

Volunteer Monitoring Program

2001

Water Quality Report

for:

River Section: (5) Catacunemaug Brook and Nonacoicus Brook

Description: Catacunemaug Brook starts above Lake Shirley and flows southeast toward its confluence with the Nashua River in Shirley. It flows through forested land and a large wetland for approximately one mile after leaving Lake Shirley. It then enters the village of Shirley where it flows through open land and residential areas starting approximately where it crosses the Shirley-Leominster Road. It is dammed in Shirley to form Phoenix Pond. There are two outlets from Phoenix Pond which converge again just upstream from the confluence with the Nashua River.

Nonacoicus Brook starts with Long Pond in Ayer which is surrounded by wooded hills. It flows west and south through a series of ponds whose shores are significantly developed and then into the town of Ayer where it forms Grove and Plow Shop Ponds. This area is a well-head protection area and therefore receives greater protection from sources of pollution. A park on the north side of Grove Pond and open areas to the south may have some impact on water quality, however. From Plow Shop Pond the brook passes under roads and rail road tracks before again entering a wooded area that extends to the mouth.

Site	Water Body, Town	Field Description of Site Location
CT01-01	Catacunemaug Brook, Shirley, MA	Upstream of mouth.
CT02-01	Catacunemaug Brook, Shirley, MA	Upstream of Phoenix Street bridge @ Sampson Pond.
CT03-01	Catacunemaug Brook, Shirley, MA	Behind Umbagog building in Shirley.
CT-04-01	Catacunemaug Brook, Shirley, MA	Downstream of bridge near dam.
NB01-01	Nonacoicus Brook, Ayer, MA	Upstream side of Jackson Rd. bridge near the mouth of the brook.

Assessment:

Biology

Coliform Bacteria - The fecal coliform geometric means for both Catacunemaug and Nonacoicus Brooks are below the Massachusetts standard of 200 colonies/100mls. However, there were spikes in fecal coliform in September (780, 860, 580 and 400 col./100mls. in CT-01, CT-02, CT-04 and NB-01, respectively) and in October (860 in CT-03). There was one sample too numerous to count (TNTC) from Nonacoicus Brook in August. (A "TNTC" reading is a laboratory result that happens when a sample has not been diluted sufficiently to allow accurate counts on the auger plate.) A half-inch of rain fell over the two days before the sampling day in September, which may have contributed coliform to the stream in the form of overland and street runoff. Due to financial and time constraints, the samples were not analyzed for E.coli.

Chemistry

pH - All sites in this section remained near neutral for the entire season (mean values ranging from 6.8 to 7.0 standard units).

Dissolved Oxygen - Quality Control Note: The accuracy for dissolved oxygen did not meet MaWWP standards for the months of May and June. See Executive Summary.

The seasonal means for the dissolved oxygen in Catacunemaug Brook meet the state standard for cold

water fisheries (at least 6.0 mg/l). Samples collected from the upstream reaches (CT-03-01 and CT-04-01) were at times quite low. Low flow probably accounts for these levels. The percent saturation nearly met coldwater fisheries standards except for the upstream location, CT-04.

Nonacoicus Brook had two events which were below the state standard for even warmwater fisheries, while the seasonal mean meets the state standard for warmwater fisheries. Saturation was poor at the Nonacoicus site as well, likely due to the low flow during the summer months.

Alkalinity - The alkalinity concentrations, as mg/l CaCO₃, are at healthy levels for all the sites, indicating the streams are well-buffered.

Physical

Temperature - The mean of the temperatures taken in both Catecunemaug and Nonacoicus Brook indicates they both support cold water fisheries. However, temperatures during the summer months did exceed the cold water fisheries standard. The levels were within the standard for warm water fisheries.

Standards Compliance:

Data from each site within the section are compared with Massachusetts **class B** water quality standards. For each parameter the geometric mean of seasonal results is used.

Site	Dissolved Oxygen*	Fecal Coliform	pH	Temperature
CT-01-01	Yes	Yes	Yes	Yes
CT-02-01	Yes	Yes	Yes	Yes
CT-03-01	Yes	Yes	Yes	Yes
CT-04-01	Yes	Yes	Yes	Yes
NB-01-01	No	Yes	Yes	Yes

(note: Yes = supports uses outlined; No = does not support uses outlined)

*Compared to warm water fisheries standards.

Summary: Catecunemaug Brook continues to be a relatively clean brook and maintains quality habitat for much of its length. Impoundments such as Lake Shirley and Phoenix Pond can effect water quality, but seem to show no major negative influences. Nonacoicus Brook drains a primarily urbanized watershed and is impounded in several places, some of which have compromised water quality. In the downstream section nearest our sampling site it flows through wetlands and is generally low gradient stream. Water quality at this site is consistent with the stream characteristics.

Recommended Actions:

- ◆ Maintain monitoring sites on Catecunemaug and Nonacoicus Brooks.
- ◆ Monitor flow at the Nonacoicus site.