

• Loch, D.D., J.L. West, and D.G. Perlmutter. 1996. "The effect of trout farm effluent on the taxa richness of benthic macroinvertebrates." *Aquaculture* 147: 37–55. These authors studied three large trout flow-through facilities in North Carolina. Their data " * * * indicate that trout farm effluent has a definite effect on stream insect communities, suggesting that water quality is reduced just below their outfalls, and to a lesser extent, 1.5 km further downstream. We were able to demonstrate quite clearly that taxa richness was significantly lower just below the outfalls compared to the control, and that although richness did increase further downstream, the recovery was not complete." The authors noted that impacts were seasonal, and that water quality and taxa richness improved during the winter. The authors also noted that sewage fungus (which they defined as a community of organisms that consist mainly of bacteria and ciliated protozoans and is the product of concentrated organic matter) "was present in great abundance at Site 2 of each trout farm" (DCN 61497).

• The Virginia Water Resources Research Center. *Benthic TMDL Reports for Six Impaired Stream Segments in the Potomac-Shenandoah and James River Basins*, Submitted by the Virginia Department of Environmental Quality, (Richmond, VA: Virginia Department of Conservation and Recreation, 2002), 207 pp. This document reports on a Total Maximum Daily Load (TMDL) calculation performed for six impaired stream segments in Virginia (see Section III.E. of today's notice). The report states that aquaculture effluents were confirmed as the primary source of the organic solids that impaired these short segments (0.02 to 0.8 miles), constituting from 86 percent to 99 percent of the organic solids loading in these largely first-order, spring-fed streams (DCN 40571). You can find this document on the Internet at <http://www.deq.state.va.us/tmdl/apptmdls/shenrvr/trout.pdf>.

• Memoranda, correspondence, and discussion with staff of the South Central Region of the Pennsylvania Department of Environmental Protection (PA DEP) regarding reports of environmental impacts at several CAAP facilities (200,000 to 400,000 lbs annual production) in Pennsylvania. PA DEP provided data and reports documenting adverse impacts of hatchery effluents in receiving spring-fed streams. The materials described observations and/or concerns including those about discharges of carbonaceous BOD and TSS and other pollutants, and results of

aquatic biological surveys showing adverse impacts in hatchery receiving waters. While recognizing unique characteristics of these hatcheries (all located on limestone spring creeks and all capture most, if not all, of the streamflow) and seasonality of these impacts, staff biologists were concerned about adverse environmental impacts observed at several sites (DCNS 40596, 40597, 40598, 40599, 40600, 40601, 40602, 40603, 40604, 40605, 40606).

F. Holding Time Study

EPA took samples at aquatic animal facilities for a holding time study. The holding time study consisted of analyzing samples at different time intervals prior to analysis (i.e., holding times) to determine whether varying holding times for the samples yielded comparable results to samples analyzed within the required time specified in the analytical method. EPA conducted the holding time study (1) to evaluate the data collected during sampling episodes at aquatic animal facilities and (2) for possible revisions to current holding time requirements. We assessed changes in target bacterial (total coliforms, fecal coliforms, *Escherichia coli*, *Aeromonas*, fecal streptococcus, and *Enterococcus*) concentrations over time (between 8 and 48 hours holding time) in wastewater samples.

When EPA designed the holding time study, we considered a range of model technologies for treating CAAP effluents, including some that would provide reductions in bacterial concentrations. EPA found the costs associated with using disinfection technologies at CAAP facilities to treat effluents are economically burdensome to the industry. The disinfection cost assessment is described in the preamble to the proposal (67 FR 57872, September 12, 2002). Because of the cost, EPA did not include technologies that reduce bacterial concentrations (such as disinfection) in the technology basis for the proposed rule. The TSS removal technologies we considered at proposal are not designed to reduce bacterial concentrations in effluents. Therefore, the original purposes for the study are no longer relevant for this rulemaking. However, study results may be useful for facilities, permit writers, and others. For this reason, this NODA summarizes the results and DCN 62398 in Section 6.20 of the rule-making record provides the complete results.

In summary, EPA conducted the study to evaluate sample concentrations at 8, 24, 30, and 48 hours after sample collection. Table II in 40 CFR part 136 specifies a maximum holding time of six hours for fecal coliforms, total

coliforms, and fecal streptococci tests used for compliance with NPDES regulations. As a matter of practicality, EPA generally considers eight hours acceptable because the analytical laboratories require some sample preparation time before a sample can be processed. In addition, Section 9060B (Preservation and Storage) of *Standard Methods*, 20th Edition, recommends that nonpotable water samples be held below 10°C for a maximum of 6 hours transport plus 2 hours to begin analysis for bacterial analyses performed for compliance purposes.

As holding times increase, we expect that bacteria concentrations will change. Many CAAP facilities are remotely located and would have difficulty meeting the required 6 hour transport time to a laboratory. In conducting the study, EPA hoped to gain insight into the length of time that would still give comparable results to samples held for eight hours.

The study results for *Aeromonas* and fecal coliforms indicate that holding times over 8 hours did not provide comparable results to results at 8 hour holding times. For total coliforms, *E. coli*, fecal streptococcus, and *Enterococcus* holding times of 30 hours or less provided results comparable to results at 8 hour holding times.

III. Summary of Comments and EPA's Preliminary Assessment

In these sections, we discuss some of the major comments received on the proposed rule and EPA's current thinking on the issues.

A. Representativeness of EPA's Sampling Database

During the comment period and at the public meetings on the proposal, commenters raised concerns over the representativeness of the sampling and DMR data (EPA's sampling database) used to evaluate options and determine limits.

Some of the commenters were concerned about the lack of representation of green water systems that produce warm water species, which they claim have very different water characteristics, especially regarding the effluent concentrations of TSS. Commenters were concerned about the ability of both green water and warm water types of production systems to be able to comply with the proposed limitations for TSS. With assistance from industry representatives and detailed survey responses, EPA identified and visited six warm water or green water production facilities. To assess these concerns, EPA obtained and examined DMR data for two of the six