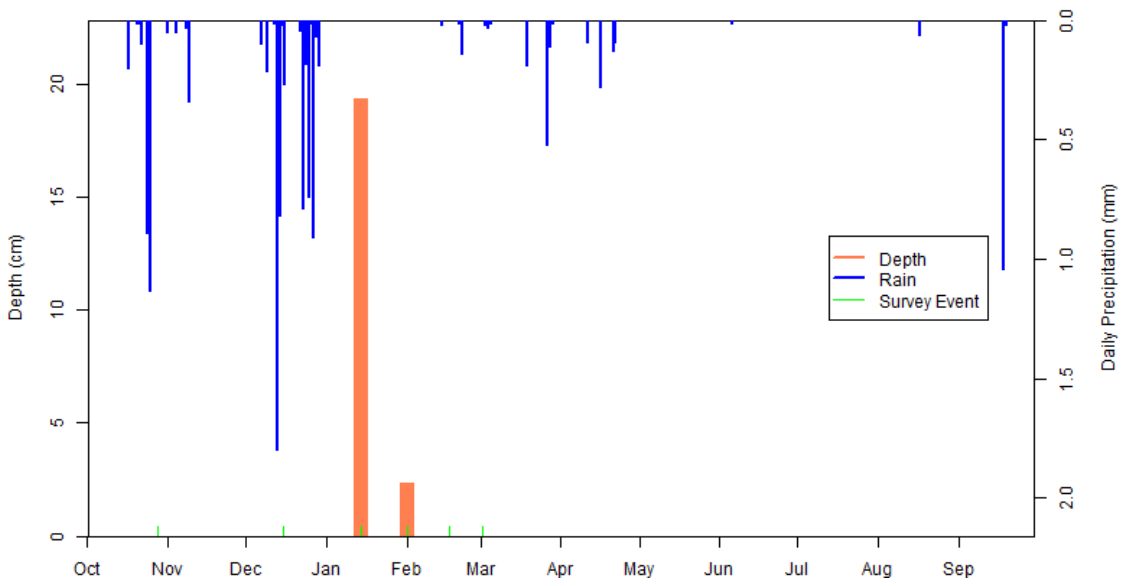


Figure 4-2. Pond 101 East (East) (Reference) Depth and Precipitation on Former Fort Ord, 2022 Water Year

Table 4-2. Pond 101 East (East) (Reference) Hydrology Monitoring Results

Pond 101EE							
Date	Inundated Surface Area (acres)	Max Depth (cm)	Dissolved Oxygen (mg/L)	Temperature (C)	Turbidity (FNU)	pH	Conductivity (µs/cm)
2021-10-28	0	0					
2021-12-15	0	0					
2022-01-14	0.2873	19	14.27	10.7	6.58	6.9	420.5
2022-02-01	NS	2	NS	NS	NS	NS	NS
2022-02-17	0	0					
2022-03-02	0	0					

NS = Not Surveyed

4.3 Pond 997

Pond 997 is a reference vernal pool that was monitored as a control for comparison to the remediated vernal pools. Depth of Pond 997 was monitored three times during 2022 water year. Pond 997 remained dry throughout the water year, thus the water quality parameters were not measured (Table 4-3 and Figure 4-3).

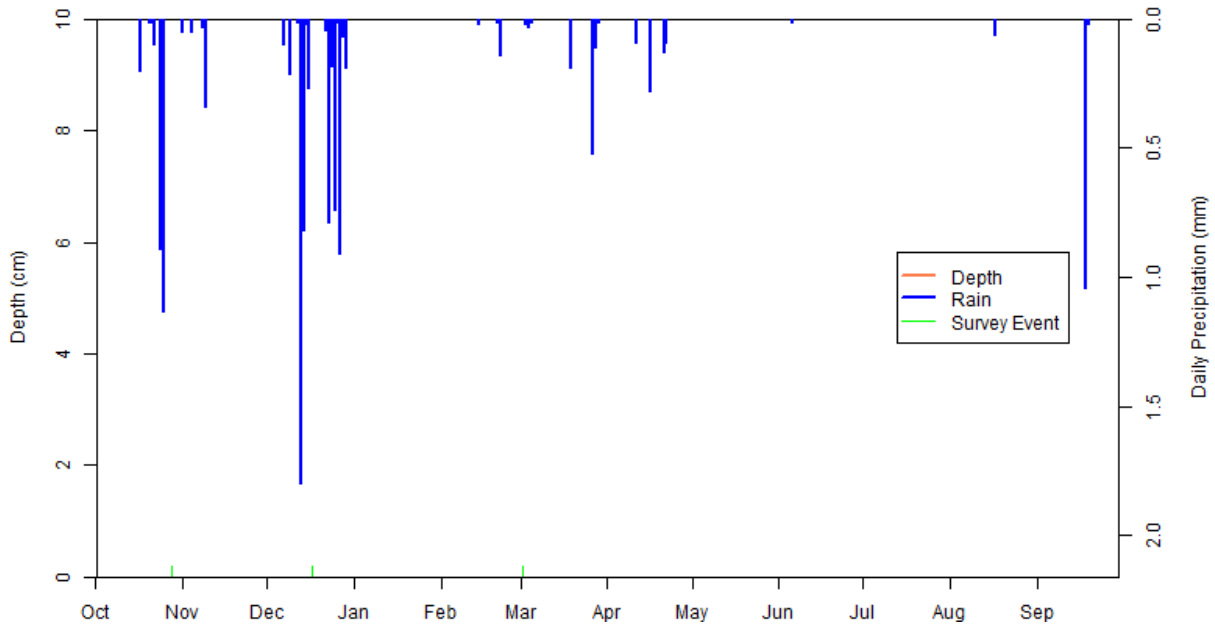


Figure 4-3. Pond 997 (Reference) Depth and Precipitation on Former Fort Ord, 2022 Water Year

Table 4-3. Pond 997 (Reference) Hydrology Monitoring Results

Pond 997							
Date	Inundated Surface Area (acres)	Max Depth (cm)	Dissolved Oxygen (mg/L)	Temperature (C)	Turbidity (FNU)	pH	Conductivity (µs/cm)
2021-10-28	0	0					
2021-12-17	0	0					
2022-03-02	0	0					

4.4 Pond 75

Pond 75 was in the second year of required baseline monitoring in the 2022 water year. Depth of Pond 75 was monitored two times during 2022 water year. Pond 75 remained dry throughout the water year; thus the water quality parameters were not measured (Table 4-4 and Figure 4-4).

Table 4-4. Pond 75 (Baseline) Hydrology Monitoring Results

Pond 75							
Date	**Inundated Surface Area (acres)**	**Max Depth (cm)**	**Dissolved Oxygen (mg/L)**	**Temperature (C)**	**Turbidity (FNU)**	**pH**	**Conductivity (µs/cm)**
2021-12-20	0	0					
2022-01-12	0	0					

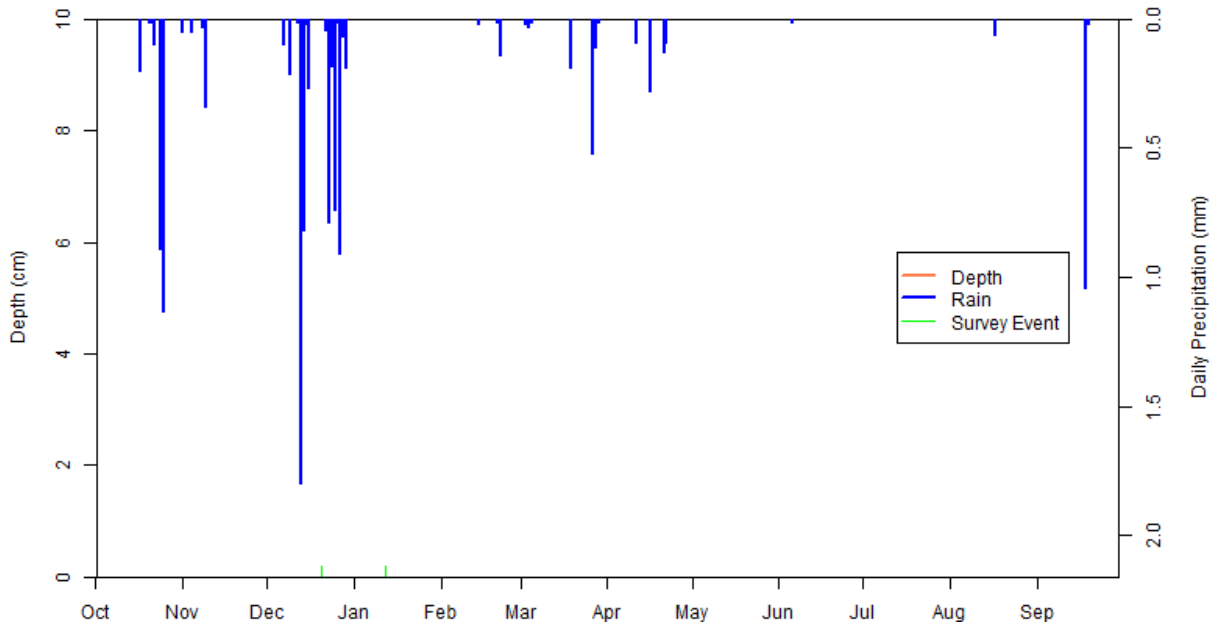


Figure 4-4. Pond 75 (Baseline) Depth and Precipitation on the Former Fort Ord, 2022 Water Year

4.5 Pond 16

Pond 16 was in year four for post-subsurface munitions remediation in the 2022 water year. Depth of Pond 16 was monitored three times during 2022 water year. Pond 16 remained dry throughout the water year, thus the water quality parameters were not measured (Table 4-5 and Figure 4-5).

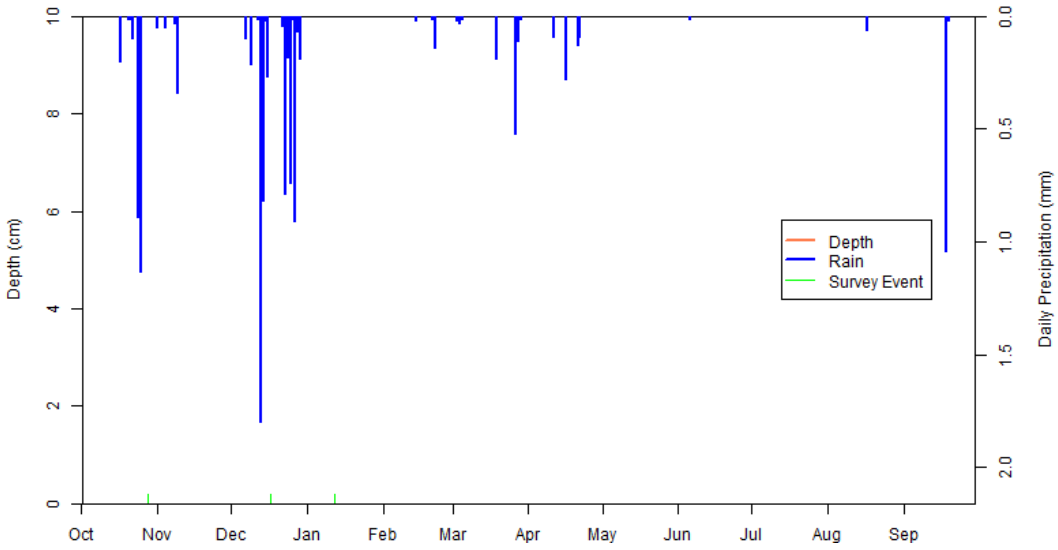


Figure 4-5. Pond 16 (Year 4 Post-Subsurface Munitions Remediation) Depth and Precipitation on the Former Fort Ord, 2022 Water Year

Table 4-5. Pond 16 (Year 4 Post-Subsurface Munitions Remediation) Hydrology Monitoring Results

Pond 16							
Date	**Inundated Surface Area (acres)**	**Max Depth (cm)**	**Dissolved Oxygen (mg/L)**	**Temperature (C)**	**Turbidity (FNU)**	**pH**	**Conductivity (µs/cm)**
2021-01-07	0	0					
2021-02-02	0	0					
2021-02-12	0	0					

4.6 Pond 39

Pond 39 was in year 4 of post-subsurface munitions remediation in the 2022 water year. Depth of Pond 39 was monitored eight times and water quality parameters were measured twice. Pond 39 was inundated from late October to early February (Table 4-6 and Figure 4-6).

Table 4-6. Pond 39 (Year 4 Post-Subsurface Munitions Remediation) Hydrology Monitoring Results

Pond 39							
Date	Inundated Surface Area (acres)	Max Depth (cm)	Dissolved Oxygen (mg/L)	Temperature (C)	Turbidity (FNU)	pH	Conductivity (µs/cm)
2021-10-28	NS	18	NS	NS	NS	NS	NS
2021-11-17	NS	18	NS	NS	NS	NS	NS
2021-12-15^	0.0089	43	7.32	9.2	62.31	6.49	41.1
2022-01-12^	0.0045	33	7.46	10.2	26.96	6.51	71.5
2022-02-01	NS	14	NS	NS	NS	NS	NS
2022-02-17	0	0					
2022-03-02	0	0					
2022-03-30	0	0					

NS = Not Surveyed

^Peripheral inundation present

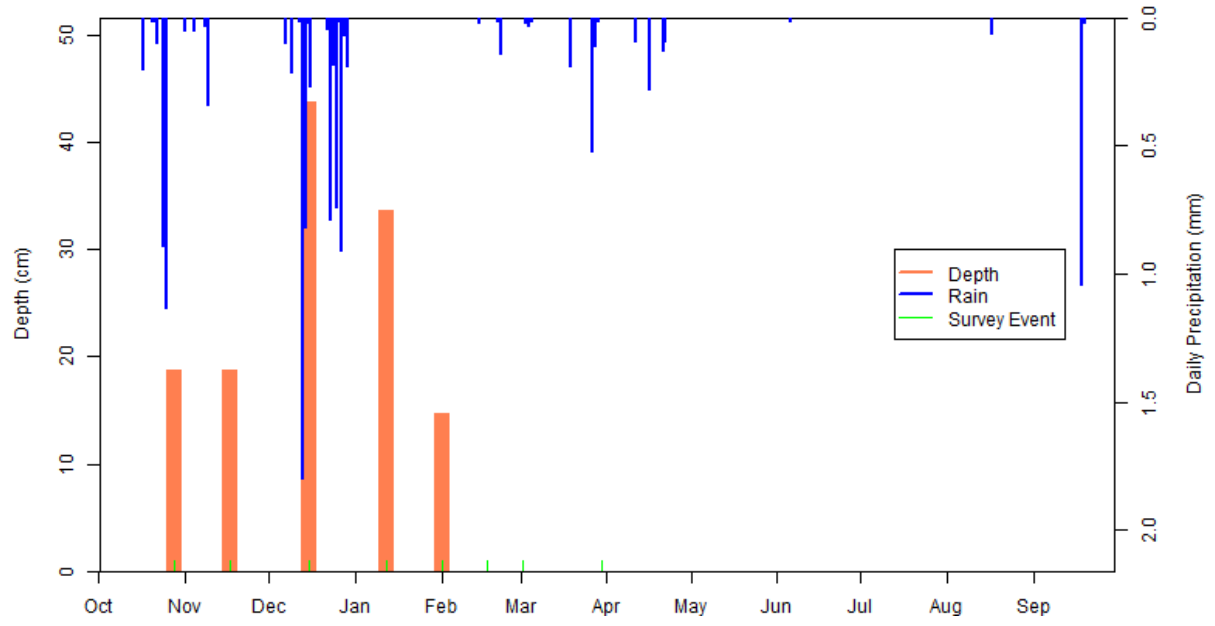


Figure 4-6. Pond 39 (Year 4 Post-Subsurface Munitions Remediation) Depth and Precipitation on the Former Fort Ord, 2022 Water Year

4.7 Pond 40 South

Pond 40 South was in year 4 of post-subsurface munitions remediation in the 2022 water year. Depth of Pond 40 South was monitored four times. Pond 40 South remained dry throughout the water year; thus measurements of the water quality parameters were not taken (Table 4-7 and Figure 4-7).

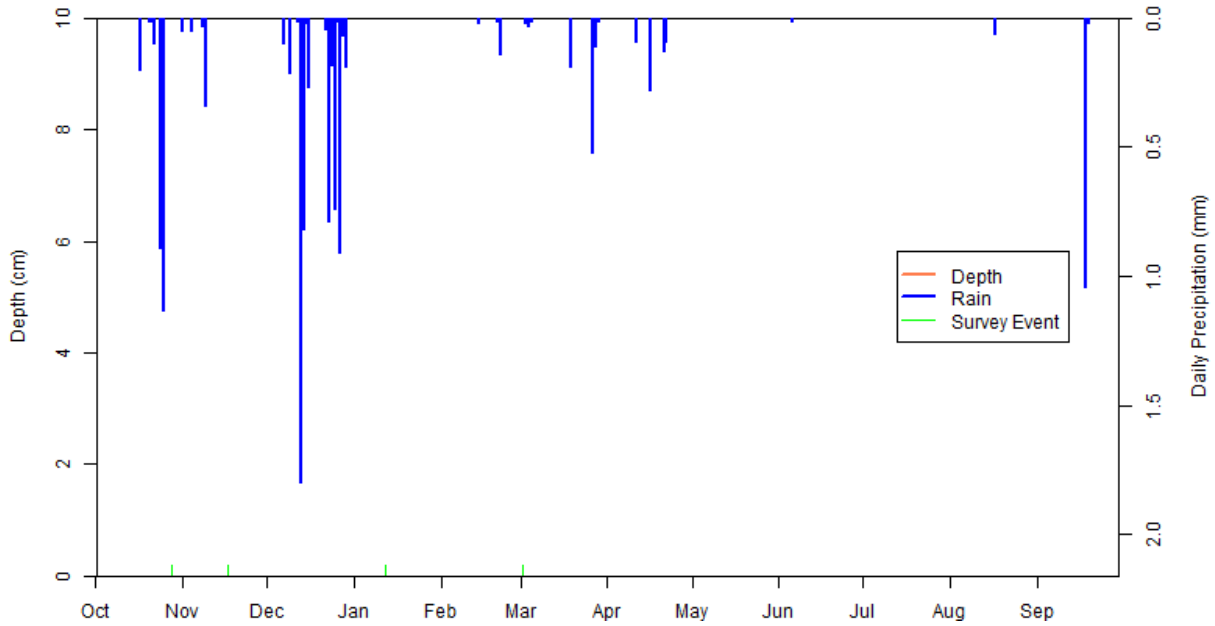


Figure 4-7. Pond 40 South (Year 4 Post-Subsurface Munitions Remediation) Depth and Precipitation on the Former Fort Ord, 2022 Water Year

Table 4-7. Pond 40 South (Year 4 Post-Subsurface Munitions Remediation) Hydrology Monitoring Results

Pond 40 South							
Date	Inundated Surface Area (acres)	Max Depth (cm)	Dissolved Oxygen (mg/L)	Temperature (C)	Turbidity (FNU)	pH	Conductivity (µs/cm)
2021-10-28	0	0					
2021-11-17	0	0					
2022-01-12	0	0					
2022-03-02	0	0					

NS = Not Surveyed

4.8 Pond 41

Pond 41, a post-subsurface munitions remediation vernal pool, was in year 4 of monitoring in the 2022 water year. Depth of Pond 41 was monitored six times during 2022 water year. Pond 41 was briefly inundated in January, and measurements of the water quality parameters were taken once (Table 4-8 and Figure 4-8).

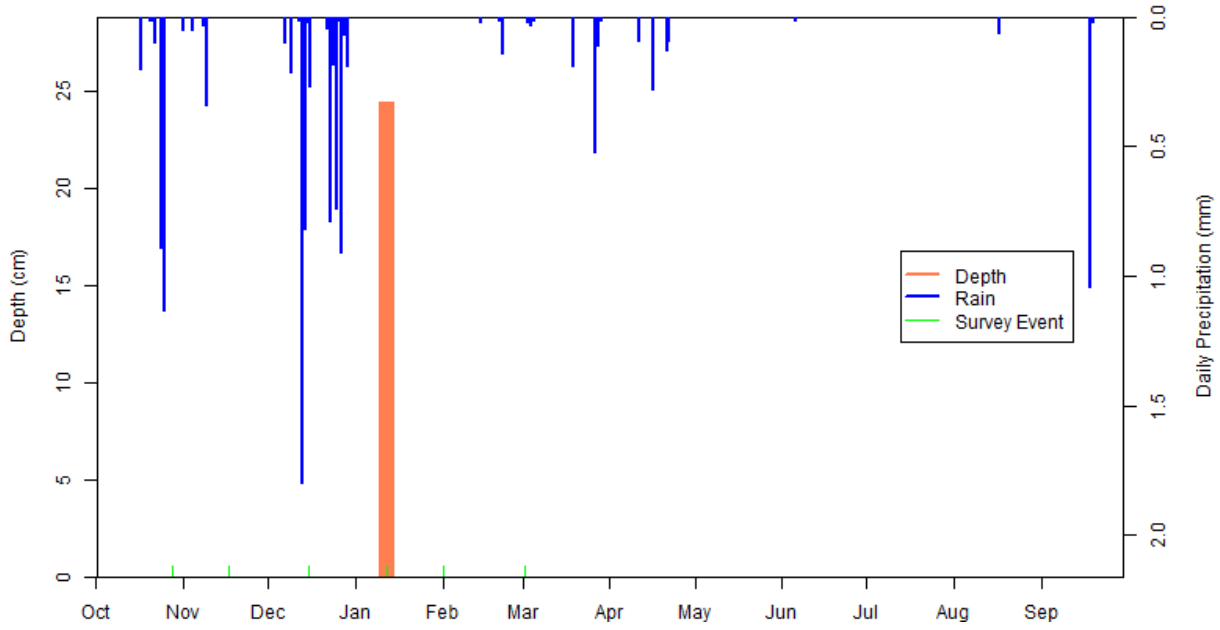


Figure 4-8. Pond 41 (Year 4 Post-Subsurface Munitions Remediation) Depth and Precipitation on the Former Fort Ord, 2022 Water Year

Table 4-8. Pond 41 (Year 4 Post-Subsurface Munitions Remediation) Hydrology Monitoring Results

Pond 41							
Date	Inundated Surface Area (acres)	Max Depth (cm)	Dissolved Oxygen (mg/L)	Temperature (C)	Turbidity (FNU)	pH	Conductivity (µs/cm)
2021-10-28	0	0					
2021-11-17	0	0					
2021-12-15	0	0					
2022-01-12^	0.0068	24	9.67	14.9	1.69	7.15	290.3
2022-02-01	0	0					
2022-03-02	0	0					

^Peripheral inundation present

4.9 Pond 42

Pond 42 was in year 4 for post-subsurface munitions remediation in the 2022 water year. Depth of Pond 42 was monitored six times and water quality parameters were measured once. Pond 42 was briefly inundated in December with peripheral inundation still present in January (Table 4-9 and Figure 4-9).

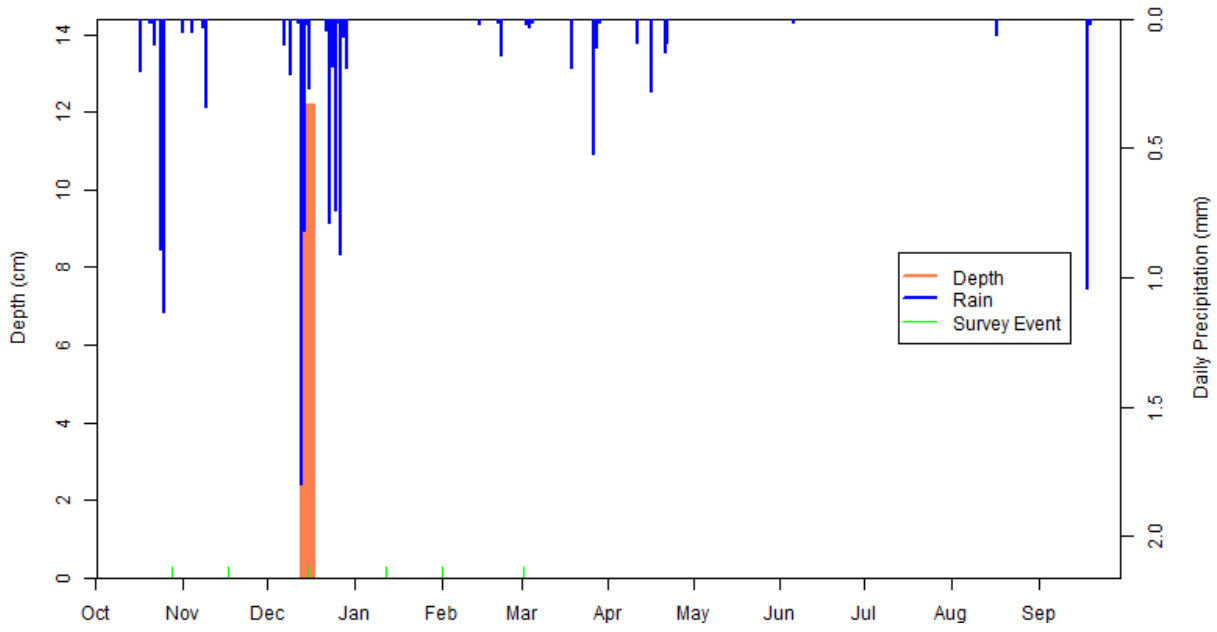


Figure 4-9. Pond 42 (Year 4 Post-Subsurface Munitions Remediation) Depth and Precipitation on the Former Fort Ord, 2022 Water Year

Table 4-9. Pond 42 (Year 4 Post-Subsurface Munitions Remediation) Hydrology Monitoring Results

Pond 42							
Date	Inundated Surface Area (acres)	Max Depth (cm)	Dissolved Oxygen (mg/L)	Temperature (C)	Turbidity (FNU)	pH	Conductivity (µs/cm)
2021-10-28	0	0					
2021-11-17	0	0					
2021-12-15^¤	0.0123	12	7.53	14.3	167.36	6.35	129.3
2022-01-12^	0	0					
2022-02-01	0	0					
2022-03-02	0	0					

^Peripheral inundation present
¤Probe not fully submerged

4.10 Pond 61

Pond 61 was in year 4 of monitoring for post-subsurface munitions remediation in the 2022 water year. Pond 61 consists of several depressions that fill with rain water at different rates. Per recommendations in the 2020 hydrology report (Chenega 2021) a staff gauge was installed in the western portion of Pond 61 and readings for the eastern and western portions were recorded separately. Pond 61 West was inundated from mid December to mid February, while Pond 61 East was dry throughout the water year (Table 4-10 and Figure 4-10). Water quality parameters were measured twice at Pond 61 West.

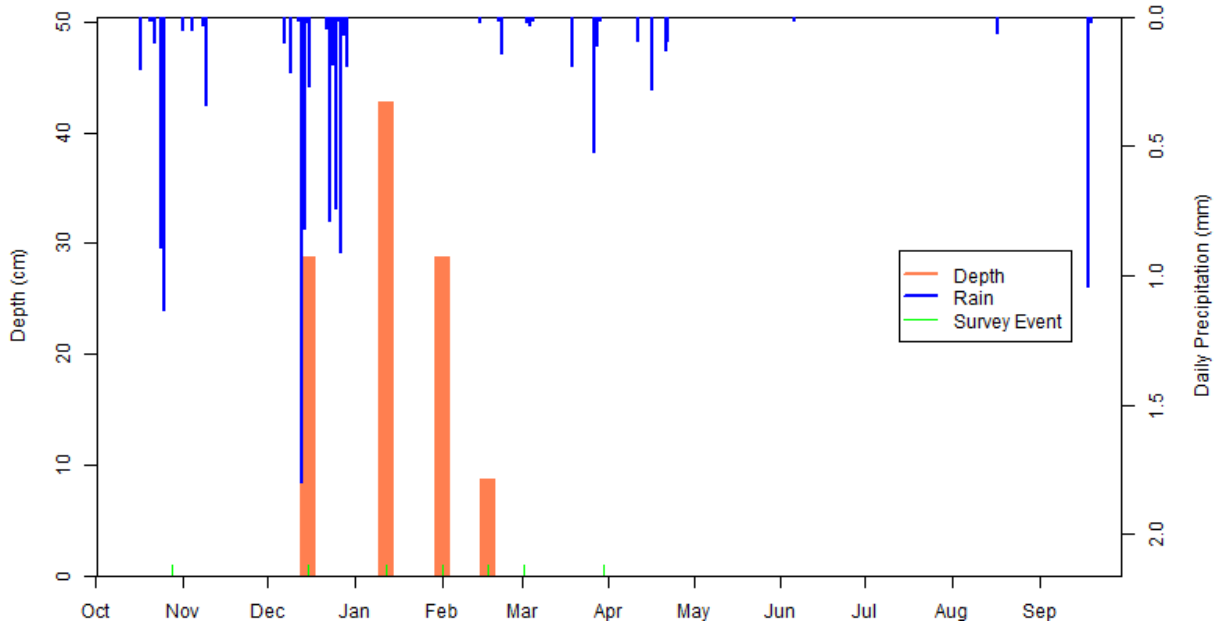


Figure 4-10. Pond 61 West (Year 4 Post-Subsurface Munitions Remediation) Depth and Precipitation on the Former Fort Ord, 2022 Water Year

Table 4-10. Pond 61 (Year 4 Post-Subsurface Munitions Remediation) Hydrology Monitoring Results

Date	Inundated Surface Area (acres)	Max Depth (cm)	Dissolved Oxygen (mg/L)	Temperature (C)	Turbidity (FNU)	pH	Conductivity (µs/cm)
Pond 61 West							
2021-10-28	0	0					
2021-12-15^	0.0108	28	10.61	13	36.83	6.71	204.9
2022-01-12^	0.0287	42	9.52	13.4	3.17	6.84	191.1
2022-02-01	NS	28	NS	NS	NS	NS	NS
2022-02-17#	5e-04	8	NS	NS	NS	NS	NS
2022-03-02	0	0					
2022-03-30	0	0					
Pond 61 East							
2021-10-28	0	0					
2021-12-15	0	0					
2022-01-12^	0	0					

NS = Not Surveyed
^Peripheral inundation present; #Pond too shallow for water quality probe

5 DISCUSSION

Vernal pools were assessed for successful wetland function following MEC remediation activities using data quality objectives (DQOs) and performance standards outlined in the Wetland Plan (Burleson, 2006). This report addresses the hydrology DQOs that are summarized below:

- DQO 1: depth – average of 25 cm through March for CTS and at least 10 cm through May for fairy shrimp
- DQO 2: inundation – consistent with baseline and similar to reference vernal pool trends
- DQO 4: water quality – adequate for the presence of CTS and/or fairy shrimp

Depth of vernal pools and the area and the temporal length of inundation largely depend on the amount and frequency of precipitation, and the geomorphic features such as slope, extent of the vernal pool basin, size of its watershed, the underlying soil types and their geologic sources. The vernal pools on the former Fort Ord vary greatly based on their individual basin size and shape. Figure 5-1 compares the historical depth vs inundation area across all vernal pools monitored in the 2022 water year.

Following initial inundation, vernal pools with large and shallow basins tend to increase rapidly in inundation area with relatively small corresponding increases in depth. Once the inundation area in these vernal pools reaches the edge of the basin, there is a steep increase in depth with only modest increases in inundation area. Ponds 5 and 101 East (East) are good examples of large and shallow vernal pools (Figure 5-1). On the opposite end of the spectrum there are vernal pools that have small and steep basins. These vernal pools increase rapidly in depth following initial inundation as is demonstrated by

Pond 39 (Figure 5-1). Thus, assessments of wetland DQOs must be made in the context of combinations of basin extent (large vs small) and basin slope (shallow vs steep) as the main drivers of vernal pool hydroperiods in any given precipitation pattern. Discussions in the following sections address DQOs for each pond individually and makes comparisons to other vernal pools and water years within the context described above.

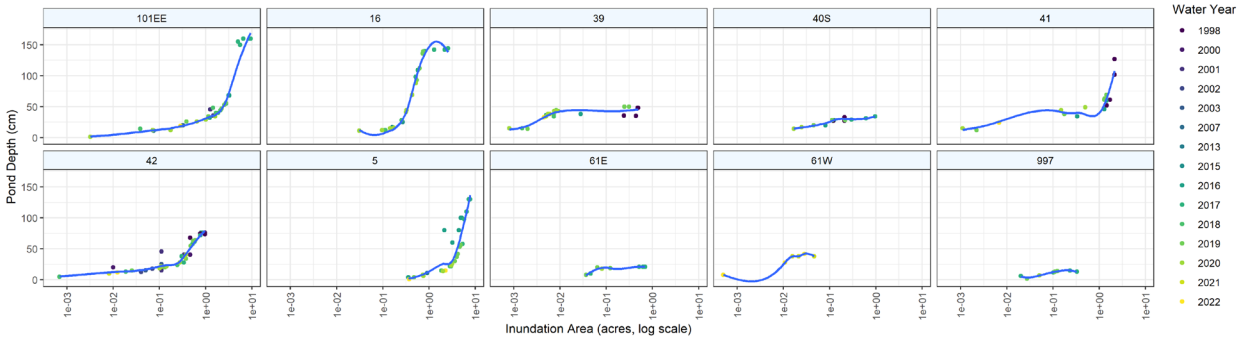


Figure 5-1. Plot of Historical Depth vs Inundation Area data going back to water year 1998 for all ponds surveyed in the 2022 water year except for pond 75, which was surveyed for the second time but was not inundated and has no depth data.

Water quality parameters for pH, temperature, dissolved oxygen, turbidity, and conductivity were measured approximately once a month in the inundated vernal pools that had sufficient depth of water. Water quality parameters can vary among vernal pools and within individual vernal pools between months and years, depending on amount and frequency of precipitation, length of inundation, depth, ambient temperature, amount of vegetation within the vernal pool, presence of wildlife, and general weather conditions. Typically, pH of vernal pools on former Fort Ord tends to be slightly acidic but can range to slightly alkaline (Figure 5-2). Water temperature tends to range from approximately 10° C in the winter months to approximately 30° C in late spring and early summer, as ambient temperature increases and vernal pools become shallower (Figure 5-3). Turbidity can be highly variable with amount and frequency of precipitation likely having a large effect (Figure 5-4). Dissolved oxygen generally varies from 10 mg/L to single digits, but values close to 25 mg/L have been recorded. Dissolved oxygen tends to decrease from the initial inundation of a vernal pool to when it dries out (Figure 5-5). Since water quality parameters can be variable, their assessment was conducted for each vernal pool by comparing them to their historic values, reference vernal pools, and other vernal pools with an objective of spotting any anomalous trends. Single measurements of water quality parameters that were out of range were noted, but occasional discrepancies are to be expected due to a variety of variables noted above. This was the second year water quality parameters were measured in Pond 61 West which are shown separately from Pond 61 East (Figures 5-2 to 5-5). Pond 61 has historically only been surveyed in the eastern portion of the vernal pool.

During 2022 water year, measured pH values were within historical ranges. Due to short inundation period for the vernal pools that held water, no trends in pH values have been spotted in the 2022 water year. Values of pH in Pond 61 West were slightly higher than in historical values of Pond 61 East, but not outside of expected range (Figure 5-2). Water temperature measurements were within historical ranges (Figure 5-3). Turbidity and dissolved oxygen values were also within historical ranges in all vernal pools (Figure 5-5).

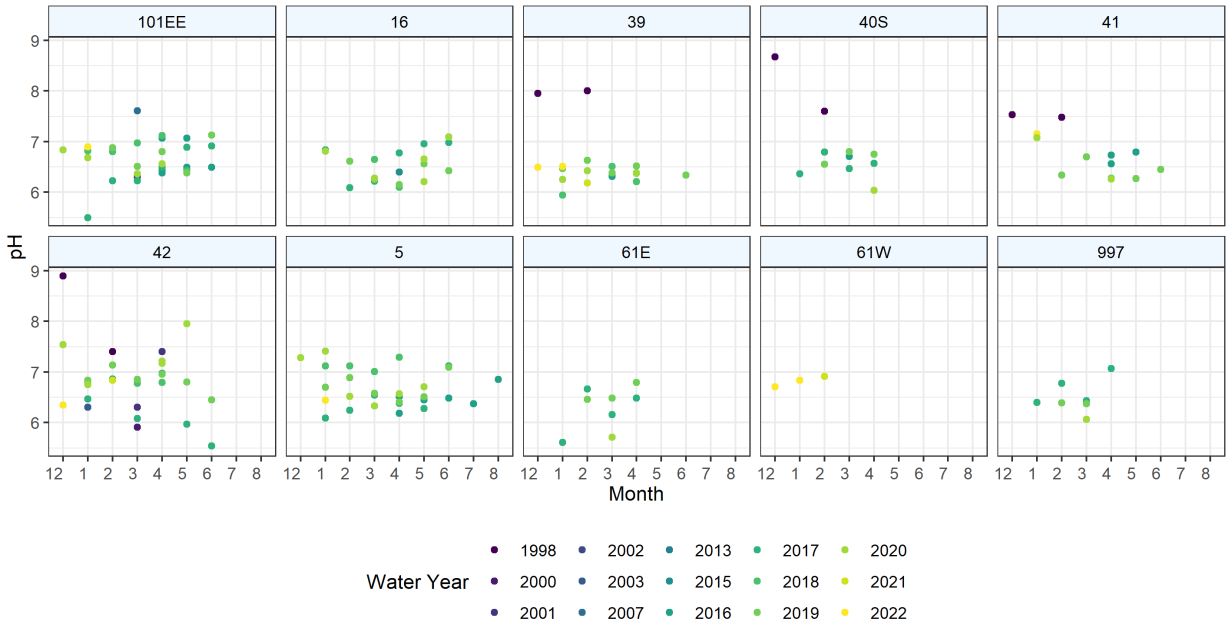


Figure 5-2. Plot of Historical pH Values going back to water year 1998 for all ponds surveyed in the 2022 water year. Water quality measurements were not taken at pond 75 due to lack of standing water.

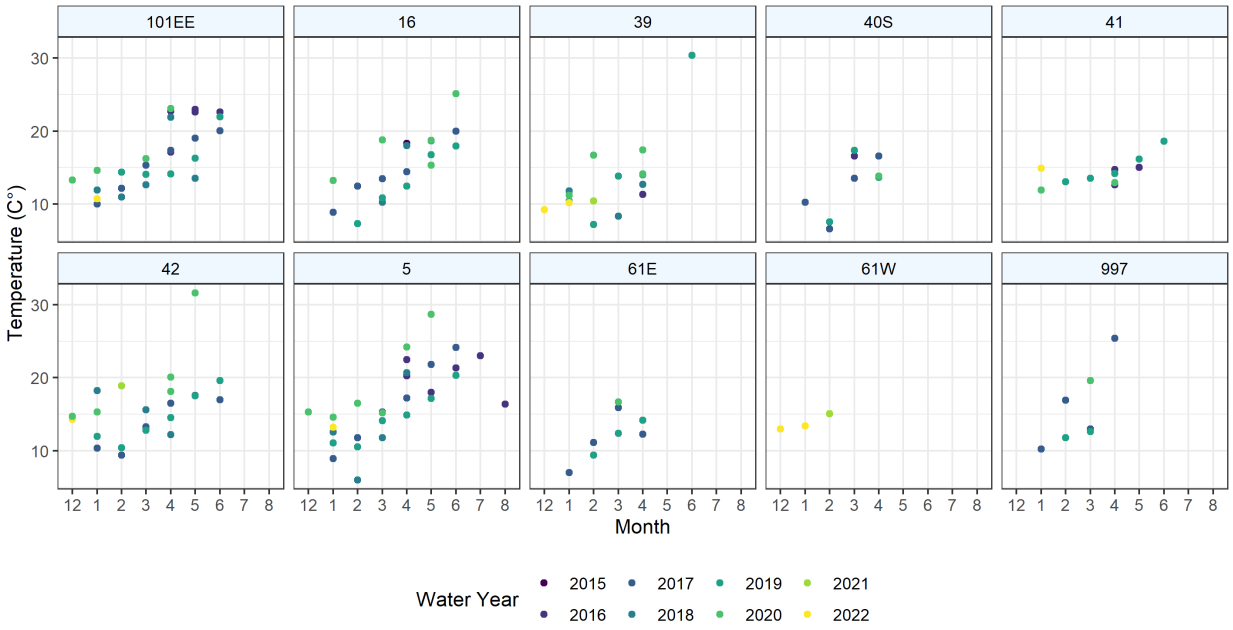


Figure 5-3. Plot of Historical Temperature Values going back to water year 1992 for all ponds surveyed in the 2022 water year. Water quality measurements were not taken at pond 75 due to lack of standing water.

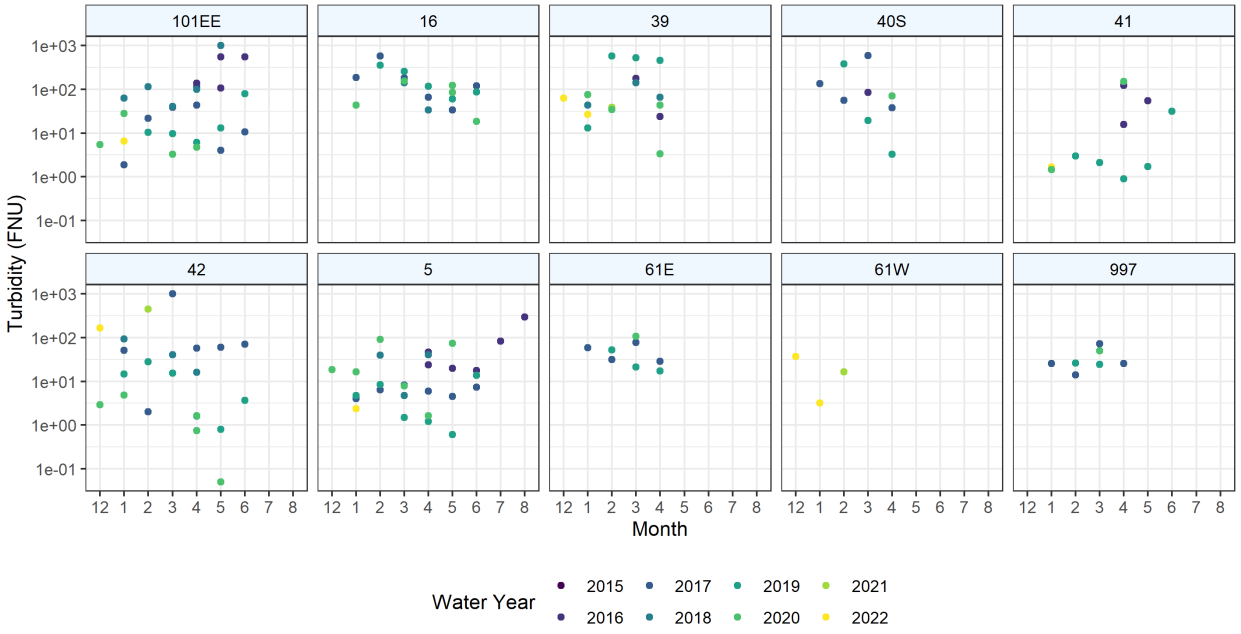


Figure 5-4. Plot of Historical Turbidity Values going back to water year 2015 for all ponds surveyed in the 2022 water year. Water quality measurements were not taken at pond 75 due to lack of standing water.

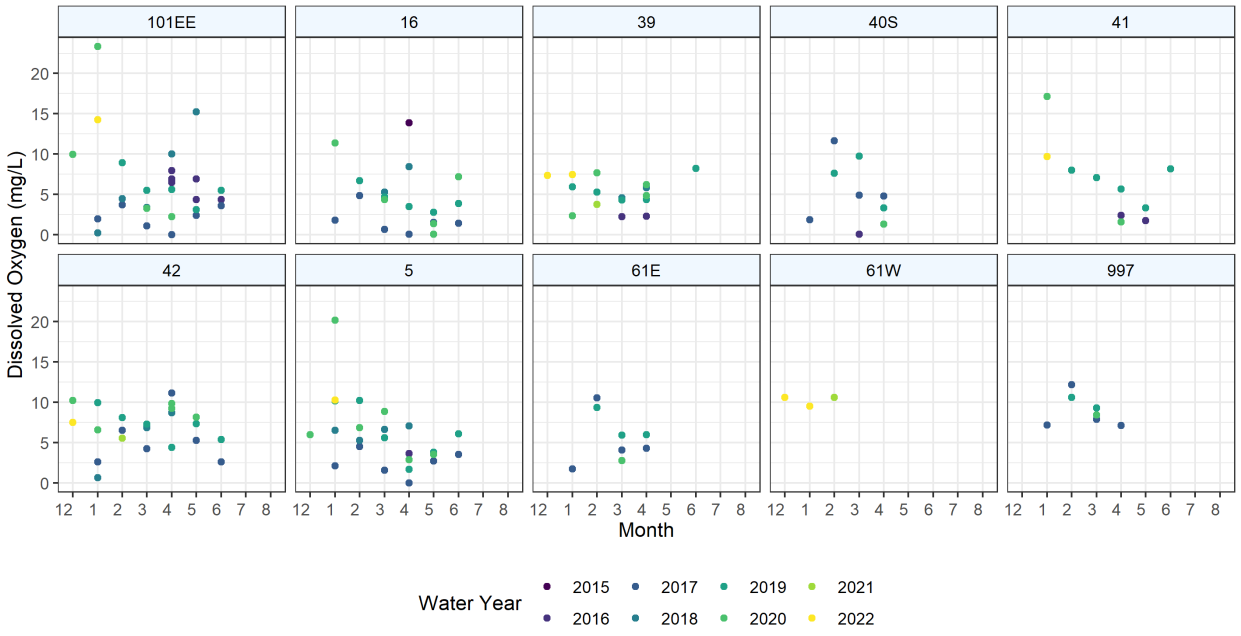


Figure 5-5. Plot of Historical Dissolved Oxygen Values going back to water year 2000 for all ponds surveyed in the 2022 water year. Water quality measurements were not taken at pond 75 due to lack of standing water.

5.1 Pond 5 – Reference

Pond 5 is situated within a large and shallow basin in the northeastern portion of the Fort Ord National Monument (Figure 2-4). Depth and inundation of Pond 5 have been monitored for 14 years (Figure 5-6).

Above normal water-years were 1995, 2016, 2017, and 2019. Close to normal water years were 1996 and 2020. All other monitoring was conducted either in a below normal water year, drought year, or a consecutive drought year.

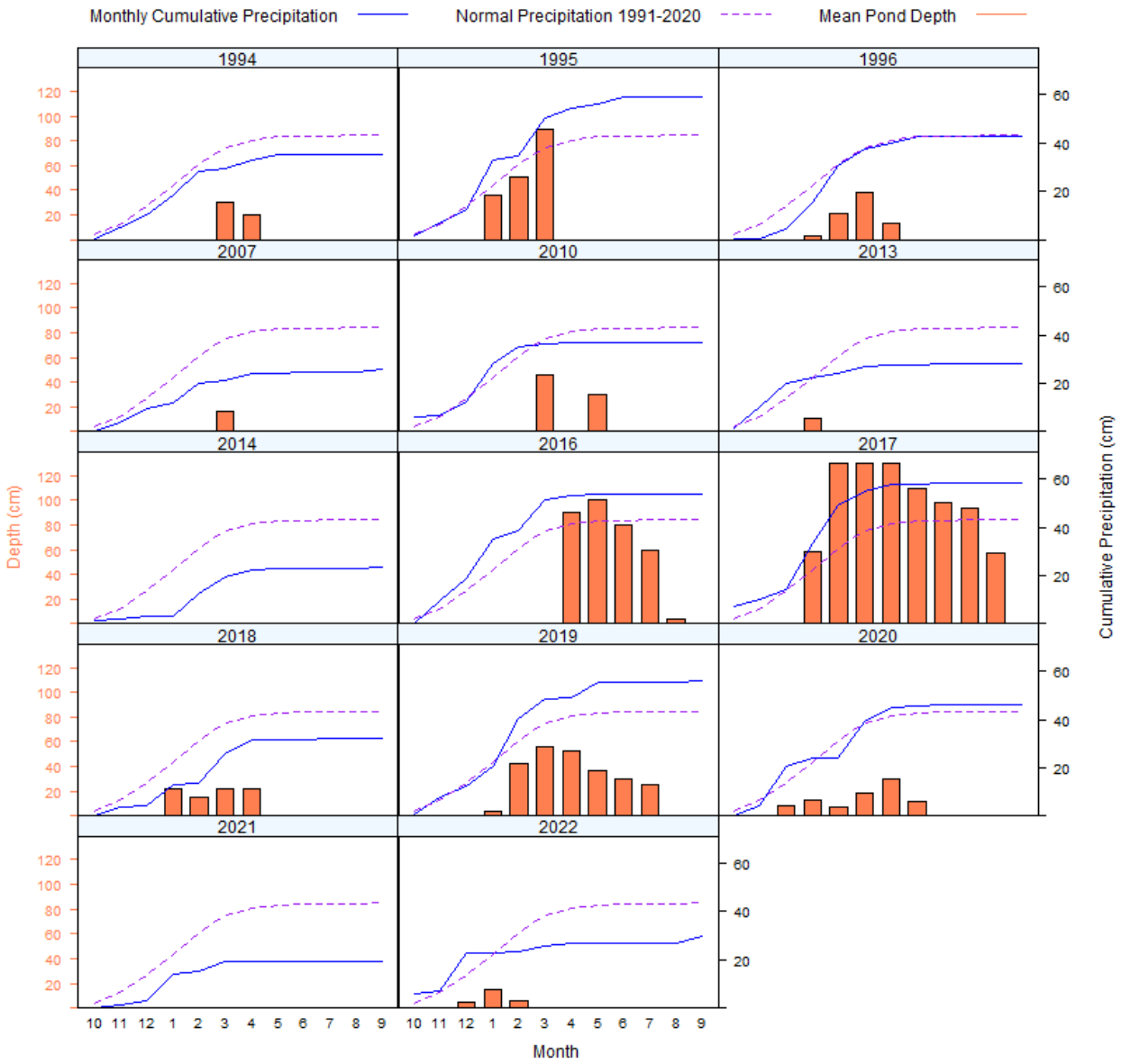


Figure 5-6. Pond 5 (Reference) Historical Mean Monthly Depths and Cumulative Monthly Precipitation Compared to the 30-Year Normal (mean 1991-2020) (NCDC NOAA, 2022)

Historically, Pond 5 remained completely dry in 2014 and 2021, and it reached a maximum depth of 130 cm and a maximum inundation of 7.8 acres in a consecutive above normal water year (2017; Figure 5-6). Pond 5 was inundated from mid December through March in the 2022 water year, reaching the maximum depth of 15 cm and maximum inundation area of 2.26 acres (Table 4-1). Water quality measurements were taken once and were within the ranges of previously recorded values (Figures 5-2 through 5-5, and Figure 5-9).

The 2022 water year was similar to 2013 when precipitation was above normal in the early part of the season, but cumulative precipitation was well below normal (Figure 5-6). Pond 5 was briefly inundated at the beginning of the 2022 water year as it was in 2013, demonstrating the dependency on steady precipitation for Pond 5 to stay inundated into spring and support CTS. It is important to note that during the fourteen years of monitoring of Pond 5 there were only two instances of Pond 5 remaining dry throughout the water year; 2014, which was a consecutive drought year, and 2021. Precipitation in both of those years was well below normal in the early part of the water year. The cumulative precipitation in the 2022 water year was also similar to 2007, and the maximum depth and inundation extent of Pond 5 in that year was similar to 2022 (Figure 5-6 and Figure 5-9). Generally, vernal pools don't become inundated until the sandy loam layer and the underlying clay layer become saturated. Once the clay layer becomes completely saturated, any additional input in water to the basin results in ponding. This suggests that there was not enough precipitation in 2021 and 2014 water years to completely saturate the sandy loam layer and/or the underlying clay layer.

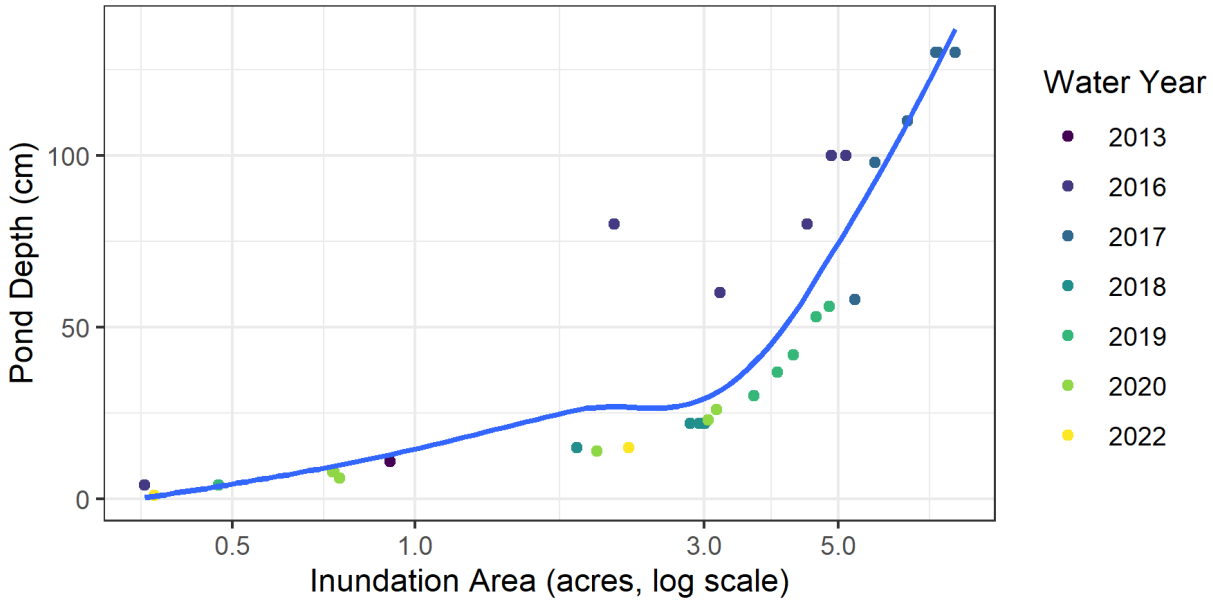


Figure 5-7. Pond 5 (Reference) Plot of Depth vs Inundation Area since 2013 Water Year

5.1.1 Data Quality Objective 1

Pond 5 did not meet the required average depths of 25 cm from the first rain event through March for CTS, nor the required 10 cm for 18 consecutive days through May for fairy shrimp. Pond 5 did not sustain sufficient depth for CTS (3.88 cm through March), but it did provide sufficient depth for fairy shrimp (10 cm from December 17 through February 1).

5.1.2 Data Quality Objective 2

Pond 5 was inundated from mid December through March in the 2022 water year which was historically consistent with low water years (Figure 5-6 and Figure 5-9).

5.1.3 Performance Standard: Hydrological Conditions and Inundation Area

Pond 5 did not sustain suitable habitat for CTS in the 2022 water year because it did not maintain the required average and minimum depth, but it did for fairy shrimp. Pond 5 is a reference vernal pool and was not required to meet the performance standards. Instead, the vernal pool was used as a control for comparison to the remediated vernal pools.

5.1.4 Data Quality Objective 4

Water quality parameters were taken once at Pond 5 in the 2022 water year and were within the historical ranges (Figures 5-2 through 5-5, and Figure 5-8)

5.1.5 Performance Standard: Wildlife Usage

Water quality was within the historical ranges and suitable for wildlife. Pond 5 is a reference vernal pool and was not required to meet the performance standards. Instead, the vernal pool was used as a control for comparison to the remediated vernal pools.

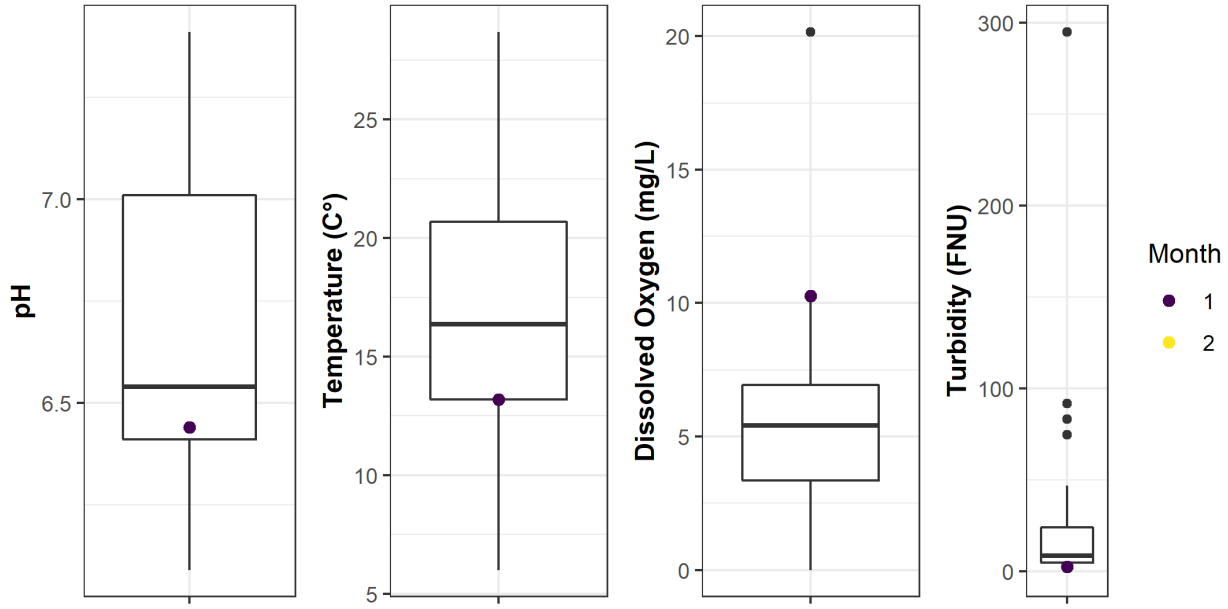


Figure 5-8. Pond 5 (Reference) historical and 2022 water quality measurements for pH, Temperature (C), Dissolved Oxygen (mg/L), and Turbidity (FNU). The line in the middle of the box represents the median, and the lower and upper ends of the box are the 25% and 75% quartiles respectively. The upper and lower whiskers represent largest and smallest values within 1.5 times above and below the size of the hinge, which is the 75% minus 25% quartiles, respectively. Small black dots represent values outside of those statistics.

Table 5-1. Success at Pond 5 (Reference) Based on Performance Standards and Applicable Data Quality Objectives

Performance Standard	Applicable DQO	Success
Hydrological Conditions & Inundation Area	DQO 1	Suitable for Comparison
	DQO 2	Suitable for Comparison
Wildlife Usage	DQO 1	Suitable for Comparison
	DQO 4	Suitable for Comparison

5.1.6 Conclusion

All Pond 5 metrics were suitable for comparison to the remediated vernal pools (Table 5-1).

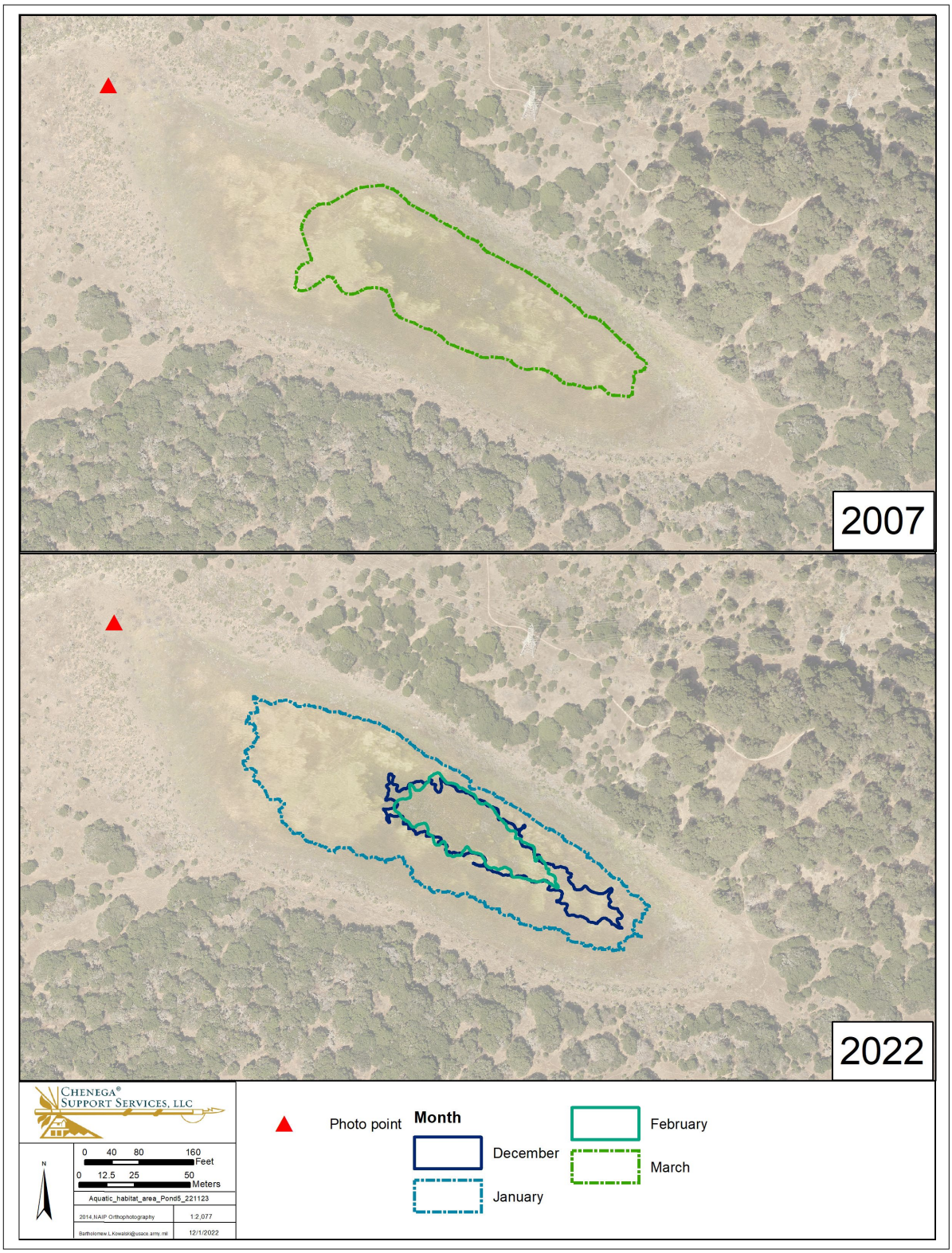


Figure 5-9. Pond 5 (Reference) inundations. The inundation extent was similar in 2007 and 2022 (both years had well below normal precipitation).

5.2 Pond 101 East (East) – Reference

Pond 101 East (East) is situated within a large and shallow basin in the northern tip of the Fort Ord National Monument (Figure 2-4). Depth and inundation of Pond 101 East (East) have been monitored for twelve years (Figure 5-10). Above normal water years were 2016, 2017, and 2019. Close to normal water years were 2001 and 2020. All other monitoring was conducted either in a below normal water year, drought year, or a consecutive drought year. In extreme above normal water years Pond 101 East (East) can become hydrologically connected to Pond 101 East (West), and even to Pond 101 West which occurred during an El Niño water year in 1998.

Historically, Pond 101 East (East) remained completely dry in a consecutive drought years (2014, 2015) and in 2021, and it reached a maximum depth of 160 cm and a maximum inundation of 9.38 acres in a consecutive above normal water year (2017, when it became hydrologically connected to Pond 101 East (West), Figure 5-10). Pond 101 East (East) was briefly inundated from mid January to beginning of February in the 2022 water year reaching the maximum depth of 19 cm and maximum inundation area of 0.29 acres (Table 4-2). Water quality measurements were taken once and were within the ranges of previously recorded values (Figures 5-2 through 5-5, and Figure 5-12).

The 2022 water year was similar to 2013 when precipitation was above normal in the early part of the season, but cumulative precipitation was well below normal (Figure 5-10). Pond 101 East (East) was briefly inundated at the beginning of the year in the 2022 water year as it was in 2013, demonstrating the dependency on steady precipitation for Pond 101 East (East) to stay inundated into spring and support CTS. It is important to note that during the twelve years of monitoring of Pond 101 East (East) there were only three instances of Pond 101 East (East) remaining dry throughout the water year; 2021, 2014, and 2015, the last two being consecutive drought years. Precipitation in 2014 and 2021 was well below normal in the early part of the water year, while it was above normal in 2015. The cumulative precipitation in the 2022 water year was also similar to 2007, and the maximum depth and inundation extent of Pond 101 East (East) was similar to 2022 (Figure 5-10 and Figure 5-13). Generally, vernal pools don't become inundated until the sandy loam layer and the underlying clay layer become saturated. Once the clay layer becomes completely saturated, any additional input in water to the basin results in ponding. This suggests that there was not enough precipitation in 2014, 2015, and 2021 water years to completely saturate the sandy loam layer and/or the underlying clay layer.

5.2.1 Data Quality Objective 1

Pond 101 East (East) did not meet the required average depths of 25 cm from the first rain event through March for CTS, nor the required 10 cm for 18 consecutive days through May for fairy shrimp. Pond 101 East (East) did not sustain sufficient depth for CTS (3.5 cm through March), nor for fairy shrimp (7 cm from January 14 through February 17).

5.2.2 Data Quality Objective 2

Pond 101 East (East) was inundated from mid January through early February in the 2022 water year which was historically consistent with low water years (Figure 5-10).

5.2.3 Performance Standard: Hydrological Conditions and Inundation Area

Pond 101 East (East) did not sustain suitable habitat for CTS nor for fairy shrimp in the 2022 water year because it did not maintain the required average and minimum depth. Pond 101 East (East) is a reference vernal pool and was not required to meet the performance standards. Instead, the vernal pool was used as a control for comparison to the remediated vernal pools.

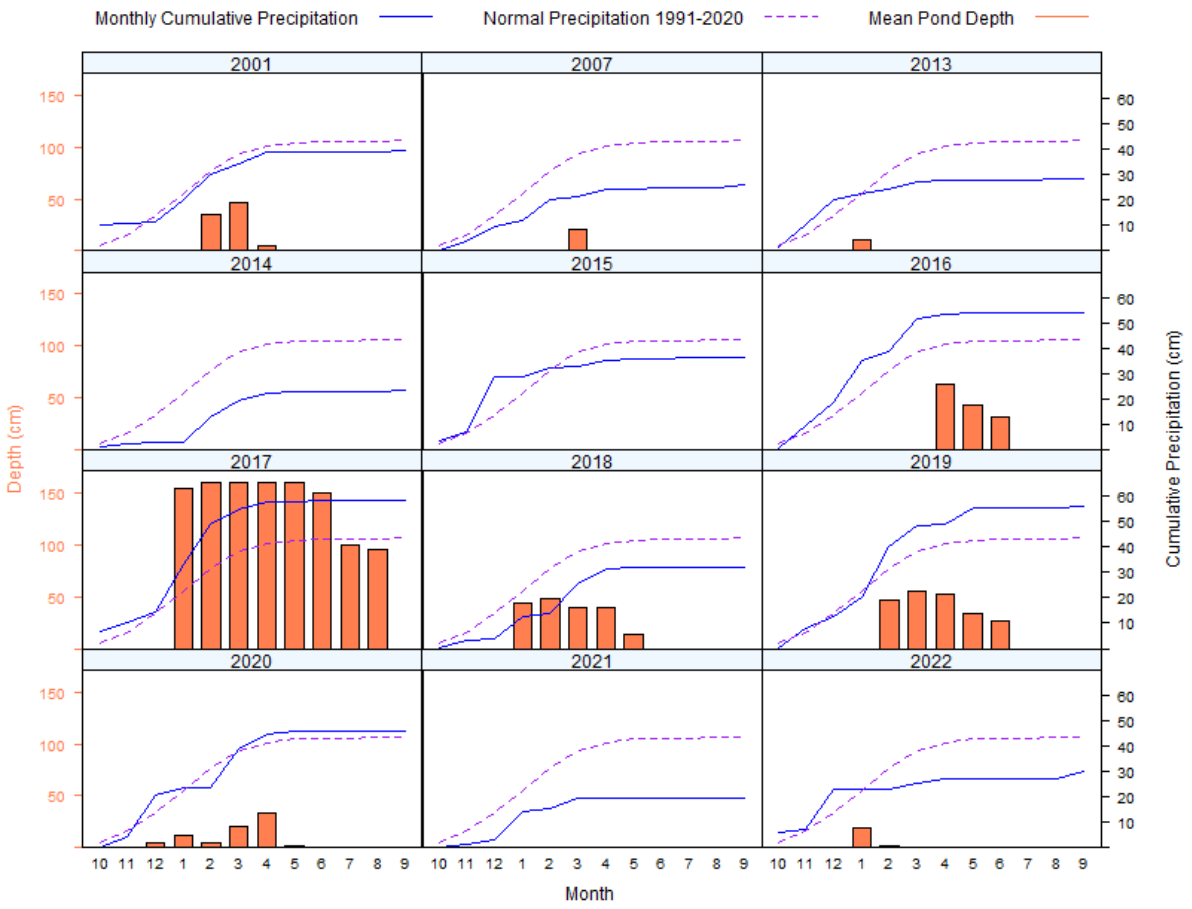


Figure 5-10. Pond 101 East (East) (Reference) Historical Mean Monthly Depths and Cumulative Monthly Precipitation Compared to the 30-Year Normal (mean 1991-2020) (NCDC NOAA, 2022)

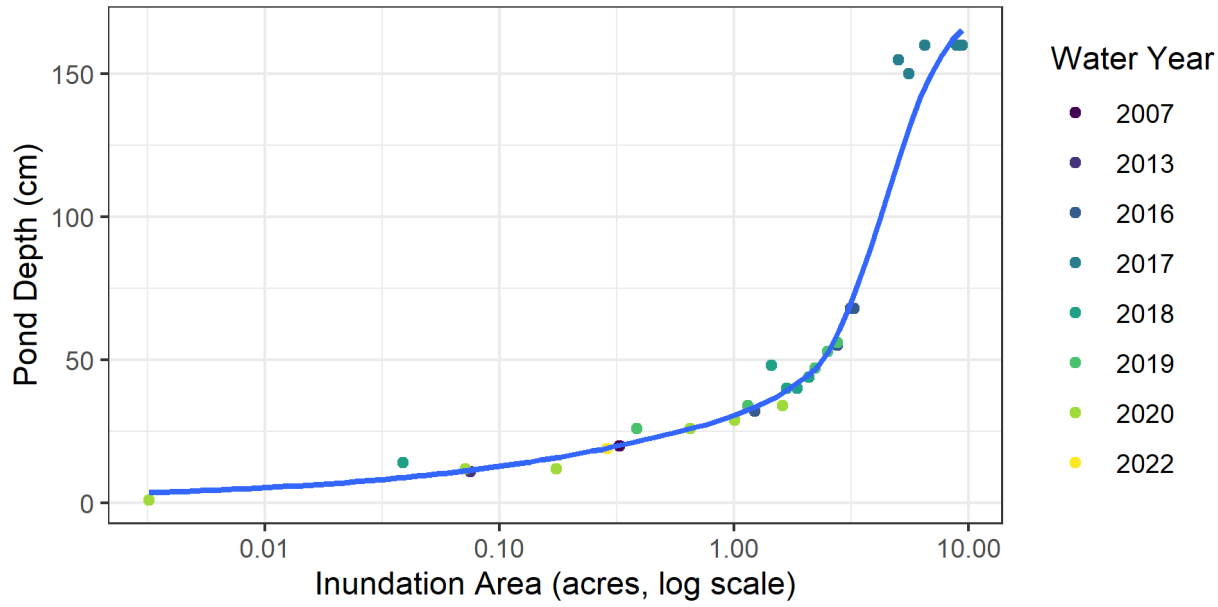


Figure 5-11. Pond 101 East (East) Plot of Depth vs Area since 2007 Water Year

5.2.4 Data Quality Objective 4

Water quality parameters were taken once at Pond 101 East (East) in the 2022 water year and were within the historical ranges (Figure 5-2 through 5-5, and Figure 5-12).

5.2.5 Performance Standard: Wildlife Usage

Water quality was within the historical ranges and suitable for wildlife. Pond 101 East (East) is a reference vernal pool and was not required to meet the performance standards. Instead, the vernal pool was used as a control for comparison to the remediated vernal pools.

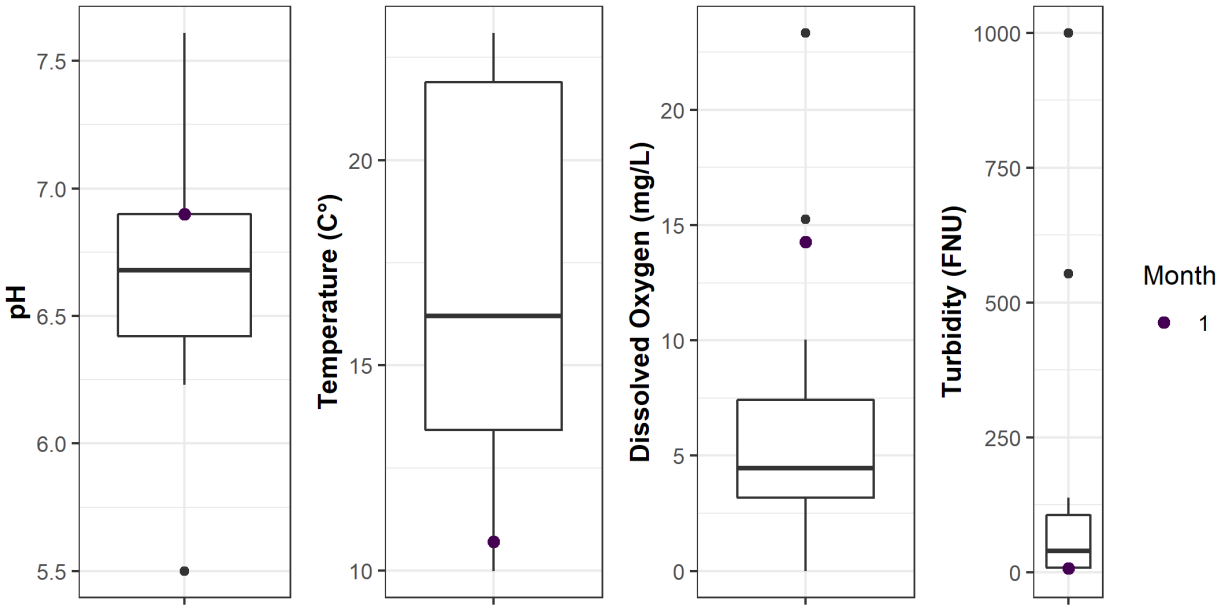


Figure 5-12. Pond 101 East (East) (Reference) historical and 2022 water quality measurements for pH, Temperature (C), Dissolved Oxygen (mg/L), and Turbidity (FNU). The line in the middle of the box represents the median, and the lower and upper ends of the box are the 25% and 75% quartiles respectively. The upper and lower whiskers represent largest and smallest values within 1.5 times above and below the size of the hinge, which is the 75% minus 25% quartiles, respectively. Small black dots represent values outside of those statistics.

Table 5-2. Success at Pond 101 East (East) (Reference) Based on Performance Standards and Applicable Data Quality Objectives

Performance Standard	Applicable DQO	Success
Hydrological Conditions & Inundation Area	DQO 1	Suitable for Comparison
	DQO 2	Suitable for Comparison
Wildlife Usage	DQO 1	Suitable for Comparison
	DQO 4	Suitable for Comparison

5.2.6 Conclusion

All Pond 101 East (East) metrics were suitable for comparison to the remediated vernal pools (Table 5-2).

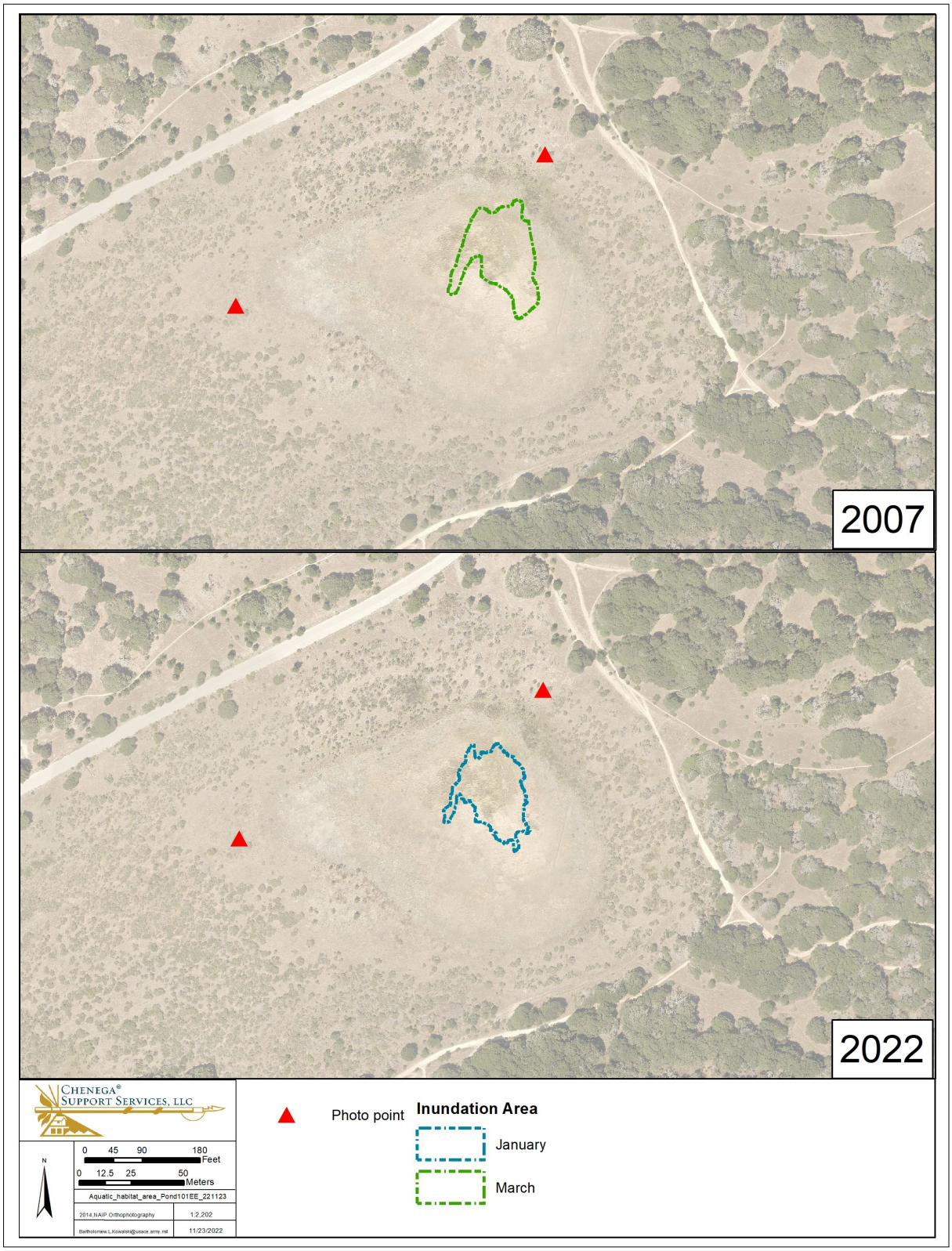


Figure 5-13. Pond 101 East (East) (Reference) inundations. The inundation extent was similar in 2007 and 2022 (both water years had well below normal precipitation)

5.3 Pond 997 – Reference

Pond 997 is situated within a small and shallow basin in the northern part of the Fort Ord National Monument (Figure 2-4). Although approximately 13% of vegetation within the Pond 997 watershed was masticated in 2017, pond 997 was monitored for six years as a reference vernal pool (Figure 5-14). The 2017 and 2019 water-years were above-normal, 2020 was close-to-normal, whereas 2018, 2021 and 2022 water years were below normal.

Historically, during the five years of monitoring, Pond 997 remained completely dry in a below normal water years in 2018 and 2021, and it reached a maximum depth of 15 cm and a maximum inundation of 0.33 acres in an above normal water year (2017; Figure 5-14). Pond 997 remained dry in the 2022 water year (Table 4-3 and Figure 4-3) and thus inundation extent, depth, and water quality measurements were not taken. Historical values are presented in Figures 5-14 to 5-17.

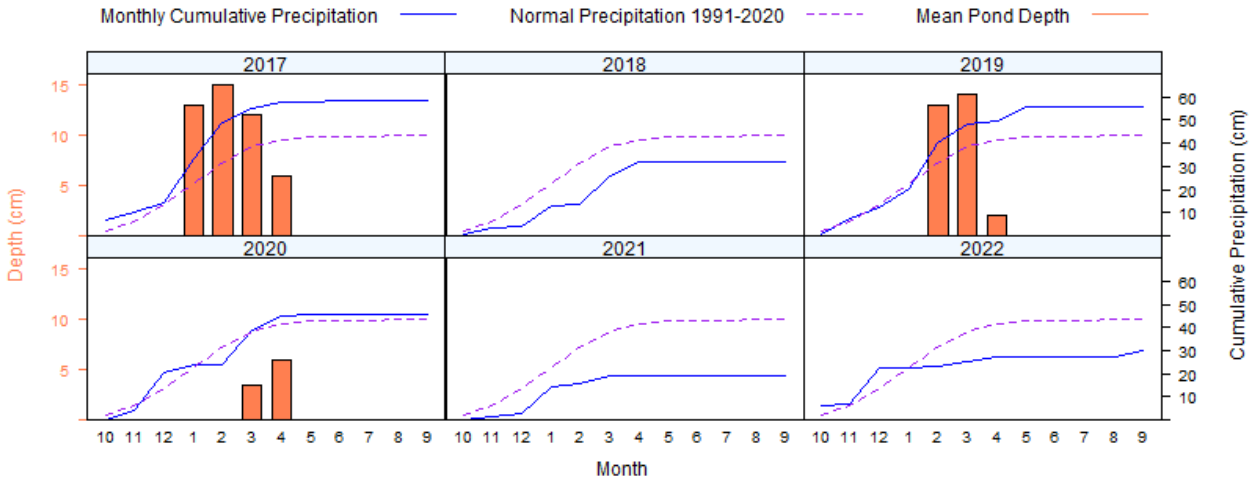


Figure 5-14. Pond 997 (Reference) Historical Mean Monthly Depths and Cumulative Monthly Precipitation Compared to the 30-Year Normal (mean 1991-2020) (NCDC NOAA, 2022)

5.3.1 Data Quality Objective 1

Pond 997 did not meet the required average depths of 25 cm from the first rain event through March for CTS nor the 10 cm for 18 consecutive days through May for fairy shrimp. Pond 997 did not sustain sufficient depth for either CTS (0 cm through March) nor fairy shrimp (0 cm through May).

5.3.2 Data Quality Objective 2

Pond 997 remained dry in the 2022 water year which was not unexpected given the well below normal precipitation (Figure 5-14).

5.3.3 Performance Standard: Hydrological Conditions and Inundation Area

Pond 997 did not sustain suitable habitat for CTS nor for fairy shrimp in the 2022 water year because it remained dry. Pond 997 is a reference vernal pool and was not required to meet the performance standard. Instead, the vernal pool was used as a control for comparison to the remediated vernal pools.

5.3.4 Data Quality Objective 4

Water quality parameters were not taken at Pond 997 because it remained dry in the 2022 water year.

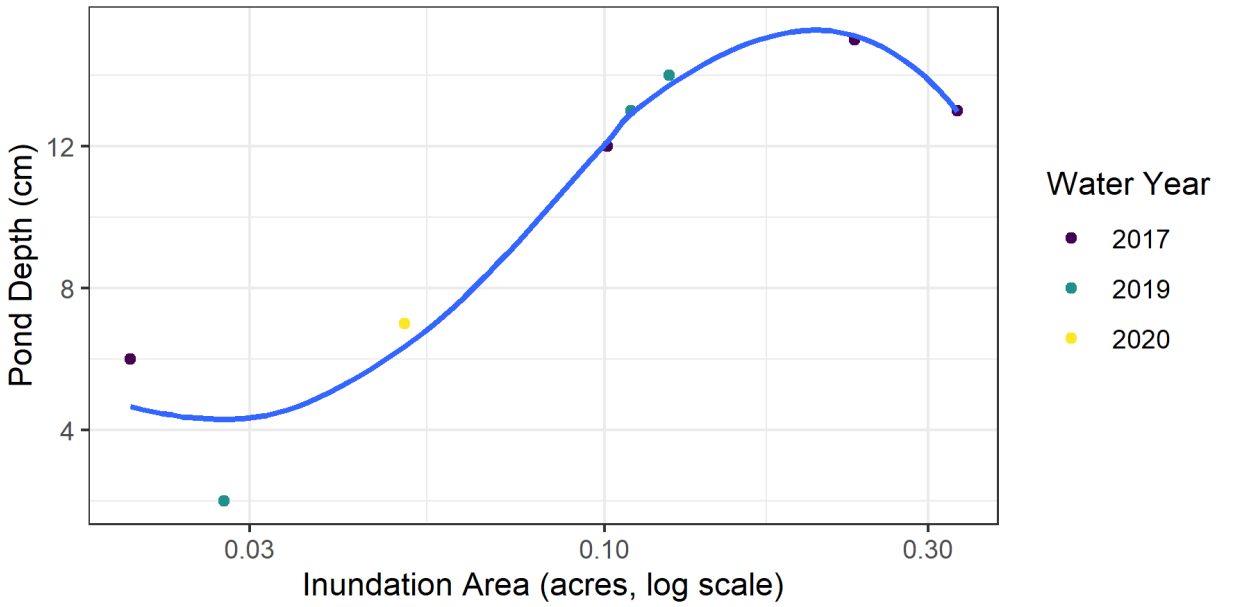


Figure 5-15. Pond 997 (Reference) Plot of Depth vs Area since 2017 Water Year

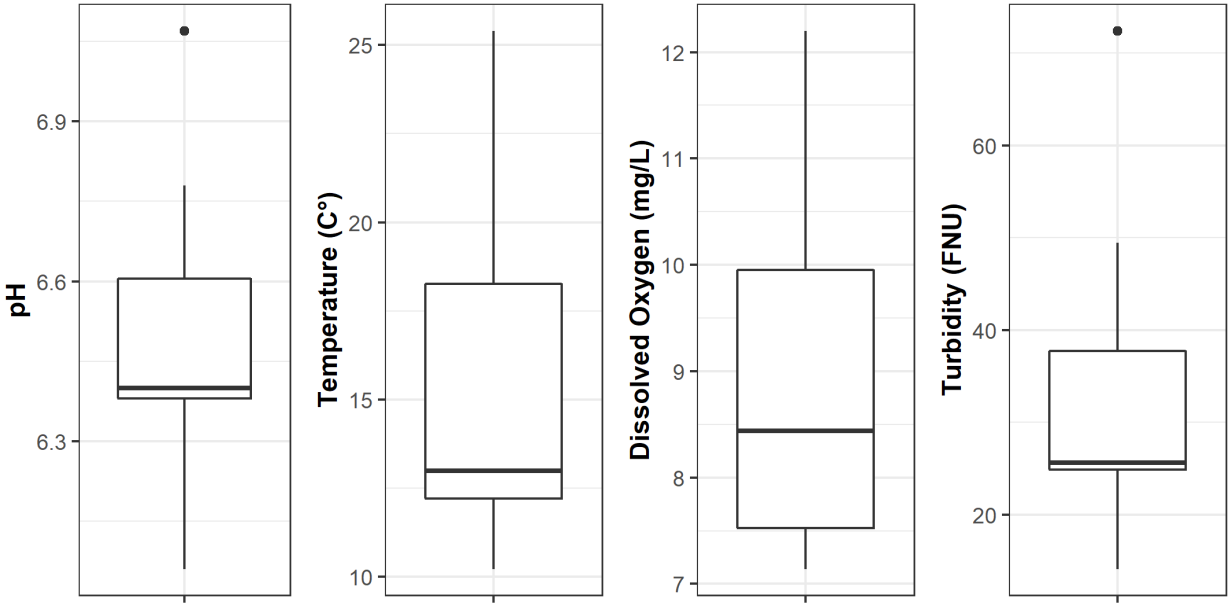


Figure 5-16. Pond 997 (Reference) historical water quality measurements for pH, Temperature (C), Dissolved Oxygen (mg/L), and Turbidity (FNU). The line in the middle of the box represents the median, and the lower and upper ends of the box are the 25% and 75% quartiles respectively. The upper and lower whiskers represent largest and smallest values within 1.5 times above and below the size of the hinge, which is the 75% minus 25% quartiles, respectively. Small black dots represent values outside of those statistics.

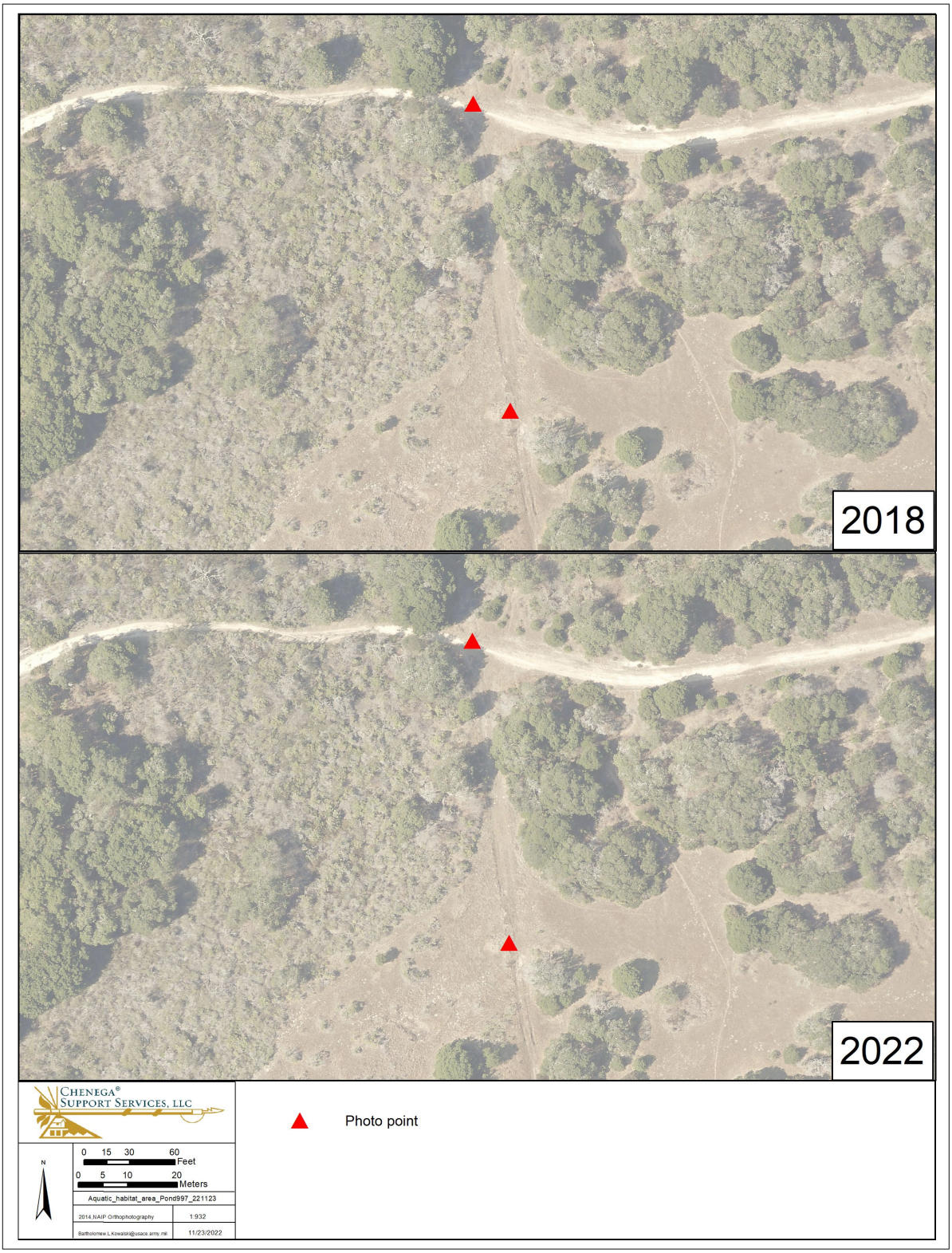


Figure 5-17. Pond 997 (Reference) inundations. It remained dry in 2018 and 2022 (both water years had below normal precipitation)

5.3.5 Performance Standard: Wildlife Usage

Water quality cannot be assessed for suitability for wildlife use. Pond 997 is a reference vernal pool and was not required to meet the performance standards. Instead, the vernal pool was used as a control for comparison to the remediated vernal pools.

5.3.6 Conclusion

With the exception of DQO 4, Pond 997 metrics were suitable for comparison to the remediated vernal pools (Table 5-3).

Table 5-3. Success at Pond 997 (Reference) Based on Performance Standards and Applicable Data Quality Objectives

Performance Standard	Applicable DQO	Success
Hydrological Conditions & Inundation Area	DQO 1	Suitable for Comparison
	DQO 2	Suitable for Comparison
Wildlife Usage	DQO 1	Suitable for Comparison
	DQO 4	Cannot assess

5.4 Pond 75 – Baseline

Pond 75 is situated within a small and very shallow basin within a narrow valley in the southern part of the Fort Ord National Monument within the Impact Area (Figure 2-4). The valley slopes gently from south to north and thus it precludes Pond 75 from ever reaching deep inundations. Pond 75 was surveyed for the first time in 2021. Pond 75 was monitored for baseline again in the 2022 water year and will be compared to data from future surveys after MEC remediation is completed in Unit 17. Due to its small size and shallow profile, the most similar reference vernal pool is Pond 997. Pond 75 remained dry in the 2022 water year and thus inundation extent, depth, and water quality measurements were not taken.

5.4.1 Data Quality Objective 1

Pond 75 did not meet the required average depths of 25 cm from the first rain event through March for CTS nor the 10 cm for 18 consecutive days through May for fairy shrimp. Pond 75 did not sustain sufficient depth for either CTS (0 cm through March) nor fairy shrimp (0 cm through May).

5.4.2 Data Quality Objective 2

Pond 75 was monitored for the second time in the 2022 water year for baseline. Pond 75 stayed dry in the 2022 water year which reflected the well below normal precipitation.

5.4.3 Performance Standard: Hydrological Conditions and Inundation Area

Pond 75 did not sustain suitable habitat for CTS nor fairy shrimp in the 2022 water year because it remained dry. Pond 75 is in a baseline year and was not required to meet the performance standard. Instead, data collected will be used to assess impact after MEC cleanup operations take place in the future years.

5.4.4 Data Quality Objective 4

Water quality parameters of Pond 75 were not taken because it remained dry in the 2022 water year.

5.4.5 Performance Standard: Wildlife Usage

Water quality cannot be assessed for suitability for wildlife use. Pond 75 was a baseline vernal pool in the 2022 water year and was not required to meet the performance standard. Instead, data collected will be used to assess impact after MEC cleanup operations take place in the future years.

5.4.6 Conclusion

Pond 75 was not compared to DQOs in the 2022 water year because it was in baseline condition. With the exception of DQO 4, Pond 75 is suitable for comparison to future monitoring events (Table 5-4).

Table 5-4. Success at Pond 75 (Baseline) Based on Performance Standards and Applicable Data Quality Objectives

Performance Standard	Applicable DQO	Success
Hydrological Conditions & Inundation Area	DQO 1	Suitable for Comparison
	DQO 2	Suitable for Comparison
Wildlife Usage	DQO 1	Suitable for Comparison
	DQO 4	Cannot assess

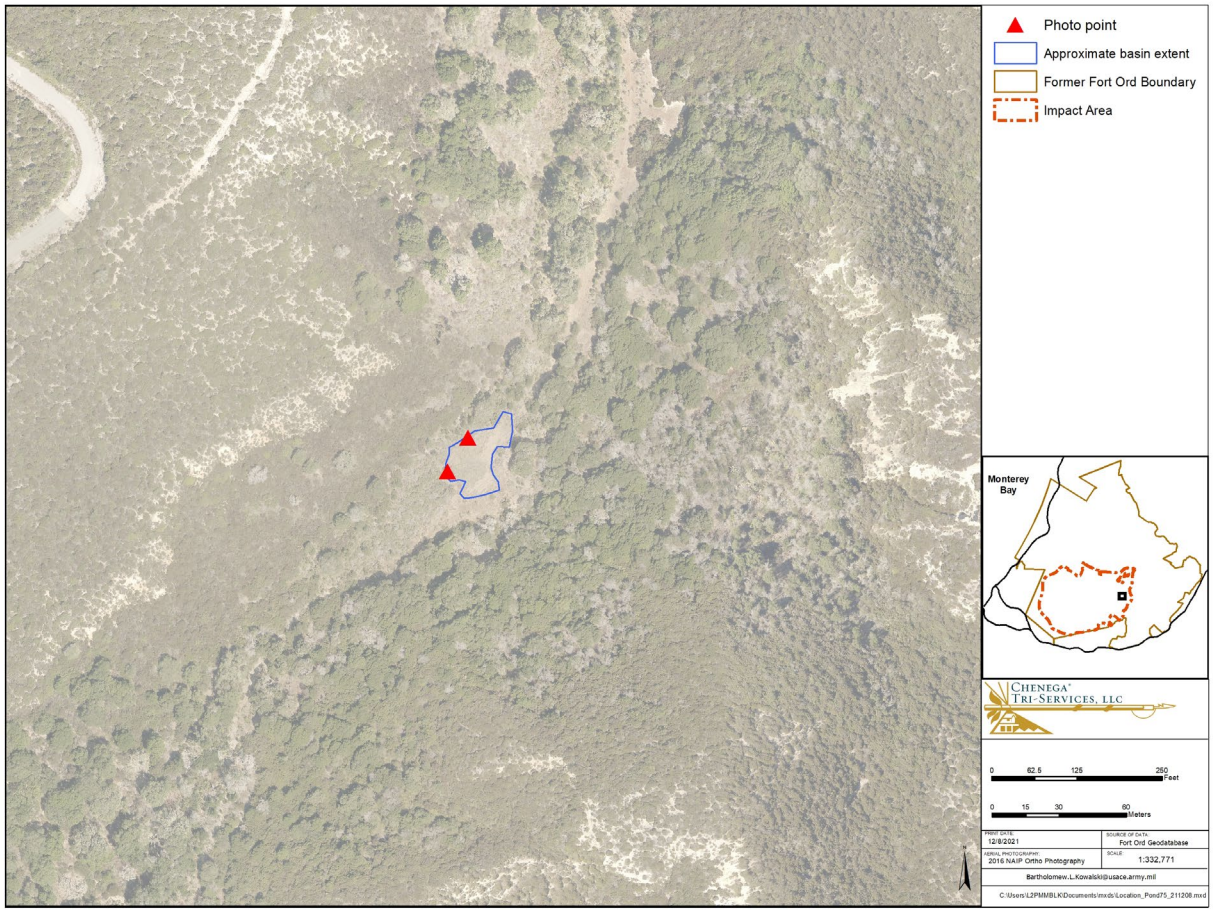


Figure 5-18. Pond 75 (Baseline) Inundation for 2022 (below normal precipitation). Pond 75 stayed dry during the 2022 water year.

5.5 Pond 16 – Year 4

Pond 16 is situated within a medium size basin with a steep profile in the southern part of the Fort Ord National Monument within the Impact Area (Figure 2-4). Depth and inundation of Pond 16 have been monitored for twelve years (Figure 5-19). Above normal water years were 1995, 2017, and 2019. Years 1992, 1996 and 2020 were close to normal water years, and all other years were below normal (1994, 2009, 2018, 2021, 2022) or consecutive drought years (2015). In above normal water years water can spill out of primary basin of Pond 16 and significantly expand its inundated area to the north which last time occurred in 2017. By size, Pond 16 is most similar to reference Pond 101 East (East), although it has a much steeper profile (Figure 5-1).

Pond 16 was monitored in the 2022 water year as a Year 4 Post-Subsurface Munitions Remediation vernal pool. Vegetation within Pond 16 and immediately around it was masticated in the summer of 2016 in preparation for a prescribed burn in Unit 31. Less than 50 percent of the Pond 16 watershed was masticated, and limited vegetation mastication occurred within the inundation area. Subsurface anomaly investigations occurred in 2018. Historically, Pond 16 reached a depth of 28 cm and an inundation area of 0.26 ac in a below normal water year (2018), it remained dry in 2021, a well below normal water year, and it reached a maximum depth of 144 cm and a maximum inundation of 2.57 acres in an above normal water year (2017, Figure 5-20). Pond 16 remained dry in the 2022 water year (Figure 5-19) and thus inundation extent, depth, and water quality measurements were not taken. Historical values are presented in Figures 5-19 to Figure 5-22.

During the twelve years of monitoring, the cumulative precipitation in 2021 was the lowest and it was second lowest in the 2022 water year (Figure 5-19). In 2018 water year, which was also a below normal water year but with greater cumulative precipitation than in 2021 or 2022, Pond 16 was briefly inundated at low depths. Generally, vernal pools don't become inundated until the sandy loam layer and the underlying clay layer become saturated. Once the clay layer becomes completely saturated, any additional input in water to the basin results in ponding. Considering that two of the reference vernal pools were only briefly inundated (Pond 5 and 101 East (East)), and the third one was dry (Pond 997), it suggests that there was not enough precipitation in the 2022 water year to completely saturate the sandy loam layer and/or the underlying clay layer.

5.5.1 Data Quality Objective 1

Pond 16 did not meet the required average depths of 25 cm from the first rain event through March for CTS, nor the required 10 cm for 18 consecutive days through May for fairy shrimp. Pond 16 did not sustain sufficient depth for CTS (0 cm through March), nor for fairy shrimp (0 cm through May).

5.5.2 Data Quality Objective 2

Pond 16 remained dry in the 2022 water year which was not unexpected given the well below normal precipitation (Figure 5-19). Reference Pond 101 East (East) was briefly inundated in the 2022 water year, and Reference Pond 997 remained dry. While Pond 16 has a greater resemblance to reference Pond 101 East (East) when fully inundated, at low depths it can be compared to reference Pond 997 (Figure 5-1).

5.5.3 Performance Standard: Hydrological Conditions and Inundation Area

Pond 16, a post-subsurface munitions remediation vernal pool, was not on track to meet the performance standard for Year 4 in the 2022 water year. Pond 16 did not meet DQO 1 indicating that it did not sustain suitable habitat for CTS and fairy shrimp in the 2022 water year. Pond 16 remained dry in the 2022 water year just as reference Pond 997; hence DQO 2 was met.

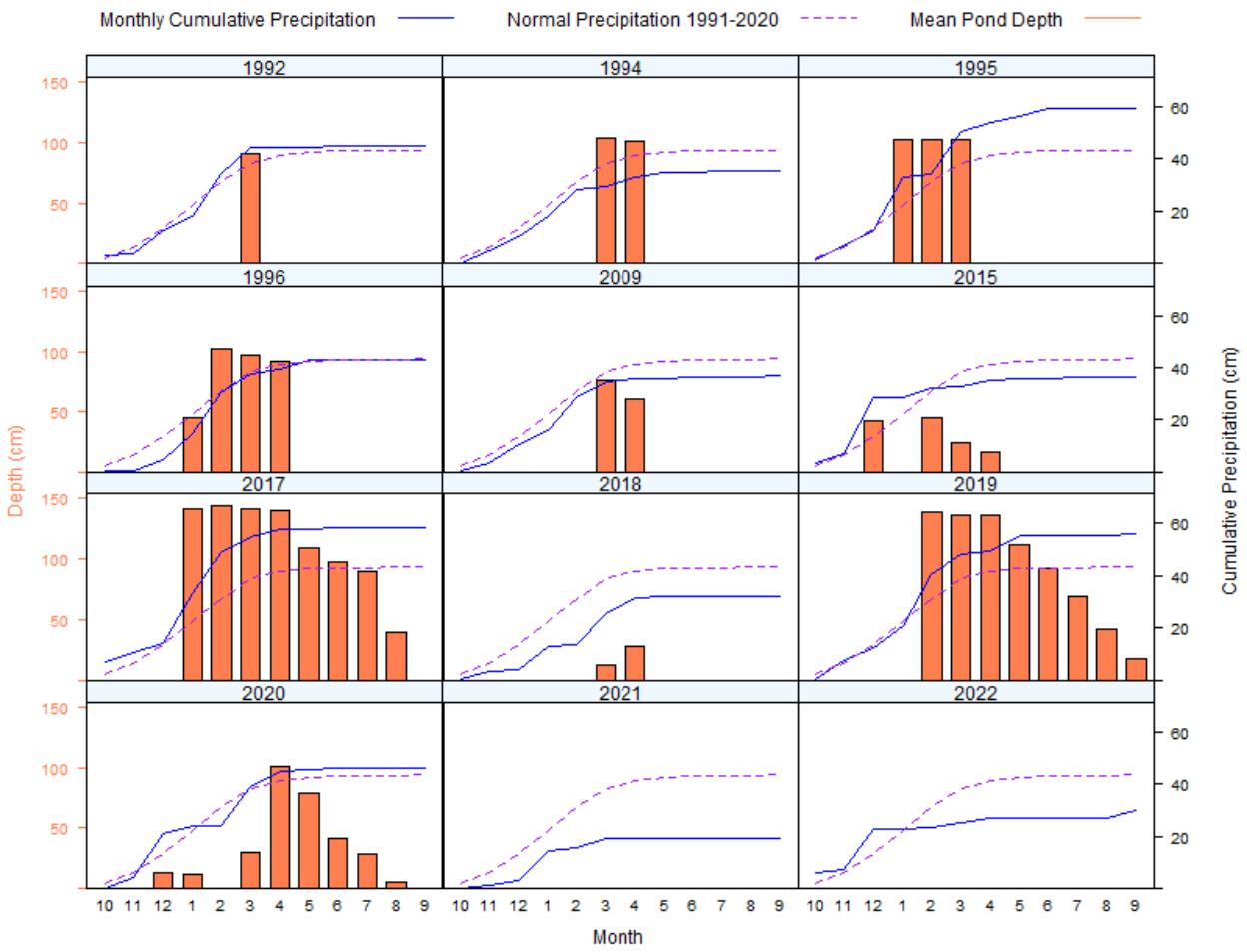


Figure 5-19. Pond 16 (Year 4 Post-Subsurface Munitions Remediation) Historical Mean Monthly Depths and Cumulative Monthly Precipitation Compared to the 30-Year Normal (mean 1991-2020) (NCDC NOAA, 2022)

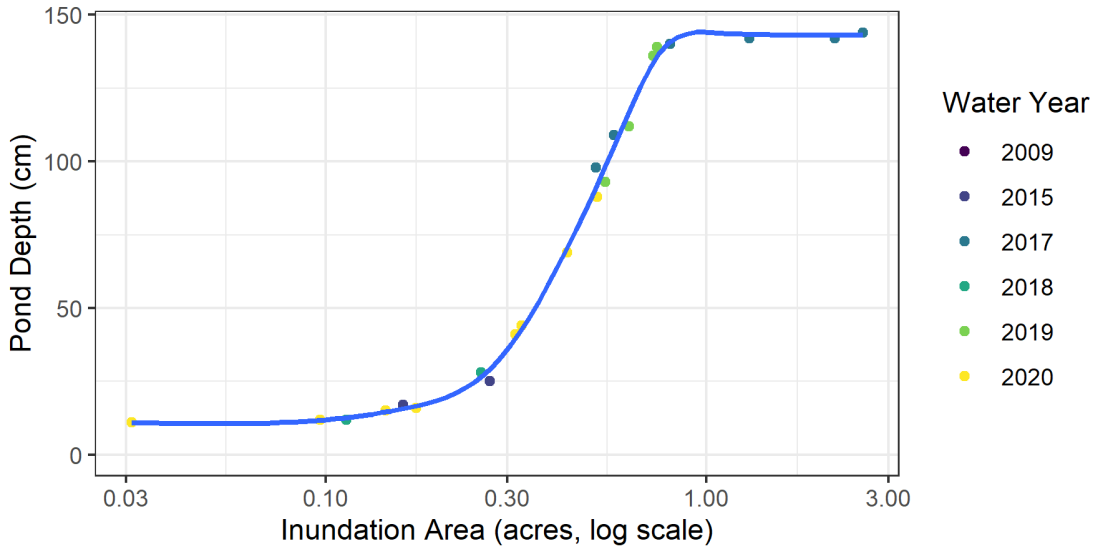


Figure 5-20. Pond 16 (Year 4 Post-Subsurface Munitions Remediation) Plot of Depth vs Area since 2009 Water Year.

5.5.4 Data Quality Objective 4

Water quality parameters could not be assessed at of Pond 16 because it remained dry in the 2022 water year.

5.5.5 Performance Standard: Wildlife Usage

Pond 16 was not on track to meet the performance standard for year 4 in the 2022 water year because it remained dry. Pond 16 was not on track for DQO 1. DQO 4 cannot be accessed for 2022 water year.

5.5.6 Conclusion

Pond 16, a post-subsurface munitions remediation vernal pool, was in year 4 of monitoring in the 2022 water year. The vernal pool was not on track to meet the performance standards (Table 5-5). Pond 16 will continue to be monitored in the future.

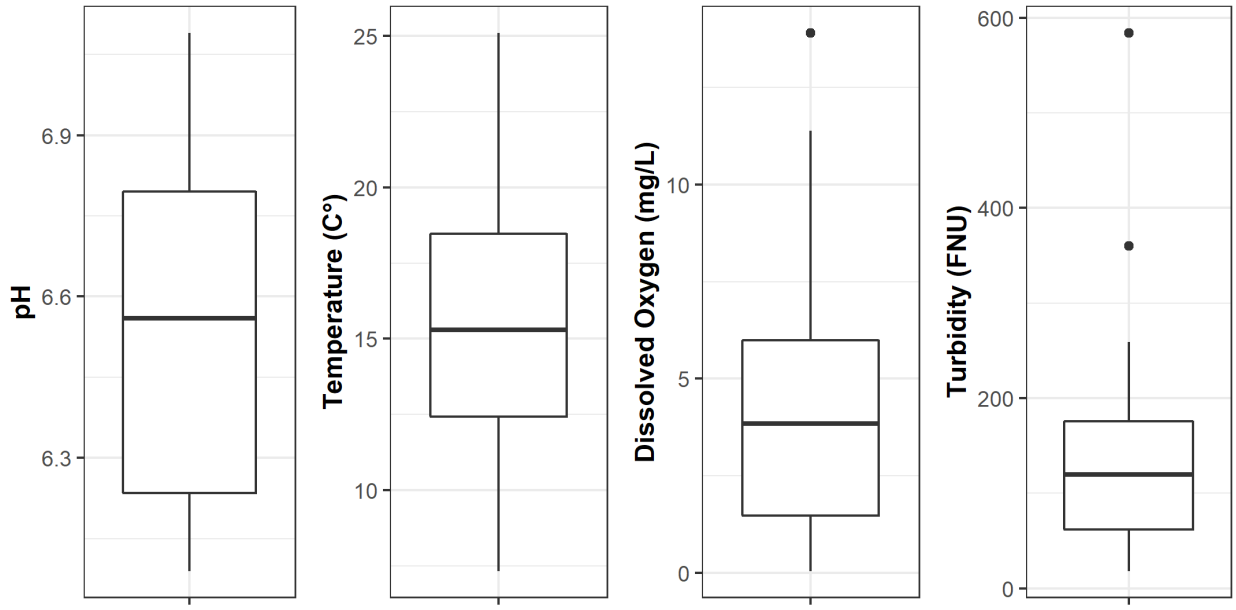


Figure 5-21. Pond 16 (Year 4 Post-Subsurface Munitions Remediation) water quality measurements for pH, Temperature (C), Dissolved Oxygen (mg/L), and Turbidity (FNU). The line in the middle of the box represents the median, and the lower and upper ends of the box are the 25% and 75% quartiles respectively. The upper and lower whiskers represent largest and smallest values within 1.5 times above and below the size of the hinge, which is the 75% minus 25% quartiles, respectively. Small black dots represent values outside of those statistics.

Table 5-5. Success at Pond 16 (Year 4 Post-Subsurface Munitions Remediation) Based on Performance Standards and Applicable Data Quality Objectives

Performance Standard	Applicable DQO	Success
Hydrological Conditions & Inundation Area	DQO 1	Not on track
	DQO 2	On track
Wildlife Usage	DQO 1	Not on track
	DQO 4	Cannot assess

Figure 5-22. Pond 16 (Year 4 Post-Subsurface Munitions Remediation) inundations. It was briefly inundated in 2018 but remained dry in 2022 (both below normal water years).

5.6 Pond 39 – Year 4

Pond 39 is situated within a very small basin with a steep profile, surrounded by topographically varied small inundations that in an above normal water year can become inundated and hydrologically connected. Pond 39 is located in the northern part of the Fort Ord National Monument (Figure 2-4). Depth and inundation of Pond 39 have been monitored for eight years (Figure 5-23). Above normal water years were 1998, 2016, and 2019. Year 2020 was a close to normal water year. All other monitoring was conducted either in a below normal water year (2018, 2021, 2022), or a consecutive drought year (2015). By size, Pond 39 is most similar to reference Pond 997, although it has a much steeper profile and in years with above normal precipitation it can reach much greater area (Figure 5-1).

Pond 39 was monitored in the 2022 water year as a Year 4 Post-Subsurface Munitions Remediation vernal pool. Pond 39 was monitored for baseline conditions in 2015 and 2016. Vegetation in Pond 39 and within its watershed was burned in October 2017 as part of the prescribed burn of BLM Area B Subunit B. Subsurface anomaly investigations occurred within the Pond 39 basin in 2018. Historically, Pond 39 remained dry in a consecutive drought year (2015), and it reached a maximum depth of 50 cm and a maximum inundation of 0.31 acres in 2019, an above normal water year. The 2022 maximum depth of Pond 39 was 43 cm and maximum inundation for was 0.009 acres (Table 4-6). The depth and inundation values were within range of previously recorded values (Figures 5-2 through 5-5, and Figure Figure 5-26).

Pond 39 was inundated from November to February, and its hydroperiod in the 2022 water year was longer than that of any reference vernal pools. The only year when Pond 39 stayed dry was in 2015, which was a consecutive drought year (Figure 5-23). Maximum inundation area in the 2022 water year was similar to 2018, which was also a below normal water year (Figure 5-25). Water quality parameters of Pond 39 were within the historical ranges and similar to other vernal pools (Figure 5-26 and Figures 5-2 to 5-5).

5.6.1 Data Quality Objective 1

Pond 39 did not stay inundated long enough to meet the required average depths of 25 cm from the first rain event through March for CTS nor the 10 cm for 18 consecutive days through May for fairy shrimp. Pond 39 did not sustain sufficient depth for CTS (15.75 cm through March), but it did provide sufficient depth for fairy shrimp (25.2 cm from October 28 through February 1).

5.6.2 Data Quality Objective 2

Pond 39 was inundated from October to February. Maximum inundation area in the 2022 water year was similar to 2018, which was also a below normal water year (Figure 5-25).

5.6.3 Performance Standard: Hydrological Conditions and Inundation Area

Pond 39, a post-subsurface munitions remediation vernal pool, was not on track to meet the performance standard for Year 4 in the 2022 water year. Pond 39 partially met DQO 1 indicating that it did not sustain suitable habitat for CTS, but it did for fairy shrimp in the 2022 water year. Pond 39 was inundated for longer in the 2022 water year than any of the reference vernal pools, and DQO 2 was met. The vernal pool will continue to be monitored in the future to evaluate its progress toward meeting the performance standard.

5.6.4 Data Quality Objective 4

Water quality parameters of Pond 39 were within the historical ranges (Figure 5-26 and Figures 5-2 to 5-5).

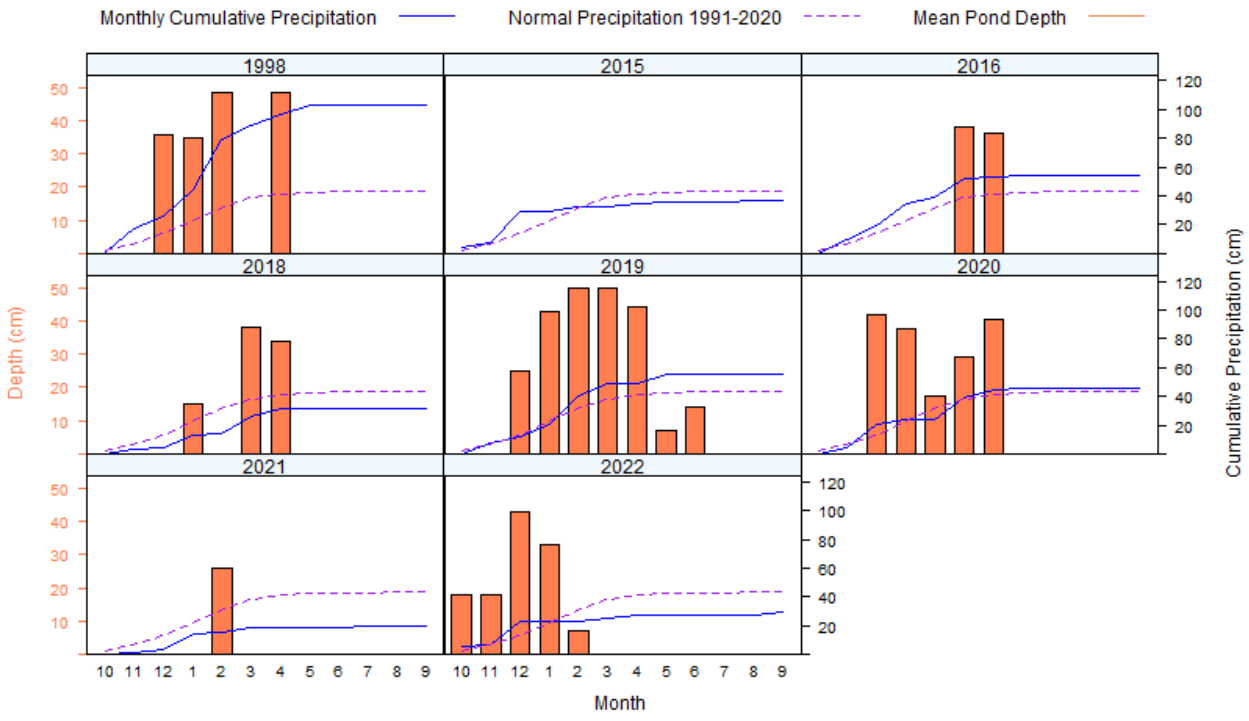


Figure 5-23. Pond 39 (Year 4 Post-Subsurface Munitions Remediation) Historical Mean Monthly Depths and Cumulative Monthly Precipitation Compared to the 30-Year Normal (mean 1991-2020) (NCDC NOAA, 2021)

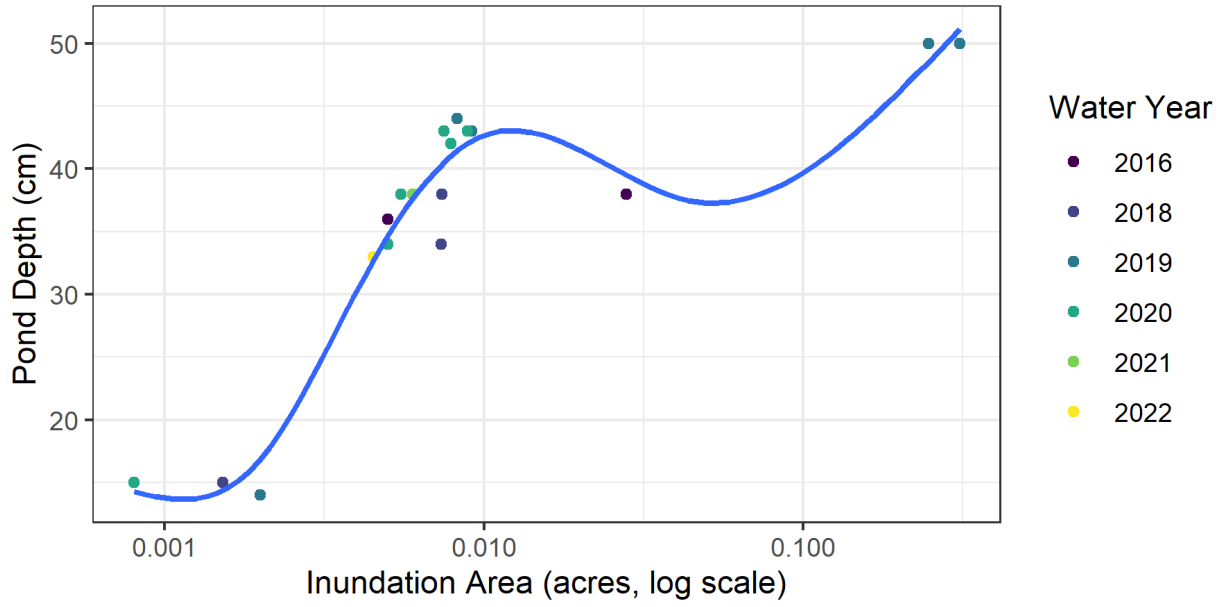


Figure 5-24. Pond 39 (Year 4 Post-Subsurface Munitions Remediation) Plot of Depth vs Area Since 2016 Water Year.

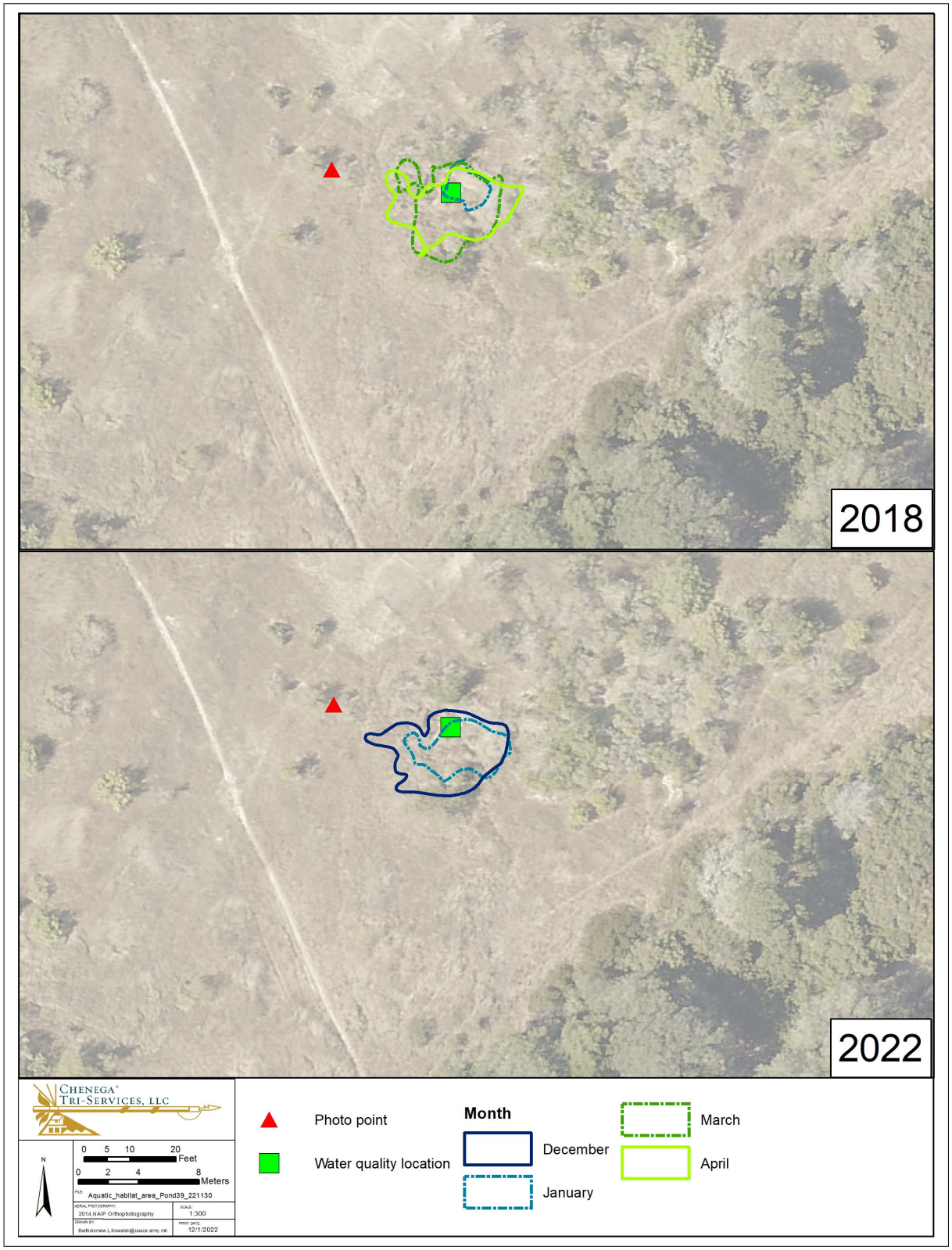


Figure 5-25. Pond 39 (Year 4 Post-Subsurface Munitions Remediation) Inundations for 2018 and 2022 (both below normal water years).

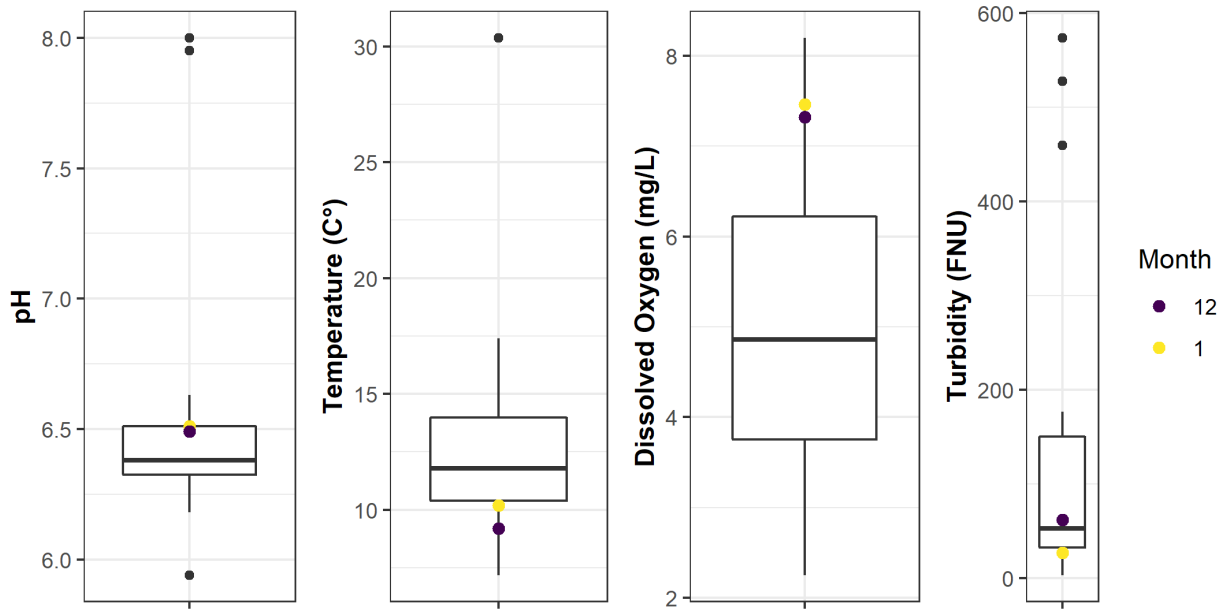


Figure 5-26. Pond 39 (Year 4 Post-Subsurface Munitions Remediation) water quality measurements for pH, Temperature (C), Dissolved Oxygen (mg/L), and Turbidity (FNU). The colored dots represent observed values in the 2022 water year. The line in the middle of the box represents the median, and the lower and upper ends of the box are the 25% and 75% quartiles respectively. The upper and lower whiskers represent largest and smallest values within 1.5 times above and below the size of the hinge, which is the 75% minus 25% quartiles, respectively. Small black dots represent values outside of those statistics.

5.6.5 Performance Standard: Wildlife Usage

Pond 39 was partially on track to meet this performance standard as it did not sustain sufficient depth and inundation for CTS, but it did for fairy shrimp. Water quality measurements were adequate for wildlife.

5.6.6 Conclusion

Pond 39, a post-subsurface munitions remediation vernal pool, was in year 4 of monitoring in the 2022 water year. The vernal pool was partially on track to meet the performance standards (Table 5-6). Pond 39 will continue to be monitored in the future.

Table 5-6. Success at Pond 39 (Year 4 Post-Subsurface Munitions Remediation) Based on Performance Standards and Applicable Data Quality Objectives

Performance Standard	Applicable DQO	Success
Hydrological Conditions & Inundation Area	DQO 1	Partially on track
	DQO 2	On track
Wildlife Usage	DQO 1	Partially on track
	DQO 4	On track

5.7 Pond 40 South – Year 4

Pond 40 South is situated within a small and shallow basin, surrounded by topographically varied small depressions that in an above normal water year can become inundated and hydrologically connected. Pond 40 South is located in the northern part of the Fort Ord National Monument (Figure 2-4). Depth

and inundation of Pond 40 South have been monitored for nine years (Figure 5-27). Above normal water years were 1998, 2016, 2017, and 2019. Year 2020 was a close to normal water year. All other monitoring was conducted either in a below normal water year (2018, 2021, 2022), or a consecutive drought year (2015). By size, Pond 40 South is most similar to reference Pond 997.

Pond 40 South was monitored in the 2022 water year as a Year 4 Post-Subsurface Munitions Remediation vernal pool. Pond 40 South was monitored for baseline conditions in 2015, 2016, and 2017. Vegetation within Pond 40 South basin and within its watershed was burned in October 2017 as part of the prescribed burn of BLM Area B Subunit B. Subsurface anomaly investigations occurred in 2018 within the Pond 40 South basin. Historically, Pond 40 South remained dry in a below normal water year (2018), and it reached a maximum depth of 34 cm and a maximum inundation of 0.96 acres in an above normal water year (2017). Pond 40 South remained dry in the 2022 water year (Figure 5-27) and thus inundation extent, depth, and water quality measurements were not taken. Historical values are presented in Figures 5-27 to 5-29.

During the nine years of monitoring of Pond 40 South it remained dry in 2015, 2018, 2021 and in the 2022 water year, all below normal water years (2015 was a consecutive drought year) suggesting that normal or above normal precipitation is necessary for it to become inundated. Generally, vernal pools don't become inundated until the sandy loam layer and the underlying clay layer become saturated. Once the clay layer becomes completely saturated, any additional input in water to the basin results in ponding. Considering that the reference Pond 997 remained dry in the 2022 water year it suggests that there was not enough precipitation in the 2022 water year to completely saturate the sandy loam layer and/or the underlying clay layer.

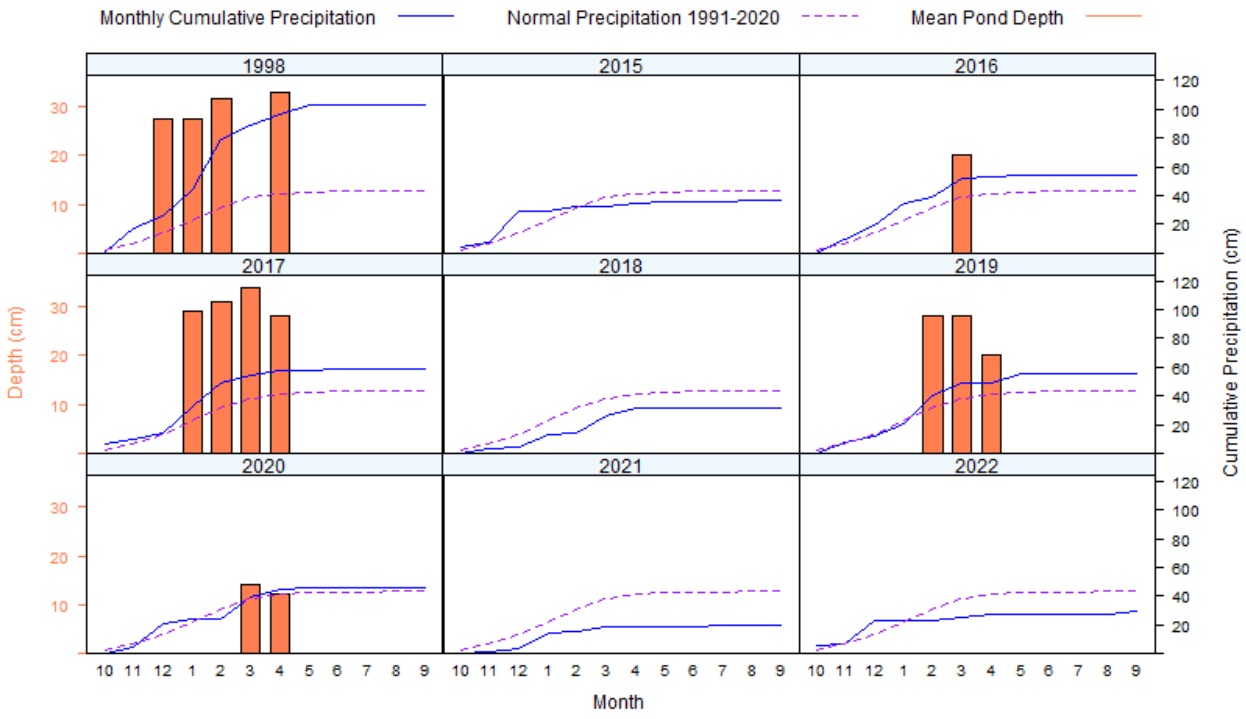


Figure 5-27. Pond 40 South (Year 4 Post-Subsurface Munitions Remediation) Historical Mean Monthly Depths and Cumulative Monthly Precipitation Compared to the 30-Year Normal (mean 1991-2020) (NCDC NOAA, 2022)

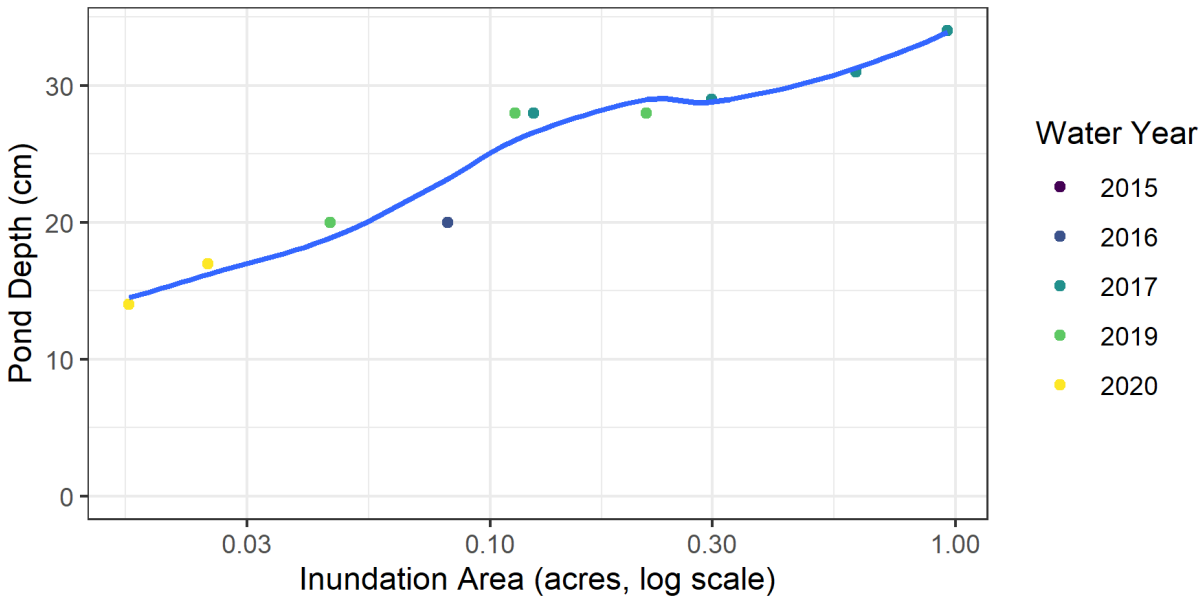


Figure 5-28. Pond 40 South (Year 4 Post-Subsurface Munitions Remediation) Plot of Depth vs Area Since Water Year 2015.

5.7.1 Data Quality Objective 1

Pond 40 South did not meet the required average depths of 25 cm from the first rain event through March for CTS, nor the required 10 cm for 18 consecutive days through May for fairy shrimp. Pond 40 South did not sustain sufficient depth for CTS (0 cm through March) nor for fairy shrimp (0 cm through May).

5.7.2 Data Quality Objective 2

Just like the reference Pond 997, Pond 40 South remained dry in the 2022 water year which was not unexpected given the well below normal precipitation (Figure 5-27).

5.7.3 Performance Standard: Hydrological Conditions and Inundation Area

Pond 40 South, a post-subsurface munitions remediation, vernal pool, was not on track to meet the performance standard for Year 4 in the 2022 water year. Pond 40 South did not meet DQO 1 indicating that it did not sustain suitable habitat for CTS and fairy shrimp in the 2022 water year. Pond 40 South remained dry in the 2022 water year just as reference Pond 997 and DQO 2 was met.

5.7.4 Data Quality Objective 4

Water quality parameters could not be assessed at Pond 40 South because it remained dry in the 2022 water year.

5.7.5 Performance Standard: Wildlife Usage

Pond 40 South was not on track to meet the performance standard for year 4 in the 2022 water year because it remained dry. Pond 40 South was not on track for DQO 1. DQO 4 cannot be accessed for 2022 water year.

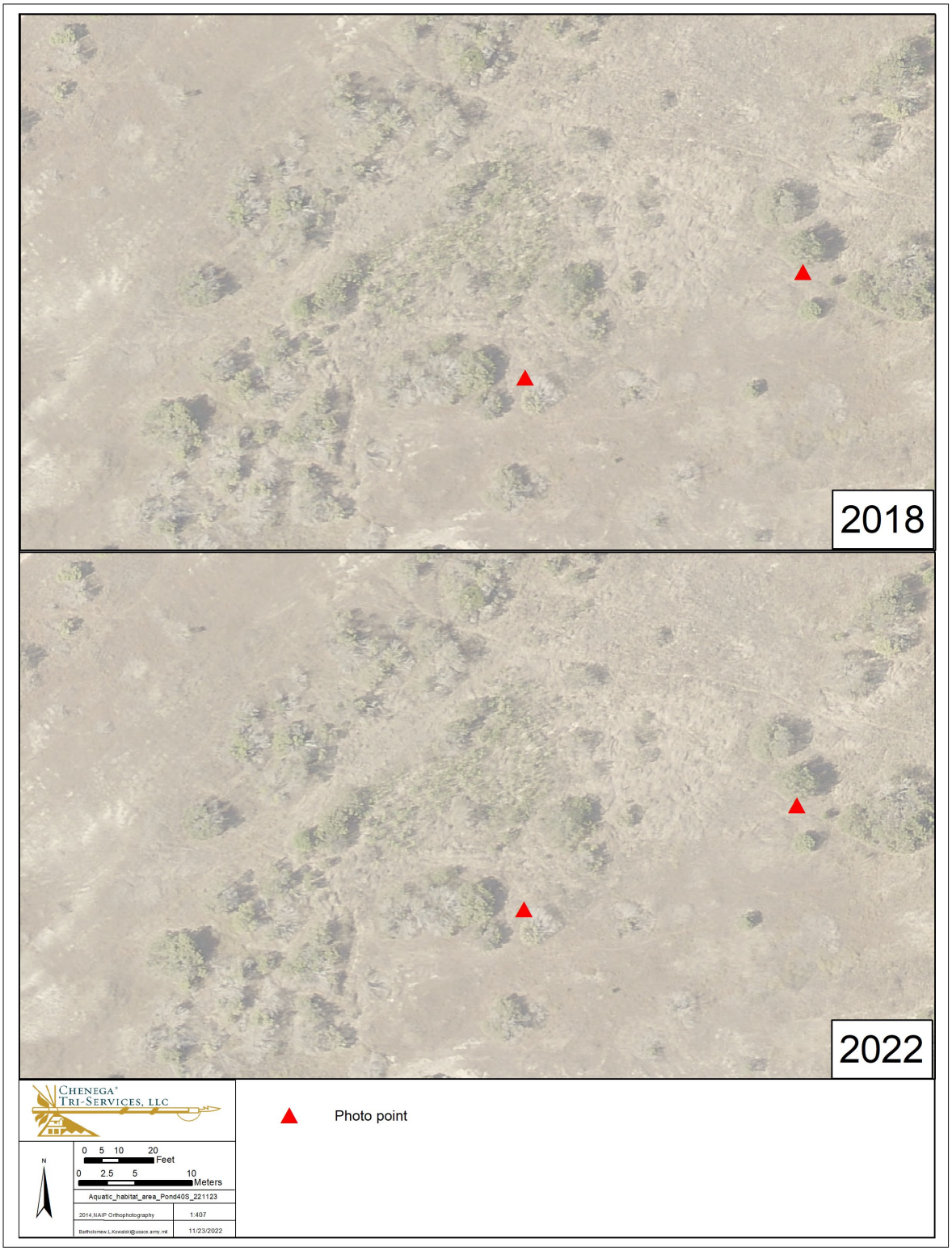


Figure 5-29. Pond 40 South (Year 4 Post-Subsurface Munitions Remediation) inundations. It remained dry in 2018 and 2022 (both below normal water years).

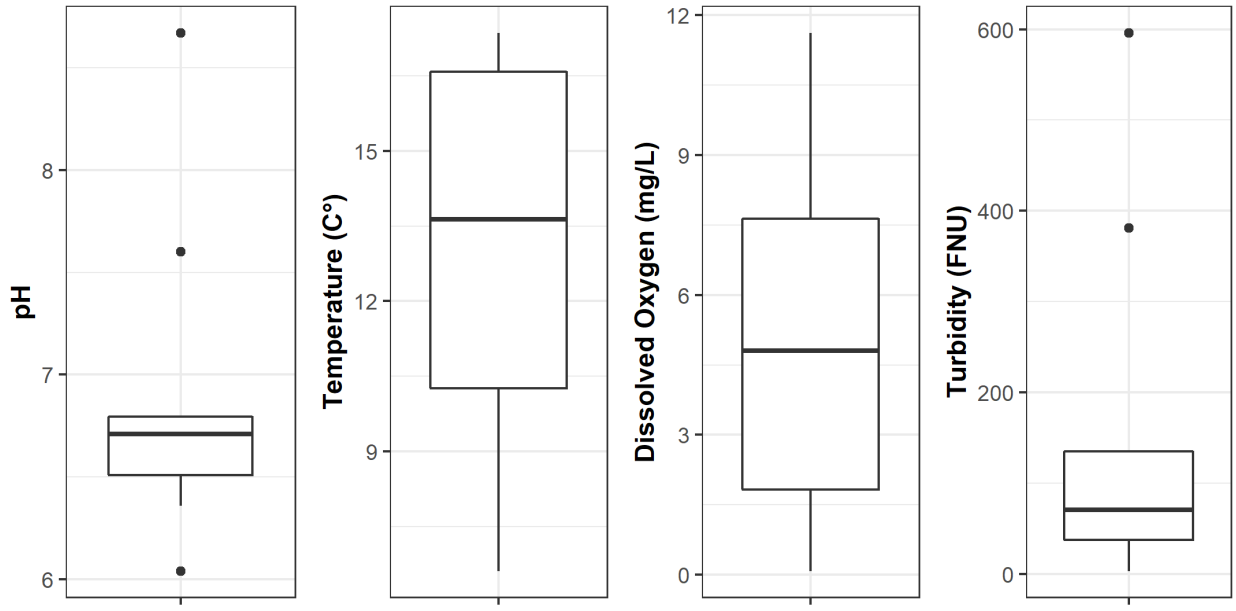


Figure 5-30. Pond 40 South (Year 4 Post-Subsurface Munitions Remediation) historical water quality measurements for pH, Temperature (C), Dissolved Oxygen (mg/L), and Turbidity (FNU). The line in the middle of the box represents the median, and the lower and upper ends of the box are the 25% and 75% quartiles respectively. The upper and lower whiskers represent largest and smallest values within 1.5 times above and below the size of the hinge, which is the 75% minus 25% quartiles, respectively. Small black dots represent values outside of those statistics.

5.7.6 Conclusion

Pond 40 South, a post-subsurface munitions remediation vernal pool, was in year 4 of monitoring in the 2022 water year. The vernal pool was not on track to meet the performance standards (Table 5-7). Pond 40 South will continue to be monitored in the future.

Table 5-7. Success at Pond 40 South (Year 4 Post-Subsurface Munitions Remediation) Based on Performance Standards and Applicable Data Quality Objectives

Performance Standard	Applicable DQO	Success
Hydrological Conditions & Inundation Area	DQO 1	Not on track
	DQO 2	On track
Wildlife Usage	DQO 1	Not on track
	DQO 4	Cannot assess

5.8 Pond 41 – Year 4

Pond 41 is situated within a medium size shallow basin in the northern part of the Fort Ord National Monument (Figure 2-4). Depth and inundation of Pond 41 have been monitored for seven years (Figure 5-31). Above normal water years were 2016, 2019, and 1998 which was an El Niño year. Water year 2020 was close to normal, 2015 was a consecutive drought year, and 2021 and 2022 were below normal water years. By size, Pond 41 is most similar to reference Pond 101 East (East).

Pond 41 was monitored in the 2022 water year as a Year 4 Post-Subsurface Munitions Remediation vernal pool. In 2018 intrusive anomaly investigations occurred at Pond 41. Historically, Pond 41 remained dry in a consecutive drought year (2015), and it reached a maximum depth of 127 cm and a maximum inundation of 2.13 acres in an extremely above normal El Niño year (1998, Figure 5-31). Pond 41 was briefly inundated in January in the 2022 water year (Figure 5-31) and it reached a depth of 24 cm and an inundation extent of 0.007 ac. Water quality measurements were taken once and were in the range of historical values (Figures 5-2 through 5-5, and Figure 5-34).

During the seven years of monitoring Pond 41 remained dry twice, in 2015 and in 2021 (Figure 5-31), both below normal water years (2015 was a consecutive drought year) suggesting that normal or above normal precipitation is necessary for it to become inundated. Generally, vernal pools don't become inundated until the sandy loam layer and the underlying clay layer become saturated. Once the clay layer becomes completely saturated, any additional input in water to the basin results in ponding. Pond 41 was briefly inundated in the 2022 water year, which was also the case with reference Pond 101 East (East), suggesting that there was not enough precipitation in the 2022 water year to keep these ponds from drying out so qickly.

5.8.1 Data Quality Objective 1

Pond 41 did not meet the required average depths of 25 cm from the first rain event through March for CTS, nor the required 10 cm for 18 consecutive days through May for fairy shrimp. Pond 41 did not sustain sufficient depth for CTS (4.8 cm through March), nor for fairy shrimp (8 cm from December 15 through February 1).

5.8.2 Data Quality Objective 2

Just like reference Pond 101 East (East), Pond 41 was briefly inundated 2022 water year which was not unexpected given the well below normal precipitation (Figure 5-31).

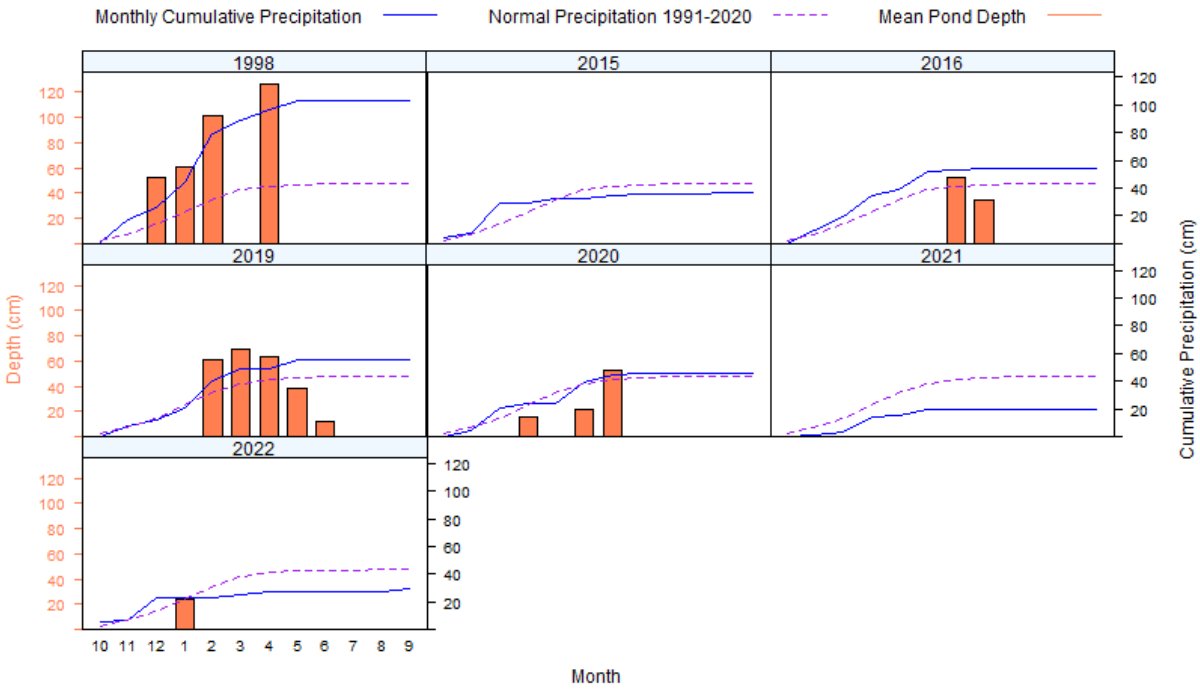


Figure 5-31. Pond 41 (Year 4 Post-Subsurface Munitions Remediation) Historical Mean Monthly Depths and Cumulative Monthly Precipitation Compared to the 30-Year Normal (mean 1991-2020) (NCDC NOAA, 2021)

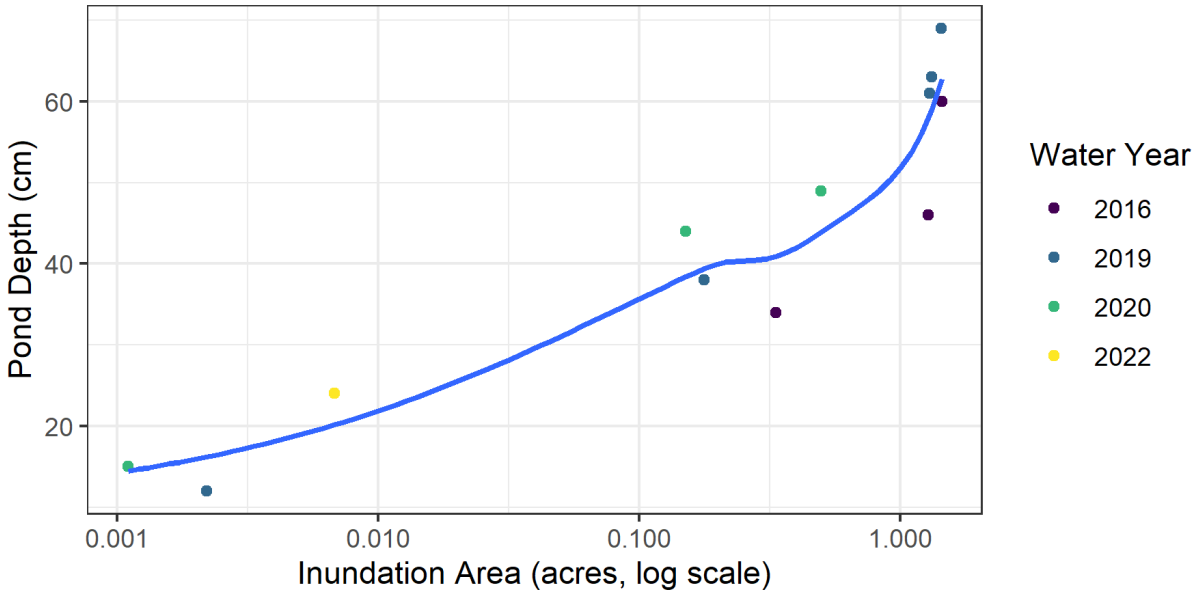


Figure 5-32. Pond 41 (Year 4 Post-Subsurface Munitions Remediation) Plot of Depth vs Area Since Water Year 2016.

5.8.3 Performance Standard: Hydrological Conditions and Inundation Area

Pond 41, a post-subsurface munitions remediation vernal pool, was not on track to meet the performance standard for Year 4 in the 2022 water year. Pond 41 did not meet DQO 1 indicating that it did not sustain suitable habitat for CTS and fairy shrimp in the 2022 water year. Pond 41 was briefly inundated in the 2022 water year just as reference Pond 101 East (East) and DQO 2 was met.

5.8.4 Data Quality Objective 4

Water quality parameters at Pond 41 were within the historical ranges (Figure 5-2 through 5-5, and Figure 5-34).

5.8.5 Performance Standard: Wildlife Usage

Pond 41 was not on track to meet the performance standard for year 4 in the 2022 water year because it did not provide suitable habitat for CTS nor for fairy shrimp. Pond 41 was not on track for DQO 1. DQO 4 cannot be accessed for 2022 water year.

5.8.6 Conclusion

Pond 41, a post-subsurface munitions remediation vernal pool, was in year 4 of monitoring in 2022. The vernal pool was not on track to meet the performance standards (Table 5-8). Pond 41 will continue to be monitored in the future.

Table 5-8. Success at Pond 41 (Year 4 Post-Subsurface Munitions Remediation) Based on Performance Standards and Applicable Data Quality Objectives

Performance Standard	Applicable DQO	Success
Hydrological Conditions & Inundation Area	DQO 1	Not on track
	DQO 2	On track
Wildlife Usage	DQO 1	Not on track
	DQO 4	On track

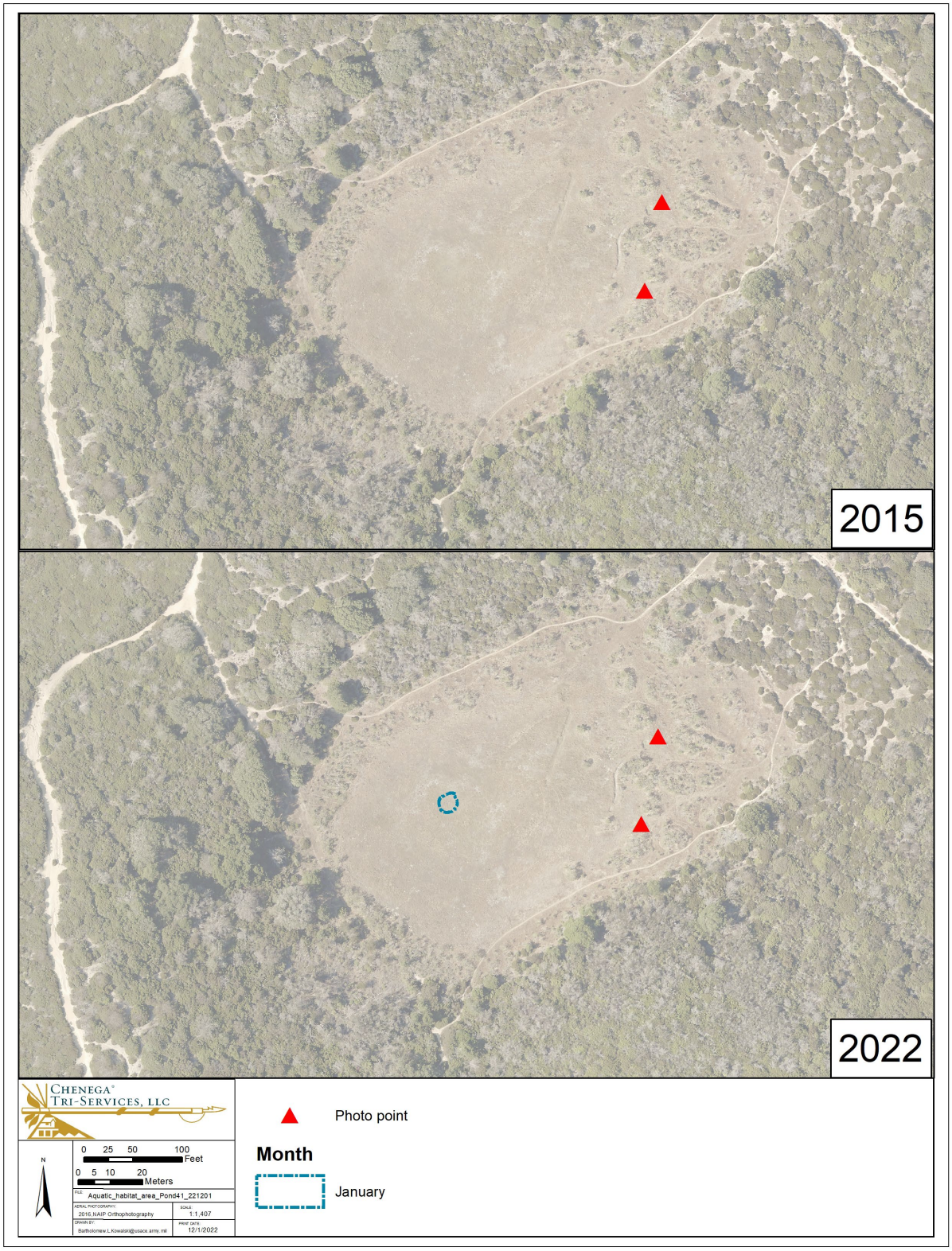


Figure 5-33. Pond 41 (Year 4 Post-Subsurface Munitions Remediation) inundations. It remained dry in 2015 (consecutive drought year) and briefly held water in the 2022 water year (below normal water year).

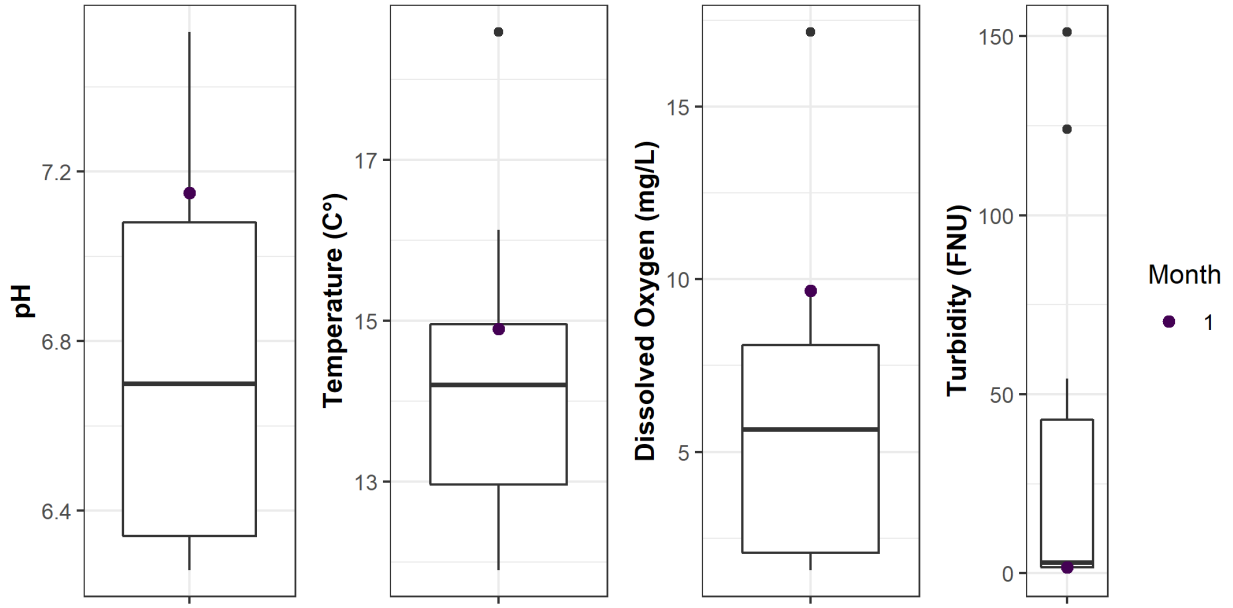


Figure 5-34. Pond 41 (Year 4 Post-Subsurface Munitions Remediation) historical water quality measurements for pH, Temperature (C), Dissolved Oxygen (mg/L), and Turbidity (FNU). The line in the middle of the box represents the median, and the lower and upper ends of the box are the 25% and 75% quartiles respectively. The upper and lower whiskers represent largest and smallest values within 1.5 times above and below the size of the hinge, which is the 75% minus 25% quartiles, respectively. Small black dots represent values outside of those statistics.

5.9 Pond 42 – Year 4

Pond 42 is situated within a small shallow basin in the northern part of Fort Ord National Monument (Figure 2-4). Depth and inundation of Pond 42 have been monitored for twelve years (Figure 5-35). Above normal water years were 1998, 2017, and 2019. Years 2000, 2001, 2003, and 2020 were close to normal water year. All other monitoring was conducted in below normal water years (2002, 2018, 2021, 2022), or in a consecutive drought year (2015). By size, Pond 42 is most similar to reference Pond 997, but it has a steeper profile (Figure 5-1). At low depths is can also be compared to reference Pond 101 East (East).

Pond 42 was monitored in the 2022 water year as a Year 4 Post-Subsurface Munitions Remediation vernal pool. Vegetation in Pond 42 and within its watershed was masticated in the summer of 2017 and was burned in October 2017 as part of the prescribed burn of BLM Area B Subunit B. Subsurface anomaly investigations occurred within Pond 42 basin in 2018. Pond 42 was first monitored for baseline in 1998. Following MEC remediation activities, Pond 42 was monitored annually from 2000 to 2003 (HLA, 2001; Harding, 2002; MACTEC, 2003). Additional baseline surveys occurred in 2015 and 2017. Historically, Pond 42 remained dry in a consecutive drought year (2015), and it reached a maximum depth of 76 cm and a maximum inundation of 0.81 acres in an above normal water year (2017, Figure 5-36). The 2022 maximum depth of Pond 42 was 12 cm and maximum inundation was 0.01 acres (Table 4-9). The depth and inundation values were within range of previously recorded values (Figure 5-36).

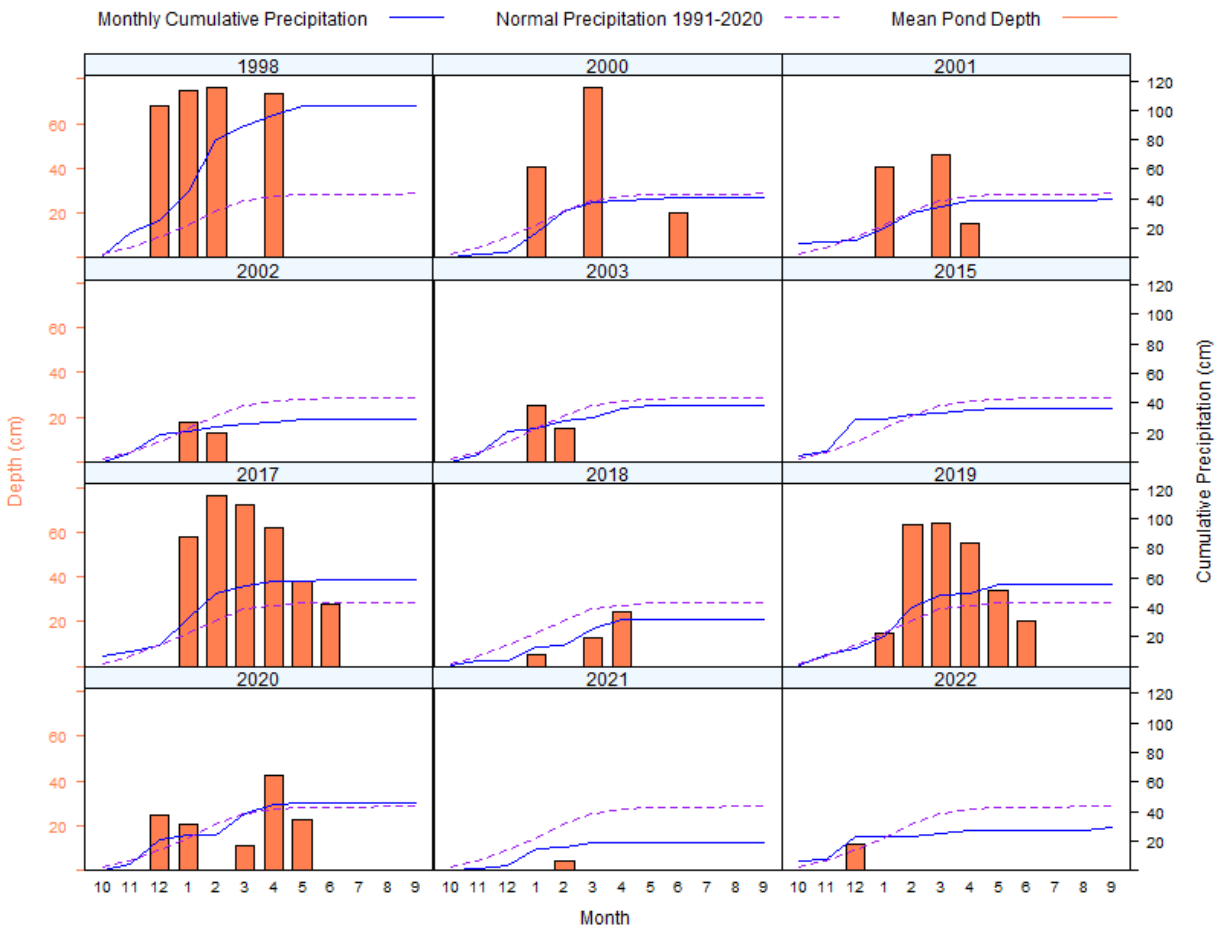


Figure 5-35. Pond 42 (Year 4 Post-Subsurface Munitions Remediation) Historical Mean Monthly Depths and Cumulative Monthly Precipitation Compared to the 30-Year Normal (mean 1991-2020) (NCDC NOAA, 2022)

Pond 42 was briefly inundated in December (Figure 5-35). In 2015, a consecutive drought year, Pond 42 was dry during surveys from March through May. It is possible that it was inundated earlier in the year, given the above normal precipitation early in the season that year. Pond 42 was also briefly inundated in 2021, a record low water year. Maximum inundation area of Pond 42 was much smaller than the maximum inundation area in April of 2018, which was also a below normal water year (Figure 5-35), but it was very similar to inundation area in March of 2018, with a cumulative precipitation at that point similar to that of December 2022. Hydroperiod of Pond 42 was similar to Reference Pond 101 East (East) which was also briefly inundated, but somewhat later in the season. Reference Pond 997 remained dry in the 2022 water year.

Water quality parameters of Pond 42 were generally within the historical ranges (Figure 5-2 through 5-5, and Figure 5-38).

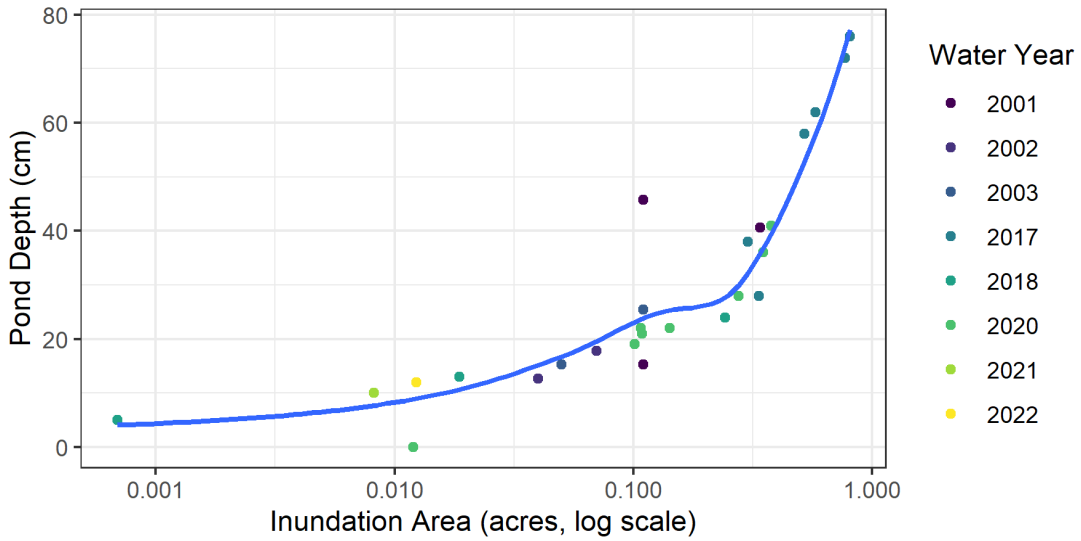


Figure 5-36. Pond 42 (Year 4 Post-Subsurface Munitions Remediation) Plot of Depth vs Area Data since 2001 Water Year.

5.9.1 Data Quality Objective 1

Pond 42 did not stay inundated long enough to meet the required average depths of 25 cm from the first rain event through March for CTS nor the 10 cm for 18 consecutive days through May for fairy shrimp. Pond 42 did not sustain sufficient depth for CTS (2.4 cm through March), nor for fairy shrimp (4 cm from October 28 through January 12).

5.9.2 Data Quality Objective 2

Pond 42 was breifly inundated in December. Pond 42 depth and inundation metrics reflected the below normal precipitation pattern of 2022 and were within the historical range (Figure 5-58). Maximum inundated area was similar to March of 2018, when the cumulative precipitation was comparable to that of December 2021 (Figure 5-59).

5.9.3 Performance Standard: Hydrological Conditions and Inundation Area

Pond 42, a post-subsurface munitions remediation vernal pool, was not on track to meet the performance standard for Year 4 in the 2022 water year. Pond 42 did not meet DQO 1 indicating that it did not sustain suitable habitat for CTS or fairy shrimp in the 2022 water year. Pond 42 was briefly inundated in the 2022 water year and by comparison to reference vernal pools and inundation patterns from 2018 DQO 2 was met. Pond 42 will continue to be monitored in the future to evaluate its progress toward meeting the performance standard.

5.9.4 Data Quality Objective 4

Water quality parameters of Pond 42 were within the historical ranges (Figure 5-2 through 5-5, and Figure 5-38).

5.9.5 Performance Standard: Wildlife Usage

Pond 42 was not on track to meet this performance standard as it did not sustain sufficient depth and inundation for CTS or fairy shrimp. Water quality measurements were adequate for wildlife.

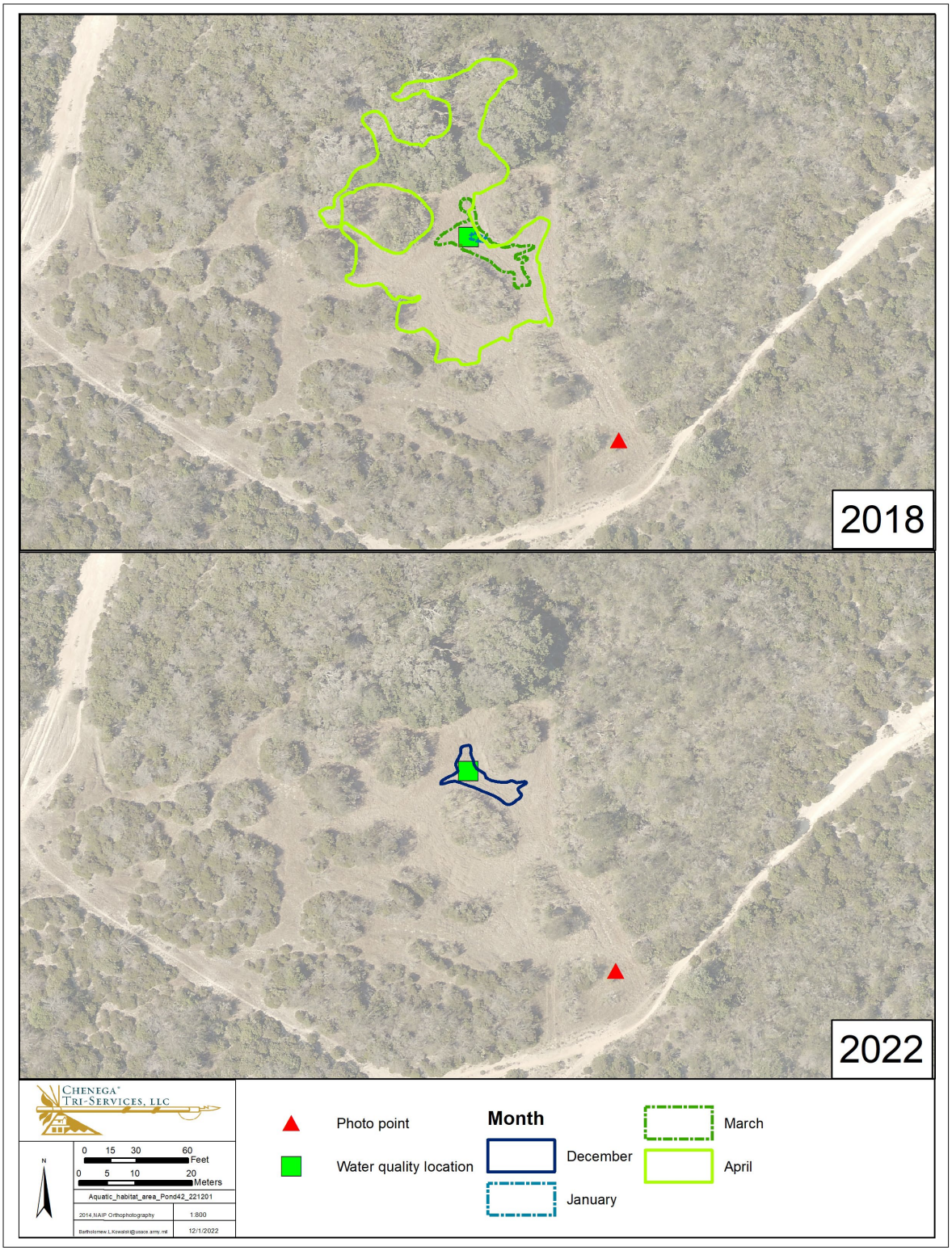


Figure 5-37. Pond 42 (Year 4 Post-Subsurface Munitions Remediation) Inundations for 2018 and 2022 (both below normal precipitation years).

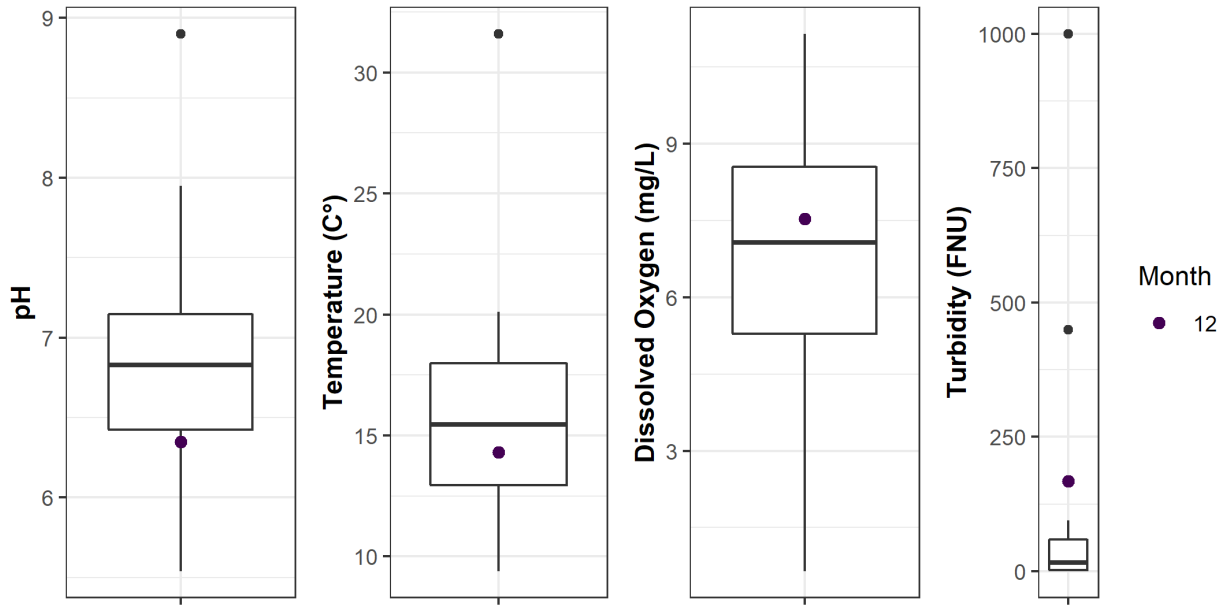


Figure 5-38. Pond 42 (Year 4 Post-Subsurface Munitions Remediation) water quality measurements for pH, Temperature (C), Dissolved Oxygen (mg/L), and Turbidity (FNU). The colored dots represent observed values in the 2022 water year. The line in the middle of the box represents the median, and the lower and upper ends of the box are the 25% and 75% quartiles respectively. The upper and lower whiskers represent largest and smallest values within 1.5 times above and below the size of the hinge, which is the 75% minus 25% quartiles, respectively. Small black dots represent values outside of those statistics.

5.9.6 Conclusion

Pond 42, a post-subsurface munitions remediation vernal pool, was in year 4 of monitoring in the 2022 water year. The vernal pool was not on track to meet performance standards (Table 5-9). Pond 42 will continue to be monitored in the future.

Table 5-9. Success at Pond 42 (Year 4 Post-Subsurface Munitions Remediation) Based on Performance Standards and Applicable Data Quality Objectives

Performance Standard	Applicable DQO	Success
Hydrological Conditions & Inundation Area	DQO 1	Not on track
	DQO 2	On track
Wildlife Usage	DQO 1	Not on track
	DQO 4	On track

5.10 Pond 61 – Year 4

Pond 61 is situated within a medium sized basin in the northern part of the Fort Ord National Monument. It is characterized by mima mounds and topographically varied small depressions that in an above normal water year can become inundated and hydrologically connected. In close to normal and below normal water years Pond 61 consist of several separate depressions, with two largest ones in the west and in the east portion of the basin. The western depression requires less precipitation to become inundated, however, the first water gauge was installed in the eastern depression. As a result, while some gauge readings in the eastern depression had zero values, the western depression may have been holding water and in instances recorded as “peripheral inundation present” (Appendix B).

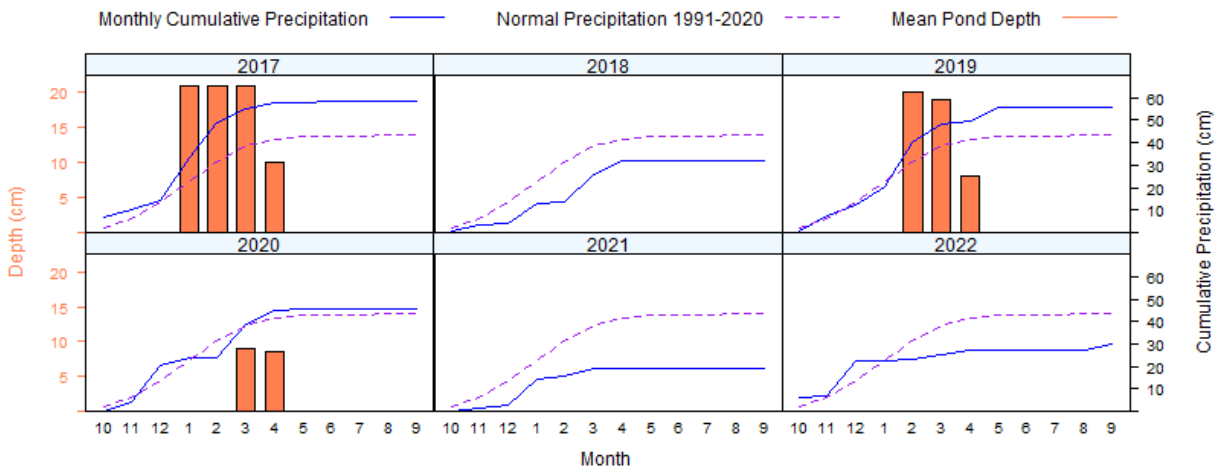


Figure 5-39. Pond 61 East (Year 4 Post-Subsurface Munitions Remediation) Historical Mean Monthly Depths and Cumulative Monthly Precipitation Compared to the 30-Year Normal (mean 1991-2020) (NCDC NOAA, 2021)

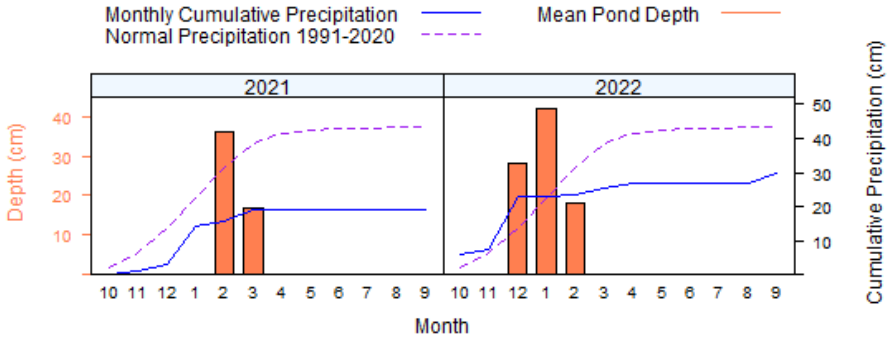


Figure 5-40. Pond 61 West (Year 4 Post-Subsurface Munitions Remediation) Historical Mean Monthly Depths and Cumulative Monthly Precipitation Compared to the 30-Year Normal (mean 1991-2020) (NCDC NOAA, 2022)

Per recommendations in the 2020 hydrology report (Chenega, 2021) a staff gauge was installed in the western portion of Pond 61 and readings for the eastern and western portions were recorded separately in 2021 and 2022. Pond 61 East was monitored for six years (Figure 5-39), while Pond 62 West was monitored for two years (Figure 5-40). Above normal water years were 2017, and 2019. Year 2020 was a close to normal water year, while 2018, 2021, and 2022 were below normal water years.

Pond 61 was monitored for baseline conditions in 2017. Although limited subsurface remediation occurred at this vernal pool in 1999, the Army did not conduct monitoring prior to 2017 and it is assumed that 2017 represents baseline conditions. Less than 50 percent of Pond 61 watershed was masticated in the summer of 2017 to support MEC remediation in BLM Area B Subunits B-3 East and B2-A. Intrusive anomaly investigations occurred within Pond 61 basin in 2018. Historically, Pond 61 East remained completely dry in a below normal water year (2018), and it reached a maximum depth of 21 cm and a maximum inundation of 0.70 acres in 2017 when it was hydrologically connected to Pond 61 West (Figure 5-41). Pond 61 East remained dry in the 2022 water year. Pond 61 West held water in both monitoring years. The 2022 maximum depth of Pond 61 West was 42 cm and maximum inundation area was 0.03 acres (Figure 5-42).

Pond 61 West was inundated from December through February and was dry on March 2 (Figure 5-40). Pond 61 East remained dry.

Water quality parameters of Pond 61 West were generally similar to the historical ranges of Pond 61 East (Figures 5-4 to 5-5 and Figure 5-43).

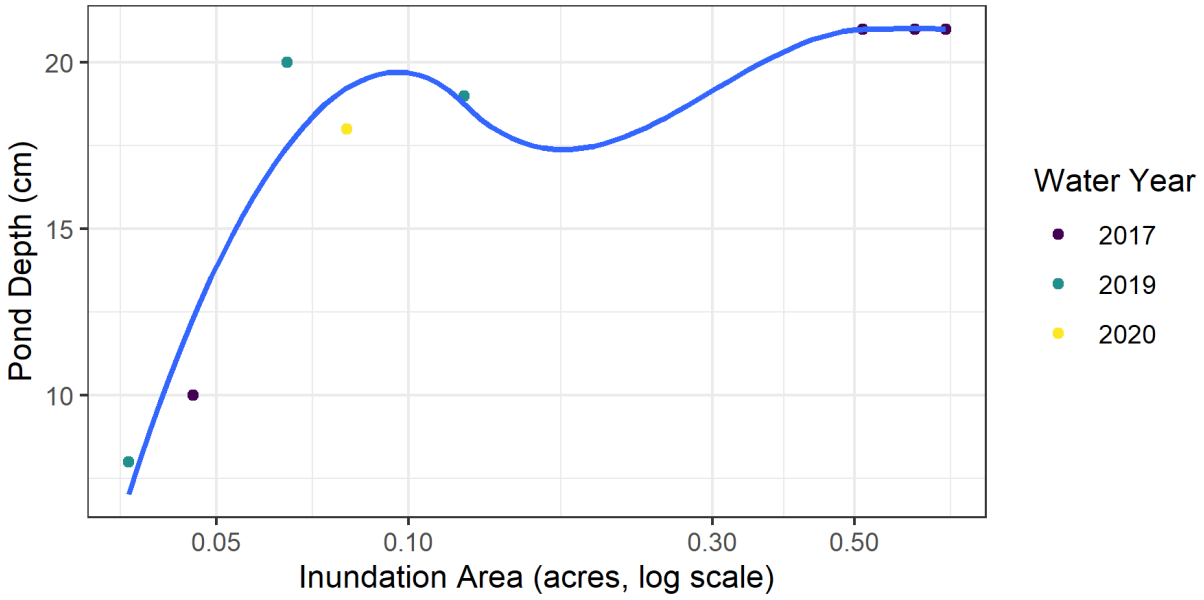


Figure 5-41. Pond 61 East (Year 4 Post-Subsurface Munitions Remediation) Plot of Depth vs Area since 2017 Water Year.

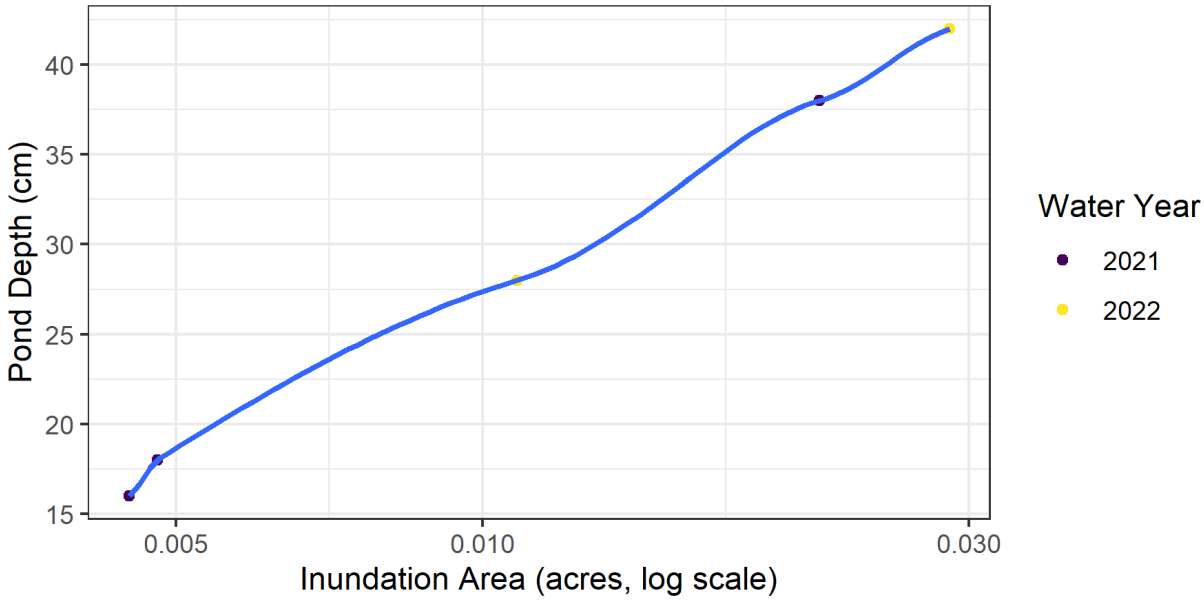


Figure 5-42. Pond 61 West (Year 4 Post-Subsurface Munitions Remediation) Plot of Depth vs Area since 2021 Water Year.

5.10.1 Data Quality Objective 1

Neither Pond 61 West nor Pond 61 East met the required average depths of 25 cm from the first rain event through March for CTS, nor the 10 cm for 18 consecutive days through May for fairy shrimp. Pond

61 West did not sustain sufficient depth for CTS (21.2 cm through March), but it did provide sufficient depth for fairy shrimp (26.5 cm from December 15 through February 17). Pond 61 East stayed dry in the 2022 water year, hence it did not sustain sufficient depth for neither CTS or fairy shrimp.

5.10.2 Data Quality Objective 2

Pond 61 West was inundated from December through February, while Pond 61 East stayed dry in the 2022 water year just like reference vernal pools. Pond 61 East was also dry in 2018 and 2021, both below normal water years. Pond 61 West held water in 2018, but the inundation extent was not recorded (Figure 5-44).

5.10.3 Performance Standard: Hydrological Conditions and Inundation Area

Pond 61 (encompassing both west and east depressions), a post-subsurface munitions remediation vernal pool, was partially on track to meet the performance standard for year 4 in the 2022 water year. Pond 61 did not meet DQO 1 for CTS, but it did for fairy shrimp. Pond 61 West held water in December through February, while Pond 61 East stayed dry. This difference in hydrology was also reflected in reference venal pools with Pond 101 East (East) being briefly inundated, and Pond 997 staying dry, thus DQO 2 was met. The vernal pool will continue to be monitored in future years to evaluate its progress to meet the performance standard.

5.10.4 Data Quality Objective 4

Water quality parameters of Pond 61 West were generally within the ranges observed at other vernal pools (Figures 5-2 through 5-5, and Figure 5-43).

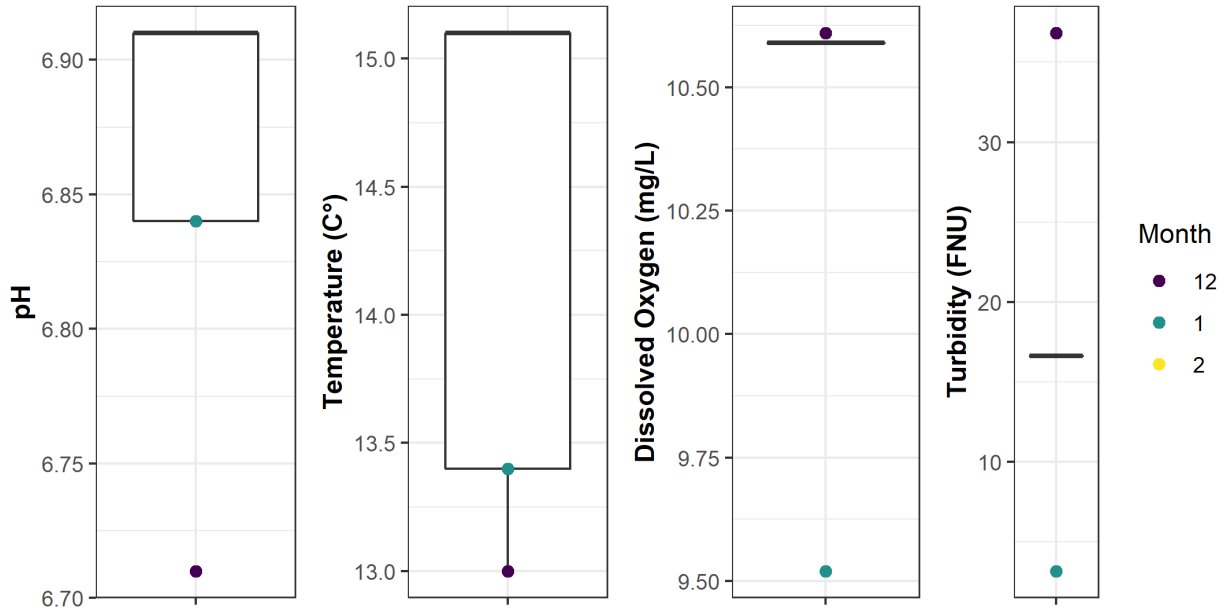


Figure 5-43. Pond 61 West (Year 4 Post-Subsurface Munitions Remediation) water quality measurements for pH, Temperature (C), Dissolved Oxygen (mg/L), and Turbidity (FNU). The colored dots represent observed values in the 2022 water year at Pond 61 West. The line in the middle of the box represents the median, and the lower and upper ends of the box are the 25% and 75% quartiles respectively. The upper and lower whiskers represent largest and smallest values within 1.5 times above and below the size of the hinge, which is the 75% minus 25% quartiles, respectively. Small black dots represent values outside of those statistics.

5.10.5 Performance Standard: Wildlife Usage

This performance standard was partailly on track in 2022 at Pond 61 because it had insufficient inundation depth and duration for CTS, but it had sufficient inundation and depth for the fairy shrimp. Water quality measurements were adequate for wildlife.

5.10.6 Conclusion

Pond 61, a post-subsurface munitions remediation vernal pool, was in year 4 monitoring in the 2022 water year. The vernal pool was partially on track to meet the performance standards (Table 5-10). Pond 61 will continue to be monitored in the future.

Table 5-10. Success at Pond 61 (Year 4 Post-Subsurface Munitions Remediation) Based on Performance Standards and Applicable Data Quality Objectives

Performance Standard	Applicable DQO	Success
Hydrological Conditions & Inundation Area	DQO 1	Partially on track
	DQO 2	On track
Wildlife Usage	DQO 1	Partially on track
	DQO 4	On track

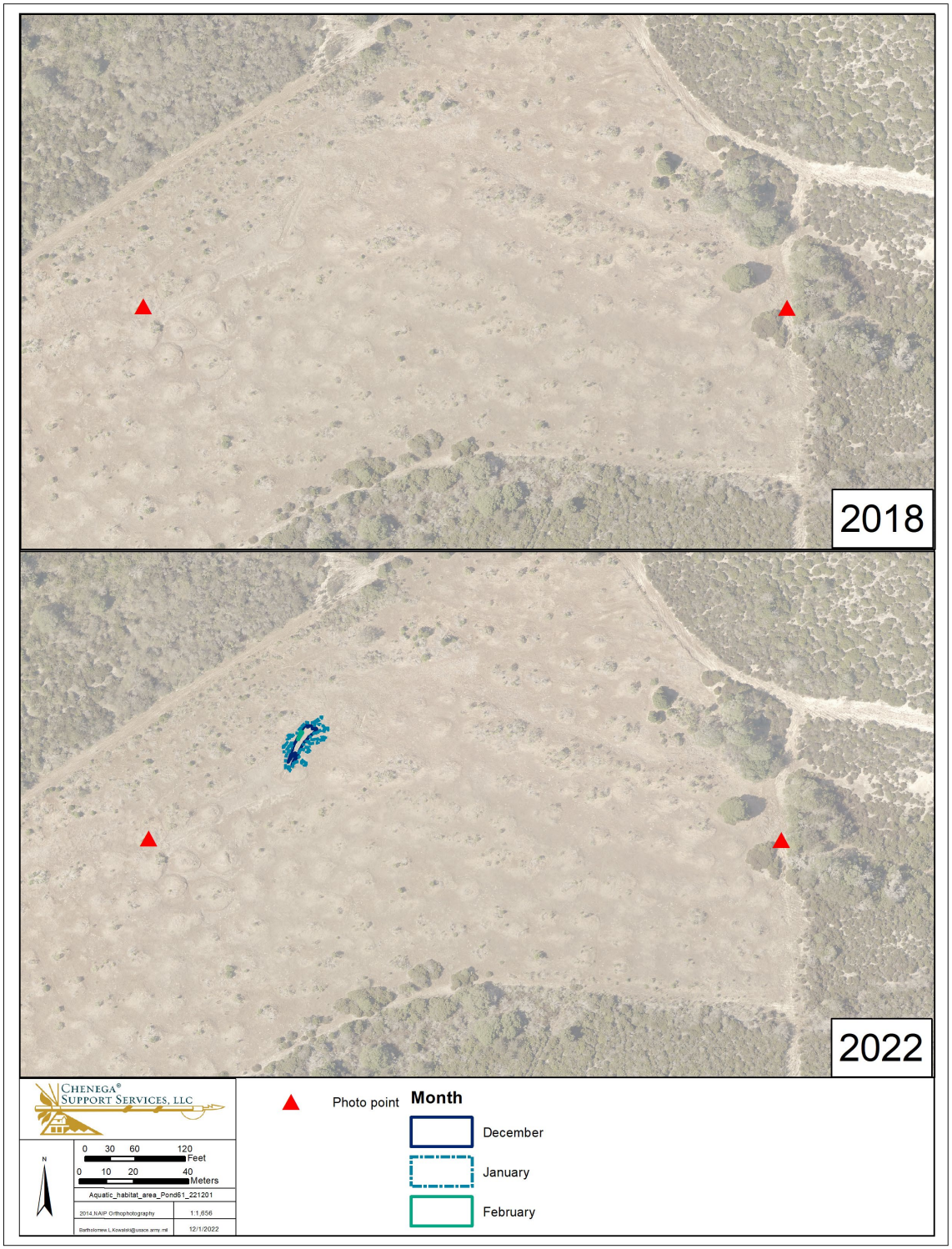


Figure 5-44. Ponds 61 East and 61 West (Year 4 Post-Subsurface Munitions Remediation) Inundations for 2018 and 2022 (both below normal precipitation water years). Inundation of Pond 61 West was not recorded in 2018.

6 CONCLUSION

Precipitation in the 2022 water year on the former Fort Ord was below normal for a second year in a row (Figure 2-2). Although precipitation in October and January were more than twice of normal, the cumulative precipitation in the 2022 water year was approximately 69% of normal (Figures 2-2 and 2-3). This had an effect on inundation levels of the 10 vernal pools monitored in the 2022 water year and their hydroperiods. Two out of the three reference vernal pools (Ponds 5 and 1010 East (East)) held water for a short period of time, while the third (Pond 997) remained dry. Four of the six remediated vernal pools held water, although two of those were inundated for only a month or less (Ponds 41 and 42). Pond 39, was inundated from October to February and Pond 61 West was inundated from November through February. Unsurprisingly, none of the monitored vernal pools met the DQO 1 for CTS as none of them had the minimum required average depth of 25 cm from the first rain event through March. DQO 1 was met for fairy shrimp at Ponds 39 and 61 West, and those were the only ponds that partially met the wildlife usage performance standard in the 2022 water year. DQO 2 was met for all remediated vernal pools monitored since their inundation was similar to respective reference vernal pools or the historical records. Water quality metrics were within the expected ranges at the four remediated vernal pools that held water (Table 6-1). All six remediated vernal pools monitored in the 2022 water year will be monitored in 2023 for Year 5 Post-Subsurface Munitions Remediation, at which point a full assessment of performance standards will be reviewed.

Pond 75 was monitored for a second year of baseline in the 2022 water year. Just like in the 2021 water year, it remained dry. This data will be used for comparison in the future after remediation activities will have taken place in Unit 17.

Table 6-1. 2022 Remediated Vernal Pools and Performance Standards Status

Vernal Pool	Monitoring Status	Hydrology		Wildlife	
		DQO 1 (depth)	DQO 2 (inundation)	DQO 1 (depth)	DQO 4 (water quality)
Pond 16	Year 4 Post-Subsurface Munitions Remediation	Not on track	On track	Not on track	Cannot assess
Pond 39	Year 4 Post-Subsurface Munitions Remediation	Partial	On track	Partial	On track
Pond 40 South	Year 4 Post-Subsurface Munitions Remediation	Not on track	On track	Not on track	Cannot assess
Pond 41	Year 4 Post-Subsurface Munitions Remediation	Not on track	On track	Not on track	On track
Pond 42	Year 4 Post-Subsurface Munitions Remediation	Not on track	On track	Not on track	On track
Pond 61	Year 4 Post-Subsurface Munitions Remediation	Partial	On track	Partial	On track

7 REFERENCES

Burleson Consulting, Inc. 2006. Wetland Monitoring and Restoration Plan for Munitions and Contaminated Soil Remediation. Prepared for the Department of the Army, U.S. Army Corps of Engineers, Sacramento, CA. AR# BW-2453

Burleson Consulting, Inc. 2017. 2016 Annual Wetland Vegetation and Wildlife Monitoring Report. Prepared for the Department of the Army, U.S. Army Corps of Engineers, Sacramento, CA. AR# BW-2825

Burleson Consulting, Inc. 2018. 2017 Annual Wetland Vegetation and Wildlife Monitoring Report. Prepared for the Department of the Army, U.S. Army Corps of Engineers, Sacramento, CA. AR# BW-2844

Burleson Consulting, Inc. 2019. 2018 Annual Wetland Vegetation and Wildlife Monitoring Report. Prepared for the Department of the Army, U.S. Army Corps of Engineers, Sacramento, CA. AR# BW-2868

Burleson Consulting, Inc. 2020. 2019 Annual Wetland Vegetation and Wildlife Monitoring Report. Prepared for the Department of the Army, U.S. Army Corps of Engineers, Sacramento, CA. AR# BW-2882

Burleson Consulting, Inc. 2021. 2020 Annual Wetland Vegetation and Wildlife Monitoring Report. Prepared for the Department of the Army, U.S. Army Corps of Engineers, Sacramento, CA. AR# BW-2898

Burleson Consulting, Inc. 2023. 2022 Annual Wetland Vegetation and Wildlife Monitoring Report. Prepared for the Department of the Army, U.S. Army Corps of Engineers, Sacramento, CA.

Chenega Tri-Services. 2021. 2020 Annual Report Wetland Hydrology and Water Quality Monitoring Former Fort Ord, California. Prepared for the Department of the Army, U.S. Army Corps of Engineers, Sacramento, CA. AR# BW-2901

Chenega Tri-Services. 2022. 2021 Annual Report Wetland Hydrology and Water Quality Monitoring Former Fort Ord, California. Prepared for the Department of the Army, U.S. Army Corps of Engineers, Sacramento, CA. AR# BW-2922

Esri. 2018. ArcGIS Version 10.7.

Harding ESE. 2002. 2001 Annual Monitoring Report Biological Baseline Studies and Follow-up Monitoring Former Fort Ord, Monterey, California. Prepared for U. S. Department of the Army, Sacramento, CA. AR# BW-2236

KEMRON. 2020a. Final BLM Area B Track 2 Ponds Geophysical Anomaly Investigation Technical Information Paper, Former Fort Ord, California. AR# OE-0966B.

KEMRON. 2020b. Unit 23 Risk Reduction Technical Memorandum, Former Fort Ord, California. AR# OE-0968B.

MACTEC. 2003. 2002 Annual Monitoring Report Biological Baseline Studies and Follow-up Monitoring Former Fort Ord, Monterey, California. Prepared for U. S. Department of the Army, Sacramento, CA. AR# BW-2237

MACTEC. 2004. 2003 Annual Monitoring Report Biological Baseline Studies and Follow-up Monitoring Former Fort Ord, Monterey, California. Prepared for U. S. Department of the Army, Sacramento, CA. AR# BW-2278

National Climatic Data Center of the National Oceanic and Atmospheric Administration (NDC NOAA). 2021. 30-Year Normal Precipitation Data for the NWSFO Monterey Airport Meteorological Tower. [Internet]. Accessed on October 20, 2022. Available at: http://www.ncdc.noaa.gov/cdo-web/datatools/normals

United States Army Corps of Engineers, Sacramento District. 1997. Installation-Wide Multi-Species Habitat Management Plan for Former Fort Ord, California. April. Sacramento, CA. AR# BW-1787.

United States Fish and Wildlife Service. 2017. Reinitiation of Programmatic Biological Opinion for Cleanup and Property Transfer Actions Conducted at the Former Fort Ord, Monterey County, CA. Report No. 8-8-09-F-74. AR# BW-2747A

APPENDIX A

Water Quality Results and Inundation Area for Vernal Pools by Month

Table A-1. Hydrology Results for October Monitoring (10/28/2021)

October								
Pond	**Date**	**Inundated Surface Area (acres)**	**Max Depth (cm)**	**Dissolved Oxygen (mg/L)**	**Temperature (C)**	**Turbidity (FNU)**	**pH**	**Conductivity (µs/cm)**
5	2021-10-28	0	0					
101EE	2021-10-28	0	0					
997	2021-10-28	0	0					
16	2021-10-28	0	0					
39	2021-10-28	NS	18	NS	NS	NS	NS	NS
40S	2021-10-28	0	0					
41	2021-10-28	0	0					
42	2021-10-28	0	0					
61E	2021-10-28	0	0					
61W	2021-10-28	0	0					

NS = Not Surveyed

Table A-2. Hydrology Results for November Monitoring (11/17/2021)

November								
Pond	**Date**	**Inundated Surface Area (acres)**	**Max Depth (cm)**	**Dissolved Oxygen (mg/L)**	**Temperature (C)**	**Turbidity (FNU)**	**pH**	**Conductivity (µs/cm)**
39	2021-11-17	NS	18	NS	NS	NS	NS	NS
40S	2021-11-17	0	0					
41	2021-11-17	0	0					
42	2021-11-17	0	0					

NS = Not Surveyed

Table A-3. Hydrology Results for December Monitoring (12/15/2021-12/20/2021)

December								
Pond	**Date**	**Inundated Surface Area (acres)**	**Max Depth (cm)**	**Dissolved Oxygen (mg/L)**	**Temperature (C)**	**Turbidity (FNU)**	**pH**	**Conductivity (µs/cm)**
5^	2021-12-17	0.5021	5	NS	NS	NS	NS	NS
101EE	2021-12-15	0	0					
997	2021-12-17	0	0					
75	2021-12-20	0	0					
16	2021-12-17	0	0					
39^	2021-12-15	0.0089	43	7.32	9.2	62.31	6.49	41.1
41	2021-12-15	0	0					
42^#	2021-12-15	0.0123	12	7.53	14.3	167.36	6.35	129.3
61E	2021-12-15	0	0					
61W^	2021-12-15	0.0108	28	10.61	13	36.83	6.71	204.9

NS = Not Surveyed

^Peripheral inundation present

#Probe not fully submerged

Table A-4. Hydrology Results for January Monitoring (1/12/2022-1/14/2022)

January								
Pond	**Date**	**Inundated Surface Area (acres)**	**Max Depth (cm)**	**Dissolved Oxygen (mg/L)**	**Temperature (C)**	**Turbidity (FNU)**	**pH**	**Conductivity (µs/cm)**
5	2022-01-14	2.2563	15	10.26	13.2	2.38	6.44	484.2
101EE	2022-01-14	0.2873	19	14.27	10.7	6.58	6.9	420.5
75	2022-01-12	0	0					
16	2022-01-12	0	0					
39^	2022-01-12	0.0045	33	7.46	10.2	26.96	6.51	71.5
40S	2022-01-12	0	0					
41^	2022-01-12	0.0068	24	9.67	14.9	1.69	7.15	290.3
42^	2022-01-12	0	0					
61E^	2022-01-12	0	0					
61W^	2022-01-12	0.0287	42	9.52	13.4	3.17	6.84	191.1

NS = Not Surveyed

^Peripheral inundation present

Table A-5. Hydrology Results for February Monitoring (2/1/2022-2/17/2022)

February								
Pond	**Date**	**Inundated Surface Area (acres)**	**Max Depth (cm)**	**Dissolved Oxygen (mg/L)**	**Temperature (C)**	**Turbidity (FNU)**	**pH**	**Conductivity (µs/cm)**
5	2022-02-01	NS	10	NS	NS	NS	NS	NS
5[#]	2022-02-17	0.3719	1	NS	NS	NS	NS	NS
101EE	2022-02-01	NS	2	NS	NS	NS	NS	NS
101EE	2022-02-17	0	0					
39	2022-02-01	NS	14	NS	NS	NS	NS	NS
39	2022-02-17	0	0					
41	2022-02-01	0	0					
42	2022-02-01	0	0					
61W	2022-02-01	NS	28	NS	NS	NS	NS	NS
61W[#]	2022-02-17	5e-04	8	NS	NS	NS	NS	NS

NS = Not Surveyed

[#]Probe not fully submerged

Table A-6. Hydrology Results for March Monitoring (3/2/2022)

March								
Pond	Date	Inundated Surface Area (acres)	Max Depth (cm)	Dissolved Oxygen (mg/L)	Temperature (C)	Turbidity (FNU)	pH	Conductivity (µs/cm)
5^	2022-03-02	0	0					
5	2022-03-22	0	0					
5	2022-03-30	0	0					
101EE	2022-03-02	0	0					
997	2022-03-02	0	0					
39	2022-03-02	0	0					
39	2022-03-30	0	0					
40S	2022-03-02	0	0					
41	2022-03-02	0	0					
42	2022-03-02	0	0					
61W	2022-03-02	0	0					

NS = Not Surveyed

^Peripheral inundation present

APPENDIX B

Historical Hydrology Monitoring Results for Reference and Remediated Vernal Pools

Table B-1. Pond 5 (Reference) Historical Hydrology Results on Former Fort Ord 1994-2022

Water Year	Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Turbidity (FNU)	Depth (cm)	Inundated Surface Area (acres)
1994	3/29/1994	-	17.00	-	-	31	2.75
	4/13/1994	-	20.00	-	-	20	-
1995	1/11/1995	-	16.00	-	-	28	0.17
	1/26/1995	-	14.00	-	-	43	0.52
	2/10/1995	-	15.00	-	-	51	0.50
	2/24/1995	-	13.00	-	-	51	0.52
	3/10/1995	-	-	-	-	76	1.72
	3/24/1995	-	22.00	-	-	>100	6.89
1996	1/3/1996	-	-	-	-	0	-
	1/18/1996	-	-	-	-	5	-
	1/31/1996	-	-	-	-	5	-
	2/14/1996	-	-	-	-	15	-
	2/29/1996	-	-	-	-	28	-
	3/14/1996	-	-	-	-	38	-
	3/28/1996	-	-	-	-	38	-
	4/11/1996	-	-	-	-	15	-
	4/25/1996	-	-	-	-	13	-
	5/9/1996	-	-	-	-	0	-
2007	12/1/2006	-	-	-	-	0	-
	1/23/2007	-	-	-	-	0	-
	3/6/2007	7.20	-	-	5.1 (NTU)	17	1.58
2010	3/11/2010	-	-	-	-	46	-
	5/25/2010	-	-	-	-	30	-
2013	11/26/2012	-	-	-	-	0	-
	12/19/2012	-	-	-	-	0§	0.01
	1/22/2013	-	-	-	-	11	0.91
	2/25/2013	-	-	-	-	0	0.00
	3/15/2013	-	-	-	-	0	0.00
	4/12/2013	-	-	-	-	0	0.00
	5/10/2013	-	-	-	-	0	0.00
2014	12/11/2013	-	-	-	-	0	0.00
	2/18/2014	-	-	-	-	0	0.00
	3/17/2014	-	-	-	-	0	0.00
	4/7/2014	-	-	-	-	0	0.00
	5/6/2014	-	-	-	-	0	0.00
	6/3/2014	-	-	-	-	0	0.00

Table B-1. Pond 5 (Reference) Historical Hydrology Results on Former Fort Ord 1994-2022

Water Year	Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Turbidity (FNU)	Depth (cm)	Inundated Surface Area (acres)
2016	4/5/2016	6.41	25.06	6.91	63.4	no gauge, ~100	5.33
	4/19/2016	6.51	20.27	5.73	23.8	no gauge, ~100	5.14
	5/9/2016	6.45	17.99	7.3	19.6	no gauge, ~100	4.86
	6/8/2016	6.48	21.32	0.34	17.7	no gauge, ~80	4.44
	7/7/2016	6.37	23.01	6.65	83.2	no gauge, ~60	3.19
	8/10/2016	6.85	16.37	0.97	295.0	4	0.36
	9/12/2016	-	-	-	-	0	0.00
2017	1/25/2017	6.09	8.94	2.13	4.0	58	5.32
	2/27/2017	6.24	11.77	4.52	6.4	gauge submerged, ~130	7.78
	3/23/2017	6.54	15.30	1.55	8.3	gauge submerged, ~130	7.30
	4/20/2017	6.38	17.22	0.00	5.9	gauge submerged, ~130	7.24
	5/25/2017	6.28	21.85	2.73	4.5	110	6.49
	6/20/2017	7.12	24.16	3.54	7.4	98	5.74
	7/28/2017	-	-	-	-	94	-
	8/16/2017	-	-	-	-	57	-
	9/6/2017	-	-	-	-	45	-
2018	11/20/2017	-	-	-	-	18	-
	1/15/2018	7.12	12.56	6.54	16.6	22	2.95
	2/23/2018	7.12	6.00	5.27	39.2	15	1.85
	3/21/2018	7.01	11.76	6.65	4.7	22	3.01
	4/18/2018	7.29	20.68	7.09	40.6	22	2.85
	5/22/2018	-	-	-	-	0	0.00‡
2019	1/14/2019	6.70	11.09	10.16	4.7	4	0.47‡
	2/13/2019	6.89	10.55	10.24	8.4	42	4.21‡
	3/7/2019	6.58	14.10	5.58	1.5	56	4.83‡
	4/4/2019	6.41	14.87	1.71	1.2	53	4.59

Table B-1. Pond 5 (Reference) Historical Hydrology Results on Former Fort Ord 1994-2022

Water Year	Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Turbidity (FNU)	Depth (cm)	Inundated Surface Area (acres)
	5/9/2019	6.51	17.15	3.80	0.6	37	3.96
	6/6/2019	7.09	20.32	6.07	13.6	30	3.62
	7/9/2019	-	-	-	-	25§	-
	8/13/2019	-	-	-	-	0	0.00
2020	12/4/2019	-	-	-	-	9	-
	12/20/2019#	7.28	15.3	6.01	18.37	8	0.7359
	1/8/2020	-	-	-	-	11	-
	1/30/2020	7.41	14.6	20.16	16.54	14	1.9979
	2/21/2020	-	-	-	-	8	-
	2/27/2020	6.52	16.5	6.87	91.61	6	0.751
	3/17/2020*	-	-	-	-	15	-
	3/27/2020	6.33	15.2	8.89	7.82	23	3.0472
	4/15/2020*	-	-	-	-	33	-
	4/28/2020	6.57	24.2	2.9	1.63	26	3.1494
	5/18/2020*	-	-	-	-	15	-
	5/26/2020	6.71	28.7	3.51	74.48	8	0.7328
	6/10/2020*	-	-	-	-	0	0
2021	1/7/2021	-	-	-	-	0	0
	2/1/2021‡	-	-	-	-	0	0
	3/29/2021‡	-	-	-	-	0	0
2022	10/28/2021	-	-	-	-	0	0
	12/17/2021‡	-	-	-	-	5	0.5021
	1/14/2022	6.44	13.2	10.26	2.38	15	2.2563
	2/1/2022	-	-	-	-	10	-
	2/17/2022#	-	-	-	-	1	0.3719
	3/2/2022‡	-	-	-	-	0	0
	3/22/2022	-	-	-	-	0	0
	3/30/2022	-	-	-	-	0	0

‡Peripheral ponding was observed but was not mapped as there was no surface hydrological connectivity between the peripheral ponding and location of the staff gauge.
§Depth is an estimate. Decreased visibility due to emergent vegetation.
*taken during Burleson surveys
#Probe not fully submerged

Pond 5 was monitored fourteen years between 1994 and 2022 water years. Pond 5 is a reference vernal pool and no remediation has occurred. The Historical data and precipitation are summarized below:

- 1994 (Jones & Stokes, 1996)
  - In a precipitation year below normal, Pond 5 held water during both monitoring events in March and April with a maximum recorded inundation of 2.75 acres. The temperatures were within a normal range.
  - Yearly cumulative precipitation 13.96 inches
  - Data collected only in March and April
  - Inundated during both monitoring events
  - Recorded inundation maximum 2.75 acres in March
  - Depth range 20-31 cm, mean 26
  - temperature 17°-20° C, mean 18.5° C
- 1995 (Jones & Stokes, 1996)
  - In a water-year that was above normal, Pond 5 was inundated by January monitoring and stayed inundated through March. Pond 5 inundation area was large compared to other monitored years and filled to 6.89 acres with a maximum depth of 102 cm. The temperature fluctuated greatly, which can be expected.
  - Yearly cumulative precipitation 23.38 inches
  - Data collected January-March, six monitoring events
  - Inundated during all monitoring events
  - Inundation range 0.17-6.89 acres, mean 1.72 acres
  - Depth range 28->100 cm, mean 58 cm
  - temperature range 13°-22° C, mean 16° C
- 1996 (Jones & Stokes, 1996)
  - In a water-year that was approximately normal, ponding occurred from January-May. The maximum depth was much lower than the previous year but similar to the 1994 water-year.
  - Yearly cumulative precipitation 16.96 inches
  - Data collected January-May, ten monitoring events
  - Inundated mid-January to early-May
  - No inundation area recorded
  - Depth range 5-38 cm, mean 20 cm
  - No water quality data collected
- 2007 (Shaw, 2008)
  - In a below normal rain year, Pond 5 was inundated to 1.58 acres. The pH at Pond 5 was neutral and the turbidity was relatively low.
  - Yearly cumulative precipitation 10.13 inches
  - Data collected December-March, three monitoring events
  - Some inundation in March, which comprised an area of 1.58 acres
  - Depth 17 cm
  - One water quality sample 7.20 pH, 5.1 FNU turbidity
- 2010 (Shaw, 2011)
  - DD&A conducted wildlife surveys in March and May. Only depth records were taken but data was not reported.
  - Below normal rain year
  - Yearly cumulative precipitation 14.6 inches
  - Maximum recorded depth was 46 cm
- 2013 (Tetra Tech, 2014)

  - In a drought year with below normal precipitation, Pond 5 was only inundated in December and January and was a fraction of the size with a maximum inundation of 0.91 acres.
  - Drought year with yearly cumulative precipitation of 11.17 inches
  - Data collected November-May, seven monitoring events
  - Inundated in December and January
  - Inundation range 0.01-0.91 acres, mean 0.46 acres
  - Depth 11 cm, only one depth recorded
  - No water quality data collected
- 2014 (Tetra Tech, 2015)
  - In a consecutive drought year Pond 5 did not fill.
  - Consecutive drought year with yearly cumulative precipitation 9.33 inches
  - Data collected December-June, six monitoring events
- 2016 (Burleson, 2017)
  - In a consecutive drought with precipitation above normal, Pond 5 was inundated from the first recorded monitoring in April through August. The maximum inundation area was 5.33 acres. Water quality was within normal ranges. Neutral to slightly acidic pH values were observed. Temperature was higher on average than some of the other large vernal pools, however, Pond 5 was often monitored in the late afternoon. Dissolved oxygen had a large range. Turbidity was low on average with a few high readings at the end of the season. It is likely that Pond 5 was inundated earlier in the water-year and maximum inundation was most likely not captured. It should be noted that data collection did not start with the first storm or inundation.
  - Consecutive drought year with yearly cumulative precipitation 21.21 inches
  - Data collected April-September, seven monitoring events
  - Inundated April through August
  - Inundation range 0.36-5.33 acres, mean 3.89 acres
  - Depth range 4-100 cm, mean 74 cm
  - pH range 6.37-6.85, mean 6.51
  - temperature range 16.4°-25.1° C, mean 20.7° C
  - dissolved oxygen range 0.34-7.30 mg/L, mean 4.65 mg/L
  - turbidity range 17.7-295.0 FNU, mean 83.8 FNU
- 2017 (Burleson, 2018)
  - After the end of a Historical drought with precipitation above normal, Pond 5 was inundated from the first recorded monitoring in January through September (Pond 5 did not 0 by last recorded monitoring in September). The maximum inundation area was 7.78 acres. Water quality was within normal ranges. Neutral to slightly acidic pH values were observed. Temperature was within normal averages for Fort Ord, with a few high readings in the middle of the season. Dissolved oxygen had a small range, with moderate levels. Turbidity was low on average.
  - Yearly cumulative precipitation 22.92 inches
  - Data collected January - September, nine monitoring events
  - Inundated January through September (pond did not 0 at last reading in September)
  - Inundation range 5.32-7.78 acres, mean 6.65 acres
  - Depth range 45-~130 cm, mean 95 cm
  - pH range 6.09-7.12, mean 6.44
  - temperature range 8.9°-24.2° C, mean 16.5° C
  - dissolved oxygen range 0.00-4.52 mg/L, mean 2.41 mg/L

  - turbidity range 4.0-8.3 FNU, mean 6.1 FNU
- 2018 (Burleson, 2019)
  - In a below normal water-year, Pond 5 was inundated from the first recorded monitoring in January through April. The maximum inundation area was 3.01 acres. Water quality was within normal ranges. Neutral to slightly acidic pH values were observed. Temperature was within normal averages for Fort Ord. Dissolved oxygen had a small range, with moderate levels. Turbidity was low on average.
  - Yearly cumulative precipitation 12.57 inches
  - Data collected November - May, six monitoring events
  - Inundated November through April
  - Inundation range 1.85-3.01 acres, mean 2.66 acres
  - Depth range 15-22 cm, mean 20 cm
  - pH range 7.01-7.29, mean 7.14
  - temperature range 6.00°-20.68° C, mean 12.75° C
  - dissolved oxygen range 5.27-7.09 mg/L, mean 6.39mg/L
  - turbidity range 4.7-40.6 FNU, mean 25.3 FNU
- 2019 (Burleson, 2020)
  - In an above normal water-year, Pond 5 was inundated from the first recorded monitoring in January through July. The maximum inundation area was 4.83 acres. Water quality was within normal ranges. Neutral to slightly acidic pH values were observed. Temperature was within normal averages for Fort Ord. Dissolved oxygen had a small range, with moderate levels. Turbidity was low on average.
  - Yearly cumulative precipitation 21.97 inches
  - Data collected January - August, eight monitoring events
  - Inundated January through July
  - Inundation range 0.47-4.83 acres, mean 3.61 acres
  - Depth range 4-56 cm, mean 35 cm
  - pH range 6.41-7.09, mean 6.70
  - temperature range 10.55°-20.32° C, mean 14.68° C
  - dissolved oxygen range 1.71-10.24 mg/L, mean 6.26 mg/L
  - turbidity range 0.6-13.6 FNU, mean 5.0 FNU
- 2020 (Chenega, 2021)
  - In a close to normal water year, Pond 5 was inundated from the first recorded monitoring in December through May. The maximum inundation area was 3.15 acres. Water quality was generally within historical ranges. Slightly acidic to slightly alkaline pH values were observed. Temperature was within normal averages for Fort Ord. Dissolved oxygen in January was highest on record, but otherwise within historical range. Turbidity values were somewhat elevated in February and May, but not outside of historical range.
  - Yearly cumulative precipitation 18.08 inches
  - Data collected December - June, 13 monitoring events
  - Inundated December through May
  - Inundation range 0-3.15 acres, mean 1.49 acres
  - Depth range 0-33 cm, mean 13.6 cm
  - pH range 6.33-7.41, mean 6.80
  - temperature range 14.6°-28.7° C, mean 19.08° C
  - dissolved oxygen range 2.9-20.16 mg/L, mean 8.06 mg/L
  - turbidity range 1.63-91.61 FNU, mean 35.08 FNU

- 2021 (Chenega, 2022)
  - In a year of lowest cumulative precipitation of 7.57 inches in last 30 years, Pond 5 did not fill
  - Data collected Jan-March, three monitoring events
- 2022
  - In consecutive below normal water year, Pond 5 was briefly inundated from mid-December to beginning of March
  - Yearly cumulative precipitation of 11.69 inches
  - Data collected October - March, 8 monitoring events
  - Inundated December through March
  - Inundation range 0-2.26 acres, mean 0.63 acres
  - Depth range 0-15 cm, mean 5.17 cm
  - pH single reading of 6.44
  - temperature single reading of 13.2° C
  - dissolved oxygen single reading of 10.26 mg/L
  - turbidity single reading of 2.38 FNU

Table B-2. Pond 101 East (East) (Reference) Historical Hydrology Results on Former Fort Ord 2001-2022

Water Year	Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Turbidity (FNU)	Depth (cm)	Inundated Surface Area (acres)
2001	Feb	-	-	-	-	36ɣ	1.47
	Mar	6.30	-	-	-	>46ɣ	1.26
	Apr	6.81	-	-	-	>5ɣ	0.36
	May	-	-	-	-	-	0.24
2007	Dec	-	-	-	-	0	0.00
	Jan	-	-	-	-	0	0.00
	Mar	7.61	-	-	6.1 (NTU)	20	0.32
	Apr	-	-	-	-	0	0.00
	May	-	-	-	-	0	0.00
	June	-	-	-	-	0	0.00
2013	11/26/2012	-	-	-	-	0§	0.00
	12/19/2012	-	-	-	-	0§	0.00
	1/22/2013	-	-	-	-	11§	0.08
	2/25/2013	-	-	-	-	0§	0.00
	3/15/2013	-	-	-	-	0§	0.00
	4/12/2013	-	-	-	-	0§	0.00
	5/10/2013	-	-	-	-	0§	0.00
2014	12/11/2014	-	-	-	-	0§	0.00
	2/18/2014	-	-	-	-	0§	0.00
	3/17/2014	-	-	-	-	0§	0.00
	4/7/2014	-	-	-	-	0§	0.00
	5/6/2014	-	-	-	-	0§	0.00
	6/3/2014	-	-	-	-	0§	0.00
2015	3/18/2015	-	-	-	-	0	0.00
	4/16/2015	-	-	-	-	0	0.00
	5/28/2015	-	-	-	-	0	0.00
2016	4/5/2016	6.44	17.1	7.93	138.0	68	3.24
	4/19/2016	6.38	22.7	6.50	112.0	68	3.13
	5/9/2016	7.07	23.0	6.92	106.0	55	2.77
	6/8/2016	6.49	23.0	4.36	53.0	32	1.23
	7/7/2016	-	-	-	-	0	0.00
2017	1/24/2017	5.50	10.0	1.95	1.9	~155, gauge submerged	Connected to 101 East (West), total 5.02
	2/27/2017	6.23	12.2	3.68	21.8	~160, gauge submerged	Connected to 101 East (West), total 9.37
	3/20/2017	6.23	15.3	1.07	39.2	~160, gauge submerged	Connected to 101 East (West), total 8.89

Table B-2. Pond 101 East (East) (Reference) Historical Hydrology Results on Former Fort Ord 2001-2022

Water Year	Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Turbidity (FNU)	Depth (cm)	Inundated Surface Area (acres)
	4/20/2017	6.49	17.3	0.00	43.2	~160, gauge submerged	Connected to 101 East (West), total 9.38
	5/25/2017	6.89	19.0	2.38	4.0	~160, gauge submerged	6.52
	6/21/2017	6.91	20.1	3.58	10.7	~150, gauge submerged	5.57
	7/28/2017	-	-	-	-	100	-
	8/16/2017	-	-	-	-	95	-
	9/6/2017	-	-	-	-	77	-
	11/20/2017	-	-	-	-	44	-
	1/19/2018	6.82	11.92	0.21	63.0	44	2.09
	2/16/2018	6.80	10.94	4.45	114.0	-	1.44
2018	3/21/2018	6.97	12.62	3.35	40.8	40	1.86
	4/17/2018	7.12	21.88	10.03	99.4	40	1.67
	5/22/2018	6.42	13.55	15.25	1000.0	14	0.04
	6/19/2018	-	-	-	-	0	0.00
	1/14/2019	-	-	-	-	0	0.00
	2/14/2019	6.88	14.36	8.94	10.4	47	2.21‡
	3/7/2019	6.51	14.08	5.48	9.7	56	2.76‡
2019	4/4/2019	6.80	14.15	5.63	6.1	53	2.51‡
	5/9/2019	6.38	16.26	3.09	13.0	34	1.14
	6/6/2019	7.13	21.92	5.48	79.8	26	0.38
	7/9/2019	-	-	-	-	0	0.00
	12/04/2019	-	-	-	-	13	-
	12/13/2019	-	-	-	-	0	0
	12/20/2019	-	-	-	-	0	0
	12/23/2019	-	-	-	-	0	0
	12/31/2019	6.84	13.3	9.98	5.46	12	0.0715
	1/06/2020	-	-	-	-	11	-
2020	1/30/2020*#	6.68	14.6	23.33	28.16	12	0.1752
	2/19/2020	-	-	-	-	8	-
	2/27/2020	-	-	-	-	1	0.0032
	3/11/2020	-	-	-	-	0	0
	3/20/2020^	-	-	-	-	26	0.6504
	3/30/2020	6.36	16.2	3.28	3.31	34	1.6103
	4/17/2020*	-	-	-	-	37	-
	4/28/2020	6.56	23.1	2.24	4.72	29	1.0074

Table B-2. Pond 101 East (East) (Reference) Historical Hydrology Results on Former Fort Ord 2001-2022

Water Year	Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Turbidity (FNU)	Depth (cm)	Inundated Surface Area (acres)
	5/19/2020*	-	-	-	-	4	-
	5/26/2020	-	-	-	-	0	0
2021	1/7/2021	-	-	-	-	0	0
	2/1/2021	-	-	-	-	0	0
	2/12/2021	-	-	-	-	0	0
	3/29/2021	-	-	-	-	0	0
2022	10/28/2021	-	-	-	-	0	0
	12/15/2021	-	-	-	-	0	0
	1/14/2022	6.9	10.7	14.27	6.58	19	0.2873
	2/1/2022	-	-	-	-	2	-
	2/17/2022	-	-	-	-	0	0
	3/2/2022	-	-	-	-	0	0

¥In 2001, depths were recorded for Waterbody 53, which includes the currently named ponds of Pond 101 West, Pond 101 East (West), and 101 East (East). It is unknown which pond was sampled for depth.
§No staff gauge. Cannot access ponds to measure depth due to potential for subsurface unexploded ordnance and other hazards. Depths are estimations
#Probe not fully submerged
*taken during Burleson surveys
^Peripheral inundation present

Pond 101 East (East) was monitored twelve years between 2001 and 2022 water years. Pond 101 East (East) is a reference vernal pool and no remediation has occurred. The Historical data and precipitation are summarized below:

- 2001 (Harding ESE, 2002)
  - In a year with early storms followed by below normal precipitation, Pond 101 East (East) was recorded as inundated from February through May with a maximum inundation of 1.47 acres. The water quality results indicate a slightly acidic to neutral pH.
  - Early storms with cumulative precipitation below normal (15.52 inches)
  - Data collected in January-May, five monitoring events
  - Inundated for all monitoring events
  - Inundation range 0.24-1.61 acres, mean 0.92 acres
  - Depth range 2-18 cm, mean 11.3 cm
  - Water quality data was collected twice, pH 6.3-6.81, mean 6.56
- 2007 (Shaw, 2008)
  - In a below normal water-year, Pond 101 East (East) was inundated only in the month of March. The water quality results indicated a slightly alkaline pH.
  - Cumulative precipitation was below normal (10.13 inches)
  - Data collected from December-June, 6 monitoring events
  - Inundated only in March to 0.32 acres and 20 cm depth
  - Inundation area was not recorded

  - pH 7.61
- 2013 (Tetra Tech, 2014)
  - In a 0 consecutive drought year with below normal cumulative precipitation, Pond 101 East (East) is thought to have held water briefly in January. It is unconfirmed if the brief inundation was at Pond 101 East (West) or 101 East (East) since the data were documented under Pond 101 East, with no further signification of East or West.
  - Consecutive drought year with cumulative precipitation below normal (11.17 inches)
  - Data collected November-May, seven monitoring events
  - Inundated in January, 0.08 acres
  - Depth 11 cm in January
  - No water quality data collected
- 2014 (Tetra Tech, 2015)
  - In a 0 consecutive drought year with below normal cumulative precipitation, Pond 101 East (East) did not hold water the entire year.
  - Consecutive drought year with cumulative precipitation below normal (9.33 inches)
  - Data collected December-June, six monitoring events
  - 0 in all monitoring events
  - No water quality data collected
- 2015 (Burleson, 2016)
  - In a 0 consecutive drought year with below normal cumulative precipitation, Pond 101 East (East) did not hold water.
  - Consecutive drought year with early storms above normal and cumulative precipitation slightly below normal (14.35 inches)
  - Data collected March to May, three monitoring events
  - 0 in all monitoring events
  - No water quality data collected
- 2016 (Burleson, 2017)
  - In a consecutive drought year with cumulative precipitation above normal, Pond 101 East (East) held water from April-June. Water quality results indicated a slightly acidic to neutral pH, normal temperatures, moderate to high dissolved oxygen and moderate turbidity. It should be noted that data collection did not start with the first storms or inundation. Maximum inundation could have been missed.
  - Drought year with cumulative precipitation above normal (21.21 inches)
  - Data collected April-July, five monitoring events
  - Inundated from April-June
  - Inundation range 1.23-3.24 acres, mean 2.59 acres
  - Depth range 32-68 cm, mean 56 cm
  - pH range 6.38-7.07, mean 6.60
  - temperature range 17.1°-23.0° C, mean 21.4° C
  - dissolved oxygen range 4.36-7.93 mg/L, mean 6.43 mg/L
  - turbidity range 106-553 FNU, mean 227 FNU
- 2017 (Burleson, 2018)
  - After the end of a Historical drought with precipitation above normal, Pond 101 East (East) was inundated from the first recorded monitoring in January through September (Pond 101EE did not 0 at last recorded monitoring in September). The maximum inundation area was 9.374 acres (101EE was connected to 101EW). Water quality was within normal ranges. Slightly acidic pH values were observed. Temperature was within

normal averages for Fort Ord. Dissolved oxygen had a small range, with moderate levels. Turbidity had a large range, with moderate levels.
  - Yearly cumulative precipitation 22.92 inches
  - Data collected January - September, nine monitoring events
  - Inundated January through September (pond did not 0 by last recorded monitoring in September)
  - Inundation range 5.02-9.40 acres, mean 7.46 acres (pond was connected to 101 East (West) for range and mean values)
  - Depth range 77-~160 cm, mean 135 cm
  - pH range 5.5-6.91, mean 6.38
  - temperature range 10.0°-20.1° C, mean 15.7° C
  - dissolved oxygen range 0.0-3.68 mg/L, mean 2.11 mg/L
  - turbidity range 1.9-43.2 FNU, mean 20.13 FNU
- 2018 (Burleson, 2019)
  - In a below normal water-year, Pond 101 East (East) was inundated from the first recorded monitoring in January through May. The maximum inundation area was 2.09 acres. Water quality was within normal ranges. Neutral to slightly acidic pH values were observed. Temperature was within normal averages for Fort Ord. Dissolved oxygen had a large range. Turbidity had a large range, with an out-of-range reading in May.
  - Yearly cumulative precipitation 12.57 inches
  - Data collected November - June, seven monitoring events
  - Inundated January through May
  - Inundation range 0.04-2.09 acres, mean 1.42 acres
  - Depth range 14-48 cm, mean 38 cm
  - pH range 6.42-7.12, mean 6.83
  - temperature range 10.94°-21.88° C, mean 14.18° C
  - dissolved oxygen range 0.21-15.25 mg/L, mean 6.66 mg/L
  - turbidity range 40.8-1000 FNU, mean 263.44 FNU
- 2019 (Burleson, 2020)
  - In an above normal water-year, Pond 101 East (East) was inundated from the second recorded monitoring in February through June. The maximum inundation area was 2.76 acres. Water quality was within normal ranges. Neutral to slightly acidic pH values were observed. Temperature was within normal averages for Fort Ord. Dissolved oxygen had a small range with moderate levels. Turbidity had a large range with moderate levels.
  - Yearly cumulative precipitation 21.97 inches
  - Data collected January - July, seven monitoring events
  - Inundated February through June
  - Inundation range 0.38-2.76 acres, mean 1.80 acres
  - Depth range 26-56 cm, mean 43 cm
  - pH range 6.38-7.13, mean 6.74
  - temperature range 14.08°-21.92° C, mean 16.15° C
  - dissolved oxygen range 3.09-8.94 mg/L, mean 5.72 mg/L
  - turbidity range 6.1-79.8 FNU, mean 23.8 FNU
- 2020 (Chenega, 2021)
  - In a close to normal water year, Pond 101 East (East) was inundated intermittently from the first recorded monitoring in December through May. The maximum inundation area was 1.61 acres. Water quality was generally within historical ranges. Slightly acidic pH values were observed. Temperature was within normal averages for Fort Ord. Dissolved

oxygen in January was highest on record, but otherwise within the historical range. Turbidity values were within the historical range.
  - Yearly cumulative precipitation 18.08 inches
  - Data collected December - May, 15 monitoring events
  - Inundated intermittently from December through May, dried out three times
  - Inundation range 0-1.61 acres, mean 0.32 acres
  - Depth range 0-37 cm, mean 11.69 cm
  - pH range 6.33-6.87, mean 6.61
  - temperature range 13.3°-23.1° C, mean 16.8° C
  - dissolved oxygen range 2.24-23.33 mg/L, mean 9.707 mg/L
  - turbidity range 3.31-28.16 FNU, mean 10.11 FNU
- 2021 (Chenega, 2022)
  - In a year of lowest cumulative precipitation of 7.57 inches in last 30 years, Pond 101 East (East) did not fill
  - Data collected Jan-March, four monitoring events
- 2022
  - In consecutive below normal water year, Pond 101 East (East) was briefly inundated from mid-December to beginning of March
  - Yearly cumulative precipitation of 11.69 inches
  - Data collected October - March, 6 monitoring events
  - Inundated January through February
  - Inundation range 0-0.29 acres, mean 0.1 acres
  - Depth range 0-19 cm, mean 5.25 cm
  - pH single reading of 6.9
  - temperature single reading of 10.7° C
  - dissolved oxygen single reading of 14.27 mg/L
  - turbidity single reading of 6.58 FNU

Table B-3. Pond 997 (Reference) Historical Hydrology Results on Former Fort Ord 2017-2022

Water-Year	Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Turbidity (FNU)	Depth (cm)	Inundated Surface Area (acres)
2017	1/25/2017	6.40	10.22	7.17	25.6	13	0.33
	2/27/2017	6.78	16.94	12.20	14.1	15	0.23
	3/23/2017	6.43	12.99	7.88	72.4	12	0.10
	4/19/2017	7.07	25.42	7.14†	25.5†	6	0.02
	5/24/2017	-	-	-	-	0	0.00
2018	1/19/2018	-	-	-	-	0	0.00
	2/23/2018	-	-	-	-	0	0.00
	3/20/2018	-	-	-	-	0	0.00
	4/18/2018	-	-	-	-	0	0.00
2019	1/14/2019	-	-	-	-	0	0.00
	2/13/2019	6.39†	11.79†	10.62†	26.0†	13	0.11‡
	3/5/2019	6.37†	12.61†	9.28†	24.2†	14	0.12‡
	4/9/2019	-	-	-	-	2	0.03
	5/9/2019	-	-	-	-	0	0.00
2020	12/04/19^	-	-	-	-	0	0
	12/20/19	-	-	-	-	0	0
	12/23/19	-	-	-	-	0	0
	01/06/20	-	-	-	-	0	0
	01/30/20	-	-	-	-	0	0
	03/20/20	-	-	-	-	0	0
	03/27/20^#	6.06	19.6	8.44	49.45	7	0.0507
	04/17/20*	-	-	-	-	6	-
	04/28/20	-	-	-	-	0	0
2021	1/7/2021	-	-	-	-	0	0
	2/1/2021	-	-	-	-	0	0
	3/29/2021	-	-	-	-	0	0
	4/05/2021	-	-	-	-	0	0
2022	10/28/2021	-	-	-	-	0	0
	12/17/2021	-	-	-	-	0	0
	3/2/2022	-	-	-	-	0	0

†Water quality probe was horizontal for measurements.
‡Peripheral ponding was observed but was not mapped as there was no surface hydrological connectivity between the peripheral ponding and location of the staff gauge.
#Probe not fully submerged
*taken during Burleson surveys
^Peripheral inundation present

Pond 997 was monitored six years between 2017 and 2022 water years. Pond 997 is a reference vernal pool and no remediation has occurred. The Historical data and precipitation are summarized below:

- 2017 (Burleson, 2018)
  - After the end of a Historical drought with precipitation above normal, Pond 997 was inundated from the first recorded monitoring in January through April. The maximum inundation area was 0.33 acres. Water quality was within normal ranges. Slightly acidic pH values were observed. Temperature was within normal averages for Fort Ord. Dissolved oxygen had a small range, with moderate levels. Turbidity had a large range, with moderate levels.
  - Yearly cumulative precipitation 22.92 inches
  - Data collected January - May, five monitoring events
  - Inundated January through April
  - Inundation range 0.02-0.33 acres, mean 0.17 acres
  - Depth range 6-15 cm, mean 12 cm
  - pH range 6.40-7.07, mean 6.67
  - temperature range 10.2°-25.4° C, mean 16.4° C
  - dissolved oxygen range 7.14-12.20 mg/L, mean 8.60 mg/L
  - turbidity range 14.1-72.4 FNU, mean 34.4 FNU
- 2018 (Burleson, 2019)
  - In a below normal water-year, Pond 997 did not hold water.
  - Yearly cumulative precipitation 12.57 inches
  - Data collected January - April, four monitoring events
  - 0 in all monitoring events
  - No water quality data collected
- 2019 (Burleson, 2020)
  - In an above normal water-year, Pond 997 was inundated from the second recorded monitoring in February through April. The maximum inundation area was 0.12 acres. Water quality was within normal ranges. Water quality data were collected in February and March. Slightly acidic pH values were observed. Temperature was within normal averages for Fort Ord. Dissolved oxygen had a small range, with moderate levels. Turbidity had a small range, with moderate levels.
  - Yearly cumulative precipitation 21.97 inches
  - Data collected January through May, five monitoring events
  - Inundated February through April
  - Inundation range 0.03-0.12 acres, mean 0.09 acres
  - Depth range 2-14 cm, mean 10 cm
  - pH range 6.37-6.39, mean 6.38
  - temperature range 11.79°-12.61° C, mean 12.20° C
  - dissolved oxygen range 9.28-10.62 mg/L, mean 9.95 mg/L
  - turbidity range 24.2-26.0 FNU, mean 25.1 FNU
- 2020 (Chenega, 2021)
  - In a close to normal water year, Pond 997 was inundated from late March through mid-April. The maximum inundation area was 0.05 acres. Water quality was measured only once but it was within Historical ranges. Slightly acidic pH value was observed.
  - Yearly cumulative precipitation 18.08 inches
  - Data collected December - April, nine monitoring events
  - Inundated from late March through mid-April
  - Inundation range 0-05 acres, mean 0.05 acres
  - Depth range 0-7 cm, mean 1.44 cm
  - pH value of 6.06

  - temperature value of 19.6
  - dissolved oxygen value of 8.44
  - turbidity value of 49.45
- 2021 (Chenega, 2022)
  - In a year of lowest cumulative precipitation of 7.57 inches in last 30 years, Pond 997 did not fill
  - Data collected Jan-April, four monitoring events
- 2022
  - In consecutive below normal water year, Pond 997 did not fill
  - Yearly cumulative precipitation of 11.69 inches
  - Data collected October - March, 3 monitoring events

Table B-4. Pond 75 (Baseline) Historical Hydrology Results on Former Fort Ord 2021 - 2022

Water-Year	Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Turbidity (FNU)	Depth (cm)	Inundated Surface Area (acres)
2021	1/7/2021	-	-	-	-	0	0
	2/2/2021	-	-	-	-	0	0
2022	12/20/2021	-	-	-	-	0	0
	1/12/2022	-	-	-	-	0	0

Pond 75 was monitored for the first time in 2021 water year. Monitoring events and related activities are summarized below:

- 2021 (Chenega, 2021)
  - In a year of lowest cumulative precipitation of 7.57 inches in last 30 years, Pond 75 did not fill
  - Data collected Jan-Feb, two monitoring events
- 2022
  - In consecutive below normal water year, Pond 75 did not fill
  - Yearly cumulative precipitation of 11.69 inches
  - Data collected December - January, 2 monitoring events

Table B-4. Pond 16 (Year 4 Post-Subsurface Munitions Remediation)
Historical Hydrology Results on Former Fort Ord 1992-2022

Water-Year	Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Turbidity (FNU)	Depth (cm)	Inundated Surface Area (acres)
1992	3/26/1992	-	20	-	extreme[x]	91	-
1994	3/15/1994	-	-	-	-	>102	-
	3/29/1994	-	-	-	-	>102	-
	4/13/1994	-	-	-	-	>102	-
1995	1/11/1995	-	-	-	-	>102	-
	1/26/1995	-	-	-	-	>102	-
	2/10/1995	-	-	-	-	>102	-
	2/24/1995	-	-	-	-	>102	-
	3/10/1995	-	-	-	-	>102	-
	3/24/1995	-	-	-	-	>102	-
1996	1/3/1996	-	-	-	-	15	-
	1/31/1996	-	-	-	-	>91	-
	2/14/1996	-	-	-	-	>91	-
	2/29/1996	-	-	-	-	>91	-
	3/14/1996	-	-	-	-	>91	-
	3/28/1996	-	-	-	-	>91	-
	4/11/1996	-	-	-	-	>91	-
	4/25/1996	-	-	-	-	>91	-
2009	3/12/2009	-	-	-	-	76	-
	4/2/2009	-	-	-	-	61	-
2015	12/22/2014-12/23/2014	-	-	-	-	~43*	-
	2/24/2015	-	-	-	-	~45*	-
	3/18/2015	-	-	-	-	20-30*	0.27
	4/16/2015	6.40	18.30	13.90	572.0 (NTU)	15-20*	0.16
	5/28/2015	-	-	-	-	0	0.00
2017	1/23/2017	6.84	8.87	1.80	188.0	142	1.29
	2/21/2017	6.09	12.42	4.87	584.0	144	2.57
	3/22/2017	6.22	13.45	0.66	182.0	142	2.17
	4/18/2017	6.78	14.40	0.05	66.6	140	0.80
	5/25/2017	6.96	18.64	1.55	33.8	109	0.57
	6/21/2017	6.98	19.97	1.40	121.0	98	0.51
	7/27/2017	-	-	-	-	90	-
	8/15/2017	-	-	-	-	40	-
	9/6/2017	-	-	-	-	28	-
2018	11/20/2017	-	-	-	-	0	0.00
	1/18/2018	-	-	-	-	0	0.00
	2/22/2018	-	-	-	-	0	0.00
	3/20/2018	6.65†	10.24†	5.29†	140.0†	12	0.11
	4/16/2018	6.10	17.99	8.43	33.8	28	0.26
	5/22/2018	-	-	-	-	0	0.00
2020	12/13/2019	-	-	-	-	15	0.1438
	12/27/2019	-	-	-	-	12	-
	1/8/2020	-	-	-	-	12	-
	1/29/2020[^#]	6.81	13.2	11.38	43.8	12	0.097
	2/21/2020	-	-	-	-	0	0
	3/19/2020	-	-	-	-	16	0.1734
	3/31/2020	6.28	18.8	4.38	156	44	0.3271
	4/20/2020	-	-	-	-	101	-

Table B-4. Pond 16 (Year 4 Post-Subsurface Munitions Remediation)
Historical Hydrology Results on Former Fort Ord 1992-2022

Water-Year	Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Turbidity (FNU)	Depth (cm)	Inundated Surface Area (acres)
	5/4/2020	6.21	15.3	0.06	122.01	88	0.5172
	5/27/2020	6.66	18.7	1.34	85.23	69	0.4311
	6/30/2020	7.09	25.1	7.19	18.31	41	0.3156
	7/14/2020	-	-	-	-	29	-
	8/3/2020^	-	-	-	-	11	0.031
2021	1/7/2021	-	-	-	-	0	0
	2021-02-02	-	-	-	-	0	0
	2/12/2021	-	-	-	-	0	0
2022	10/28/2021	-	-	-	-	0	0
	12/17/2021	-	-	-	-	0	0
	1/12/2022	-	-	-	-	0	0

ˣ In 1992, turbidity was measured qualitatively.
* No staff gauge. Cannot access ponds to measure depth due to potential for subsurface unexploded ordnance and other hazards. Depths are estimations
#Probe not fully submerged
^Peripheral inundation present

Pond 16 was monitored eleven years between 1992 and 2022 water years. Mastication activities occurred in 2016 and Munitions remediation activities occurred in 2018. In 2022, Pond 16 was in year 4 of monitoring for post-subsurface Munitions remediation. The Historical data and precipitation are summarized below:

- 1992 (Jones & Stokes, 1992)
  - In a year with near-normal precipitation, Pond 16 was surveyed once in March 1992. It should be noted that data collection did not start with the first storms or inundation.
  - Yearly cumulative precipitation near-normal (17.84 inches)
  - Data collected March, one monitoring event
  - Inundated March
  - Depth 91 cm
  - temperature 20˚C
  - pH, turbidity, and dissolved oxygen data were not collected
- 1994 (Jones & Stokes, 1996)
  - In a precipitation year below normal, Pond 16 held water during both monitoring events in March and April.
  - Yearly cumulative precipitation 13.96 inches
  - Data collected in March and April, three monitoring events
  - Inundated during all monitoring events
  - No inundation areas recorded
  - Depth during all monitoring events >102 cm
  - No water quality data were collected
- 1995 (Jones & Stokes, 1996)
  - In a water-year that was above normal, Pond 16 was inundated by January monitoring and stayed inundated through March.

  - Yearly cumulative precipitation 23.38 inches
  - Data collected January-March, six monitoring events
  - Inundated during all monitoring events
  - No inundation areas recorded
  - Depth during all monitoring events >102 cm
  - No water quality data were collected
- 1996 (Jones & Stokes, 1996)
  - In a water-year that was approximately normal, Pond 16 was inundated from January to April. The maximum depth was lower but similar to previous years.
  - Yearly cumulative precipitation 16.96 inches
  - Data collected January-April, eight monitoring events
  - Inundated early-January to late-April
  - No inundation areas recorded
  - Depth range 15- >91 cm, mean 73 cm
  - No water quality data collected
- 2009 (Shaw, 2010)
  - In a water-year that was below normal, Pond 16 was inundated in March and April. Depth was recorded during wildlife surveys, which occurred three times, but depth was recorded only twice. No inundation area or water quality were measured. Depth values were taken from data sheets not included in the report.
  - Depth range 61-76 cm, mean 67.5 cm
- 2015 (Burleson, 2016)
  - In a consecutive drought year with cumulative precipitation below normal, Pond 16 was inundated at the first survey in April and held water through April. Maximum inundation was 0.27 acres. Water quality data were collected once, in April.
  - Consecutive drought year with yearly cumulative precipitation of 14.35 inches
  - Data collected December - May, five monitoring events
  - Inundated December - April
  - Inundation range 0-0.27 acres, mean 0.14 acres
  - Depth range ~15-~45 cm, mean ~26 cm
  - pH 6.4 in April
  - temperature 18.3°C in April
  - dissolved oxygen 13.9 mg/L in April
  - turbidity 572 NTU in April
- 2017 (Burleson, 2018)
  - After the end of a Historical drought with precipitation above normal, Pond 16 was inundated from the first recorded monitoring in January through September (pond did not 0 by last recorded monitoring in September). The maximum inundation area was 2.57 acres. Water quality was within normal ranges. Neutral to slightly acidic pH values were observed. Temperature was within normal averages for Fort Ord, with a few high readings in the middle of the season. Dissolved oxygen had a small range, with moderate levels. Turbidity had a large range, with high readings at the beginning of the season.
  - Yearly cumulative precipitation 22.92 inches
  - Data collected January - September, nine monitoring events
  - Inundated January through September (pond did not 0 by last recorded monitoring in September)
  - Inundation range 0.51-2.57 acres, mean 1.32 acres

  - Depth range 28-144 cm, mean 104 cm
  - pH range 6.09-6.98, mean 6.65
  - temperature range 8.9°-20.0° C, mean 14.6° C
  - dissolved oxygen range 0.05-4.87 mg/L, mean 1.72 mg/L
  - turbidity range 33.8-584.0 FNU, mean 195.9 FNU
- 2018 (Burleson, 2019)
  - In a below normal water-year, Pond 16 was inundated in March and April. The maximum inundation area was 0.26 acres. Water quality was within normal ranges. Neutral to slightly acidic pH values were observed. Temperature was within normal range for Fort Ord. Dissolved oxygen had a small range and moderate levels. Turbidity had moderate levels.
  - Yearly cumulative precipitation 12.57 inches
  - Data collected November, January - May, six monitoring events
  - Inundated March and April
  - Inundation range 0.11-0.26 acres, mean 0.18 acres
  - depth range 12-28 cm, mean 20 cm
  - pH range 6.10-6.65, mean 6.38
  - temperature range 10.24°-17.99° C, mean 14.12° C
  - dissolved oxygen range 5.29-8.43 mg/L, mean 6.86 mg/L
  - turbidity range 33.8-140 FNU, mean 86.9 FNU
- 2019 (Burleson, 2020)
  - In an above normal water-year, Pond 16 was inundated from the second recorded monitoring in February through September. The maximum inundation area was 0.74 acres. Water quality was within normal ranges. Slightly acidic pH values were observed. Temperature was within normal range for Fort Ord, with higher readings in May and June. Dissolved oxygen had a small range and low levels. Turbidity had a moderate range, with high readings in February, March, and April.
  - Yearly cumulative precipitation 21.97 inches
  - Data collected January - September, six monitoring events
  - Inundated February through September
  - Inundation range 0.54-0.74 acres, mean 0.67 acres
  - Depth range 18-139 cm, mean 93 cm
  - pH range 6.15-6.61, mean 6.40
  - temperature range 7.33°-17.94° C, mean 13.07° C
  - dissolved oxygen range 2.75-6.68 mg/L, mean 4.29 mg/L
  - turbidity range 60.1-360.0 FNU, mean 176.6 FNU
- 2020 (Chenega, 2021)
  - In a close to normal water year, Pond 16 was inundated intermittently from the first recorded monitoring in December through beginning of August. The maximum inundation area was 0.52 acres. Water quality was within Historical ranges. Slightly acidic pH to normal values were observed. Temperature reached a record value of 25.1 °C in June, but otherwise was within normal averages for Fort Ord. Dissolved oxygen and turbidity values were within the Historical ranges.
  - Yearly cumulative precipitation 18.08 inches
  - Data collected December - August, 14 monitoring events
  - Inundated intermittently from December through August, dried out two times
  - Inundation range 0-0.52 acres, mean 0.19 acres
  - Depth range 0-101 cm, mean 30 cm

  - pH range 6.21-7.09, mean 6.61
  - temperature range 13.2°-25.1° C, mean 18.22° C
  - dissolved oxygen range 0.06-11.38 mg/L, mean 4.87 mg/L
  - turbidity range 18.31-156 FNU, mean 85.07 FNU
- 2021 (Chenega, 2022)
  - In a year of lowest cumulative precipitation of 7.57 inches in last 30 years, Pond 16 did not fill
  - Data collected Jan-February, three monitoring events
- 2022
  - In consecutive below normal water year, Pond 16 did not fill
  - Yearly cumulative precipitation of 11.69 inches
  - Data collected October - January, 3 monitoring events

Table B-5. Pond 39 (Year 4 Post-Subsurface Munitions Remediation) Historical Hydrology Results on Former Fort Ord 1997-2022

Water-Year	Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Turbidity (FNU)	Depth (cm)	Inundated Surface Area (acres)
1998	Dec	7.58-7.95	-	-	>100.0 (NTU)	36	0.24
	Jan	-	-	-	27.0-204.0 (NTU)	35	0.44
	Feb	7.57-8.00	-	-	48.7 (NTU)	48	0.49
	April	-	-	-	-	48	0.49
2015	2/24/2015	-	-	-	-	0	0.00
	3/18/2015	-	-	-	-	0	0.00
	4/16/2015	-	-	-	-	0	0.00
	5/28/2015	-	-	-	-	0	0.00
2016	3/31/2016	6.31	13.85	2.25	177.0	38§	0.03
	4/19/2016	6.37	11.31	2.29	23.8	36§	0.01
	5/9/2016	-	-	-		0	0.00
2018	11/20/2017	-	-	-	-	0	0.00
	1/16/2018	5.94	11.78	2.36	43.1	15	0.002
	2/20/2018	-	-	-	-	0	0.00
	3/19/2018	6.51	8.35	4.59	142.0	38	0.01
	4/16/2018	6.21	12.68	5.81	66.2	34	0.01
	5/21/2018	-	-	-	-	0	0.00
2019	12/13/2018	-	-	-	-	25	-
	1/16/2019	6.47	10.40	5.91	13.0	43	0.01‡
	2/11/2019	6.63	7.18	5.26	574.0	50	0.31‡
	3/6/2019	6.38	13.80	4.29	528.0	50	0.25‡
	4/3/2019	6.52	13.98	4.33	460.0	44	0.01‡
	5/7/2019	-	-	-	-	7	-
	6/10/2019	6.34	30.37	8.20	>1000	14	0.002
	7/9/2019	-	-	-	-	0	0.00
2020	12/6/2019^	-	-	-	-	42	0.0079
	1/8/2020	-	-	-	-	37	-
	1/29/2020	6.25	11.2	2.35	74.97	38	0.0055
	2/21/2020	-	-	-	-	20	-
	2/27/2020#	6.42	16.7	7.65	34.17	15	8e-04
	3/12/2020	-	-	-	-	0	0
	3/17/2020*	-	-	-	-	44	-
	3/19/2020^	-	-	-	-	43	0.0075
	4/3/2020^	6.37	14.1	6.22	43.27	43	0.0089
	4/16/2020*	-	-	-	-	45	-
	4/29/2020^	6.38	17.4	4.86	3.32	34	0.005

	5/20/2020*	-	-	-	-	0	0
	5/26/2020	-	-	-	-	0	0
2021	1/5/2021	-	-	-	-	0	0
	2/1/2021^	8	10.4	3.75	38.62	0.006	38
	2/10/2021	-	-	-	-	-	27
	2/24/2021	-	-	-	-	-	13
	3/02/2021	-	-	-	-	0	0
	2021-03-25	-	-	-	-	0	0
2022	10/28/2021	-	-	-	-	18	-
	11/17/2021	-	-	-	-	18	-
	12/15/2021^	6.49	9.2	7.32	62.31	43	0.0089
	1/12/2022^	6.51	10.2	7.46	26.96	33	0.0045
	2/1/2022	-	-	-	-	14	-
	2/17/2022	-	-	-	-	0	0
	3/2/2022	-	-	-	-	0	0
	3/30/2022	-	-	-	-	0	0

§ A second gauge was added in 2017 at the deepest point of the pool. A difference of 30 cm was measured between the prior gauge and new gauge in 2018. Depths in 2016 were adjusted to reflect the offset.
‡Peripheral ponding was observed but was not mapped as there was no surface hydrological connectivity between the peripheral ponding and location of the staff gauge.
#Probe not fully submerged
*taken during Burleson surveys
^Peripheral inundation present

Pond 39 was monitored eight years between 1997 and 2022. Burn activities occurred in 2017 and Munitions remediation activities occurred in 2018. In 2022, Pond 39 was in year 4 of monitoring for post-burn and year 2 for post-subsurface Munitions remediation. The Historical data and precipitation are summarized below:

- 1998 (HLA, 1998)
  - In an El Niño year with yearly cumulative precipitation significantly above normal, Pond 39 held water December through April. Turbidity and pH were the only water quality parameters collected.
  - El Niño year with yearly cumulative precipitation above normal (40.54 inches)
  - Data collected December-April, four monitoring events
  - Inundated from December through April
  - Inundation range 0.24-0.49 acres, mean 0.41 acres
  - Depth range 35-48 cm, mean 42 cm
  - pH range 7.57-8.00, mean 7.78
    turbidity range 27.0-204.0 NTU, mean 95.0 NTU
- 2015 (Burleson, 2016)
  - In a 0 consecutive drought year with below normal precipitation, Pond 39 remained 0. No water quality data were collected.
  - Early storms pushed early cumulative precipitation above normal while total yearly cumulative precipitation fell below normal (14.35 inches)
  - Data collected February to May, four monitoring events
  - No water quality data were collected
- 2016 (Burleson, 2017)

  - In a consecutive drought with precipitation above normal, Pond 39 was inundated from the first recorded monitoring in March and April and was 0 by May monitoring. The maximum inundation area was 0.03 acres. Water quality was within normal ranges. Slightly acidic pH values were observed. Temperature was within normal averages for Fort Ord. Dissolved oxygen had a small range. Turbidity had a moderate reading in March and a low reading in April. It is likely that Pond 39 was inundated earlier in the water-year and maximum inundation was most likely not captured. It should be noted that data collection did not start with the first storm or inundation.
  - Consecutive drought year with yearly cumulative precipitation 21.21 inches
  - Data collected March - May, three monitoring events
  - Inundated March through May
  - Inundation range 0.01-0.03 acres, mean 0.02 acres
  - Depth range 6-8 cm, mean 7 cm
  - pH range 6.31-6.37, mean 6.34
  - temperature range 11.31°-13.85° C, mean 12.58° C
  - dissolved oxygen range 2.25-2.29 mg/L, mean 2.27 mg/L
  - turbidity range 23.8-177.0 FNU, mean 100.4 FNU
- 2018 (Burleson, 2019)
  - In a below normal water-year, Pond 39 was inundated in January, March, and April, but was 0 in February and May. The maximum inundation area was 0.01 acres. Water quality was within normal ranges. Moderately to slightly acidic pH values were observed. Temperature was within normal averages for Fort Ord. Dissolved oxygen had a small range and relatively low. Turbidity had moderate to low levels.
  - Yearly cumulative precipitation 12.57 inches
  - Data collected November - May, six monitoring events
  - Inundated January, March, and April
  - Inundation range 0.002-0.01 acres, mean 0.01 acres
  - Depth range 15-38 cm, mean 29 cm
  - pH range 5.94-6.51, mean 6.22
  - temperature range 8.35°-12.68° C, mean 10.94° C
  - dissolved oxygen range 2.36-5.81 mg/L, mean 4.25 mg/L
  - turbidity range 43.1-142.0 FNU, mean 83.8 FNU
- 2019 (Burleson, 2020)
  - In an above normal water-year, Pond 39 was inundated from the first recorded monitoring in January through June. The maximum inundation area was 0.31 acres. Water quality was within normal ranges. Slightly acidic pH values were observed. Temperature was within normal averages for Fort Ord, with a high reading in June. Dissolved oxygen had a small range and relatively low. Turbidity had moderate levels with a high reading in June.
  - Yearly cumulative precipitation 21.97 inches
  - Data collected December - July, eight monitoring events
  - Inundated January through June
  - Inundation range 0.002-0.31 acres, mean 0.12 acres
  - Depth range 7-50 cm, mean 33 cm
  - pH range 6.34-6.63, mean 6.47
  - temperature range 7.18°-30.37° C, mean 15.15° C
  - dissolved oxygen range 4.29-8.20 mg/L, mean 5.60 mg/L
  - turbidity range 13->1000 FNU, mean 393.8 FNU

- 2020 (Chenega, 2021)
  - In a close to normal water year, Pond 39 was inundated intermittently from the first recorded monitoring in December through April. The maximum inundation area was 0.009 acres. Water quality was within Historical ranges. Slightly acidic pH values were observed. Temperature, dissolved oxygen, and turbidity values were within the Historical ranges.
  - Yearly cumulative precipitation 18.08 inches
  - Data collected December - May, 12 monitoring events
  - Inundated from December through April
  - Inundation range 0-0.009 acres, mean 0.004 acres
  - Depth range 0-45 cm, mean 27.77 cm
  - pH range 6.25-6.42, mean 6.36
  - temperature range 11.2°-17.4° C, mean 14.85° C
  - dissolved oxygen range 2.35-7.65 mg/L, mean 5.27 mg/L
  - turbidity range 3.32-74.97 FNU, mean 38.93 FNU
- 2021 (Chenega, 2022)
  - In a year of lowest cumulative precipitation of 7.57 inches in last 30 years, Pond 39 was briefly inundated in February
  - Maximum inundation area was 0.006, and maximum depth was 38 cm
- 2022
  - In consecutive below normal water year, Pond 39 was inundated from October to February
  - Yearly cumulative precipitation of 11.69 inches
  - Data collected October - March, 8 monitoring events
  - Inundation range 0-0.0089 acres, mean 0.004 acres
  - Depth range 0-43 cm, mean 21 cm
  - pH range 6.49-6.51, mean 6.50
  - temperature range 9.2°-10.2° C, mean 9.7° C
  - dissolved oxygen range 7.32-7.46 mg/L, mean 7.39 mg/L
  - turbidity range 62.31-26.96 FNU, mean 44.64 FNU

Table B-6. Pond 40 South (Year 4 Post-Subsurface Munitions Remediation) Historical Hydrology Results on Former Fort Ord 1997-2022

Water-Year	Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Turbidity (FNU)	Depth (cm)	Inundated Surface Area (acres)
1998	Dec	8.67	-	-	>100.0 (NTU)	27	0.12
	Jan	-	-	-	27.0 (NTU)	27	0.21
	Feb	7.60	-	-	50.4 (NTU)	32	0.21
	April	-	-	-	-	33	0.21
2015	3/18/2015	-	-	-	-	0	0.00
	4/16/2015	-	-	-	-	0	0.00
	5/28/2015	-	-	-	-	0	0.00
2016	3/31/2016	6.71	16.59	0.08	84.6	20	0.08
	4/19/2016	-	-	-	-	0	0.00
2017	1/23/2017	6.36	10.26	1.83	135.0	29	0.30
	2/28/2017	6.79	6.61	11.62	56.1	31	0.61
	3/22/2017	6.47	13.50	4.88	596.0	34	0.96
	4/18/2017	6.57	16.58	4.81	37.6	28	0.12
	5/25/2017	-	-	-	-	0	0.00
2018	1/16/2018	-	-	-	-	0	0.00
	2/20/2018	-	-	-	-	0	0.00
	3/19/2018	-	-	-	-	0	0.00
	4/16/2018	-	-	-	-	0	0.00
2019	1/16/2019	-	-	-	-	0	0.00‡
	2/11/2019	6.55	7.58	7.63	381.0	28	0.22‡
	3/6/2019	6.80	17.36	9.75	19.2	28	0.11‡
	4/3/2019	6.75	13.63	3.30	3.3	20	0.05‡
	5/7/2019	-	-	-	-	0	0.00
2020	12/6/2019	-	-	-	-	0	0
	1/8/2020	-	-	-	-	0	0
	1/29/2020	-	-	-	-	0	0
	2/21/2020	-	-	-	-	0	0
	3/19/2020^	-	-	-	-	14	0.0167
	4/3/2020^	6.04	13.8	1.31	70.47	17	0.0247
	4/16/2020*	-	-	-	-	20	-
	4/29/2020	-	-	-	-	0	0
	5/26/2020	-	-	-	-	0	0
2021	1/5/2021	-	-	-	-	0	0
	2/1/2021	-	-	-	-	0	0
	2021-03-25	-	-	-	-	0	0
2022	10/28/2021	-	-	-	-	0	0
	11/17/2021	-	-	-	-	0	0

	1/12/2022	-	-	-	-	0	0
	3/2/2022	-	-	-	-	0	0

‡Peripheral ponding was observed but was not mapped as there was no surface hydrological connectivity between the peripheral ponding and location of the staff gauge.
*taken during Burleson surveys
^Peripheral inundation present

Pond 40 South was monitored nine years between 1997 and 2022. Burn activities occurred in 2017 and Munitions remediation activities occurred in 2018. In 2022, Pond 40 South was in year 4 of monitoring for post-subsurface Munitions remediation. The Historical data and precipitation are summarized below:

- 1998 (HLA, 1998)
  - In an El Niño year with yearly cumulative precipitation significantly above normal, Pond 40 South held water through April. Turbidity and pH were collected December through February.
  - El Niño year with yearly cumulative precipitation above normal (40.54 inches)
  - Data collected December-April, four monitoring events
  - Inundated from December through April
  - Inundation range 0.12-0.21 acres, mean 0.19 acres
  - Depth range 27-33 cm, mean 30 cm
  - pH range 7.60-8.67, mean 8.14
    turbidity range 27- >100 NTU, mean 59.1 NTU
- 2015 (Burleson, 2016)
  - In a consecutive drought year with cumulative precipitation below normal, Pond 40 South did not fill.
  - Consecutive drought year with yearly cumulative precipitation 14.35 inches
  - Data collected March-May, three monitoring events
  - 0 though the entire monitoring season
- 2016 (Burleson, 2017)
  - In a consecutive drought year with cumulative precipitation above normal, Pond 40 South held water through March. Water quality data were collected once, in March. It is likely that Pond 40 South was inundated earlier in the water-year and maximum inundation was not captured. It should be noted that data collection did not start with the first storm or inundation.
  - Drought year with cumulative precipitation above normal (21.21 inches)
  - Data collected March-April, two monitoring events
  - Inundated from March-April
  - Inundation 0.08 acres in March
  - Depth 20 cm in March
  - pH 6.71 in March
  - temperature 16.59° C
  - dissolved oxygen 0.08 mg/L
  - turbidity range 84.6 FNU
- 2017 (Burleson, 2018)
  - After the end of a Historical drought with precipitation above normal, Pond 40 South was inundated from the first recorded monitoring in January through May. The maximum inundation area was 0.96 acres. Water quality was within normal ranges. Slightly acidic pH values were observed. Temperature was within normal averages for

Fort Ord. Dissolved oxygen had a large range. Turbidity was moderate on average, with a few high readings in January and March.
  - Yearly cumulative precipitation 22.92 inches
  - Data collected January - May, five monitoring events
  - Inundated January through April
  - Inundation range 0.12-0.96 acres, mean 0.50 acres
  - Depth range 28-34 cm, mean 31 cm
  - pH range 6.36-6.79, mean 6.55
  - temperature range 6.6°-16.6° C, mean 11.7° C
  - dissolved oxygen range 1.83-11.62 mg/L, mean 5.79 mg/L
    turbidity range 37.6-596.0 FNU, mean 206.2 FNU
- 2018 (Burleson, 2019)
  - In a below normal water-year, Pond 40 South did not hold water. No water quality data were collected.
  - Yearly cumulative precipitation 12.57 inches
  - Data collected January - April, four monitoring events
  - 0 during all monitoring events
  - No water quality data were collected
- 2019 (Burleson, 2020)
  - In an above normal water-year, Pond 40 South was inundated from the second recorded monitoring in February through April. Peripheral ponding not hydrologically connected to the staff gauge was observed in January. The maximum inundation area was 0.22 acres. Water quality was within normal ranges. Slightly acidic pH values were observed. Temperature was within normal averages for Fort Ord. Dissolved oxygen had a small range with low levels. Turbidity was moderate on average, with a high reading in February.
  - Yearly cumulative precipitation 21.97 inches
  - Data collected January - May, five monitoring events
  - Inundated February through April
  - Inundation range 0.05-0.22 acres, mean 0.12 acres
  - Depth range 20-28 cm, mean 25 cm
  - pH range 6.55-6.80, mean 6.70
  - temperature range 7.58°-17.36° C, mean 12.86° C
  - dissolved oxygen range 3.30-9.75 mg/L, mean 6.89 mg/L
  - turbidity range 3.3-381.0 FNU, mean 134.5 FNU
- 2020 (Chenega, 2021)
  - In a close to normal water year, Pond 40 South was inundated from March through April. The maximum inundation area was 0.025 acres. Water quality was within Historical ranges. Slightly acidic pH values were observed. Temperature, dissolved oxygen, and turbidity values were within the Historical ranges.
  - Yearly cumulative precipitation 18.08 inches
  - Data collected December - May, 12 monitoring events
  - Inundated from December through April
  - Inundation range 0-0.009 acres, mean 0.004 acres
  - Depth range 0-45 cm, mean 27.77 cm
  - pH range 6.25-6.42, mean 6.36
  - temperature range 11.2°-17.4° C, mean 14.85° C
  - dissolved oxygen range 2.35-7.65 mg/L, mean 5.27 mg/L

  - turbidity range 3.32-74.97 FNU, mean 38.93 FNU
- 2021 (Chenega, 2022)
  - In a year of lowest cumulative precipitation of 7.57 inches in last 30 years, Pond 40 South did not fill
  - Data collected January - March, three monitoring events
- 2022
  - In consecutive below normal water year, Pond 40 South did not fill
  - Yearly cumulative precipitation of 11.69 inches
  - Data collected October - March, 4 monitoring events

Table B-7. Pond 41 (Year 4 Post-Subsurface Munitions Remediation) Historical Hydrology Results on Former Fort Ord 1997-2022

Water-Year	Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Turbidity (FNU)	Depth (cm)	Inundated Surface Area (acres)
1998	Dec	7.53	-	-	25 (NTU)	52	1.45
	Jan	-	-	-	3.48 (NTU)	61	1.70
	Feb	7.48	-	-	3.82 (NTU)	102	2.13
	April	-	-	-		>127	2.13
2015	2/24/2015	-	-	-	-	0	0.00
	3/18/2015	-	-	-	-	0	0.00
	4/16/2015	-	-	-	-	0	0.00
	5/28/2015	-	-	-	-	0	0.00
2016	4/4/2016	6.56	12.64	2.40	124.0	60	1.44
	4/18/2016	6.73	14.73	1.58	15.8	46	1.28
	5/9/2016	6.79	15.01	1.75	54.3	34	0.33
	6/7/2016	-	-	-		0	0.00
2019	2/14/2019	6.34	13.03	7.99	3.00	61	1.29‡
	3/6/2019	6.70	13.54	7.09	2.1	69	1.43
	4/2/2019	6.28	14.20	5.65	0.9	63	1.31‡
	5/7/2019	6.27	16.13	3.30	1.7	38	0.18‡
	6/11/2019	6.45	18.59	8.18	31.4	12	0.002
	7/9/2019	-	-	-	-	0	0.00
2020	12/6/2019	-	-	-	-	0	0
	12/20/2019	-	-	-	-	0	0
	12/23/2019	-	-	-	-	0	0
	12/31/2019^	-	-	-	-	0	0
	1/29/2020^#	7.08	11.9	17.16	1.46	15	0.0011
	2/19/2020	-	-	-	-	0	0
	3/11/2020	-	-	-	-	0	0
	3/19/2020^	-	-	-	-	44	0.1503
	4/3/2020^	6.26	12.9	1.58	151.21	49	0.4961
	4/16/2020*	-	-	-	-	56	-
	4/29/2020^	6.26	17.6	0.01	7.62	47	0.4152
	5/26/2020	-	-	-	-	0	0
	6/16/2020*	-	-	-	-	0	0
2021	1/5/2021	-	-	-	-	0	0
	2/1/2021	-	-	-	-	0	0
	2021-03-25	-	-	-	-	0	0
	10/28/2021	-	-	-	-	0.00	0
	11/17/2021	-	-	-	-	0.00	0

2022	12/15/2021	-	-	-	-	0.00	0
	1/12/2022^	7.15	14.9	9.67	1.69	24.00	0.0068
	2/1/2022	-	-	-	-	0.00	0
	3/2/2022	-	-	-	-	0.00	0

‡Peripheral ponding was observed but was not mapped as there was no surface hydrological connectivity between the peripheral ponding and location of the staff gauge.
#Probe not fully submerged
*taken during Burleson surveys, ^Peripheral inundation present

Pond 41 was monitored seven years between 1997 and 2022 water years. Munitions remediation activities occurred in 2018. Pond 41 is a post-subsurface Munitions remediation vernal pool and was in year 4 of monitoring in 2022. The Historical data and precipitation are summarized below:

- 1998 (HLA, 1998)
  - In an El Niño year with yearly cumulative precipitation significantly above normal, Pond 41 held water December through April. Turbidity and pH were the only water quality parameters collected in December and February.
  - El Niño year with yearly cumulative precipitation above normal (40.54 inches)
  - Data collected December-April, four monitoring events
  - Inundated from December through April
  - Inundation range 1.45-2.13 acres, mean 1.85 acres
  - Depth range 52 - >127 cm, mean 85 cm
  - pH range 7.48-7.53, mean 7.51
    turbidity range 3.48-25.0 NTU, mean 1.08 NTU
- 2015 (Burleson, 2016)
  - In a 0 consecutive drought year with below normal precipitation, Pond 41 did not hold water.
  - Early storms pushed early cumulative precipitation above normal while total yearly cumulative precipitation fell below normal (14.35 inches)
  - Data collected February to May, four monitoring events
  - 0 in all monitoring events
  - No water quality data collected
- 2016 (Burleson, 2017)
  - In a consecutive drought year with cumulative precipitation above normal, Pond 41 held water from April-May. Water quality results had a slightly acidic pH, normal temperature, low dissolved oxygen, and low to moderate turbidity. It should be noted that data collection did not start with the first storms or inundation. Maximum inundation could have been missed.
  - Drought year with cumulative precipitation above normal (21.21 inches)
  - Data collected April-June, four monitoring events
  - Inundated April through May
  - Inundation range 0.33-1.44 acres, mean 1.02 acres
  - Depth range 34-60 cm, mean 47 cm
  - pH range 6.56-6.79, mean 6.69
  - temperature range 12.64°-15.01° C, mean 14.13° C
  - dissolved oxygen range 1.58-2.40 mg/L, mean 1.91 mg/L
  - turbidity range 15.8-124.0 FNU, mean 64.7 FNU
- 2019 (Burleson, 2020)

  - In an above normal water-year, Pond 41 was inundated from the first recorded monitoring in February through June. The maximum inundation area was 1.43 acres. Water quality was within normal ranges. Slightly acidic pH values were observed. Temperature was within normal averages for Fort Ord. Dissolved oxygen had a small range. Turbidity had a small range, with low levels.
  - Yearly cumulative precipitation 21.97 inches
  - Data collected February through July, six monitoring events
  - Inundated February through June
  - Inundation range 0.18-1.43 acres, mean 0.84 acres
  - Depth range 12-69 cm, mean 49 cm
  - pH range 6.27-6.70, mean 6.41
  - temperature range 13.03°-18.59° C, mean 15.10° C
  - dissolved oxygen range 3.30-8.18 mg/L, mean 6.44 mg/L
  - turbidity range 0.9-31.4 FNU, mean 7.8 FNU
- 2020 (Chenega, 2021)
  - In a close to normal water year, Pond 41 was inundated intermittently from the end of January through the end of April. The maximum inundation area was 0.50 acres. Water quality was generally within Historical ranges. Slightly acidic pH to normal values were observed. Dissolved oxygen in January and turbidity in April were highest on record, but otherwise water quality parameters were within the Historical ranges.
  - Yearly cumulative precipitation 18.08 inches
  - Data collected December - May, 12 monitoring events
  - Inundated intermittently from January through August, dried out two times
  - Inundation range 0-0.50 acres, mean 0.09 acres
  - Depth range 0-56 cm, mean 16.23 cm
  - pH range 6.26-7.08, mean 6.53
  - temperature range 11.9°-17.6° C, mean 14.13° C
  - dissolved oxygen range 0.01-17.16 mg/L, mean 4.87 mg/L
  - turbidity range 1.46-151.21 FNU, mean 53.43 FNU
- 2021 (Chenega, 2022)
  - In a year of lowest cumulative precipitation of 7.57 inches in last 30 years, Pond 41 did not fill
  - Data collected Jan-March, three monitoring events
- 2022
  - In consecutive below normal water year, Pond 41 was briefly inundated in January
  - Yearly cumulative precipitation of 11.69 inches
  - Data collected October - March, 6 monitoring events
  - Inundation range 0-0.007 acres
  - Depth range 0-24 cm
  - pH single reading of 7.15
  - temperature single reading of 14.9° C
  - dissolved oxygen single reading of 9.67 mg/L
  - turbidity single reading of 1.69 FNU

Table B-8. Pond 42 (Year 4 Post-Subsurface Munitions Remediation)
Historical Hydrology Results on Former Fort Ord 1997-2022

Water-Year	Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Turbidity (FNU)	Depth (cm)	Inundated Surface Area (acres)
1998	Dec	8.90	-	-	40.0 (NTU)	68	0.46
	Jan	-	-	-	4.5-5.0 (NTU)	75	0.77
	Feb	7.40	-	-	3.0 (NTU)	76	0.96
	April	-	-	-	-	74	0.96
2000	1/26/2000	-	-	-	-	41	0.46
	2/23/2000	-	-	-	-	-	0.69
	3/13/2000	5.91	-	-	2.42 (NTU)	>76	0.82
	6/15/2000	-	-	-	-	20	0.01
2001	1/12/2001	-	-	-	-	41	0.34
	3/26/2001	6.30	-	-	-	46	0.11
	4/18/2001-4/19/2001	7.40	-	-	-	15	-
	5/23/2001-5/24/2001	0.00	-	-	-	0	0.00
2002	1/23/2002	-	-	-	10.8 (NTU)	18	0.07
	2/25/2002	-	-	-	12.0 (NTU)	13	0.04
	3/27/2002	0.00	-	-	0	0	0.00
	4/17/2002	0.00	-	-	0	0	0.00
	5/1/2002	0.00	-	-	0	0	0.00
2003	1/28/2003	6.30	-	-	16.0 (NTU)	25	0.11
	2/24/2003	-	-	-	-	15	0.05
	3/29/2003	-	-	-	-	0	0.000
2015	3/18/2015	-	-	-	-	0	0.00
	4/16/2015	-	-	-	-	0	0.00
	5/28/2015	-	-	-	-	0	0.00
2017	1/23/2017	6.47	10.36	2.60	51.3	58	0.52
	2/28/2017	6.86	9.39	6.55	2.0	76	0.81
	3/22/2017	6.08	13.28	4.26	>1000	72	0.77
	4/18/2017	6.97	16.53	11.15	57.3	62	0.58
	5/25/2017	5.97	17.60	5.27	60.1	38	0.30
	6/15/2017	5.54	17.01	2.63	70.4	~28†	0.34
	7/7/2017	-	-	-	-	0	0.00
2018	1/15/2018	6.82	18.26	0.65	93.9	5	0.001
	2/20/2018	-	-	-	-	0	0.00
	3/19/2018	6.78	15.61	6.85	40.3	13	0.02‡
	4/16/2018	6.79	12.18	8.69	16.1	24	0.24
	5/21/2018	-	-	-	-	0	0.00

Table B-8. Pond 42 (Year 4 Post-Subsurface Munitions Remediation)
Historical Hydrology Results on Former Fort Ord 1997-2022

Water-Year	Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Turbidity (FNU)	Depth (cm)	Inundated Surface Area (acres)
2019	1/16/2019	6.84	11.99	9.94	14.8	15	0.03‡
	2/11/2019	7.14	10.40	8.12	28.2	63	0.54‡
	3/6/2019	6.85	12.82	7.29	15.3	64	0.59‡
	4/3/2019	6.96	14.51	4.42	1.6	55	0.48‡
	5/7/2019	6.80	17.50	7.36	0.8	34	0.38‡
	6/11/2019	6.45	19.59	5.36	3.7	20	0.13‡
	7/9/2019	-	-	-	-	0	0.00
2020	12/6/2019^	-	-	-	-	28	0.276
	12/31/2019^	7.54	14.7	10.24	2.89	22	0.1418
	1/6/2020^	-	-	-	-	20	-
	1/29/2020^	6.75	15.3	6.56	4.87	21	0.1088
	2/19/2020^	-	-	-	-	0	0
	2/27/2020^	-	-	-	-	0	0.012
	3/11/2020	-	-	-	-	0	0
	3/19/2020^	-	-	-	-	22	0.1075
	4/3/2020^	7.21	20.1	9.86	1.62	36	0.3487
	4/15/2020*	-	-	-	-	51	-
	4/29/2020^	7.17	18.1	9.23	0.74	41	0.3787
	5/19/2020*	-	-	-	-	26	-
	5/26/2020	7.95	31.6	8.15	0.05	19	0.1015
	6/10/2020^	-	-	-	-	0	0
	6/26/2020*	-	-	-	-	0	0
	6/30/2020	-	-	-	-	0	0
2021	1/5/2021	-	-	-	-	0	0
	2/1/2021^	6.84	18.9	5.56	449.52	0.0082	10
	2/10/2021	-	-	-	-	0	0
	2/12/2021	-	-	-	-	-	2
	3/10/2021	-	-	-	-	0	0
	2021-03-25	-	-	-	-	0	0
2022	10/28/2021	-	-	-	-	0.00	0
	11/17/2021	-	-	-	-	0.00	0
	12/15/2021	-	-	-	-	0.00	0
	1/12/2022^	7.15	14.9	9.67	1.69	24.00	0.0068
	2/1/2022	-	-	-	-	0	0
	3/2/2022	-	-	-	-	0	0

‡Peripheral ponding was observed but was not mapped as there was no surface hydrological connectivity between the peripheral ponding and location of the staff gauge,*taken during Burleson surveys, ^Peripheral inundation present, ǂDecreased visibility due to emergent vegetation

Pond 42 was monitored twelve years between 1997 and 2022. Burn activities occurred in October 2017 and mastication and Munitions remediation activities occurred in the summer of 2018. In 2022, Pond 42 was in year 4 of monitoring for post-subsurface Munitions remediation. All years prior to 2018 are baseline. The Historical data and precipitation are summarized below:

- 1998 (HLA, 1998)
  - In an El Niño year with yearly cumulative precipitation significantly above normal, Pond 42 held water through April. Turbidity and pH were collected December through February.
  - El Niño year with yearly cumulative precipitation above normal (40.54 inches)
  - Data collected December-April, four monitoring events
  - Inundated from December through April
  - Inundation range 0.46-0.96 acres, mean 0.79 acres
  - Depth range 68->76 cm, mean 73 cm
  - pH range 7.40-8.90, mean 8.15
    turbidity range 3.0-40.0 NTU, mean 15.9 NTU
- 2000 (Harding Lawson Associates, 2001)
  - In a precipitation year below normal, Pond 42 held water from January through June with a maximum recorded inundation of 0.82 acres. Water quality data were only collected once, in March.
  - Yearly cumulative precipitation 16.13 inches
  - Data collected January-June, four monitoring events
  - Inundated January through April
  - Inundation range 0.01-0.82 acres, mean 0.49 acres
  - Depth range 20- >76 cm, mean 46 cm
  - pH 5.91 in March
  - turbidity 2.42 NTU in March
- 2001 (Harding ESE, 2002)
  - In a precipitation year below normal, Pond 42 held water from January through April with a maximum recorded inundation of 0.11 acres. Water quality data were only collected twice.
  - Yearly cumulative precipitation 15.52 inches
  - Data collected January- May, five monitoring events
  - Inundated January through April
  - Inundation range 0.11-0.34, mean 0.15 acres
  - Depth range 15-46 cm, mean 34 cm
  - pH range 6.30-7.40, mean 6.85
- 2002 (Mactec, 2003)
  - In a precipitation year below normal, Pond 42 held water from January through April with a maximum recorded inundation of 0.07 acres. Turbidity was the only water quality parameter measured.
  - Yearly cumulative precipitation 11.42 inches
  - Data collected January-May, five monitoring events
  - Inundated January through February
  - Inundation range 0.04-0.07 acres, mean 0.06 acres
  - Depth range 13-18 cm, mean 16 cm
  - Turbidity range 10.8-12.0 NTU, mean 11.4 NTU
- 2003 (Mactec, 2004)

  - In a precipitation year below normal, Pond 42 held water from January through April with a maximum recorded inundation of 0.11 acres. Water quality data were only collected once, in January.
  - Yearly cumulative precipitation 15.02 inches
  - Data collected January-March, three monitoring events
  - Inundated January through February
  - Inundation range 0.05-0.11 acres, mean 0.08 acres
  - Depth range 15-25 cm, mean 20 cm
  - pH 6.3 in January
  - turbidity 16.0 NTU in January
- 2015 (Burleson, 2016)
  - In a 0, consecutive drought year with cumulative precipitation below normal, Pond 42 did not fill.
  - Consecutive drought year with yearly cumulative precipitation 14.35 inches
  - Data collected March-May, three monitoring events
  - 0 through the entire monitoring season
- 2017 (Burleson, 2018)
  - After the end of a Historical drought with precipitation above normal, Pond 42 was inundated from the first recorded monitoring in January through July. The maximum inundation area was 0.806 acres. Water quality was within normal ranges. Slightly acidic pH values were observed. Temperature was within normal averages for Fort Ord. Dissolved oxygen had a small range, with moderate levels. Turbidity had a large range, with a very high reading in March.
  - Yearly cumulative precipitation 22.92 inches
  - Data collected January - July, seven monitoring events
  - Inundated January through June
  - Inundation range 0.30-0.81 acres, mean 0.55 acres
  - Depth range ~28-76 cm, mean 56 cm
  - pH range 5.54-6.97, mean 6.32
  - temperature range 9.4°-17.6° C, mean 14.0° C
  - dissolved oxygen range 2.60-11.15 mg/L, mean 5.41 mg/L
  - turbidity range 2.0 - >1000 FNU, mean 206.9 FNU
- 2018 (Burleson, 2019)
  - In a below normal water-year, Pond 42 held water for the January, March, and April monitoring, but was 0 in February and May. The maximum inundation area was 0.24 acres. Water quality was within normal ranges. Neutral pH values were observed. Temperature was within normal averages for Fort Ord. Dissolved oxygen had a large range and turbidity had a small range, with moderate levels.
  - Yearly cumulative precipitation 12.57 inches
  - Data collected January - May, five monitoring events
  - Inundated January, March-April
  - Inundation range 0.001-0.24 acres, mean 0.09 acres
  - Depth range 5-24 cm, mean 14 cm
  - pH range 6.78-6.82, mean 6.80
  - temperature range 12.18°-18.26° C, mean 15.35° C
  - dissolved oxygen range 0.65-8.69 mg/L, mean 5.40 mg/L
  - turbidity range 16.1-93.9 FNU, mean 50.1 FNU
- 2019 (Burleson, 2020)

  - In an above normal water-year, Pond 42 was inundated from the first recorded monitoring in January through June. The maximum inundation area was 0.59 acres. Water quality was within normal ranges. Neutral to slightly acidic pH values were observed. Temperature was within normal averages for Fort Ord. Dissolved oxygen and turbidity had small ranges, with moderate levels.
  - Yearly cumulative precipitation 21.97 inches
  - Data collected January - July, seven monitoring events
  - Inundated January through June
  - Inundation range 0.03-0.59 acres, mean 0.36 acres
  - Depth range 15-64 cm, mean 42 cm
  - pH range 6.45-7.14, mean 6.84
  - temperature range 10.40°-19.59° C, mean 14.47° C
  - dissolved oxygen range 4.42-9.94 mg/L, mean 7.08 mg/L
  - turbidity range 0.8-28.2 FNU, mean 10.7 FNU
- 2020 (Chenega, 2021)
  - In a close to normal water year, Pond 42 was inundated intermittently from the first recorded monitoring in December through May. The maximum inundation area was 0.38 acres. Water quality was within Historical ranges. Slightly acidic to slightly alkaline pH values were observed. Temperature value in May was highest on record. Dissolved oxygen, and turbidity values were within the Historical ranges.
  - Yearly cumulative precipitation 18.08 inches
  - Data collected December - June, 15 monitoring events
  - Inundated intermittently from December through May, dried out twice
  - Inundation range 0-0.38 acres, mean 0.11 acres
  - Depth range 0-51 cm, mean 17.88 cm
  - pH range 6.75-7.95, mean 7.32
  - temperature range 14.7°- 31.6° C, mean 19.96° C
  - dissolved oxygen range 6.86-10.24 mg/L, mean 8.81 mg/L
  - turbidity range 0.05-4.87 FNU, mean 2.03 FNU
- 2021
  - In a year of lowest cumulative precipitation of 7.57 inches in last 30 years, Pond 42 was intermittently inundated in February
  - Maximum inundation area was 0.008, and maximum depth was 10 cm
- 2022
  - In consecutive below normal water year, Pond 42 was briefly inundated in December
  - Yearly cumulative precipitation of 11.69 inches
  - Data collected October - March, 6 monitoring events
  - Inundation range 0-0.01 acres
  - Depth range 0-12 cm
  - pH single reading of 6.35
  - temperature single reading of 14.3° C
  - dissolved oxygen single reading of 7.53 mg/L
  - turbidity single reading of 167.36 FNU

Table B-9. Pond 61 East (Year 4 Post-Subsurface Munitions Remediation)
Historical Hydrology Results on Former Fort Ord 2017-2022

Water-Year	Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Turbidity (FNU)	Depth (cm)	Inundated Surface Area (acres)
2017	1/24/2017	5.61	7.00	1.76	59.1	21	0.70
	2/28/2017	6.66	11.13	10.54	31.3	21	0.52
	3/22/2017	6.16	15.89	4.08	76.7	21	0.62
	4/19/2017	6.48	12.26	4.31	28.8	10	0.05
	5/25/2017	-	-	-	-	0	0.00
2018	1/16/2018	-	-	-	-	0	0.00
	2/20/2018	-	-	-	-	0	0.00
	3/19/2018	-	-	-	-	0	0.00‡
	4/17/2018	-	-	-	-	0	0.00‡
2019	1/15/2019	-	-	-	-	0	0.00‡
	2/13/2019	6.46	9.42	9.34	52.3	20	0.06‡
	3/6/2019	6.48	12.40	5.94	21.1	19	0.12‡
	4/3/2019	6.79†	14.15†	6.01†	17.1†	8	0.04‡
	5/8/2019	-	-	-	-	0	0.00
2020	12/6/2019^	-	-	-	-	0	0.1092
	12/23/2019^	-	-	-	-	0	0
	1/8/2020^	-	-	-	-	0	0
	1/30/2020^	-	-	-	-	0	0
	2/27/2020^	-	-	-	-	0	0.009
	3/20/2020^	-	-	-	-	0	0
	3/30/2020	5.71	16.7	2.78	106.68	18	0.0801
	4/14/2020*	-	-	-	-	17	-
	4/29/2020	-	-	-	-	0	0
2021	1/5/2021	-	-	-	-	0	0
	2/1/2021	-	-	-	-	0	0
	3/24/2021	-	-	-	-	0	0
2022	10/28/2021	-	-	-	-	0	0
	12/15/2021	-	-	-	-	0	0
	1/12/2022^	-	-	-	-	0	0

†Water quality probe was on its side for measurements.
‡Peripheral ponding was observed but was not mapped as there was no surface hydrological connectivity between the peripheral ponding and location of the staff gauge.
*taken during Burleson surveys
^Peripheral inundation present

Pond 61 East was monitored for six years between 2016 and 2022. Mastication activities occurred in 2017 and Munitions remediation activities occurred in 2018. In 2022, Pond 61 was in year 4 for post-subsurface Munitions remediation. The Historical data and precipitation are summarized below:

- 2017 (Burleson, 2018)
  - After the end of a Historical drought with precipitation above normal, Pond 61 was inundated from the first recorded monitoring in January through April. The maximum inundation area was 0.695 acres. Water quality was within normal ranges. Slightly acidic pH values were observed. Temperature was within normal averages for Fort Ord. Dissolved oxygen had a small range, with moderate levels. Turbidity had a large range, with moderate levels.
  - Yearly cumulative precipitation 22.92 inches
  - Data collected January - May, five monitoring events
  - Inundated January through April
  - Inundation range 0.05-0.70 acres, mean 0.47 acres
  - Depth range 10-21 cm, mean 18 cm
  - pH range 5.61-6.66, mean 6.23
  - temperature range 7.0°-15.9° C, mean 11.6° C
  - dissolved oxygen range 1.76-10.54 mg/L, mean 5.17 mg/L
  - turbidity range 28.8-76.7 FNU, mean 48.98 FNU
- 2018 (Burleson, 2019)
  - In a below normal water-year, Pond 60 did not hold water. No water quality data were collected.
  - Yearly cumulative precipitation 12.57 inches
  - Data collected January - April, four monitoring events
  - 0 in all monitoring events
  - No water quality data collected
- 2019 (Burleson, 2020)
  - In an above normal water-year, Pond 61 was inundated from the second recorded monitoring in February through April. Peripheral ponding that was not hydrologically connected to the staff gauge was observed in January. The maximum inundation area was 0.12 acres. Water quality was within normal ranges. Slightly acidic pH values were observed. Temperature was within normal averages for Fort Ord. Dissolved oxygen had a small range, with moderate levels. Turbidity had a small range, with moderate levels.
  - Yearly cumulative precipitation 21.97 inches
  - Data collected January - May, five monitoring events
  - Inundated February through April
  - Inundation range 0.04-0.12 acres, mean 0.07 acres
  - Depth range 8-20 cm, mean 16 cm
  - pH range 6.46-6.79, mean 6.58
  - temperature range 9.42°-14.15° C, mean 11.99° C
  - dissolved oxygen range 5.94-9.34 mg/L, mean 7.10 mg/L
  - turbidity range 17.1-52.3 FNU, mean 30.2 FNU
- 2020 (Chenega, 2021)
  - In a close to normal water year, Pond 61 was inundated from late March to mid-April. The maximum inundation area was 0.11 acres. Water quality was within Historical ranges. Slightly acidic pH value was observed. Temperature, dissolved oxygen, and turbidity values were within the Historical ranges.
  - Yearly cumulative precipitation 18.08 inches
  - Data collected December - April, nine monitoring events
  - Inundated from late March to mid-April
  - Inundation range 0-0.1 acres, mean 0.03 acres

  - Depth range 0-18 cm, mean 3.89 cm
  - pH value of 5.71
  - temperature value of 16.7° C
  - dissolved oxygen value 2.78 mg/L
  - turbidity value of 106.7 FNU
- 2021 (Chenega, 2022)
  - In a year of lowest cumulative precipitation of 7.57 inches in last 30 years, Pond 61 East did not fill
  - Data collected Jan-March, three monitoring events
- 2022
  - In consecutive below normal water year, Pond 61 East did not fill
  - Yearly cumulative precipitation of 11.69 inches
  - Data collected October - January, 3 monitoring events

Table B-10. Pond 61 West (Year 4 Post-Subsurface Munitions Remediation)
Historical Hydrology Results on Former Fort Ord 2017-2022

Water-Year	Date	pH	Temperature (°C)	Dissolved Oxygen (mg/L)	Turbidity (FNU)	Depth (cm)	Inundated Surface Area (acres)
2021	1/5/2021	-	-	-	-	0	0
	2/1/2021^	6.91	15.1	10.59	16.63	38	0.0214
	2/10/2021	-	-	-	-	34	NS
	3/02/2021	7.07	14.8	11.96	1.3	18	0.0048
	3/24/2021	6.95	10.7	10.14	0.07	16	0.0045
	4/05/2021	-	-	-	-	0	0
2022	10/28/2021	-	-	-	-	0	0
	12/15/2021^	6.71	13	10.61	36.83	28	0.0108
	1/12/2022^	6.84	13.4	9.52	3.17	42	0.0287
	2/1/2022	-	-	-	-	28	-
	2/17/2022#	-	-	-	-	8	5e-04
	3/2/2022	-	-	-	-	0	0

^Peripheral inundation present

Pond 61 West was monitored for two years between 2021 and 2022. Mastication activities occurred in 2017 and Munitions remediation activities occurred in 2018. Historically, Pond 61 West became connected to Pond 61 East in water years with above normal precipitation. In 2022, Pond 61 was in year 4 for post-subsurface Munitions remediation. The Historical data and precipitation are summarized below:

- 2021 (Chenega, 2022)
  - In a year of lowest cumulative precipitation of 7.57 inches in last 30 years, Pond 61 West was inundated from February through March
  - Maximum inundation area was 0.02 ac, and maximum depth was 38 cm
  - Data collected January - April, six monitoring events
  - Inundation range 0-0.02 acres, mean 0.006 acres
  - Depth range 0-38 cm, mean 17.67 cm
  - pH range 6.91-7.07, mean 6.98
  - temperature range 10.7°- 15.1° C, mean 13.53° C
  - dissolved oxygen range 10.14-11.96 mg/L, mean 10.9 mg/L
  - turbidity range 0.07-16.63 FNU, mean 6 FNU
- 2022
  - In consecutive below normal water year, Pond 40 South did not fill
  - Yearly cumulative precipitation of 11.69 inches
  - Data collected October - March, 4 monitoring events
  - Inundation range 0-0.03 acres, mean 0.008 acres
  - Depth range 0-42 cm, mean 17.67 cm
  - pH range 6.71-6.84, mean 6.78
  - temperature range 13.0°- 13.4° C, mean 13.2° C
  - dissolved oxygen range 10.61-9.52 mg/L, mean 10.07 mg/L
  - turbidity range 36.83-3.17 FNU, mean 20.00 FNU

APPENDIX C

Site Photos

Figure C-1. Pond 5 (Reference): Hydrology Survey on 1/14/2022

Figure C-2. Pond 101 East (East) (Reference): Hydrology Survey on 1/14/2022

Figure C-3. Pond 997 (Reference): Hydrology Photo Point 1 on 1/12/2022

Figure C-4. Pond 75 (Baseline) Hydrology Photo Point 1 on 1/12/2022

Figure C-5. Pond 16 (Year 4 Post Subsurface munitions remediation) Hydrology Photo Point 1 on 1/12/2022

Figure C-6. Pond 39 (Year 4 Post Subsurface munitions remediation) Hydrology Photo Point 2 on 12/15/2021

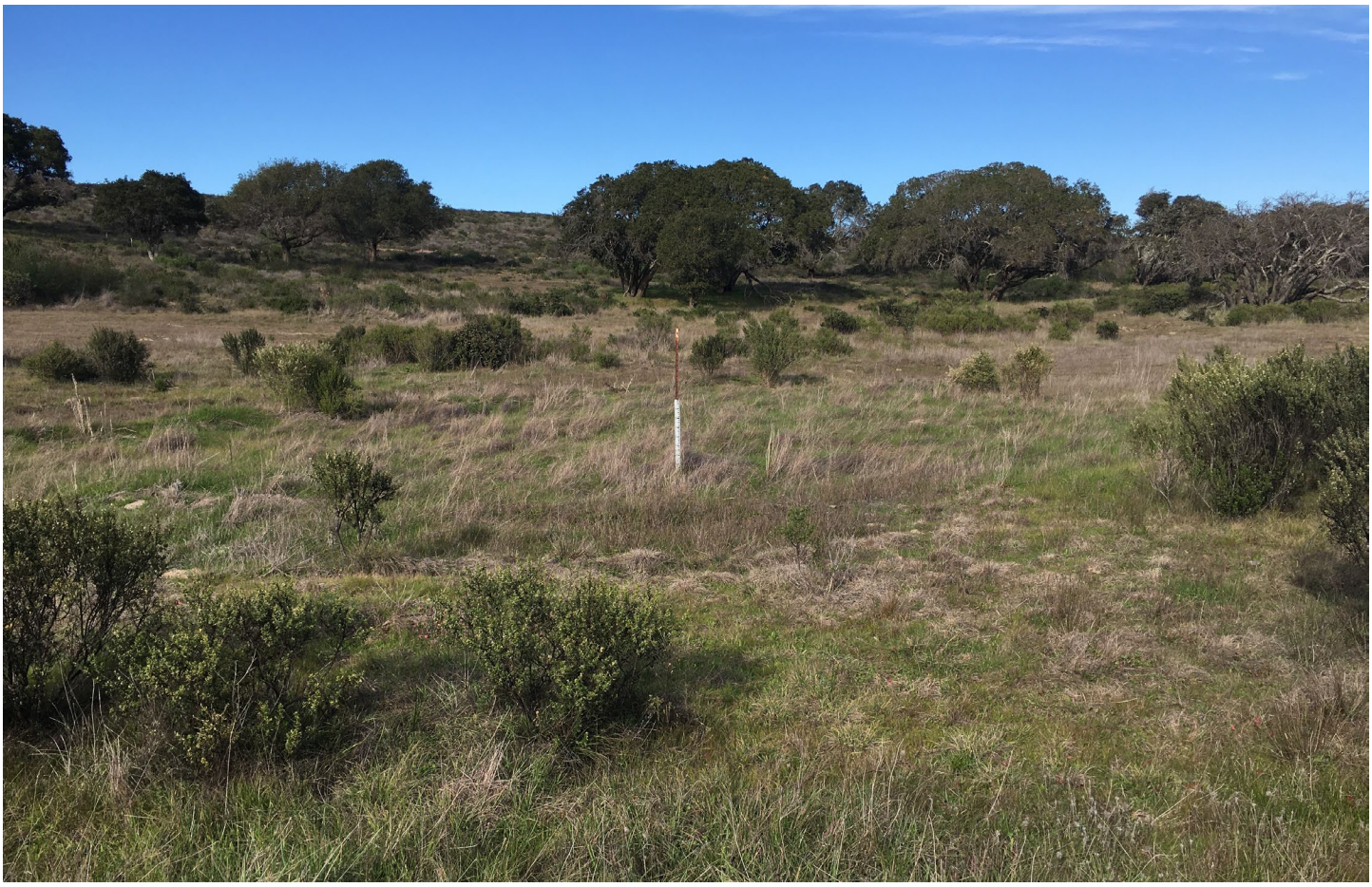


Figure C-7. Pond 40 South (Year 4 Post Subsurface munitions remediation) Hydrology Photo Point 2 on 1/12/2022

Figure C-8. Pond 41 (Year 4 Post Subsurface munitions remediation) Hydrology Survey on 1/12/2022

Figure C-9. Pond 42 (Year 4 Post Subsurface munitions remediation) Hydrology Photo Point 2 on 12/15/2021

Figure C-10. Pond 61 East (Year 4 Post Subsurface munitions remediation) Hydrology Photo Point 2 on 12/15/2021

Figure C-11. Pond 61 West (Year 4 Post Subsurface munitions remediation) Hydrology Photo Point 1 on 1/12/2022