



State of Ohio Environmental Protection Agency

Northeast District Office

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George V. Voinovich
Governor

Mr. Newt Bakley
P.O. Box 437
Roaming Shores, Ohio 44084-0437

May 23, 1996

Dear Newt,

I have enclosed a copy of the data collected from Rome Rock Lake by Ohio EPA in 1995. First, let me extend my appreciation to you for providing use of your boat and time to collect these data. I enjoyed our discussions about Rome Rock and lakes in general.

We collected lake water samples three times in 1995: 05/23/95; 08/01/95; 08/24/95. Both top and bottom samples were collected at the "deep hole" area near the dam. We call this station L-1. We also collected data at one meter intervals for dissolved oxygen, temperature, and conductivity.

The water chemistry data showed that Rome Rock forms a summer thermocline between 3-4 meters in early August and at 2-3 meters in late August. No dissolved oxygen is present in the water below this thermocline. This type of situation is very common in run of river reservoirs in Ohio. Good levels of dissolved oxygen, well about Ohio EPA WWH standards of 5-4 mg/l, were present above the thermocline. Obviously, the fishery of this lake during the summer is limited to the upper 3 meters of water (about 10 feet), most likely near the shore where cover and food would be most abundant. The water temperature in the summer bottom samples was at 10-11C (about 50-52 F), which would support a cold water fishery, but this potential use is limited by the lack of oxygen. Thus one possible fish management option, if the Association would like to start a cold water fishery, is to add oxygen into the bottom waters via some sort of aeration system. The costs and benefits would have to be investigated to determine the feasibility of this. I see no need to add oxygen into the surface water at this time.

The data also show that iron, manganese, ammonia-N, and total phosphorus were being released into the water from the anoxic lake sediments during the summer. From the dissolved oxygen profile data, this release would occur throughout the lake at depths greater than 3-4 meters. Iron and manganese can cause taste problems in public drinking water, a current, but not future use of Rome Rock lake water.

I have attached a summary of "trophic state" data (i.e. TP, chlorophyll-a, Secchi disk) that we have in our 305(b) report. Using the average of summer chlorophyll and spring phosphorus Carlson TSI numbers, Rome Rock received a final trophic state TSI of 56, which is in the "eutrophic" range (OEPA defines the eutrophic TSI range from 48 to 66 Carlson TSI using spring TP and summer chlorophyll measurements). These data indicate that Rome Rock lake is nutrient enriched, as are many reservoirs in Ohio. This nutrient enrichment would be one cause



of the loss of oxygen in the bottom waters in summer. From talks with you it does not appear that this enrichment has had any significant effect on the fishery of the lake. The 1994 fish community survey conducted by Robert Jones of Jones Fish Hatcheries and Distributors Inc. found that the lake "has an excellent sport fishery", however, they did find a deficiency in fish prey for predatory fish in the 10-14 " range. They recommended stocking of Gizzard Shad and Shiner Minnows to help increase the population of baitfish for your Bass populations.

In looking at the Secchi disk data from 1991 to 1995 I see very little deviation over time, with a slight peak during 1993. More long term data should be collected to see if this relatively stable trend in water clarity continues.

Dr. Robert Carlson, Professor of Limnology at Kent State University, has developed a graphic method that looks at the differences in TSI values to help in the determination of what factors limit algae biomass in lakes. I have attached a plot of our 1995 data for Rome Rock lake. The data, although limited in sample size, indicate a very interesting trend of both phosphorus and silt-clay limitation of algal biomass in summer, and silt-clay limitation in spring. The graph also indicates that blue-green algae are predicted to be the dominant summer algae type.

The graph thus suggests that the "trophic state" of Rome Rock is effected not only by nutrient enrichment, leading to blue green algae, but also by small silt-clay particles or brown colored organic molecules. The "color" of the water using the CLIP color scale was at 9 during the spring sample, a very brown color.

Evidence of blue-green algae dominance (by number of cells) in the summer comes from the attached phytoplankton analysis that was conducted by Paul Anderson, a biologist here at our district office. Blue-green algae represented 94 to 99 % of the total number of net phytoplankton species found in the lake water, with dominance by *Aphanizomenon flos-aquae*. According to Mr. Anderson, the presence of this species, along with other blue-green species, is not uncommon in eutrophic lakes. Mr. Anderson also wanted me to inform you that he is working on "biomass" determinations of the various species for Rome Rock. Blue-green algae may or may not be dominant in the lake in terms of total biomass--we will have to wait for the data. When these biomass data are available we will send them to you. You can call Mr. Anderson at (216) 963-1228 if you wish to discuss the algae situation in Roaming Rock Lake in more detail.

A sample of the bottom sediment at site L-1 showed normal levels of heavy metals with no detectable PCBs and pesticides using US EPA method 8080. This method does not test for the presence of currently used agricultural pesticides. Please note that the total level of phosphorus in the sediment is high 1930 mg/kg--this indicates that a large pool of phosphorus is available to be released from the anoxic sediments in the summer. This pool of internal phosphorus is obviously one potential cause of the "eutrophic" condition of the lake water.

Finally, the Ohio EPA has developed a multi-parameter lake condition index (the Ohio LCI) that we use to assess the overall ecosystem health of the lake. The assessment includes both monitored and questionnaire data for 14 different parameters. The LCI summary for Roaming Rock Lake is shown below:

Roaming Rock Lake, Ashtabula County. Ohio Lake Condition Index assessment.

Parameter	LCI Condition	Status
Secchi Disk Depth	fu(m)	Good
Overall Fishery	fu(bpj)	Good-Excellent
Macrophytes	fu(bpj)	Good
Aesthetics	fu(m)	Good
Non-priority pollutants	t(m)	Fair (low bottom water oxygen, high Fe, Mn)
Organic Pollutants	ne	Unknown in Water
Heavy metals	t(m)	Hg, Cu in Surface water
Production (algae)	t-e(m)	Fair, Eutrophic
Nutrients (TP)	t-e(m)	Fair, Eutrophic
Fish Tissue Contamination	ne	Unknown
Sediment Contamination	fu(m)	Good
Bacteria(fecal coliform)	fu(m)	Good
Acid Mine Drainage	fu(m)	Good
Volume Loss over Time	fu(m)	Good

fu = full use; t = threatened; m= monitored data; bpj = best professional judgement
e = eutrophic; ne = no data-not evaluated.

From the above multi-parameter analysis, the good and fair conditions of the lake can be identified. The low level presence of the heavy metals Hg and Cu does not indicate that toxic conditions exist, only that they were detected at levels near chronic water quality standards. Much more intensive sampling would be required to determine chronic levels. As already mentioned, the data indicate that the lake is "eutrophic", but whether or not this is "good" or "bad" depends on how you plan to use the lake. Since the lake will, in the near future, no longer be used as a source of public drinking water, the fact that the lake aesthetics and fishery are both rated as good indicates that the "eutrophic" conditions are not, at this time, causing any loss of potential recreational use. Because this can change over time, I would recommend that you continue to monitor the fishery and aesthetics at regular intervals.

I hope you find this information to be useful. Please give me a call at (216) 963-1132 if you have any questions.

Sincerely,

A handwritten signature in blue ink, appearing to read "Robert D. Davic". The signature is fluid and cursive, with the first name "Robert" and last name "Davic" clearly distinguishable.

Robert D. Davic, Ph.D.
Environmental Scientist
Division of Surface Water

cc: Diane Conyers-Rizzo, ACRT
Paul Anderson, Ohio EPA, NEDO