An Asiatic clam surveillance program has been carried out on a weekly to monthly basis at Duquesne Light Company's Beaver Valley Power Station, Pennsylvania, from 1985 through 1989. Parameters evaluated included the rate of clam invasion, growth and spawning potential of populations subjected to natural river temperatures at the intake bays versus those in the elevated temperatures of the cooling towers. Growth rates were determined for adults placed in cages and measured for growth increments monthly and for larvae that invaded empty cages. The weekly traveling screen surveys have shown a trend of increasing numbers of *Corbicula* collected, thus reflecting the general increase in the river population. Clam densities checked during scheduled outages for both cooling towers have also increased during the survey period. In the maximum growing season of May to October, larval clams grew to adult size (25.50mm) in the intake bays. Adults released larvae during two distinct seasons in the intake bays while those placed in the cooling towers spawned initially within the first month and had a prolonged release in the latter summer-early fall season.

34.2 STATUS OF A RELOCATED MUSSEL BED IN THE OHIO RIVER: A TWO YEAR REVIEW

Dunn, Heidi L. (Environmental Science and Engineering, Inc., 11665 Lilburn Park Road, St. Louis, MO 63146)

Over 5,000 mussels were tagged, measured, weighed, and relocated from a fleeting area near Cincinnati, Ohio to a known area near Ripley, Ohio. The relocation and monitoring effort was funded by the Mussel Mitigation Trust Fund set up by AEPSC. Preliminary results of the first annual monitoring effort were presented at last year's Ohio River symposium. A second monitoring effort was completed in 1989. Many of the trends identified in 1988 were verified in 1989. Survival (and recovery) was variable throughout the transect with substrate being the primary influence. Most species, with the exception of *Truncilla trundata* and *Quadrula quadrula*, exhibited high survival. Growth was apparent in 11 of the 19 species collected. *Cyclonaias tuberculata* and *Fusconaia flava* were the most active species. Some changes in substrate and mussel population, apparently due to high spring and summer discharge, were evident in 1989.

34.3 A QUANTITATIVE SURVEY OF A MUSSEL BED AT OHIO RIVER MILE/444.4-445.6

Miller, Andrew C., Albert J. Burky and Barry S. Payne (US Army Engineer Waterways Experiment Station, Vicksburg, MS 39180-6199)

Qualitative and quantitative data were obtained at six and two sites, respectively, at a mussel bed on the Ohio River (RM 444.4-445.6) on 21-24 July 1989. The purpose was to collect baseline information on freshwater mussels (Family *Unionidae*) to assess the effects of coal deliveries by barge at the Zimmer Power Plant, located immediately upriver. Total species richness (24) was similar to that at other large-river mussel beds. Average unionid density (±SD) at two sites (45.9±14.8 and 36.7±20.4 individuals/m^2) was slightly less than typical values at similar habitats. The unionid fauna consisted almost entirely of thick-shelled species and was dominated by *Pleurobema cordatum* (20.9%), *Quadrula metanevra* (18.4%), and *Q. pustulosa* (15.7%). The assemblage was characterized by an equitable distribution of species (evenness equal to 0.76 and 0.80) with no clear dominants. *Corbicula fluminea* (1227.7±274.2 and 915.2±155,5) outnumbered unionids, although there was no evidence of competition (either in terms of density or biomass) between native and non-native bivalves. Populations of dominant unionids consisted of large numbers of intermediate-sized animals and moderate to low numbers of juveniles and adults. All had multiple age classes and showed evidence of moderately strong recruitment by several recent year classes.

34.4 ANNUAL VARIATION IN RECRUITMENT OF MUSSELS IN THE LOWER OHIO AND TENNESSEE RIVERS

Payne, Barry S. and Andrew C. Miller (Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station, 3909 Halls Ferry Road, Vicksburg, MS 39180-6199)

Demographically complete sampling of historically prominent mussel beds in the lower Ohio and lower Tennessee rivers revealed two distinctive recruitment patterns for dominant species. In the lower Ohio River, a single year class (1981) comprised approximately 70% of the *Fusconaia ebena* population from 1983-1987; recruitment of subsequent year classes has not been strong and mortality of the dominant 1981 cohort has been negligible. Conversely, several recent year classes were abundant in 1986 samples of a lower Tennessee River population of *F. ebena*; analysis of the size demography of this population revealed strong recruitment in 1982, 1983, and 1984 and moderate recruitment from 1978-1981 and in 1985. Population sample sizes were sufficiently large for detailed analysis of two other species in the lower Tennessee River, *Amblema plicata* and *Quadrula pustulosa*. Both species showed moderate-to-strong recruitment of several recent year classes, although interspecific differences were apparent in the relative abundance of particular year classes. Although species richness, relative abundance, and density were similar at these two beds, recruitment patterns of dominant species were different. An understanding of recruitment at these beds is necessary to prevent overharvesting by commercial shellers and excessive damage by other manmade disturbances.

34.5 ADULT AQUATIC INSECTS OF RESERVOIR OUTFLOWS IN THE UPPER OHIO RIVER DRAINAGE BASIN

Sykora, Jan L. (Graduate School of Public Health, University of Pittsburgh, Pittsburgh, PA 15261), J. Michael Fowles (U.S. Army Corps of Engineers, Loyalhanna Lake RD2, Box 131, Saltsburg, PA 15681-9302), Michael Koryak, (US Army Corps of Engineers, Williams S. Moorehead Federal Bldg., 1000 Liberty Ave., Pittsburgh, PA 15222) and Patrick D. Gavaghan (Graduate School of Public Health, University of Pittsburgh, Pittsburgh, PA 15261)

Light-trap samples were collected in monthly intervals at outflows from thirteen reservoirs operated by the U.S. Army Corps of Engineers in the upper Ohio River Drainage Basin of Western Pennsylvania, Northeastern Ohio and Northern West Virginia. Twelve families of caddisflies (order *Trichoptera*) represented by 95 species were identified. Twelve species were recorded for the first time from Pennsylvania, two possibly from Ohio and seven from West Virginia. One species, *Cheumatopsyche sp.*, is probably new to science. Mayflies (order *Ephemeroptera*) were represented by fourteen taxa while flies (order *Diptera*) included a variety of craneflies, blackflies and midges.

34.6 TAILRACE FISHERIES OF RESERVOIRS IN THE UPPER OHIO RIVER DRAINAGE BASIN

Hoskin, Robert and Michael Koryak (U.S. Army Corps of Engineers, Pittsburgh District, 1000 Liberty Avenue, Pittsburgh, PA 15222)

Spring and autumn electrofishing surveys were conducted in the tailwaters of twelve Corps of Engineers' reservoirs in the upper Ohio River Drainage of Western Pennsylvania and Northeast Ohio. Quantitative and qualitative differences were apparent between the tailrace fisheries of projects located in the glaciated and unglaciated portions of the Appalachian Plateau. Some species of fish with a more Mid-Western distribution were typically present in the glaciated region that were totally absent from the unglaciated area, and cold water outflow temperature regimes had different species than cool or warm water tailraces. Otherwise, most of the variation appeared to be related to the water quality of the upstream impoundments. Reservoirs in the glaciated plateau had higher nutrient concentrations and plank-