Final

Wetland Survey Report in Support of the Proposed Fallon Range Training Complex Expansion, Nevada

December 2019

Prepared for:
Naval Facilities Engineering Command, Southwest
San Diego, CA

Prepared by:
ManTech International Corporation
Environmental, Range and Sustainability Services
Lompoc and Solana Beach, CA

[Cover: Potential Wetland Site HC-1 within the proposed DVTA expansion area; October 2, 2018; Photo – M. Cloud-Hughes, ManTech]

TABLE OF CONTENTS

Appendices

List of Figures

List of Tables

Acronyms and Abbreviations

ac	acre(s)
BLM	Bureau of Land Management
°C	degrees Celsius
cm	centimeter(s)
DoN	U.S. Department of the Navy
DVTA	Dixie Valley Training Area
FRTC	Fallon Range Training Complex
°F	degrees Fahrenheit
ft	foot/feet
GIS	geographic information system
ha	hectare(s)
in.	inch(es)
km	kilometer(s)
m	meter(s)
NAS	Naval Air Station
NNHP	Nevada Natural Heritage Program
NWI	National Wetlands Inventory
U.S.	United States
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1. INTRODUCTION

Naval Air Station (NAS) Fallon manages the Fallon Range Training Complex (FRTC), which currently encompasses a combination of withdrawn and acquired lands totaling approximately over 223,600 acres (ac) (90,490 hectares [ha]) of military training land located southeast of Fallon, Nevada (Figure 1-1). The FRTC is the United States (U.S.) Department of the Navy's (hereafter DoN or Navy) premier integrated strike warfare training complex, supporting air units and special operations forces in a variety of mission areas. Since World War II, the Navy has extensively used the ranges and airspace of the FRTC to conduct military air warfare and ground training, including live-fire training activities. However, the current training areas are insufficient for implementation of realistic training scenarios and the buffers required for public safety require expansion. In order to effectively meet these needs, the Navy proposes to modernize the land and airspace configurations of the FRTC. The Navy is currently proposing to expand the land administered by NAS Fallon by approximately 680,000 ac (275,200 ha). The proposed expansion areas are broken into four discontinuous areas associated with four of the current training ranges (ranges B-16, B-17, B-20, and Dixie Valley Training Area [DVTA]) (Figure 1-1):

- The area west of B-16 is the proposed B-16 Expansion Area.
- The area surrounding B-20 is the proposed B-20 Expansion Area.
- The areas west and east of B-17 and south of Highway 50, and areas north of Highway 50 surrounding the DVTA are the proposed DVTA expansion areas.
- The area south of B-17 and Highway 50 and east of B-17 is the proposed B-17 Expansion Area.

Currently, the Navy is preparing an Environmental Impact Statement (EIS) to assess the potential environmental effects of the proposed FRTC expansion. In support of the EIS, Naval Facilities Engineering Command, Southwest contracted ManTech International, Inc. to perform a variety of ecological surveys to inventory the flora and fauna within the proposed FRTC expansion areas. This report details the results of a wetlands assessment in which aerial and ground-based surveys were conducted to document the occurrence of potential wetlands within the proposed FRTC expansion areas. While this report describes the wetland attributes of the surveyed sites, it should be noted that the U.S. Army Corps of Engineers (USACE) must make the official determination of whether the sites fall under their regulatory program. Only after the USACE determines their jurisdictional authority over these sites would a wetland delineation become necessary.

The surveys were conducted in 2018 under contract N62742-14-D-1863, Task Order N6247317F4650 and in 2019 under Task Order N6247317F4650, Modification #P00001 (Figure 1-1).

1.1. Project Area

The project area lies within the geographic feature known as the Great Basin, particularly the Great Basin Desert. The Great Basin Desert is the largest desert in the U.S., roughly bounded by the Sierra Nevada – Cascade mountain range to the west and the Rocky Mountains to the east. Between these large mountain ranges are a series of basins interspersed by smaller, north-south running mountain ranges. This desert covers roughly 158,000 square miles (409,218 square kilometers [km]) of southern Idaho, southeastern Oregon, western Utah, eastern California, and nearly all of Nevada (MacMahon 1985). The Great Basin is a high, cold desert, with most of its elevations over 4,000 feet (ft) 1,200 meters [m]), and most of its precipitation comes in the form of snow, although rain showers can occur throughout the year (Sowell 2001).

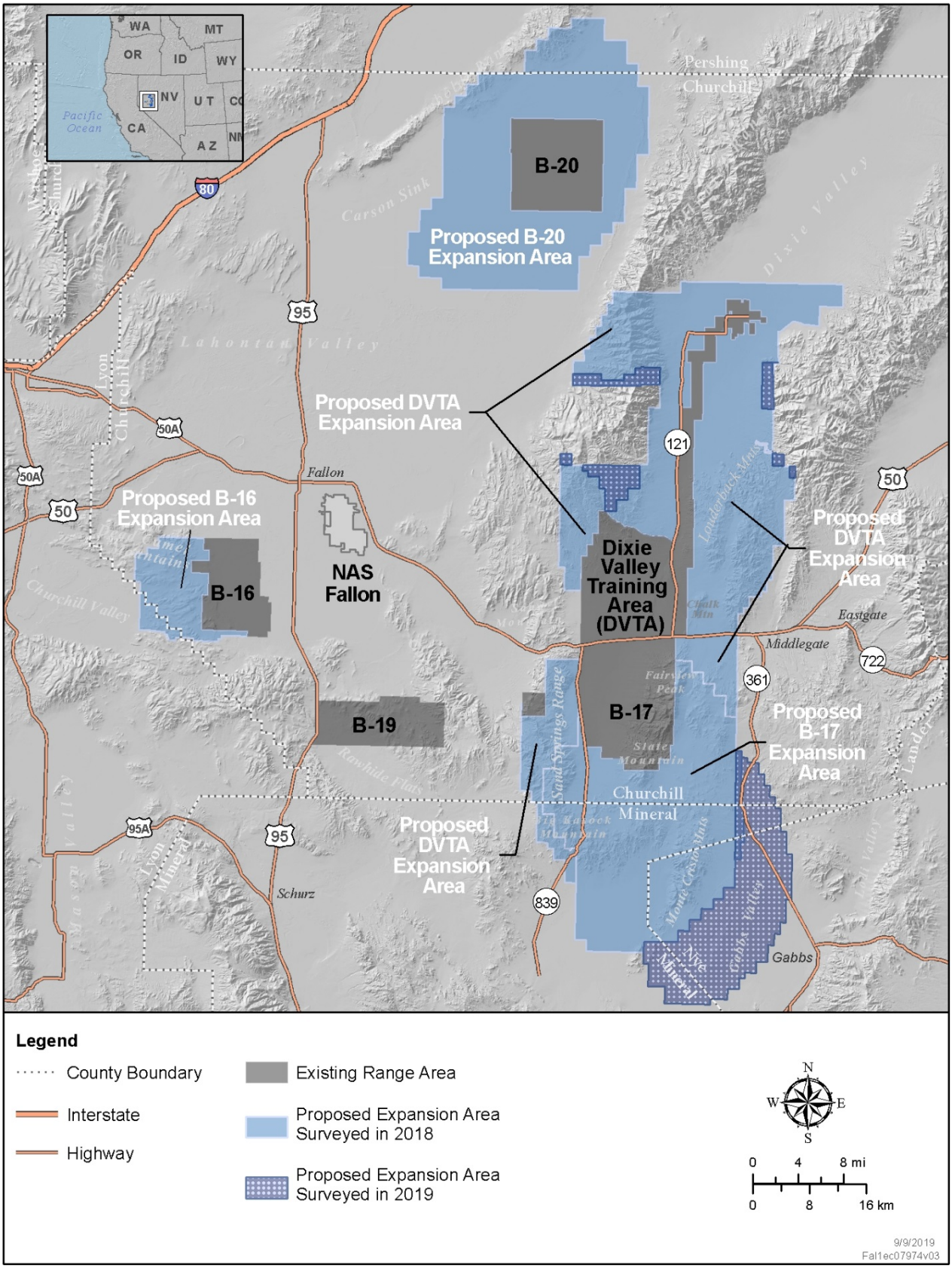


Figure 1-1. Regional Location of the Proposed FRTC Expansion Areas

1.2. Regional Climate

The climate of the region is classified as arid continental, characterized by abundant sunshine, low humidity, and substantial diurnal and seasonal variations in temperature throughout the year. The major influences on the regional climate are the Sierra Nevada Mountains to the west and elevation (DoN 2014).

The climate of NAS Fallon is hot during summer when day time temperatures average in the 90s degrees Fahrenheit (°F) (30s degrees Celsius [°C]) and cold during winter when temperatures average in the 40s °F (5-10 °C). The warmest month of the year is July with an average maximum temperature of 93 °F (34 °C), while the coldest months of the year are December and January with an average minimum temperature of 21 °F (−6 °C) (Figure 1-2a). Temperature variations between night and day tend to be relatively large due to low humidity. During summer the difference can vary by 39 °F (4 °C), being more moderate during winter with an average difference of 28 °F (2 °C) (DoN 2014).

In the past 30 years the average precipitation in the Lahontan Valley was 4.91 inches (in.) (12.47 centimeters [cm]). Most of the precipitation occurs during the winter/early spring months, primarily as snow (Figure 1-2b). Although Fallon gets around 7-8 in. (17.8-20.3 cm) of snow annually, it is generally very light and melts within a few days, except in the mountainous regions, where several inches can fall and remain for longer periods of time (DoN 2014; U.S Climate Data 2018).

1.3. Previous Wetland Investigations within the Region

Three previous wetland inventories have been conducted within the region, all within existing NAS Fallon-administered lands.

- In 1995, an inventory of wetlands was conducted on existing NAS Fallon-administered lands: NAS Fallon, Dixie Valley, B-16, B-17, B-19 and B-20 (Curtis 1996a, b). Field work for the inventory was conducted primarily during the spring and early summer of 1995, which was an unusually wet year, and involved a combination of aerial photointerpretation and ground-truthing. The methodology employed was based on the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI), which uses a classification system encompassing a broad spectrum of vegetated and nonvegetated features (Cowardin et al. 1979). Eight separate wetland habitats were identified, corresponding to about 75 different wetland subtypes in the Cowardin system.
- Between the summer of 1996 and spring 1997, wetland plant communities were inventoried on existing NAS Fallon-administered lands: NAS Fallon, DVTA, B-16, B-17, B-19 and B-20 (NAS Fallon 1997). Eight wetland habitats were identified (based on vegetation, but not hydrology or soils) and quantitatively sampled.
- In 2007, a wetland delineation was conducted within existing NAS Fallon-administered lands: DVTA, Horse Creek, B-16, B-17, B-19, and the Shoal Site (NAS Fallon 2008). The focused field work was supplemented with aerial photo interpretation, incidental observations during vegetation mapping and other field work, and the 1996-1997 wetland mapping efforts. The resulting delineation identified 11 wetland habitats totaling 11,932 ac (4,829 ha) of non-jurisdictional wetlands, plus an additional 1,690 ac (684 ha) of mixed grasslands with wetland components and 290 miles (467 km) of linear features (i.e., U.S. Geological Survey [USGS] ‘blue line’ watercourses).

The 2014 Integrated Natural Resources Management Plan for NAS Fallon lists six wetland habitat types covering approximately 52,510 ac (21,250 ha) plus 139 miles (224 km) of linear features on NAS Fallon, B-16, B-17, B-19, B-20, Horse Creek, DVTA, and the Shoal Site (DoN 2014).

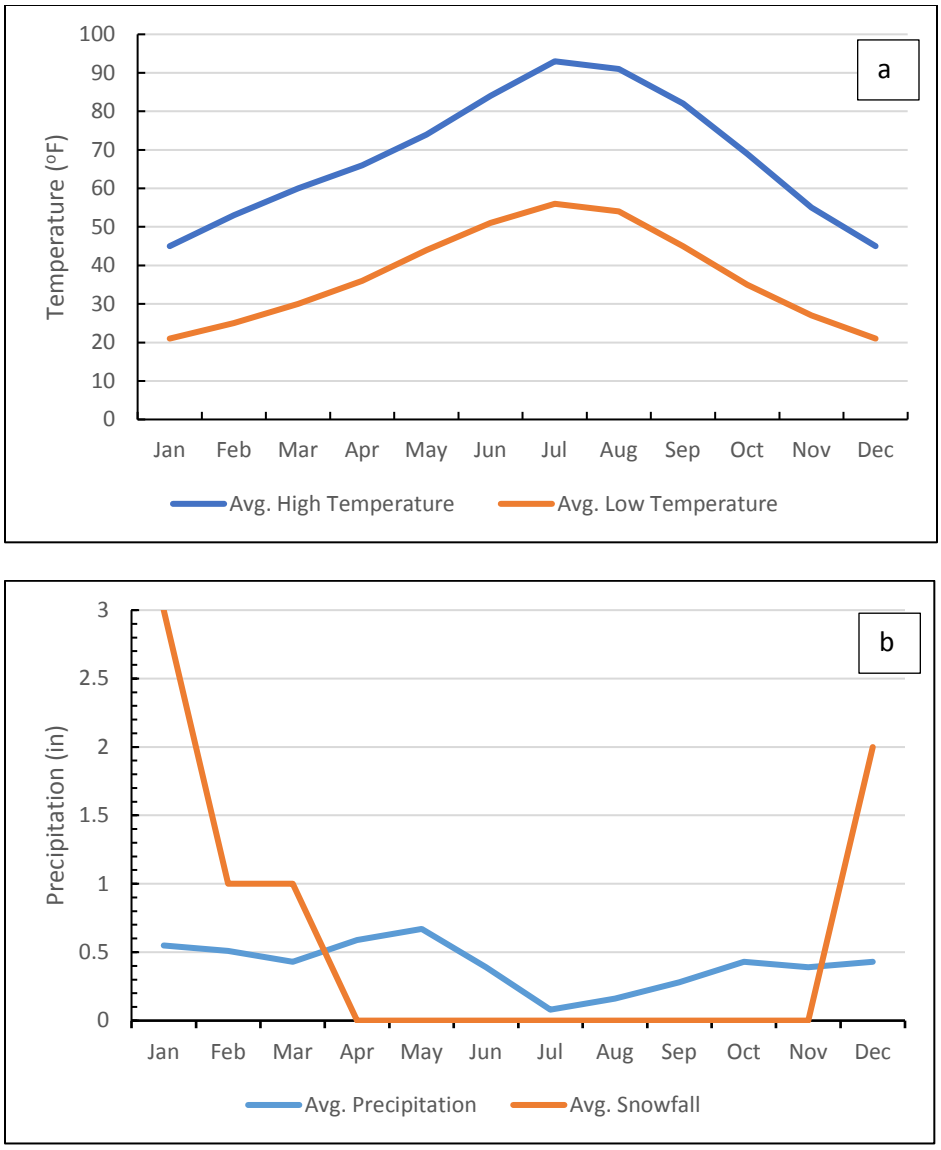


Figure 1-2. (a) Yearly Average Temperature and (b) Precipitation and Snowfall – Fallon, Nevada
Source: U.S. Climate Data 2018.

2. METHODS

2.1. Pre-field Preparation

In preparation for field work, geographic information system (GIS) information was gathered and literature reviews were performed to develop pre-determined survey locations and determine the types of wetlands likely to occur in the project area. GIS data were obtained from the USFWS NWI (USFWS 2018); USGS National Hydrography Dataset (USGS 2017); Bureau of Land Management (BLM), Carson City Resource Management Plan (BLM 2014); orthophotographs of the project area; and the 2017 and 2019 vegetation community mapping prepared as part of the overall ecological inventory of the proposed expansion areas in support of the FRTC EIS (DoN 2019a). Potential wetland features were also identified during aerial vegetation surveys in April and August 2017 and in May 2019 from a Hughes 500 helicopter at an altitude of approximately 50-100 ft (15-30 m). Global positioning system (GPS)-encoded aerial

photographs of potential water features were taken using a Canon 5D Mark III camera with a 28-105 millimeter lens to capture wide angle images. These sources were used to determine possible wetland sites that were likely to be representative of similar sites nearby. A total of 39 such sites were selected for either ground-based surveys or aerial surveys in 2018, depending on terrain and accessibility (Figure 2-1). As all wetlands were of similar types to those previously sampled in 2018, ground-based surveys were not conducted in 2019. All sites were mapped and photographed from the air and/or from aerial imagery in 2019.

For the 2018 ground-based survey effort, data forms were developed using ArcGIS Survey123 and ArcGIS Collector, form- and map-based mobile data collection services available from ESRI. Two Survey123 forms were prepared, one based on the USACE wetland delineation form for the Arid Southwest, and the other for use in collecting unknown plant specimens for later identification. Fields used in these forms are included as Appendix A. The Collector Data Form included layers for the project boundary, pre-determined survey sites, known spring and wet drainage locations from the GIS data, an orthophotograph for navigation, and point, line and polygon data collection features with the basic information fields included in Appendix A.

2.2. Field Surveys

Field work consisted of a combination of ground and aerial surveys during the peak of detectability for the majority of the relevant plant species. The 2018 ground-based surveys were performed predominantly at the beginning of the survey period, with more aerial surveys conducted later during the survey effort. This allowed for more intensive investigation of the types of wetlands at the beginning, the need for which tapered off as the types were identified. Ground surveys were conducted either via truck or occasionally by landing the helicopter. The 2018 aerial surveys were conducted to ensure full coverage of the project area and to access remote sites. In 2019, all sites were mapped and photographed from the air and/or from aerial imagery and no ground-based surveys were conducted.

Wetland surveys were undertaken by a professional botanist with training (e.g., Wetland Training Institute) and experience in wetland delineations to determine if selected potential surface water features within the survey area contain the wetland indicators as defined by the USACE: wetland hydrology, hydrophytic vegetation, and hydric soils. These three criteria must be satisfied for federal jurisdictional status. The 1987 USACE Wetland Delineation Manual (USACE 1987) and 2008 Regional Supplement for the Arid West Region (Version 2) (USACE 2008) were used as the basis for evaluating the wetland indicators of each potential wetland site.

- *Hydrology*: Hydrology was characterized based upon the presence of surface water or saturated soils and connection to any stream or natural surface drainage systems.
- *Hydrophytic Vegetation*: The occurrence of obligate wetland species was assessed to characterize the presence of hydrophytic vegetation. The Arid West 2016 Regional Wetland Plant List was used for classification of plant species as wetland obligate (OBL), facultative (FAC), facultative upland (FACU), facultative wetland (FACW), or upland (UPL) (Lichvar et al. 2016).
- *Hydric Soils*: Determination of the presence of hydric soils was conducted by digging test pits as close to the ponded water level as possible and classifying soils via a Munsell Color Chart. Sampling of paired soil test pits was not conducted as the goal of the current survey effort was to determine if hydric soils were present at each site, not delineate wetland boundaries.

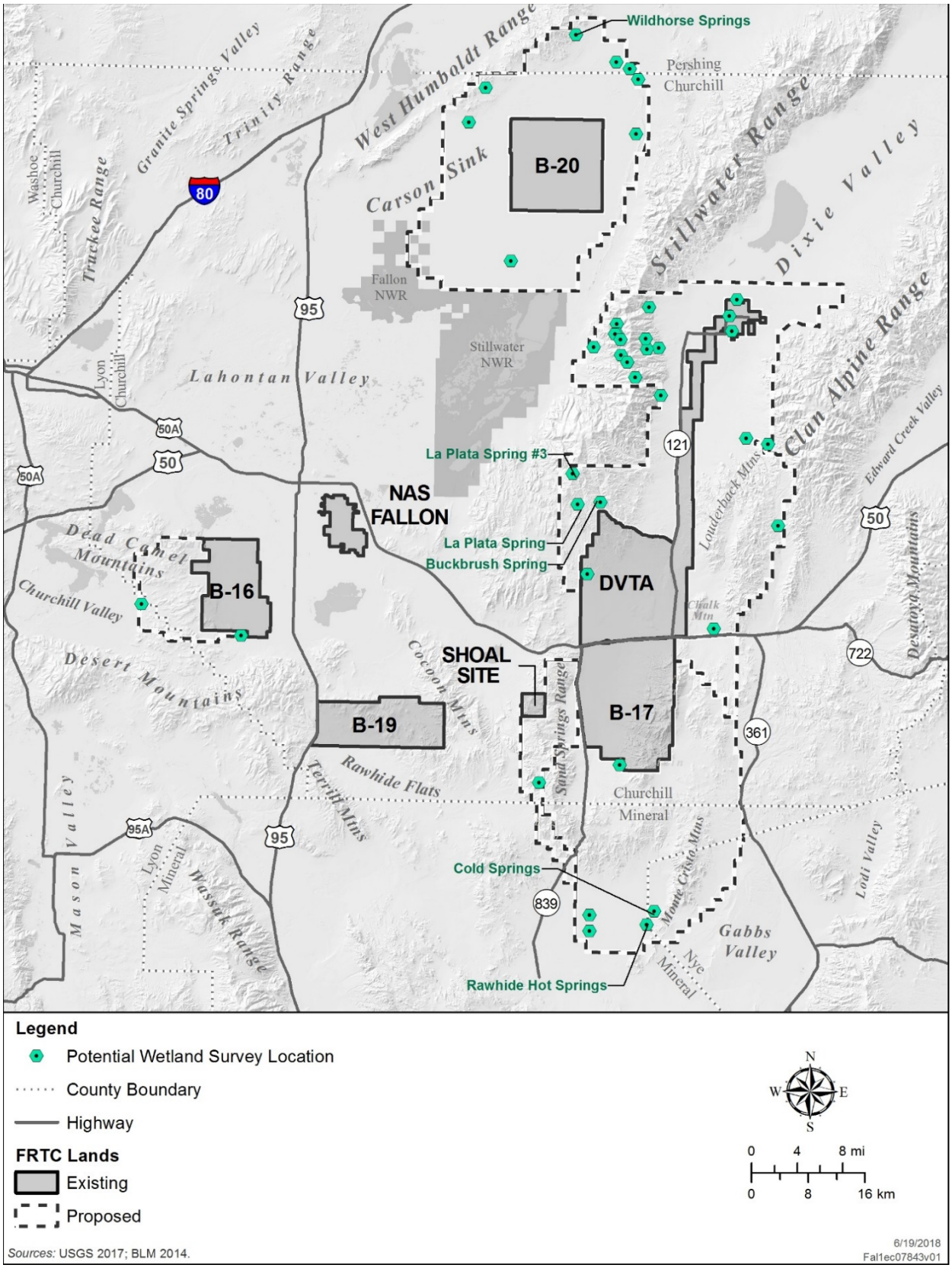


Figure 2-1. Potential 2018 Wetland Survey Locations within the Proposed FRTC Expansion Areas

In 2018, the pre-selected survey points were visited or discarded, depending on the first visual inspection. If the site clearly did not support wetland vegetation, no further survey was performed. If hydrophytic vegetation was present or possibly present, the site was inspected further. Vegetation, hydrology, and soils information were collected based on the USACE Arid West wetland delineation form (USACE 2008: Appendix C) using ArcGIS Survey123 and ArcGIS Collector. Although a full delineation was not performed at any of the potential wetlands, each survey site visit included inspection of each of the three wetland aspects to determine if hydrophytic vegetation, hydric soils, and/or wetland hydrology were present. If hydrophytic vegetation and surface water appeared to be present upon cursory inspection, one or more soil pits were dug and a full data form was completed (Figure 2-2).

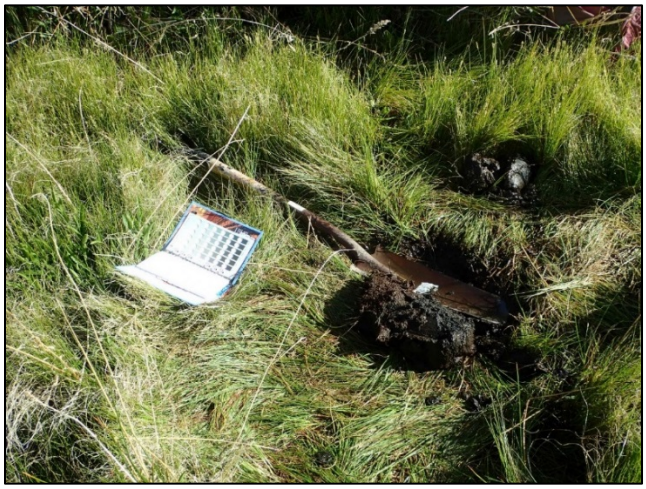


Figure 2-2. Soil Test Pit and Munsell Color Chart

Unknown plant specimens were bagged as needed for later identification or verification, and species new to the project or sensitive species were also noted. Site boundaries were generally placed at the greatest extent of the hydrophytic vegetation to give the most liberal interpretation of where the wetland could be delineated. Thus, boundary estimates represent the maximum extent of the wetland, and many may actually be smaller if formally delineated. This allowed for assessments of significantly more sites than if all sites were subjected to the time-consuming process of formal delineation.

Aerial surveys were conducted after ground surveys allowed surveyors to establish search images for the types of wetlands found within the project area. Thereafter, aerial surveys were used to map boundaries of remote or large potential wetlands, with occasional landings to refine boundaries or collect additional data.

The 2019 survey efforts relied solely on aerial surveys and photographs, and sites were evaluated based on the field experience gained during the 2018 surveys. As with the 2018 surveys, site boundaries were placed at the greatest extent of the hydrophytic vegetation visible from the helicopter overflights and from photographs to give the most liberal interpretation of where the wetland could be delineated.

3. RESULTS

In 2018, field work consisted of a combination of ground and aerial surveys conducted in early May, during the peak of detectability for the majority of the relevant wetland plant indicator species (Table 3-1). In 2019, aerial surveys and photography of all sites were conducted on May 22 and 23, again during the peak of detectability for the majority of the relevant wetland plant indicator species. Identification of wetland

plant indicator species from the helicopter and from photographs was based on the extensive experience gained while conducting aerial and ground-based surveys of potential wetland areas in 2018.

Table 3-1. Survey Dates, Areas, and Methods Used during 2018 and 2019 Wetland Assessments of Proposed FRTC Expansion Areas

Date	Area	Method
2018		
2 May	Proposed B-16 Expansion Area	Ground
3 May	Proposed DVTA Expansion Area (Horse Creek and base of Stillwater Mountains)	Ground
4 May	Proposed B-17 and DVTA Expansion Areas (Stillwater Mountains)	Ground and aerial
5 May	Proposed B-20 Expansion Area	Ground and aerial
6 May	Proposed B-17 Expansion Area	Ground and aerial
7 May	Proposed DVTA Expansion Area (Settlement Area)	Ground
9 May	Proposed DVTA Expansion Area (Settlement Area and surroundings)	Aerial
10 May	Proposed DVTA Expansion Area (Stillwater Mountains)	Aerial
2019		
22 May	Proposed DVTA Expansion Area and Proposed B-17 Expansion Area (northern half of Gabbs Valley)	Aerial
23 May	Proposed B-17 Expansion Area (southern half of Gabbs Valley)	Aerial

In addition to wetland surveys, separate fish surveys were also conducted during May 2018 as part of a separate task under the same contract. Wetland sites DVTA-2 and DVTA-3 correspond to the Highway 121 #1 and #2 ponds, respectively (Figure 3-1). Wetland site DVTA-11 corresponds to the East Valley Road #1 fish survey site, and wetland site DVTA-12 corresponds to East Valley Road #2, #3, and #4 (Figure 3-2). Refer to the Fish Survey Report (DoN 2019b) for further details on occurrence of fish within these wetland/pond features.

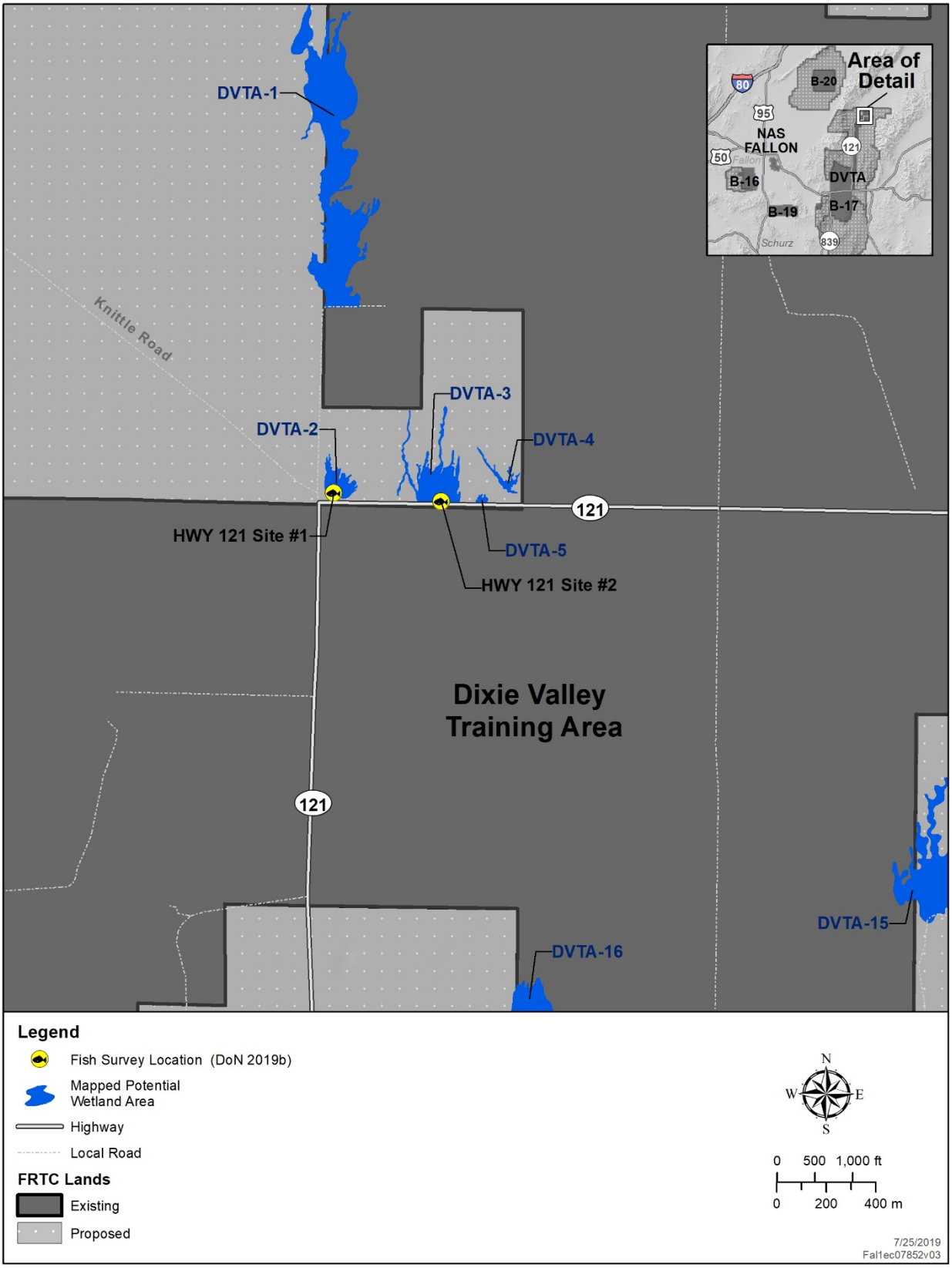


Figure 3-1. Locations of Co-located Wetland and Fish Survey Sites – Proposed Northwestern DVTA Expansion Area

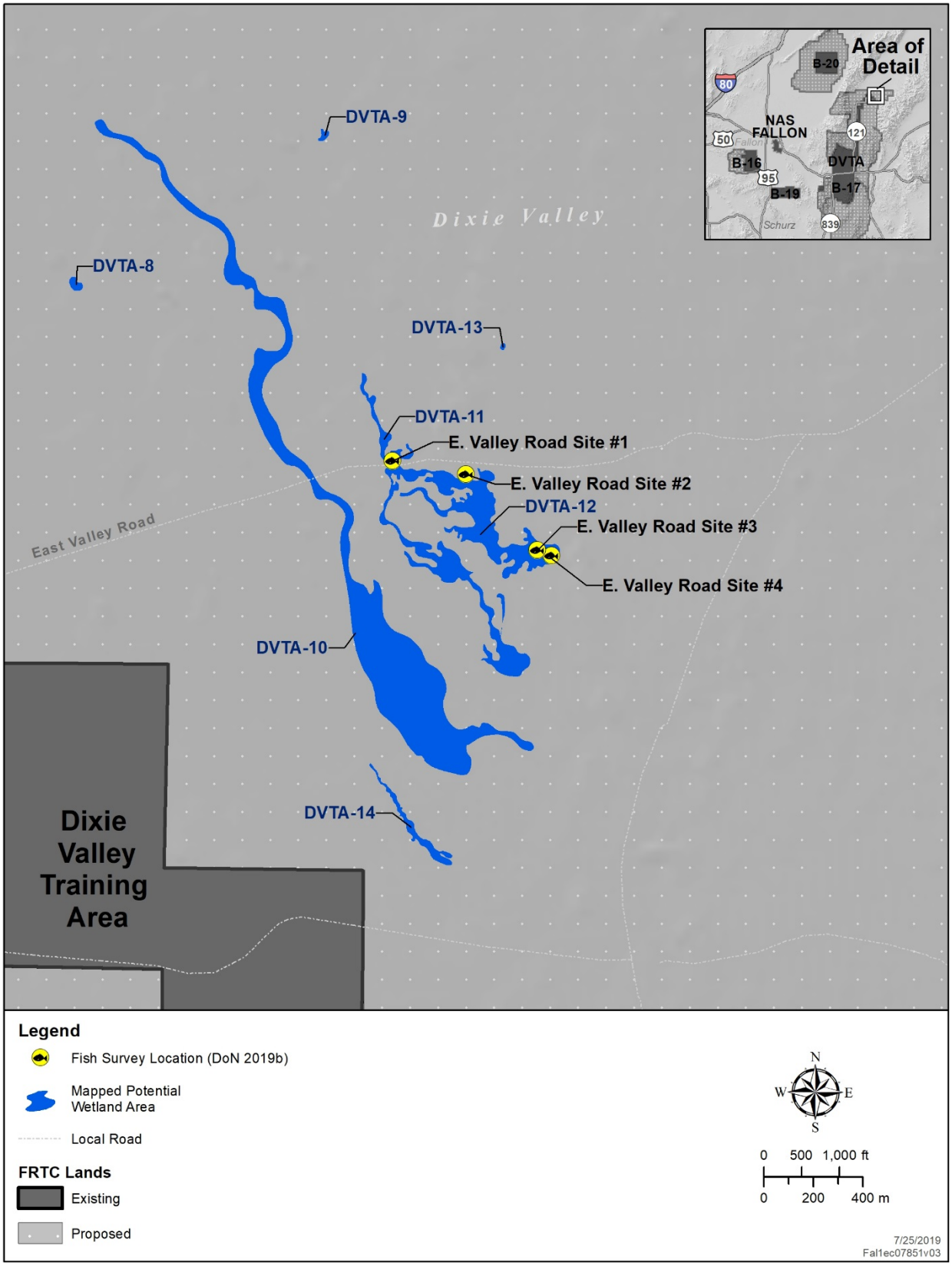


Figure 3-2. Locations of Co-located Wetland and Fish Survey Sites – Proposed Northeastern DVTA Expansion Area

3.1. Characteristics of Potential Wetlands within Proposed FRTC Expansion Areas

A total of 75 potential wetlands totaling approximately 297 ac (120 ha) were mapped within the proposed DVTA, B-17, and B-20 expansion areas, or on the border of a proposed expansion area or existing FRTC-administered lands; the proposed B-16 expansion area did not include any potential wetlands (Table 3-2; Figure 3-3 through Figure 3-5). Potential wetlands clustered into three main types based primarily on different vegetation characteristics, with some differences in hydrology and soils. First, the single hot spring mapped in the proposed B-17 expansion area was notable in its relatively sparse cover of vegetation, primarily graminoids. Occasional tamarisk (*Tamarix ramosissima*) trees and dense patches of reeds (*Juncus* spp.) were also noted. Salt crusts were also present at this site, and it had more prominent redox concentrations in the soil than other sites where soil pits were dug.

Table 3-2. Characteristics of Potential Wetlands Mapped in the Proposed FRTC Expansion Areas

Type	Vegetation Characteristics	Hydrological Characteristics	Soil Characteristics	Expansion Area No. Wetlands (ac)			Total
				DVTA	B-20	B-17	
Hot Spring	Sparse cover of graminoids, occasional tamarisk.	Saturation; inundation on aerial Image; salt crust.	Clay soils; redox concentrations; depleted matrix.	0	0	1 (17.0)	1 (17.0)
Valley Bottom Springs	Dense cover of graminoids, with annual & perennial forbs; occasional non-native trees.	Surface water; saturation; high water table.	Depleted matrix; sandy or loamy texture, with occasional gley soil; generally hydrogen sulfide odor.	22 (235.9)	0	18 (6.7)	40 (242.6)
Mountain Seeps & Canyon Bottoms	Overstory of willows, Fremont cottonwood, Wood's rose, silver buffalo-berry; understory of dense forbs and graminoids.	Surface water; saturation; high water table.	Depleted matrix; occasional gley soil; occasional hydrogen sulfide odor.	31 (36.2)	1 (0.1)	0	32 (36.3)
Stock Pond	Very narrow band of vegetation that may qualify as hydric in some years; generally sparse to dense graminoids, occasional overstory of willow or cottonwood.	Surface water; saturation; high water table	Not sampled	2 (1.1)	0	0	2 (1.1)
			Total	**55 (273.2)**	**1 (0.1)**	**19 (23.7)**	**75 (297.0)**

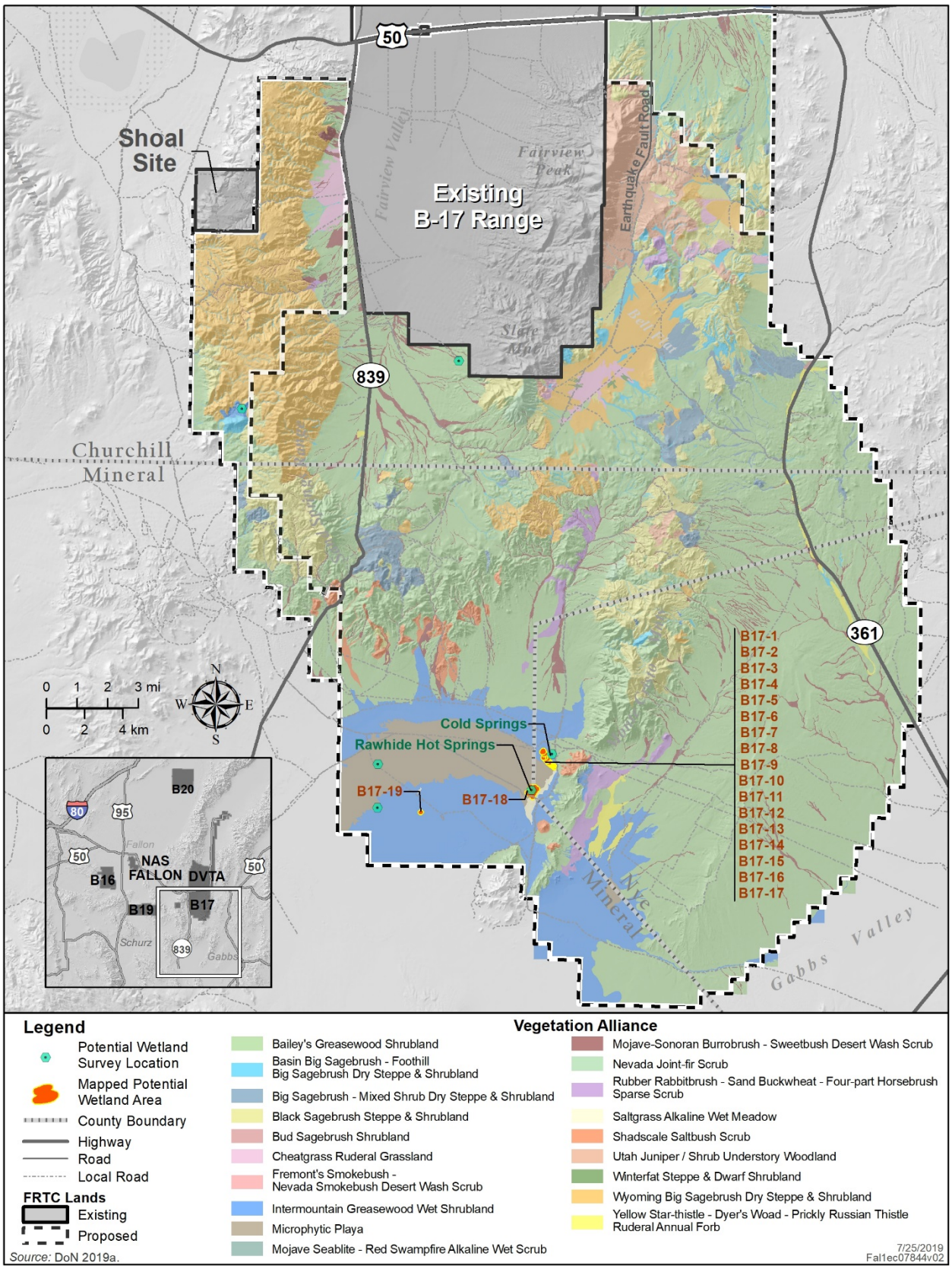


Figure 3-3. Locations of Potential Wetlands within the Proposed B-17 Expansion Area

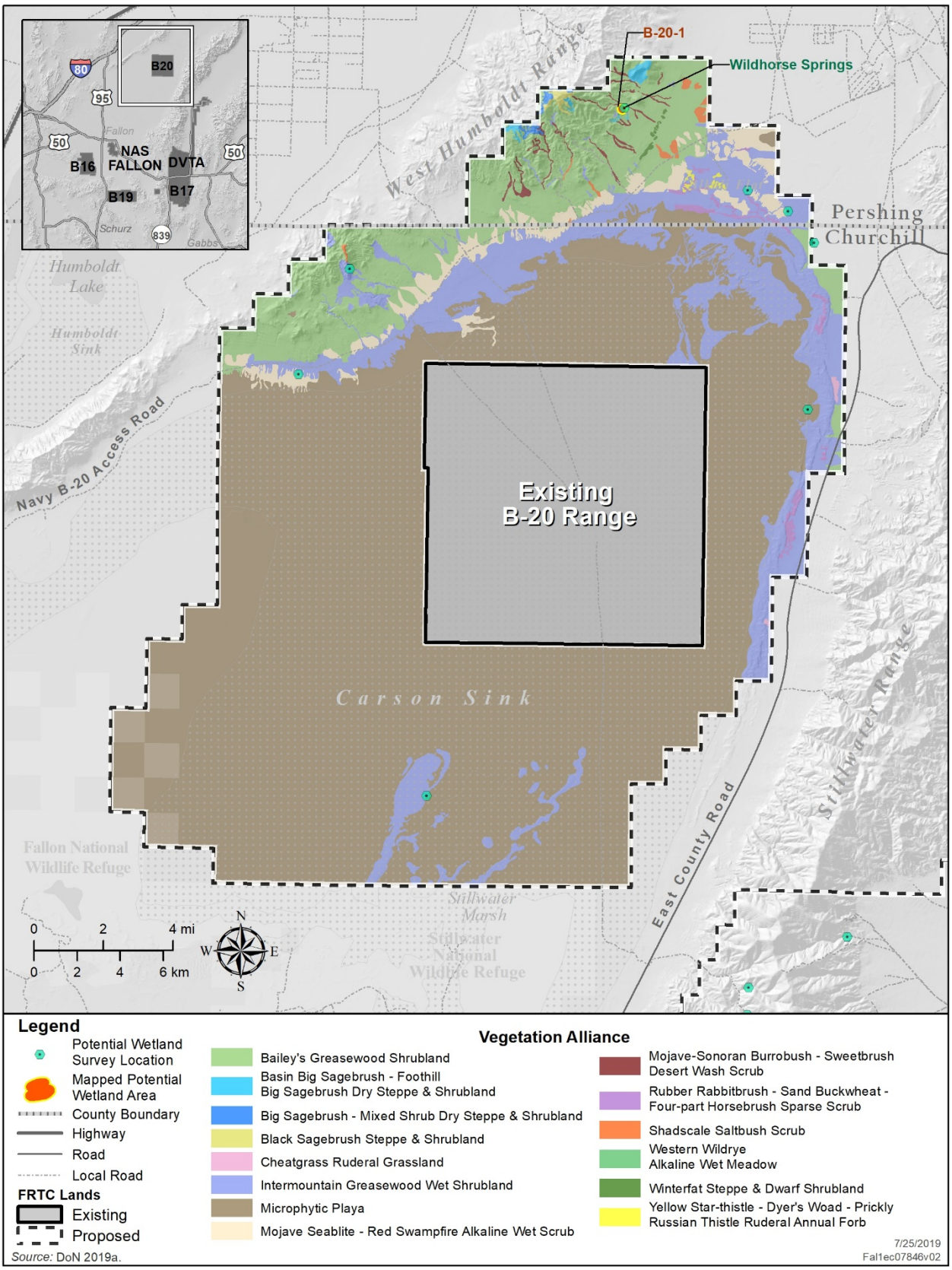


Figure 3-4. Locations of Potential Wetlands within the Proposed B-20 Expansion Area

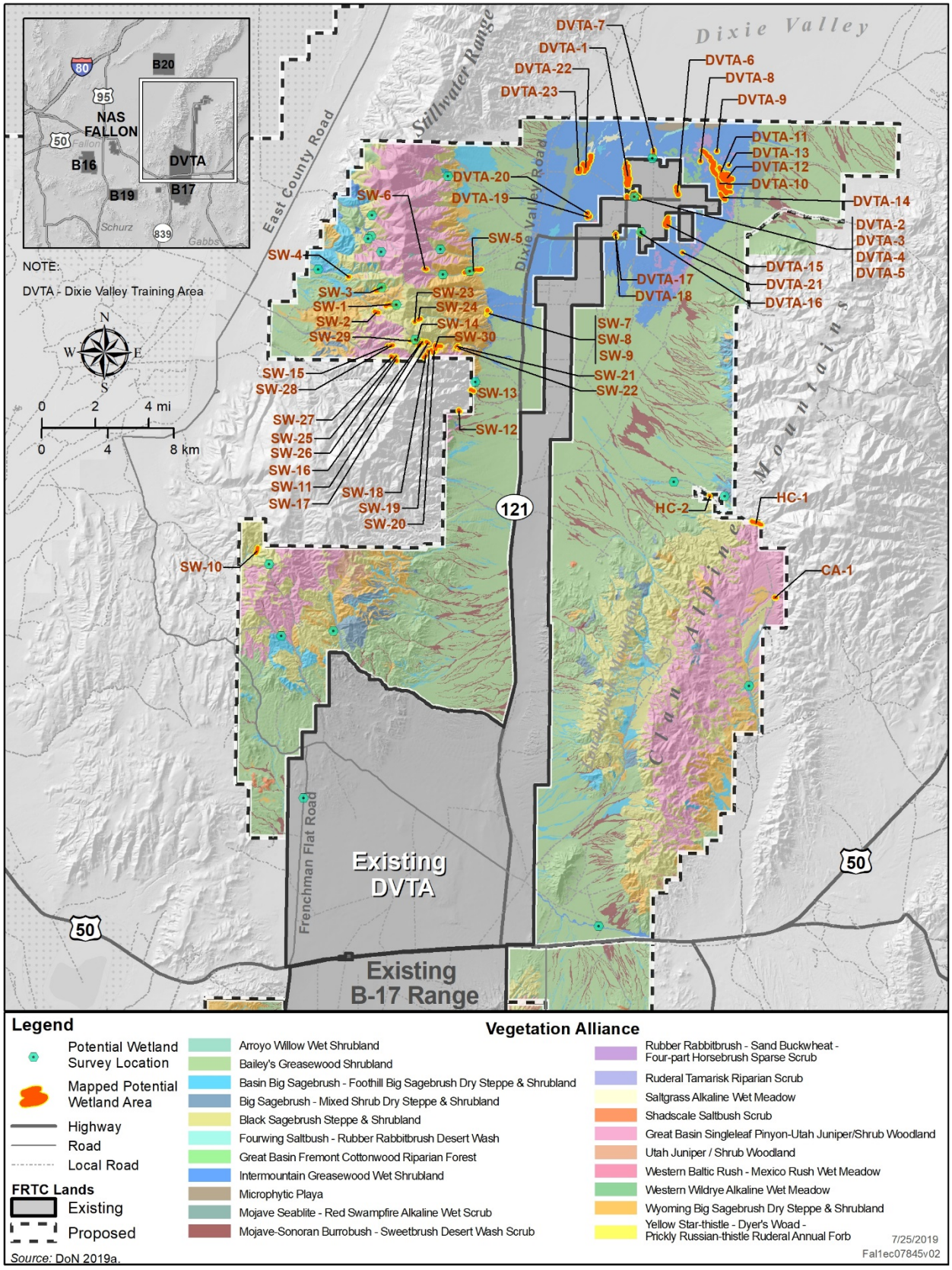


Figure 3-5. Locations of Potential Wetlands within the Proposed Northern DVTA Expansion Area

Second, the Valley Bottom Springs and Mountain Seeps & Canyon Bottoms potential wetlands were substantially vegetated with a diverse assemblages of shrubs, forbs, and graminoid plants. Soils and hydrology wetland indicators types nearly always included surface water and saturation, with hydrogen sulfide odor noted in many. Depleted matrices and gley soils characterized the majority of the sites tested. These two types are separated primarily by their markedly different terrains, with Valley Bottom Springs occupying the lowest topographic position on flat ground. These springs were often small and circular in shape, or occasionally larger with amorphous shape and a linear outflow continuing the potential wetland outward. Mountain Seeps & Canyon Bottoms occurred on both slopes of the Stillwater Mountains, often beginning at the confluence of two small canyons and continuing in a narrow linear band down the canyon. These potential wetlands nearly always disappear at the base of the mountain range where it encounters the valley floor.

Lastly, two perennial or nearly-perennial stock ponds were recorded. These were created by damming an existing flow and generally consisted of a very narrow band of vegetation that is likely hydric in some or most years. Vegetation consisted of occasionally dense patches of graminoids with occasional overstory willow or cottonwood trees.

3.2. Classification of Potential Wetlands

All of the potential wetlands observed fell into the Palustrine System of wetlands (Table 3-3) (Federal Geographic Data Committee 2013). Palustrine wetlands are dominated by trees, shrubs, persistent emergents, or emergent mosses or lichens, or are wetland sites that lack this vegetation but are less than 20 ac (8 ha) in size without active wave-formed or bedrock shorelines, with shallow water and with low salinity. Palustrine wetlands are described as marshes, bogs, prairies, ponds, etc. The Palustrine System is further divided into classes, based on the nature of the vegetation or substrate.

Of the 75 potential wetlands, 55 were in the Emergent Wetland class within the Palustrine System (Table 3-3). These potential wetlands were dominated by short graminoids or forbs, with only occasional shrubs or short trees. The remaining 20 potential wetlands were characterized as Scrub-Shrub Wetlands due to the dominance of native or exotic shrubs such as willows (*Salix* spp.), tamarisk or Russian olive (*Eleagnus angustifolia*). Each potential wetland was assigned a code based on the Cowardin system that denotes its System, Class, Subclass and any water regime or additional modifiers important at the site (Figure 3-6).

Table 3-3. Classification and Acreage of Potential Wetlands within the Proposed FRTC Expansion Areas

Type/ Wetland ID*	Survey Date	Survey Type	Wetland System†	Wetland Class†	Cowardin Code‡	Area (ac)
Hot Spring/						
B17-18	5/4/2018	Ground and Air	Palustrine	Emergent	PEM1H-E	17.04
Valley Bottom Spring/						
B17-1	5/4/2018	Air	Palustrine	Emergent	PEM1H	0.12
B17-2	5/4/2018	Air	Palustrine	Emergent	PEM1H	0.18
B17-3	5/4/2018	Air	Palustrine	Emergent	PEM1H	0.35
B17-4	5/4/2018	Air	Palustrine	Emergent	PEM1H	0.11
B17-5	5/4/2018	Air	Palustrine	Emergent	PEM1H	0.04
B17-6	5/4/2018	Air	Palustrine	Emergent	PEM1H	0.52
B17-7	5/4/2018	Air	Palustrine	Emergent	PEM1H	0.14
B17-8	5/4/2018	Air	Palustrine	Emergent	PEM1H	0.12
B17-9	5/4/2018	Air	Palustrine	Emergent	PEM1H	0.21
B17-10	5/4/2018	Air	Palustrine	Emergent	PEM1H	0.15

Table 3-3. Classification and Acreage of Potential Wetlands within the Proposed FRTC Expansion Areas

Type/ Wetland ID*	Survey Date	Survey Type	Wetland System†	Wetland Class†	Cowardin Code‡	Area (ac)
B17-11	5/4/2018	Air	Palustrine	Emergent	PEM1H	0.75
B17-12	5/4/2018	Air	Palustrine	Emergent	PEM1H	0.60
B17-13	5/4/2018	Air	Palustrine	Emergent	PEM1H	1.05
B17-14	5/4/2018	Air	Palustrine	Emergent	PEM1H	0.26
B17-15	5/4/2018	Air	Palustrine	Emergent	PEM1H	0.10
B17-16	5/4/2018	Air	Palustrine	Emergent	PEM1H	0.56
B17-17	5/4/2018	Air	Palustrine	Emergent	PEM1H	1.16
B17-19	5/6/2018	Air	Palustrine	Emergent	PEM1H	0.25
					B-17 Subtotal	**23.71**
DVTA-1✦	5/7/2018	Ground	Palustrine	Emergent	PEM1G	39.81
DVTA-2	5/7/2018	Ground	Palustrine	Emergent	PEM1G	3.00
DVTA-3	5/7/2018	Ground	Palustrine	Emergent	PEM1Hx-E	8.17
DVTA-4	5/7/2018	Ground	Palustrine	Emergent	PEM1F	1.23
DVTA-5	5/7/2018	Ground	Palustrine	Emergent	PEM1G	0.38
DVTA-6^	5/7/2018	Ground	palustrine	Emergent	PEM1H-E	[7.16] ^
DVTA-7	5/7/2018	Ground	Palustrine	Emergent	PEM1E	1.50
DVTA-8	5/9/2018	Air	Palustrine	Emergent	PEM1G	0.53
DVTA-9	5/9/2018	Air	Palustrine	Emergent	PEM1E	0.31
DVTA-10	5/9/2018	Air	Palustrine	Emergent	PEM1H-G	68.06
DVTA-11	5/4/2018	Ground	Palustrine	Emergent	PEM1G	2.84
DVTA-12	5/9/2018	Air	Palustrine	Emergent	PEM1H-E	32.81
DVTA-13	5/9/2018	Air	Palustrine	Emergent	PEM1E	0.11
DVTA-14	5/9/2018	Air	Palustrine	Emergent	PEM1E	2.89
DVTA-15	5/7/2018	Ground	Palustrine	Emergent	PEM1H-E	15.72
DVTA-16✦	5/7/2018	Ground	Palustrine	Emergent	PEM1H-E	7.29
DVTA-17	5/7/2018	Ground	Palustrine	Emergent	PEM1G	0.77
DVTA-18	5/7/2018	Ground	Palustrine	Scrub-Shrub	PSS1D	0.33
DVTA-19	5/9/2018	Air	Palustrine	Emergent	PEM1E	0.78
DVTA-20	5/9/2018	Air	Palustrine	Emergent	PEM1E	1.30
DVTA-21	5/9/2018	Air	Palustrine	Emergent	PEM1E	0.14
DVTA-22	5/9/2018	Air	Palustrine	Emergent	PEM1H-E	36.01
DVTA-23	5/9/2018	Air	Palustrine	Emergent	PEM1G	11.90
					DVTA Subtotal	**235.87**
Mountain Seep & Canyon Bottom/						
B-20-1	5/5/2018	Ground	Palustrine	Scrub-Shrub	PSS2D	0.10
					B-20 Subtotal	**0.10**
SW-1	5/10/2018	Air	Palustrine	Emergent	PEM1G	2.11
SW-2	5/10/2018	Air	Palustrine	Emergent	PEM1G	1.25
SW-3	5/10/2018	Ground	Palustrine	Emergent	PEM1G	3.34
SW-4	5/4/2018	Ground	Palustrine	Scrub-Shrub	PSS1G	0.41
SW-5	5/10/2018	Ground	Palustrine	Emergent	PEM1G-D	5.21
SW-6	5/10/2018	Air	Palustrine	Emergent	PEM1G	0.55
SW-7	5/3/2018	Ground	Palustrine	Emergent	PEM1G	0.27
SW-8	5/3/2018	Ground	Palustrine	Emergent	PEM1G	0.60
SW-9	5/10/2018	Air	Palustrine	Emergent	PEM1G	0.30

Table 3-3. Classification and Acreage of Potential Wetlands within the Proposed FRTC Expansion Areas

Type/ Wetland ID*	Survey Date	Survey Type	Wetland System†	Wetland Class†	Cowardin Code‡	Area (ac)
SW-10	5/3/2018	Ground	Palustrine	Emergent	PEM1G	0.96
SW-11	5/10/2018	Ground	Palustrine	Emergent	PEM1G	1.82
SW-12✦	5/9/2018	Air	Palustrine	Scrub-Shrub	PSS1F	0.48
SW-13✦	5/9/2018	Air	Palustrine	Emergent	PEM1G-D	0.36
SW-14	5/10/2018	Ground	Palustrine	Scrub-Shrub	PSS1G	0.89
SW-15	4/22/2019	Air	Palustrine	Scrub-Shrub	PSS1F	0.21
SW-16	4/22/2019	Air	Palustrine	Emergent	PEM1G	1.65
SW-17	4/22/2019	Air	Palustrine	Scrub-Shrub	PSS1G	0.72
SW-18	4/22/2019	Air	Palustrine	Scrub-Shrub	PSS1G	1.33
SW-19	4/22/2019	Air	Palustrine	Scrub-Shrub	PSS1G	0.89
SW-20	4/22/2019	Air	Palustrine	Scrub-Shrub	PSS1G	2.13
SW-21	4/22/2019	Air	Palustrine	Scrub-Shrub	PSS1G	0.71
SW-22	4/22/2019	Air	Palustrine	Scrub-Shrub	PSS1G	0.34
SW-23	4/22/2019	Air	Palustrine	Scrub-Shrub	PSS1F	0.40
SW-24	4/22/2019	Air	Palustrine	Scrub-Shrub	PSS1F	1.12
SW-25	4/22/2019	Air	Palustrine	Scrub-Shrub	PSS1F	0.17
SW-26	4/22/2019	Air	Palustrine	Scrub-Shrub	PSS1F	1.03
SW-27	4/22/2019	Air	Palustrine	Scrub-Shrub	PSS1F	0.63
SW-28	4/22/2019	Air	Palustrine	Scrub-Shrub	PSS1F	0.38
SW-29	4/22/2019	Air	Palustrine	Emergent	PEM1G	0.22
SW-30	4/22/2019	Air	Palustrine	Scrub-Shrub	PSS1G	3.36
					SW Subtotal	**33.86**
HC-1	4/22/2019	Air	Palustrine	Scrub-Shrub	PSS1G	2.29
					HC Subtotal	**2.29**
Stock Pond/						
HC-2	5/3/2018	Air	Palustrine	Emergent	PEM1Hx	0.21
CA-1	4/22/2019	Air	Palustrine	Emergent	PEM1Hx	0.85
					Stock Pond Subtotal	**1.06**
					Grand Total	**296.89**

Notes: *CA = Clan Alpines Mountains site. DVTA-# = Sites in the low-lying areas of the DVTA. HC-# = Horse Creek sites. SW-# = Sites in the Stillwater Mountains, the high-elevation portion of the DVTA. Refer to Figures 3-3, 3-4, and 3-5 for locations of the potential wetland sites.

†Federal Geographic Data Committee 2013.

‡Refer to Figure 3-6 for definitions of the Cowardin codes. Cowardin codes including a dash indicate a site with more than one water regime, for instance a pond (H) and its outflow (E).

✦Potential wetland sites that occur on the border of the proposed DVTA expansion area and existing FRTC-administered lands or lands that are not included as part of the proposed expansion. Although only a portion of the identified potential wetland occurs within the proposed DVTA expansion area, for the purposes of this summary, the total wetland acreage is included within these proposed expansion area.

DVTA-1: 30% occurs within the proposed DVTA expansion area.

DVTA-16: 10% occurs within the within proposed DVTA expansion area.

SW-12: 10% occurs within the within proposed DVTA expansion area.

SW-13: 90% occurs within the within proposed DVTA expansion area.

^DVTA-6: 100% of the estimated 7.16-acre potential wetland is within existing DVTA lands, therefore it is not included in the DVTA subtotal wetland acreage or the Grand Total but is provided for future reference.

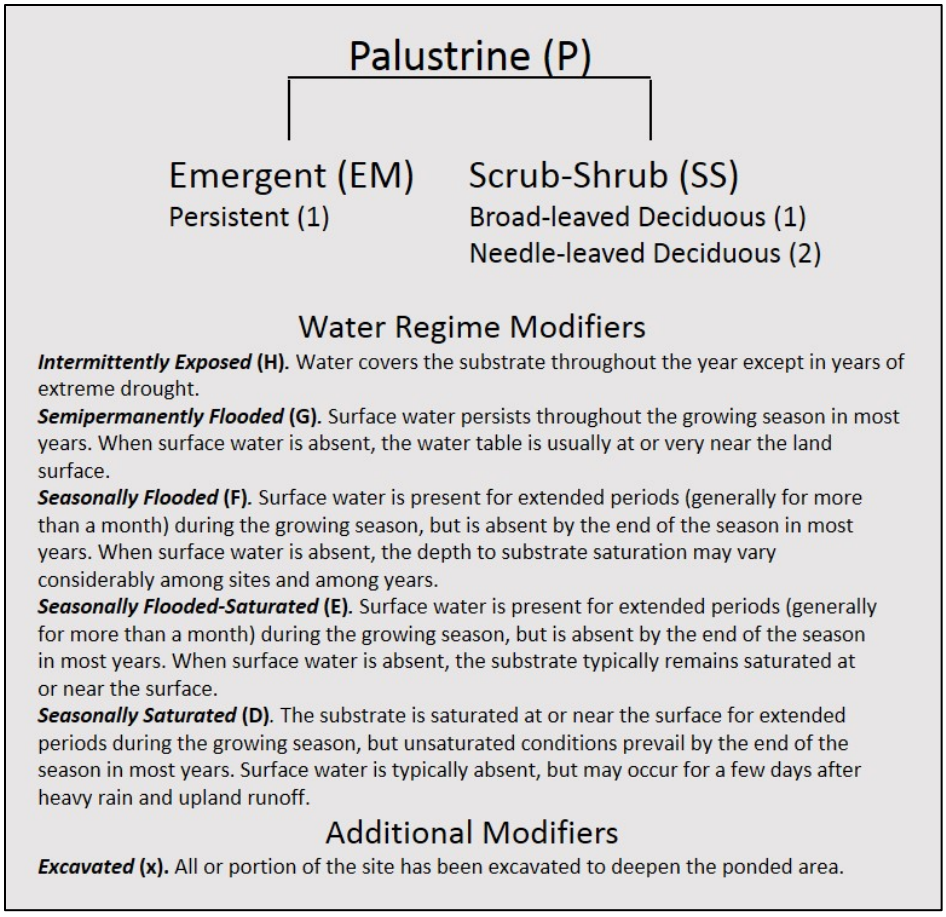


Figure 3-6. Key to Cowardin Codes

(*Note*: The palustrine system includes two classes, each of which is further divided by the nature of the dominant vegetation present. Modifiers can be used to further denote the duration of flooding or saturation, as well as additional characteristics such as excavation of the site.)

3.3. Incidental Observations

During the 2018 surveys, incidental observations of plant species and invasive animals not previously recorded in the survey area during previous survey efforts (e.g., DoN 2019a, c) were noted at several sites.

- Within the proposed northern DVTA expansion area were two observations of desert popcorn flower or saltmarsh allocarya (*Plagiobothrys salsus*) (Figure 3-7 and Figure 3-8), which is listed as imperiled/vulnerable by the Nevada Natural Heritage Program (NNHP) and is on the NNHP Watch List (NNHP 2018).
- Near the B17-12 site in the southern end of the proposed B-17 expansion area (Figure 3-3), three plant species were identified that were undocumented during the 2017 rare plant surveys of the proposed expansion areas (DoN 2019c) or previous vegetation surveys of the study area (NAS Fallon 1997, 2008): dwarf hesperochiron (*Hesperochiron pumilus*), dark-throated shooting star (*Primula* [=*Dodecatheon*] *pauciflora*), and Nevada blue eyed grass (*Sisyrinchium halophilum*) (Figure 3-9). All were in flower.
- Non-native invasive American bullfrogs (*Lithobates catesbeianus*) were noted at sites DVTA-3, DVTA-17, and DVTA-18. Bullfrogs have been recorded from other sites within the existing DVTA (NAS Fallon 1997, 2008).

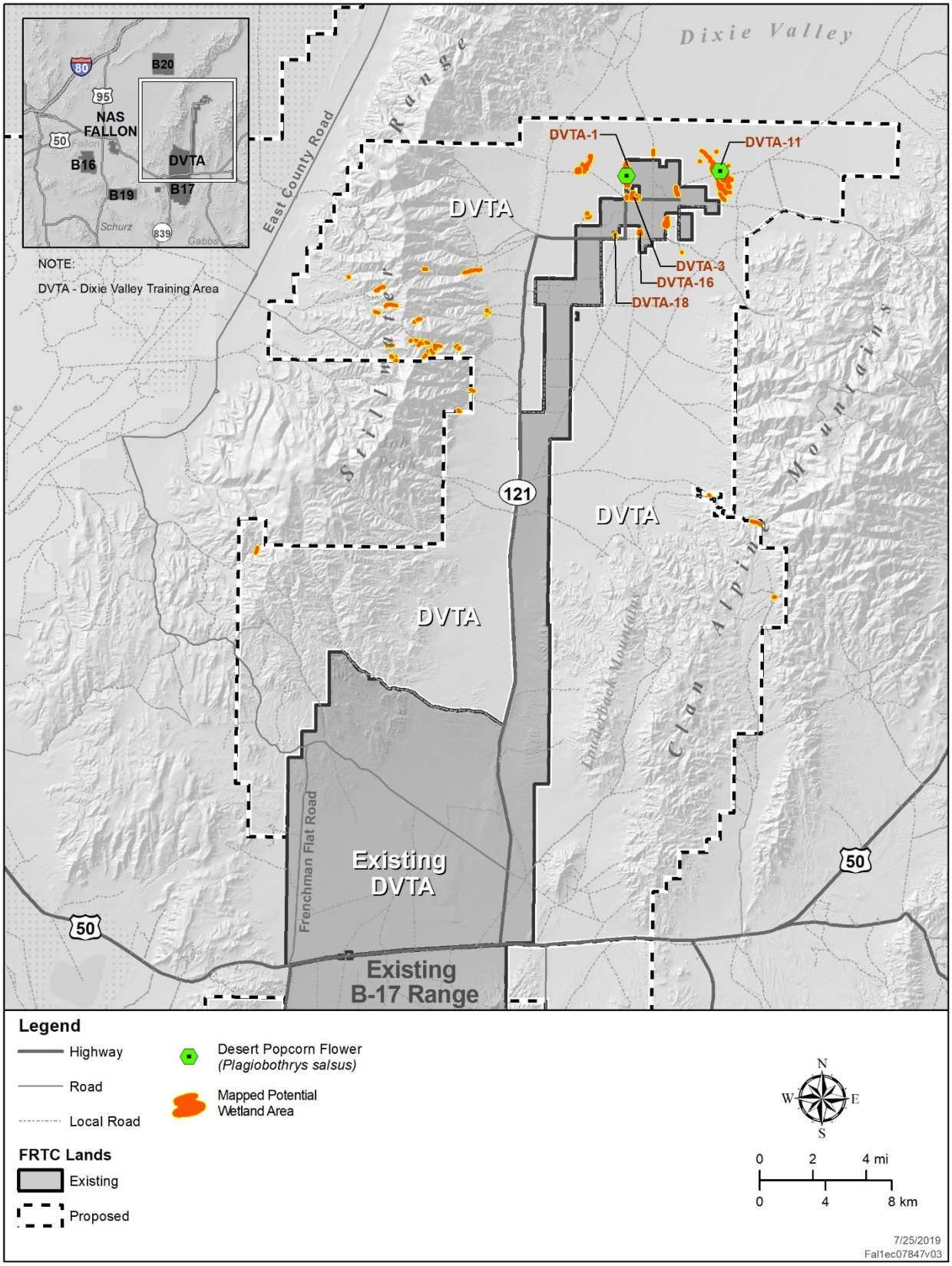


Figure 3-7. Incidental Observations of Desert Popcorn Flower (*Plagiobothrys salsus*) in May 2018 within the Proposed Northern DVTA Expansion Area

Figure 3-8. Desert Popcorn Flower (*Plagiobothrys salsus*) Observed at Potential Wetland Site DVTA-11 in May 2018

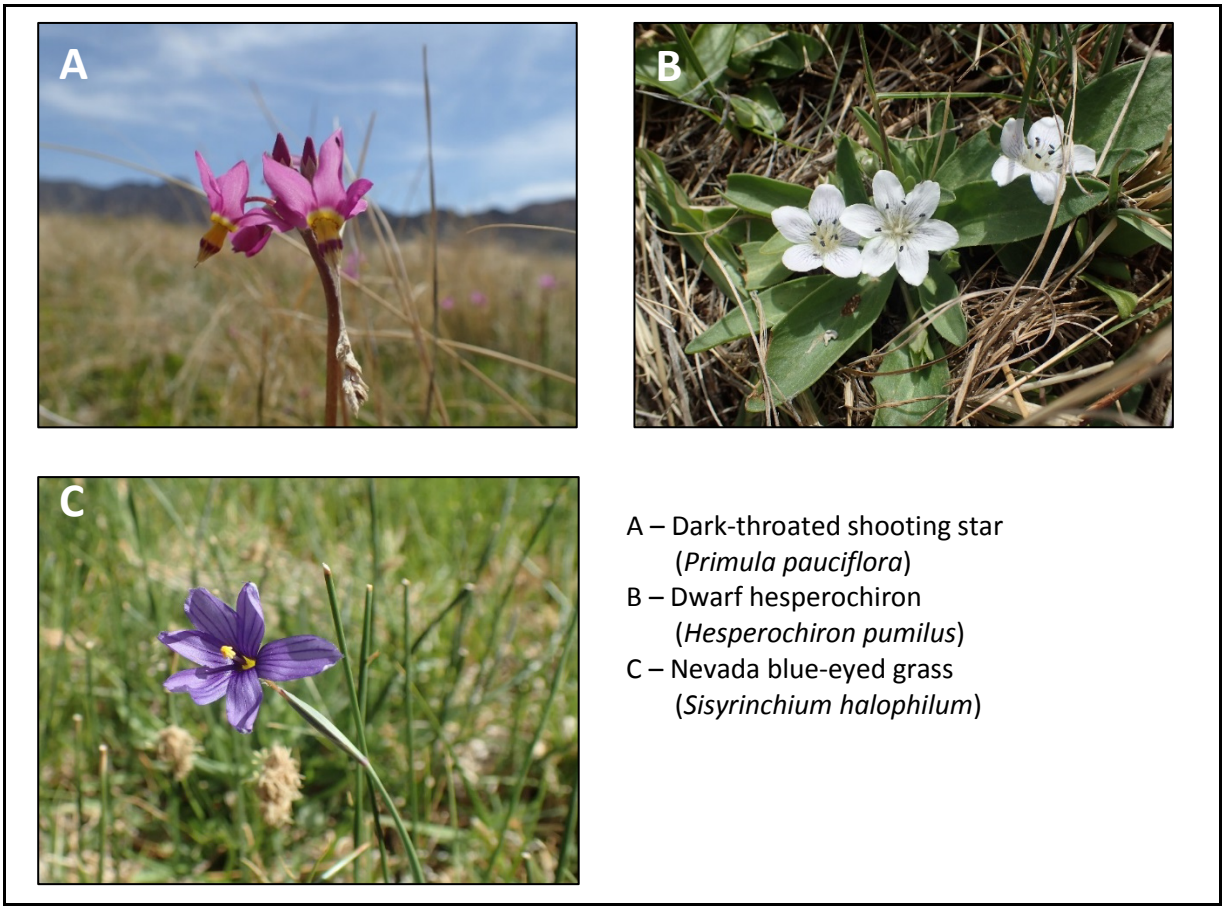


Figure 3-9. New Plant Species Records at Potential Wetland Site B17-12 (May 2018)

4. DISCUSSION

All identified potential wetlands within the proposed FRTC expansion areas were determined to be isolated or non-jurisdictional under Section 404 of the Clean Water Act. Under current law and guidance, no jurisdictional waters of the U.S. or wetlands as defined under Section 404 of the Clean Water Act exist on proposed FRTC expansion areas. No tributaries to federal navigable waters were identified. Therefore, none of the wetlands or waters identified have federal jurisdictional status. The results of this field survey are preliminary and will require verification by USACE for questions on jurisdictional status and impacts to jurisdictional wetlands. This report describes the wetland attributes of the surveyed sites and is not an official wetland delineation. The USACE must make the official determination of whether the sites fall under their regulatory program. Only after the USACE determines their jurisdictional authority over these sites would a wetland delineation become necessary.

Wetlands within the expansion area face three primary threats to their persistence: changes in grazing patterns, fire, and invasive species. First, changes in grazing patterns of feral and domestic livestock could alter the functionality and nature of these wetlands. If domestic livestock are removed, grazing patterns of feral horses could change, with potentially unexpected consequences for wetlands, some of which may be beneficial and some detrimental. Currently, cattle in the Dixie Valley area already have visible impacts on wetlands, with heavy grazing, compaction, and spread of invasive species apparent in grazed wetlands compared to ungrazed wetlands. This effect is considerably less-apparent in the Stillwater Mountains, although some grazing does occur on the western slope.

Second, fires that escape containment could drastically alter vegetation, particularly for the Mountain Seep and Canyon Bottoms potential wetlands. Fires that begin in low-lying areas could spread into the surrounding canyons and consume vegetation, leading to erosion and changes in hydrology in the following years. Thirdly, fires can facilitate establishment or spread of invasive plant species, which may already be present in some expansion area wetlands. Plants such as tamarisk, Russian knapweed (*Rhaponticum repens*), perennial pepperweed (*Lepidium latifolium*), and common reed (*Phragmites australis*) are all present in one or more sites in the proposed expansion areas. These species can alter hydrology, compete with native species, and degrade the quality of the habitat for native wildlife such as birds, invertebrates, and mammals.

Interestingly, several areas selected for survey based on the 2017 vegetation mapping (DoN 2019a) and other background data did not qualify as potential wetlands. This was the case for several areas in the Stillwater Mountains that were mapped as Arroyo Willow Wet Shrubland and Fremont Cottonwood Great Basin Riparian Forest. Although some willow-dominated sites did have sufficient moisture to create true wetland characteristics, many others did not, and should instead be considered riparian areas, but not wetlands. One notable example of this is the Horse Creek drainage, which has abundant running water carried quite far out onto the valley bottom. However, several soil test pits and vegetation analysis did not support its status as a wetland. In contrast, the areas mapped as Western Baltic Rush – Mexican Rush Wet Meadow generally corresponded to areas mapped as potential wetlands.

5. REFERENCES

BLM. 2014. Draft Resource Management Plan and Environmental Impact Statement. Carson City District Office, Carson City, NV. November.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. FWS/OBS-79/31. Office of Biological Services, U.S. Fish and Wildlife Service, Washington, DC. December.

Curtis, A.C. 1996a. Mapping Report for Naval Air Station Fallon and Dixie Valley, Nevada. Prepared for Public Works Department, NAS Fallon, NV by Environmental Systems Research Institute, Inc., Redlands, CA. October.

Curtis, A.C. 1996b. Mapping Report for Naval Air Station Fallon's Training Ranges Bravo One Six, Bravo One Seven, Bravo One Nine, and Bravo Two Zero. Prepared for Public Works Department, NAS Fallon, NV by Environmental Systems Research Institute, Inc., Redlands, CA. October.

DoN. 2014. Final Integrated Natural Resources Management Plan Naval Air Station Fallon, Fallon, Nevada. Prepared for Public Works Department, Environmental Division, NAS Fallon, NV. July.

DoN. 2019a. Final Plant Community Surveys and Mapping Report in Support of the Proposed Fallon Range Training Complex Expansion, Nevada. Prepared for Naval Facilities Engineering Command Southwest, San Diego, CA by ManTech International Corporation, Lompoc and Solana Beach, CA. July.

DoN. 2019b. Final Fish Inventory and Habitat Assessment in Support of the Proposed Fallon Range Training Complex Expansion, Nevada. Prepared for Naval Facilities Engineering Command Southwest, San Diego, CA by ManTech International Corporation, Solana Beach, CA. June.

DoN. 2019c. Final Rare Plant Survey Report in Support of the Proposed Fallon Range Training Complex Expansion, Nevada. Prepared for Naval Facilities Engineering Command Southwest, San Diego, CA by ManTech International Corporation, Solana Beach and Lompoc, CA. December.

Federal Geographic Data Committee. 2013. Classification of Wetlands and Deepwater Habitats of the United States. FGDC-STD-004-2013. Second Edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, DC. August.

Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. Arid West 2016 Regional Wetland Plant List. The National Wetland Plant List: 2016 Wetland Ratings. Phytoneuron 2016-30: 1-17. 28 April.

MacMahon, J. 1985. National Audubon Society Nature Guides: Deserts. Chanticleer Press, New York, NY.

NAS Fallon. 1997. Ecological Inventory of NAS Fallon and Environs Survey Report. Prepared for Commanding Officer, NAS Fallon, NV by Tetra Tech, Inc., EcoSystems-West, H.T. Harvey & Associates, and Wetland Research Associates. December.

NAS Fallon. 2008. Ecological Inventory Update Naval Air Station Fallon. Prepared for Fallon Range Training Complex, NAS Fallon, NV by Tierra Data, Escondido, CA.

NNHP. 2018. Plant and Animal Watch List – January 2018. Department of Conservation and Natural Resources, Carson City, NV.

Sowell, J. 2001. Desert Ecology: An Introduction to Life in the Arid Southwest. University of Utah Press, Salt Lake City, UT.

USACE. 1987. Corps of Engineers Delineation Manual. Technical Report Y-87-1. U.S. Army Waterways Experiment Station, Vicksburg, MS.

USACE. 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0). ERDC/EL TR-08-28. Wetlands Regulatory Assistance Program, U.S. Army Engineer Research and Development Center, Vicksburg, MS. September.

U.S. Climate Data. 2018. Climate Data for Fallon Experiment Stn, Longitude: -118.781, Latitude: 39.4572; Average Weather Fallon, NV 89406; 1981-2010 Normals Fallon – Nevada. https://www.usclimatedata.com/climate/fallon/nevada/united-states/usnv0028. Accessed June 26.

USFWS. 2018. National Wetlands Inventory: Surface Waters and Wetlands. https://www.fws.gov/wetlands/data/Mapper.html.

USGS. 2017. National Hydrography Dataset: Nevada. https://nhd.usgs.gov/NHD_High_Resolution.html.

[This page intentionally left blank.]

APPENDIX A: Explanation of Form Fields and Codes for Wetland Datasheets

[This page intentionally left blank.]

Table A-1. Wetland Form Fields for Collection of Unknown Plant Species for Identification

Field	Explanation
Date	Date of Observation
Associated species	List dominant species nearby
Location/Habitat notes	Soils or habitat notes
Species	Tentative species, genus or family
Notes	Flower color, root characteristics, any factors not captured by the bagged specimen
CollNum	Collection number corresponding to the number written on the bag

Table A-2. Wetland Form Fields

Code	Alias	Domain Choices
PrjSite	Project or Site	
CityCnty	City or County	
SurvDate	Survey Date	
Owner	Property Owner	
State	State	
SampPt	Sample Point Name	
Landform	Landform	hillslope, terrace, arroyo, basin, canyon, dry lake, fault, flat, lowland marsh, pond, ravine
LocRelief	Local Relief	concave, convex, none
Slope	Slope	0-1°, 2-5°, 6-10°, 11-20°, >20°
ClimHydTyp	Are climate and hydrology typical?	Yes, No
VegDist	Is vegetation significantly disturbed?	Yes, No
SoilDist	Is soil significantly disturbed?	Yes, No
HydroDist	Is hydrology significantly disturbed?	Yes, No
Normal	Are normal circumstances present?	Yes, No
Veg	Is hydrophytic vegetation present?	Yes, No
Soil	Is hydric soil present?	Yes, No
Hydro	Is wetland hydrology present?	Yes, No
*TreeSp1	First tree species	Any member of the species list in the tree stratum (see additional sheet for species list and codes)
*TreeSp2	Second tree species	Any member of the species list in the tree stratum (see additional sheet for species list and codes)
*TreeSp3	Third tree species	Any member of the species list in the tree stratum (see additional sheet for species list and codes)
*TreeSp4	Fourth tree species	Any member of the species list in the tree stratum (see additional sheet for species list and codes)
*TS1Cover	Cover of first tree species	
*TS2Cover	Cover of second tree species	
*TS3Cover	Cover of third tree species	
*TS4Cover	Cover of fourth tree species	
*TotTreeCov	Total Tree cover	
*FiftyPctT	Autocalculation of 50% of the total tree cover	

Table A-2. Wetland Form Fields

Code	Alias	Domain Choices
*TwentyPctT	Autocalculation of 20% of the total tree cover	
*T1Dom	Is the first tree species dominant?	Yes, No
*T2Dom	Is the second tree species dominant?	Yes, No
*T3Dom	Is the third tree species dominant?	Yes, No
*T4Dom	Is the fourth tree species dominant?	Yes, No
*IndicSta_1	Wetland indicator status of the first tree species	Autopopulated from USACE wetland status list (see additional sheet for species wetland codes)
*IndicSta_2	Wetland indicator status of the first tree species	Autopopulated from USACE wetland status list (see additional sheet for species wetland codes)
*IndicSta_3	Wetland indicator status of the first tree species	Autopopulated from USACE wetland status list (see additional sheet for species wetland codes)
*IndicSta_4	Wetland indicator status of the first tree species	Autopopulated from USACE wetland status list (see additional sheet for species wetland codes)
*NumWetT	Number of Dominant trees that are OBL, FACW, or FAC	
*NumDomT	Total Number of Dominant Trees	
*NotesTree	Notes about the tree stratum	
BareGrnd	Cover of bare ground within the herb stratum	
BioCrust	Cover of biotic crust	
OBLCov	Total cover of all OBL species	
FACWCov	Total cover of all FACW species	
FACCov	Total cover of all FAC species	
FACUCov	Total cover of all FACU species	
UPLCov	Total cover of all UPL species	
TotIndicCo	Total of indicator species cover	
WgtTot	Weighted total of indicator species cover	
PrevIndScr	Prevalence index score	Auto calculated
DomTest	Is the dominance test >50%?	Yes, No
PrevIndTes	Is the prevalence index more than or equal to 3.0?	Yes, No
Morpho	Are morphological adaptations present?	Yes, No
Problemati	Is problematic hydrophytic vegetation present?	Yes, No
Remarks	Remarks about the site	
D1	depth of the first soil layer	
D2	depth of the second soil layer	
D3	depth of the third soil layer	
D4	depth of the fourth soil layer	

Table A-2. Wetland Form Fields

Code	Alias	Domain Choices
D5	depth of the fifth soil layer	
D6	depth of the sixth soil layer	
†D1MatColor	Matrix color of the first soil layer	
†D1MatPct	Matrix percentage of the first soil layer	
†D1RedColor	Redox color of the first soil layer	
†D1RedPct	Redox percentage in the first layer	
†D1RedType	Redox type in the first layer	Concentration, depletion, reduced matrix, covered sand grains
†D1RedLoc	Redox location in the first layer	Matrix, pore lining
†D1Soil	Soil texture of first soil layer	Sand, Loamy Sand, Sandy Loam, Sandy Clay Loam, Sandy Clay, Loam , Clay Loam, Clay, Silt Loam, Silty Clay Loam, Silty Clay
SoilRemark	Remarks about the soils	
HydricPres	Hydric Soil Indicators	See Additional Sheet for Hydric Soil Indicators
HydricRema	Remarks about hydrology	
PrimIndic	Primary Indicators of wetland hydrology	See Additional Sheet for Wetland Hydrology Indicators
SurfWater	Is surface water present?	Yes, No
WaterTbl	Is a high water table present?	Yes, No
Saturation	Is saturation present?	Yes, No
depthSurf	Depth to surface water	
depthTbl	Depth to water table	
depthSat	Depth to saturation	
WetHydro	Is wetland hydrology present?	Yes, No
HydroRemar	Hydrology remarks	

Notes: *These fields repeated for Shrub and Herb layers. †These fields repeated as necessary for additional soil layers.
FAC = facultative; FACU = facultative upland; FACW = facultative wetland; OBL – obligate; UPL = upland.

Table A-3. Wetland Plant Species Codes

Code	Species Name
Abtu	*Abronia turbinata*
Acsh	*Acamptopappus shockleyi*
Acre	*Acroptilon repens*
Agur	*Agastache urticifolia*
Aggl	*Agoseris glauca*
Agcrpe	*Agropyron cristatum pectinatum*
Agde	*Agropyron desertorum*
Allemi	*Aliciella leptomeria micromeria*
Allo	*Aliciella lottiae*
Almi	*Aliciella micromeria*
Altr	*Aliciella triodon*
Aloc	*Allenrolfea occidentalis*
Alan	*Allium anceps*
Alat	*Allium atrorubens*
Alde	*Alyssum desertorum*
Amal	*Amaranthus albus*
Amac	*Ambrosia acanthicarpa*
Ampl	*Ambrosia platyspina*
Amsasa	*Ambrosia salsola salsola*
Amut	*Amelanchier utahensis*
Amme	*Amsinckia menziesii*
Amte	*Amsinckia tessellata*
Andi	*Antennaria dimorpha*
Apca	*Apocynum cannabinum*
Ardi	*Arceuthobium divaricatum*
Armu	*Argemone munita*
Arlu	*Artemisia ludoviciana*
Arno	*Artemisia nova*
Artrtr	*Artemisia tridentata tridentata*
Artrwy	*Artemisia tridentata wyomingensis*
Arvu	*Artemisia vulgaris*
Ascrda	*Asclepias cryptoceras davisii*
Aserio	*Asclepias eriocarpa*
Aseros	*Asclepias erosa*
Asfa	*Asclepias fascicularis*
Asof	*Asparagus officinalis*
Asac	*Astragalus acutirostris*
Asar	*Astragalus argophyllus*
Asatat	*Astragalus atratus atratus*
Asfi	*Astragalus filipes*
Asgege	*Astragalus geyeri geyeri*
Asioio	*Astragalus iodanthus iodanthus*
Asle	*Astragalus lentiginosus*
Asleke	*Astragalus lentiginosus kennedyi*
Asneca	*Astragalus newberryi castoreus*
Asps	*Astragalus pseudiodanthus*
Asse	*Astragalus serenoi*
Atarar	*Atriplex argentea argentea*

Code	Species Name
Atca	*Atriplex canescens*
Atco	*Atriplex confertifolia*
Atpa	*Atriplex parryi*
Atsa	*Atriplex saccaria*
Atto	*Atriplex torreyi*
Attr	*Atriplex truncata*
Basa	*Balsamorhiza sagittata*
Baam	*Bassia americana*
Bahy	*Bassia hyssopifolia*
Beer	*Berula erecta*
Blki	*Blepharidachne kingii*
Boli	*Boechera lignifera*
Bore	*Boechera retrofracta*
Brlomu	*Brickellia longifolia multiflora*
Brmimi	*Brickellia microphylla microphylla*
Brobli	*Brickellia oblongifolia linifolia*
Brma	*Bromus madritensis*
Brte	*Bromus tectorum*
Cabr	*Calochortus bruneaunis*
Cane	*Camissonia nevadensis*
Cadr	*Cardaria draba*
Capu	*Cardaria pubescens*
Cado	*Carex douglasii*
Cami	*Carex microptera*
Caoc	*Carex occidentalis*
Capa	*Carex pachystachya*
Capr	*Carex praegracilis*
Casp	*Carsonia sparsifolia*
Cach	*Castilleja chromosa*
Camimi	*Castilleja minor minor*
Cacrcr	*Caulanthus crassicaulis crassicaulis*
Capi	*Caulanthus pilosus*
Chdo	*Chaenactis douglasii*
Chma	*Chaenactis macrantha*
Chst	*Chaenactis stevioides*
Chwh	*Chaetadelpha wheeleri*
Chal	*Chenopodium album*
Chle	*Chenopodium leptophyllum*
Chruhu	*Chenopodium rubrum humile*
Chte	*Chorispora tenella*
Chri	*Chorizanthe rigida*
Chwa	*Chorizanthe watsonii*
Chvipu	*Chrysothamnus viscidiflorus puberulus*
Chvivi	*Chrysothamnus viscidiflorus viscidiflorus*
Chcl	*Chylismia claviformis*
Chclin	*Chylismia claviformis integrior*
Chclla	*Chylismia claviformis lacinifolia*

Table A-3. Wetland Plant Species Codes

Code	Species Name
Cimo	*Cirsium mohavense*
Cine	*Cirsium neomexicanum*
Cioc	*Cirsium occidentale*
Civu	*Cirsium vulgare*
Clpe	*Claytonia perfoliata*
Clli	*Clematis ligusticifolia*
Cllu	*Cleome lutea*
Clse	*Cleome serrulata*
Clhihi	*Cleomella hillmanii hillmanii*
Clpl	*Cleomella plocasperma*
Copa	*Collinsia parviflora*
Cogr	*Collomia grandiflora*
Crruan	*Crepis runcinata andersonii*
Crse	*Croton setiger*
Crci	*Cryptantha circumscissa*
Crfl	*Cryptantha flavoculata*
Crgr	*Cryptantha gracilis*
Crmi	*Cryptantha micrantha*
Crne	*Cryptantha nevadensis*
Crpt	*Cryptantha pterocarya*
Cusa	*Cuscuta salina*
Cyco	*Cymopterus corrugatus*
Dean	*Delphinium andersonii*
Deda	*Deschampsia danthonioides*
Depa	*Descurainia paradisa*
Depi	*Descurainia pinnata*
Deso	*Descurainia sophia*
Dica	*Dicoria canescens*
Dicale	*Dieteria canescens leucanthemifolia*
Disp	*Distichlis spicata*
Elan	*Elaeagnus angustifolius*
Elbo	*Eleocharis bolanderi*
Elpa	*Eleocharis palustris*
Elpar	*Eleocharis parishii*
Elqu	*Eleocharis quinqueflora*
Elel	*Elymus elymoides*
Elpo	*Elymus ponticus*
Epne	*Ephedra nevadensis*
Epvi	*Ephedra viridis*
Epcici	*Epilobium ciliatum ciliatum*
Epgi	*Epipactis gigantea*
Erkigl	*Eremogone kingii glabrescens*
Ertr	*Eremopyrum triticeum*
Erbo	*Eremothera boothii*
Erbode	*Eremothera boothii desertorum*
Erwi	*Eriastrum wilcoxii*
Eral	*Ericameria albida*
Erla	*Ericameria laricifolia*

Code	Species Name
Erna	*Ericameria nana*
Ernaho	*Ericameria nauseosa hololeuca*
Ernaor	*Ericameria nauseoua oreophila*
Erap	*Erigeron aphanactis*
Ercan	*Erigeron canadensis*
Erba	*Eriogonum baileyi*
Erca	*Eriogonum caespitosum*
Erdene	*Eriogonum deflexum nevadense*
Erhehe	*Eriogonum heermannii heermannii*
Erinin	*Eriogonum inflatum inflatum*
Erma	*Eriogonum maculatum*
Ermila	*Eriogonum microthecum laxiflorum*
Erni	*Eriogonum nidularium*
Erovov	*Eriogonum ovalifolium ovalifolium*
Erovpu	*Eriogonum ovalifolium purpureum*
Erpu	*Eriogonum pusillum*
Erru	*Eriogonum rupinum*
Erumum	*Eriogonum umbellatum umbellatum*
Erwr	*Eriogonum wrightii*
Erci	*Erodium cicutarium*
Ergu	*Erythranthe guttata*
Erpi	*Erythranthe pilosus*
Ersu	*Erythranthe suksdorfii*
Eual	*Euphobia albomarginata*
Eufe	*Euphorbia fendleri*
Eugl	*Euphorbia glyptosperma*
Euoc	*Euphorbia ocellata*
Eupo	*Euphorbia polycarpa*
Euse	*Euphorbia serpyllifolia*
Eune	*Euphrosyne nevadensis*
Femy	*Festuca myuros*
Feoc	*Festuca octoflora*
Feov	*Festuca ovina*
Gaap	*Galium aparine*
Gamu	*Galium multiflorum*
Gahu	*Gayophytum humile*
Gara	*Gayophytum ramosissimum*
Gibrbr	*Gilia brecciarum brecciarum*
Gisa	*Gilia salticola*
Gisc	*Gilia scopulorum*
Glma	*Glyptopleura marginata*
Gnpa	*Gnaphalium palustre*
Grsp	*Grayia spinosa*
Grpu	*Grusonia pulchella*
Gusa	*Gutierrezia sarothrae*
Hagl	*Halogeton glomeratus*
Hean	*Helianthus anomalus*
Hecu	*Heliotropium curassavicum*

Table A-3. Wetland Plant Species Codes

Code	Species Name
Hecoco	*Hesperostipa comata comata*
Hija	*Hilaria jamesii*
Hodu	*Holodiscus dumosus*
Homu	*Hordeum murinum*
Hopr	*Hornungia procumbens*
Ippo	*Ipomopsis polycladon*
Ivaxro	*Iva axillaris robustior*
Ivki	*Ivesia kingii*
Juar	*Juncus arcticus*
Jubu	*Juncus bufonius*
Jume	*Juncus mexicanus*
Jusa	*Juncus saximontanus*
Juto	*Juncus torreyi*
Juxi	*Juncus xiphioides*
Juos	*Juniperus osteosperma*
Kero	*Keckiella rothrockii*
Krla	*Krascheninnikovia lanata*
Lase	*Lactuca serriola*
Lagl	*Layia glandulosa*
Leca	*Lepidium campestre*
Leflfl	*Lepidium flavum flavum*
Lefr	*Lepidium fremontii*
Lela	*Lepidium lasiocarpum*
Lelat	*Lepidium latifolium*
Lepe	*Lepidium perfoliatum*
Lere	*Lewisia rediviva*
Leci	*Leymus cinereus*
Letr	*Leymus triticoides*
Lipo	*Ligusticum porteri*
Lica	*Linanthus campanulatus*
Liph	*Linanthus pharnaceoides*
Lipu	*Linanthus pungens*
Lode	*Logfia depressa*
Lofoma	*Lomatium foeniculaceum macdougalii*
Luarhe	*Lupinus argenteus heteranthus*
Lupuin	*Lupinus pusillus intermontanus*
Maca	*Machaeranthera canescens*
Maglo	*Madia glomerata*
Magr	*Madia gracilis*
Magl	*Malacothrix glabrata*
Maso	*Malacothrix sonchoides*
Madi	*Matricaria discoidea*
Mest	*Melica stricta*
Mein	*Melilotus indica*
Meof	*Melilotus officinalis*
Mesp	*Menodora spinescens*
Mear	*Mentha arvensis*
Meal	*Mentzelia albicaulis*

Code	Species Name
Melala	*Mentzelia laevicaulis laevicaulis*
Meve	*Mentzelia veatchiana*
Mipu	*Micromonolepis pusilla*
Migr	*Microsteris gracilis*
Minu	*Minuartia nuttallii*
Mial	*Mirabilis alipes*
Milavi	*Mirabilis laevis villosa*
Mogl	*Monardella glauca*
Monu	*Monolepis nuttalliana*
Muas	*Muhlenbergia asperifolia*
Naarmu	*Nama aretioides multiflorum*
Nade	*Nama densa*
Naof	*Nasturtium officinale*
Nabr	*Navarretia breweri*
Niat	*Nicotiana attenuata*
Nioc	*Nitrophila occidentalis*
Oeca	*Oenothera caespitosa*
Oecama	*Oenothera caespitosa marginata*
Oede	*Oenothera deltoides*
Oedepi	*Oenothera deltoides piperi*
Oppoer	*Opuntia polycarpa erinacea*
Orco	*Orobanche corymbosa*
Oxpe	*Oxytheca perfoliata*
Pamu	*Packera multilobata*
Paca	*Panicum capillare*
Peacla	*Penstemon acuminatus latebracteata*
Pede	*Penstemon deustus*
Pehu	*Penstemon humilis*
Pepapa	*Penstemon palmeri palmeri*
Pesp	*Penstemon speciosus*
Pebo	*Perideridia bolanderi*
Phbibi	*Phacelia bicolor bicolor*
Phcr	*Phacelia crenulata*
Phgl	*Phacelia glaberrima*
Phgy	*Phacelia gymnoclada*
Phhaha	*Phacelia hastata hastata*
Phhoca	*Phlox hoodii canescens*
Phlo	*Phlox longifolia*
Phst	*Phlox stansburyi*
Phch	*Phoenicaulis cheiranthoides*
Phju	*Phoradendron juniperinum*
Phau	*Phragmites australis*
Pide	*Picrothamnus desertorum*
Pimo	*Pinus monophylla*
Plki	*Plagiobothrys kingii*
Plsa	*Plagiobothrys salsus*
Plscpe	*Plagiobothrys scouleri penicillatus*
Plla	*Plantago lanceolata*

Table A-3. Wetland Plant Species Codes

Code	Species Name
Plma	*Plantago major*
Plov	*Plantago ovata*
Plsp	*Pleiacanthus spinosus*
Pobu	*Poa bulbosa*
Popr	*Poa pratensis*
Pose	*Poa secunda*
Poar	*Polygonum argyrocoleon*
Poav	*Polygonum aviculare*
Pomo	*Polypogon monspeliensis*
Povi	*Polypogon viridis*
Pofr	*Populus fremontii*
Pobi	*Potentilla biennis*
Prex	*Prenanthella exigua*
Pran	*Prunus andersonii*
Prse	*Prunus serotina*
Prvi	*Prunus virginiana*
Psan	*Psathyrotes annua*
Pspo	*Psorothamnus polydenius*
Pudi	*Puccinellia distans*
Pyra	*Pyrrocoma racemosa*
Racysa	*Ranunculus cymbalaria saximontanus*
Rate	*Ranunculus testiculatus*
REru	*REriogonum rubricaule*
Rive	*Ribes velutinum*
Rote	*Rorippa tenerrima*
ROne	*ROryctes nevadensis*
Rowo	*Rosa woodsii*
Rucr	*Rumex crispus*
Ruve	*Rumex venosus*
Saex	*Salix exigua*
Salae	*Salix laevigata*
Salas	*Salix lasiolepis*
Sapa	*Salsola paulsenii*
Satr	*Salsola tragus*
Saco	*Salvia columbariae*
Sanice	*Sambucus nigra cerula*
Saba	*Sarcobatus baileyi*
Save	*Sarcobatus vermiculatus*
Scam	*Schoenoplectus americanus*
Scne	*Scirpus nevadensis*
Shar	*Shepherdia argentea*
Sial	*Sisymbrium altissimum*
Sotr	*Solanum triflorum*

Code	Species Name
Sosp	*Solidago spectabilis*
Soas	*Sonchus asper*
Spma	*Spergularia marina*
Spamam	*Sphaeralcea ambigua ambigua*
Spgr	*Sphaeralcea grossulariifolia*
Spai	*Sporobolus airoides*
Spcr	*Sporobolus cryptandrus*
Stel	*Stanleya elata*
Stpi	*Stanleya pinnata*
Stvi	*Stanleya viridiflora*
Stac	*Stenotus acaulis*
Stex	*Stephanomeria exigua*
Stpa	*Stephanomeria pauciflora*
Sthy	*Stipa hymenoides*
Stne	*Stipa nevadensis*
Stsp	*Stipa speciosa*
Stth	*Stipa thuberiana*
Stco	*Stutzia covillei*
Suni	*Suaeda nigra*
Sylo	*Symphoricarpos longiflorus*
Tara	*Tamarix ramosissima*
Taof	*Taraxacum officinale*
Tegl	*Tetradymia glabrata*
Tesp	*Tetradymia spinosa*
Tete	*Tetradymia tetrameres*
Tinu	*Tiquilia nuttallii*
Tosc	*Townsendia scapigera*
Topa	*Toxicoscordion paniculatum*
Trdu	*Tragopogon dubius*
Trte	*Tribulus terrestris*
Trcy	*Trifolium cyathiferum*
Trre	*Trifolium repens*
Trco	*Triglochin concinna*
Trin	*Tripleurospermum inodorum*
Tyan	*Typha angustifolia*
Tydo	*Typha domingensis*
Urdi	*Urtica dioica*
Veam	*Veronica americana*
Vean	*Veronica anagallis-aquatica*
Vepexa	*Veronica peregrina xalapensis*
Xast	*Xanthium strumarium*
Zapa	*Zannichellia palustris*
Zeex	*Zeltnera exaltata*

Table A-4. Hydric Soil Indicator Codes

Code	Indicator
A1	Histosol
A2	Histic Epipedon
A3	Black Histic
A4	Hydrogen Sulfide
A5	Stratified Layers
A9	1-cm Muck
A10	2-cm Muck
A11	Depleted Below Dark Surface
A12	Thick Dark Surface
S1	Sandy Mucky Mineral
S4	Sandy Gleyed Matrix
S5	Sandy Redox
S6	Stripped Matrix
F1	Loamy Mucky Mineral
F2	Loamy Gleyed Matrix
F3	Depleted Matrix
F6	Redox Dark Surface
F7	Depleted Dark Surface
F8	Redox Depressions
F9	Vernal Pools
F18	Reduced Vertic
TF2	Red Parent Material

Table A-5. Hydrology Indicator Codes

Code	Indicator
HA1	Surface Water
HA2	High Water Table
HA3	Saturation
B1	Water Marks (nonriverine)
B1R	Water Marks (riverine)
B2	Sediment Deposits (nonriverine)
B2R	Sediment Deposits (riverine)
B3	Drift Deposits (nonriverine)
B3R	Drift Deposits (riverine)
B6	Surface Soil Cracks
B7	Inundation Visible on Aerial Imagery
B9	Water-Stained Leaves
B10	Drainage Patterns
B11	Salt Crust
B12	Biotic Crust
B13	Aquatic Invertebrates
C1	Hydrogen Sulfide Odor
C2	Dry-Season Water Table
C3	Oxidized Rhizospheres Along Living Roots
C4	Presence of Reduced Iron
C6	Recent Iron Reduction in Tilled Soils
C7	Thin Muck Surface
C8	Crayfish Burrows
C9	Saturation Visible on Aerial Imagery
D3	Shallow Aquitard
D5	FAC-Neutral Test
Other	Other

APPENDIX B: Photographs of Potential Wetland Sites within the Proposed FRTC Expansion Areas

[This page intentionally left blank.]

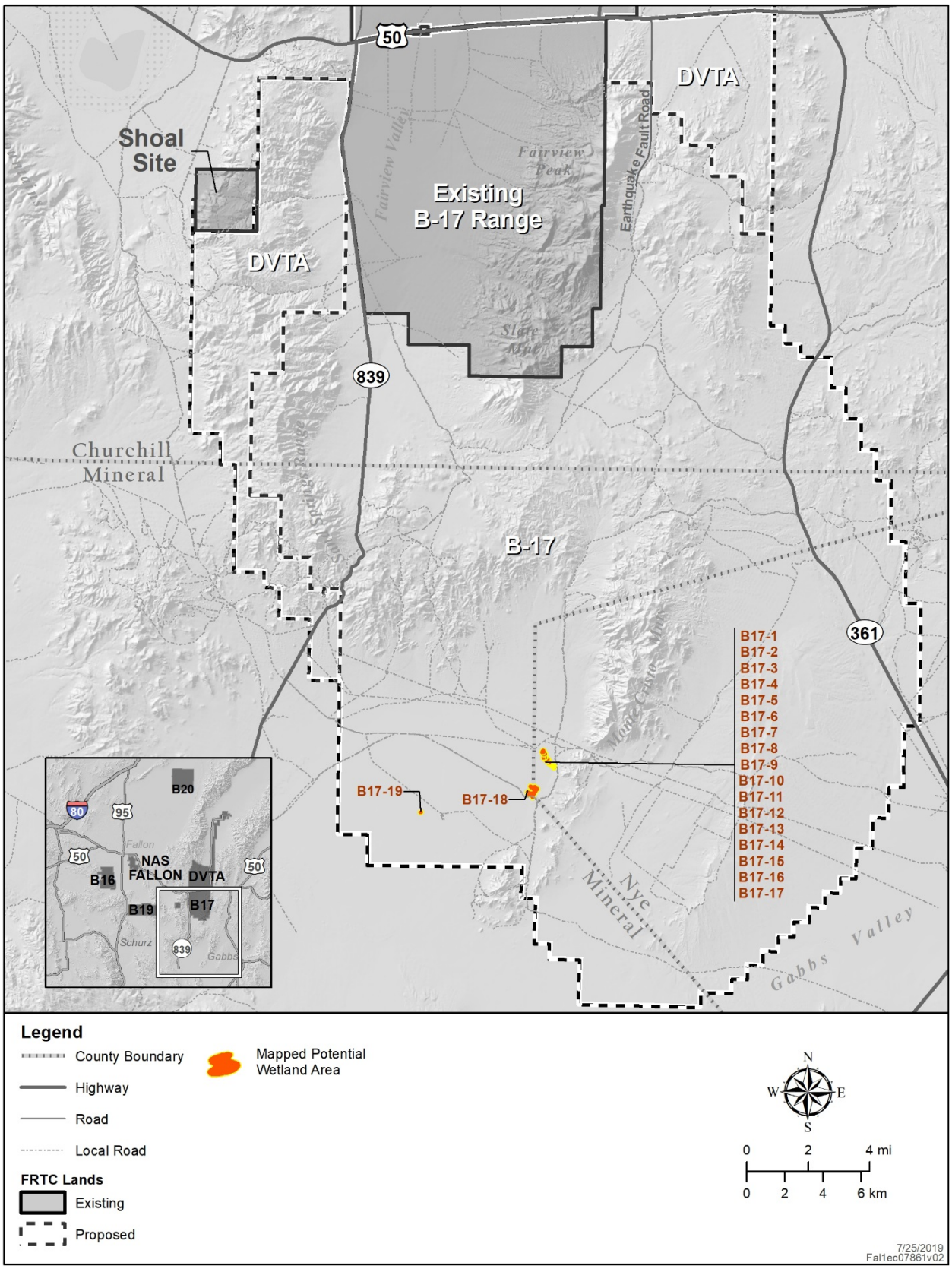


Figure B-1. Locations of Potential Wetlands within the Proposed B-17 Expansion Area

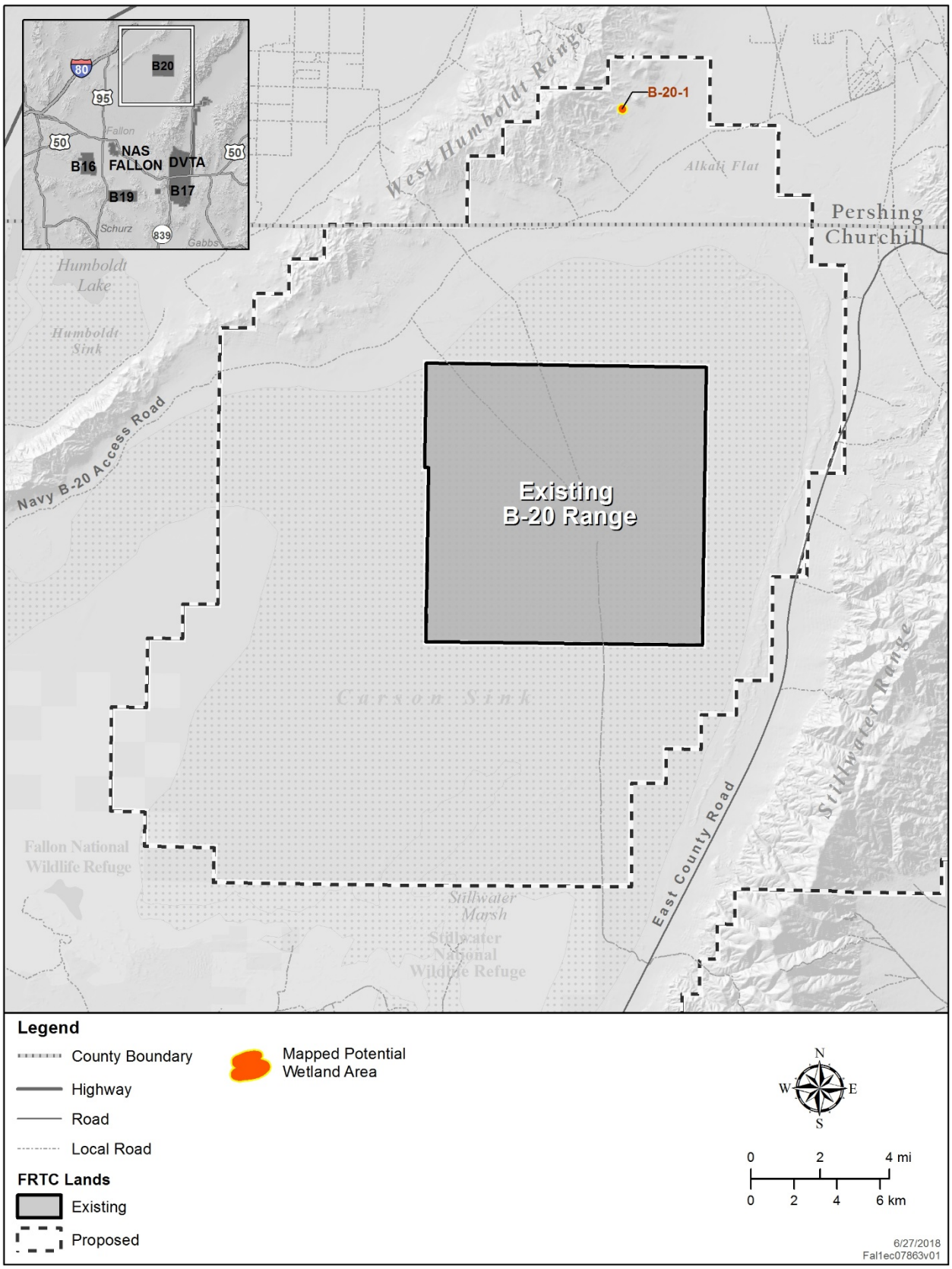


Figure B-2. Locations of Potential Wetlands within the Proposed B-20 Expansion Area

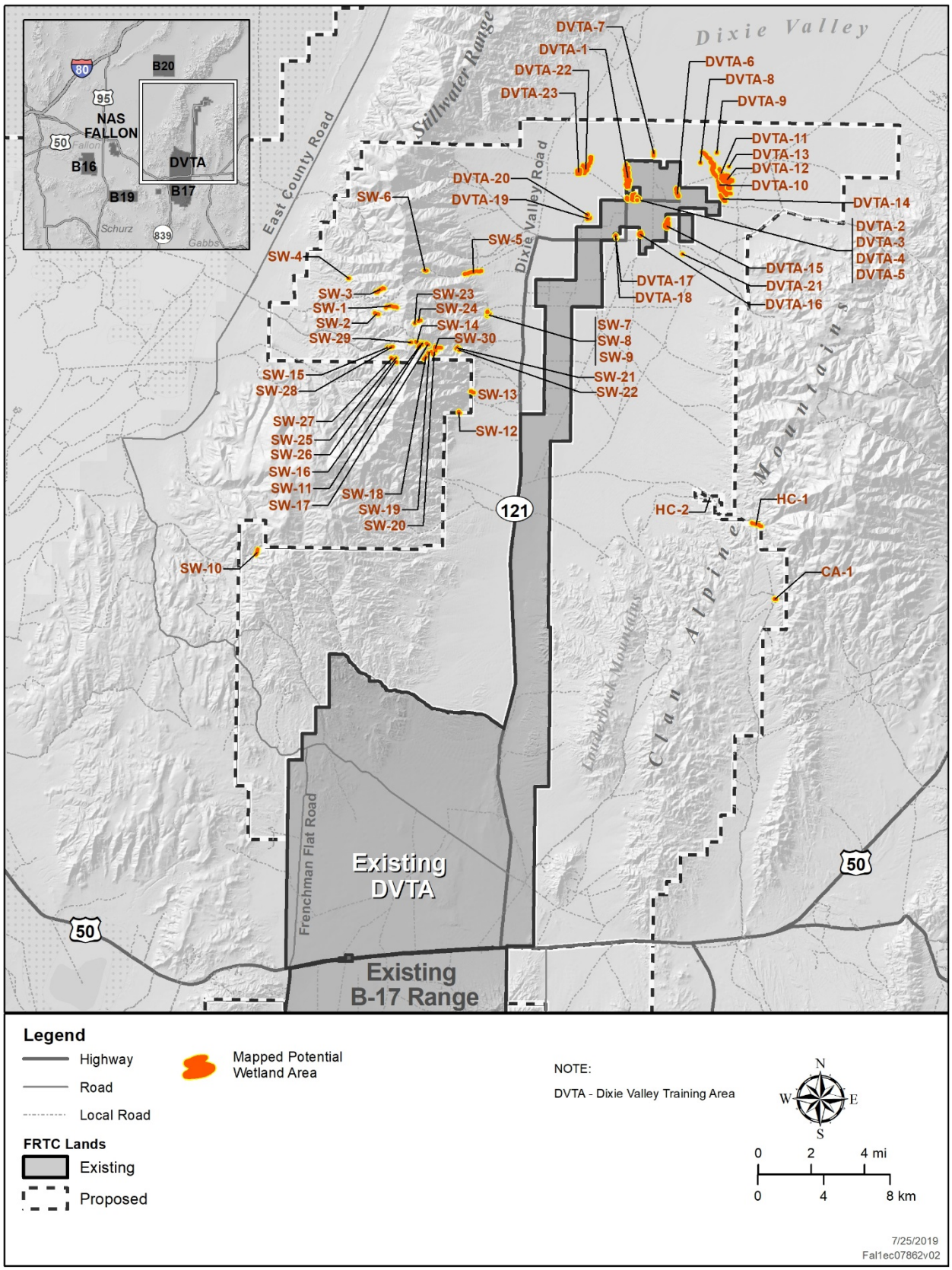


Figure B-3. Locations of Potential Wetlands within the Proposed Northern DVTA Expansion Area

[This page intentionally left blank.]

Photographs of representative potential wetland sites within the proposed FRTC expansion areas. Refer to Figures B-1 thru B-3 for locations within each area.

B17-1

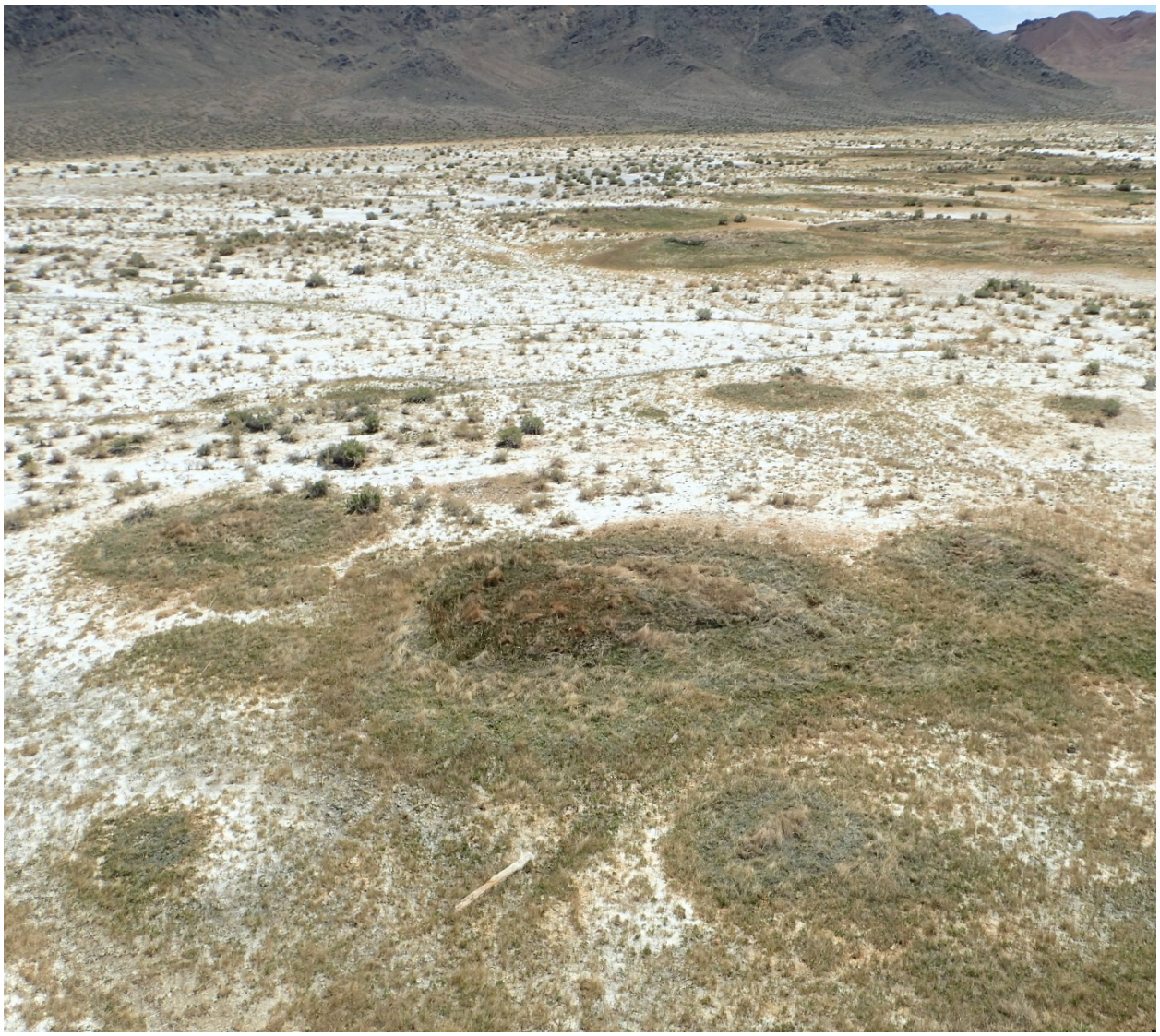
B17-2

B17-8

B17-12a

B17-12b

B17-13a



B17-13b

B17-18

B17-19

B20-1

DVTA-1

DVTA-3

DVTA-6

DVTA-7

DVTA-11

DVTA-15

DVTA-16a

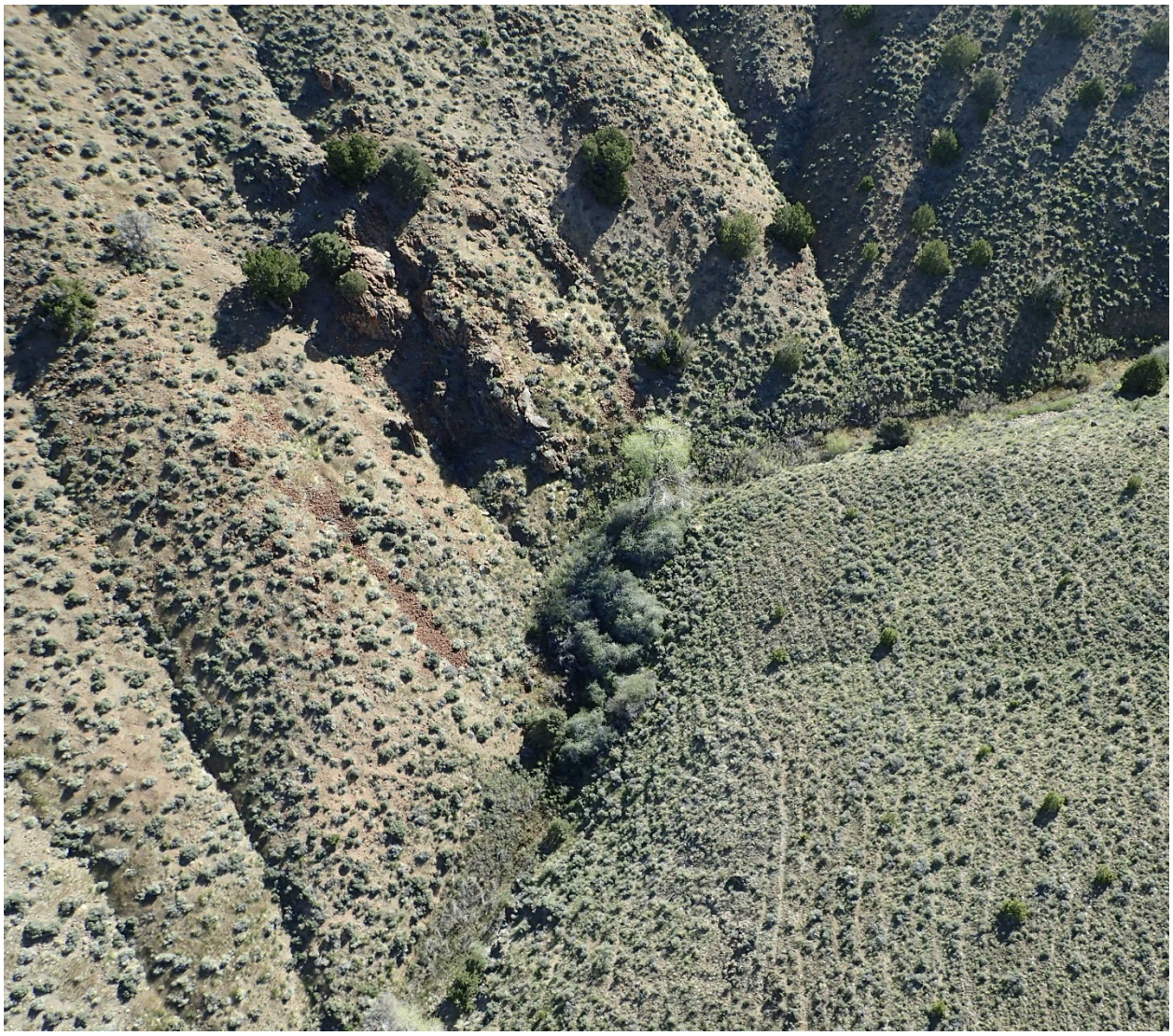
DVTA-16b (showing recent dredge spoils)

DVTA-17

DVTA-19

DVTA-21

DVTA-22



SW-1

SW-2

SW-4

SW-5

SW-6

SW-7

SW-11

SW-12

SW-13a

SW-13b

SW-15

SW-16

SW-21

SW-23

SW-24

SW-29

HC-1

HC-2