

Volunteer Monitoring Program

2001

Water Quality Report

for:

River Section: (3) Unket Brook and James Brook

Description: Much of Unkety Brook flows through significant wetlands and is therefore often slow moving and exposed to direct sunlight. Some new neighborhood development on adjacent uplands may influence the water quality in the brook. Lacking dramatic relief in its bed, the stream has generally moderate flow. The brook flows through more shaded woodlands where riffles are present before it finally meets the Nashua River in Dunstable. James Brook watershed remains mostly forest and open spaces. Starting in Groton, the brook flows through old fields and agricultural areas. It parallels Old Ayer Rd. for about a mile before heading west toward and through a residential area. After crossing under Rte. 111 in Ayer it flows through field and forest to its confluence with the Nashua River at the Ayer State Game Area.

Site	Water Body, Town	Field Description of Site Location
UK01	Unkety Brook, Dunstable, MA	Upstream side of River St. bridge. Gravel pit nearby.
UK02	Unkety Brook, Dunstable, MA	Upstream side of Rte. 113 bridge.
JB01	James Brook, Ayer, MA	Upstream at Rte 111 bridge. Pump house on river left

Assessment:

Biology

Coliform Bacteria - One sample collected from Unkety Brook (UK02-01), collected in September, exceeded the state standard of 200 colonies/100 ml sample (705 colonies/100 mls). The spike in September may be due to rainfall events totaling 0.5 inches in the two days preceding the sampling day.

Three samples collected from James Brook, collected in June, August and September, had fecal coliform results of 256, 760, and 680 colonies/100 ml, respectively. The precision for the duplicate field sample collected in August, however, was 220 colonies/ 100 ml. Although this result is still above the state standard, the 760 level is thrown into question because the precision requirement was not met. The geometric mean for the samples also is below the state accepted standard of 200 colonies/100 ml, when the "not detected" results are also figured into the mean.

The source of the fecal coliform levels in James Brook are not obvious, but beaver activity has been noted in the past.

Chemistry

pH and Alkalinity - Both Unkety and James Brooks had pH levels consistent with past years' observations. All levels fall within the state standards. James Brook is very well buffered with high alkalinity (as CaCO₃) levels. Alkalinity levels along Unkety Brook are lower, as are the pH levels. Neither indicate the brook is in danger of acidification.

Dissolved Oxygen - James Brook maintained D.O. saturation levels above the state standard for warmwater fisheries (60 percent saturation), with the exception of the months of June and July. The brook was not sampled in April and May. In July the D.O. level was slightly below the warm water fisheries standard, at 54.8%.

The mean dissolved oxygen levels in the Unkety Brook samples collected at UK01-01 (farthest downstream, River Street bridge) just met the state standard of 5.0 mg/l, even though D.O. the summer months did not meet state standards for warmwater fisheries. The mean saturation levels (49.8%), however, did not meet the state standard of 60%. Samples collected at UK02-01 (Route 113) demonstrated low D.O. levels for all months sampled except April and October. The low D.O. levels are probably due to low flow.

Physical

Temperature - Temperatures in James Brook were at or below the state standard for cold water fisheries (20°C). Water in Unkety exceeds 20°C during the summer months thereby making it habitat for warm water fishes and associated organisms.

Standards Compliance:

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

Site	Dissolved Oxygen	Fecal Coliform	pH	Temperature
UK01	No	Yes	Yes	Yes
UK02	No	Yes	Yes	Yes
JB01	Yes	Yes	Yes.	Yes

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

Summary: The sites sampled on Unkety Brook are both in areas where the water is slowed by large wetlands. Dissolved oxygen at each site is low and sometimes too low to support fish. Despite a fecal coliform spike in the upstream Unkety sample (UK-02-1) in September, the geometric mean for the samples was under the standard of 200 col/100ml.

The fecal coliform results from James Brook are higher than experienced in past years, though the geometric mean is below the standard of 200 col/100mls. Otherwise, water quality in James Brook is good and has been shown to support native trout in past years.

Recommended Actions:

- ◆ Continue monitoring current sites on Unkety Brook and/or perhaps look for a sites in a more shaded and riffled area downstream from the current sites.
- ◆ Try to determine the fecal coliform sources in James Brook. Perform at least one E.Coli sample to determine if the bacteria is from a human source.