REPORT

Freshwater Snails and Bivalves in East and West Twin Lake: 2024 Monitoring

prepared for

Twin Lakes Association
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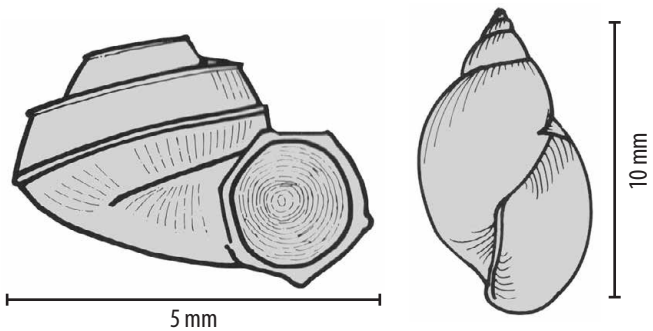
November 2024

Survey site 5 in West Twin Lake in Salisbury, Connecticut.

INTRODUCTION

Biodrawversity LLC conducted an aquatic snail and bivalve survey in East Twin Lake and West Twin Lake in Salisbury, Connecticut. The Connecticut Department of Energy and Environmental Protection (CTDEEP) requested monitoring to help understand the potential effects of plant management on, and how best to conserve, the molluscan fauna in these lakes, particularly three state-listed snail species. Target snail species included *Valvata tricarinata*, *Stagnicola catascopium*, and *Fossaria galbana*. The 2024 survey repeated a 2015 and 2020 survey (Biodrawversity 2015, 2020), with identical survey objectives and methods. The objectives were to determine the species composition of aquatic snails and bivalves in East and West Twin Lake, and characterize habitat use and availability for snails and mussels.

Of the three target species, Jokinen (1983) documented *V. tricarinata* in both lakes, and *S. catascopium* only in East Twin Lake. *V. tricarinata* and *S. catascopium* were found in both East and West Twin Lake in 2015 and 2020 (Biodrawversity 2015, 2020). In Connecticut, *V. tricarinata* occurs primarily in calcium-rich lakes in the upper Housatonic basin and exists on a variety of substrates, often with detritus and aquatic vegetation (Jokinen 1983). In Connecticut, *S. catascopium* occurs only in calcium-rich lakes in the upper Housatonic Basin, and a morphologically distinct form also exists in the lower Connecticut River (Jokinen 1983). Data for *F. galbana* is scarce; it was not reported to occur in Connecticut (Jokinen 1983) or New York (Jokinen 1992). Burch and Jung (1992) describe its range as "*Great Lakes-St. Lawrence River basin northward in the region west of James Bay…northwestward into the boreal forest region to the vicinity of Great Slave Lake*." Based on this described range, and its morphological similarity to other species of *Fossaria* that are known to occur in Connecticut lakes, the validity of an *F. galbana* record from the Twin Lakes is



Valvata tricarinata (L) and *Stagnicola catascopium* (R) (Jokinen 1992).

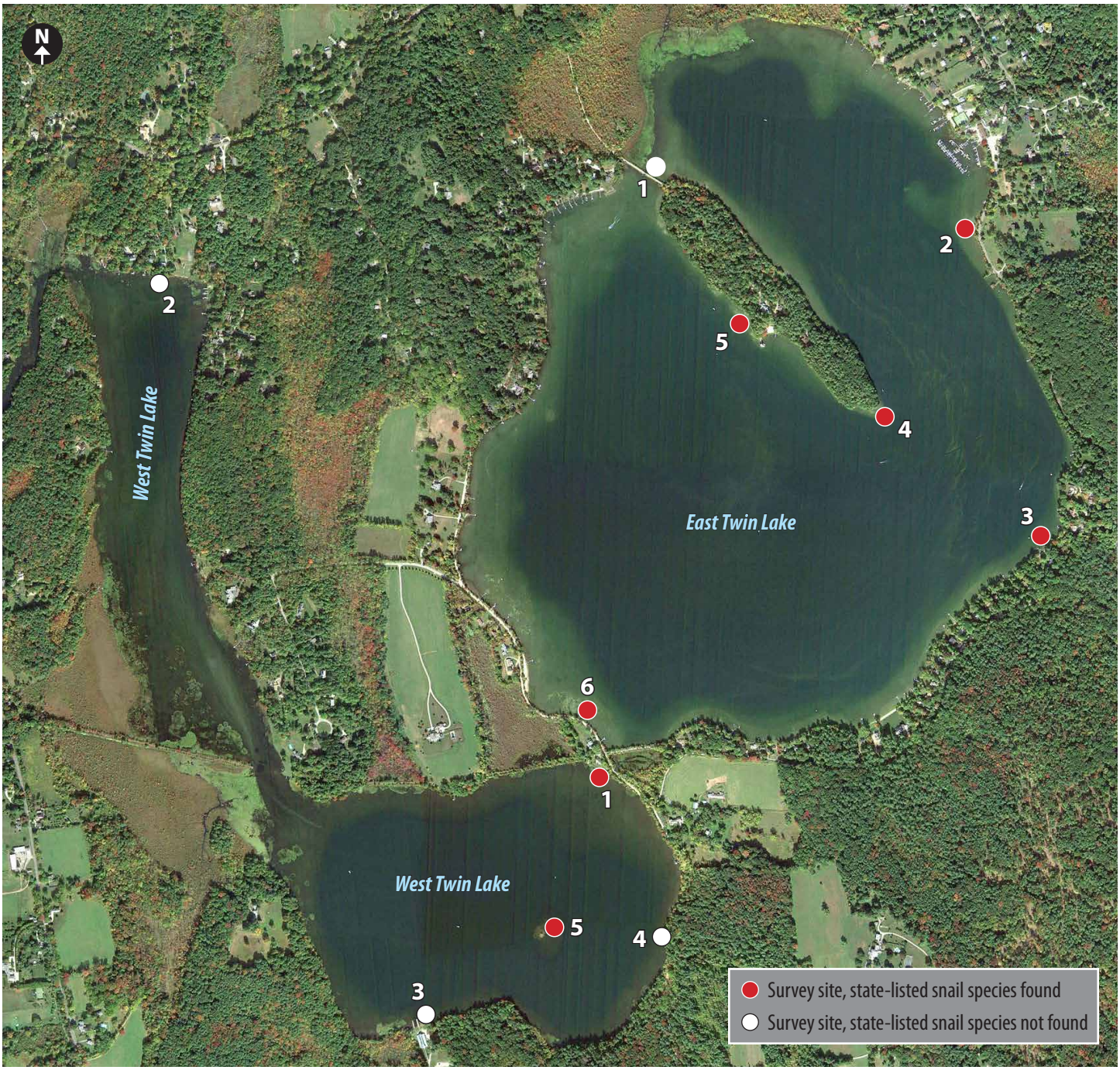


Figure 1. Snail and mussel survey sites in East and West Twin Lake (Salisbury, CT), showing locations where state-listed snail species were found in 2024.

questionable. Biodrawversity (2015, 2020) did not detect *F. galbana* in East or West Twin Lake.

METHODS

Two biologists completed the survey in two days: July 26-27, 2024. Snails and bivalves were surveyed in available aquatic habitats at 11 locations (6 in East Twin Lake, 5 in West Twin Lake; Figure 1, Table 1). Sites were selected to provide adequate spatial coverage and to capture the diversity of habitats present. Published habitat descriptions for the three target snail species were generally non-specific and therefore provided very little insight into where species might occur within each lake. Nearly all survey sites contained habitats that were suitable for one or more of the target species. Deep water below the thermocline, where chemical and physical conditions typically preclude snails and mussels, were excluded from the survey. Basic habitat parameters (water depth, substrate, and aquatic vegetation) and photographs were recorded

Table 1. Survey sites, dates, and methods.

Lake	Site	Survey Date	Survey Method		
			SCUBA	Snorkel	D-Net
East	1	7/26/2024		X	X
East	2	7/26/2024		X	X
East	3	7/26/2024		X	X
East	4	7/26/2024	X	X	X
East	5	7/26/2024	X	X	X
East	6	7/27/2024		X	X
West	1	7/27/2024		X	X
West	2	7/27/2024		X	X
West	3	7/27/2024		X	X
West	4	7/27/2024		X	X
West	5	7/27/2024	X	X	X

at each site (Table 2, Appendix 1). Sampling methods included a combination of aquatic D-nets, basket sieves, and hand-picking while snorkeling and SCUBA diving. Mussels and larger snails were identified to species and released unharmed. Representative snail samples were collected, preserved in alcohol, and identified under a dissecting microscope using keys of Jokinen (1983, 1992) and Burch and Jung (1992). Pea clams (*Pisidium* sp.) and fingernail clams (*Musculium* sp.) were also collected or documented, but only identified to genus.

RESULTS

Target Species: *V. tricarinata* was found at four of six sites in East Twin Lake, which is consistent with the 2015 and 2020 survey results (Table 3). In West Twin Lake, *V. tricarinata* was found only at Site 5 near the small island in the southern basin. Sites where *V. tricarinata* were found had diverse substrates (including coarse rock and ledge) and dense submergent vegetation (especially *Chara* sp.). *V. tricarinata* does not seem to have a strong affinity for any specific habitat parameter; it was found in a range of substrate types and often in the presence of vegetation and detritus. *S. catascopium* was uncommon; a few individuals were found at two sites in East Twin Lake (Sites 2 and 6) and two sites in West Twin Lake (Sites 1 and 5). Few *S. catascopium* were found at each site. Jokinen (1983) described its habitat as "buried in the sand"; we are not sure how accurate this description is and if it suggests that other substrates (e.g., mud, gravel, cobble, detritus, vegetation) are not suitable habitats. It seems to be uncommon and therefore difficult to detect in these lakes. As in 2015, we did not find any snails that match the illustrations or descriptions of *F. galbana* in Burch and Jung (1992).

Snail Community: Twelve snail species were found in East Twin Lake, which is three fewer than what was reported by Jokinen (1983) but one more than what was found in 2015 or 2020 (Table 3). Species richness ranged from 8 to 10 among all sites. Numerically dominant species included the non-native *Viviparus georgianus* and the native *Amnicola limosa*, and other common species included *Physa heterostropha*, *Campeloma decisum*, *Helisoma anceps*, *Helisoma campanulatum*, *Gyraulus parvus*, and *V. tricarinata*. As observed in previous years, shells of all snails were typically far more abundant than live snails.

Fourteen snail species were found in West Twin Lake, which is four more than what was reported by Jokinen (1983) and higher than the species total in 2015 or 2020. The non-native chinese mystery snail, *Cipangopaludina chinensis*, was found again in 2024, whereas it was not reported by Jokinen or found in 2015. Species richness ranged from 8 to 12 among sites. As in East Twin Lake, numerically dominant species included the non-native *Viviparus georgianus* and the native *Amnicola limosa*. Other common species included *Physa heterostropha*, *Campeloma decisum*, *Helisoma anceps*, and *Helisoma campanulatum*. As observed in previous years, shells of all snails were typically far more abundant than live snails.

Table 2. Habitat parameters recorded at each of the survey sites in East Twin Lake and West Twin Lake.

Lake	Site	Water Depth (ft)	Substrate*						Aquatic Vegetation
			Si	S	G	C	B	BR	
East	1	1.0 - 3.5	X	X					High coverage of submergent, floating, and emergent species
East	2	1.0 - 5.0	X	X	X	X	X	XX	*Chara* widespread and abundant, other submergent species common in deeper water
East	3	1.0 - 5.0	X	XX	X	X			*Chara* and other submergent species abundant in deeper areas.
East	4	1.0 - 12.0	X	X	X	X	XX	XX	*Chara* widespread and abundant, other submergent species common in deeper water
East	5	1.0 - 8.0		X	X	X	XX	XX	High coverage of *Chara* and other submergent species in deeper water.
East	6	1.0 - 6.0	X	XX	X	X			*Chara* common, isolated patches of pond lilies, some emergent species
West	1	1.0 - 3.0	X	X	X	X			*Chara* and other submergent species abundant in deeper water. Emergents common in shallows.
West	2	1.0 - 4.0	X	X	X			X	Submergent, floating, and emergent species common.
West	3	1.0 - 5.0	X	X	X				*Chara* and other submergent species abundant in deeper water
West	4	1.0 - 4.0	X	X	X				*Chara* and other submergent species common in deep water; emergent species common in shallows
West	5	1.0 - 10.0	X		X	X	XX	XX	*Chara* widespread and abundant, other submergent species common in deeper water

*Substrate abbreviations: Si = Silt, S = Sand, G = Gravel, C = Cobble, B = Boulder, BR = Bedrock

Table 2. Snail and bivalve species found in East and West Twin Lake in 2024, compared to Jokinen (1983) and the 2015 and 2020 surveys.

	East Twin Lake				2024 Survey Site						West Twin Lake				2024 Survey Site				
Species	**Jokinen**	**2015**	**2020**	**2024**	**1**	**2**	**3**	**4**	**5**	**6**	**Jokinen**	**2015**	**2020**	**2024**	**1**	**2**	**3**	**4**	**5**
Snails																			
Amnicola limosa	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Campeloma decisum	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Cipangopaludina chinensis	X			X	X		X						X	X	X	X		X	
Ferrissia parallela	X			X	X														
Fossaria modicella	X	X	X									X	X	X	X				X
Gyraulus deflectus	X										X	X							
Gyraulus parvus	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X
Helisoma anceps	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Helisoma campanulatum	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Physa ancillaria	X	X	X	X	X			X	X		X	X	X	X	X		X	X	X
Physa heterostropha	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Promenetus exacuous	X													X	X				
Pseudosuccinia columella											X	X		X	X				
Stagnicola catascopium	X	X	X	X		X				X		X	X	X	X				X
Valvata tricarinata	X	X	X	X		X	X	X	X		X	X	X	X					X
Viviparus georgianus	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X
Bivalves																			
Pyganodon cataracta			X	X			X	X		X		X	X	X	X	X	X	X	X
Elliptio complanata			X	X		X	X	X		X		X	X	X	X	X	X	X	X
Pisidium sp.			X	X	X	X	X	X	X	X			X	X	X	X	X	X	X
Musculium sp.			X	X	X									X		X			
Dreissena polymorpha		X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X
Number of Snail Species	15	11	11	12	10	9	9	9	9	8	10	13	12	14	12	8	8	9	11
Number of Bivalve Species	0	1	5	5	3	3	4	4	2	4	0	3	4	5	4	5	4	4	4

Bivalve Community: Two species of native mussels, *Pyganodon cataracta* and *Elliptio complanata*, were found in both East Twin Lake and West Twin Lake. Very few live native mussels were found in East Twin Lake, and both species were more numerous in West Twin Lake. Zebra mussels (*Dreissena polymorpha*) were found at every sampling site and were far more abundant in 2024 than they were in 2020 or 2015, especially in East Twin Lake where most hard surfaces were entirely covered with zebra mussels. Native mussels in East Twin Lake were heavily fouled with zebra mussels, but less so in West Twin Lake. Native *Pisidium* sp. were found at most survey sites in both lakes, and native *Musculium* sp. was found at one site in East Twin Lake and West Twin Lake. Neither bivalve was recorded in 2015, but we think they were undersampled.

DISCUSSION

East and West Twin Lake harbor two species of aquatic snails that are listed as Special Concern in Connecticut due to their highly restricted distributions in the state. Based on survey results and observed/documented habitat preferences of target snail species, *V. tricarinata* is widely distributed in shallow water (<10-15 ft) around the

Native mussel heavily fouled with zebra mussels in 2024.

Representative lake bottom photos (from the 2020 survey) in East Twin Lake.

perimeter of East Twin Lake. It was found less frequently in West Twin Lake. *S. catascopium* was also documented in East and West Twin Lake, but at much lower density and at fewer survey sites. Given the challenges of detecting rare species during short-term qualitative studies, we are not confident that these species are absent at the sites where they were not detected. Therefore, for the purposes of planning lake management activities, we suggest that both lakes be considered actual or potential habitat for *V. tricarinata* and *S. catascopium*. The presence of a third species, *F. galbana*, remains inconclusive and there is uncertainty about the validity of past records and the taxonomy of the species. CTDEEP considers it "believed extirpated" in Connecticut. Burch and Jung (1992) describe its range as "*Great Lakes-St. Lawrence River basin northward in the region west of James Bay…northwestward into the boreal forest region to the vicinity of Great Slave Lake*." It is not included in monographs on the snails of Connecticut (Jokinen 1983), or New York (Jokinen 1992), nor has it been documented in lakes of Massachusetts. Based on published descriptions of its range and other regional publications that do not include it, the historic presence of *F. galbana* in Connecticut is dubious.

The 2015-2024 surveys provide qualitative data on snail and bivalve species occurrence, relative abundance, and

habitat. Results have been fairly consistent among the three studies. Moving forward, we suggest that this type of biological monitoring (i.e., the 2015, 2020, and 2024 surveys) may provide an adequate snapshot of the snail and bivalve communities, and therefore should remain part of the long-term lake management plan for East and West Twin Lake. Repeating this survey every 4-5 years would probably be adequate for this purpose.

LITERATURE CITED

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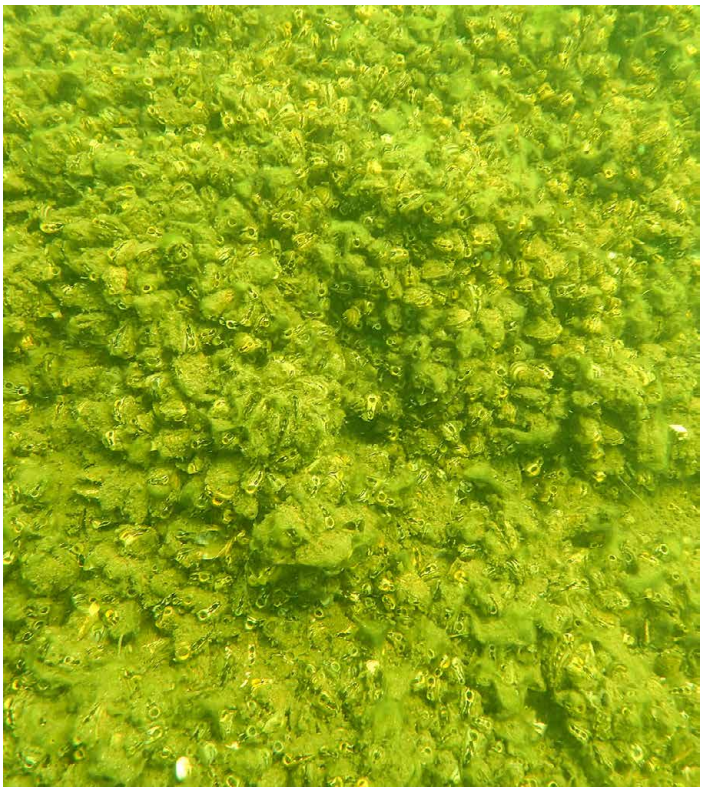


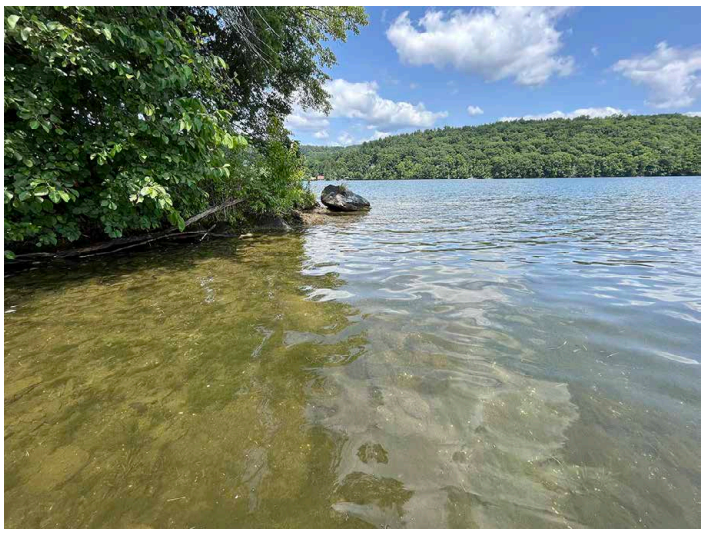
Bedrock heavily encrusted with zebra mussels in 2024.

APPENDIX 1: Survey Site Photographs

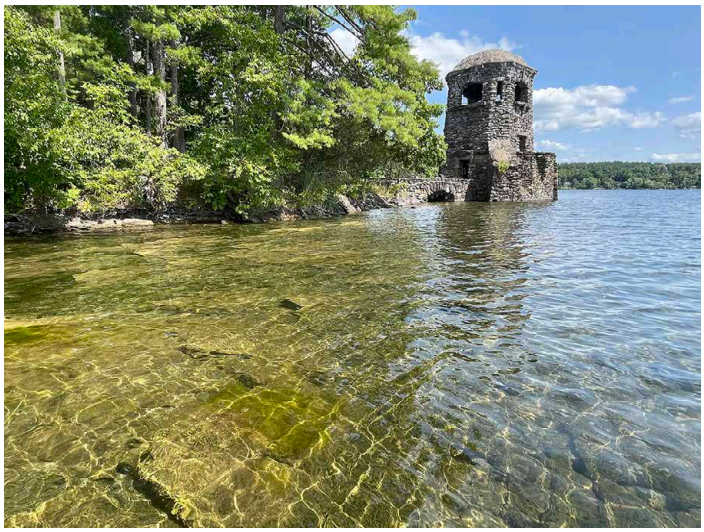
Site 1, East Twin Lake

Site 2, East Twin Lake

Site 3, East Twin Lake



Site 4, East Twin Lake



Site 5, East Twin Lake

Site 6, East Twin Lake

Site 1, West Twin Lake

Site 2, West Twin Lake

Site 3, West Twin Lake

Site 4, West Twin Lake

Site 5, West Twin Lake