

# FIRST RECORDS OF THE FISH ASSEMBLAGE ON TURNBULL NATIONAL WILDLIFE REFUGE, SPOKANE COUNTY, WASHINGTON, 2013

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## Abstract

We present the first documentation of the fish assemblage on Turnbull National Wildlife Refuge (TNWR) in Spokane County, Washington. Using various methods, we collected fishes inhabiting the wetlands of TNWR in 2013. A total of 15,921 fish was collected, and included, recorded by relative abundance (RA); brook stickleback (RA = 81%), pumpkinseed (RA = 18%), speckled dace (RA = <1%), redbreasted sunfish (RA = <1%), and brown bullhead (RA = <1%). This paper describes the 2013 fish assemblage at Turnbull National Wildlife Refuge.

**Key words:** brook stickleback; Turnbull National Wildlife Refuge; fish assemblage; wetlands

## Introduction

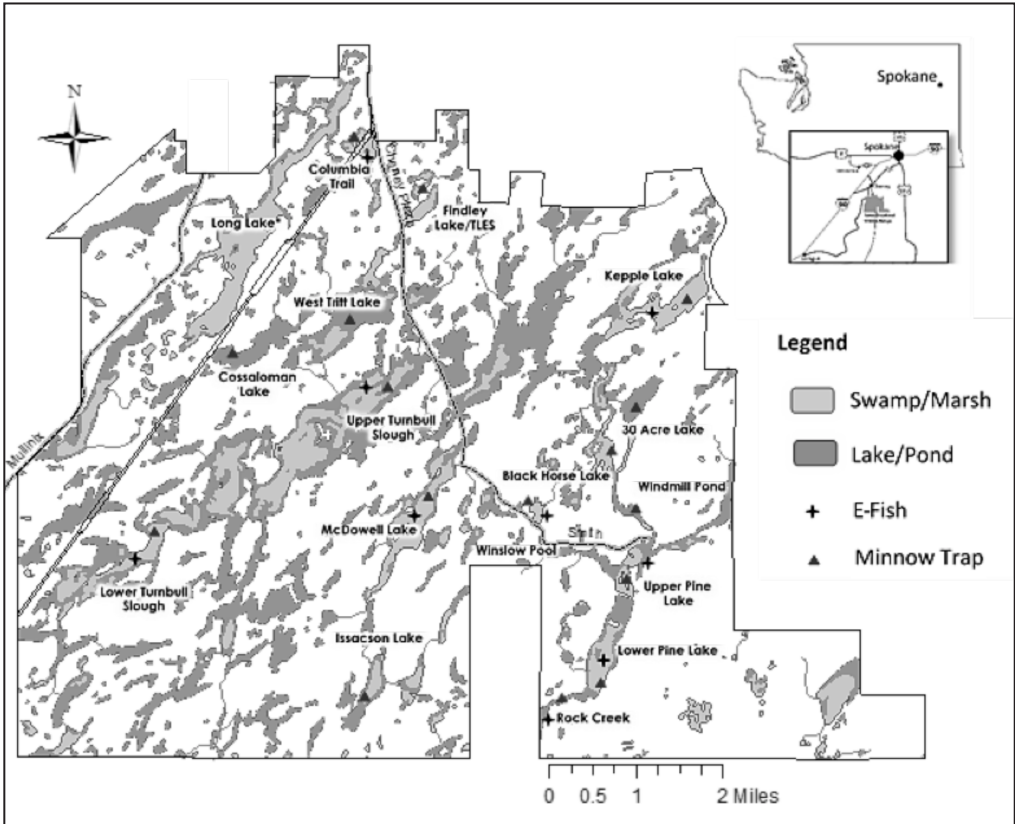
A previous fish investigation by Scholz et al. (2003) in 1999 reported the first occurrence of the nonindigenous brook stickleback (*Culaea inconstans*) in the headwaters of Rock Creek on the Turnbull National Wildlife Refuge (TNWR). This discovery prompted us to conduct more comprehensive fish surveys in all of the water bodies on the refuge in 2013. This paper presents the first record of the assemblage of the fish species on TNWR. The data presented here could serve as a baseline for future studies on the refuge. A cursory study conducted in 2002 revealed that brook stickleback, brown bullhead (*Ameiurus nebulosus*), kokanee salmon (*Oncorhynchus nerka*), pumpkinseed (*Lepomis gibbosus*), rainbow trout (*O. mykiss*), redbreasted sunfish (*Richardsonius balteatus*), and speckled dace (*Rhinichthys osculus*) were present on the refuge (Nine and Scholz, unpublished data).

TNWR is located 32 km southwest of Spokane, Washington (Fig. 1) and was

established for the protection of migratory birds in 1937 by Franklin D. Roosevelt. TNWR is 6,475 hectares in size with 2,023 hectares of lakes, wetlands, and marshes. The Cheney/Plaza road divides the refuge into east and west sides (Fig. 1). The native fish community, comprised of speckled dace and redbreasted sunfish, was present only in water bodies on the east side of the road (unpublished data). There were likely no native fishes on the west side of the road, but nonindigenous pumpkinseed had established self-sustaining populations in most water bodies on both the east and west sides and nonindigenous brook stickleback had established self-sustaining populations in most water bodies on the east side of the refuge by 2002.

## Methods

The sample locations consisted of 17 lakes, ponds, streams, and sloughs on the refuge (Fig. 1). Fish were collected at randomly selected sites by using a combination of baited minnow traps



**Figure 1.** Map of Turnbull National Wildlife Refuge, Spokane County, Washington, with the method of sampling in each waterbody in 2013.

( $n = 508$  total) or electrofishing transects ( $n = 23$  total) from April to August – 2013 (Table 1). Each minnow trap was set for 24-hours (1 trap night). Electrofishing transects of 10 minutes duration, were conducted using either a Smith Root electrofishing boat or Smith Root backpack electrofisher (Model LR20B), dependent on the presence of a boat launch. Each site was sampled in accordance with the guidelines set forth by the American Fisheries Society (Jenkins et al. 2004), United States Fish and Wildlife Service (USFWS; Brennan-Dubbs 2012), and the Washington Department of Fish and Wildlife (WDFW; Bonar et al. 2000). After collection, fish were identified to species using taxonomic keys (Wydoski and Whitney 1979, 2003; Scholz and McLellan 2009, 2010). Data for each water body sampled was compiled and catch per unit effort (CPUE) by each method for each water body was recorded.

## Results

A total of 15,921 fish was collected in 2013. The fish community consisted of [number ( $n$ ), relative abundance (RA)] brook stickleback ( $n = 12355$ ,  $RA = 81\%$ ), pumpkinseed ( $n = 2730$ ,  $RA = 18\%$ ), reidside shiner ( $n = 61$ ,  $RA = <1\%$ ), speckled dace ( $n = 13$ ,  $RA = <1\%$ ), and brown bullhead ( $n = 1$ ,  $RA = <1\%$ ). The CPUE at each water body for each method of collection is summarized in Table 1. We observed two brook sticklebacks on the west side of the Cheney/Plaza Road in 2013 (Fig. 1). These were the first observations of brook stickleback on the west side of the refuge.

## Discussion

TNWR was established as habitat for waterfowl and is one of the last quality breeding habitats available to waterfowl in Eastern Washington. Brook stickleback

**Table 1.** Summary of the effort to collect fish [Catch per unit effort (CPUE) and standard deviation (SD)] on Turnbull National Wildlife Refuge in 2013 by minnow trapping and electrofishing. TLES = Turnbull Laboratory for Ecological Studies, BBH = brown bullhead, BS = brook stickleback, PS = pumpkinseed, RSS = redbreast sunfish, SPD = speckled dace.

Site	Minnow Trap				Electrofishing				
	Traps	Species	# of fish	CPUE (fish per trap night) ( $\pm$ SD)	Minutes E-fish	Transects	Species	# of fish	CPUE (fish/min) ( $\pm$ SD)
30 Acre Lake	7	BS	197	50 (28)	-	-	-	-	-
Black Horse Lake	38	BS	878	40 (47)	10	1	BS	19	2
		PS	475	30 (27)			PS	12	1
Columbia Trail Pond	5	BS	1	0.2 (0.44)	10	1	BS	16	2
Cossaloman Lake	5	-	-	-	-	-	-	-	-
Findley Lake	43	PS	534	12 (35)	-	-	-	-	-
Issacson Lake	7	-	-	-	-	-	-	-	-
Kepple Lake	32	BS	403	13 (12)	20	2	BS	1	<1
							SPD	3	<1
Lower Turnbull Slough	110	PS	530	5 (13)	57	6	PS	52	0.9
McDowell Lake	11	PS	275	25 (32)	10	1	PS	3	<1
Pine Lake	61	BS	3904	64 (105)	34	4	BS	3801	112
		PS	2	<1			RSS	60	1.8
		BBH	1	<1			PS	3	<1
							SPD	6	<1
Rock Creek	26	BS	1231	54 (50)	30	3	BS	90	3
		PS	1	<1			PS	5	<1
		RSS	1	<1					
TLES Ponds 1 & 2	14	-	-	-	-	-	-	-	
Upper Pine Creek	18	BS	800	44 (70)	-	-	-	-	-
Upper Turnbull Slough	57	PS	174	3 (10)	50	5	PS	41	<1
		BS	1	<1					
West Tritt Lake	25	PS	623	25 (25)	-	-	-	-	-
		BS	2	<1					
Windmill Pond	24	BS	96	4 (7)	-	-	-	-	-
		SPD	4	<1					
Winslow Pool	25	BS	915	37 (90)	-	-	-	-	-
TOTAL	508		11048		221	23		4112	

can potentially compete with water birds that rely on the same invertebrates (e.g., *Chironomus* larvae and cladocerans) for prey items (McParland and Paszkowski 2006). Brook stickleback have reduced invertebrate

densities within aquatic systems (Zimmer et al. 2000); consequently, they can potentially impact prey items for waterfowl populations (McParland and Paszkowski 2006). Bridges (2011) examined the diets of brook

stickleback on TNWR and found that ~50% of their diet overlapped with prey consumed by waterfowl. Brook stickleback has the potential to impact not only native minnows, but also indirectly effect waterfowl through food limitation.

During a cursory fish survey of TNWR conducted in 2002 (Nine and Scholz, unpublished data), the same species were collected as in this study with the addition of two species, rainbow trout and kokanee salmon. In this study 12,928 fish were collected and were comprised of [number (n), relative abundance (RA)]: brook stickleback (n = 8,946, RA = 69%), pumpkinseed (n = 3,562, RA = 28%), rainbow trout (n = 245, RA = 2%), redbreast shiner (n = 84, RA = <1%), speckled dace (n = 69, RA = <1%), brown bullhead (n = 21, RA = <1%), and kokanee (n = 1, RA = <1%).

Rainbow trout (n=245) and kokanee salmon (n=1) were observed in Rock Creek between Lower Pine Lake and Chapman Lake in 2002, but not in 2013. The WDFW formerly stocked both species in Chapman Lake and it is likely that a few individuals migrated upstream into Rock Creek in 2002. WDFW discontinued stocking Rainbow Trout in 2009 because the land owner denied public access to the lake (John Whalen, WDFW, Spokane, WA, personal communication), so it is not surprising that we did not catch any in 2013.

Because the non-native brook stickleback was the most commonly collected fish in the 2013 study posing potential competitive food interactions with native fish and waterfowl, future studies should quantify populations and biomass of brook stickleback at TNWR and propose possible eradication measures.

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