Final

Fish Inventory and Habitat Assessment in Support of the Proposed Fallon Range Training Complex Expansion, Nevada

June 2019

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

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Contract N62742-14-D-1863: Task Orders N6247317F4650 and N6247317F4650, Modification #P00001

[**Cover Photo:** East Valley Road Site #2; May 1, 2018; D. Heilprin]

TABLE OF CONTENTS

Appendices

List of Figures

List of Tables

Acronyms and Abbreviations

DVTA	Dixie Valley Training Area
E	East
e-fishing	electrofishing
FRTC	Fallon Range Training Complex
ft	foot/feet
ft^2	square feet
HWY	Highway
m	meter(s)
m^2	square meters
mm	millimeter(s)
NAS	Naval Air Station
NDOW	Nevada Department of Wildlife
U.S.	United States

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Air Station (NAS) Fallon manages the Fallon Range Training Complex (FRTC), which currently encompasses a combination of withdrawn and acquired lands totaling approximately over 223,600 acres (ac) (90,490 hectares [ha]) of military training land located southeast of Fallon, Nevada (Figure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 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. In order to effectively meet future training 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 684,000 ac (276,800 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 Corporation (ManTech) 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 fish inventory and habitat assessment 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. 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 Mountain range to the east. This desert covers roughly 158,000 square miles (409,218 square kilometers) 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).

Potential water features were identified during an aerial surveys in February 2018 and March 2019 from an MD 500 helicopter at an altitude of approximately 50-100 ft. GPS-encoded aerial photographs of potential water features were taken in the northern DVTA expansion areas using a Canon 5D Mark III camera with a 28-105 millimeter (mm) lens to capture wide angle images. The only areas within the project area that contained potentially suitable open water (i.e., ponds, creeks, streams, etc.) that could support fish species occurred within the northern DVTA within associated with wetlands and ponds and the northeastern portion of the DVTA along Horse Creek (Figure 1-2).

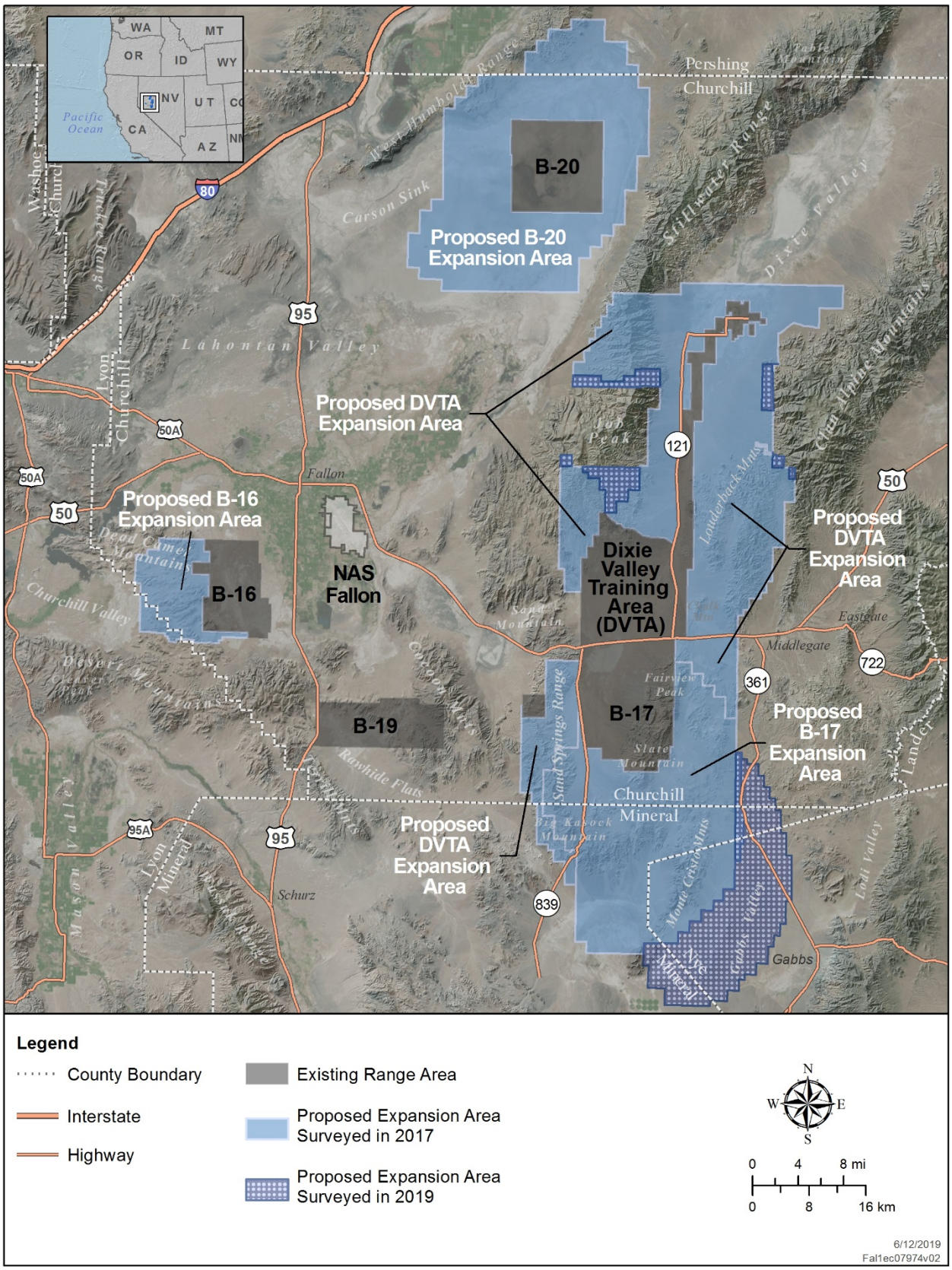

Figure 1-1. Regional Location of the Proposed FRTC Expansion Areas

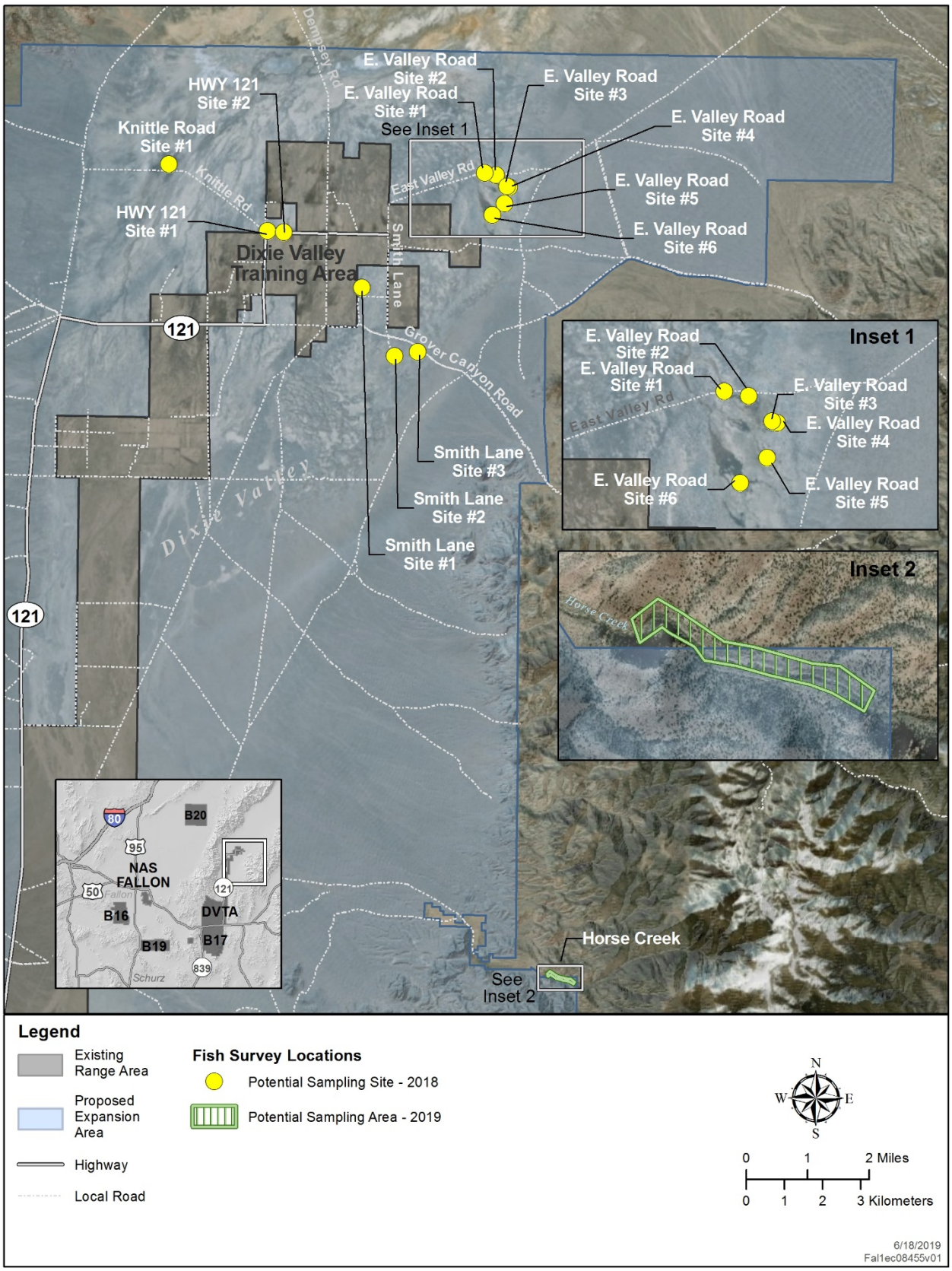

Figure 1-2. Potential Fish Sampling Sites within the Proposed Northern DVTA Expansion Area

1.2. Historical Fish Surveys

The year round ponds and marshes of Dixie Valley support suitable habitat for a variety of fish species. Prior to settlement in the area, it is unlikely fish existed in these shallow bodies of water; however, early settlers built holding ponds and stocked fish to control mosquitoes and provide a food source. A total of 22 game and nongame fish species are known to occur or potentially occur in the region of the proposed FRTC expansion areas (Table 1-1) (Rissler et al. 1991; NAS Fallon 2008; Nevada Department of Wildlife [NDOW], personal communication 2018). Of these 22 species, 18 are introduced non-native species and only 4 are native to Nevada.

Table 1-1. Fish Species Known to Occur or Potentially Occurring within the FRTC Region

Common Name	Scientific Name	Regional Status
Black crappie	*Pomoxis nigromaculatus*	Non-native
Bluegill*	*Lepomis macrochirus*	Non-native
Brook trout*	*Salvelinus fontinalis*	Non-native
Bullhead catfish	*Ameiurus* spp.	Non-native
Channel catfish	*Ictalurus punctatus*	Non-native
Common carp**	*Cyprinus carpio*	Non-native
Fathead minnow	*Pimephales promelas*	Non-native
Green sunfish*	*Lepomis cyanellus*	Non-native
Lahontan speckled dace	*Rhinichthys osculus robustus*	Native
Lahontan mountain sucker	*Catostomus lahontan*	Native
Largemouth bass*	*Micropterus salmoides*	Non-native
Mosquitofish*	*Gambusia affinis*	Non-native
Rainbow trout	*Oncorhynchus mykiss*	Non-native
Sacramento blackfish	*Orthodon microlepidotus*	Non-native
Spotted bass	*Micropterus punctulatus*	Non-native
Tahoe sucker	*Catostomus tahoensis*	Native
Tui chub*	*Gila bicolor*	Native
Walleye	*Sander vitreus*	Non-native
White bass	*Morone chrysops*	Non-native
White catfish	*Ameiurus catus*	Non-native
White crappie	*Pomoxis annularis*	Non-native
Yellow perch	*Perca flavescens*	Non-native

Notes: *Recorded during 1990 and 2007 surveys of the existing DVTA.
**Recorded during 1990 surveys of the existing DVTA.
Sources: Rissler et al. 1991; NAS Fallon 2008; NDOW, personal communication, 2018.

Two previous survey efforts have been conducted within or adjacent to the existing FRTC lands that specifically targeted fish species, both focusing on the existing DVTA and Horse Creek area. A 1990 survey focused on surveys to determine the distribution of the Dixie Valley tui chub (*Gila bicolor s*sp.), at the time a candidate species for listing under the Endangered Species Act, and to determine the general fish distribution and characterize aquatic habitats in Dixie Valley. The survey recorded a total of 7 fish species from 23 sampled ponds, with the tui chub found at only one site (Rissler et al. 1991). A 2007 survey recorded a total of 6 fish species from 14 sampled ponds, with tui chub being the only native fish species detected (Table 1-1) (NAS Fallon 2008). All of the ponds sampled in 2007 were on existing NAS Fallon-managed lands.

The 2018 and 2019 survey efforts only sampled ponds and Horse Creek within the proposed DVTA expansion area and did not include any ponds on existing NAS Fallon-managed lands.

2. METHODS

2.1. Electrofishing

Electrofishing (e-fishing) was conducted from a small inflatable boat (Figure 2-1) and from land along the edges of the pond in April/May 2018 and along Horse Creek (April/May 2019) using a Halltech HT-2000 backpack electrofisher. Fish that enter the electrical field produced by an e-fishing unit were stunned or drawn towards the positively charged anode enabling the fish to be collected by dip nets. Collected fish were placed in a 5-gallon bucket of water and transported to shore for identification and measurement.

2.2. Fish Traps

Fish trapping was conducted using both small (minnow) and large (catfish) traps (Figure 2-1). Minnow traps (Eagle Claw Fishing Tackle Co., Denver, Colorado) were used for the small traps and were constructed of 0.25 inch (0.63 centimeter [cm]) black vinyl coated wire and had one inch openings at both ends. Catfish traps (Memphis Net & Twine, Co., Inc., Memphis, Tennessee) were used for the large fish traps were constructed of one inch square treated nylon netting measuring 60 inches (152 cm) long and 19 inches (48 cm) in diameter. This trap had two throats and a drawstring on the bottom. Fish traps were deployed with a small inflatable boat, with small traps being positioned along the edges of the vegetation and large traps placed in the middle, deeper parts of the pond. Traps were baited with opened canned cat food to allow the food scent to disperse. Most traps were left in place for 24 hours prior to retrieval.

2.3. Seine Sampling

Seine sampling was conducted in only one of the shallow ponds (E Valley Road #1) using a Common Sense seine constructed of 0.25 inch (0.63 cm) polyester netting, measuring 10 ft (3 m) in length and 4 ft (1.2 m) deep (Figure 2-1). Each end of the net was fastened to a PVC pole to allow the net to be pulled through the water.

2.4. Dip Netting

Dip netting was conducted in only one of the shallow ponds (E Valley Road #1) using a hand-held Baitwell dip net. The net consists of a 16 in (0.4 m) wood handle and was constructed of 0.25 inch (0.63 cm) polyester netting measuring 7 in (18 cm) by 8 in (20 cm) by 4 in (10 cm) deep.

2.5. Fish Handling

Once captured, fish were placed in 5-gallon buckets filled with pond/creek water, identified to the lowest taxonomic level possible, and standard length (in mm) recorded. Fishes collected at Horse Creek during the April/May 2019 surveys were measured using fork length (in mm). Voucher photographs were taken for all species collected prior to their release at the point of capture. Fish were returned unharmed to the ponds or creek where they were captured within 2-3 minutes and no fish mortality occurred during the surveys. Information on each site sampled, including approximate size (area), depth, water temperature, and the presence of vegetation was also recorded.

Figure 2-1. Sampling Methods Used during April/May Fish Surveys
Methods included e-fishing (top), small and large fish traps (middle), and a small seine (bottom).

3. RESULTS

Of the 12 locations identified in the February 2018 aerial surveys as potential survey sites, 6 were sampled for fish in April/May 2018 (Table 3-1 and Figure 3-1). The other six ponds were not sampled due to the lack of signs that fish were present (swirling water or juvenile fish on the pond edges), the pond was not accessible due to fencing and/or the presence of cattle, or the pond was not deep enough to sample (less than 1 ft [0.3 m] water depth). In addition, 10 reaches of Horse Creek were sampled by electro fishing in April/May 2019 (Figure 3-1). Appendix A provides photographs and characteristics of each sampled pond and the representative areas of Horse Creek.

Table 3-1. Fish Sampling Locations during April/May 2018 and April/May 2019

Date	Pond/ Horse Creek*	Lat/Long	Pond/Reach Area (ft^2)*	Pond/Reach Depth (ft)	Sampling Gear
30 Apr 2018	HWY 121 #1	39.695/ -118.079	375	7-8	Large trap, small traps
30 Apr 2018	HWY 121 #2	39.695/ -118.075	2,226	4-5	Large trap, small traps
1 May 2018	E Valley Road #1	39.709/ -118.014	1,045	3-4	Seine, dip net
1 May 2018	E Valley Road #2	39.709/ -118.010	8,925	7-8	Large trap, small trap, e-fishing
1 May 2018	E Valley Road #4	39.706/ -118.006	13,834	7-8	Large trap, small trap, e-fishing
2 May 2018	E Valley Road #3	39.706/ -118.007	13,462	7-8	E-fishing
30 Apr 2019	Horse Creek #1	39.520/ -117.991	300	1-2	E-fishing
30 Apr 2019	Horse Creek #2	39.520/ -117.991	300	1-2	E-fishing
30 Apr 2019	Horse Creek #3	39.520/ -117.990	350	1-2	E-fishing
30 Apr 2019	Horse Creek #4	39.520/ -117.990	425	1-2	E-fishing
30 Apr 2019	Horse Creek #5	39.519/ -117.989	425	1-2	E-fishing
1 May 2019	Horse Creek #6	39.519/ -117.987	425	1-2	E-fishing
1 May 2019	Horse Creek #7	39.518/ -117.987	425	1-2	E-fishing
1 May 2019	Horse Creek #8	39.518/ -117.985	425	1-2	E-fishing
1 May 2019	Horse Creek #9	39.518/ -117.985	425	1-2	E-fishing
1 May 2019	Horse Creek #10	39.518/ -117.984	425	1-2	E-fishing

Notes: *E = east; ft^2 = square feet; HWY = highway.

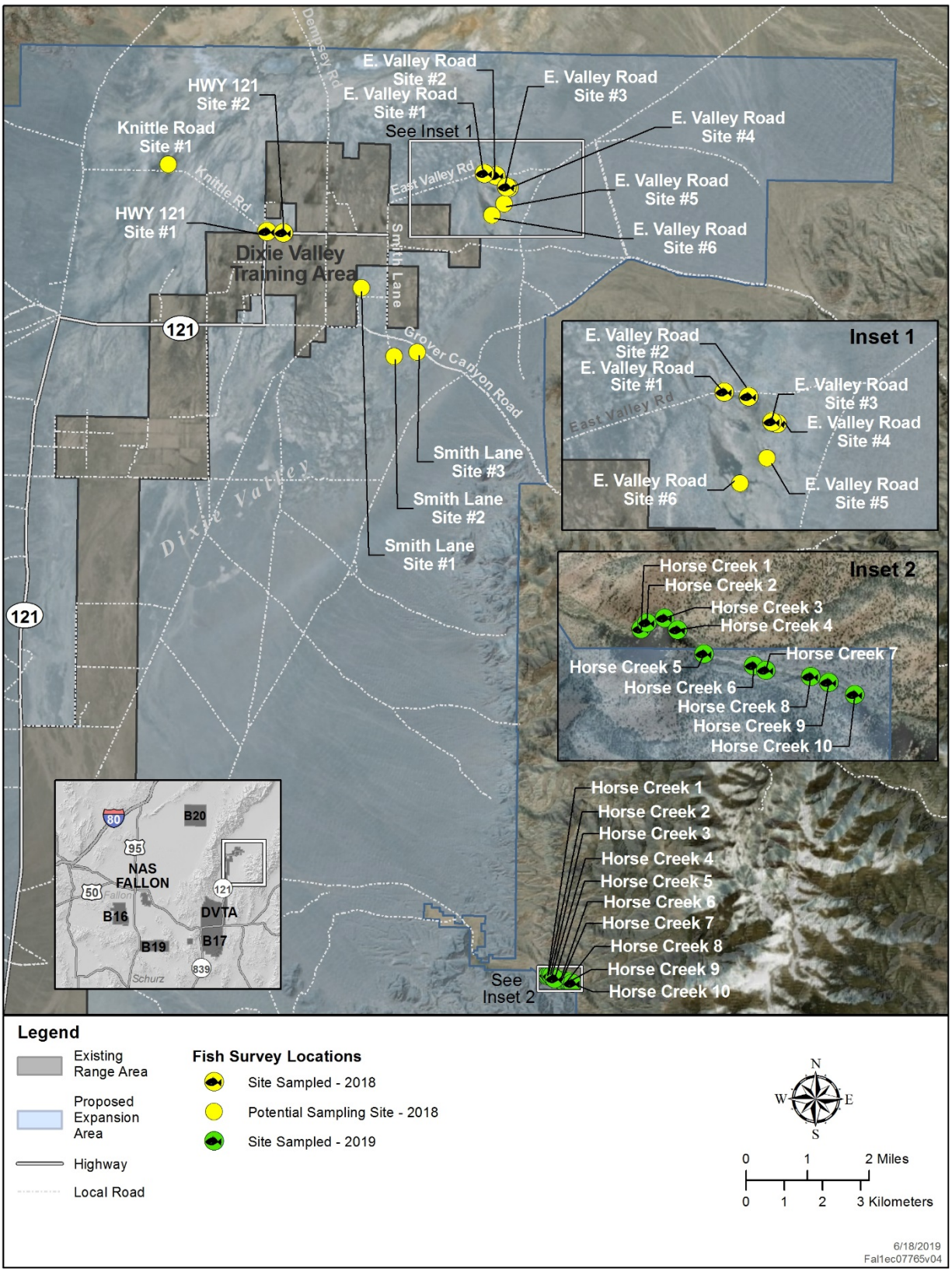

Figure 3-1. Potential and Sampled Water Features within the Proposed Northern DVTA Expansion Area

In addition to fish surveys, separate wetland surveys were also conducted during May 2018. The Highway (HWY) 121 #1 and #2 ponds correspond to wetland sites DVTA-2 and DVTA-3, respectively (Figure 3-2). The East (E) Valley Road #1 site corresponds to wetland site DVTA-11, and E Valley Road #2, #3, and #4 correspond to wetland site DVTA-12 (Figure 3-3). Refer to the Final Wetland Survey Report (U.S. Department of the Navy 2018) for further details on these wetland/pond features.

The smallest pond was the HWY 121 #1 pond that was approximately 375 square feet (ft^2) (35 square m [m^2]) in area, while the largest pond was E Valley Road #4, which was about 13,834 ft^2 (1,285 m^2) (Table 3-1). Pond water depth was relatively consistent, with most other ponds being 7-8 ft (2.1-2.4 m) deep, and the E Valley Road #1 pond being the shallowest at 3-4 ft (0.9-1.2 m).

A total of 84 individuals of 3 fish species were detected in 3 ponds (Table 3-2). No fish were detected at the HWY 121 #1 and #2 ponds or at the E Valley Road #1 pond. A total of 72 individual brook trout were detected at 10 locations along Horse Creek during April/May 2019 (Table 3-2). Copies of field datasheets are presented in Appendix B.

Table 3-2. Number of Fish Detected (All Sampling Gear Combined) during April/May 2018 and April/May 2019 Surveys

Species	Pond			Horse Creek	Total
	E Valley Road #2	E Valley Road #3	E Valley Road #4		
Bluegill (*Lepomis macrochirus*)*	12	19	28	**0**	**59**
Green sunfish (*Lepomis cyanellus)**	0	4	8	**0**	**12**
Mosquitofish (*Gambusia affinis*)	0	7	6	**0**	**13**
Brook trout (*Salvelinus fontinalis*)	0	0	0	**72**	**72**
Total	**12**	**30**	**42**	**72**	**156**

Note: *Possible hybrids detected.

Bluegill were the most common species detected (n=59) at all pond stations, with the highest number detected at the E Valley Road # 4 pond (n=28). A total of 13 mosquitofish and 12 green sunfish were detected at the E Valley Road ponds (Table 3-2). In addition, it is possible that hybrid bluegill/green sunfish were detected in the E Valley Road ponds. Brook trout was the only fish species detected in Horse Creek.

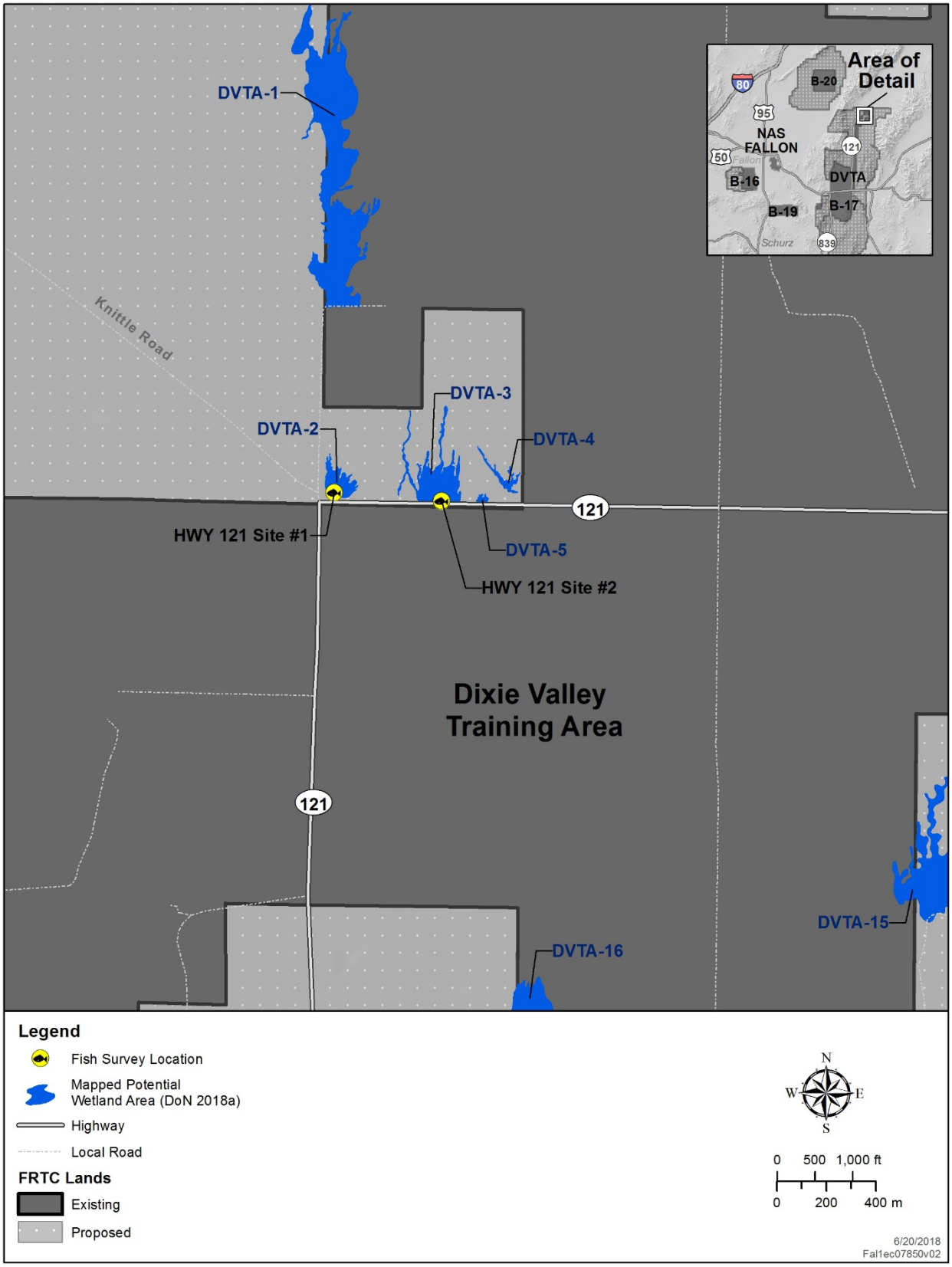

Figure 3-2. Locations of Co-located Wetland and Fish Survey Sites – Proposed Northwestern DVTA Expansion Area

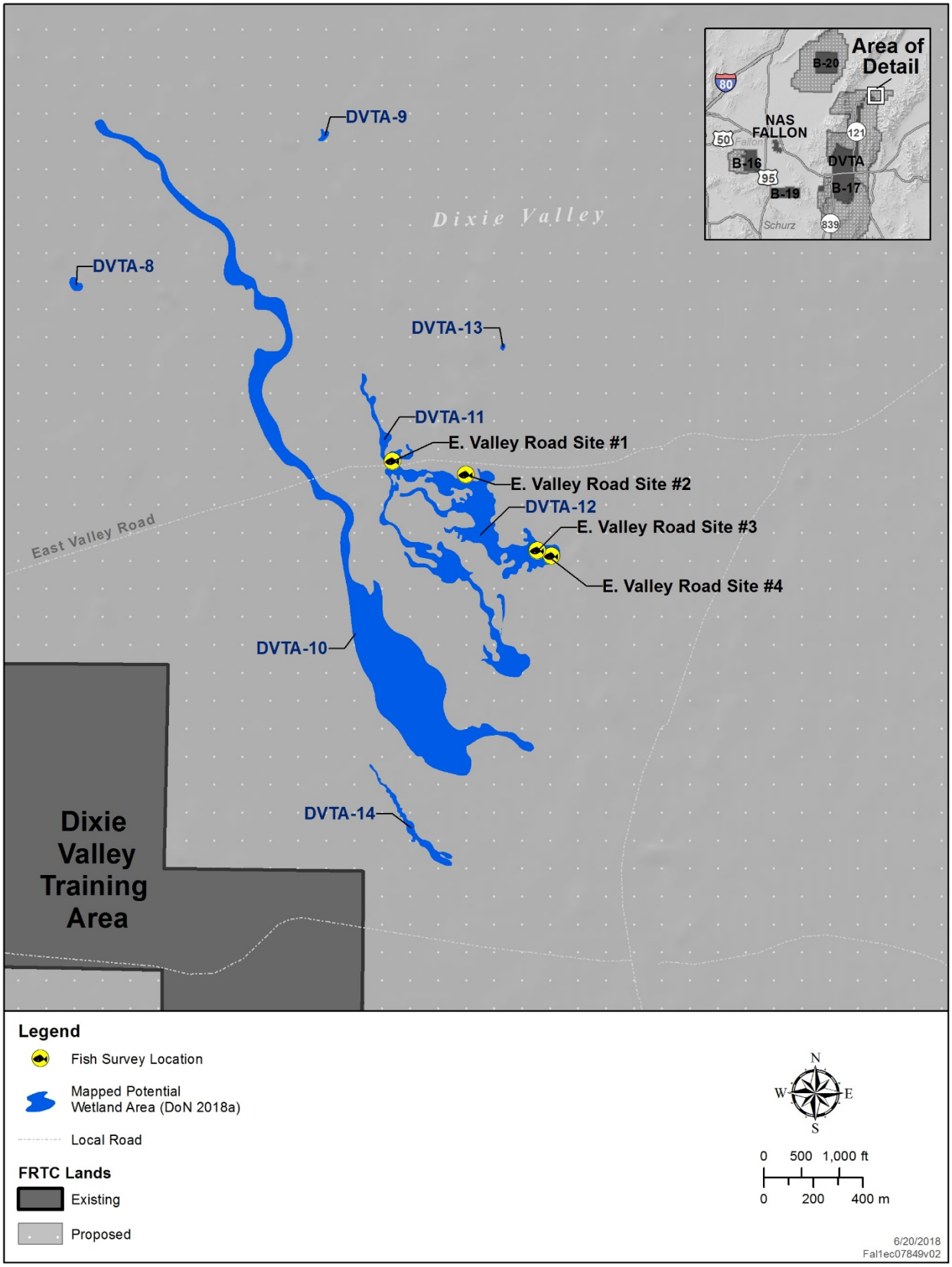

Figure 3-3. Locations of Co-located Wetland and Fish Survey Sites – Proposed Northeastern DVTA Expansion Area

4. DISCUSSION

During the current study, no native fishes were detected in any of the ponds sampled in the northern DVTA expansion area. Sampled ponds were dominated by non-native/stocked fish species such as bluegill, green sunfish, and possibly bluegill/green sunfish hybrids. Near and Koppelman (2009) found that most sunfishes (*Lepomis* spp.) hybridize despite differing degrees of evolutionary divergence. Although the factors that influence the occurrence of hybridization between bluegill and green sunfish, as well as other centrarchids, are not completely understood, there is a general consensus that degraded habitats play a major role in influencing hybridization in nature (Wittman 2016). Hybrids appear to be more common in environments where there is an extremely high abundance of aquatic vegetation and in waters with high turbidity which can result in the pure species' inability to differentiate the male and female of the other species when searching for a mate (Hubbs 1955).

Results of the current fish surveys within the proposed DVTA expansion area are consistent with the 2007 fish surveys within the existing DVTA (NAS Fallon 2008). The 2007 surveys reported a total of six species, while this study detected four. In addition to sampling different ponds, the difference in species composition between the current study of the DVTA extension areas and the previous fish study is likely due to water quality conditions in ponds and whether they have been historically stocked with game fishes such as largemouth bass. It is possible that the ponds sampled during the current study had the same species at one time as the ponds sampled in previous studies, but those additional species were unable to withstand changes in the physical or biological structure of the pond and over time were unable to adapt to changing pond conditions. Other differences are likely the result of slightly different sampling methods, with the current fish surveys using electrofishing methods in addition to the traps and seines.

While no fishes were detected at the HWY 121 #1 and #2 ponds or at the E Valley Road #1 pond, these three ponds were the smallest of the sampled ponds (i.e., less than 2,300 ft^2 [214 m^2] in area) and two were less than 5 ft (1.5 m) deep. The ponds where fish were detected (E Valley Road #2, #3, and #4) are large in size (approx. 9,000-14,000 ft^2 [836-1,300 m^2]), relatively deep (7-8 ft [2.1-2.4 m]), and have well-established vegetation along the pond edges. It is possible that these ponds have been historically stocked with fishes and that the ponds have relatively good water quality conditions that persist throughout the year.

5. REFERENCES

Hubbs, C.L. 1955. Hybridization between fish species in nature. Systematic Biology 4: 1–20.

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

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

NDOW. 2018. Comments on Draft Fish Inventory and Habitat Assessment. Personal communication via email to R. Sosa, Naval Technical Representative, NAVFAC Southwest, San Diego, CA. September 11.

Near, T.J., and J. Koppelman. 2009. Species Diversity, Phylogeny and Phylogeography of Centrarchidae. Pages 1–38 *in* S.J. Cooke and D. Philipp, eds. Centrarchid Fishes: Diversity, Biology, and Conservation. John Wiley & Sons, Hoboken, NJ.

Rissler, P.H., S. Byers, G.G. Scoppettone, and D. Withers. 1991. Status of Tui Chub and Other Fishes on Navy Lands in Dixie Valley. Prepared by U.S. Fish and Wildlife Service, National Fishery Research

Center, Reno, NV for Natural Resources Management Branch, Western Division, Naval Facilities Engineering Command, San Bruno, CA. April.

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

U.S. Department of the Navy. 2018. Final Wetland 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, Inc., Environmental, Range and Sustainability Services, Lompoc, CA. September.

Wittman, J. 2016. Effects of aquatic habitat degradation on hybridization between two species of sunfish: bluegill (*Lepomis macrochirus*) and green sunfish (*Lepomis cyanellus*). Thesis, Ohio State University, Colombus, OH.

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APPENDIX A: Descriptions and Photographs of Sampled Ponds and Reaches

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Highway 121 #1 Pond

Date Sampled	Pond Area	Pond Depth	Water Temperature*	Vegetation
30 Apr 2018	375 ft^2	7-8 ft	62.6 °F	Mexican rush (*Juncus mexicanus*), narrowleaf cattail (*Typha angustifolia*), spikerushes (*Eleocharis palustrus* and *parishii*).

°F = degrees Fahrenheit.

Highway 121 #2 Pond

Date Sampled	Pond Area	Pond Depth	Water Temperature	Vegetation
30 Apr 2018	2,226 ft^2	4-5 ft	63.1 °F	Mexican rush (*Juncus mexicanus*), narrowleaf cattail (*Typha angustifolia*), spikerushes (*Eleocharis palustrus* and *E. parishii*).

°F = degrees Fahrenheit.

East Valley Road #1 Pond

Date Sampled	Pond Area	Pond Depth	Water Temperature	Vegetation
1 May 2018	1,045 ft^2	3-4 ft	55.2 °F	Dense clustered field sedge (*Carex praegracilis*), common spikerush (*E. palustris*), and Mexican rush.

°F = degrees Fahrenheit.

East Valley Road #2 Pond

Date Sampled	Pond Area	Pond Depth	Water Temperature	Vegetation
1 May 2018	8,925 ft^2	7-8 ft	59.4 °F	Narrowleaf cattail, chairmaker's bulrush (*Schoenoplectus americanus*), Russian olive (*Eleaganus angustifolia*).

°F = degrees Fahrenheit.

East Valley Road #3 Pond

Date Sampled	Pond Area	Pond Depth	Water Temperature	Vegetation
2 May 2018	13,462 ft^2	7-8 ft	63.9 °F	Chairmaker's bulrush, narrowleaf cattail, tamarisk (*Tamarix ramosissima*), Russian olive, Fremont cottonwood (*Populus fremontii*).

°F = degrees Fahrenheit.

East Valley Road #4 Pond

Date Sampled	Pond Area	Pond Depth	Water Temperature	Vegetation
1 May 2018	13,834 ft^2	7-8 ft	65.6 °F	Chairmaker's bulrush, narrowleaf cattail, tamarisk (*Tamarix ramosissima*), Russian olive.

°F = degrees Fahrenheit.

Horse Creek #1 (top) and Horse Creek #2 (bottom)

Dates Sampled	No. Reaches	Area per Reach	Depth	Water Temperature	Vegetation
30 April & 1 May 2019	10	300-400 ft^2	1-2 ft	43-47 ^oF	Arroyo willow (*Salix lasiolepis*), big sagebrush (*Artemisia tridentata*), rabbitbrush (*Ericameria nauseosa*), Sandberg bluegrass (*Poa secunda*), cheatgrass (*Bromus tectorum*)

^oF = degrees Fahrenheit.

APPENDIX B: Field Datasheets

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Page 1 of 1

2018 NAS FALLON FISH SURVEYS

Date	Station	Water Temp (°F)	Sampling Gear	Time In	Time Out	Species	Count	Length (mm)	Notes
4/30/18	Hwy 121 #1	62.6	LT	10:28	0835	(5/1/18)	Ø		
11	11	62.6	ST (n=4)	10:28	0835	(5/1/18)	Ø		

DN = dip net; E = electrofishing; LT = large trap; ST = small trap; S = seine

Page 1 of 4

2018 NAS FALLON FISH SURVEYS

Date	Station	Water Temp (°F)	Sampling Gear	Time In	Time Out	Species	Count	Length (mm)	Notes
4/30/18	Hwy 121 #2	63.1	LT	1058	0845	(5/1/18)	∅		
〃	〃	63.1	ST (n=6)	1058	0845	(5/1/18)	∅		
5/1/18	E. Valley #1	55.2	S	0910	0925		∅		3 seine pulls
5/1/18	E. Valley #1	55.2	DN	0910	0920		∅		1 DN swath
5/1/18	E. Valley #2	59.4	ST	1005	1045	(5/2/18)	∅		n=10
〃	〃	〃	LT	1015	1057	(5/2/18)	7		n=2
〃	〃	〃	E	10:30	11:35				e-fishing started
〃	〃	〃	E		10:52	bluegill	1	110	
〃	〃	〃	E		11:05		1	125	
〃	〃	〃	E		1107		1	128	
〃	〃	〃	E		1122		1	103	
〃	〃	〃	E		1126		1	113	
5/1/18	E. Valley #3	65.6	ST	1240	11:25	(5/2/18)	∅		n=8
〃	〃	〃	LT	1245	11:38	(5/2/18)	∅		n=1
〃	〃	〃	E	1300	1420				w/ boat + from land
			E	—	—	mosquitofish	1	23	
						bluegill	1	83	
						〃	1	95	
							1	85	
							1	95	
							1	97	
							1	82	hybrid?

DN = dip net; E = electrofishing; LT = large trap; ST = small trap; S = seine

2018 NAS FALLON FISH SURVEYS

Page 2 of 4

Date	Station	Water Temp (°F)	Sampling Gear	Time In	Time Out	Species	Count	Length (mm)	Notes
5/1/18	E. Valley #4		E			bluegill	1	110	
							1	88	hybrid?
							1	92	hybrid?
							1	102	
							1	78	hybrid?
						green sunfish	1	75	hybrid?
						bluegill	1	89	hybrid?
							1	102	hybrid?
							1	93	
							1	80	hybrid?
						green sunfish	1	73	hybrid?
							1	78	hybrid?
						bluegill	1	85	
						green sunfish	1	70	tail rot
							1	78	hybrid?
							1	81	
						bluegill	1	80	hybrid?
							1	85	
						bluegill	1	102	
							1	92	hybrid?
						green sunfish	1	78	hybrid?
						bluegill	1	80	hybrid?
						bluegill	1	105	
						bluegill	1	75	

DN = dip net; E = electrofishing; LT = large trap; ST = small trap; S = seine

Page 3 of 4

2018 NAS FALLON FISH SURVEYS

Date	Station	Water Temp (°F)	Sampling Gear	Time In	Time Out	Species	Count	Length (mm)	Notes
5/1/18	E. Valley #4		E	—	—	bluegill	1	95	
								75	
								80	
								100	
								82	
						green sunfish	1	110	
5/2/18	E. Valley #2		LT	—	—	Bluegill	1	155	
							1	110	
							1	133	
							1	120	
							1	147	
							1	137	
							1	122	
5/2/18	E. Valley #4		DN			Mosquito Fish	1	35	
							1	31	
							1	27	
							1	30	
							1	30	
5/2/18	E. Valley #3	63.9	E	1202			—	—	enfolding from boat
						bluegill	1	42	
							1	28	
							1	50	hybrid?
							1	48	hybrid?
						green sunfish	1	135	
						bluegill	1	108	

DN = dip net; E = electrofishing; LT = large trap; ST = small trap; S = seine

Page 4 of 4

2018 NAS FALLON FISH SURVEYS

Date	Station	Water Temp (°F)	Sampling Gear	Time In	Time Out	Species	Count	Length (mm)	Notes
5/2/18	E. Valley #3	—	E	—	—	green sunfish	1	105	
						green sunfish	1	95	
						bluegill	1	145	
							1	49	hybrid?
							1	75	hybrid?
							1	126	
							1	60	hybrid?
						green sunfish	1	134	
						Bluegill	1	125	
							1	110	
							1	135	
							1	98	hybrid?
							1	90	hybrid?
							1	110	
							1	106	
							1	42	hybrid?
							1	98	hybrid?
						Mosquito fish	1	26	
							1	34	
							1	23	
							1	24	
							1	24	
							1	21	
							1	20	

DN = dip net; E = electrofishing; LT = large trap; ST = small trap; S = seine

Page 1 of 9

2019 NAS FALLON FISH SURVEYS

Date	Station	Water Temp (°F)	Sampling Gear	Time In	Time Out	Species	Count	Fork Length (mm)	Notes
4/30/19	HC1		E	1024	1025	brook trout	1	91	wt= 15g
	HC1		E	1030	1031	"	1	85	wt = 11g
	HC1		E	1045	1046	"	1	156	wt = 47g
	HC1		E	1045	1046	"	1	152	wt = 42g
	HC1		E	1045	1046	"	1	148	wt = 31g
	HC1		E	1045	1046	"	1	109	wt = 15g
	HC1		E	1045	1046	"	1	144	wt = 41g
	HC2		E	1051	1052	"	1	142	wt = 44g
	HC2		E	1051	1052	"	1	133	wt = 35g
	HC2		E	1051	1052	"	1	86	wt = 12g
	HC2		E	1051	1052	"	1	85	wt = 8g
	HC2			1105	1106	"	1	111	wt = 16g
	HC2			1105	1106	"	1	105	wt = 12g
	HC2			1105	1106	"	1	162	wt = 37g
	HC2			1105	1106	"	1	93	wt = 7g
	HC3			1115	1120	"	1	87	wt = 5g
	HC3			1115	1120	"	1	92	wt = 9g
	HC3			1115	1120	"	1	155	wt = 42g
	HC3			1115	1120	"	1	149	wt = 41g
	HC3			1115	1120	"	1	172	wt = 54g
	HC3			1115	1120	"	1	172	wt = 39g
	HC4			1130	1145	"	1	148	wt = 38g
	HC4			1130	1145	"	1	134	wt = 34g
	HC4			1130	1145	"	1	99	wt = 8g
	HC4			1130	1145	"	1	146	wt = 43g

DN = dip net; E = electrofishing; LT = large trap; ST = small trap; S = seine

(25)

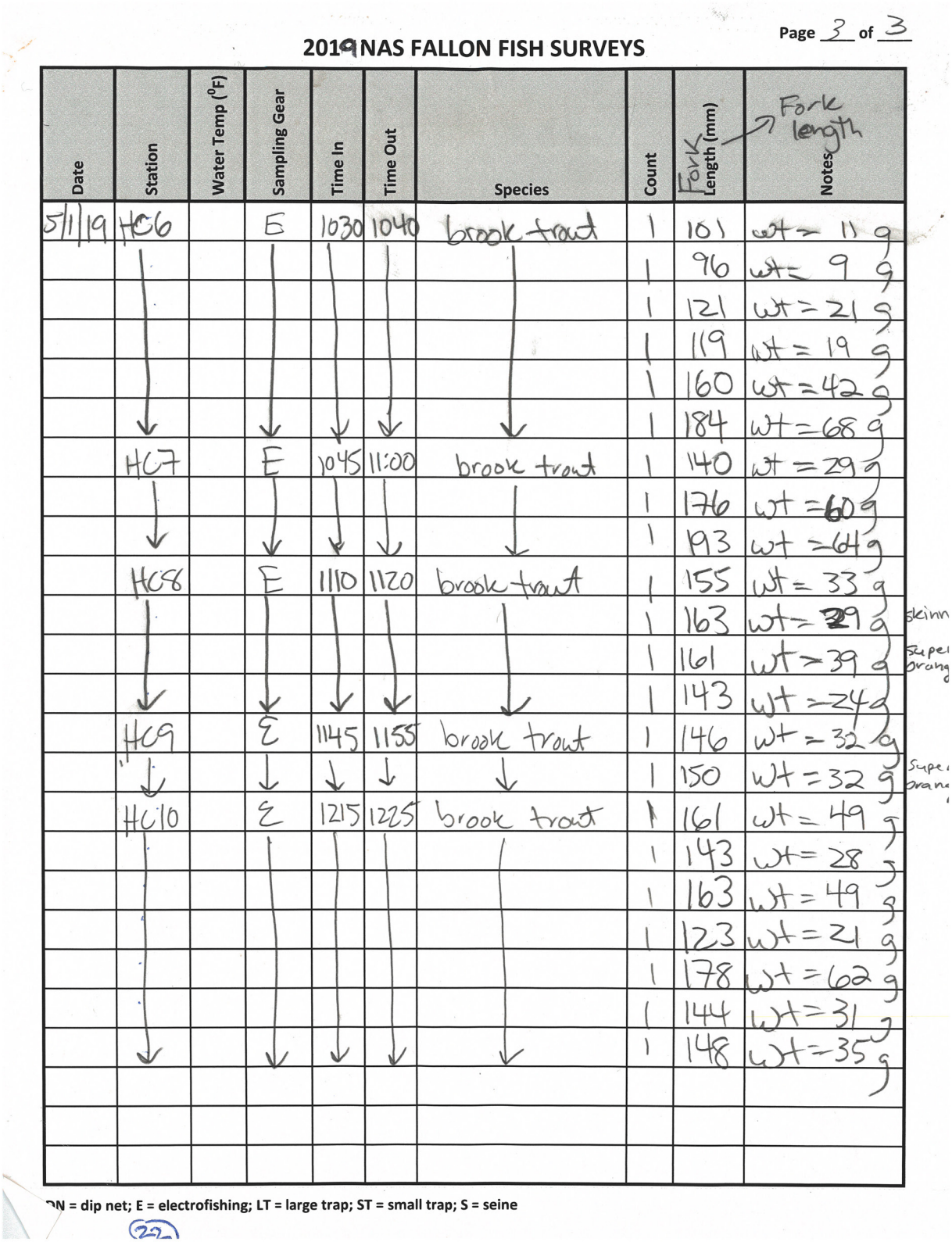
Page 2 of 3

2019 NAS FALLON FISH SURVEYS

Date	Station	Water Temp (°F)	Sampling Gear	Time In	Time Out	Species	Count	Fork Length (mm)	Notes
4/30/19	HC4		E	1130	1145	brook trout	1	89	wt = 9 g
							1	80	wt = 5 g
							1	102	wt = 10 g
							1	135	wt = 28 g
							1	92	wt = 9 g
							1	104	wt = 12 g
							1	100	wt = 14 g
							1	88	wt = 8 g
							1	109	wt = 13 g
							1	144	wt = 29 g
							1	145	wt = 20 g *thin caudal erosi
							1	139	wt = 33 g
							1	150	wt = 40 g
	↓			↓	↓	↓	1	172	wt = 59 g
	HC5			1215	1225	brook trout	1	151	wt = 46 g
							1	109	wt = 15 g
							1	159	wt = 41 g
							1	173	wt = 56 g
							1	159	wt = 38 g
							1	156	wt = 39 g
							1	108	wt = 14 g
							1	165	wt = 43 g
							1	155	wt = 42 g
							1	191	wt = 87 g
↓	↓ (23)		↓	↓	↓	↓	1	137	wt = 29 g

DN = dip net; E = electrofishing; LT = large trap; ST = small trap; S = seine

* 1230 → started sampling



Page 3 of 3

2019 NAS FALLON FISH SURVEYS

Date	Station	Water Temp (°F)	Sampling Gear	Time In	Time Out	Species	Count	Fork Length (mm)	Notes
5/1/19	HC6		E	1030	1040	brook trout	1	101	wt = 11 g
	↓		↓	↓	↓	↓	1	96	wt = 9 g
							1	121	wt = 21 g
							1	119	wt = 19 g
							1	160	wt = 42 g
	↓		↓	↓	↓	↓	1	184	wt = 68 g
	HC7		E	1045	11:00	brook trout	1	140	wt = 29 g
	↓		↓	↓	↓	↓	1	176	wt = 60 g
	↓		↓	↓	↓	↓	1	193	wt = 64 g
	HC8		E	1110	1120	brook trout	1	155	wt = 33 g
	↓		↓	↓	↓	↓	1	163	wt = 29 g skinn
	↓		↓	↓	↓	↓	1	161	wt = 39 g Super orang
	↓		↓	↓	↓	↓	1	143	wt = 24 g
	HC9		E	1145	1155	brook trout	1	146	wt = 32 g
	↓		↓	↓	↓	↓	1	150	wt = 32 g Super orang
	HC10		E	1215	1225	brook trout	1	161	wt = 49 g
	↓		↓	↓	↓	↓	1	143	wt = 28 g
	↓		↓	↓	↓	↓	1	163	wt = 49 g
	↓		↓	↓	↓	↓	1	123	wt = 21 g
	↓		↓	↓	↓	↓	1	178	wt = 62 g
	↓		↓	↓	↓	↓	1	144	wt = 31 g
	↓		↓	↓	↓	↓	1	148	wt = 35 g

DN = dip net; E = electrofishing; LT = large trap; ST = small trap; S = seine