

METHODS USED TO DETERMINE IF MINE SITE ARE SUITABLE FOR AQUACULTURE.¹

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Abstract: There are a number of critical characteristics needed for a mine site to be developed for the commercial production of fish. These characteristics include physical and chemical attributes, as well as a history of water flows during all seasons of the year. In many cases state agencies have already collected years of discharge data in order to be in compliance with the mining permit.

The “economy of size” principle is an economic principle that was used to limit the number of mine sites being investigated. Only mine discharges with larger flows (1000 gpm) were chosen to be visited and sampled for water analysis. The physical attributes of each site that were noted during the visit included: area, slope, vegetation, security issues, distance to paved roads and electrical lines, distance to markets and processing plant, and identifying the receiving stream. Sampling included measuring the flow with a flow meter, and analyzing the water for pH, Ca, Mg, Mn, Fe, Al, ammonia, alkalinity, hardness, CO₂ and sulfates.

Photos were usually taken and the lab results from the water samples were used to determine if there were any serious health threats. Local people were found to be valuable in remembering how droughts affected the flow of the site. If at this point there were no obvious obstacles to fish health an effort was made to get permission to conduct a simple bioassay with a marketable species of fish, usually trout.

Based on the infrastructure of the site the method of conducting a bioassay was chosen. Where ponds were present, cages were chosen to house the fish. In one case where CO₂ was an issue, a trickling filter was used to remove CO₂ and an untreated tank was employed as a control. Failures were often associated with fish in cages located in polishing ponds directly downstream from acid mine discharge treatment plants. Electronic monitoring devices (sondes) collected water quality data from the remote sites and uploaded to computers. When fish died, the monitors were useful in determining if pH or dissolved oxygen was responsible for the deaths. Security at the research sites continues to be a challenge, especially when the fish are larger.

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