

EASTERN CONNECTICUT CONSERVATION DISTRICT, INC.

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December 21, 2021

Preston Inland Wetlands and Watercourse Commission
389 Route 2
Preston, CT

RE: Inland Wetlands Application #2021-12, Blue Camp CT, LLC

Background information: Since 2003, Eastern Connecticut Conservation District has been working in partnership with CT DEEP to restore the anadromous fish migratory pathway for Alewife (*Alosa pseudoharengus*) from Long Island Sound to Amos Lake in Preston, CT. Historically, there was a substantial annual alewife migration to Amos Lake. This migratory route originates in the Atlantic Ocean, enters into Long Island Sound, proceeds up the Thames River and into Poquetanuck Cove. From Poquetanuck Cove, the fish swim up Poquetanuck Brook (aka Hewitt Brook) to a fishway installed by ECCD at Hallville Pond. This fishway was completed in 2013 with funding from multiple sources. In 2014, the Straight Pond Dam upstream of Hallville Pond was notched to further benefit the Alewife and allow access further up into the watershed. Currently, ECCD, again in partnership with CT DEEP, is finalizing the design plans for an additional fishway at a dam in Shewville Brook. This dam is the last major man-made obstacle for fish migrating to Amos Lake. Once the new fishway is installed at the Shewville Dam, the fish will be able continue their route to Avery Pond and Amos Lake via Indiantown Brook.

While some river herring lay their eggs in flowing river systems, Alewife lay their eggs in slow-moving water and ponds. Hallville Pond, Avery Pond and Amos Lake are all good breeding habitat for these fish.

Anticipating the construction of the fishway to allow Alewife to circumvent this final barrier to fish migration, DEEP fisheries biologists have been releasing pre-spawn Alewife in Amos Lake, Avery Pond and Hallville Pond. As the fish spawn in these lakes, their fry should chemically imprint on the chemical makeup of these ponds. The fish leave their habitat as juveniles and swim downstream to the Long Island Sound estuary from July to October, and then out to the Atlantic Ocean. Three to five years later, they will reach breeding age and journey back to where they were spawned to deposit their eggs.

Existing site conditions: Avery Pond is a natural pond that formed after the last period of glaciation. There is no human-built dams or flow control structures for artificially raising or lowering the water level in the pond. Indiantown Brook is the main outlet of the pond. It is located in the northeastern corner of the pond. There is a second pond outlet in the southwestern part of the pond that joins with Indiantown Brook further downstream, after crossing under Route 2. This outlet may only function seasonally or at other times when the lake water level is high. On December 10, 2021, I confirmed that this outlet is an intermittent stream originating at Avery Pond. I followed it from the pond to the Route 2 culvert along the western side and noted it continued under Route 2.

Resource Concern: ECCD would like to assure that any future development along the shore of Avery Pond or its outlets, Indiantown Brook and the unnamed stream channel draining from the southern end of the pond, will not impede or impact the efforts to restore the historic alewife fish migration route to Avery Pond, or the breeding habitat of Avery Pond.

Discussion: Alewife are anadromous fish that spawn in lentic (non-flowing) freshwater but live their adult life in the ocean. Alewife begin their upstream migration to freshwater from April – June. The adults return to the ocean shortly after spawning. The eggs hatch in lakes, ponds and other areas with low flow, and juveniles typically begin their migration to salt water in late summer to early fall. While in these freshwater habitats, the juvenile Alewife are an important food resource for other types of fish as well as birds and mammals.

The main food resource for juvenile alewife is various types of zooplankton. The juvenile alewife feed at night. Zooplankton practice diel vertical migration, which means they move up and down in the water column at different times of the day. During the day, zooplankton sink to where there is less light and return to the surface at night to feed. This makes them less vulnerable to predation.ⁱ Marianne V. Moore conducted a study and found that artificial light impacts the diel vertical migration of zooplankton, resulting in less zooplankton and reduced water quality because of the reduction of zooplankton feeding on algae at the surface at night.ⁱⁱ

The increased water temperatures from impervious surface runoff combined with a likely increase in nutrient enrichment from the developed campground could exacerbate cyanobacteria growth and tip Avery Pond toward hypereutrophic conditions. Water quality data from multiple sources show Avery Pond can become highly nutrient enriched in the summer. When the water quality data is compared to the Connecticut Water Quality Standards and Classifications, it indicates the pond ranges from mesotrophic range to eutrophic/hypereutrophic range. Hypereutrophic conditions and water temperatures above 25°C (77°F) favor cyanobacteria (formerly known as blue green algae) growth over other types of algae. Seasonal cyanobacteria blooms have been documented during the summer of 2020 and 2021 and samples were collected and sent to the US EPA as part of the Cyanobacteria Monitoring Collaborative. These samples are being analyzed for cyanotoxins that may be produced in a harmful quantity as a by-product of cellular metabolism by various types of cyanobacteria. Cyanotoxins can be harmful to humans and other mammals. Avery Pond was sampled for cyanotoxins by volunteers involved with The Last Green Valley water quality monitoring program in the summer of 2020 and 2021. Due to a Covid-19 lab closure, the results are still pending.

Recommendations:

Prevent further nutrient enrichment of Avery Pond: It will be important to assure that additional nutrient enrichment of Avery Pond does not occur as the result of any new development in its watershed. Stormwater management is the primary concern. Stormwater runoff from new development should be managed to minimize overland flow. If infiltration basins are utilized as a stormwater management practice, the soil must be properly perk tested to assure the basin can capture and infiltrate at least the first inch of runoff. Stormwater basins located close to or adjacent to wetlands may not drain. According to the 2004 CT Stormwater Quality Manual, the bottom of an infiltration facility should be located at least 3 feet above the seasonally high-water table or bedrock, and documented on site by lab permeability testing. Percolation testing used for septic

systems is not adequate.¹ Stormwater infiltration basins designed for the edge of wetland soils may not function in those locations.

Evaluate Soils for Plow Pan Soil Compaction: The project is proposed for land that was previously farmland. Rain gardens installed where land was previously tilled may not properly drain due to the development of a human induced plow pan layer where soil is compacted after being repeatedly plowed. A plow pan is a subsurface horizon or soil layer having a high bulk density and a lower total porosity than the soil directly above or below it from pressure applied by normal tillage operations, such as plows, discs, and other tillage implements. Proper percolation tests by a qualified soil scientist is recommended prior to constructing any infiltration feature.

Assess for existing tile drainage systems: A portion of the project area was formerly a farm field in an area surrounded by wetlands and the southern shore of Avery Pond. Often tile drainage systems were installed under agricultural fields to drain marginal lands more quickly and extend the growing season. There may be no records of this activity. If tile drains are present, their flow must be intercepted to prevent the direct conveyance of infiltrated stormwater into Avery Pond or the nearby wetlands. Detention ponds and rain gardens only function as pollution filters when the soil and soil microorganisms are in contact with the infiltrated stormwater. Conveyance through a tile system would short cut that contact and reduce the effectiveness of the rain gardens and detention basins as a water treatment method.

Protect and enhance riparian vegetation: CT DEEP in 1991 developed a policy statement recommending maintenance of riparian corridor widths for perennial streams (100 feet) and intermittent streams (50 feet). These recommendations were developed by DEEP's fisheries division. Riparian vegetation helps to stabilize soil, slow down runoff and uptake nutrients in stormwater runoff. ECCD supports this recommendation.

Artificial lighting and shielding: Shield the pond from light pollution that will impact the daily vertical migration of zooplankton. In addition to structural shields to block the artificial light from shining on the pond surface, to minimize the impact of any security lighting in the campground, we recommend maintaining a minimum 100-foot vegetated riparian buffer comprised of plant species native to Connecticut and made up of mature trees and understory shrubs to block light trespass onto the pond. The vegetated buffer will serve the dual purpose of filtering stormwater runoff from the developed area. This proposal as presented includes removal of the existing trees along parts of the shoreline within the 100-foot upland review area. ECCD recommends maintaining a 100-foot vegetated riparian buffer along Avery Pond.

Water withdrawal concerns: When contacted about potential environmental impacts from developing a campground on the shore of Avery Pond and Indiantown Brook, staff from CT DEEP fisheries expressed concerns over water withdrawals and use by the project. We already know that areas of the stream watershed are severely taxed by water withdrawals from existing uses. In 2020, water withdrawals "pumped the stream dry and prevented the emigration of juveniles [alewife] from late summer to well into the fall." If any additional surface or groundwater withdrawals from the stratified drift deposit associated with Avery Pond are planned, they must be carefully evaluated for conflicts with existing uses and with fish passage in late summer.

Water Quality: Avery Pond is not currently classified as an impaired water in the Connecticut Integrated Water Quality Report, last updated in 2020, but data is available indicating the pond

¹ From the 2004 Connecticut Stormwater Quality Manual, Chapter 11-P3-3.

can become hypereutrophic in summer and the pond has been documented to experience seasonal cyanobacteria blooms. These cyanobacteria blooms are being monitored by volunteers with The Last Green Valley Volunteer Water Quality Monitoring program and the information is being shared with CT DEEP and the US EPA. As part of the planned restoration of the fish migration pathway from the Atlantic Ocean to Avery Pond and Amos Lake, further degradation of water quality in Avery Pond needs to be avoided.

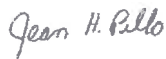
Additional information and/or useful links:

*CT DEEP Department of Environmental Protection, Inland Fisheries Division Policy Statement
Riparian Corridor Protection*

<https://portal.ct.gov/-/media/DEEP/fishing/restoration/RiparianPolicypdf.pdf>

I hope that the information included in this document will help guide the Preston IWWC with deciding whether this Bluewater Recreation Campground Resort at Avery Pond as designed will impact the wetlands and water resource of the Town of Preston, or if design changes are necessary to allow the development near Avery Pond while minimizing those impacts. If ECCD can be of any further assistance, or if any clarification is needed, please do not hesitate to contact me.

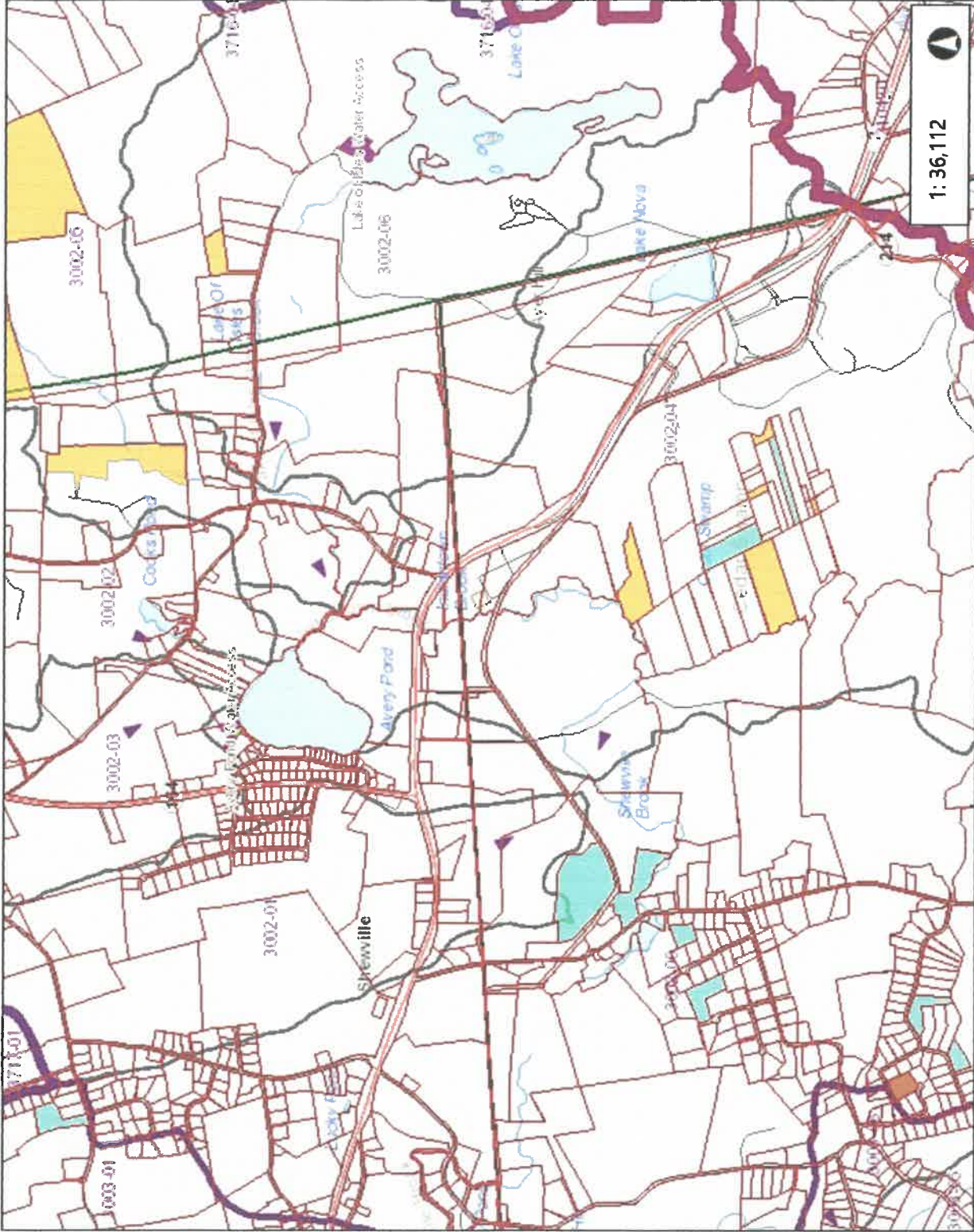
Sincerely,



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ⁱ What is vertical migration of zooplankton and why does it matter? October 28, 2021 by Allen Collins, NOAA Fisheries National Systematic Laboratory and Smithsonian National Museum of Natural History
<https://oceanexplorer.noaa.gov/facts/vertical-migration.html>

ⁱⁱ January 2001, Urban light pollution alters the diel vertical migration of Daphnia. Marianne V. Moore et al., Conference: Proceedings of the International Association of Theoretical and Applied Limnology Volume: 27



1: 36,112

Legend

Parcels for Protected Open Sp

DEEP Property

- State Forest
- State Park
- State Park Scenic Reserve
- State Park Trail
- Natural Area Preserve
- Historic Preserve
- Wildlife Area
- Wildlife Sanctuary
- DEP Owned Waterbody
- Water Access
- Flood Control
- Fish Hatchery
- Other

Protected Open Space Mapping

- Federal
- Land Trust
- Municipal
- Private
- State

Local Basin Boundary

- Major Basin
- Regional Basin
- Subregional Basin
- Local Basin

Notes

Watershed drainage outlines are shown by grey lines.

This map is intended for general planning, management, education, and research purposes only. Data shown on this map may not be complete or current. The data shown may have been compiled at different times and at different map scales, which may not match the scale at which the data is shown on this map.

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